# ANCHOR SYSTEMS - GENERAL INFORMATION



Simpson Strong-Tie<sup>®</sup> Anchor Systems manufactures a full line of anchoring and fastening products for concrete and masonry. The product line includes adhesives for anchoring and crack injection, mechanical anchors, powder actuated fasteners and drill bits. Anchor Systems products offer unique solutions to applications in the light framed construction market when used with, and without, Simpson connectors.



For complete information on product performance, installation requirements and appropriate code listings for Anchor Systems products please refer to the Anchor Systems catalog (form C-SAS, see page 187 for details) or visit www.simpsonanchors.com.



#### ACRYLIC-TIE<sup>®</sup> HIGH STRENGTH, ALL TEMPERATURE ADHESIVE

Acrylic-Tie® is a two-component, 10:1 ratio acrylic based adhesive for use as a high strength, anchor grouting material. Formulated for use in all types of weather, AT is designed to dispense easily and cure at temperatures down to 0°F. Resin and initiator are dispensed and mixed simultaneously through the mixing nozzle.

CODES: ICC-ER 5791; City of L.A. RR 25459; FL 2304.1



#### SET HIGH STRENGTH EPOXY

Epoxy-Tie<sup>®</sup> SET epoxy is a two-component, low odor, 1:1 ratio, 100% solids epoxy-based adhesive for use as a high strength, non-shrink anchor grouting material. SET is ideal for high load applications where strength is the main concern. Resin and hardener are dispensed and mixed simultaneously through the mixing nozzle.

CODES: ICC ESR-1772; City of L.A. RR 25279; FL 5550.3



SET22





SIMPSON

Strong-Tie

 Anchor
 Adhesive
 P. A. T.

 IN THE SPECS
 • ON THE JOB
 • AT YOUR SERVICE™

#### ET EPOXY-TIE ADHESIVE

Epoxy-Tie® ET is a twocomponent, low odor, 1:1 ratio, 100% solids epoxybased system for use as a high strength, non-shrink anchor grouting material. ET offers an economical solution for general anchoring applications. Resin and hardener are dispensed and mixed simultaneously through the mixing nozzle.

CODES: ICC ER-4945; City of L.A. RR 25185 & RR 25120; FL 5550.1

Refer to the Anchors and Fasteners for Concrete and Masonry catalog for other Adhesive Solutions



ET22

#### 40°F 60°F 80°F 25°F 100°F 0°F AT 24 hrs 8 hrs 4 hrs 1 hr 25 min 20 min Base Material SET 72 hrs 24 hrs 20 hrs 16 hrs Temp FT 72 hrs 24 hrs 24 hrs 12 hrs

### **MECHANICAL ANCHOR SOLUTIONS**

These products are available with additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson for details.

#### TITEN HD<sup>®</sup> Heavy-Duty Screw Anchor

The Titen HD is a patented, high-strength screw anchor for concrete and masonry. The self-undercutting, non-expansion characteristics of the Titen HD makes it the ideal anchor for structural applications, even at minimum edge distances and under reduced spacing conditions. WARNING: Recommended for permanent dry, interior, non-corrosive environments or temporary outdoor applications. Contact Simpson for more information. **CODES:** ICC ESR-1056; City of L.A. RR 25560; FL 2304.2

#### STRONG-BOLT™ Wedge Anchor

The Strong-Bolt is a wedge anchor specifically designed for optimum performance in both cracked and uncracked concrete; a requirement that the 2003 and 2006 IBC place on post-installed anchors. Rigorously tested according to the newest industry-wide criteria, the Strong-Bolt anchor is proven to offer increased reliability in adverse conditions, including proper functioning in cracked concrete under static and seismic loading. **CODES:** ICC-ES ESR-1771; Florida FL 8668.1

#### WEDGE-ALL<sup>®</sup> Wedge Anchor

The Wedge-All is a non-bottom bearing, wedge style expansion anchor for use in solid concrete or grout filled masonry. A one-piece clip ensures uniform holding capacity that increases as tension is applied. **CODES:** ICC ER-3631; City of L.A. RR 24682; FL 5415.3







### ANCHOR SYSTEMS Holdown and Post Base Anchor Solutions

Simpson Strong-Tie® Anchor Systems products offer several post-installed anchorage solutions for holdowns and bases. Often times these products are used when cast-in-place anchors are omitted or mislocated, or in retrofit applications. The following design values provide solutions to common applications encountered in the light frame construction market.

For a more complete solution guide refer to the Anchor Systems Specifications for Connectors technical bulletin T-ANCHORSPEC. For complete information on product performance, installation requirements and appropriate code listings for Anchor Systems products please refer to the Anchor Systems catalog (form C-SAS) or visit www.simpsonanchors.com. Also refer to pages 14-15 for Important Instructions to Designer.

For Corrosion Information, see pages 10-11.

#### ADHESIVE SOLUTIONS

#### Tension Loads for Threaded Rod in Concrete Slab

				•						
	Dril	l Bit	Embed.	Т	ension L	oad Base	d on Bon	d Streng	th	Tension
Anchor	Diame	ter (in)	Depth	Nol	Edge	Near	Edge	Cor	ner	Load Based
	AT	SET	E	AT	SET	AT	SET	AT	SET	Strength
			21⁄8	1315	1805	660	1175	660	1175	
1⁄2	9⁄16	5⁄8	41⁄4	4165	4425	2085	2875	1605	2415	3750
			6	4795	4640	3115	2740	2400	2000	
			21/2	2125	1695	1065	815	1065	815	
5⁄8	11/16	3⁄4	5½	6505	6680	3255	3205	2340	2245	5875
			93⁄8	7920	8350	4830	5345	3335	3820	
			33/8	3250	3865	1625	1855	1430	1615	
3⁄4	<sup>13</sup> ⁄16	7⁄8	6¾	9405	10525	4705	5050	3035	3235	8460
			111/4	10595	11910	5935	6790	3740	4345	
			37⁄8	3550	4780	1740	2295	1390	1835	
7⁄8	1	1	73⁄4	10710	12290	5250	5900	3255	3600	11500
			131⁄8	13785	16670	7170	8670	4205	5085	
			41⁄2	5200	5020	2290	2410	1600	1785	
1	11/16	11/8	9	15125	15015	6655	7205	3725	4250	15025
			15	20630	20600	8045	9680	3750	5190	
			55⁄8	8090	8965	3800	5200	2320	3590	
11⁄4	15⁄16	13⁄8	111⁄4	18090	19260	8500	11170	4505	7010	23490
			183⁄4	3162	30670	13600	15640	6325	8365	

Allowable bond strength loads are based on a reduction factor of 4.0.

- 2. Allowable bond strength loads may be increased 331/6% for short term loading due to wind or seismic forces where permitted by code.
- The allowable tension load is the lesser of the allowable load based on bond strength and 3. the allowable load based on steel strength (A36 rod shown).
- 4. Minimum  $f'_{C} = 2000 \text{ psi}.$
- Anchors are not permitted for use in conjunction with fire-resistive construction. Exceptions are: 5. (1) Anchors designed to resist wind or seismic loading only,
- (2) For other than wind or seismic loading, special consideration is given to fire exposure conditions. 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.
- 7. Some jurisdictions may require special inspection to achieve these allowable loads.

#### TITEN HD<sup>®</sup> ANCHOR SOLUTIONS

NEW longer 1/2" diameter Titen HD anchors achieve sufficient embedment depth to yield tension loads equal to certain Simpson holdowns. Now instead of using cast-in-place bolts or adhesive anchors, the Titen HD can be used as a time saving alternative. Reference flier F-SAS-THD4HD for more information (see page 187 for details).

#### Tension Loads in Normal Weight Concrete Stemwall

						Tensio	n Load		
Size (in)	Drill Bit Dia.	Drill Min. t Dia. Embed.		Min. Edge Distance	Min. End Distance	f'c ≥ 2500 psi Concrete	f'c≥4500 psi Concrete		
(11)	(in)	(in)	(in)	(in)	(in)	Allow. (Ibs.)	f'c≥4500 psi Concrete Allow. (Ibs.) 4760 5075		
1/	1/	10	6	13/	43⁄8	3570	4760		
/2	/2	10	0	19/4	8 3855		5075		

- 1. The allowable loads are based on a reduction factor of 4.0. Allowable loads may be increased 331/3% for short term loading due to wind or seismic forces where permitted
- by code. 3.
- The minumum anchor spacing is 15 inches.
- 4. The minimum concrete thickness is 12 inches.
- Allowable loads may be interpolated for compressive 5. strengths between 2,500 and 4,500 psi.
- 6. Titen HD available in 12", 13", 14" and 15" lengths for this application.
- 7 Suitable for use with any Simpson Strong-Tie holdown that requires a % anchor and allowable loads equal to or less than those shown in the table.
- 8. Some jurisdictions may require special inspection to achieve these allowable loads.



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#### Tension Loads for Threaded Rod in Concrete Stemwall

Anchor	Drill B (i	it Dia. n)	Embed.	Allowable Tension Load	
Dia.	AT SET		AT	SET	
5⁄8	11/16	3⁄4	10	3230	3410
7⁄8	1	1	15	5460	5665





## ANCHOR SYSTEMS Sill Plate Anchor Solutions

Simpson Strong-Tie<sup>®</sup> Anchor Systems offers several post-installed solutions for sill plate anchorage to concrete or concrete block foundations. Often times these products are used in retrofit applications or when cast-in-place anchors are omitted or mislocated. Some products are available in galvanized and stainless steel versions to address most pressure-treated wood applications. The following information provides some guidance

when substituting Anchor Systems products for cast-in-place sill bolts.

For complete information on product performance, installation requirements and appropriate code listings for Anchor Systems products please refer to the Anchor Systems catalog (form C-SAS) or visit www.simpsonanchors.com.

For Corrosion Information, see pages 10-11.

#### EXTERIOR/INTERIOR SILL PLATE ANCHORAGE SOLUTIONS

These products are available with additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson for details.

#### Titen HD<sup>®</sup> Anchor: As a Direct 1 to 1 Replacement for Equivalent Diameter Sill Bolts

Titen HD Size (in.)	Titen HD Model No.	Sill Plate Size (in.)	Minimum Edge Distance	Minimum End Distance
½ x 6	THD50600H <sup>2</sup>	2x or 3x	1¾	8
½ x 8	THD50800H <sup>2</sup>	Double 2x	1¾	8
5∕8 x 6	THD62600H <sup>2</sup>	2x	1¾	10
5⁄8 x 61⁄2	THD62612H <sup>2</sup>	3x	1¾	10
5∕8 x 8	THD62800H <sup>2</sup>	Double 2x	1¾	10

1. Minimum concrete strength 2500 psi.

- For ACQ or CA pressure-treated wood order products Mechanically Galvanized (MG). For additional information, visit www.strongtie.com/info.
- 3. Designs based on a minimum embedment of 31/4" for 1/2" Titen HDs and 33/4" for 5%" Titen HDs.
- For additional information, refer to the latest Simpson Anchor and Fastening Systems for Concrete & Masonry catalon
- Concrete & Masonry catalog. 5. Direct 1 to 1 replacement is based on parallel-toplate, perpendicular-to-plate, and tension

comparisons to a cast-in-place anchor bolt of equivalent diameter.

- For concrete foundation only, 6" minimum stemwall width.
- Minimum edge and end distances are based on distance from edge of concrete to center of bolt.
- Use bearing plate as required by code (see page 30).
   Other Titen HD sizes available
- Other Titen HD sizes available.
   Some jurisdictions may require special
- inspection.

#### RFB and SET/AT/ET: As a Direct 1 to 1 Replacement for Equivalent Diameter Sill Bolts

RFB Size	Minimum Embed.	Sill Plate Size (in.)	Minimum Edge Distance	Minimum End Distance	
RFB #4x7	41/.	2x	13/	01/	
RFB #4x10	4 74	Double 2x or 3x	1%4	0 /2	
RFB #5x8	F	2x	13/	10	
RFB #5x10	5	Double 2x or 3x	19/4		

 Minimum concrete strength 2500 psi.
 For ACQ or CA pressure-treated wood, order products HDG. For additional information vi

products HDG. For additional information, visit www.strongtie.com/info. 3. Direct 1 to 1 replacement is based on

parallel-to-plate, perpendicular-to-plate, and

- bolt of equivalent diameter. 4. For concrete foundations only.
- 5. Minimum edge and end distances are based on

tension comparisons to a cast-in-place anchor

- distance from edge of concrete to center of bolt. 6. Use bearing plate as required by code (see page 30).
- INTERIOR (ONLY) SILL PLATE ANCHORAGE SOLUTIONS

Simpson Anchor Systems offers a full line of powder actuated tools, fasteners and powder loads for fastening to concrete and steel. Powder actuated pins are often used to fasten the sill plate to concrete slabs.

For complete information on product performance, installation requirements and appropriate code listings for Anchor Systems products please refer to the Anchor Systems catalog (*form C-SAS*) or visit www.simpsonanchors.com.







PDPWL (PDPWL Available in galvanized finish for pressure-treated wood applications)

Catalog	Overall Length	Head Diameter	Shank Diameter	Maximum S (in.)	Spacing	Code
Number	(in.)	(in.)	(in.)	Interior Braced Walls <sup>3</sup>	Interior Walls <sup>2</sup>	Ret.
PDPW-300	3	5⁄16	0.145	12	24	
PDPWL-300	3	5⁄16	0.145	12	24	00
PHN-72	21⁄8	5⁄16	0.145	18	36	22
PHNW-72	27⁄8	5⁄16	0.145	18	36	

RFR

 Spacings are based upon the attachment of 2-inch (nominal thickness) wood sill plates, with specific gravity of 0.50 or greater, to concrete floor slabs or footings. For species of wood with specific gravity of 0.42 to 0.49, multiply required spacing of fasteners for shear walls by 0.81. For species of wood with specific gravity of 0.31 to 0.41, multiply the required spacing of fasteners for shear walls by 0.65.

All walls shall have fasteners placed at 6 inches from ends of sill plates, with maximum spacing as shown in the table.

3. Fasteners indicated shall have two pins placed 6 inches and 10 inches, respectively, from each end of sill plates, with maximum spacing as shown in the table.

4. All fasteners must be installed with a minimum 3/4-inch-diameter, No. 16 gauge (0.0598 inch) steel washer.

5. Fasteners shall not be driven until the concrete has reached a compressive strength of 2,000 psi. Minimum edge distance is 1¾ inches.

6. The fasteners shall not be used for the attachment of shear walls having a unit shear in excess of 100 pounds per foot. Spacings shown are independent of the number of building stories.



Code Ref.



**Concrete Connectors & Anchors** 



## ANCHOR SYSTEMS Ledger and Purlin Anchorage Solutions

Simpson Strong-Tie<sup>®</sup> Anchor Systems offers adhesive and mechanical anchor solutions to anchor ledgers to concrete and concrete block (*both grouted and hollow*). These products are also used to anchor roof connections in new and retrofit construction.

For complete information on product performance, installation requirements and appropriate code listings for Anchor Systems products please refer to the Anchor Systems catalog (*form C-SAS*) or visit *www.simpsonanchors.com*.

For Corrosion Information, see pages 10-11.

#### Purlin Anchorage Adhesive Tension Allowable Loads

Rod Dia.	Embed. Depth	Critical End/Edge Distance	SET Spacing	AT Spacing	Allowable Tension Loads (133)				
(in.)	(in.)	(in.)	(in.)	i.) (in.) SET AT					
	NORM AL-WEIGHT CONCRETE (71/4" MIN. WALL THICKNESS)								
5/	/		5	5	5875	5465			
78	-	71/	15	16	5875	5465 5875 4730			
7/	5	/ 1/2	5	5	6020	4730			
1/8						16	24	9555	7505
	GROUT FILLED CMU (8" NOMINAL WALL THICKNESS)								
E/	F	00	8	—	1775 <sup>4</sup>	_			
1/8	5	20	20	_	2195 <sup>4</sup>	_			

1. The allowable loads for the adhesives (only) have been increased  $33\frac{1}{2}$  percent for short term loading due to wind or seismic forces.

 Concrete shall have a minimum f'c = 3000 psi and CMU shall have a minimum f'm = 1500 psi at 28 days. Refer to C-SAS for additional block, mortar and grout specifications.

3. Threaded rods must comply with ASTM A307 minimum

 Allowable loads may be increased to 2225 lbs. for 8" spacing and 2745 lbs. for 20" spacing for designs using the UBC.

#### Titen HD<sup>®</sup> as a Replacement for a Ledger Shear Bolt

		Concrete	_	Gro	ut Filled CM	J
Titen HD Diameter (in.)	Minimum Embedment Depth (in.)	Minimum Edge/End Distance (in.)	Minimum Spacing (in.)	Minimum Embedment Depth (in.)	Minimum Edge/End Distance (in.)	Minimum Spacing (in.)
1/2		6	2	31⁄2		4
5⁄8	23⁄4	71⁄2	21⁄2	41⁄2	12	5
3⁄4		9	3	5½		6

 Titen HD anchors installed with the dimensional limitations described shall achieve equivalent NDS wood calculated capacity as the same diameter anchor bolt for DF, SP, SPF and HF lumber up to 4x ledgers. NDS values may include a maximum 133% duration increase.

- For combined gravity and lateral loads Designers shall consider the unity equation.
   Concrete shall have a minimum f'c = 3000 psi and CMU shall have a minimum f'm = 1500 psi
- at 28 days. Refer to C-SAS-2007 for additional block, mortar and grout specifications. 4. For CMU applications install a minimum of 1<sup>1</sup>/4<sup>\*</sup> from vertical head and T-Joints.
- 5. Titen HD fasteners are recommended for permanent dry environments only.



#### Ledger Shear Bolt Attachment With Titen HD



#### **Anchor Placement**



### Get the rest of the information on Simpson Strong-Tie Anchor Systems

The information in this catalog is an introduction to *Anchoring and Fastening Systems for Concrete & Masonry* catalog. You can get the rest of the technical information three ways:

- Call Simpson Strong-Tie at (800) 999-5099 and request the current Anchors and Fasteners for Concrete and Masonry catalog.
- For a full Simpson Anchor Systems Technical Manual/Binder, call Simpson and ask to speak with your local Technical Sales Representative or Field Engineer. This binder features the C-SAS catalog in easy-to-use tabular format, as well as code reports, MSDS sheets and more!
- Visit Simpson Anchor Systems at *www.simpsonanchors.com*. You can access technical and product application information, code reports, new product information and much more. E-mail Ask Simpson at *www.simpsonanchors.com/ask* for answers to your questions or check our Frequently Asked Questions section for the information you are looking for.
- Call Simpson and request an Anchor Systems CD-ROM which contains all of the information you need for your anchoring and fastening needs. In addition to complete product information and the Anchor Designer, Drill Bit Selector and Adhesive Estimator programs, the CD also contains product code reports, MSDS sheets and product fliers.