

Submittal / Substitution Request



SUBMITTED TO:

To: _____

Firm: _____

Project: _____

Submitted Product: **SIMPSON STRONG-TIE® ET EPOXY-TIE® ANCHORING ADHESIVE**

Specified Product: _____

Section: _____ Page: _____ Detail/Sheet No.: _____

Description of Application: _____

Attached information includes product description, installation instructions and pertinent technical data needed for evaluation of the submittal request.

SUBMITTED BY:

Name: _____ Signature: _____

Firm: _____

Address: _____

Phone: _____ Fax: _____

E-Mail: _____

Date of Submittal: _____

FOR ARCHITECT/ENGINEER USE:

Approved: _____ Approved As Noted: _____ Not Approved: _____

(Please briefly explain why not approved)

By: _____ Date: _____

Remarks: _____



Table of Contents

Simpson Strong-Tie® ET Epoxy-Tie® Technical Information

ICC-ES ER-4945

ET Epoxy-Tie® Material Safety Data Sheet

ET Epoxy-Tie® Anchoring Adhesive

ET Epoxy-Tie® is a two-component, high solids, epoxy-based system for use as a high-strength, non-shrink anchor grouting material. Resin and hardener are dispensed and mixed simultaneously through the mixing nozzle. ET meets the ASTM C-881 specifications for Type I, II, IV and V, Grade 3, Classes B and C, except gel time.

- USES:**
- Threaded rod anchoring
 - Rebar doweling
 - Bonding hardened concrete to hardened concrete
 - Pick-proof sealant around doors, windows and fixtures
 - Paste-over for crack injection

CODES: ICC-ES ER-4945 (URM); City of L.A. RR25185, RR25120; Florida FL 11506.2; Multiple DOT Listings.  The load tables list values based upon results from the most recent testing and may not reflect those in current code reports. Where code jurisdictions apply, consult the current reports for applicable load values.

APPLICATION: Surfaces to receive epoxy must be clean. For installations in or through standing water, see page 15 for details. The base material temperature must be 40°F or above at the time of installation. For best results, material should be 70°F - 80°F at the time of application. Cartridges should not be immersed in water to facilitate warming. To warm cold material, the cartridges should be stored in a warm, uniformly heated area or storage container for a sufficient time to allow epoxy to warm completely. Mixed material in nozzle can harden in 5–7 minutes at a temperature of 40°F or above.

INSTALLATION: See pages 31–32

SHELF LIFE: 24 months from date of manufacture in unopened container

STORAGE CONDITIONS: For best results store between 45°F - 90°F. To store partially used cartridges, leave hardened nozzle in place. To re-use, attach new nozzle.

COLOR: Resin – white, hardener – black
When properly mixed, ET adhesive will be a uniform medium gray color.

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

TEST CRITERIA: Anchors installed with ET Epoxy-Tie® adhesive have been tested in accordance with ICC-ES's *Acceptance Criteria for Adhesive Anchors (AC58)* for the following:

- Seismic and wind Loading
- Long-term creep at elevated-temperature
- Static loading at elevated-temperature
- Damp holes
- Freeze-thaw conditions
- Critical and minimum edge distance and spacing

In addition, anchors installed with ET adhesive have been tested in accordance with ICC-ES's *Acceptance Criteria for Unreinforced Masonry Anchors (AC60)*.

PROPERTY	TEST METHOD	RESULTS
Consistency (77°F)	ASTM C 881	Non-sag/thixotropic paste
Heat deflection	ASTM D 648	168°F (76°C)
Bond strength (moist cure)	ASTM C 882	2,030 psi (2 days) 4,240 psi (14 days)
Water absorption	ASTM D 570	0.19% (24 hours)
Compressive yield strength	ASTM D 695	9,174 psi (24 hours) 13,390 psi (7 days)
Compressive modulus	ASTM D 695	658,200 psi (7 days)
Gel time (77°F)	ASTM C 881	10 min. – 60 gram mass 30 min – Thin film

CHEMICAL RESISTANCE Very good to excellent against distilled water, inorganic acids and alkalis. Fair to good against organic acids and alkalis, and many organic solvents. Poor against ketones. For more detailed information visit our website or contact Simpson Strong-Tie and request Technical Bulletin T-SAS-CHEMRES08.



- IMPORTANT -
SEE Pages 31–32
FOR INSTALLATION
INSTRUCTIONS

ET Cartridge Systems

Model No.	Capacity ounces (cubic inches)	Cartridge Type	Carton Quantity	Dispensing Tool(s)	Mixing ⁴ Nozzle
ET22	22 (39.7)	side-by-side	10	EDT22B, EDT22AP, or EDT22CKT	EMN22i
ET56	56 (101.1)	side-by-side	6	EDT56AP	EMN22i or EMN50

1. Bulk containers also available, call Simpson Strong-Tie for details.
2. Cartridge and bulk estimation guides are available on pages 63–66.
3. Detailed information on dispensing tools, mixing nozzles and other adhesive accessories is available on pages 87–92.
4. Use only appropriate Simpson Strong-Tie® mixing nozzle in accordance with Simpson Strong-Tie instructions. Modification or improper use of mixing nozzle may impair epoxy performance.

SUGGESTED SPECIFICATIONS: Anchoring adhesive shall be a two-component high solids epoxy based system supplied in manufacturer's standard side-by-side cartridge and dispensed through a static-mixing nozzle supplied by the manufacturer. Epoxy shall meet the minimum requirements of ASTM C-881 specification for Type I, II, IV, and V, Grade 3, Class B and C, except gel time, and must develop a minimum 13,390 psi compressive yield strength after 7 day cure. Epoxy must have a heat deflection temperature of a minimum 168°F (76°C). Adhesive shall be ET Epoxy-Tie® adhesive from Simpson Strong-Tie, Pleasanton, CA. Anchors shall be installed per Simpson Strong-Tie instructions for ET Epoxy-Tie® adhesive.

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

Cure Schedule

Base Material Temperature		Cure Time
°F	°C	
40	4	72 hrs.
60	16	24 hrs.
80	27	24 hrs.
100	38	12 hrs.

In-Service Temperature Sensitivity

Base Material Temperature		Percent Allowable Load
°F	°C	
40	4	100%
70	21	100%
110	43	100%
135	57	85%
150	66	69%
180	82	58%

1. Refer to temperature-sensitivity chart for allowable bond strength reduction for temperature. See page 15 for more information.
2. Percent allowable load may be linearly interpolated for intermediate base material temperatures.
3. °C = (°F-32) / 1.8

Tension Loads for Threaded Rod Anchors in Normal-Weight Concrete



Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Tension Load Based on Bond Strength			Tension Load Based on Steel Strength		
					f'c ≥ 2000 psi (13.8 MPa) Concrete			A307 (SAE 1018)	A193 GR B7 (SAE 4140)	F593 (A304SS)
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
3/8 (9.5)	1/2	3 1/2 (89)	5 1/4 (133)	14 (356)	8,777 (39.0)	324 (1.4)	2,195 (9.8)	2,105 (9.4)	4,535 (20.2)	3,630 (16.1)
1/2 (12.7)	5/8	4 1/4 (108)	6 3/8 (162)	17 (432)	15,368 (68.4)	605 (2.7)	3,840 (17.1)	3,750 (16.7)	8,080 (35.9)	6,470 (28.8)
5/8 (15.9)	3/4	5 (127)	7 1/2 (191)	20 (508)	22,877 (101.8)	718 (3.2)	5,720 (25.4)	5,875 (26.1)	12,660 (56.3)	10,120 (45.0)
3/4 (19.1)	7/8	6 3/4 (171)	10 1/8 (257)	27 (686)	35,459 (157.7)	4,940 (22.0)	8,865 (39.4)	8,460 (37.6)	18,230 (81.1)	12,400 (55.2)
7/8 (22.2)	1	7 3/4 (197)	11 5/8 (295)	31 (787)	43,596 (193.9)	1,130 (5.0)	10,900 (48.5)	11,500 (51.2)	24,785 (110.2)	16,860 (75.0)
1 (25.4)	1 1/8	9 (229)	13 1/2 (343)	36 (914)	47,333 (210.5)	1,243 (5.5)	11,835 (52.6)	15,025 (66.8)	32,380 (144.0)	22,020 (97.9)
1 1/8 (28.6)	1 1/4	10 1/8 (257)	15 1/4 (387)	40 1/2 (1029)	61,840 (275.1)	.	15,460 (68.8)	19,025 (84.6)	41,000 (182.4)	27,880 (124.0)
1 1/4 (31.8)	1 3/8	11 1/4 (286)	16 7/8 (429)	45 (1143)	78,748 (350.3)	4,738 (21.1)	19,685 (87.6)	23,490 (104.5)	50,620 (225.2)	34,420 (153.1)

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

1. Allowable load must be the lesser of the bond or steel strength.
2. The allowable loads listed under allowable bond are based on a safety factor of 4.0.
3. Allowable loads may be increased by 33% for short-term loading due to wind or seismic forces where permitted by code.
4. Refer to allowable load-adjustment factors for spacing and edge distance on pages 60 and 61.
5. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
6. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.
7. Anchors are not permitted to resist tension forces in overhead or wall installations unless proper consideration is given to fire-exposure and elevated-temperature conditions.

Shear Loads for Threaded Rod Anchors in Normal-Weight Concrete



Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Shear Load Based on Concrete Edge Distance			Shear Load Based on Steel Strength		
					f'c ≥ 2000 psi (13.8 MPa) Concrete			A307 (SAE 1018)	A193 GR B7 (SAE 4140)	F593 (A304SS)
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
3/8 (9.5)	1/2	3 1/2 (89)	5 1/4 (133)	5 1/4 (133)	7,615 (33.9)	591 (2.6)	1,905 (8.5)	1,085 (4.8)	2,340 (10.4)	1,870 (8.3)
1/2 (12.7)	5/8	4 1/4 (108)	6 3/8 (162)	6 3/8 (162)	11,273 (50.1)	1,502 (6.7)	2,820 (12.5)	1,930 (8.6)	4,160 (18.5)	3,330 (14.8)
5/8 (15.9)	3/4	5 (127)	7 1/2 (191)	7 1/2 (191)	19,559 (87.0)	1,289 (5.7)	4,890 (21.8)	3,025 (13.5)	6,520 (29.0)	5,220 (23.2)
3/4 (19.1)	7/8	6 3/4 (171)	10 1/8 (257)	10 1/8 (257)	27,696 (123.2)	2,263 (10.1)	6,925 (30.8)	4,360 (19.4)	9,390 (41.8)	6,385 (28.4)
7/8 (22.2)	1	7 3/4 (197)	11 5/8 (295)	11 5/8 (295)	•	•	6,925 (30.8)	5,925 (26.4)	12,770 (56.8)	8,685 (38.6)
1 (25.4)	1 1/8	9 (229)	13 1/2 (343)	13 1/2 (343)	53,960 (240.0)	3,821 (17.0)	13,490 (60.0)	7,740 (34.4)	16,680 (74.2)	11,345 (50.5)
1 1/8 (28.6)	1 1/4	10 1/8 (257)	15 1/4 (387)	15 1/4 (387)	59,280 (263.7)	•	14,820 (65.9)	9,800 (43.6)	21,125 (94.0)	14,365 (63.9)
1 1/4 (31.8)	1 3/8	11 1/4 (286)	16 7/8 (429)	16 7/8 (429)	64,572 (287.2)	3,503 (15.6)	16,145 (71.8)	12,100 (53.8)	26,075 (116.0)	17,730 (78.9)

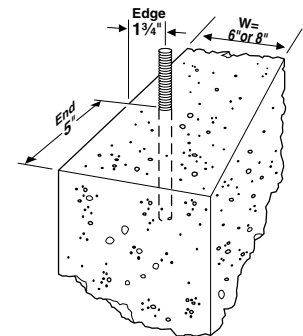
*See page 10 for an explanation of the load table icons

1. Allowable load must be the lesser of the load based on concrete edge distance or steel strength.
2. The allowable loads based on concrete edge distance are based on a safety factor of 4.0.
3. Allowable loads may be increased by 33% for short-term loading due to wind or seismic forces where permitted by code.
4. Refer to allowable load-adjustment factors for spacing and edge distance on pages 60 and 61.
5. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
6. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.

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



Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Stemwall Width in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	Tension Load Based on Bond Strength			Tension Load Based on Steel Strength
						f'c ≥ 2000 psi (13.8 MPa) Concrete			A307 (SAE 1018)
						Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
5/8 (15.9)	3/4	9 1/2 (241.3)	6 (152.4)	1 3/4 (44.5)	5 (127.0)	10,720 (47.7)	1,559 (6.9)	2,680 (11.9)	5,875 (26.1)
5/8 (15.9)	3/4	12 (304.8)	6 (152.4)	1 3/4 (44.5)	5 (127.0)	16,150 (71.8)	260 (1.2)	4,040 (18.0)	5,875 (26.1)
7/8 (22.2)	1	12 1/2 (317.5)	8 (203.2)	1 3/4 (44.5)	5 (127.0)	17,000 (75.6)	303 (1.3)	4,250 (18.9)	11,500 (51.2)
7/8 (22.2)	1	15 1/2 (393.7)	8 (203.2)	1 3/4 (44.5)	5 (127.0)	23,340 (103.8)	762 (3.4)	5,835 (26.0)	11,500 (51.2)



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

1. Allowable load must be the lesser of the bond or steel strength.
2. The allowable loads listed under allowable bond are based on a safety factor of 4.0.
3. Allowable loads may be increased by 33% for short-term loading due to wind or seismic forces where permitted by code.
4. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
5. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.

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

**Tension Loads for Rebar Dowels
in Normal-Weight Concrete**



Rebar Size No. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Tension Load Based on Bond Strength						Tension Load Based on Steel Strength
					f'c ≥ 2000 psi (13.8 MPa) Concrete			f'c ≥ 4000 psi (27.6 MPa) Concrete			ASTM A615 Grade 60 Rebar
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
#4 (12.7)	5/8	4 1/4 (108)	6 3/8 (162)	17 (432)	17,596 (78.3)	533 (2.4)	4,400 (19.6)	•	•	4,400 (19.6)	4,800 (21.4)
		6 (152)	9 (229)	24 (610)	•	•	•	20,250 (90.1)	263 (1.2)	5,060 (22.5)	
#5 (15.9)	3/4	5 (127)	7 1/2 (191)	20 (508)	25,427 (113.1)	1,899 (8.4)	6,355 (28.3)	•	•	6,355 (28.3)	7,440 (33.1)
		9 3/8 (238)	14 1/8 (359)	37 1/2 (953)	•	•	•	29,510 (131.3)	2,270 (10.1)	7,375 (32.8)	
#6 (19.1)	7/8	6 3/4 (171)	10 1/8 (257)	27 (686)	41,812 (186.0)	595 (2.6)	10,455 (46.5)	•	•	10,455 (46.5)	10,560 (47.0)
		11 1/4 (286)	16 7/8 (429)	45 (1143)	•	•	•	44,210 (196.7)	1,227 (5.5)	11,050 (49.2)	
#7 (22.2)	1	7 3/4 (197)	11 5/8 (295)	31 (787)	50,241 (223.5)	2,995 (13.3)	12,560 (55.9)	•	•	12,560 (55.9)	14,400 (64.1)
		13 1/8 (333)	19 3/4 (502)	52 1/2 (1334)	•	•	•	59,325 (263.9)	3,444 (15.3)	14,830 (66.0)	
#8 (25.4)	1 1/8	9 (229)	13 1/2 (343)	36 (914)	60,145 (267.5)	5,493 (24.4)	15,035 (66.9)	•	•	15,035 (66.9)	18,960 (84.3)
		12 (305)	18 (457)	48 (1219)	•	•	•	•	•	18,260 (81.2)	
		15 (381)	22 1/2 (572)	60 (1524)	•	•	•	85,970 (382.4)	17,965 (79.9)	21,490 (95.6)	
#9 (28.6)	1 1/4	9 (229)	13 1/2 (343)	36 (914)	•	•	15,035 (66.9)	•	•	15,035 (66.9)	24,000 (106.8)
		13 (330)	19 1/2 (495)	52 (1321)	•	•	•	•	•	21,310 (94.8)	
		16 7/8 (429)	25 3/8 (645)	67 1/2 (1715)	•	•	•	110,370 (491.0)	4,768 (21.2)	27,590 (122.7)	
#10 (31.8)	1 1/2	11 1/4 (286)	16 7/8 (429)	45 (1143)	70,685 (314.4)	1,112 (4.9)	17,670 (78.6)	•	•	17,670 (78.6)	30,480 (135.6)
		15 (381)	22 1/2 (572)	60 (1524)	•	•	•	•	•	23,960 (106.6)	
		18 3/4 (476)	28 1/8 (714)	75 (1905)	•	•	•	120,976 (538.1)	6,706 (29.8)	30,245 (134.5)	
#11 (34.9)	1 5/8	12 3/8 (314)	18 5/8 (473)	49 1/2 (1257)	78,422 (348.8)	4,603 (20.5)	19,605 (87.2)	•	•	19,605 (87.2)	37,440 (166.5)
		16 1/2 (419)	24 3/4 (629)	66 (1676)	•	•	•	•	•	28,605 (127.2)	
		20 5/8 (524)	31 (787)	82 1/2 (2096)	•	•	•	150,415 (669.1)	8,287 (36.9)	37,605 (167.3)	
#14 (44.5)	2	15 3/4 (400)	23 5/8 (600)	63 (1600)	91,518 (407.1)	3,797 (16.9)	22,880 (101.8)	•	•	22,880 (101.8)	54,000 (240.2)

1. Allowable load must be the lesser of the bond or steel strength.
2. The allowable loads listed under allowable bond are based on a safety factor of 4.0.
3. Allowable loads may be increased by 33Zc percent for short-term loading due to wind or seismic forces for only the shallowest embedment depths listed where permitted by code.
4. Refer to allowable load-adjustment factors for spacing and edge distance on pages 60 and 61.
5. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
6. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.
7. Anchors are not permitted to resist tension forces in overhead or wall installations unless proper consideration is given to fire-exposure and elevated-temperature conditions.

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

Shear Loads for Rebar Dowels in Normal-Weight Concrete

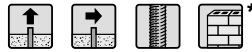


Rebar Size No. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing Dist. in. (mm)	Shear Load Based on Concrete Edge Distance			Shear Load Based on Steel Strength
					f'c ≥ 2500 psi (17.2 MPa) Concrete			ASTM A615 Grade 60 Rebar
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Allowable lbs. (kN)
#4 (12.7)	5/8	4 1/4 (108)	8 (203)	6 3/8 (162)	13,564 (60.3)	971 (4.3)	3,390 (15.1)	3,060 (13.6)
#5 (15.9)	3/4	5 (127)	10 (254)	7 1/2 (191)	20,914 (93.0)	3,034 (13.5)	5,230 (23.3)	4,740 (21.1)
#6 (19.1)	7/8	6 3/4 (171)	12 (305)	10 1/8 (257)	30,148 (134.1)	1,322 (5.9)	7,535 (33.5)	6,730 (29.9)
#7 (22.2)	1	7 3/4 (197)	14 (356)	11 5/8 (295)	39,838 (177.2)	1,854 (8.2)	9,960 (44.3)	9,180 (40.8)
#8 (25.4)	1 1/8	9 (229)	16 (406)	13 1/2 (343)	53,090 (236.2)	3,562 (15.8)	13,270 (59.0)	12,085 (53.8)
#9 (28.7)	1 1/4	10 1/8 (257)	18 (457)	15 1/4 (387)	63,818 (284.7)	3,671 (16.3)	15,955 (71.0)	15,300 (68.1)
#10 (32.3)	1 1/2	11 1/4 (286)	20 (508)	16 7/8 (429)	82,782 (368.2)	2,245 (10.0)	20,695 (92.1)	19,430 (86.4)
#11 (35.8)	1 5/8	12 3/8 (314)	22 (559)	18 5/8 (473)	96,056 (427.3)	3,671 (16.3)	24,015 (106.8)	23,865 (106.2)
#14 (43.0)	2	12 3/8 (314)	22 (559)	18 5/8 (473)	•	•	24,015 (106.8)	34,425 (153.1)

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

1. Allowable load must be the lesser of the load based on concrete edge distance or steel strength.
2. The allowable loads based on concrete edge distance are based on a safety factor of 4.0.
3. Allowable loads must be decreased by 12 percent for short-term loading due to wind or seismic forces.
4. Refer to allowable load-adjustment factors for spacing and edge distance on pages 60 and 61.
5. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.
6. Anchors are permitted to be used within fire-resistive construction, provided the anchors resist wind or seismic loads only. For use in fire-resistive construction, the anchors can also be permitted to be used to resist gravity loads, provided special consideration has been given to fire-exposure conditions.

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



Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth ⁸ in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	Min. Spacing Dist. in. (mm)	6 and 8-inch Grout-Filled CMU Allowable Loads Based on CMU Strength			
						Tension		Shear	
						Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)
Anchor Installed in Face Shell (See Figure 1)									
3/8 (9.5)	7/16	3 1/2 (89)	12 (305)	4 (102)	14 (356)	6,489 (28.9)	1,300 (5.8)	5,231 (23.3)	1,045 (4.6)
			12 (305)	12 (305)	14 (356)	7,247 (32.2)	1,450 (6.4)	6,738 (30.0)	1,350 (6.0)
1/2 (12.7)	9/16	4 1/4 (108)	12 (305)	4 (102)	17 (432)	8,646 (38.5)	1,730 (7.7)	5,705 (25.4)	1,140 (5.1)
			12 (305)	12 (305)	17 (432)	8,975 (39.9)	1,795 (8.0)	10,879 (48.4)	2,175 (9.7)
5/8 (15.9)	3/4	4 3/4 (121)	12 (305)	4 (102)	19 (483)	10,213 (45.4)	2,045 (9.1)	5,973 (26.6)	1,195 (5.3)
			12 (305)	12 (305)	19 (483)	11,290 (50.2)	2,260 (10.1)	13,027 (57.9)	2,605 (11.6)
		6 (152)	4 (102)	45/8 (117)	24 (610)	4,905 (21.8)	980 (4.4)	4,766 (21.2)	955 (4.2)
3/4 (19.1)	7/8	6 3/4 (171)	12 (305)	4 (102)	27 (686)	11,976 (53.3)	2,395 (10.7)	•	•
			12 (305)	12 (305)	27 (686)	•	•	19,141 (85.1)	3,830 (17.0)
Anchor Installed in Mortar "T" Joint (See Figure 2)									
3/8 (9.5)	7/16	3 1/2 (89)	8 (203)	8 (203)	14 (356)	7,646 (34.0)	1,530 (6.8)	5,507 (24.5)	1,100 (4.9)
1/2 (12.7)	9/16	4 1/4 (108)	8 (203)	8 (203)	17 (432)	9,529 (42.4)	1,905 (8.5)	8,003 (35.6)	1,600 (7.1)
5/8 (15.9)	3/4	4 3/4 (121)	8 (203)	8 (203)	19 (483)	9,955 (44.3)	1,990 (8.9)	9,529 (42.4)	1,905 (8.5)
3/4 (19.1)	7/8	6 3/4 (171)	16 (406)	8 (203)	27 (686)	•	•	7,238 (32.2)	1,450 (6.4)
Anchor Installed in Cell Opening (Top of Wall) (See Figure 3)									
5/8 (15.9)	3/4	6 (152)	4 (102)	45/8 (117)	24 (610)	6,721 (29.9)	1,345 (6.0)	4,833 (21.5)	965 (4.3)
3/4 (19.1)	7/8	6 (152)	4 (102)	45/8 (117)	24 (610)	•	1,345 (6.0)	•	965 (4.3)

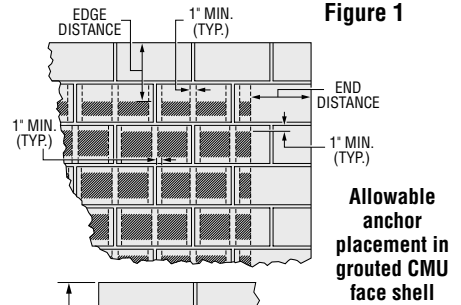


Figure 1

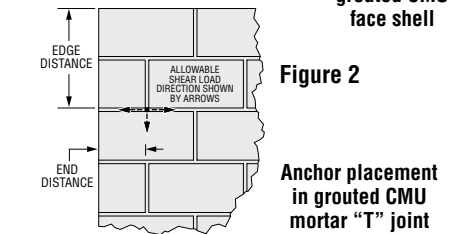


Figure 2

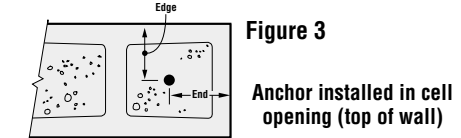
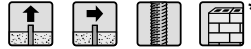


Figure 3

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

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

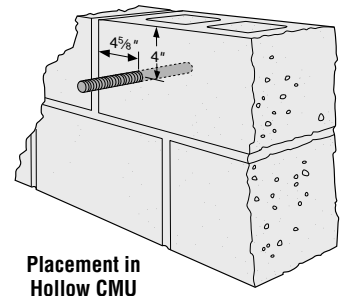


Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	6 and 8-inch Hollow CMU Allowable Loads Based on CMU Strength			
					Tension		Shear	
					Ultimate lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Allowable lbs. (kN)
Anchor Installed in Face Shell w/ETS Screen Tube (See Figure 1)								
1/2 (12.7)	5/8	3 (76.2)	4 (101.6)	45/8 (117.5)	1,400 (6.2)	280 (1.2)	1,326 (5.9)	265 (1.2)
3/4 (19.1)	7/8	3 (76.2)	4 (101.6)	45/8 (117.5)	•	280 (1.2)	•	265 (1.2)

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

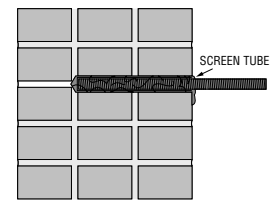
* See page 10 for explanation of the load table icons

Figure 1

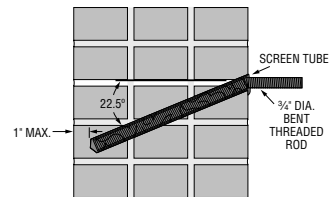


Placement in Hollow CMU

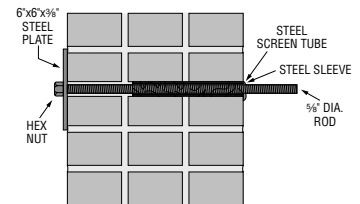
Configuration A (Shear)



Configuration B (Tension & Shear)



Configuration C (Tension & Shear)



Tension and Shear Loads for Installations in Unreinforced Brick Masonry Walls Minimum URM Wall Thickness is 13\"



Rod Dia. in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Min. Edge/End Dist. in. (mm)	Min. Vertical Spacing Dist. in. (mm)	Min. Horiz. Spacing Dist. in. (mm)	Tension Load Based on URM Strength		Shear Load Based on URM Strength	
						Minimum Net Mortar Strength = 50 psi		Minimum Net Mortar Strength = 50 psi	
						Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
Configuration A (Simpson ETS or ETSP Screen Tube Required)									
3/4 (19.1)	1	8 (203)	24 (610)	18 (457)	18 (457)	•	•	1,000 (4.4)	1,000 (4.4)
Configuration B (Simpson ETS or ETSP Screen Tube Required)									
3/4 (19.1)	1	13 (330)	16 (406)	18 (457)	24 (610)	1,200 (5.3)	•	1,000 (4.4)	1,000 (4.4)
Configuration C (Simpson ETS Screen Tube and AST Steel Sleeve Required)									
5/8 (15.9)	1	**	24 (610)	18 (457)	18 (457)	1,200 (5.3)	•	750 (3.3)	750 (3.3)

1. Threaded rods must comply with ASTM A 307 minimum.
2. All holes are drilled with a 1" diameter carbide-tipped drill bit with the drill set in the rotation-only mode.
3. The unreinforced brick walls must have a minimum thickness of 13 inches (three wythes of brick).
4. The allowable load is applicable only where in-place shear tests indicate minimum net mortar strength of 50 psi.
5. The allowable load for Configuration B and C anchors subjected to a combined tension and shear load is determined by assuming a straight-line relationship between allowable tension and shear.
6. The anchors installed in unreinforced brick walls are limited to resisting seismic or wind forces only.
7. Configuration A has a straight threaded rod or rebar embedded 8 inches into the wall with a C1/32" diameter by 8-inch long screen tube (part # ETS758 or ETS758P). This configuration is designed to resist shear loads only.
8. Configuration B has a 3/4" threaded rod bent and installed at a 22.5-degree angle and installed 13 inches into the wall, to within 1-inch (maximum) of the exterior wall surface. This configuration is designed to resist tension and shear loads. The pre-bent threaded rod is installed with a C1/32" diameter by 13-inch long screen tube (part # ETS7513 or ETS7513P).
9. Configuration C is designed to resist tension and shear forces. It consists of a 5/8" diameter, ASTM A 307 threaded rod and an 8" long sleeve (part # AST800) and a C1/32" diameter by 8-inch long screen tube (part # ETS758). The steel sleeve has a plastic plug in one end. A 6" by 6" by 3/8" thick ASTM A 36 steel plate is located on the back face of the wall.
10. Special inspection requirements are determined by local jurisdiction and must be confirmed by the local building official.
11. Refer to in-service temperature sensitivity chart for allowable load adjustment for temperature.

* See page 10 for explanation of the load table icons

Installation Instructions for Configuration C:

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

Load-Adjustment Factors for ET Epoxy-Tie® Adhesive in Normal-Weight Concrete: Edge Distance, Tension and Shear Loads

How to use these charts:

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

Edge Distance Tension (f_c)



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

Edge Dist. C_{act} (in.)	Dia.	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	#11	#14									
	Rebar	#4	#5	#6	#7	#8	#9	#10	#11	#14										
E	3 1/2	4 1/4	6	5	9 3/8	6 3/4	11 1/4	7 3/4	13 1/8	9	15	9	16 7/8	10 1/8	11 1/4	18 3/4	12 3/8	20 5/8	15 3/4	
C_{cr}	5 1/4	6 3/8	9	7 1/2	14 1/8	10 1/8	16 7/8	11 5/8	19 3/4	13 1/2	22 1/2	13 1/2	25 3/8	15 1/4	16 7/8	28 1/8	18 5/8	31	23 5/8	
C_{min}	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	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	2 3/4	2 3/4	2 3/4	2 3/4	
f_{cmin}	0.50	0.50	0.59	0.50	0.64	0.50	0.57	0.50	0.52	0.50	0.47	0.50	0.47	0.58	0.58	0.51	0.58	0.51	0.58	
1 3/4		0.50	0.50	0.59	0.50	0.64	0.50	0.57	0.50	0.52	0.50	0.47								
2 3/4		0.64	0.61	0.65	0.59	0.67	0.56	0.60	0.55	0.55	0.54	0.50	0.50	0.47	0.58	0.58	0.51	0.58	0.51	0.58
3		0.68	0.64	0.66	0.61	0.68	0.57	0.61	0.56	0.55	0.55	0.50	0.51	0.48	0.59	0.59	0.51	0.59	0.51	0.59
4		0.82	0.74	0.72	0.70	0.71	0.63	0.63	0.61	0.58	0.60	0.53	0.56	0.50	0.62	0.62	0.53	0.61	0.53	0.61
5		0.96	0.85	0.77	0.78	0.73	0.69	0.66	0.66	0.61	0.64	0.55	0.60	0.52	0.66	0.65	0.55	0.64	0.55	0.63
6		1.00	0.96	0.83	0.87	0.76	0.75	0.69	0.72	0.63	0.68	0.58	0.65	0.55	0.69	0.68	0.57	0.67	0.57	0.65
7			1.00	0.89	0.96	0.79	0.81	0.72	0.77	0.66	0.72	0.60	0.70	0.57	0.72	0.71	0.59	0.69	0.58	0.67
8				0.94	1.00	0.82	0.87	0.75	0.82	0.69	0.77	0.63	0.74	0.59	0.76	0.74	0.61	0.72	0.60	0.69
9				1.00		0.85	0.93	0.78	0.87	0.71	0.81	0.66	0.79	0.62	0.79	0.77	0.63	0.75	0.62	0.71
10					0.88	0.99	0.80	0.92	0.74	0.85	0.68	0.84	0.64	0.82	0.80	0.65	0.77	0.64	0.73	
12					0.94	1.00	0.86	1.00	0.79	0.94	0.73	0.93	0.69	0.89	0.86	0.69	0.82	0.67	0.77	
14					1.00		0.92		0.85	1.00	0.78	1.00	0.73	0.96	0.91	0.73	0.88	0.71	0.81	
16						0.98		0.90		0.83		0.78	1.00	0.97	0.77	0.93	0.74	0.85		
18						1.00		0.95		0.89		0.83		1.00	0.80	0.98	0.77	0.89		
20							1.00		0.95		0.94		0.87		0.84	1.00	0.81	0.93		
22								0.99		0.92				0.88		0.84	0.97			
24								1.00		0.97				0.92		0.88	1.00			
26									1.00					0.96		0.91				
28										1.00				0.95		0.95				
30														0.98		0.98				
32																1.00				

See notes below.

Edge Distance Shear (f_c)



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

Edge Dist. C_{act} (in.)	Dia.	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	#11	#14						
	Rebar	#4	#5	#6	#7	#8	#9	#10	#11	#14							
E	3 1/2	4 1/4	4 1/4	5	5	6 3/4	6 3/4	7 3/4	7 3/4	9	9	10 1/8	10 1/8	11 1/4	11 1/4	12 3/8	12 3/8
C_{cr}	5 1/4	6 3/8	8	7 1/2	10	10 1/8	12	11 5/8	14	13 1/2	16	18	15 1/4	16 7/8	20	22	22
C_{min}	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	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	2 3/4	2 3/4	2 3/4
f_{cmin}	0.29	0.20	0.16	0.13	0.10	0.13	0.10	0.13	0.09	0.08	0.08			0.14	0.14	0.14	0.14
1 3/4		0.29	0.20	0.16	0.13	0.10	0.13	0.10	0.09	0.08	0.08						
2 3/4		0.49	0.37	0.29	0.28	0.21	0.23	0.19	0.22	0.16	0.16	0.14	0.08	0.14	0.14	0.14	0.14
3		0.54	0.42	0.33	0.32	0.24	0.26	0.21	0.24	0.18	0.18	0.16	0.10	0.16	0.16	0.15	0.15
4		0.75	0.59	0.46	0.47	0.35	0.36	0.30	0.33	0.26	0.23	0.16	0.23	0.22	0.20	0.20	0.20
5		0.95	0.76	0.60	0.62	0.45	0.47	0.39	0.42	0.33	0.29	0.22	0.29	0.28	0.25	0.24	0.24
6		1.00	0.94	0.73	0.77	0.56	0.57	0.47	0.50	0.41	0.41	0.35	0.28	0.36	0.34	0.30	0.29
7			1.00	0.87	0.92	0.67	0.68	0.56	0.59	0.48	0.49	0.42	0.34	0.43	0.40	0.35	0.33
8				1.00	1.00	0.78	0.78	0.65	0.68	0.55	0.57	0.48	0.40	0.50	0.46	0.40	0.37
9					0.89	0.88	0.74	0.77	0.63	0.65	0.55	0.46	0.57	0.52	0.45	0.42	0.42
10					1.00	0.99	0.82	0.86	0.70	0.73	0.61	0.52	0.64	0.58	0.50	0.46	0.46
11						1.00	0.91	0.94	0.78	0.80	0.68	0.58	0.71	0.64	0.55	0.51	0.51
12							1.00	1.00	0.85	0.88	0.74	0.64	0.78	0.70	0.60	0.55	0.55
13								0.93	0.96	0.81	0.70	0.85	0.76	0.65	0.60	0.60	
14								1.00	1.00	0.87	0.76	0.91	0.82	0.70	0.64	0.64	
15										0.94	0.82	0.98	0.89	0.75	0.69	0.69	
16										1.00	0.88	1.00	0.95	0.80	0.73	0.73	
18											1.00		1.00	0.90	0.82	0.82	
20														1.00	0.91	0.91	
22															1.00	1.00	

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

Load-Adjustment Factors for ET Epoxy-Tie® Adhesive in Normal-Weight Concrete: Spacing, Tension and Shear Loads

How to use these charts:

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

Spacing Tension (f_s)



S_{act} (in.)	Dia.	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 3/4	1 7/8	2							
	Rebar	#4		#5		#6		#7		#8		#9		#10		#11		#14		
	E	3 1/2	4 1/4	6	5	9 3/8	6 3/4	11 1/4	7 3/4	13 1/8	9	15	9	16 7/8	10 1/8	11 1/4	18 3/4	12 3/8	20 5/8	15 3/4
	S_{cr}	14	17	24	20	37 1/2	27	45	31	52 1/2	36	60	36	67 1/2	40 1/2	45	75	49 1/2	82 1/2	63
	S_{min}	13/4	2 1/8	3	2 1/2	4 3/4	3 3/8	5 5/8	3 7/8	6 5/8	4 1/2	7 1/2	4 1/2	8 1/2	5 1/8	5 5/8	9 3/8	6 1/4	10 3/8	7 7/8
	f_{smin}	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
1 3/4		0.89																		
2		0.89																		
4		0.91	0.90	0.90	0.90		0.89		0.89											
6		0.93	0.92	0.91	0.91	0.89	0.90	0.89	0.90		0.90		0.90		0.89	0.89				
8		0.95	0.93	0.92	0.92	0.90	0.91	0.90	0.91	0.89	0.90	0.89	0.90		0.90	0.90		0.89		0.89
10		0.96	0.95	0.93	0.94	0.91	0.92	0.90	0.91	0.90	0.91	0.90	0.91	0.89	0.91	0.90	0.89	0.90		0.89
12		0.98	0.96	0.94	0.95	0.91	0.93	0.91	0.92	0.90	0.92	0.90	0.92	0.90	0.91	0.91	0.89	0.90	0.89	0.90
14		1.00	0.98	0.95	0.96	0.92	0.94	0.91	0.93	0.91	0.92	0.90	0.92	0.90	0.92	0.91	0.90	0.91	0.90	0.90
16			0.99	0.96	0.97	0.93	0.95	0.92	0.94	0.91	0.93	0.91	0.93	0.90	0.92	0.92	0.90	0.91	0.90	0.91
18			1.00	0.97	0.99	0.93	0.96	0.92	0.95	0.92	0.94	0.91	0.94	0.91	0.93	0.92	0.90	0.92	0.90	0.91
20				0.98	1.00	0.94	0.97	0.93	0.96	0.92	0.94	0.91	0.94	0.91	0.94	0.93	0.91	0.92	0.90	0.91
24				1.00		0.95	0.99	0.94	0.97	0.93	0.96	0.92	0.96	0.92	0.95	0.94	0.91	0.94	0.91	0.92
28						0.97	1.00	0.95	0.99	0.94	0.97	0.93	0.97	0.93	0.96	0.95	0.92	0.95	0.92	0.93
32						0.98		0.96	1.00	0.95	0.99	0.94	0.99	0.93	0.97	0.96	0.93	0.96	0.92	0.94
36						0.99		0.97		0.96	1.00	0.95	1.00	0.94	0.99	0.97	0.93	0.97	0.93	0.95
40						1.00		0.99		0.97		0.96		0.95	1.00	0.99	0.94	0.98	0.94	0.95
45								1.00		0.98		0.97		0.96		1.00	0.95	0.99	0.94	0.96
50										0.99		0.98		0.97			0.96	1.00	0.95	0.97
55										1.00		0.99		0.98			0.97		0.96	0.98
60												1.00		0.99			0.97		0.97	0.99
65														1.00			0.98		0.97	1.00
70																	0.99		0.98	
75																	1.00		0.99	
82 1/2																			1.00	

See Notes Below

Spacing Shear (f_s)



S_{act} (in.)	Dia.	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 3/4
	Rebar	#4		#5		#6		#7		#8	
	E	3 1/2	4 1/4	5	6 3/4	7 3/4	9	10 1/8	11 1/4	12 3/8	12 3/8
	S_{cr}	5 1/4	6 3/8	7 1/2	10 1/8	11 5/8	13 1/2	15 1/4	16 7/8	18 5/8	18 5/8
	S_{min}	13/4	2 1/8	2 1/2	3 3/8	3 7/8	4 1/2	5 1/8	5 5/8	6 1/4	6 1/4
	f_{smin}	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
1 3/4		0.83									
2		0.84									
3		0.89	0.87	0.85							
4		0.94	0.91	0.88	0.85	0.83					
5		0.99	0.95	0.92	0.87	0.85	0.84				
6		1.00	0.99	0.95	0.90	0.88	0.86	0.84	0.84		
7			1.00	0.98	0.92	0.90	0.88	0.86	0.85	0.84	0.84
8				1.00	0.95	0.92	0.90	0.88	0.87	0.85	0.85
9					0.97	0.94	0.92	0.90	0.88	0.87	0.87
10					1.00	0.96	0.93	0.91	0.90	0.88	0.88
12						1.00	0.97	0.95	0.93	0.91	0.91
14							1.00	0.98	0.96	0.94	0.94
16								1.00	0.99	0.96	0.96
18									1.00	0.99	0.99
20										1.00	1.00

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

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

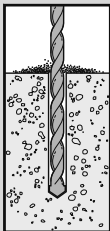
ADHESIVE ANCHORING INSTALLATION INSTRUCTIONS

NOTE: Always check expiration date on product label. Do not use expired product.

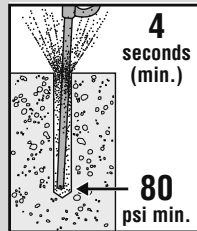
WARNING: When drilling and cleaning hole use eye and lung protection. When installing adhesive use eye and skin protection.

1 HOLE PREPARATION: Concrete, Brick, Hollow and Grout-Filled CMU

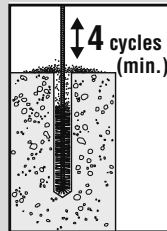
For horizontal, vertical and overhead applications.



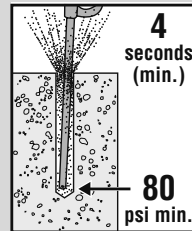
1. Drill—Drill hole to specified diameter and depth.



2. Blow—Remove dust from hole with oil-free compressed air for a minimum of 4 seconds.



3. Brush—Clean with a nylon brush (see page 92) for a minimum of 4 cycles.



4. Blow—Remove dust from hole with oil-free compressed air for a minimum of 4 seconds.

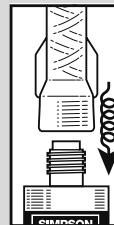
Notes:
Refer to specific product page (within this catalog) or product label for proper drill bit size.

Refer to page 92 of this catalog for proper brush part number.

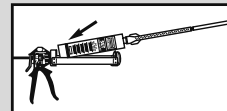
2 CARTRIDGE PREPARATION: For AT, ET, EDOT™, SET and SET-XP™ Adhesives

1. Check—Check expiration date on product label. **Do not use expired product.** Product is usable until end of printed expiration month.

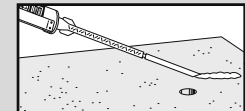
2. Open—Open cartridge per package instructions.



3. Attach—Attach proper Simpson Strong-Tie® nozzle to cartridge. Do not modify nozzle.



4. Insert—Insert cartridge into dispensing tool.



5. Dispense—Dispense adhesive to the side until properly mixed (uniform color).

Note: Refer to page 89 for proper mixing nozzle and pages 87–88 for dispensing tool part number.

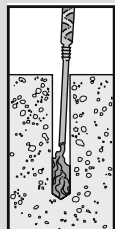


NOTE: For bulk dispensing, check pail or drum label for detailed mixing and preparation instructions.

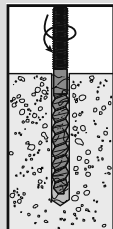
3 FILLING THE HOLE: Vertical Anchorage: For AT, ET, EDOT™, SET and SET-XP™ Adhesives and SET-XP™ Adhesive with IXP™ Anchor

Prepare the hole per instructions “Hole Preparation”.

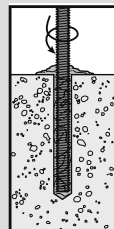
Dry and Damp Holes:



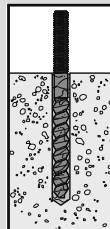
1. Fill—Fill hole ½ - ¾ full, starting from bottom of hole to prevent air pockets. Withdraw nozzle as hole fills up.



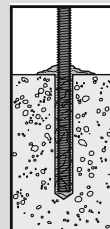
IXP™ anchor Threaded rod or rebar



2a. Insert—Insert clean, oil free anchor, turning slowly until the anchor contacts the bottom of the hole.

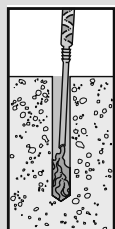


2b. Embed—Embed IXP anchor to the bottom of UNC thread.

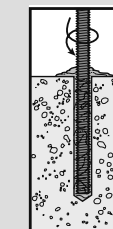


3. Do not disturb—Do not disturb anchor until fully cured. (See cure schedule for specific adhesive.)

Water Filled Holes: (SET or AT only)

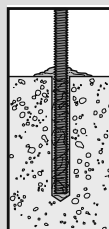


1. Fill—Fill hole completely full, starting from bottom of hole to prevent water pockets. Withdraw nozzle as hole fills up.



Threaded rod or rebar

2. Insert—Insert clean, oil-free anchor, turning slowly until the anchor contacts the bottom of the hole.



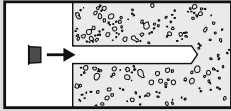
3. Do not disturb—Do not disturb anchor until fully cured. (See cure schedule for specific adhesive.)

ADHESIVE ANCHORING INSTALLATION INSTRUCTIONS

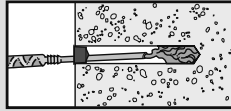
Continued from page 31.

3 FILLING THE HOLE: Horizontal and Overhead Anchorage: For AT, ET, EDOT™, SET, and SET-XP™ Adhesives and SET-XP Adhesive with IXP™ Anchor.

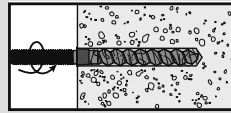
Prepare the hole per instructions "Hole Preparation".



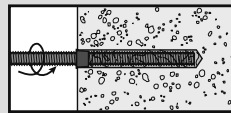
1. Install—Install Simpson ARC adhesive retaining cap. Refer to page 89 for proper ARC size.



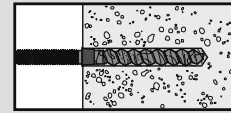
2. Fill—Fill hole 1/2 - 2/3 full, starting from bottom of hole to prevent air pockets. Withdraw nozzle as hole fills up.



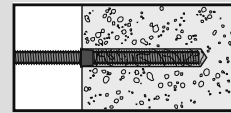
IXP anchor



Threaded rod or rebar



IXP anchor



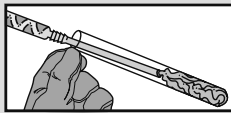
Threaded rod or rebar

3. Insert—Insert clean, oil-free anchor, turning slowly until the anchor contacts the bottom of the hole.

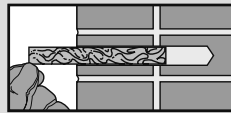
4. Do not disturb—Do not disturb anchor until fully cured. (See cure schedule for specific adhesive.)

FILLING THE HOLE: When Anchoring with Screens: For AT, ET, and SET Adhesives (except SET1.7KT or SET1.7KTA)

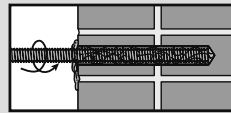
Prepare the hole per instructions "Hole Preparation".



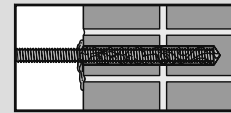
1. Fill—Fill screen completely. Fill from the bottom of the screen and withdraw the nozzle as the screen fills to prevent air pockets. (Opti-Mesh® screens: Close integral cap after filling.)



2. Insert—Insert adhesive filled screen into hole.



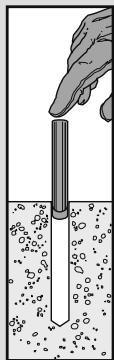
3. Insert—Insert clean, oil-free anchor, turning slowly until the anchor contacts the bottom of the screen.



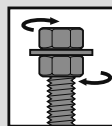
4. Do not disturb—Do not disturb anchor until fully cured. (See cure schedule for specific adhesive.)

FILLING THE HOLE: VGC Vinylester Glass Capsule (Hammer Capsule)

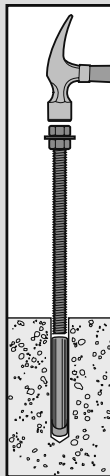
Prepare the hole per instructions "Hole Preparation".



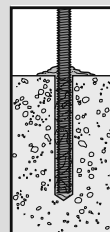
1. Insert—Insert the VGC capsule(s) to the bottom of the hole (either end first).



2. Install—Install double nut to protect thread.

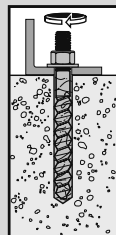


3. Drive—Drive stud or rod to the bottom of the hole. Spinning of the stud or rod is not required.



4. Do not disturb—Do not disturb anchor until fully cured. (See cure schedule for VGC.) **VGC is not recommended for overhead applications.**

4 TIGHTENING: When Using IXP™ Anchor



1. Tighten—After adhesive has fully cured, tighten to the required installation torque.



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Legacy report on the 1997 *Uniform Building Code*™

DIVISION: 04—MASONRY

Section: 04081—Masonry Anchorage

SIMPSON STRONG-TIE EPOXY TIE ANCHORING SYSTEMS

SIMPSON STRONG-TIE COMPANY, INC.
4637 CHABOT DRIVE, SUITE 200
PLEASANTON, CALIFORNIA 94588

1.0 SUBJECT

Simpson Strong-Tie Epoxy Tie Anchoring Systems with Epoxy Tie ET, ETF and ETR Anchoring Adhesives.

2.0 DESCRIPTION

2.1 General:

Simpson Strong-Tie Epoxy Tie anchoring systems described in this evaluation report are stud-type adhesive anchors. Systems using Epoxy Tie ET and ETR adhesives are for use as anchors installed in unreinforced brick walls.

For installations in unreinforced brick walls, the systems each consist of the adhesive, threaded steel rods, screen tubes, steel sleeves, and steel plates.

2.2 Materials:

2.2.1 Adhesives: Epoxy Tie ET and ETR are two-component (resin and hardener) epoxy adhesives, supplied in dual, side-by-side cartridges with a 1:1 volume ratio. The cartridges are used with a manual or pneumatically activated tool to dispense the adhesives through an 18-element static mixing nozzle, supplied by Simpson Strong-Tie Company, Inc., attached to the dual cartridges.

The adhesives have a two-year shelf life when stored in a dry environment at temperatures ranging from 45°F (7.2°C) to 90°F (32.2°C).

2.2.2 Threaded Rods: All-threaded rods must be manufactured either from steel conforming to ASTM A 307 or ASTM A 193 Grade B7, or from stainless steel. Stainless steel threaded rods shall comply with ASTM F 593 Grade A304.

2.3 Unreinforced Brick Wall Anchors:

2.3.1 General: Anchors installed with Epoxy Tie ET or Epoxy Tie ETR Renovation Formula adhesives in existing unreinforced brick walls are designed to resist seismic and wind loads only. The existing unreinforced brick walls must have a minimum thickness of 13 inches (330 mm). The anchor is recognized for installation in the three configurations shown in Figure 2. The adhesive, threaded rod and screen tube are

used in all anchor installations. Configuration A has a straight threaded rod embedded 8 inches (203 mm) into the wall. Configuration B has a threaded rod bent and installed 13 inches (330 mm) into the wall at a 22.5-degree angle. Configuration C uses a through-bolt, a steel sleeve and steel plate.

The threaded rod for Configurations A and B is a ³/₄-inch-diameter (19.1 mm), ASTM A 307 rod. A ⁵/₈-inch-diameter (15.9 mm) ASTM A 307 threaded rod is used in Configuration C.

The screen tube consists of steel screen formed into a tube having a ³¹/₃₂-inch (24.6 mm) outside diameter and a length of either 8 or 13 inches (203 or 330 mm). The 8-inch-long (203 mm) screen tube is used in Configurations A and C. The 13-inch-long (330 mm) screen tube is used in Configuration B.

An 8-inch-long (203 mm) sleeve formed from C1010 steel, used in the through-bolted connection of Configuration C, has an outside and inside diameter of ¹³/₁₆ inch and ¹¹/₁₆ inch (20.6 mm and 17.5 mm), respectively. The steel sleeve has a plastic plug in one end. A 6-inch-by-6-inch-by-³/₈-inch-thick (152 mm by 152 mm by 9.5 mm) ASTM A 36 steel plate is located on the back face of the wall, at the end of the threaded rod of the through-bolted connection.

The allowable shear value for Configurations A and B is 1,000 pounds (4450 N). The allowable tension value for Configuration C is 1,200 pounds (5338 N).

Allowable values are for short-term wind and seismic loads, and cannot be increased for short-term loads. The adhesive for the installed anchors must be protected from direct weather exposure.

2.3.2 Installation: The anchors are installed in 1-inch-diameter (25 mm) holes that are drilled using rotary drill bits designed for use in concrete or masonry and a rotary drill or a rotary hammer drill used in the "rotation only" mode. The hole is drilled perpendicular to the wall face, to a depth of 8 inches (203 mm), for Configurations A and C. The hole for the Configuration B anchor is at the angle and embedment described in Section 2.3.1, and is drilled using a guide that is hand held or attached to the drill. The holes are cleaned with oil-free compressed air and a nylon brush.

The mixed adhesive is injected into the screen tube until the tube is completely full. The tube is then placed into the drilled hole. The threaded rod of either Configuration A or B, or the steel sleeve of Configuration C, is slowly pushed into the screen tube, forcing the adhesive through the screen and into the hole. Before installation of the Configuration C anchor can

***Corrected January 2007 and Revised January 2008**

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continue, the adhesive must be cured at the temperatures and for the time periods noted in Table 1. After the adhesive on Configuration C anchors has cured, a $\frac{5}{8}$ -inch-diameter (15.9 mm) standard rotary drill bit is used to drill a hole through the plastic plug in the end of the steel sleeve and completely through the wall. The $\frac{5}{8}$ -inch-diameter (15.9 mm) threaded rod is inserted through the hole, and is attached to the other side of the wall using the metal plate and a nut.

2.3.3 Temperature Limitations: Adhesive anchor performance is temperature-sensitive. The allowable loads of anchors installed with Epoxy Tie ET must be adjusted in accordance with Figure 1 where the base material temperature exceeds 70°F (21.1°C).

2.3.4 Miscellaneous: Anchor installations require the following:

1. Use of the anchors must be approved by the project engineer.
2. The anchors must be installed under special inspection in accordance with Section 1701 of the code and Section 2.4 of this report.
3. Edge distances and spacings of anchors shall comply with Table 2.
4. Only wind and seismic loads are imposed on the anchors.
5. Allowable tension and shear loads are applicable only where in-place shear tests conducted in accordance with UBC Standard 21-6 indicate a minimum average net ultimate shear strength of 50 psi (345 kPa).
6. One-fourth (25 percent) of the anchors must be tested by a special inspector using a calibrated torque wrench set at a minimum torque of 60 foot-pounds (81 N·m). Steel sleeves for anchors in Configuration C are tested prior to installation of threaded rod, using an expansion bolt inserted into the sleeve.
7. Five percent of the tension-resisting anchors must be tested, with a minimum of two tests being required. Where the wall thickness varies, at least one test must be performed on an anchor that has the least embedment. Tests must indicate that bolts can sustain a tension load of 3,000 pounds (13 344 N) for a five-minute period with an allowable deviation of 10 percent.
8. For each job, the project engineer or contractor must submit a test report to the local building department, verifying that the requirements of Sections 2.3.4 (5), (6) and (7) of this report have been met. Tests must be conducted under the supervision of the project engineer or an approved independent testing laboratory. At a minimum, the test report must include:
 - a. Test location(s).
 - b. Brick/mortar condition.
 - c. Bolt movement/elongation.
 - d. Embedment depth.
 - e. Applied load.

2.4 Special Inspection:

Adhesive anchor installations require special inspection in accordance with Section 1701 of the code. The special inspector must record product description (including product name), adhesive expiration date, anchor diameter and steel grade, compliance of drill bit with this report, hole diameter,

cleanliness of hole and anchor, adhesive application, anchor embedment, and verification that anchor installation is in accordance with both the manufacturer's published installation instructions and this report.

2.5 Identification:

The packaging for the adhesives bears the product designation; name and address of Simpson Strong-Tie Company, Inc.; expiration date; evaluation report number (ER-4945); and installation instructions. Steel specifications for threaded rods are identified on attached labels. Screen tubes and steel sleeves are identified by container labels bearing the name and address of Simpson Strong-Tie Company, Inc., and the size and quantity.

3.0 EVIDENCE SUBMITTED

Data in accordance with the Acceptance Criteria for Unreinforced Masonry Anchors (AC60), dated January 1995.

4.0 FINDINGS

That the Simpson Strong-Tie Epoxy Tie Anchoring Systems described in this report comply with the 1997 Uniform Building Code™, subject to the following conditions:

- 4.1 The anchors are installed in accordance with the manufacturer's instructions and this report.
- 4.2 Anchors installed in unreinforced brick walls are limited to resisting wind or seismic forces that do not exceed the allowable loads noted in Section 2.3.1.
- 4.3 Special inspection is provided in accordance with Sections 2.3.4 and 2.4 for all anchor installations.
- 4.4 Calculations and details showing compliance with this report are submitted to the local building official for approval.
- 4.5 Anchors are not used to resist tension forces in wall installations unless special consideration is given to fire-exposure conditions.
- 4.6 Anchors are not subjected to vibratory or shock loads, such as those encountered by supports for reciprocating engines or crane rails.
- 4.7 The anchors are limited to interior use, with the following exceptions:
 - (1) Installations are permitted in moderate or negligible exterior weathering locations, in accordance with Figure 21-1-1 of UBC Standard 21-1, when stainless steel threaded rods are used.
 - (2) Epoxy Tie ET anchors may also be installed in severe exterior weathering locations when stainless steel threaded rods are used.
- 4.8 During installation, the hole and surrounding location must be dry.
- 4.9 The adhesives are manufactured by Simpson Strong-Tie Company, Inc., in Addison, Illinois, under a quality control program with inspections by CEL Consulting, Division of Consolidated Engineering Laboratories, Inc. (AA-639).

This report is subject to re-examination in two years.

TABLE 1—MANUFACTURER’S RECOMMENDED CURE TIME FOR EPOXY TIE ET¹

TEMPERATURE (°F)	INITIAL SET ² (hours)	INITIAL CURE ³ (hours)
100	4	12
90	4	16
80	4	24
70	5	24
65	6	24

For SI: $t^{\circ}F = \frac{9}{5} t^{\circ}C + 32$.

¹Anchors installed and cured at substrate temperatures colder than 65°F are beyond the scope of this report.

²Anchors are to be undisturbed during the initial set time.

³Application of allowable (design) tensile or shear loads shall occur after the initial cure time.

TABLE 2—MINIMUM SPACING AND EDGE DISTANCES FOR ANCHORS INSTALLED IN UNREINFORCED MASONRY

ANCHOR CONFIGURATION	MINIMUM VERTICAL SPACING (inches)	MINIMUM HORIZONTAL SPACING (inches)	MINIMUM EDGE DISTANCE (inches)
A	18	18	24
B	18	24	16
C	18	18	24

For SI: 1 inch = 25.4 mm.

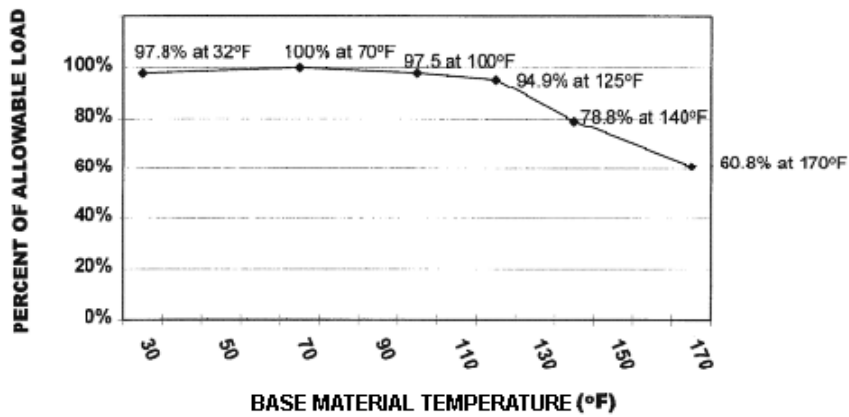


FIGURE 1—EPOXY TIE ET ADHESIVE IN-SERVICE TEMPERATURE SENSITIVITY GRAPH

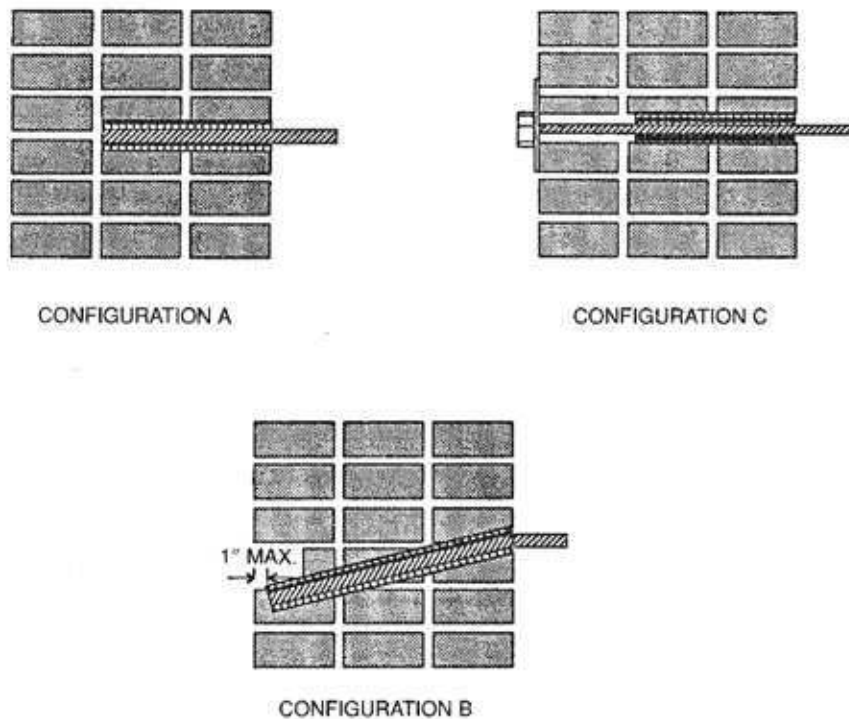


FIGURE 2

I. PRODUCT AND COMPANY IDENTIFICATION

Company: Simpson Strong-Tie Company, Inc.
Address: 5956 W. Las Positas Blvd.
Pleasanton, CA 94588

Product Name: ET22, ET56, ET020R, ET050R - ET Resin

Product Description: Epoxy-Tie Adhesive – Epoxy Resin

Emergency Contact No.: 1-800-535-5053 USA
1-352-323-3500 International

Date Prepared or Revised: March 2008. For most current MSDS, please visit our web site at
www.simpsonanchors.com

II. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Names	CAS Numbers
BisPhenolA/Epichlorohydrin (Epoxy Resin)	25068-38-6
Silica, crystalline quartz	14808-60-7
Titanium dioxide	1317-80-2

The remaining ingredients are designated as “trade secret”.

III. HAZARD IDENTIFICATION**EMERGENCY OVERVIEW**

Non-corrosive.
May cause eye and skin irritation.
May cause skin sensitization.

POTENTIAL HEALTH EFFECTS**ACUTE**

Eye Contact: May cause eye irritation, swelling, tearing, redness or cornea damage.
Skin Contact: Moderate irritation. May cause skin sensitization, evidenced by rashes and hives.
Inhalation: Moderate irritation to the nose and respiratory tract. May cause Central Nervous System depression, evidenced by headache, dizziness, and nausea.
Ingestion: May cause irritation to the gastrointestinal tract. May cause Central Nervous System depression or other systemic effects.
Systemic Effects: Lungs, eyes, and skin.

IV. FIRST AID MEASURES

Eye Contact: Immediately flush eyes with plenty of cool water for at least 15 minutes while holding the eyes open. If redness, burning, blurred vision, or swelling persists, **CONSULT A PHYSICIAN**.

Skin Contact: Remove product and immediately wash affected area with soap and water. Do not apply greases or ointments. Remove contaminated clothing. Wash clothing with soap and water before reuse. If redness, burning, or swelling persists, **CONSULT A PHYSICIAN**.

Ingestion: **DO NOT INDUCE VOMITING.** Never administer anything by mouth to an unconscious person. Rinse out mouth with water, then drink sips of water to remove taste from mouth. **CONSULT A PHYSICIAN** if vomiting occurs spontaneously, keep head below hips to prevent aspiration.

Inhalation: Remove patient to fresh air. If patient continues to experience difficulty breathing, **CONSULT A PHYSICIAN**.

V. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: Water fog, carbon dioxide or dry chemical, aqueous foam.
Fire And Explosion Hazard: Hazardous decomposition products may occur when materials polymerize at temperatures above 500°F. Do not allow run-off from fire fighting to enter drains or water courses.
Fire Fighting Equipment and Procedures: Wear full protective clothing and self-contained breathing apparatus for fire fighting. Isolate fuel supply from fire. Clear fire area of all non-emergency personnel. Use water spray to cool fire-exposed surfaces and containers.

VI. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Use cautious judgment when cleaning up spill. Shut off leaks, if possible without personal risk. Wear suitable protective clothing, gloves and eye/face protection. Evacuate personnel to safe areas.
Environmental Precautions: Construct a dike to prevent spreading. Keep out of sewers, storm drains, surface waters, and soils.
Clean-up Methods: **Small spills:** Soak up with absorbent material such as clay, sand or other suitable non-reactive material. Place in leak-proof containers. Seal tightly for proper disposal. **Large spills:** Approach suspected leak areas with caution. Create a dike or trench to contain material. Soak up with absorbent material such as clay, sand or other suitable non-reactive material. Place in leak-proof containers. Seal tightly for proper disposal.
Additional Information: Notify authorities if any exposures to the general public or environment occur or are likely to occur. Dispose in accordance with federal, state, and local regulations.

VII. STORAGE AND HANDLING

Storage: Keep away from: acids, oxidizers, heat, or flames. Keep in cool, dry, well-ventilated area in closed containers. Protect containers from physical damage.
Handling: To prevent skin and eye contact under the foreseeable conditions of use, wear appropriate protective clothing and safety eyewear. When handling, do not eat, drink, or smoke. Wash thoroughly after handling. Avoid breathing fumes. Handle in a well-ventilated work area.

VIII. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Measure: Wear appropriate personal protective equipment.
Eye Protection: Avoid contact with eyes. Wear chemical splash goggles or safety glasses with side shield.
Hand Protection: Wear chemical-resistant gloves such as: Nitrile, neoprene, butyl.
Skin and Body Protection: Wear chemical-resistant gloves and other clothing as required to minimize contact.
Respirator Protection: Not required for properly ventilated areas.
Exposure Limits:

COMPONENT	ACGIH (TLV)	OSHA (PEL)
BisPhenolA/Epichlorohydrin (Epoxy Resin)	N/E	N/E
Silica, crystalline quartz (airborne particulates of respirable size)	0.1 mg/m ³	0.4 mg/m ³
Titanium dioxide (total dust)	10 mg/m ³	15 mg/m ³

IX. PHYSICAL AND CHEMICAL PROPERTIES

Form: Paste
Color: White
Odor: Sweet
Vapor Pressure: Not Volatile
Boiling Point: > 260°C (>500°F)
Freezing Point: N/E
Flash Point: 250°F (Open Cup)
Specific Gravity: 1.19 @ 72°F
Solubility In Water: Insoluble

X. REACTIVITY DATA

Stability: Stable under normal storage conditions.
Conditions To Avoid: Incompatible chemicals, high heat and open flame.
Materials To Avoid: Oxidizing agents, acids, organic bases, and amines.
Hazardous Decomposition Products: Combustion may produce carbon monoxide, carbon dioxide, aldehydes, acids and other organic substances.
Hazardous Polymerization: Will not occur.

XI. TOXICOLOGICAL PROPERTIES

Acute Oral (LD₅₀, Rat): N/E
Acute Dermal (LD₅₀, Rabbit): N/E
Acute Inhalation (LC₅₀, Rat): N/E

Chronic Health Hazard The Diglycidyl Ether of Bisphenol A has shown weak carcinogenicity in 2-year mice bioassays. This material has shown activity in-vitro microbial mutagenicity screening and has produced chromosomal aberrations in cultured rat liver cells. No activity when tested by vivo mutagenicity assays.

XII. DISPOSAL CONSIDERATIONS

Waste From Residues / Unused Products: This material is not a hazardous waste by RCRA criteria (40 CFR 261). Dispose of container and unused contents in accordance with federal, state, and local requirements.

XIII. TRANSPORTATION

US DOT (CFR): Not Regulated For Transport.
IATA: Not Regulated For Transport.
IMO: Not Regulated For Transport.

XIV. REGULATORY INFORMATION

Country	Regulatory List
USA	TSCA

EPA SARA Title III Section 312 (40 CFR 370) Hazardous Classification:

Acute/Chronic Health Hazard.

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'de minimus' level:

None.

US. California "Safe Drinking Water and Toxic Enforcement Act" (Proposition 65):

This product contains small traces of the following chemicals that are known to the State of California to cause cancer and/or reproductive toxicity and other harm.

Component	Regulation	Concentration	Remarks
Phenylglycidyl ether*	ACGIH	Trace	Carcinogenic
Epichlorohydrin*	ACGIH	Trace	Carcinogenic

* May be absorbed through skin.

XV. OTHER INFORMATION

HMIS RATING

Health	Flammability	Physical Hazard
2	1	0

N/E – Not Established

This Material Safety Data Sheet (MSDS) is prepared by Simpson Strong-Tie Co. in compliance with the requirements of OSHA 29 CFR Part 1910.1200. The information it contains is offered in good faith as accurate as of the date of this MSDS. This MSDS is provided solely for the purpose of conveying health, safety, and environmental information. No warranty, expressed or implied, is given. Health and Safety precautions may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations.

I. PRODUCT AND COMPANY IDENTIFICATION

Company: Simpson Strong-Tie Company, Inc.
Address: 5956 W. Las Positas Blvd.
 Pleasanton, CA 94588

Product Name: **ET22, ET56, ET020H, ET050H - ET Hardener**

Product Description: Epoxy-Tie Adhesive – Epoxy Hardener

Emergency Contact No.: 1-800-535-5053 USA
 1-352-323-3500 **International**

Date Prepared or Revised: March 2008. For most current MSDS, please visit our web site at
 www.simpsonanchors.com

II. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Names	CAS Numbers
Phenol (Benzenol)	108-95-2
Phenol, 4,4-(1-methylethylidene)bis	80-05-7
Amine Blend	N/E
Silica, crystalline quartz	14808-60-7

The remaining ingredients are designated as “trade secret”.

III. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

Non-corrosive.
 Moderate irritation to eyes and skin.
 May cause skin sensitization.
 Components of the product may affect the nervous system.

POTENTIAL HEALTH EFFECTS

ACUTE

Eye Contact: May cause eye irritation, swelling, tearing, redness or cornea damage.
Skin Contact: Moderate irritation. May cause skin sensitization, evidenced by rashes and hives.
Inhalation: Moderate irritation to the nose and respiratory tract. May cause Central Nervous System depression, evidenced by giddiness, headache, dizziness, and nausea.
Ingestion: May cause irritation to the gastrointestinal tract. May cause headache nausea. May cause Central Nervous System depression or other systemic effects.
Systemic Effects: Lungs, eyes, and skin.

IV. FIRST AID MEASURES

Eye Contact: Immediately flush eyes with plenty of cool water for at least 15 minutes while holding the eyes open. If redness, burning, blurred vision, or swelling persists, **CONSULT A PHYSICIAN**.

Skin Contact: Remove product and immediately wash affected area with soap and water. Do not apply greases or ointments. Remove contaminated clothing. Wash clothing with soap and water before reuse. If redness, burning, or swelling persists, **CONSULT A PHYSICIAN**.

Ingestion: **DO NOT INDUCE VOMITING.** Never administer anything by mouth to an unconscious person. Rinse out mouth with water, then drink sips of water to remove taste from mouth. **CONSULT A PHYSICIAN** if vomiting occurs spontaneously, keep head below hips to prevent aspiration.

Inhalation: Remove patient to fresh air. If patient continues to experience difficulty breathing, **CONSULT A PHYSICIAN**.

V. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: Water spray, fog or foam, carbon dioxide, dry chemical, limestone powder.
Fire And Explosion Hazard: Irritating and toxic fumes may be produced at high temperature. In a fire, may produce carbon monoxide, toxic nitrogen oxide, ammonia, and carbon dioxide. Use of water may result in the formation of very toxic aqueous solution. Do not allow run-off from fire fighting to enter drains or water courses.
Fire Fighting Equipment and Procedures: Wear full protective clothing and self-contained breathing apparatus for fire fighting. Isolate fuel supply from fire. Clear fire area of all non-emergency personnel.

VI. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Use cautious judgment when cleaning up spill. Shut off leaks, if possible without personal risk. Wear suitable protective clothing, gloves and eye/face protection. Evacuate personnel to safe areas.
Environmental Precautions: Construct a dike to prevent spreading. Keep out of sewers, storm drains, surface waters, and soils.
Clean-up Methods: **Small spills:** Soak up with absorbent material such as clay, sand or other suitable non-reactive material. Place in leak-proof containers. Seal tightly for proper disposal. **Large spills:** Approach suspected leak areas with caution. Create a dike or trench to contain material. Soak up with absorbent material such as clay, sand or other suitable non-reactive material. Place in leak-proof containers. Seal tightly for proper disposal.
Additional Information: Notify authorities if any exposures to the general public or environment occur or are likely to occur. Dispose in accordance with federal, state, and local regulations.

VII. STORAGE AND HANDLING

Storage: Keep away from: acids, oxidizers, heat, or flames. Keep in cool, dry, well-ventilated area in closed containers. Protect containers from physical damage.
Handling: To prevent skin and eye contact under the foreseeable conditions of use, wear appropriate protective clothing and safety eyewear. When handling, do not eat, drink, or smoke. Wash thoroughly after handling. Avoid breathing fumes. Handle in a well ventilated work area.

VIII. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Measure: Wear appropriate personal protective equipment.
Eye Protection: Avoid contact with eyes. Wear chemical splash goggles or safety glasses with side shield.
Hand Protection: Wear chemical-resistant gloves such as: Nitrile, neoprene, butyl.
Skin and Body Protection: Wear chemical-resistant gloves and other clothing as required to minimize contact.
Respirator Protection: Not required for properly ventilated areas.
Exposure Limits:

Chemical Names	ACGIH (TLV)	OSHA (PEL)
Phenol (Benzenol)	5ppm	5ppm
Phenol, 4,4-(1-methylethylidene)bis	N/E	N/E
Silica, crystalline quartz (airborne particulates of respirable size)	0.1mg/m ³	0.4mg/m ³

IX. PHYSICAL PROPERTIES

Form: Paste
Color: Black
Odor: Ammonia
Boiling Point: N/E
Freezing Point: N/E
Vapor Pressure: N/E
Flash Point: 225°F Open cup
Specific Gravity: 1.36@ 72°F
Solubility In Water: Slight

X. REACTIVITY DATA

Stability: Stable under normal storage conditions.
Conditions To Avoid: Incompatible chemicals, heat, and open flame.
Materials To Avoid: Oxidizing agents and acids.
Hazardous Decomposition Products: Combustion may produce carbon monoxide, carbon dioxide, and nitrogen oxide, and other organic substances.
Hazardous Polymerization: Will not occur.

XI. TOXICOLOGICAL PROPERTIES

Acute Oral (LD₅₀, Rat): N/E
Acute Dermal (LD₅₀, Rabbit): N/E
Acute Inhalation (LC₅₀, Rat): N/E
Chronic Health Hazard Components of this product are not listed as carcinogens in concentrations of 0.1% or greater. Repeated or prolonged exposure may cause allergic reaction and/or limited sensitization.

XII. DISPOSAL CONSIDERATIONS

Waste From Residues / Unused Products: Dispose of container and unused contents in accordance with federal, state, and local requirements.

XIII. TRANSPORTATION

US DOT(CFR): Not Regulated For Transport.
IATA: Not Regulated For Transport.
IMO: Not Regulated For Transport.

XIV. REGULATORY INFORMATION

Country	Regulatory List
USA	TSCA

EPA SARA Title III Section 312 (40 CFR 370) Hazardous Classification:

Acute/Chronic Health Hazard.

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'de minimus' level:

Phenol, 4,4-(1-methylethylidene)bis. Phenol.

US. California "Safe Drinking Water and Toxic Enforcement Act" (Proposition 65):

This product contains small traces of the following chemicals that are known to the State of California to cause cancer and/or reproductive toxicity and other harm.

Component	Regulation	Concentration	Remarks
Carbon Black	ACGIH	Trace	Carcinogenic
Silica, crystalline quartz (airborne particulates of respirable size)	ACGIH	Trace	Carcinogenic

XV. OTHER INFORMATION

HMIS RATING

Health	Flammability	Physical Hazard
2	1	0

N/E – Not Established

This Material Safety Data Sheet (MSDS) is prepared by Simpson Strong-Tie Co. in compliance with the requirements of OSHA 29 CFR Part 1910.1200. The information it contains is offered in good faith as accurate as of the date of this MSDS. This MSDS is provided solely for the purpose of conveying health, safety, and environmental information. No warranty, expressed or implied, is given. Health and Safety precautions may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations.