SIMPSON
Strong-Tie
ANCHOR SYSTEMS

2011 ADDENDUM

Anchoring and Fastening Systems

For Concrete and Masonry

2009-2010

F-SAS-CSAS2009

Adhesives

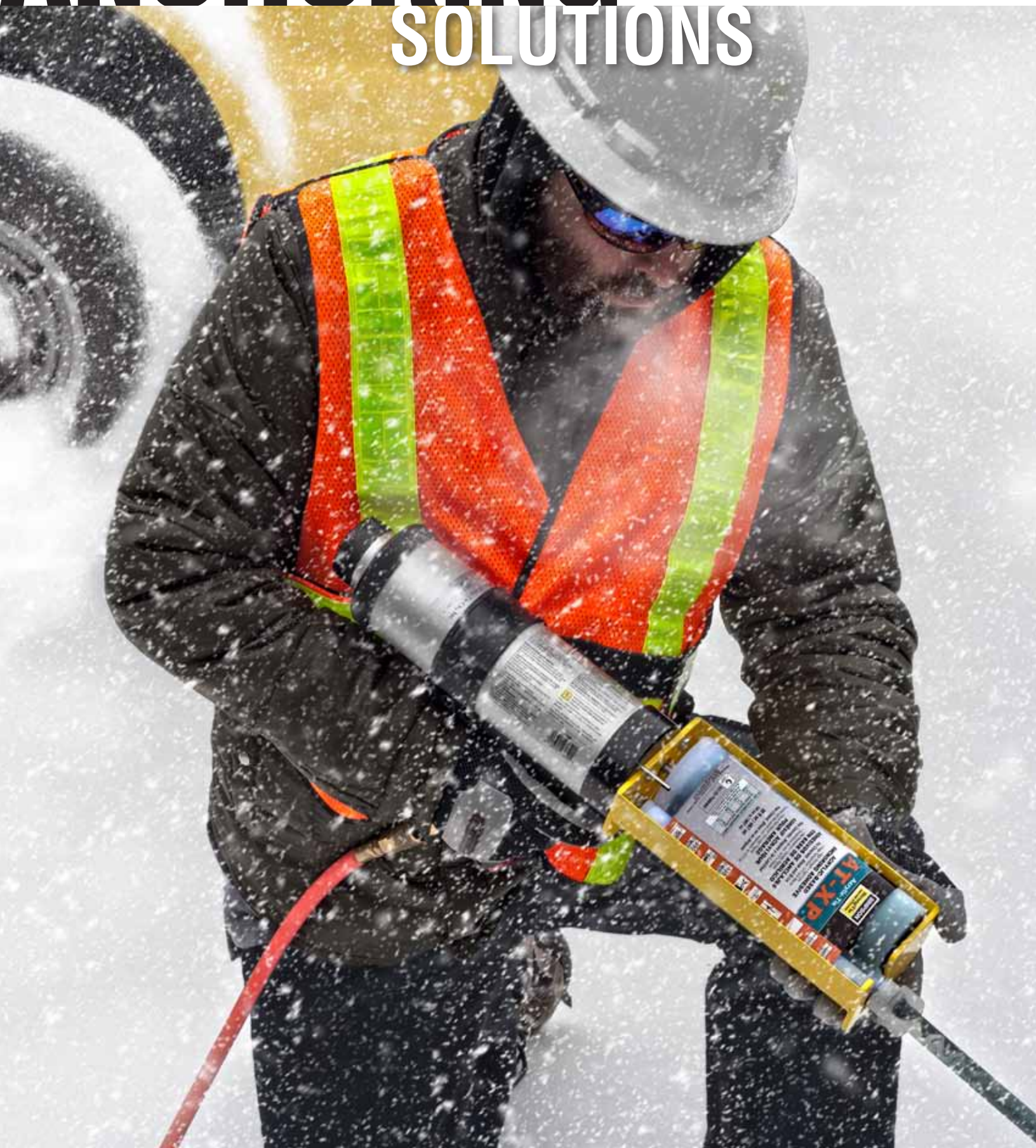
Mechanical Anchors

Gas & Powder Actuated

Carbide

(800) 999-5099
www.simpsonanchors.com

ANCHORING SOLUTIONS



Unwavering Commitment to our Customers

Simpson Strong-Tie has maintained a steadfast commitment to our customers for nearly 60 years. During that time, we have diligently listened and learned about the challenges they face, and answered their needs with high-quality products.

Our new product solutions for 2011 are the result of conversations with designers, contractors and dealers who have told us what they need to make their jobs as efficient as possible. The introduction of Acrylic-Tie® AT-XP™ adhesive is our response to changing codes and our customers' request for faster-curing adhesives that perform well in cold weather. The Strong-Bolt™ 2 wedge anchor and Titen HD® threaded rod hanger are two new, code-listed mechanical anchor solutions for cracked and uncracked concrete.

The new GCN-MEP gas-actuated tool shows how Simpson Strong-Tie Anchor Systems® has responded to the specialized needs of the mechanical, electrical and plumbing (MEP) trades.

We encourage you to learn more about the exciting new products that make Simpson Strong-Tie Anchor Systems the trusted source for concrete and masonry anchoring solutions.

To learn more, visit
www.simpsonanchors.com

AT-XP™ adhesive

Strong-Bolt™ 2 anchor

TitenHD® rod hanger

GCN-MEP gas-actuated nailer

Introduction

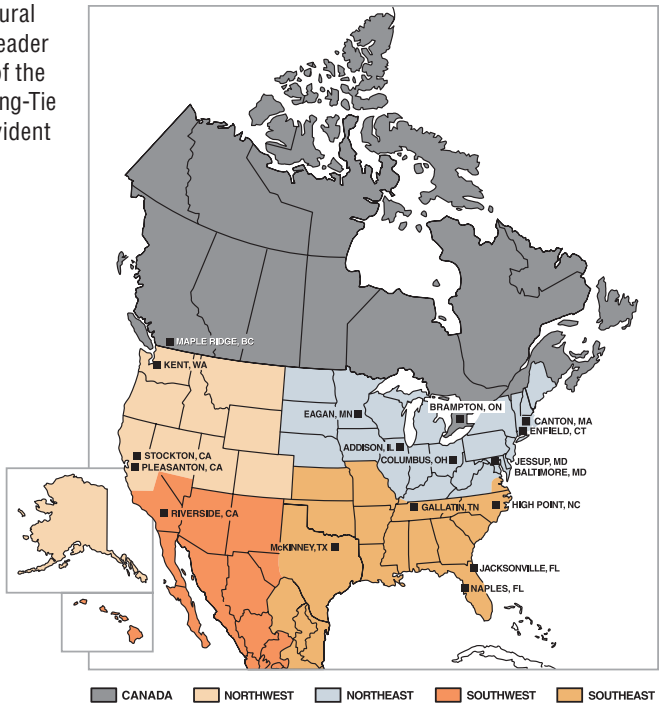
For more than 50 years, Simpson Strong-Tie has focused on creating structural products that help people build safer and stronger homes and buildings. A leader in structural systems research and technology, Simpson Strong-Tie is one of the largest suppliers of structural building products in the world. The Simpson Strong-Tie commitment to product development, engineering, testing and training is evident in the consistent quality and delivery of its products and services.

Simpson Strong-Tie® product lines include:

- Anchors and fasteners for concrete and masonry
- Structural connectors for wood and cold-formed-steel construction
- Strong-Wall® prefabricated shearwalls
- Strong Frame™ ordinary moment frames
- ATS Anchor Tiedown systems for multi-story buildings
- Quik Drive® auto-feed screw driving systems
- Stainless-steel and corrosion-resistant fasteners

The Simpson Strong-Tie Company Inc. "NO EQUAL" pledge includes:

- Quality products value-engineered for the lowest installed cost at the highest rated performance levels
- Most thoroughly tested and evaluated products in the industry
- Strategically-located manufacturing and warehouse facilities
- Field Engineering support.
- National Code Agency listings
- Largest number of patented connectors in the industry
- World-wide locations with an international sales team
- In-house R&D, and tool and die professionals
- In-house product testing and quality control engineers
- Member of AITC, ASTM, ASCE, AWPA, ACI, AISC, CAMA, CSI, ICFA, NBMDA, NLBMDA, PATMI, SETMA, STAFDA, SREA, NFBA, WTCA and local engineering groups



The Simpson Strong-Tie® Quality Policy

We help people build safer structures economically. We do this by designing, engineering and manufacturing "No Equal" structural connectors and other related products that meet or exceed our customers' needs and expectations. Everyone is responsible for product quality and is committed to ensuring the effectiveness of the Quality Management System.

Tom Fitzmyers
Chief Executive Officer

Terry Kingsfather
President

Getting Fast Technical Support

When you call for engineering technical support, we can help you quickly if you have the following information at hand. This will help us to serve you promptly and efficiently.

- Which Simpson Strong-Tie catalog are you using? *(See the front cover for the catalog number)*
- Which Simpson Strong-Tie product are you using?
- What are the design requirements? (e.g. loads, anchor diameter, base material, edge/spacing distance, etc.).

We Are ISO 9001-2000 Registered

Simpson Strong-Tie is an ISO 9001-2000 registered company. ISO 9001-2000 is an internationally-recognized quality assurance system which lets our domestic and international customers know that they can count on the consistent quality of Simpson Strong-Tie's products and services.

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Important Information and General Notes

Welcome to the 2011 Addendum to our 2009–2010 *Anchoring and Fastening Systems for Concrete and Masonry* Catalog

Since the release of the 2009–2010 *Anchoring and Fastening Systems for Concrete and Masonry* catalog, Simpson Strong-Tie Anchor Systems has introduced exciting new products and important additions to existing product lines as well as provided updated technical information. We capture all of this with the new 2011 Addendum to the 2009–2010 *Anchoring and Fastening Systems for Concrete and Masonry* catalog.

Important Information in the 2009–2010 *Anchoring and Fastening Systems for Concrete and Masonry* catalog

Important information pertaining to the specification and installation of Simpson Strong-Tie Anchor Systems products is included in the front section of the 2009–2010 *Anchoring and Fastening Systems for Concrete and Masonry* catalog. Please still see that catalog for the following:

- Corrosion information and supplemental topics
- Additional important information and general notes
- Warnings about improper installation
- General instructions for the Installer
- General instructions for the Designer
- Limited warranty and terms and conditions of sale

Check Website if Any Important Updates are Needed

Until a new Simpson Strong-Tie Anchor Systems® catalog is released in 2012, you are encouraged to visit **www.simpsonanchors.com** occasionally to get updated on any possible developments that may occur after the release of the 2011 Addendum.

As developments warrant more immediate updates, Simpson Strong-Tie Anchoring Systems will place any catalog or addendum corrections on our website at www.simpsonanchors.com/corrections.

Value-Added Software

Simpson Strong-Tie Anchor Systems offers software solutions to help Designers with their product selection and specification processes.

Anchor Selector™ Software for ACI 318

Anchor Selector Software for ACI 318 analyzes and offers anchor solutions using the ACI 318, Appendix D strength design methodology (or CAN/CSA A23.3 Annex D limit states design methodology). It provides cracked- and uncracked-concrete anchor solutions for many Simpson Strong-Tie Anchor Systems® mechanical and adhesive anchors.

With its easy-to-use graphical interface, Anchor Selector Software for ACI 318 offers quick and accurate analysis or design of anchor solutions, eliminating the need for tedious calculations by hand that would otherwise be necessary to determine cracked-concrete anchor solutions. The software helps to increase productivity by eliminating the need to conduct time-consuming calculations.

Features/Benefits

- Helps increase productivity by including pre-qualified post-installed mechanical and adhesive anchor solutions for cracked and/or uncracked concrete
- Anchor types analyzed include Simpson Strong-Tie Anchor Systems solutions as well as cast-in-place anchor options
- Supports the following concrete types:
  - Normal weight concrete
  - Lightweight concrete
  - Normal weight concrete over metal deck
  - Sand-lightweight concrete over metal deck
- Includes cast-in-place anchor solutions
- Single and multiple anchor layouts provide solutions for multiple design applications

To download this free software, go to **www.simpsonanchors.com/software/as_aci318.html**

Table Icon System

In order to allow easier identification of performance data, the following icon system has been incorporated into the sections of the catalog with multiple load tables. These icons will appear in the heading of the table to promote easier visual identification of the type of load, insert type and substrate addressed in the table. Icons are intended for quick identification. All specific information regarding suitability should be read from the table itself.


Threaded Rod


Rebar


Normal-Weight Concrete

Lightweight Concrete


Concrete Block (CMU)


Lightweight Concrete over Metal Deck


Unreinforced Brick (URM)


Steel


Tension Load


Shear Load


Oblique Load


Edge Distance


Spacing

SET-XP® *High-Strength Epoxy-Tie Anchoring Adhesive for Cracked and Uncracked Concrete*

Cracked & Uncracked CONCRETE — IBC 2009 — ICC-ES ESR-2508

SIMPSON Strong-Tie ANCHOR SYSTEMS

SET-XP®, the popular epoxy-based anchoring adhesive formulated for optimum performance in both cracked and uncracked concrete, is now available in a 56 oz. cartridge for larger-volume jobs. Rigorously tested in accordance with ICC-ES AC308 2006 and 2009 IBC requirements, and proven to deliver increased reliability in the most adverse conditions, SET-XP provides greater convenience coupled with unmatched performance. This non-shrink epoxy anchoring adhesive meets the requirements of ASTM C881 specification for Type I and Type IV, Grade 3, Class C epoxy.

USES: When SET-XP® adhesive is used with threaded rod, rebar or the IXP™ anchor, the system can be used in tension and seismic zones where there is a risk of cracks occurring that pass through the anchor location. It is also suitable for uncracked concrete conditions.

CODES: ICC-ES ESR-2508; City of L.A. RR25744; Florida FL 11506.5 NSF/ANSI Standard 61 (216 in²/1000 gal). ⚠ The load tables list values based upon results from the most recent testing and may not reflect those in current code reports. Where additional local jurisdiction requirements apply, consult the current reports for applicable load values.

APPLICATION: Surfaces to receive epoxy must be clean. The base-material temperature must be 50° F or above at the time of installation. For best results, material should be 70–80° 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.

DESIGN EXAMPLE: See pages 26–28 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog

INSTALLATION: See pages 31–32 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog

SHELF LIFE: 24 months from date of manufacture in unopened side-by-side cartridge.

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

COLOR: Resin – white, hardener – black-green. When properly mixed, SET-XP adhesive will be a uniform teal 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 SET-XP® Epoxy-Tie® adhesive have been tested in accordance with ICC-ES's *Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements (AC308)* for the following:

- Seismic and wind loading in cracked and uncracked concrete
- Static tension and shear loading in cracked and uncracked concrete
- Horizontal and overhead installations
- Long-term creep at elevated temperatures
- Static loading at elevated temperatures
- Damp holes
- Freeze-thaw conditions
- Critical and minimum edge distance and spacing

PROPERTY	TEST METHOD	RESULTS
Consistency	ASTM C881	Passed, non-sag
Glass transition temperature	ASTM E1356	155°F (68°C)
Bond strength (moist cure)	ASTM C882	3,742 psi at 2 days
Water absorption	ASTM D570	0.10%
Compressive yield strength	ASTM D695	14,830 psi
Compressive modulus	ASTM D695	644,000 psi
Gel time	ASTM C881	49 minutes

CHEMICAL RESISTANCE: Very good to excellent against distilled water, in-organic 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.

EDT56AP

SET-XP56

SET-XP Cartridge System

Model No.	Capacity ounces (cubic inches)	Cartridge Type	Carton Quantity	Dispensing tool(s)	Mixing Nozzle
SET-XP22	22 (39.7)	side-by-side	10	EDT22B EDT22AP EDT22CKT EDT22S	EMN22i
NEW SET-XP56	56 (101.1)	side-by-side	6	EDT56AP	EMN22i

1. Cartridge estimation guides are available on page 64 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
2. Detailed information on dispensing tools, mixing nozzles and other adhesive accessories is available on pages 87–92 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
3. Use only appropriate Simpson Strong-Tie® mixing nozzle in accordance with Simpson Strong-Tie instructions. Modification or improper use of mixing nozzle may impair epoxy performance.

Cure Schedule[1]

Base Material Temerature		Cure Time (hrs.)
°F	°C	
50	10	72 hrs.
60	16	48 hrs.
70	21	24 hrs.
90	32	24 hrs.
110	43	24 hrs.

1. For water-saturated concrete, the cure times must be doubled.

SUGGESTED SPECIFICATION: Anchoring adhesive shall be a two-component high-solids, epoxy-based system supplied in manufacturer's standard cartridge and dispensed through a static-mixing nozzle supplied by the manufacturer. The adhesive anchor shall have been tested and qualified for performance in cracked and uncracked concrete per ICC-ES AC308. Adhesive shall be Epoxy-Tie® SET-XP® adhesive from Simpson Strong-Tie, Pleasanton, CA. Anchors shall be installed per Simpson Strong-Tie instructions for SET-XP adhesive.

SET-XP® Epoxy Anchor Installation Information and Additional Data for Threaded Rod and Rebar in Normal-Weight Concrete[1]

Characteristic		Symbol	Units	Nominal Anchor Diameter (in.) / Rebar Size						
				⅜ / #3	½ / #4	⅝ / #5	¾ / #6	⅞ / #7	1 / #8	1¼ / #10
Installation Information										
Drill Bit Diameter		d_{hole}	in.	½	⅝	¾	⅞	1	1⅛	1⅜
Maximum Tightening Torque		T_{inst}	ft-lb	10	20	30	45	60	80	125
Permitted Embedment Depth Range[2]	Minimum	h_{ef}	in.	2⅜	2¾	3⅛	3½	3¾	4	5
	Maximum	h_{ef}	in.	7½	10	12½	15	17½	20	25
Minimum Concrete Thickness		h_{min}	in.	$h_{ef} + 5d_o$						
Critical Edge Distance		c_{ac}	in.	$3 \times h_{ef}$						
Minimum Edge Distance		c_{min}	in.	1¾						2¾
Minimum Anchor Spacing		s_{min}	in.	3						6

1. The information presented in this table is to be used in conjunction with the design criteria of ICC-ES AC308. See pages 18–19 of C-SAS-2009 *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
2. Minimum and maximum embedment depths are are listed in accordance with ICC-ES AC308 requirements.

SET-XP® Epoxy Anchor Tension Design Data for Threaded Rod and Rebar in Normal-Weight Concrete[1,12]

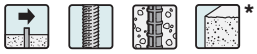



*See page 5 for an explanation of the load table icons

Characteristic			Symbol	Units	Nominal Anchor Diameter (in.) / Rebar Size						
					⅜ / #3	½ / #4	⅝ / #5	¾ / #6	⅞ / #7	1 / #8	1¼ / #10
Steel Strength in Tension											
Threaded Rod	Minimum Tensile Stress Area		A_{se}	in²	0.078	0.142	0.226	0.334	0.462	0.606	0.969
	Tension Resistance of Steel - ASTM A193, Grade B7		N_{sa}	lb.	9,750	17,750	28,250	41,750	57,750	75,750	121,125
	- ASTM A307, Grade C				4,525	8,235	13,110	19,370	26,795	35,150	56,200
	- Type 410 Stainless (ASTM A193, Grade B6)				8,580	15,620	24,860	36,740	50,820	66,660	106,590
	- Type 304 and 316 Stainless (ASTM A193, Grade B8 and B8M)				4,445	8,095	12,880	19,040	26,335	34,540	55,235
	Strength Reduction Factor - Steel Failure		ϕ	—	0.75[9]						
Rebar	Minimum Tensile Stress Area		A_{se}	in²	0.11	0.20	0.31	0.44	0.60	0.79	1.23
	Tension Resistance of Steel - Rebar (ASTM A615, Grade 60)		N_{sa}	lb.	9,900	18,000	27,900	39,600	54,000	71,100	110,700
	Strength Reduction Factor - Steel Failure		ϕ	—	0.75[9]						
Concrete Breakout Strength in Tension (2,500 psi ≤ f'c ≤ 8,000 psi)[15]											
Effectiveness Factor - Uncracked Concrete			k_{uncr}	—	24						
Effectiveness Factor - Cracked Concrete			k_{cr}	—	17						
Strength Reduction Factor - Breakout Failure			ϕ	—	0.65[11]						
Bond Strength in Tension (2,500 psi ≤ f'c ≤ 8,000 psi)[15]											
Temp. Range 1 for Uncracked Concrete[2,4,5]	Characteristic Bond Strength[8]		$\tau_{k,uncr}$	psi	1,651	2,422	2,263	1,942	1,670	2,003	1,094
	Permitted Embedment Depth Range	Minimum	h_{ef}	in	2⅜	2¾	3⅛	3½	3¾	4	5
		Maximum			7½	10	12½	15	17½	20	25
Temp. Range 1 for Cracked Concrete[2,4,5]	Characteristic Bond Strength[8,13,14]		$\tau_{k,cr}$	psi	1,177	1,040	718	1,003	619	968	716
	Permitted Embedment Depth Range	Minimum	h_{ef}	in	3	4	5	6	7	8	10
		Maximum			7½	10	12½	15	17½	20	25
Temp. Range 2 for Uncracked Concrete[3,4,5]	Characteristic Bond Strength[6,8]		$\tau_{k,uncr}$	psi	852	1,250	1,170	1,005	860	1,035	564
	Permitted Embedment Depth Range	Minimum	h_{ef}	in	2⅜	2¾	3⅛	3½	3¾	4	5
		Maximum			7½	10	12½	15	17½	20	25
Temp. Range 2 for Cracked Concrete[3,4,5]	Characteristic Bond Strength[6,8,13,14]		$\tau_{k,cr}$	psi	607	537	371	518	320	500	369
	Permitted Embedment Depth Range	Minimum	h_{ef}	in	3	4	5	6	7	8	10
		Maximum			7½	10	12½	15	17½	20	25
Bond Strength in Tension - Bond Strength Reduction Factors for Continuous Special Inspection											
Strength Reduction Factor - Dry Concrete			$\phi_{dry,\ ci}$	—	0.65[10]						
Strength Reduction Factor - Water-saturated Concrete			$\phi_{sat,\ ci}$	—	0.45[10]						
Additional Factor for Water-saturated Concrete[7]			$K_{sat,\ ci}$	—	0.57						
Bond Strength in Tension - Bond Strength Reduction Factors for Periodic Special Inspection											
Strength Reduction Factor - Dry Concrete			$\phi_{dry,\ pi}$	—	0.55[10]						
Strength Reduction Factor - Water-saturated Concrete			$\phi_{sat,\ pi}$	—	0.45[10]						
Additional Factor for Water-saturated Concrete[7]			$K_{sat,\ pi}$	—	0.48						

1. The information presented in this table is to be used in conjunction with the design criteria of ICC-ES AC308, except as modified below. See pages 18–19 of C-SAS-2009 *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
2. Temperature Range 1: Maximum short-term temperature of 110°F (43°C). Maximum long-term temperature of 75°F (24°C).
3. Temperature Range 2: Maximum short-term temperature of 150°F (66°C). Maximum long-term temperature of 110°F (43°C).
4. Short-term concrete temperatures are those that occur over short intervals (diurnal cycling).
5. Long-term concrete temperature are constant temperatures over a significant time period.
6. For anchors that only resist wind or seismic loads, bond strengths may be increased by 72%.
7. In water-saturated concrete, multiply $\tau_{k,uncr}$ and $\tau_{k,cr}$ by K_{sat}.
8. For anchors installed in overhead and subjected to tension resulting from sustained loading, multiply the value calculated for N_a according to ICC-ES AC308 by 0.75. See page 18 of C-SAS-2009 *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
9. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
10. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
11. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
12. Sand-lightweight and all-lightweight concrete are beyond the scope of this table.
13. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values for ⅞" anchors or #7 rebar anchors must be multiplied by $\alpha_{N,seis} = 0.80$.
14. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values for 1" anchors or #8 rebar anchors must be multiplied by $\alpha_{N,seis} = 0.92$
15. The values of f'_c used for calculation purposes must not exceed 8000 psi (55.1 MPa) for uncracked concrete. The value of f'_c used for calculation purposes must not exceed 2,500 psi (17.2 MPa) for cracked concrete.

SET-XP® Epoxy Anchor Shear Design Data for Threaded Rod and Rebar in Normal-Weight Concrete[1,5]



*See page 5 for an explanation of the load table icons

Characteristic		Symbol	Units	Nominal Anchor Diameter (in.) / Rebar Size						
				⅜ / #3	½ / #4	⅝ / #5	¾ / #6	⅞ / #7	1 / #8	1¼/#10
Steel Strength in Shear										
Threaded Rod	Minimum Shear Stress Area	A_{se}	in²	0.078	0.142	0.226	0.334	0.462	0.606	0.969
	Shear Resistance of Steel - ASTM A193, Grade B7	V_{sa}[6]	lb.	5,850	10,650	16,950	25,050	34,650	45,450	72,675
	- ASTM A307, Grade C			2,715	4,940	7,865	11,625	16,080	21,090	33,720
	- Type 410 Stainless (ASTM A193, Grade B6)			5,150	9,370	14,910	22,040	30,490	40,000	63,955
	- Type 304 and 316 Stainless (ASTM A193, Grade B8 and B8M)			2,670	4,855	7,730	11,420	15,800	20,725	33,140
	Reduction for Seismic Shear - ASTM A307, Grade C[6]	$\alpha_{V,seis}$	—	0.71						
	Reduction for Seismic Shear - ASTM A193, Grade B7[6]			0.71						
	Reduction for Seismic Shear - Stainless (ASTM A193, Grade B6)[6]			0.80						
	Reduction for Seismic Shear - Stainless (ASTM A193, Grade B8 and B8M)[6]			0.80						
	Strength Reduction Factor - Steel Failure	ϕ	—	0.65[2]						
Rebar	Minimum Shear Stress Area	A_{se}	in²	0.11	0.20	0.31	0.44	0.60	0.79	1.23
	Shear Resistance of Steel - Rebar (ASTM A615, Grade 60)	V_{sa}[6]	lb.	5,940	10,800	16,740	23,760	32,400	42,660	66,420
	Reduction for Seismic Shear - Rebar (ASTM A615, Grade 60)[6]	$\alpha_{V,seis}$	—	0.80						
	Strength Reduction Factor - Steel Failure	ϕ	—	0.65[2]						
Concrete Breakout Strength in Shear										
Outside Diameter of Anchor		d_o	in.	0.375	0.500	0.625	0.750	0.875	1.000	1.250
Load Bearing Length of Anchor in Shear		ℓ_e	in.	h_{ef}						
Strength Reduction Factor - Breakout Failure		ϕ	—	0.70[3]						
Concrete Pryout Strength in Shear										
Coefficient for Pryout Strength		k_{cp}	—	2.0						
Strength Reduction Factor - Pryout Failure		ϕ	—	0.70[4]						

1. The information presented in this table is to be used in conjunction with the design criteria of ICC-ES AC308, except as modified below. See pages 18–19 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
2. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of AC 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
3. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
4. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
5. Sand-lightweight and all-lightweight concrete are beyond the scope of this table.
6. The values of V_{sa} are applicable for both cracked and uncracked concrete. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, V_{sa} must be multiplied by $\alpha_{V,seis}$ for the corresponding anchor material.

AT-XP™ *High-Strength Acrylic-Tie® Anchoring Adhesive*

TESTED TO MEET IBC® 2009

SIMPSON StrongTie ANCHOR SYSTEMS

Acrylic-Tie® AT-XP™ anchoring adhesive is specifically formulated for fast curing and delivers optimum performance anchoring threaded rod and dowels in uncracked concrete. AT-XP adhesive blends high strength with easy cold-weather dispensing and excellent reduced-temperature performance to provide a complete adhesive anchoring solution.

Rigorously tested in accordance with ICC-ES AC308 and IBC 2009 requirements for uncracked concrete, reduced-temperature testing results have shown AT-XP adhesive to dispense easily with no load reductions in substrate temperatures as low as 14°F (-10°C). AT–XP is a two-component, high-solids, 10:1 ratio acrylic-based adhesive for use as a high strength, anchor-grouting material. Resin and initiator are dispensed and mixed simultaneously through the mixing nozzle.

USES:

- Threaded rod anchoring in concrete
- Rebar doweling in concrete

CODES: ICC-ES evaluation report pending

APPLICATION: Surfaces to receive adhesive must be clean and free of frost. The base material temperature must be 14°F (-10°C) or above at the time of installation.

INSTALLATION: When the concrete temperature is at or below freezing, ensure any holes drilled in advance are free of frost or ice. See pages 31–32 of C-SAS-2009 *Anchoring and Fastening Systems for Concrete and Masonry* catalog

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

STORAGE CONDITIONS: For best results store between 32°F–80°F (0°C– 27°C). Partially used cartridges can be stored for a limited time by leaving nozzle in place. To re-use, attach new nozzle.

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

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

GEL TIME: Under the ASTM C 881 test method, 9 min – Thin film at 73°F (23°C)

CHEMICAL RESISTANCE: Very good to excellent against distilled water and inorganic acids. Fair to good against organic acids and alkalis, inorganic alkalis and many organic solvents. Poor against ketones. For more detailed information, visit our website.

SUGGESTED SPECIFICATIONS: Anchoring adhesive shall be a two-component, high-solids, acrylic-based system supplied in manufacturer's standard cartridge and dispensed through a static-mixing nozzle supplied by the manufacturer. The adhesive anchor shall have been tested and qualified for performance in cracked and uncracked concrete per ICC-ES AC308. Adhesive shall be Acrylic-Tie® AT-XP™ adhesive from Simpson Strong-Tie, Pleasanton, CA. Anchors shall be installed per Simpson Strong-Tie instructions for AT-XP adhesive. For additional questions, contact Simpson Strong-Tie.

ACCESSORIES: See pages 87–92 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog for information on dispensing tools, mixing nozzles and other accessories.

AT-XP13

AMN19Q

ADT813B

AT-XP13 | AT-XP30 | EMN22i

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

AT-XP Cartridge System

Model No.	Capacity ounces (cubic in.)	Cartridge Type	Carton Qty.	Dispensing Tool	Mixing Nozzle
AT-XP13	13 (23.5)	side-by-side	10	ADT813	AMN19Q
AT-XP30	30 (54.2)	side-by-side	5	ADT30S, ADT30P or ADT30CKT	EMN22i

1. Cartridge estimation guides are available in pages 83–86 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
2. Detailed information on dispensing tools, mixing nozzles and other adhesive accessories is available in pages 87–92 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
3. Use only Simpson Strong-Tie® mixing nozzle in accordance with Simpson Strong-Tie instructions. Modification or improper use of mixing nozzle may impair AT-XP™ adhesive performance.

Cure Schedule[1]

Base Material Temperature		Cure Time (hrs.)
°F	°C	
14	-10	24
32	0	8
50	10	3
68	21	1

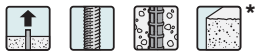
1. For water-saturated concrete, the cure times must be doubled.

AT-XP™ Adhesive Anchor Installation Information and Additional Data for Threaded Rod and Rebar in Normal-Weight Concrete[1]

Characteristic		Symbol	Units	Nominal Anchor Diameter (in.) / Rebar Size						
				⅜ / #3	½ / #4	⅝ / #5	¾ / #6	⅞ / #7	1 / #8	1¼ / #10
Installation Information										
Drill Bit Diameter		d_{hole}	in.	7/16 / ½	9/16 / ⅝	11/16 / ¾	13/16 / ⅞	1	1⅛	1⅜
Maximum Tightening Torque		T_{inst}	ft-lb	10	20	30	45	60	80	125
Permitted Embedment Depth Range[2]	Minimum	h_{ef}	in.	2⅜	2¾	3⅛	3½	3¾	4	5
	Maximum	h_{ef}	in.	7½	10	12½	15	17½	20	25
Minimum Concrete Thickness		h_{min}	in.	$h_{ef} + 5d_o$						
Critical Edge Distance		c_{ac}	in.	3 x h_{ef}						
Minimum Edge Distance		c_{min}	in.	1¾						2¾
Minimum Anchor Spacing		s_{min}	in.	3						6

1. The information presented in this table is to be used in conjunction with the design criteria of ICC-ES AC308. See pages 18-19 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
2. Minimum and maximum embedment depths are set so as to fit the ICC-ES AC308 design model.

*See page 5 for an explanation of the load table icons



AT-XP™ Adhesive Anchor Tension Design Data for Threaded Rod and Rebar in Normal-Weight Concrete[1,12]

Characteristic			Symbol	Units	Nominal Anchor Diameter (in.) / Rebar Size						
					⅜ / #3	½ / #4	⅝ / #5	¾ / #6	⅞ / #7	1 / #8	1¼ / #10
Steel Strength in Tension											
Threaded Rod	Minimum Tensile Stress Area		A_{se}	in²	0.078	0.142	0.226	0.334	0.462	0.606	0.969
	Tension Resistance of Steel - ASTM A307, Grade C		N_{sa}	lb.	4,525	8,235	13,110	19,370	26,795	35,150	56,200
	- ASTM A193, Grade B7				9,750	17,750	28,250	41,750	57,750	75,750	121,125
	- Type 410 Stainless (ASTM A193, Grade B6)				8,580	15,620	24,860	36,740	50,820	66,660	106,590
	- Type 304 and 316 Stainless (ASTM A193, Grade B8 & B8M)				4,445	8,095	12,880	19,040	26,335	34,540	55,235
	Strength Reduction Factor - Steel Failure		ϕ	—	0.75[9]						
Rebar	Minimum Tensile Stress Area		A_{se}	in²	0.11	0.20	0.31	0.44	0.60	0.79	1.23
	Tension Resistance of Steel - Rebar (ASTM A615 Grade 60)		N_{sa}	lb.	9,900	18,000	27,900	39,600	54,000	71,100	110,700
	Strength Reduction Factor - Steel Failure		ϕ	—	0.75[9]						
Concrete Breakout Strength in Tension (2,500 psi ≤ f'c ≤ 8,000 psi)											
Effectiveness Factor - Uncracked Concrete			k_{uncr}	—	24						
Strength Reduction Factor - Breakout Failure			ϕ	—	0.65[11]						
Bond Strength in Tension (2,500 psi ≤ f'c ≤ 8,000 psi)											
Temperature Range 1[2,4,5]	Characteristic Bond Strength[8]		$\tau_{k,uncr}$	psi	1,460	1,460	1,460	1,315	1,240	1,170	1,095
	Permitted Embedment Depth Range	Minimum	h_{ef}	in.	2⅜	2¾	3⅛	3½	3¾	4	5
		Maximum			7½	10	12½	15	17½	20	25
Temperature Range 2[3,4,5]	Characteristic Bond Strength[6,8]		$\tau_{k,uncr}$	psi	1,315	1,315	1,315	1,185	1,120	1,050	985
	Permitted Embedment Depth Range	Minimum	h_{ef}	in.	2⅜	2¾	3⅛	3½	3¾	4	5
		Maximum			7½	10	12½	15	17½	20	25
Bond Strength in Tension - Bond Strength Reduction Factors for Periodic Special Inspection											
Strength Reduction Factor - Dry Concrete			ϕ_{dry}	—	0.65[10]						
Strength Reduction Factor - Water-saturated Concrete			ϕ_{sat}	—	0.45[10]						
Additional Factor for Water-saturated Concrete			K_{sat}	—	0.98[7]						

1. The information presented in this table is to be used in conjunction with the design criteria of ICC-ES AC308, except as modified below. See pages 18-19 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
2. Temperature Range 1: Maximum short-term temperature of 110°F. Maximum long-term temperature of 75°F.
3. Temperature Range 2: Maximum short-term temperature of 180°F. Maximum long-term temperature of 110°F.
4. Short-term concrete temperatures are those that occur over short intervals (diurnal cycling).
5. Long-term concrete temperatures are constant temperatures over a significant time period.
6. For anchors that only resist wind loads, bond strengths may be increased by 11%.
7. In water-saturated concrete, multiply $\tau_{k,uncr}$ by K_{sat}.
8. For anchors installed in overhead and subjected to tension resulting from sustained loading, multiply the value calculated for N_a according to ICC-ES AC308 by 0.75. See pages 18-19 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
9. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
10. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
11. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
12. Sand-lightweight and all-lightweight concrete are beyond the scope of this table.

*See page 5 for an explanation of the load table icons

AT-XP™ Adhesive Anchor Shear Design Data for Threaded Rod and Rebar in Normal-Weight Concrete[1,5]

Characteristic		Symbol	Units	Nominal Anchor Diameter (in.) / Rebar Size						
				⅜ / #3	½ / #4	⅝ / #5	¾ / #6	⅞ / #7	1 / #8	1¼ / #10
Steel Strength in Shear										
Threaded Rod	Minimum Shear Stress Area	A_{se}	in²	0.078	0.142	0.226	0.334	0.462	0.606	0.969
	Shear Resistance of Steel - ASTM A307, Grade C	V_{sa}	lb.	2,715	4,940	7,865	11,625	16,080	21,090	33,720
	- ASTM A193, Grade B7			5,850	10,650	16,950	25,050	34,650	45,450	72,675
	- Type 410 Stainless (ASTM A193, Grade B6)			5,150	9,370	14,910	22,040	30,490	40,000	63,955
	- Type 304 and 316 Stainless (ASTM A193, Grade B8 & B8M)			2,670	4,855	7,730	11,420	15,800	20,725	33,140
	Strength Reduction Factor - Steel Failure	ϕ	—	0.65[2]						
Rebar	Minimum Shear Stress Area	A_{se}	in²	0.11	0.20	0.31	0.44	0.60	0.79	1.23
	Shear Resistance of Steel - Rebar (ASTM A615 Grade 60)	V_{sa}	lb.	5,940	10,800	16,740	23,760	32,400	42,660	66,420
	Strength Reduction Factor - Steel Failure	ϕ		0.65[2]						
Concrete Breakout Strength in Shear										
Outside Diameter of Anchor		d_o	in.	0.375	0.500	0.625	0.750	0.875	1.000	1.250
Load Bearing Length of Anchor in Shear		ℓ_e	in.	h_{ef}						
Strength Reduction Factor - Breakout Failure		ϕ	—	0.70[3]						
Concrete Pryout Strength in Shear										
Coefficient for Pryout Strength		k_{cp}	—	2.0						
Strength Reduction Factor - Pryout Failure		ϕ	—	0.70[4]						

1. The information presented in this table is to be used in conjunction with the design criteria of ICC-ES AC308, except as modified below. See pages 18-19 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
2. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. if the load combinations of AC 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
3. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4 (c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
4. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
5. Sand-lightweight and all-lightweight concrete are beyond the scope of this table.

Adhesive Accessories

Two new adhesive dispensing tools designed to provide reliable, trouble-free dispensing of Simpson Strong-Tie Anchor Systems® adhesives are now available.

EDT22S – Manual Dispensing Tool for 22 oz. Epoxy-Tie® Adhesive Cartridges

The EDT22S epoxy adhesive tool features a steel carriage and is engineered for high-volume, continuous use, delivering maximum performance for all 22 oz. Simpson Strong-Tie Anchor Systems adhesives.

FEATURES:

- 26:1 thrust ratio delivers maximum dispensing power
- Double-gripping plates eliminates drive rod slippage
- Cartridges snap into place for better alignment
- All steel construction for durability

EDT22S

ADT30S – Manual Dispensing Tool for 30 oz. Acrylic-Tie® Adhesive Cartridges

The ADT30S features a steel carriage for ultimate durability and is engineered for continuous, high-volume use.

FEATURES:

- 26:1 thrust ratio
- Double-gripping plates eliminates drive rod slippage
- Rugged and durable steel construction
- Engineered for continuous, high-volume use

ADT30S

Hole Cleaning Brushes

A new 1⅝ x 6" hole cleaning brush has been added to our broad line of sizes. The ETB12 brush is used for cleaning drilled holes 1 3⁄16"–1 3⁄8" in diameter prior to adhesive anchor installation. The brushes have a twisted wire handle with nylon bristles.


ETB

Description	Model No.	For Anchor/Rebar Diameter (in.)	For Hole Diameter (in.)	Ctn Qty
½" x 3" brush (8" total length)	ETB4	¼–5⁄16	3⁄8–7⁄16	24
¾" x 4" brush (16" total length)	ETB6	3⁄8–5⁄8	½–¾	24
1" x 4" brush (16" total length)	ETB8	¾	13⁄16–⅞	24
1" x 4" brush (24" total length)	ETB8L	¾	13⁄16–⅞	24
1 1¼" x 4" brush (29" total length)	ETB10	⅞–1	1– 1⅛	24
NEW 1⅝ x 6" brush (34" total length)	ETB12	1¼	1 3⁄16–1 3⁄8	24

Torq-Cut™ *Self-Undercutting Anchor for Cracked and Uncracked Concrete*

TESTED TO MEET IBC® 2009

SIMPSON StrongTie ANCHOR SYSTEMS

The Torq-Cut™ self-undercutting anchor is a heavy-duty, high-capacity anchor designed and tested for use in cracked and uncracked concrete under static and seismic loading conditions. It is designed to meet the stringent requirements of the 2006 and 2009 IBC for post-installed anchors. The built-in ring with hardened cutters expands with installation torque forming undercut grooves in the concrete. This interlocking connection between the anchor and the concrete provides superior load carrying capacity.

FEATURES:

- Self-undercutting feature provides higher load carrying capacity than conventional mechanical anchors
- AC193 code tested to ensure outstanding performance in both cracked and uncracked concrete
- Excellent for resisting seismic and vibratory loads
- Suitable for seismic applications categories A-F
- Ductile steel rod provides consistent, reliable performance
- Specially designed, low-friction expansion cone minimizes binding and speeds installation
- Installs just like a conventional expansion anchor, no special tool, drill bit, or secondary drilling is required
- The head is stamped with the Simpson Strong-Tie® "≠" sign and size identification for easy post installation verification

MATERIAL: ASTM A193 grade B7 or B7M rod with SAE J403 grade 1144 undercut expansion ring and expansion cone

FINISH: Zinc plated **CODES:** ICC-ES pending

The load tables list values based upon results from the most recent testing and may not reflect those in current code reports. Where additonal local jurisdiction requirements apply, consult the current reports for applicable load values.

TEST CRITERIA: The Torq-Cut anchor has been tested in accordance with ICC-ES's Acceptance Criteria for Mechanical Anchors in Concrete Elements (AC193) and ACI 355.2 for the following:

- Static tension and shear loading in cracked and uncracked concrete
- Seismic and wind loading in cracked and uncracked concrete
- Performance in cracked concrete

NEW Torq-Cut Setting Tool

The TCAST is the steel setting tool used to install the Torq-Cut anchor. It is used to drive the anchor into the pre-drilled hole and protect the threads on the Torq-Cut from being damaged by hammer blows.

INSTALLATION:

Caution: Oversized holes in the base material will make it difficult to set the anchor and will reduce the anchor's load capacity. Do not use an impact wrench to set or tighten the Torq-Cut anchor.

Installation Instructions: Pre-Set Version

1. Drill a hole in the base material to the specified embedment depth using the appropriate diameter carbide drill bit specified for each diameter.
2. Blow the hole clean using compressed air.
3. Assemble the anchor with nut and washer and finger tighten nut so all components are snug (spacer sleeve, expansion sleeve and cone). The bottom of the threaded rod should be flush with the bottom of the cone.
4. Place the anchor into the drilled hole and use a hammer and setting tool to drive the anchor until the washer and nut are tight against the surface of the base material.
5. Remove the nut and washer and install the fixture. Re-assemble the nut and washer over the fixture.
6. Tighten to the required installation torque.

Installation Instructions: Through-Set Version

1. Drill a hole in the base material to the specified embedment depth using the appropriate diameter carbide drill bit specified for each diameter.
2. Blow the hole clean using compressed air.
3. Assemble the anchor with nut and washer and finger tighten nut so all components are snug (spacer sleeve, expansion sleeve and cone). The bottom of the threaded rod should be flush with the bottom of the cone.
4. Place the anchor through the fixture and into the drilled hole. Use a hammer and setting tool to drive the anchor until the washer and nut are tight against the fixture.
5. Tighten to the required installation torque.

APPLICATION: Interior environment where low levels of moisture and corrosive chemicals are present

SUGGESTED SPECIFICATIONS:

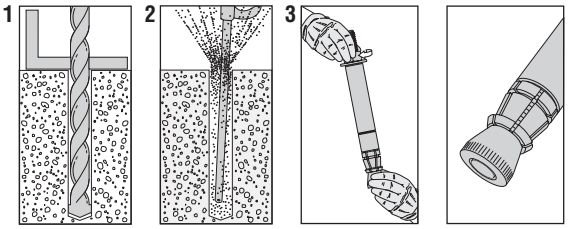
Self-undercutting anchors shall have an expansion ring with undercutting teeth which expands by tightening the nut that pushes the ring into a cone expander via a spacer sleeve. The anchor shall have been tested and qualified for performance in cracked and uncracked concrete per ACI 355.2 and ICC-ES AC193. Undercut anchor shall be the Torq-Cut self-undercutting anchor from Simpson Strong-Tie, Pleasanton, CA, and be installed following the Simpson Strong-Tie instructions.

Torq-Cut™ Self-Undercutting Anchor
U.S. Patent 7,357,613

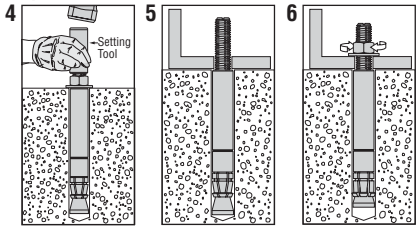
Torq-Cut™ Setting Tool
(Sold separately)

Installation Sequence

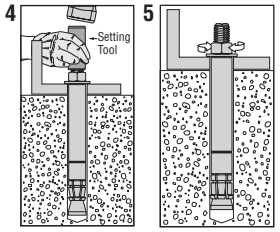
Steps 1, 2, 3 – Pre-Set and Through-Set Version



Steps 4, 5, 6 – Pre-Set Version



Steps 4, 5 – Through-Set Version



Torq-Cut Anchor Installation Data

Nominal Anchor Dia (in)	⅜	½	⅝	¾
Drill Bit Size (in)	⅝	⅞	1	1 ¼
Min. Fixture Hole Dia Pre-Set (in)	7⁄16	9⁄16	11⁄16	13⁄16
Min. Fixture Hole Dia Through-Set (in)	11⁄16	15⁄16	11⁄16	1 5⁄16
Wrench Size (in)	9⁄16	¾	15⁄16	1 ⅛
Setting Tool Required	TCAST37	TCAST50	TCAST62	TCAST75

Torq-Cut™ Anchor Product Data, Pre-Set Version[1]

Size (in.)	Model No.	Drill Bit Dia. (in.)	Min. Drilled Hole Depth (A) (in.)	Min. Effective Embedment Depth, h_{ef} (C) (in.)	Max. Fixture Thickness (F) (in.)	Min. Fixture Hole Dia. (in.)	Threaded Rod Length (D) (in.)	Quantity	
								Box	Carton
⅜ x 6	TCAP370600	⅝	5	4	¾	7/16	6	10	4
½ x 8¾	TCAP500834	⅞	7	5¾	1¼	9/16	8¾	5	2
½ x 9½	TCAP500912	⅞	7	5¾	2	9/16	9½	5	2
⅝ x 11½	TCAP621112	1	9.5	8	1½	11/16	11½	4	2
⅝ x 12½	TCAP621212	1	9.5	8	2½	11/16	12½	4	2
¾ x 14⅝	TCAP751458	1¼	12	10¼	2	13/16	14⅝	4	2
¾ x 16⅝	TCAP751658	1¼	12	10¼	4	13/16	16⅝	4	2

1. See detail below

Torq-Cut™ Anchor Product Data, Through-Set Version[1]

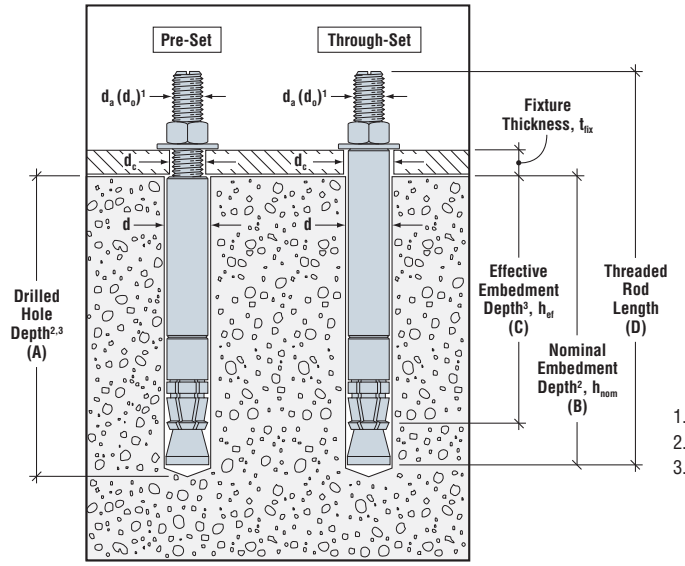
Size (in.)	Model No.	Drill Bit Dia. (in.)	Min. Drilled Hole Depth (A) (in.)	Min. Effective Embedment Depth, h_{ef} (C) (in.)	Max. Fixture Thickness (F) (in.)	Min. Fixture Hole Dia. (in.)	Threaded Rod Length (D) (in.)	Quantity	
								Box	Carton
⅜ x 6	TCAT370600	⅝	5	4	¾	11/16	6	10	4
½ x 8¾	TCAT500834	⅞	7	5¾	1¼	15/16	8¾	5	2
½ x 9½	TCAT500912	⅞	7	5¾	2	15/16	9½	5	2
⅝ x 11½	TCAT621112	1	9.5	8	1½	1 1/16	11½	4	2
⅝ x 12½	TCAT621212	1	9.5	8	2½	1 1/16	12½	4	2
¾ x 14⅝	TCAT751458	1¼	12	10¼	2	1 5/16	14⅝	4	2
¾ x 16⅝	TCAT751658	1¼	12	10¼	4	1 5/16	16⅝	4	2

1. See detail below

Torq-Cut™ Anchor Material Specifications

Carbon Steel Component Materials					
Threaded Rod	Nut	Washer	Spacer Sleeve	Undercut Expansion Ring	Expansion Cone
ASTM A193[1]	SAE J995, Grade 8	ASTM F436, Type 1	SAE J403 Grade 1045 Steel	SAE J403 Grade 1045 Steel	SAE J403 Grade 1144 Steel
Zinc Plated ASTM B633 SC1	Commercial Zinc	Commercial Zinc	Zinc Plated ASTM B633 SC1	Zinc Plated ASTM B633 SC1	Zinc Plated ASTM B633 SC1

1. ⅜" TCA uses ASTM A193 Grade B7 rod. ½", ⅝" and ¾" TCA uses ASTM A193 Grade B7M rod.



Drilled Hole Depth

1. The notation in parentheses is for the 2006 IBC.
2. The Drilled Hole Depth must equal or exceed the Nominal Embedment Depth.
3. For the Through-Set version of the Torq-Cut anchor, if the actual Fixture Thickness (t_{fix}) is less than the Maximum Fixture Thickness (F), the Minimum Drilled Hole Depth (A) must be increased as follows:

   Drilled Hole Depth = A + (F - 7 t_{fix})

   Similarly, the Minimum Effective Embedment Depth (C) is increased as follows:

   Effective Embedment Depth = C + (F-t_{fix})

Torq-Cut™ Anchor Installation and Additional Data[1]

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)			
			3/8	1/2	5/8	3/4
Installation Information						
Drill Bit Diameter	d	in.	5/8	7/8	1	1 1/4
Pre-Set Minimum Baseplate Clearance Hole Diameter[2]	d_c	in.	7/16	9/16	11/16	13/16
Through-Set Minimum Baseplate Clearance Hole Diameter[2]	d_c	in.	11/16	15/16	1 1/16	1 5/16
Installation Torque	T_{inst}	ft-lb	55	90	185	240
Minimum Nominal Embedment Depth	h_{nom}	in.	5	7	9 1/2	12
Critical Edge Distance	c_{ac}	in.	6	8 5/8	12	15 3/8
Minimum Edge Distance	c_{min}	in.	6	7	10	7 3/4
Minimum Spacing	s_{min}	in.	6	7	9	7 3/4
Minimum Concrete Thickness	h_{min}	in.	6	8 5/8	12	15 3/8
Additional Data						
Anchor Category	category	—	1	1	1	1
Yield Strength	f_{ya}	ksi	105	80	80	80
Tensile Strength	f_{uta}	ksi	125	100	100	100
Effective Tensile and Shear Stress Area	A_{se}	in^2	0.078	0.142	0.226	0.334
Axial Stiffness in Service Load Range – uncracked concrete	β_{uncr}	lb/in.	635,830			
Axial Stiffness in Service Load Range - cracked concrete	β_{cr}	lb/in.	346,694			

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D.
2. The clearance must comply with applicable code requirements for the connected element.

Torq-Cut™ Anchor Characteristic Tension Design Data[1,6]

*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)			
			3/8	1/2	5/8	3/4
Minimum Nominal Embedment Depth	h_{nom}	in.	5	7	9 1/2	12
Steel Strength in Tension						
Nominal Steel Strength in Tension	N_{sa}	lb.	9,690	14,190	22,600	33,450
Strength Reduction Factor – Steel Failure	ϕ	—	0.75[2]	0.75[2]	0.75[2]	0.75[2]
Concrete Breakout Strength in Tension[6]						
Minimum Effective Embedment Depth	h_{ef}	in.	4	5 3/4	8	10 1/4
Critical Edge Distance[4]	c_{ac}	in.	6	8 5/8	12	15 3/8
Effectiveness Factor – Uncracked Concrete	k_{uncr}	—	30	30	30	24
Effectiveness Factor – Cracked Concrete	k_{cr}	—	24	24	24	24
Ratio of k_{uncr}/k_{cr}	$\psi_{c,N}$	—	1.25	1.25	1.25	1.00
Strength Reduction Factor – Concrete Breakout Failure	ϕ	—	0.65[5]	0.65[5]	0.65[5]	0.65[5]
Pullout Strength in Tension[7]						
Pullout Strength Uncracked Concrete	$N_{p,uncr}$	lb	—[3]	—[3]	—[3]	—[3]
Pullout Strength Cracked Concrete	$N_{p,cr}$	lb	—[3]	—[3]	—[3]	—[3]
Strength Reduction Factor - Pullout Failure	ϕ	—	—[3]	—[3]	—[3]	—[3]
Tension Resistance for Seismic Applications[7]						
Tension Resistance - Seismic Loads	N_{eq}	lb	9,690	14,190	22,600	33,450
Strength Reduction Factor – Steel Failure	ϕ	—	0.75[2]	0.75[2]	0.75[2]	0.75[2]

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ. Anchors are considered ductile steel elements.
3. Pullout strength is not reported since steel failure controls.
4. The modification factor $\psi_{cp,N} = 1.0$ for cracked concrete. Otherwise, the modification factor for uncracked concrete without supplementary reinforcement to control splitting is either: (1) $\psi_{cp,N} = 1.0$ if $c_{a,min} \geq c_{ac}$ or (2) $\psi_{cp,N} = c_{a,min} / c_{ac} \geq 1.5h_{ef} / c_{ac}$ if $c_{a,min} < c_{ac}$. The modification factor, $\psi_{cp,N}$ is applied to the nominal concrete breakout strength, N_{cb} or N_{cbg}.
5. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
6. For sand-lightweight concrete, in lieu of ACI 318 Section D.3.4, modify the value of N_n by multiplying all values of $\sqrt{f'_c}$ affecting N_n by 0.60. All-lightweight concrete is beyond the scope of this table.
7. For sand-lightweight concrete, modify the value of N_{eq} by 0.60. All-lightweight concrete is beyond the scope of this table.

Torq-Cut™ Characteristic Shear Design Data[1,5]

*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)			
			3/8	1/2	5/8	3/4
Minimum Nominal Embedment Depth	h_{nom}	in.	5	7	9½	12
Steel Strength in Shear						
Steel Strength in Shear	V_{sa}	lb.	5,815	8,515	13,560	20,070
Strength Reduction Factor – Steel Failure	ϕ	—	0.65[2]			
Concrete Breakout Strength in Shear[5]						
Outside Diameter	da (d_O)[6]	in.	5/8	7/8	1	1¼
Load Bearing Length of Anchor in Shear	ℓ_e	in.	2.8	4.3	5.8	7.5
Strength Reduction Factor – Concrete Breakout Failure	ϕ	—	0.70[3]			
Concrete Pryout Strength in Shear						
Coefficient for Pryout Strength	k_{cp}	—	2.0	2.0	2.0	2.0
Strength Reduction Factor – Concrete Pryout Failure	ϕ	—	0.70[4]			
Steel Strength in Shear for Seismic Applications						
Steel Strength in Shear for Seismic Loads	V_{eq}	lb	5,815	8,515	13,560	20,070
Strength Reduction Factor – Steel Failure	ϕ	—	0.65[2]			

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ. Anchors are considered ductile steel elements
3. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
4. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
5. For sand-lightweight concrete, in lieu of ACI 318 Section D.3.4, modify the value of V_n by multiplying all values of $\sqrt{f'_c}$ affecting V_n by 0.60. All-lightweight concrete is beyond the scope of this table.
6. The notation in brackets is for the 2006 IBC.

Strong-Bolt™ 2 *Wedge Anchor*

The Strong-Bolt™ 2 wedge anchor is the next-generation solution for cracked and uncracked concrete. Following rigorous testing according to ICC-ES acceptance criteria, the Strong-Bolt™ 2 anchor received classification as a Category 1 anchor, the highest attainable anchor category for performance in cracked concrete under static and seismic loading. Available in stainless steel, it is code-listed by ICC-ES under the 2009 IBC requirements for post-installed anchors in cracked and uncracked concrete.

FEATURES:

- **Category 1 anchor classification:** The Strong-Bolt™ 2 anchor received classification as a Category 1 anchor, which is established by performance in reliability tests in accordance with AC193 and ACI355.2 test criteria. Category 1 is the highest attainable anchor category for reliability.
- **Tri-segmented clip:** Each segment adjusts independently, increasing follow-up expansion should the hole increase in size as a result of a crack
- **Dual embossments on each clip segment:** Enables clip to undercut into the concrete thereby increasing follow-up expansion should a crack occur
- **The only ⅜" anchor solution approved for 3¼" concrete thickness:** The Strong-Bolt 2 anchor can be installed in cracked concrete with a minimum thickness of 3¼", including concrete-over-metal decking
- **High-strength alloy clip on carbon-steel anchors:** This special alloy clip offers improved performance
- **Standard (ANSI) fractional anchor:** Fits most fixtures and installs with common drill bit sizes and tools
- **Easy post-installation identification:** The head is stamped with Simpson Strong-Tie "≠" symbol and a letter for length identification
- **Type 316 stainless-steel clip on stainless steel anchors:** In addition to superior corrosion resistance, a stainless-steel clip offers "memory" that contributes to the anchor's performance if the hole increases in size because of a crack

MATERIAL: Carbon-steel stud with special alloy clip; stainless-steel stud with stainless-steel clip (⅜" diameter only)

FINISH: Zinc-plated (carbon steel)

CODES: ICC-ES ESR-3037 (carbon and stainless steel); City of Los Angeles – Pending; UL – Pending; FM – Pending; Florida – Pending

TEST CRITERIA:
The Strong-Bolt 2 wedge anchor has been tested in accordance with ICC-ES's Acceptance Criteria for Mechanical Anchors in Concrete Elements (AC 193) and ACI 355.2 for the following:

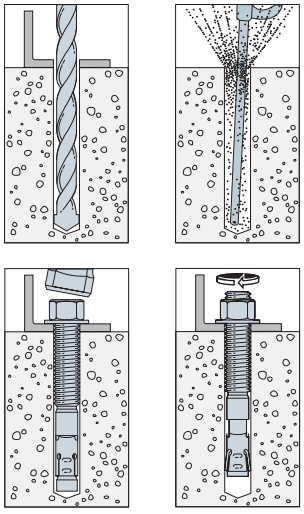
- Static tension and shear loading in cracked and uncracked concrete
- Seismic and wind loading in cracked and uncracked concrete
- Performance in cracked concrete
- Performance in lightweight concrete over metal deck

NOTE PRODUCT AVAILABILITY AS FOLLOWS:
STB2 ⅜"- diameter in carbon steel, stainless steel: first quarter 2011
STB2 ½"- and ⅝"-diameter in carbon steel: second quarter 2011

Strong-Bolt™ 2 Wedge Anchor

Head Stamp
The head is stamped with the Simpson Strong-Tie "No-Equal" symbol and the length identification letter.

Installation Sequence



Length Identification Head Marks on Strong-Bolt™ 2 Wedge Anchors (corresponds to length of anchor – inches)

Mark	Units	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
From	in.	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	11	12	13	14	15	16	17	18
Up To But Not Including	in.	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	11	12	13	14	15	16	17	18	19

Strong-Bolt™ 2 *Wedge Anchor Product Information*

SIMPSON Strong-Tie ANCHOR SYSTEMS

Strong-Bolt™ 2 Anchor Product Data

Size (in.)	Carbon Steel Model No.	316 Stainless Steel Model No.	Drill Bit Dia. (in.)	Thread Length (in.)	Quantity	
					Box	Carton
⅜ x 2¾	STB2-37234	STB2-372346SS	⅜	1 5/16	50	250
⅜ x 3	STB2-37300	STB2-373006SS	⅜	1 9/16	50	250
⅜ x 3½	STB2-37312	STB2-373126SS	⅜	2 1/16	50	250
⅜ x 3¾	STB2-37334	STB2-373346SS	⅜	2 5/16	50	250
⅜ x 5	STB2-37500	STB2-375006SS	⅜	3 9/16	50	200
⅜ x 7	STB2-37700	STB2-377006SS	⅜	5 9/16	50	200
½ x 3¾	STB2-50334	•	½	2 1/16	25	125
½ x 4¼	STB2-50414	•	½	2 9/16	25	100
½ x 5½	STB2-50512	•	½	3 13/16	25	100
½ x 7	STB2-50700	•	½	5 5/16	25	100
½ x 8½	STB2-50812	•	½	6	25	50
½ x 10	STB2-50100	•	½	6	25	50
⅝ x 4½	STB2-62412	•	⅝	2 7/16	20	80
⅝ x 5	STB2-62500	•	⅝	2 15/16	20	80
⅝ x 6	STB2-62600	•	⅝	3 15/16	20	80
⅝ x 7	STB2-62700	•	⅝	4 15/16	20	80
⅝ x 8½	STB2-62812	•	⅝	6	20	40
⅝ x 10	STB2-62100	•	⅝	6	10	20

Material Specifications

Carbon Steel - Zinc Plated[1]			
Component Materials			
Anchor Body	Nut	Washer	Clip
Carbon Steel	Carbon Steel ASTM A 563, Grade A	Carbon Steel ASTM F844	Carbon Steel ASTM A 568

1. Zinc meets ASTM B 633, Class SC 1 (Fe / Zn 5), Type III.

Stainless Steel			
Component Materials			
Anchor Body	Nut	Washer	Clip
Type 316 Stainless Steel	Type 316 Stainless Steel	Type 316 Stainless Steel	Type 316 Stainless Steel

Strong-Bolt 2 Installation Information[1]

Characteristic	Symbol	Units	Nominal Anchor Diameter (in.)									
			Carbon Steel								Stainless Steel	
			⅜		½			⅝			⅜	
Installation Information												
Nominal Diameter	d_a[3]	in.	⅜		½			⅝			⅜	
Drill Bit Diameter	d	in.	⅜		½			⅝			⅜	
Baseplate Clearance Hole Diameter[2]	d_c	in. (mm)	7/16 (11.1)		9/16 (14.3)			11/16 (17.5)			7/16 (11.1)	
Installation Torque	T_{inst}	ft-lbf (N-m)	30 (40.7)		60 (81.3)			90 (122.0)			30 (40.7)	
Nominal Embedment Depth[5]	h_{nom}	in. (mm)	2 (51)	2⅞ (73)	2¾ (70)		3⅞ (98)	3⅜ (86)	5⅛ (130)		2 (51)	2⅞ (73)
Effective Embedment Depth	h_{ef}	in. (mm)	1⅝ (41)	2½ (64)	2¼ (57)		3⅜ (86)	2¾ (70)	4½ (114)		1⅝ (41)	2½ (64)
Minimum Overall Anchor Length	ℓ_{anch}	in. (mm)	2¾ (70)	3½ (89)	3¾ (95)		5½ (140)	4½ (114)	6 (152)		2¾ (70)	3½ (89)
Critical Edge Distance	c_{ac}	in. (mm)	6½ (165)	6 (152)	6½ (165)	6½ (165)	7½ (191)	7½ (191)	9 (229)		6½ (165)	8½ (216)
Minimum Edge Distance	c_{min}	in. (mm)	6 (152)		7 (178)	4 (102)	4 (102)	6½ (165)			6 (152)	
	for $s \geq$	in. (mm)	— —		— —	— —	— —	— —			10 (254)	
Minimum Spacing	s_{min}	in. (mm)	3 (76)		7 (178)	4 (102)	4 (102)	5 (127)			3 (76)	
	for $c \geq$	in. (mm)	— —		— —	— —	— —	— —			10 (254)	
Minimum Concrete Thickness	h_{min}	in. (mm)	3¼ (83)	4½ (114)	4½ (114)	5½ (140)	6 (152)	5½ (140)	7⅞ (200)		3¼ (83)	4½ (114)
Additional Data												
Yield Strength	f_{ya}	psi (MPa)	92,000 (634)		85,000 (586)						80,000 (552)	
Tensile Strength	f_{uta}[4]	psi (MPa)	115,000 (793)								100,000 (689)	
Minimum Tensile and Shear Stress Area	A_{se}	in² (mm²)	0.0514 (33)		0.105 (68)			0.166 (107)			0.0514 (33)	
Axial Stiffness in Service Load Range – Cracked and Uncracked Concrete	β	lb./in (N/mm)	34,820 (6,098)		63,570 (11,133)			91,370 (16,001)			29,150 (5,105)	

For **SI**: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m, 1 psi = 6.89 Pa, 1 in² = 645 mm², 1 lbf/in = 0.175 N/mm.

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D.
2. The clearance must comply with applicable code requirements for the connected element.
3. For the 2006 IBC, d_o replaces d_a.
4. For the 2003 IBC, f_{ut} replaces f_{uta}.
5. Drilled hole depth to be greater than or equal to nominal embedment depth.

Strong-Bolt™ 2 *Wedge Anchor Performance Data*

SIMPSON Strong-Tie ANCHOR SYSTEMS

Strong-Bolt™ 2 Wedge Anchor Tension Strength Design Data[1]

*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Nominal Anchor Diameter (in.)							
			Carbon Steel						Stainless Steel	
			3/8		1/2		5/8		3/8	
Anchor Category	1,2 or 3	—	1						1	
Nominal Embedment Depth	h_{nom}	in. (mm)	2 (51)	2 7/8 (73)	2 3/4 (70)	3 7/8 (98)	3 3/8 (86)	5 1/8 (130)	2 (51)	2 7/8 (73)
Steel Strength in Tension (ACI 318 Section D.5.1)										
Steel Strength in Tension	N_{sa}	lb (kN)	5,600 (24.9)		12,100 (53.8)		19,070 (84.8)		5,140 (22.9)	
Strength Reduction Factor – Steel Failure[2]	ϕ_{sa}	—	0.75						0.75	
Concrete Breakout Strength in Tension (ACI 318 Section D.5.2)										
Effective Embedment Depth	h_{ef}	in. (mm)	1 5/8 (41)	2 1/2 (64)	2 1/4 (57)	3 3/8 (86)	2 3/4 (70)	4 1/2 (114)	1 5/8 (41)	2 1/2 (64)
Critical Edge Distance	c_{ac}	in. (mm)	6 1/2 (165)	6 (152)	6 1/2 (165)	7 1/2 (191)	7 1/2 (191)	9 (229)	6 1/2 (165)	8 1/2 (216)
Effectiveness Factor – Uncracked Concrete	k_{uncr}	—	24		24		24		24	
Effectiveness Factor – Cracked Concrete	k_{cr}	—	17		17		17		17	
Modification Factor	$\psi_{c,N}$[8]	—	1.00		1.00		1.00		1.00	
Strength Reduction Factor – Concrete Breakout Failure[3]	ϕ_{cb}	—	0.65						0.65	
Pull-Out Strength in Tension (ACI 318 Section D.5.3)										
Pull-Out Strength Cracked Concrete (f'_c = 2500 psi)	$N_{p,cr}$	lb (kN)	1,300[5] (5.8)[5]	2,775[5] (12.3)[5]	N/A[4]	3,735[5] (16.6)[5]	N/A[4]	6,895[5] (30.7)[5]	1,720[6] (7.7)[6]	3,145[6] (14.0)[6]
Pull-Out Strength Uncracked Concrete (f'_c = 2500 psi)	$N_{p,uncr}$	lb (kN)	N/A[4]	3,340[5] (14.9)[5]	3,615[5] (16.1)[5]	5,255[5] (23.4)[5]	N/A[4]	9,025[5] (40.1)[5]	N/A[4]	4,770[6] (21.2)[6]
Strength Reduction Factor – Pullout Failure[7]	ϕ_p	—	0.65						0.65	
Tensile Strength for Seismic Applications (ACI Section D.3.3.3)										
Tension Strength of Single Anchor for Seismic Loads (f'_c = 2500 psi)	$N_{p,eq}$	lb (kN)	1,300[5] (5.8)[5]	2,775[5] (12.3)[5]	N/A[4]	3,735[5] (16.6)[5]	N/A[4]	6,895[5] (30.7)[5]	1,720[6] (7.7)[6]	2,830[6] (12.6)[6]
Strength Reduction Factor – Pullout Failure[7]	ϕ_{eq}	—	0.65						0.65	

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. The information presented in this table must be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. The tabulated value of ϕ_{sa} applies when the load combinations of Section 1605.2.1 of the IBC, or ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, the appropriate value of ϕ_{sa} must be determined in accordance with ACI 318 D.4.5. Strong-Bolt™ 2 anchors are ductile steel elements as defined in ACI 318 D.1.
3. The tabulated value of ϕ_{cb} applies when both the load combinations of Section 1605.2.1 of the IBC, or ACI 318 Section 9.2 are used and the requirements of ACI 318 Section D.4.4(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided. For installations where complying supplementary reinforcement can be verified, the ϕ_{cb} factors described in ACI 318 D.4.4 for Condition A are allowed. If the load combinations of ACI 318 Section 9.2 are used and the requirements of ACI 318 Section D.4.4 for Condition A are met, the appropriate value of ϕ_{cb} must be determined in accordance with ACI 318 D.4.4(c). If the load combinations of ACI 318 Appendix C are used, the appropriate value of ϕ_{cb} must be determined in accordance with ACI 318 D.4.5(c).
4. N/A (Not Applicable) denotes that pullout resistance does not need to be considered.
5. The characteristic pull-out strength for greater concrete compressive strengths shall be increased by multiplying the tabular value by $(f'_c / 2{,}500 \text{ psi})^{0.5}$ or $(f'_c / 17.2 \text{ MPa})^{0.5}$.
6. The characteristic pull-out strength for greater concrete compressive strengths shall be increased by multiplying the tabular value by $(f'_c / 2{,}500 \text{ psi})^{0.3}$ or $(f'_c / 17.2 \text{ MPa})^{0.3}$.
7. The tabulated value of ϕ_p or ϕ_{eq} applies when the load combinations of Section 1605.2.1 of the IBC, or ACI 318 Section 9.2 are used and the requirements of ACI 318 D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, appropriate value of ϕ must be determined in accordance with ACI 318 Section D.4.5(c).
8. For the 2003 IBC, Ψ_3 replaces $\Psi_{c,N}$.
9. When anchors are used in structural sand-lightweight concrete, the modification factor (/\) for concrete breakout strength may be taken as 0.6. In addition, the pullout strength $N_{p,uncr}$, $N_p$cr and $N_{p,eq}$ shall be multiplied by 0.6 as applicable.

Strong-Bolt™ 2 Wedge Anchor Shear Strength Design Data[1]

*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Nominal Anchor Diameter (in.)							
			Carbon Steel						Stainless Steel	
			⅜		½		⅝		⅜	
Anchor Category	1,2 or 3	—	1						1	
Nominal Embedment Depth	h_{nom}	in. (mm)	2 (51)	2⅞ (73)	2¾ (70)	3⅞ (98)	3⅜ (86)	5⅛ (130)	2 (51)	2⅞ (73)
Steel Strength in Shear (ACI 318 Section D.6.1)										
Steel Strength in Shear	V_{sa}	lb (kN)	1,800 (8.0)		7,235 (32.2)		11,035 (49.1)		3,085 (13.7)	
Strength Reduction Factor – Steel Failure[2]	ϕ_{sa}	—	0.65						0.65	
Concrete Breakout Strength in Shear (ACI 318 Section D.6.2)										
Outside Diameter	d_a[5]	in. (mm)	0.375 (9.5)		0.500 (12.7)		0.625 (15.9)		0.375 (9.5)	
Load Bearing Length of Anchor in Shear	ℓ_e	in. (mm)	1.625 (41)	2.500 (64)	2.250 (57)	3.375 (86)	2.750 (70)	4.500 (114)	1.625 (41)	2.500 (64)
Strength Reduction Factor – Concrete Breakout Failure[3]	ϕ_{cb}	—	0.70						0.70	
Concrete Pryout Strength in Shear (ACI 318 Section D.6.3)										
Coefficient for Pryout Strength	k_{cp}	—	1.0	2.0	1.0	2.0	2.0		1.0	2.0
Effective Embedment Depth	h_{ef}	in. (mm)	1⅝ (41)	2½ (64)	2¼ (57)	3⅜ (86)	2¾ (70)	4½ (114)	1⅝ (41)	2½ (64)
Strength Reduction Factor – Concrete Pryout Failure[4]	ϕ_{cp}	—	0.70						0.70	
Steel Strength in Shear for Seismic Applications (ACI 318 Section D.3.3.3)										
Shear Strength of Single Anchor for Seismic Loads (f'_c = 2500 psi)	V_{eq}	lb (kN)	1,800 (8.0)		6,510 (29.0)		9,930 (44.2)		3,085 (13.7)	
Strength Reduction Factor – Steel Failure[2]	ϕ_{sa}	—	0.65						0.65	

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. The information presented in this table must be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. The tabulated value of ϕ_{sa} applies when the load combinations of Section 1605.2.1 of the IBC, or ACI 318 Section 9.2 are used and the requirements of ACI 318 D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, the appropriate value of ϕ_{sa} must be determined in accordance with ACI 318 D.4.5. Strong-Bolt™ 2 anchors are ductile steel elements as defined in ACI 318 D.1.
3. The tabulated value of ϕ_{cb} applies when both the load combinations of Section 1605.2.1 of the IBC, or ACI 318 Section 9.2 are used and the requirements of ACI 318 Section D.4.4(c) for Condition B are met. Condition B applies where supplementary reinforcement is not provided. For installations where complying supplementary reinforcement can be verified, the ϕ_{cb} factors described in ACI 318 Section D.4.4 for Condition A are allowed. If the load combinations of ACI 318 Section 9.2 are used and the requirements of ACI 318 Section D.4.4 for Condition A are met, the appropriate value of ϕ_{cb} must be determined in accordance with ACI 318 Section D.4.4(c). If the load combinations of ACI 318 Appendix C are used, the appropriate value of ϕ_{cb} must be determined in accordance with ACI 318 Section D.4.5(c).
4. The tabulated value of ϕ_{cp} applies when both the load combinations of IBC Section 1605.2.1 or ACI 318 Section 9.2 are used and the requirements of ACI 318 D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, the appropriate value of ϕ_{cp} must be determined in accordance with ACI 318 D.4.5(c).
5. For the 2006 IBC, d_o replaces d_a.

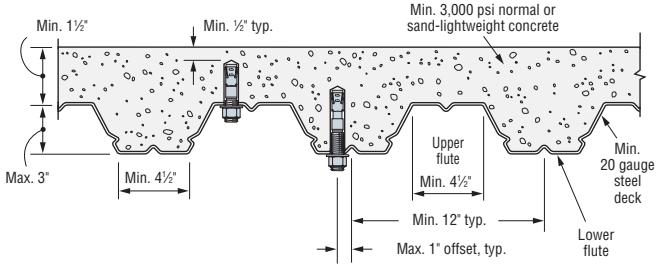
Strong-Bolt™ 2 Wedge Anchor Tension and Shear Strength Design Data for the Soffit of Concrete Over Profile Steel Deck, Floor and Roof Assemblies[1,2,6,9]

*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Nominal Anchor Diameter (in.)										
			Carbon Steel								Stainless Steel		
			Lower Flute						Upper Flute		Lower Flute		Upper Flute
			⅜		½		⅝		⅜	½	⅜		⅜
Nominal Embedment Depth	h_{nom}	in. (mm)	2 (51)	3⅜ (86)	2¾ (70)	4½ (114)	3⅜ (86)	5⅝ (143)	2 (51)	2¾ (70)	2 (51)	3⅜ (86)	2 (51)
Effective Embedment Depth	h_{ef}	in. (mm)	1⅝ (41)	3 (76)	2¼ (57)	4 (102)	2¾ (70)	5 (127)	1⅝ (41)	2¼ (57)	1⅝ (41)	3 (76)	1⅝ (41)
Installation Torque	T_{inst}	ft-lbf (N-m)	30 (40.7)		60 (81.3)		90 (122.0)		30 (40.7)	60 (81.3)	30 (40.7)		30 (40.7)
Pullout Strength, concrete on metal deck (cracked)[3,4]	$N_{p,deck,cr}$	lb (kN)	1,250[7] (5.6)[7]	2,230[7] (9.9)[7]	2,040[7] (9.1)[7]	2,730[7] (12.1)[7]	2,615[7] (11.6)[7]	4,990[7] (22.2)[7]	1,610[7] (7.2)[7]	3,785[7] (16.8)[7]	1,120[8] (5.0)[8]	2,795[8] (12.4)[8]	1,410[8] (6.3)[8]
Pullout Strength, concrete on metal deck (uncracked)[3,4]	$N_{p,deck,uncr}$	lb (kN)	1,765[7] (7.9)[7]	3,150[7] (14.0)[7]	2,580[7] (11.5)[7]	3,840[7] (17.1)[7]	3,685[7] (16.4)[7]	6,565[7] (29.2)[7]	2,275[7] (10.1)[7]	4,795[7] (21.3)[7]	1,580[8] (7.0)[8]	3,950[8] (17.6)[8]	1,990[8] (8.9)[8]
Steel Strength in Shear, concrete on metal deck[5]	$V_{st,deck}$	lb (kN)	1,595 (7.1)	3,490 (15.5)	2,135 (9.5)	4,580 (20.4)	2,640 (11.7)	7,000 (31.1)	4,060 (18.1)	5,920 (26.3)	2,285 (10.2)	3,785 (16.8)	3,830 (17.0)

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1. The information presented in this table must be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. Profile steel deck must comply with the configuration in the figure below, and have a minimum base-steel thickness of 0.035 inch (0.889 mm) [20 gauge]. Steel must comply with ASTM A 653/A 653M SS Grade 33 with minimum yield strength of 38,000 psi (262 Mpa). Concrete compressive strength shall be 3,000 psi minimum.
3. For anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies, calculation of the concrete breakout strength may be omitted.
4. In accordance with ACI 318 Section D.5.3.2, the nominal pullout strength in cracked concrete for anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and rood assemblies $N_{p,deck,cr}$ shall be substituted for $N_{p,cr}$. Where analysis indicates no cracking at service loads, the normal pullout strength in uncracked concrete $N_{p,deck,uncr}$ shall be substituted for $N_{p,uncr}$.
5. In accordance with ACI 318 Section D.6.1.2(c), the shear strength for anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and rood assemblies $V_{st,deck}$ shall be substituted for V_{sa}.
6. The minimum anchor spacing along the flute must be the greater of $3.0h_{ef}$ or 1.5 times the flute width.
7. The characteristic pull-out strength for greater concrete compressive strengths shall be increased by multiplying the tabular value by $(f'_c/3{,}000\ psi)^{0.5}$ or $(f'_c/20.7\ MPa)^{0.5}$.
8. The characteristic pull-out strength for greater concrete compressive strengths shall be increased by multiplying the tabular value by $(f'_c / 3{,}000\ psi)^{0.3}$ or $(f'_c / 20.7\ MPa)^{0.3}$.
9. Minimum distance to edge of panel is $2h_{ef}$.



Example: Strong-Bolt™ 2 Wedge Anchor Allowable Stress Design Tension Values for Illustrative Purposes[1,2,3,4,5,6,7,8,9]

*See page 5 for an explanation of the load table icons

Nominal Anchor Diameter (in.)	Nominal Embedment Depth, h_{nom} (in.)	Effective Embedment Depth, h_{ef} (in.)	Allowable Tension Load, fN_n/a (lbs.)
Carbon Steel			
⅜	2	1⅝	1,090
	2⅞	2½	1,465
½	2¾	2¼	1,585
	3⅞	3⅜	2,305*
⅝	3⅜	2¾	2,400
	5⅛	4½	3,965
Stainless Steel			
⅜	2	1⅝	1,090
	2⅞	2½	2,080

Design Assumptions:
1. Single anchor.
2. Tension load only.
3. Concrete assumed to remain uncracked for the life of the anchorage.
4. Load combinations taken from ACI 318 Section 9.2 (no seismic loading).
5. 30% Dead Load (D) and 70% Live Load (L); Controlling load combination is 1.2D + 1.6L. Calculation of a based on weighted average: $\alpha = 1.2D + 1.6L = 1.2(0.3) + 1.6(0.7) = 1.48$.
6. Normal weight concrete with $f'_c = 2{,}500$ psi.
7. $c_{a1} = c_{a2} \geq c_{ac}$
8. Concrete thickness, $h \geq h_{min}$
9. Values are for Condition B (supplementary reinforcement in accordance with ACI 318 D.4.4 is not provided.)

*Illustrative Procedure (reference Strong-Bolt™ 2 Tension Strength Design Data Table): Strong-Bolt™ 2, ½"-diameter with an effective embedment depth, h_{ef} = 3 ⅜".

Step 1: Calculate steel strength in tension in accordance with ACI 318 D.5.1; $\phi_{sa}N_{sa}$ = 0.75 x 12,100 = 9,075 lbs.

Step 2: Calculate concrete breakout strength in tension in accordance with ACI 318 D.5.2; $\phi_{cb}N_{cb}$ = 0.65 x 7,440 = 4,836 lbs.

Step 3: Calculate pullout strength in tension in accordance with ACI 318 D.5.3; $\phi_p N_{p,uncr}$ = 0.65 x 5,255 = 3,416 lbs.

Step 4: The controlling value from Steps 1, 2, and 3 above in accordance with ACI 318 D.4.1.2; ϕN_n = 3,416 lbs.

Step 5: Divide the controlling value by the conversion factor a as determined in footnote 5; $T_{allowable,ASD} = \phi N_n/\alpha$ = 3,416 / 1.48 = 2,305 lbs.

The edge distance, spacing and member thickness requirements in the Strong-Bolt™ 2 Installation Information Table apply to a single anchor and anchor groups.

Titen HD® *Threaded Rod Hanger*

Cracked & Uncracked CONCRETE IBC 2009 ICC-ES ESR-2713

SIMPSON Strong-Tie ANCHOR SYSTEMS

The Titen HD® rod hanger is a high-strength screw anchor designed to suspend threaded rod from concrete slabs and beams in order to hang pipes, cable tray and HVAC equipment. Two new designs feature a ⅜" dia. shank which specifically qualifies these models for code listing by ICC-ES for cracked and uncracked concrete applications under the 2006 and 2009 IBC.

FEATURES:

- High-load capacity as a result of the full-length threads that undercut the concrete and effectively transfer load into the base material
- Specialized heat-treating process creates greater hardness at the tip to facilitate cutting while the body remains ductile
- Serrated cutting teeth and patented thread design enable quick and easy installation
- No special installation tools required. Holes can be drilled with a rotary hammer or hammer drill with standard ANSI-size bit. Anchors are installed with standard-size sockets.

MATERIAL: Carbon steel, heat treated

FINISH: Zinc plated

INSTALLATION:

Caution: Oversized holes in the base material will reduce or eliminate the mechanical interlock of the threads with base material and will reduce the anchor's load capacity. Use a Titen HD Rod Hanger one time only. Installing the anchor multiple times may result in excessive thread wear and reduce load capacity.

CODES: ICC-ES ESR-2713 *(THD37212RH and THD50234RH)*, Factory Mutual 3031136 *(THD50234RH and THD37218RH)* and 3035761 *(THD37212RH)*

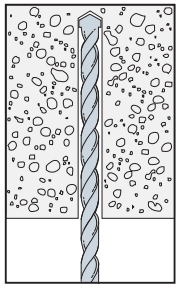
U.S. Patent 5,674,035 & 6,623,228

THD50234RH (⅜" dia. shank) **THD37212RH** (⅜" dia. shank) **THD37218RH** **THD25112RH**

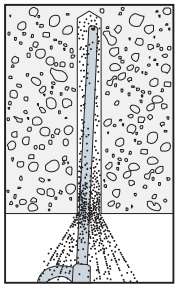
Titen HD® Rod Hanger Product Data

Size (in.)	Model No.	Accepts Rod Dia. (in.)	Drill Bit Dia. (in.)	Wrench Size (in.)	Min. Embed. (in.)	Quantity	
						Box	Carton
¼ x 1½	THD25112RH	¼	¼	⅜	1½	100	500
⅜ x 2⅛	THD37218RH	⅜	¼	½	2⅛	50	250
NEW ⅜ x 2½	THD37212RH	⅜	⅜	½	2½	50	200
½ x 2¾	THD50234RH	½	⅜	11/16	2¾	50	100

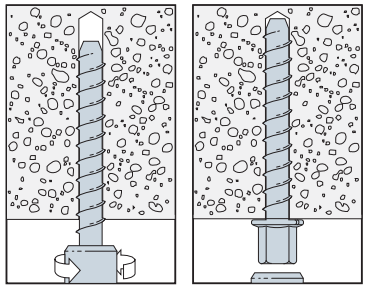
Installation Sequence



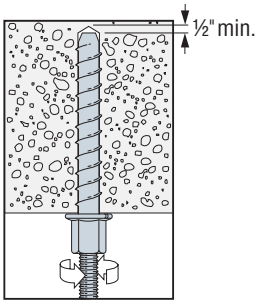
1. Drill a hole using the specified diameter carbide bit into the base material to a depth of at least ½" deeper than the required embedment.



2. Blow the hole clean of dust and debris using compressed air.



3. Insert anchor into the hole. Tighten the anchor with an impact wrench or a torque wrench into the base material until the hex washer head contacts the base material.



4. Install threaded rod in the anchor to support pipes, wiring, etc.

Titen HD® Rod Hanger Installation Information and Additional Data[1]

Characteristic	Symbol	Units	Model Number	
			THD37212RH	THD50234RH
Installation Information				
Rod Hanger Diameter	d_O	in.	⅜	½
Drill Bit Diameter	d	in.	⅜	⅜
Maximum Installation Torque[2]	$T_{inst,max}$	ft-lbf	50	50
Maximum Impact Wrench Torque Rating[3]	$T_{impact,max}$	ft-lbf	150	150
Minimum Hole Depth	h_{hole}	in.	3	3¼
Embedment Depth	h_{nom}	in.	2½	2¾
Effective Embedment Depth	h_{ef}	in.	1.77	1.77
Critical Edge Distance	c_{ac}	in.	2 11/16	2 11/16
Minimum Edge Distance	c_{min}	in.	1¾	
Minimum Spacing	s_{min}	in.	3	
Minimum Concrete Thickness	h_{min}	in.	3¾	3¾
Anchor Data				
Yield Strength	f_{ya}	psi	97,000	
Tensile Strength	f_{uta}	psi	110,000	
Minimum Tensile and Shear Stress Area	A_{se}	in^2	0.099	0.099
Axial Stiffness in Service Load Range – Uncracked Concrete	β_{uncr}	lb/in.	715,000	
Axial Stiffness in Service Load Range – Cracked Concrete	β_{cr}	lb/in.	345,000	

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D.
2. $T_{inst,max}$ is the maximum permitted installation torque for installations using a torque wrench.
3. $T_{impact,max}$ is the maximum permitted torque rating for impact wrenches.

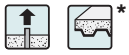
Strength Design Values for Titen HD® Rod Hanger in Tension for Installations in Concrete[1,6,7]

*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Model Number	
			THD37212RH	THD50234RH
Anchor Category	1, 2 or 3	—	1	
Embedment Depth	h_{nom}	in.	2½	2¾
Steel Strength in Tension (ACI 318 Section D.5.1)				
Tension Resistance of Steel	N_{sa}	lbf	10,890	10,890
Strength Reduction Factor – Steel Failure[2]	ϕ_{sa}	—	0.65	
Concrete Breakout Strength in Tension (ACI 318 Section D.5.2)[6]				
Effective Embedment Depth	h_{ef}	in.	1.77	1.77
Critical Edge Distance	c_{ac}	in.	2 11/16	2 11/16
Effectiveness Factor – Uncracked Concrete	k_{uncr}	—	24	
Effectiveness Factor – Cracked Concrete	k_{cr}	—	17	
Modification Factor	$\psi_{c,N}$	—	1.0	
Strength Reduction Factor – Concrete Breakout Failure[5]	ϕ_{cb}	—	0.65	
Pullout Strength in Tension (ACI 318 Section D.5.3)[7]				
Pullout Resistance – Uncracked Concrete (f'_c = 2500 psi)	$N_{p,uncr}$	lbf	2,025[3]	2,025[3]
Pullout Resistance – Cracked Concrete (f'_c = 2500 psi)	$N_{p,cr}$	lbf	1,235[3]	1,235[3]
Strength Reduction Factor – Pullout Failure[4]	ϕ_p	—	0.65	
Tension Strength for Seismic Applications (ACI 318 Section D.3.3.3)				
Nominal Pullout Strength for Seismic Loads (f'c = 2500 psi)	$N_{p,eq}$	lbf	1,235[3]	1,235[3]
Strength Reduction Factor – Pullout Failure[4]	ϕ_{eq}	—	0.65	

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ. Anchors are considered brittle steel elements.
3. Adjust the characteristic pullout resistance for other concrete compressive strengths by multiplying the tabular value by $(f'_{c,specified}/2500)^{0.5}$.
4. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
5. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
6. For sand-lightweight concrete, in lieu of ACI 318 Section D.3.4, modify the value of N_n by multiplying all values of $\sqrt{f'_c}$ affecting N_n by 0.60. All-lightweight concrete is beyond the scope of this table.
7. For sand-lightweight concrete, modify the value of $N_{p,cr}$, $N_{p,uncr}$ and $N_{p,eq}$ by 0.60. All-lightweight concrete is beyond the scope of this table.

Strength Design Values for Titen HD® Rod Hanger in Tension for Installations in the Lower and Upper Flute of Normal-Weight or Sand-Lightweight Concrete through Metal Deck[1,2,5,6]



*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Catalog Number	
			THD37212RH	THD50234RH
Minimum Hole Depth	h_{hole}	in.	3	3¼
Embedment Depth	h_{nom}	in.	2½	2¾
Effective Embedment Depth	h_{ef}	in.	1.77	1.77
Pullout Resistance – Cracked Concrete[2,3,4]	$N_{p,deck,cr}$	lbf	1145	1145
Pullout Resistance – Uncracked Concrete[2,3,4]	$N_{p,deck,uncr}$	lbf	1430	1430

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. Concrete compressive strength shall be 3000 psi minimum. The characteristic pullout resistance for greater compressive strengths shall be increased by multiplying the tabular value by $(f'_{c,\,specified}/3000\ psi)^{0.5}$.
3. For anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies, as shown in Figure A, calculation of the concrete breakout strength may be omitted.
4. In accordance with ACI 318 Section D.5.3.2, the nominal pullout strength in cracked concrete for anchors installed in the soffit of sand-lightweight or normal-weight-concrete-over-metal-deck floor and roof assemblies $N_{p,deck,cr}$ shall be substituted for $N_{p,cr}$. Where analysis indicates no cracking at service loads, the normal pullout strength in uncracked concrete $N_{p,deck,uncr}$ shall be substituted for $N_{p,uncr}$.
5. Minimum distance to edge of panel is $2h_{ef}$.
6. The minimum anchor spacing along the flute must be the greater of $3h_{ef}$ or 1.5 times the flute width.

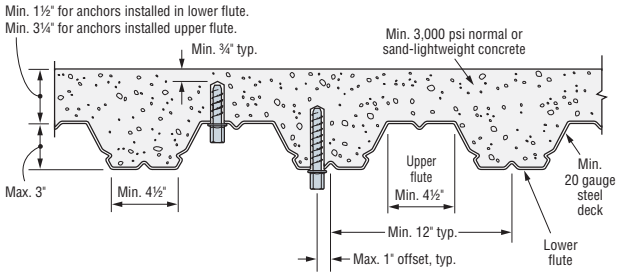
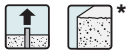


Figure A – Installation in Concrete Over Metal Deck

Allowable Stress Design (ASD) Values for Titen HD® Rod Hanger with ⅛" and ⅜" Shanks Tension Loads in Normal-Weight Concrete



*See page 5 for an explanation of the load table icons

Catalog Number	Rod Hanger Dia. (in.)	Drill Bit Dia. (in.)	Emb. Depth (in.)	Critical Edge Distance (in.)	Critical Spacing Distance (in.)	Tension Load			
						$f'_c \geq 2000$ psi Concrete		$f'_c \geq 4000$ psi Concrete	
						Ultimate (lbs.)	Allowable (lbs.)	Ultimate (lbs.)	Allowable (lbs.)
THD25112RH	¼	¼	1½	3	6	1319	330	2102	525
THD37218RH	⅜	¼	2⅛	3	6	2210	555	3227	805
THD37212RH	⅜	⅜	2½	3	6	3650	915	5275	1320
THD50234RH	½	⅜	2¾	3	6	4297	1075	6204	1550

1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
3. Refer to allowable load-adjustment factors for spacing and edge distance on pages 128–129 in the current Simpson Strong-Tie® *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
4. The minimum concrete thickness is 1½ times the embedment depth.
5. Allowable load may be interpolated for concrete compressive strengths between 2000 psi and 4000 psi.

Short Drop-In Anchor *Internally Threaded Expansion Anchor*

Drop-in anchors are internally threaded, deformation-controlled expansion anchors with a preassembled expander plug, suitable for flush mounting in solid base materials. A new ½" diameter Short Drop-In anchor now complements the existing ⅜" diameter offering for solid and hollow concrete applications. The short length enables shallow embedment that helps avoid drilling into rebar or prestressed or post-tensioned cables.

FEATURES:

- Lipped edge enables consistent embedment that contributes to uniform rod lengths and installation into deep and bottomless holes
- Lipped edge eliminates the need for precisely drilled hole depths
- Each box includes a setting tool compatible with the anchor to ensure consistent installation

MATERIAL: Carbon steel **FINISH:** Zinc plated

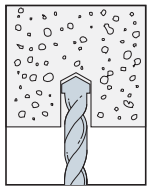
DIA37S

Drop-In Anchor Setting Tool

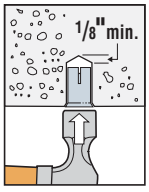
Short Drop-In Anchor Product Data

Rod Size (in.)	Model No.	Drill Bit Diameter (in.)	Bolt Threads (per in.)	Body Length (in.)	Quantity	
					Box	Carton
⅜	DIA37S	½	16	¾	100	500
NEW ½	DIA50S	⅝	13	1	50	200

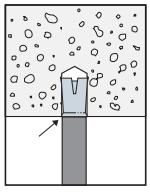
Installation Sequence



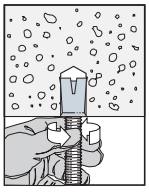
1. Drill a hole using the specified diameter carbide bit into the base material to a depth of at least ⅛" deeper than the required embedment. Then blow the hole clean of dust and debris using compressed air.



2. Insert Drop-In anchor into hole. Tap with hammer until flush against surface.



3. Using the Drop-In anchor setting tool, drive expander plug toward the bottom of the anchor until the shoulder of setting tool makes contact with the top of the anchor.



4. Install threaded rod into the anchor to support pipes, wiring, etc.

Fixed-Depth Drill Bits Available for the ⅜" and ½" Short Drop-In Anchors

Fixed-depth drill bits take the guesswork out of drilling to the correct depth for Short Drop-In anchors. Using the fixed-depth drill bit prevents overdrilling, which saves time and prolongs bit life.

Fixed-Depth Drill Bit Product Data

Drill Bit Diameter (in.)	Drop-In Anchor (in.)	Model No.	Drill Depth (in.)
½	⅜	MDPL050DIAS	15⁄16
⅝	½	MDPL062DIAS	1¼

Fixed-Depth Drill Bit

Short Drop-In Anchor *Internally Threaded Expansion Anchor*

Tension and Shear Loads for ⅜" and ½" Short Drop-In Anchor in Normal-Weight Concrete

*See page 5 for an explanation of the load table icons

Model No.	Rod Size (in.)	Drill Bit Dia. (in.)	Emb. Depth (in.)	Tension Critical Edge Distance (in.)	Shear Critical Edge Distance (in.)	Critical Spacing (in.)	Normal-Weight Concrete, $f'_c \geq 2500$ psi				Normal-Weight Concrete, $f'_c \geq 4000$ psi			
							Tension Load		Shear Load		Tension Load		Shear Load	
							Ultimate (lbs.)	Allowable (lbs.)	Ultimate (lbs.)	Allowable (lbs.)	Ultimate (lbs.)	Allowable (lbs.)	Ultimate (lbs.)	Allowable (lbs.)
DIA37S	⅜	½	¾	4½	5¼	3	1500	375	2274	570	2170	540	3482	870
DIA50S	½	⅝	1	6	7	4	2039	510	3224	805	3420	855	5173	1295

1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
3. Refer to allowable load-adjustment factors for edge distances and spacing on page 157 of Simpson Strong-Tie® *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
4. Allowable loads may be linearly interpolated between concrete strengths.
5. The minimum concrete thickness is 1½ times the embedment depth.

Tension and Shear Loads for ⅜" and ½" Short Drop-In Anchor in Hollow Core Concrete Panel

*See page 5 for an explanation of the load table icons

Model No.	Rod Size (in.)	Drill Bit Dia. (in.)	Emb. Depth (in.)	Tension Critical Edge Distance (in.)	Shear Critical Edge Distance (in.)	Critical Spacing (in.)	Hollow Core Concrete Panel, $f'_c \geq 4000$ psi			
							Tension Load		Shear Load	
							Ultimate (lbs.)	Allowable (lbs.)	Ultimate (lbs.)	Allowable (lbs.)
DIA37S	⅜	½	¾	4½	5¼	3	1860	465	3308	825
DIA50S	½	⅝	1	6	7	4	2650	660	4950	1235

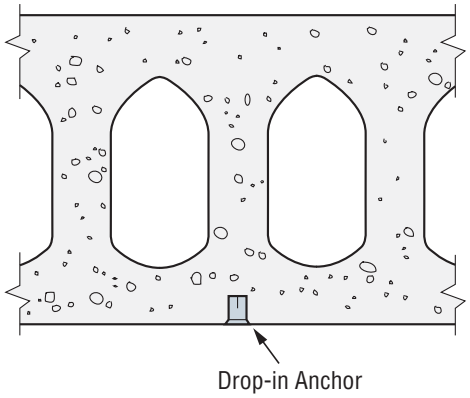
1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
3. Refer to allowable load-adjustment factors for edge distances and spacing on page 157 of Simpson Strong-Tie *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
4. Allowable loads may be linearly interpolated between concrete strengths.

Tension and Shear Loads for ⅜" and ½" Short Drop-In Anchor in Sand-Lightweight Concrete Fill over Metal Deck

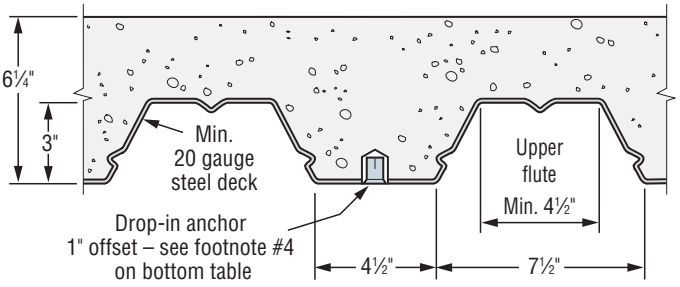
*See page 5 for an explanation of the load table icons

Model No.	Rod Size (in.)	Drill Bit Dia. (in.)	Emb. Depth (in.)	Tension Critical End Distance (in.)	Shear Critical End Distance (in.)	Critical Spacing (in.)	Install through the Lower Flute or Upper Flute of Metal Deck, $f'_c \geq 3000$ psi Concrete			
							Tension Load		Shear Load	
							Ultimate (lbs.)	Allowable (lbs.)	Ultimate (lbs.)	Allowable (lbs.)
DIA37S	⅜	½	¾	6	7	8	1344	335	1649	410
DIA50S	½	⅝	1	8	9⅜	10⅝	1711	430	2070	515

1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
3. Refer to allowable load-adjustment factors for edge distances and spacing on page 158 of Simpson Strong-Tie *Anchoring and Fastening Systems for Concrete and Masonry* catalog.
4. Anchors were installed with a 1" offset from the centerline of the flute.



Hollow Core Concrete Panel
(Anchor can be installed below web or hollow core)



Lightweight Concrete over Metal Deck

Sure Wall *Drywall Anchor*

Sure Wall anchors are designed to self-drill into drywall and provide excellent holding value and greater capacity than screws alone. The standard Sure Wall cuts threads into drywall, greatly increasing the bearing surface and strength of the fastening. The Sure Wall Gripper expands behind the drywall, greatly increasing the bearing surface, resulting in higher loads than the standard Sure Wall. The Sure Wall Nylon Toggle has a die-cast zinc-drilling point that toggles into position to provide the most bearing surface behind the drywall and the highest capacity in the Sure Wall product line.

Sure Wall Nylon | Sure Wall Zinc | Sure Wall Gripper | Sure Wall Nylon Toggle

FEATURES:

- Self-Drilling: Only a screwdriver needed for installation in gypsum board drywall
- Standard Sure Wall can be used as a fastener in fixtures with sufficiently large holes
- All designs maximize the load-carrying capacity of gypsum drywall
- New designs include screws with the anchors

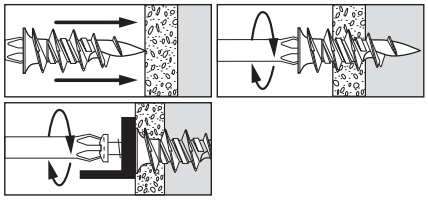
MATERIAL:

- Sure Wall Standard: Die-cast zinc or reinforced nylon
- Sure Wall Gripper: Reinforced nylon
- Sure Wall Toggle: Reinforced nylon with a die-cast, zinc drilling point/toggle

Sure Wall Product Data

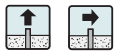
Screw Size	Model	Style	Quantity		Applications
			Box	Carton	
#6 x 1	SWN06S-R100	Nylon	100	500	⅜", ½" Drywall, Ceiling Tile
#8 x 1 ¼	SWN08LS-R100	Nylon	100	500	⅜", ½" Drywall, Ceiling Tile
#6 x 1	SWZ06S-R100	Zinc	100	500	⅜", ½" Drywall, Ceiling Tile, Plaster, Pegboard
#8 x 1 ¼	SWZ08LS-R100	Zinc	100	500	⅜", ½", ⅝" Drywall, Plaster

Standard Sure Wall (Nylon or Zinc)



Sure Wall Tension and Shear Loads in ½" Drywall

Model	Screw Size	Allowable Load[1] (lbs.)	
		Tension	Shear
SWN06S	#6	10	30
SWN08LS	#8	10	50
SWZ06LS	#6	10	30
SWZ08LS	#8	10	50



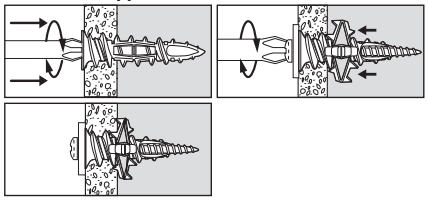
* *See page 5 for an explanation of the load table icons

See notes below.

Sure Wall Gripper Product Data

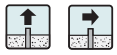
Screw Size	Model	Style	Quantity		Applications
			Box	Carton	
#8 x 2"	SWNG08S-R50	Gripper Nylon	50	250	⅜", ½" Drywall

Sure Wall Gripper



Sure Wall Gripper Tension and Shear Loads in ½" Drywall

Model	Screw Size	Allowable Load[1] (lbs.)	
		Tension	Shear
SWNG08S	#8	25	60



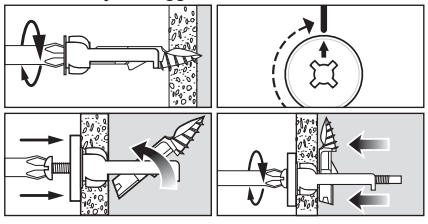
* *See page 5 for an explanation of the load table icons

See notes below.

Sure Wall Nylon Toggle Product Data

Screw Size (in.)	Model	Style	Quantity		Applications
			Box	Carton	
⅛ x 2	SWNT12200-R50	Nylon Toggle	50	250	⅜", ½", ⅝" Drywall
⅛ x 3	SWNT12300-R50	Nylon Toggle	50	250	⅜", ½", ⅝" Drywall
3⁄16 x 2	SWNT18200-R50	Nylon Toggle	50	250	⅜", ½", ⅝" Drywall
3⁄16 x 3	SWNT18300-R50	Nylon Toggle	50	250	⅜", ½", ⅝" Drywall
¼ x 3	SWNT25300-R25	Nylon Toggle	25	125	⅜", ½", ⅝" Drywall
¼ x 4	SWNT25400-R25	Nylon Toggle	25	125	⅜", ½", ⅝" Drywall

Sure Wall Nylon Toggle



Sure Wall Nylon Toggle Tension and Shear Loads in ½" Drywall

Model	Screw Size	Allowable Load[1] (lbs.)	
		Tension	Shear
SWNT12	⅛	30	50
SWNT18	3⁄16	35	60
SWNT25	¼	40	80

1. The allowable loads listed are based on a safety factor of 4.0.
2. The allowable loads listed are based on single anchor tests.
3. The performance of multiple anchors spaced closely together has not been investigated.

* *See page 5 for an explanation of the load table icons

PSATG *Plastic Screw Anchor*

Simpson Strong-Tie Anchor Systems introduces the PSATG, a new plastic screw anchor that brings an innovative high-performance design to a broad range of applications and substrates, such as fastening bathroom fixtures, window treatments, picture framing and shelving.

The PSATG features "triple-grip" technology with claws on the neck that hold the anchor stationary while inserting the screw. Two expandable wings also provide gripping power, fastening tightly behind the wall for maximum holding power.

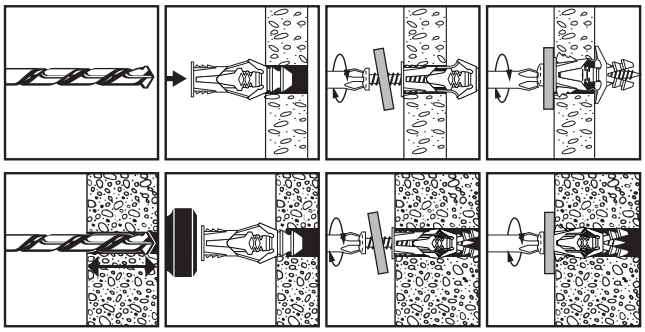
MATERIAL: Polyethylene plastic

INSTALLATIONS:

- Drill a pilot hole into the base material using the appropriate type and size of drill bit
- Insert the PSATG into the hole
- Insert the screw through the fixture and screw into the PSATG
- Turn clockwise until a firm resistance is achieved

Caution: Oversized holes will make it difficult to set the anchor and will impact the anchor's performance

PSATG



Plastic Screw Anchors with Screws Included

Screw Size	Model	Description	Drill Bit Required (in.)	Embedment Depth (in.)	Quantity		Applications
					Box	Carton	
#6 x 1¼	PSATG06-R200	#6 Beige	¼	1½	200	1000	⅜", ½", ⅝" Drywall, plaster, brick, concrete, ceramic, stone
#8 x 1¼	PSATG08-R200	#8 Gray	¼	1½	200	1000	⅜", ½", ⅝" Drywall, plaster, brick, concrete, ceramic, stone
#10 x 1½	PSATG10-R125	#10 Blue	5/16	1¾	125	625	⅜", ½", ⅝" Drywall, plaster, brick, concrete, ceramic, stone
#12 x 1¾	PSATG12-R70	#12 Green	⅜	2	70	350	⅜", ½", ⅝" Drywall

Tension and Shear Loads in ½" Drywall[2,3]

*See page 5 for an explanation of the load table icons

Description	Model	Screw Size	Allowable Load[1] (lbs.)	
			Tension	Shear
Plastic Screw Anchor - Beige	PSATG06	#6	5	35
Plastic Screw Anchor - Gray	PSATG08	#8	5	35
Plastic Screw Anchor - Blue	PSATG10	#10	10	45
Plastic Screw Anchor - Green	PSATG12	#12	15	55

1. The allowable loads listed are based on a safety factor of 4.0.
2. The allowable loads listed are based on single anchor tests.
3. The performance of multiple anchors spaced closely together has not been investigated.

Tension and Shear Loads in 2500 psi Normal-Weight Concrete

*See page 5 for an explanation of the load table icons

Description	Model	Screw Size	Drill Bit Size (in.)	Embed. Depth (in.)	Allowable Load[1] (lbs.)	
					Tension	Shear
Plastic Screw Anchor - Beige	PSATG06	#6	1/4	1 1/2	20	100
Plastic Screw Anchor - Gray	PSATG08	#8	1/4	1 1/2	30	150
Plastic Screw Anchor - Blue	PSATG10	#10	5/16	1 3/4	35	175

1. The allowable loads listed are based on a safety factor of 4.0.
2. The allowable loads listed are based on single anchor tests.
3. The performance of multiple anchors spaced closely together has not been investigated.

GCN-MEP *Gas-Actuated Concrete Nailer*

The new GCN-MEP gas-actuated concrete nailer is the ideal solution for attaching light-duty fixtures to concrete, CMU and metal deck for mechanical, electrical and plumbing (MEP) applications. Since the tool does not require electrical cords or pneumatic hoses, the gas-actuated GCN-MEP is completely portable, increasing productivity.

FEATURES

- Easy magazine attachment with no extra tools
- Power to drive .125" diameter pins
- Pin-depth control dial
- Easy nose piece change-out (for .25" and .300" fasteners) with no extra tools
- High-voltage spark for cleaner fuel combustion
- Comfortable, “sure-grip” rubber handle
- Battery charge indicator light
- No operator's license required

SPECIFICATIONS

- Tool dimensions:
  Length – 17.3" (439mm)
  Width – 4.2" (107mm)
  Height – 15.3" (389mm)
- Tool weight: 8.3 lbs (3.7kg)
- Suitable Fasteners:
  Length – ½" (12.7mm) to 1½" (38mm),
  Diameter – For .25" and .300" headed pins
- Magazine capacity: 40 + 2 pins*
- Average number of shots per fuel cell: 1,200
- Average number of shots per battery charge: 3,300
- 6V NiMH batteries
- Average battery charge time: 2 hours
- Operates at temperatures between 20°F–120°F (-6°C–49°C)
- 2 shots per second

**To ensure the tool does not discharge without pins in the magazine, all but the last two pins will be used before reloading is necessary.*

Magazine sold separately

KEY FASTENING APPLICATIONS:

- Drywall track to concrete, steel, CMU or lightweight concrete on metal deck with magazine
- Conduit clips
- Ceiling clips
- Low-voltage cable
- Cable straps

THE GCN-MEP GAS-ACTUATED CONCRETE NAILER KIT INCLUDES:

- GCN-MEP nailer
- 2 batteries
- Battery charger
- Allen wrenches
- Safety glasses and ear plugs
- Operator’s manual/tool schematic
- Rugged tool box

GCN-MEPKT

GCN-MEP Gas-Actuated Pins and Assemblies for Mechanical, Electrical and Plumbing (MEP) Applications

New, pre-assembled MEP fasteners are available for use with the GCN-MEP gas-actuated concrete nailer designed for high-volume applications such as affixing conduit clips, rod hangers, cable ties and drywall track. With their .300" heads, these versatile pins and assemblies can also be used with common powder-actuated tools when fastening into harder substrates (structural steel or extra hard concrete) when required.

Mechanical, Electrical and Plumbing Pins

All pins are .125" diameter x 1" except where specified.

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GRH25-R100	¼" Rod Hanger with .125 Dia. x 1" Length Pin	100	GCN-MEP
GRH37-R100	.125" Step Shank x 1" Length Pin	100	GCN-MEP

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GCC50-R100	½" Conduit Clip w/ .125 Dia. x 1" Length Pin	100	GCN-MEP
GCC75-R100	¾" Conduit Clip w/ .125 Dia. x 1" Length Pin	100	GCN-MEP
GCC100-R100	1" Conduit Clip w/ .125 Dia. x 1" Length Pin	100	GCN-MEP
GCC125-R100	1" Conduit Clip (13 Gauge Steel) w/ .125 Dia. x 1" Length Pin	100	GCN-MEP

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GCL50-R50	½" Conduit Clamp w/ .125 Dia. x 1" Length Pin	50	GCN-MEP
GCL75-R25	¾" Conduit Clamp w/ .125 Dia. x 1" Length Pin	25	GCN-MEP

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GAC-R100	Angle Clip w/ .125 Dia. x 1" Length Pin	100	GCN-MEP

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GCT-R50	Tie Strap Holder w/ .125 Dia x 1" Length Pin	50	GCN-MEP

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GW50-R200	½" Dome Washer w/ .109"/ .125 Dia. x ½" Length Pin (Step Shank Pin)	200	GCN-MEP
GW75-R200	½" Dome Washer w/ .125 Dia. x ¾" Length Pin	200	GCN-MEP
GW100-R100	½" Dome Washer w/ .125" Dia. x 1" Length Pin	100	GCN-MEP

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GTS45075-R200	¼-20 thread, ½" length thread, ¾" length shank (.125 dia shank)	200	GCN-MEP

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GDPM-50KT	.109" / .125" Dia. Pin x ½" Length Pin Note: .109" Dia. is at Tip and is ¼" Long.	1000	GCN-MEP
GDPM-75KT	.125" Dia. x ¾" Length Pin	1000	GCN-MEP
GDPM-100KT	.125" Dia. x 1" Length Pin	1000	GCN-MEP

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GBR2-R25	2" Dia. Ring, w/ .125" Dia. x 1" Length Pin	25	GCN-MEP

Model No.	Description	Pack Qty.	Compatible Gas-Actuated Nailer
GTH-R200	.125" Dia. x 1" Length Pin	200	GCN-MEP

GRH

GCC

GCL

GAC

GCT

GW

GTS

GDPM

GBR

GTH

Fuel Cell

The GFC34 fuel cell is designed to operate with the GCN-MEP Gas-Actuated Concrete Nailer and also works with many major brand gas concrete-nailer tools. The fuel cell provides 1,200 shots and can operate at temperatures between 20°F–120°F (-6°C–49°C). The fuel cells are offered in a 2-per-pack clamshell. Additionally, one fuel cell is included with each pack of 1,000 pins.

Gas Fuel Cells for the GCN-MEP

Model No.	Description	Pack Qty.	Packs/ Carton	Compatible with these Tools
GFC34-RC2	(2) 34 gram fuel cells	2	6	Simpson Strong-Tie® GCN-MEP and GCN-150 Others: TrakFast® TF1100, Trak-It® C3

GFC Fuel Cell

GCN150 *Concrete Nailer Fasteners and Accessories*

The new GDPS pins are designed to work in the GCN150 gas-actuated nailer tool for installation into A36 and A572 structural steel. The step-shank pin, with smaller-diameter tip, facilitates easier penetration into the steel, while the larger diameter upper shank provides more shear resistance and successful installation.

GDPS

GDPS Product Data

.106 Diameter Shank Drive Pins for the GCN150

Model No.	Length (in.)	Qty. Pins/ Pack + 1 fuel cell	Pack/ Carton	Compatible Tools	
				Simpson Strong-Tie	Others
GDPS-50	1½	1,000	5	GCN150	TF1100, C3
GDPS-62	5⁄8	1,000	5		

GDPS Tension and Shear Loads in Steel

*See page 5 for an explanation of the load table icons

Model No.	Shank Dia. in. (mm)	Min. Penetration in. (mm)	Min. Edge Distance in. (mm)	Min. Spacing in. (mm)	Min. Steel Strength[3]	Allowable Tension Loads lbs. (kN)				Allowable Shear Loads lbs. (kN)			
						Steel Thickness (in.)				Steel Thickness (in.)			
						3⁄16"	¼"	3⁄8"	½"	3⁄16"	¼"	3⁄8"	½"
GDPS	0.110 (2.8)	THRU	0.5 (13)	1.0 (25)	ASTM A36	95 (0.42)	170 (0.76)	165[4] (0.73)[4]	145[4] (0.64)[4]	180 (0.80)	265 (1.18)	225[4] (1.00)[4]	225[4] (1.00)[4]
	0.110 (2.8)	THRU	0.5 (13)	1.0 (25)	ASTM A572, Grade 50	110 (0.49)	170 (0.76)	155[4] (0.69)[4]	—	205 (0.91)	305 (1.36)	205[4] (0.91)[4]	—

1. The entire pointed portion of the fastener must penetrate through the steel to obtain the tabulated values, unless otherwise indicated in footnote 4.
2. The allowable tension and shear values are for the fastener only. Members connected to the steel must be investigated separately in accordance with accepted design criteria.
3. Steel strength must comply with the minimum requirements of ASTM A 36 (Fy = 36 ksi, Fu = 58 ksi) or ASTM A 572, Grade 50 (fy = 50 ksi, Fu = 65 ksi).
4. Tabulated values are based on minimum penetration depth of 0.35" (8.9 mm).

GWL-100 Lathing Washer and GMR-1 Magnetic Ring

The new GWL-100 lathing washer is used with the GCN150 tool and attaches lath to the wall surface for overlaying scratch coats, brown coats and stucco. The washers are held onto the nose of the tool with the new GMR-1 magnetic ring and are attached to the substrate (including concrete and CMU) with GDP pins, which fasten through the washer. No extra tools are needed to install the magnetic ring to the nosepiece of the tool.

Lathing Washer and Magnetic Ring Product Data

Model No.	Description	Pack Qty.	Carton Qty.
GWL-100	Lathing Washer, 1" Dia.	1,000	5,000
GMR-1	Magnetic Ring for GCN150	10	900

PT-22P *Powder-Actuated Tool*

SIMPSON StrongTie ANCHOR SYSTEMS

FEATURES:

- Single-shot fastening
- Engineered for continuous use, high reliability and low maintenance
- All-aluminum body provides rugged durability

PT-22P

SPECIFICATIONS:

- Fastener Length: ½"–1 ½"
- Fastener Type: .300 inch or 8mm headed fasteners or ¼"-20 threaded studs
- Firing Action: Single shot
- Load Caliber: .22 single loads, gray through yellow (Levels 1–4). Note: Not for use with 22 caliber straight wall loads
- Length: 14"
- Weight: 4 lbs. 7 oz.

KEY FASTENING APPLICATIONS:

- Drywall track
- Furring strips
- Framing pins
- Electrical boxes
- Ceiling clips

TOOL IS SOLD IN A RUGGED TOOL BOX COMPLETE WITH:

- Operator's manual
- Spall suppressor
- Tools for disassembly
- Safety glasses / ear plugs
- Cleaning brushes
- Operator's exam and caution sign
- One additional piston

Common Repair Parts

Description	Model No.
Nosepiece	PT-22P-01
Stop Pin Cover	PT-22P-17
Barrel Stop Pin	PT-22P-20
Barrel Stop Pin Spring	PT-22P-21
Piston with Ring	PT-22P-02

The PT-22P is sold individually in a tool box with accessories.

The full line of Simpson Strong-Tie® Powder Loads and Fasteners begins on page 198 of C-SAS-2009 *Anchoring and Fastening Systems for Concrete and Masonry* catalog.

PDPA *.300" Headed Fasteners with .157" Shank Diameter*

Simpson Strong-Tie Anchor Systems has added several new lengths to the PDPA line of pins. PDPA pins are specifically designed for fastening into A36 and A572 structural steel and extra-hard concrete. The fasteners are compatible with several Simpson Strong-Tie® powder-actuated tools and other major-brand power-actuated tools. The .157" shank diameter and special heat treating results in a strong and ductile pin.

PDPA

PDPA Product Data

Length (in.)	Model No.	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
½	PDPA-50	100	1,000	PTP-27ALX, PTP-27ASX, PT-27, PT-27HD, PT-22, PT-22GS,PT-22P, PT-22H	721, D-60, U-2000 and most other low-velocity tools.
½ knurled	PDPA-50K	100	1,000		
½ knurled	PDPA-50KM	1,000	5,000		
⅝ knurled	PDPA-62K	100	1,000		
⅝ knurled	PDPA-62KM	1,000	5,000		
¾	PDPA-75	100	1,000		
¾	PDPA-75M	1,000	5,000		
1	PDPA-100	100	1,000		
1¼	PDPA-125	100	1,000		
1½	PDPA-150	100	1,000		
1⅞	PDPA-178	100	1,000		
2	PDPA-200	100	1,000		
2½	PDPA-250	100	1,000		
2⅞	PDAP-278	100	1,000		

PDPA Tension and Shear Loads in Steel

*See page 5 for an explanation of the load table icons

Model No.	Shank Diameter in. (mm)	Minimum Penetration in. (mm)	Minimum Edge Distance in. (mm)	Minimum Spacing in. (mm)	Minimum Steel Strength[3]	Allowable Tension Loads – lbs. (kN)					Allowable Shear Loads – lbs. (kN)				
						Steel Thickness (in.)					Steel Thickness (in.)				
						⅜	¼	⅜	½	¾	⅜	¼	⅜	½	¾
PDPA	0.157 (4.0)	THRU[1]	0.5 (13)	1.0 (25)	ASTM A36	260 (1.16)	370 (1.65)	380[7] (1.69)[7]	530[7] (2.36)[7]	195[4] (0.87)[4]	410 (1.82)	365 (1.62)	385[7] (1.71)[7]	385[7] (1.71)[7]	325[4] (1.45)[4]
		THRU[1]	0.5 (13)	1.0 (25)	ASTM A572, Grade 50	305 (1.36)	335 (1.49)	355[7] (1.58)[7]	485[5] (2.16)[5]	170[6] (0.76)[6]	420 (1.87)	365 (1.62)	290[7] (1.29)[7]	275[5] (1.22)[5]	275[6] (1.22)[6]

1. The entire pointed portion of the fastener must penetrate through the steel to obtain the tabulated values, unless otherwise indicated in footnote 4, 5, 6 or 7.
2. The allowable tension and shear values are for the fastener only. Members connected to the steel must be investigated separately in accordance with accepted design criteria.
3. Steel strength must comply with the minimum requirements of ASTM A 36 (Fy = 36 ksi, Fu = 58 ksi) or ASTM A 572, Grade 50 (Fy = 50 ksi, Fu = 65 ksi).
4. Based upon minimum penetration depth of 0.46" (11.7 mm).
5. Based upon minimum penetration depth of 0.58" (14.7 mm).
6. Based upon minimum penetration depth of 0.36" (9.1 mm).
7. The fastener must be driven to where the point of the fastener penetrates through the steel.

PDPA Tension and Shear Loads in Normal-Weight Concrete

*See page 5 for an explanation of the load table icons

Model No.	Shank Diameter in. (mm)	Minimum Penetration in. (mm)	Minimum Edge Distance in. (mm)	Minimum Spacing in. (mm)	Allowable Tension Load lbs. (kN)		Allowable Shear Load lbs. (kN)	
					$f'_c \geq 4{,}000$ psi (27.6 MPa) Concrete	$f'_c \geq 6{,}000$ psi (41.3 MPa) Concrete	$f'_c \geq 4{,}000$ psi (27.6 MPa) Concrete	$f'_c \geq 6{,}000$ psi (41.3 MPa) Concrete
PDPA	0.157 (4.0)	¾ (19)	3.5 (89)	5 (127)	30 (0.13)	70 (0.31)	135 (0.60)	130 (0.58)
		1 (25)	3.5 (89)	5 (127)	310 (1.38)	160 (0.71)	310 (1.38)	350 (1.56)
		1¼ (32)	3.5 (89)	5 (127)	380 (1.69)	365 (1.62)	420 (1.87)	390 (1.73)

1. The fastener shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
2. The allowable tension and shear values are for the fastener only. Members connected to the steel must be investigated separately in accordance with accepted design criteria.

PDPA Tension and Shear Loads in Lightweight Concrete over Metal Deck

*See page 5 for an explanation of the load table icons

Model No.	Shank Diameter in. (mm)	Minimum Penetration in. (mm)	Allowable Tension Load - lbs. (kN)		Allowable Shear Load – lbs. (kN)	
			Installed In Concrete	Installed Thru. Metal Deck	Installed In Concrete	Installed Thru. Metal Deck
			$f'_c \geq 3{,}000$ psi (20.7 MPa) Concrete		$f'_c \geq 3{,}000$ psi (20.7 MPa) Concrete	
PDPA	0.157 (4.0)	¾ (19)	85 (0.38)	105 (0.47)	105 (0.47)	280 (1.25)
		1 (25)	150 (0.67)	145 (0.64)	225 (1.00)	280 (1.25)
		1¼ (32)	320 (1.42)	170 (0.76)	420 (1.87)	320 (1.42)

1. The fastener shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
2. The allowable tension and shear values are for the fastener only. Members connected to the steel must be investigated separately in accordance with accepted design criteria.
3. Metal deck must be minimum 20 gauge and has a minimum yield strength of 38,000 psi.
4. Shear values are for loads applied toward edge of flute.
5. The fastener shall be installed 1½" from the edge of flute.

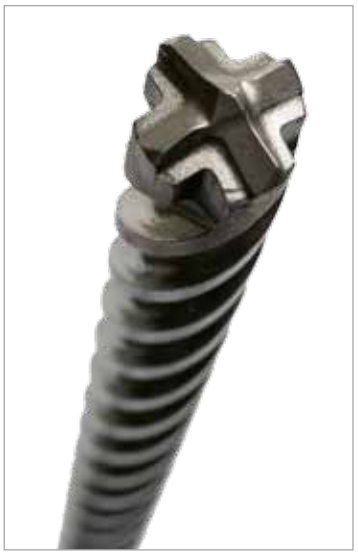
Solid-Tip Carbide Drill Bit

Simpson Strong-Tie Anchor Systems has extended its line of professional-grade carbide drill bits with the introduction of a new solid-tip drill bit featuring a solid piece of carbide in the head to provide more efficient cutting and greater performance in reinforced concrete. Available in a SDS shank, the German-manufactured bit is also specifically engineered for greater durability.

FEATURES:

- One-piece, embedded carbide element with four chamfered edges ensures low vibration
- Symmetrical four-cutter head helps prevent sticking when hitting rebar
- Head design facilitates precisely drilled holes for proper anchor installation
- Centering tip provides easy spot drilling with pinpoint accuracy
- Short, wide dust entrances quickly channel drilling dust from bit head into the flute

Simpson Strong-Tie Anchors Systems has also added two new sizes to its SDS-Plus®, SDS-MAX and SDS-MAX Quad Head shank bits.



Solid-tip carbide drill bit

SDS-PLUS® Solid-Tip Carbide Drill Bits

Model No.	Diameter (in.)	Total length (in.)	Drilling Depth (in.)
MDPL01804S	3/16	4 1/4	2
MDPL01806S	3/16	6 1/4	4
MDPL01808S	3/16	8 1/4	6
MDPL01812S	3/16	12	10
MDPL02506S	1/4	6 1/4	4
MDPL02508S	1/4	8 1/4	6
MDPL02512S	1/4	12	10
MDPL03106S	5/16	6 1/4	4
MDPL03112S	5/16	12	10
MDPL03706S	3/8	6 1/4	4
MDPL03712S	3/8	12 1/4	10
MDPL05006S	1/2	6 1/4	4
MDPL05012S	1/2	12 1/4	10
MDPL05606S	9/16	6	4
MDPL05612S	9/16	12	10

SDS-PLUS® Shank Bits

Dia. (in.)	Drilling Depth (in.)	Overall Length (in.)	Model No.
5/32	2	4 1/4	MDPL01504
	4	6 1/4	MDPL01506
3/16	2	4 1/4	MDPL01804
	4	6 1/4	MDPL01806
	6	8 1/4	MDPL01808
	8	10	MDPL01810
	10	12	MDPL01812
	12	14	MDPL01814
7/32	4	6 1/4	MDPL02106
	6	8 1/4	MDPL02108
	14	16	MDPL02116
NEW	18	20	MDPL02120
1/4	2	4 1/4	MDPL02504
	4	6 1/4	MDPL02506
	6	8 1/4	MDPL02508
	9	11	MDPL02511
	12	14	MDPL02514
	14	16	MDPL02516
5/16	4	6 1/4	MDPL03106
	10	12	MDPL03112
3/8	4	6 1/4	MDPL03706
	8	10	MDPL03710
	10	12 1/4	MDPL03712
	16	18	MDPL03718
	22	24	MDPL03724
7/16	4	6 1/4	MDPL04306
	10	12 1/4	MDPL04312
1/2	4	6 1/4	MDPL05006
	8	10 1/4	MDPL05010
	10	12 1/4	MDPL05012
	16	18	MDPL05018
	22	24	MDPL05024
9/16	4	6 1/4	MDPL05606
	10	12 1/4	MDPL05612
	16	18	MDPL05618
5/8	6	8	MDPL06208
	10	12	MDPL06212
	16	18	MDPL06218
	22	24	MDPL06224
11/16	6	8	MDPL06808
3/4	6	8	MDPL07508
	8	10	MDPL07510
	10	12	MDPL07512
	16	18	MDPL07518
	22	24	MDPL07524
13/16	6	8	MDPL08108
27/32	6	8	MDPL08408
7/8	6	8	MDPL08708
	10	12 1/4	MDPL08712
	16	18	MDPL08718
1	8	10	MDPL10010
	16	18	MDPL10018

SDS-PLUS® Shank Bit

SDS-Plus bits use an asymmetrical-parabolic flute for efficient energy transmission and dust removal.

SDS-MAX® and SDS-MAX Quad Head[4x] Shank Bits

Dia. (in.)	Drilling Depth (in.)	Overall Length (in.)	Model No.
NEW 3/8	7 1/2	13	MDMC03713
1/2	7 1/2	13	MDMX05013
	15 1/2	21	MDMX05021
9/16	7 1/2	13	MDMX05613
	15 1/2	21	MDMX05621
5/8	7 1/2	13	MDMX06213Q
	15 1/2	21	MDMX06221Q
	30 1/2	36	MDMX06236Q
11/16	15 1/2	21	MDMX06821Q
3/4	8	13	MDMX07513Q
	17	21	MDMX07521Q
	31	36	MDMX07536Q
13/16	17	21	MDMX08121Q
7/8	8	13	MDMX08713Q
	17	21	MDMX08721Q
1	8	13	MDMX10013Q
	17	21	MDMX10021Q
	31	36	MDMX10036Q
1 1/16	18	23	MDMX10623Q
1 1/8	12	17	MDMX11217Q
	17	21	MDMX11221Q
1 3/16	18	23	MDMX11823Q
1 1/4	10	15	MDMX12515Q
	18	23	MDMX12523Q
	31	36	MDMX12536Q
1 3/8	12	17	MDMX13717Q
	18	23	MDMX13723Q
1 1/2	18	23	MDMX15023Q
1 3/4	18	23	MDMX17523Q
2	18	23	MDMX20023Q

Model numbers ending with "Q" denote Quad Head[4x] bits

SDS-MAX® Shank Bit

Errata

Your Resource for Product Updates, Revised Loads and Other Corrections

The following errata section lists important corrections to the 2009-2010 *Anchoring and Fastening Systems for Concrete and Masonry* catalog since it was published in 2009. These changes include revised loads and changes in product dimensions and footnote information. To ensure clarity regarding what has changed from the catalog, new information in this section will be highlighted in **orange**.

AT High-Strength Acrylic-Tie® Anchoring Adhesive

From Page 69 of C-SAS-2009* Anchoring and Fastening Systems for Concrete and Masonry *catalog

Allowable load percentages with respect to in-service temperature sensitivity have been updated.

In-Service Temperature Sensitivity

Base Material Temperature		Percent Allowable Load for T_{inst} = 0°F	Percent Allowable Load for $T_{inst} \geq$ 70°F
°F	°C		
0	-18	100%	100%
32	0	100%	100%
70	21	100%	100%
110	43	82%	82%
135	57	74%	82%
150	66	38%	65%
180	82	22%	28%

1. Refer to in-service temperature sensitivity chart for allowable bond strength reduction for in-service temperature. See page 15 of the *Anchoring and Fastening Systems for Concrete and Masonry* catalog for more information.
2. T_{inst} is the base material temperature during installation and curing of the adhesive.
3. Percent allowable load for T_{inst} = 0°F (-18°C) is to be used for T_{inst} between 0°F (-18°C) and 70°F (21°C).
4. Percent allowable load may be linearly interpolated for intermediate base material in-service temperatures.
5. °C = (°F-32) / 1.8

Strong-Bolt™ Wedge Anchor for Cracked and Uncracked Concrete

From Page 116 of C-SAS-2009* Anchoring and Fastening Systems for Concrete and Masonry *catalog

Thread lengths for the Strong-Bolt™ anchor have been revised.

Strong-Bolt™ Anchor Product Data

Size (in.)	Model No.	Drill Bit Dia. (in.)	Thread Length (in.)	Quantity	
				Box	Carton
½ x 3¾	STB50334	½	1¾	25	125
½ x 4¼	STB50414		2¼	25	100
½ x 5½	STB50512		3½	25	100
½ x 7	STB50700		5	25	100
½ x 8½	STB50812		6	25	50
½ x 10	STB50100		6	25	50
⅝ x 4½	STB62412	⅝	2 1/16	20	80
⅝ x 5	STB62500		2 9/16	20	80
⅝ x 6	STB62600		3 9/16	20	80
⅝ x 7	STB62700		4 9/16	20	80
⅝ x 8½	STB62812		6	20	40
⅝ x 10	STB62100		6	10	20
¾ x 5½	STB75512	¾	2 11/16	10	40
¾ x 6¼	STB75614		3 7/16	10	40
¾ x 7	STB75700		4 3/16	10	40
¾ x 8½	STB75812		5 11/16	10	20
¾ x 10	STB75100		6	10	20
1 x 7	STB100700	1	3½	5	20
1 x 10	STB1001000		3½	5	10
1 x 13	STB1001300		3½	5	10

1. The published length is the overall length of the anchor. Allow one anchor diameter for the nut and washer thickness plus the fixture thickness when selecting a length.

Material Specifications

Carbon Steel - Zinc Plated[1]			
Component Materials			
Anchor Body	Nut	Washer	Clip
Carbon Steel SAE J403, Grade 1030-1035 SAE J403, Grade 12L14	Carbon Steel ASTM A 563, Grade A	Carbon Steel ASTM F844	316 Stainless Steel

1. Zinc meets ASTM B 633, Class SC 1 (Fe / Zn 5), Type III.

Titen HD® Heavy-Duty Screw Anchor for Concrete and Masonry

From Page 121–123 of C-SAS-2009* Anchoring and Fastening Systems for Concrete and Masonry *catalog

Titen HD installation information has been updated as well as revisions made to tension design data. These changes are made to ensure consistency with the values and structure of load tables in ICC-ES ESR-2713.

Titen HD® Installation Information and Additional Data[1,4]

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)					
			3/8[6]		1/2		3/4	
Installation Information								
Drill Bit Diameter	d	in.	3/8		1/2		3/4	
Baseplate Clearance Hole Diameter	d_c	in.	1/2		5/8		7/8	
Maximum Installation Torque	$T_{inst,max}$	ft-lb	50[2]		65[2]		150[2]	
Maximum Impact Wrench Torque Rating	$T_{impact,max}$	ft-lb	150[3]		385[3]		385[3]	
Embedment Depth	h_{nom}	in.	2 1/2	3 1/4	3 1/4	4	5 1/2	6 1/4
Critical Edge Distance	c_{ac}	in.	2 11/16	3 5/8	3 9/16	4 1/2	6 3/8	7 5/16
Minimum Edge Distance	c_{min}	in.	1 3/4					
Minimum Spacing	s_{min}	in.	3					
Minimum Concrete Thickness	h_{min}	in.	3 3/4	5	5	6 1/4	8 3/4	10
Additional Data								
Anchor Category	category	—	1					
Yield Strength	f_{ya}	psi	97,000					
Tensile Strength	f_{uta}	psi	110,000					
Minimum Tensile & Shear Stress Area	A_{se}	in^2	0.099		0.183		0.414	
Axial Stiffness in Service Load Range - Uncracked Concrete	β_{uncr}	lb/in.	715,000					
Axial Stiffness in Service Load Range - Cracked Concrete	β_{cr}	lb/in.	345,000					

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D.
2. $T_{inst,max}$ is the maximum permitted installation torque for the embedment depth range covered by this table for installations using a torque wrench. This is not applicable to other embedment depths published elsewhere in this catalog.
3. $T_{impact,max}$ is the maximum permitted torque rating for impact wrenches for the embedment depth range covered by this table. This is not applicable to other embedment depths published elsewhere in this catalog.
4. See page 21 for further information regarding installations using the Titen HD Rod Hanger.

Titen HD® Tension Design Data[1, 7, 8, 9]

*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)					
			3/8[10]		1/2		3/8	
Embedment Depth	h_{nom}	in.	2 1/2	3 1/4	3 1/4	4	5 1/2	6 1/4
Steel Strength in Tension								
Nominal Steel Strength in Tension	N_{sa}	lb.	10,890		20,130		45,540	
Strength Reduction Factor - Steel Failure	ϕ	—	0.65[2]					
Concrete Breakout Strength in Tension[8]								
Effective Embedment Depth	h_{ef}	in.	1.77	2.40	2.35	2.99	4.22	4.86
Critical Edge Distance[6]	c_{ac}	in.	2 11/16	3 5/8	3 9/16	4 1/2	6 3/8	7 5/16
Effectiveness Factor - Uncracked Concrete	k_{uncr}	—	24					
Effectiveness Factor - Cracked Concrete	k_{cr}	—	17					
Modification Factor	$\Psi_{c,N}$	—	1.0					
Strength Reduction Factor - Concrete Breakout Failure	ϕ	—	0.65[6]					
Pullout Strength in Tension[9]								
Nominal Pullout Strength Uncracked Concrete (f'_c=2,500 psi)	$N_{p,uncr}$	lb.	2,700[4]	—[3]	—[3]	—[3]	—[3]	—[3]
Nominal Pullout Strength Cracked Concrete (f'_c=2,500 psi)	$N_{p,cr}$	lb.	1,235[4]	2,700[4]	—[3]	—[3]	6,070[4]	7,195[4]
Strength Reduction Factor - Pullout Failure	ϕ	—	0.65[5]					
Breakout or Pullout Strength in Tension for Seismic Applications								
Nominal Pullout Strength for Seismic Loads (f'_c=2,500 psi)	$N_{p,eq}$	lb.	1,235[4]	2,700[4]	—[3]	—[3]	6,070[4]	7,195[4]
Strength Reduction Factor - Breakout or Pullout Failure	ϕ	—	0.65[5]				—	

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ. Anchors are considered brittle steel elements.
3. Pullout strength is not reported since concrete breakout controls.
4. Adjust the characteristic pullout resistance for other concrete compressive strengths by multiplying the tabular value by $(f'_{c,specified} / 2{,}500)^{0.5}$.
5. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
6. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
7. For sand-lightweight concrete, in lieu of ACI 318 Section D.3.4, modify the value of N_n by multiplying all values of $\sqrt{f'_c}$ affecting N_n by 0.60. All-lightweight concrete is beyond the scope of this table.
8. For sand-lightweight concrete, modify the value of $N_{p,cr}$, $N_{p,uncr}$ and N_{eq} by 0.60. All-lightweight concrete is beyond the scope of this table.
9. See page 21 for further information regarding installations using the Titen HD® Rod Hanger.

Errata

Titen HD® Shear Design Data[1,5]

*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)					
			⅜		½		¾	
Embedment Depth	h_{nom}	in.	2½	3¼	3¼	4	5½	6¼
Steel Strength in Shear								
Nominal Steel Strength in Shear (f'_c = 2,500 psi)	V_{sa}	lb.	4,460		7,455		16,840	
Strength Reduction Factor - Steel Failure	ϕ	—	0.60[2]					
Concrete Breakout Strength in Shear[5]								
Outside Diameter	d_O	in.	0.375		0.500		0.750	
Load Bearing Length of Anchor in Shear	ℓ_e	in.	1.77	2.40	2.35	2.99	4.22	4.86
Strength Reduction Factor - Concrete Breakout Failure	ϕ	—	0.70[3]					
Concrete Pryout Strength in Shear								
Coefficient for Pryout Strength	k_{cp}	—	1.0			2.0		
Strength Reduction Factor - Concrete Pryout Failure	ϕ	—	0.70[4]					
Steel Strength in Shear for Seismic Applications								
Nominal Steel Strength in Shear for Seismic Loads (f'_c=2,500 psi)	$V_{sa,eq}$	lb.	2,855		4,790		9,350	
Strength Reduction Factor - Steel Failure	ϕ	—	0.60[2]					

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. The value of ϕ applies when the load combinations of ACI 318 Section 9.2 are used. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ. Anchors are considered brittle steel elements
3. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition A are met, refer to Section D.4.4 to determine the appropriate value of ϕ. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
4. The value of ϕ applies when both the load combinations of ACI 318 Section 9.2 are used and the requirements of Section D.4.4(c) for Condition B are met. If the load combinations of ACI 318 Appendix C are used, refer to Section D.4.5 to determine the appropriate value of ϕ.
5. For sand-lightweight concrete, in lieu of ACI 318 Section D.3.4, modify the value of V_n by multiplying all values of $\sqrt{f'c}$ affecting V_n by 0.60. All-lightweight concrete is beyond the scope of this table.

Titen HD® Tension and Shear Design Data for Normal-Weight or Sand-Lightweight Concrete over Metal Deck[1,2,6,7]

*See page 5 for an explanation of the load table icons

Characteristic	Symbol	Units	Lower Flute				Upper Flute	
			Nominal Anchor Diameter (inch)				Nom. Anch. Diameter (inch)	
			⅜		½		⅜	½
Embedment Depth	h_{nom}	in.	1⅞	2½	2	3½	1⅞	2
Effective Embedment Depth	h_{ef}	in.	1.23	1.77	1.29	2.56	1.23	1.29
Pullout Resistance, concrete on metal deck (cracked)[2,3,4]	$N_{p,deck,cr}$	lbs.	580	1,335	905	2,040	765	1,700
Pullout Resistance, concrete on metal deck (uncracked)[2,3,4]	$N_{p,deck,uncr}$	lbs.	825	1,905	1,295	2,910	1,095	2,430
Steel Strength in Shear, concrete on metal deck[5]	$V_{st,deck}$	lbs.	2,240	2,395	2,435	4,430	4,180	7,145

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D, except as modified below.
2. Concrete compressive strength shall be 3000 psi minimum. The characteristic pullout resistance for greater compressive strengths shall be increased by multiplying the tabular value by $(f'_{c,\,specified}/3000\ psi)^{0.5}$.
3. For anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies, as shown in Figure A, calculation of the concrete breakout strength may be omitted.
4. In accordance with ACI 318 Section D.5.3.2, the nominal pullout strength in cracked concrete for anchors installed in the soffit of sand-lightweight or normal-weight-concrete-over-metal-deck floor and roof assemblies $N_{p,deck,cr}$ shall be substituted for $N_{p,cr}$. Where analysis indicates no cracking at service loads, the normal pullout strength in uncracked concrete $N_{p,deck,uncr}$ shall be substituted for $N_{p,uncr}$.
5. In accordance with ACI 318 Section D.6.1.2 (c), the shear strength for anchors installed in the soffit of sand-lightweight or normal-weight concrete over metal deck floor and roof assemblies $V_{st,deck}$ shall be substituted for V_{sa}.
6. Minimum distance to edge of panel is $2h_{ef}$.
7. The minimum anchor spacing along the flute must be the greater of $3h_{ef}$ or 1.5 times the flute width.

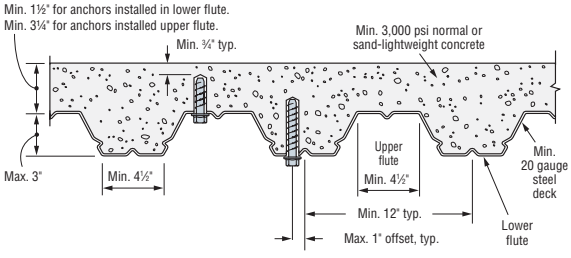


Figure A – Installation in Concrete over Metal Deck

Errata

Titen HD® Rod Coupler

From Page 132 of C-SAS-2009* Anchoring and Fastening Systems for Concrete and Masonry *catalog

Titen HD® Rod Coupler Tension Loads in Normal-Weight Concrete Stemwall

*See page 5 for an explanation of the load table icons

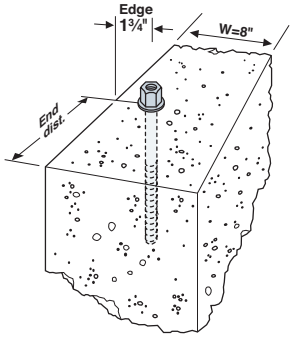
Size in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Stemwall Width in. (mm)	Minimum Edge Dist. in. (mm)	Minimum End Dist. in. (mm)	Minimum Spacing Dist. in. (mm)	Tension Load Based on Concrete Strength		Tension Load Based on Connected Rod Strength
							$f'_c \geq 2500$ psi (17.2 Mpa) Concrete		A307 (SAE 1018)
							Ultimate lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
3/8 (9.5)	3/8	5 (127)	8 (203)	1 3/4 (44)	10 (254)	20 (508)	8,900 (39.6)	2,225 (9.9)	2,105 (9.4)
1/2 (12.7)	1/2	8 (203)	8 (203)	1 3/4 (44)	16 (406)	32 (813)	15,540 (69.1)	3,885 (17.3)	3,750 (16.7)

1. Allowable load must be the lesser of the concrete or steel strength.
2. The allowable loads based on concrete strength are based on a factor of safety of 4.0.
3. The allowable load based on steel strength is limited by the strength of the coupler nut supplied with this anchor. Use of higher strength rod will not increase allowable loads.
4. The minimum concrete thickness is 1.5 times the embedment depth.
5. Tension and shear loads may be combined using the straight-line interaction equation (n=1).

Titen HD® Rod Coupler Shear Loads in Normal-Weight Concrete Stemwall, Load Applied Parallel to Concrete Edge

Size in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Stemwall Width in. (mm)	Minimum Edge Dist. in. (mm)	Minimum End Dist. in. (mm)	Minimum Spacing Dist. in. (mm)	Shear Load Based on Conc. Edge Dist.	
							$f'c \geq 2500$ psi (17.2 Mpa) Concrete	
							Ultimate lbs. (kN)	Allowable lbs. (kN)
1/2 (12.7)	1/2	8 (203)	8 (203)	1 3/4 (44)	16 (406)	32 (813)	6,200 (27.6)	1,550 (6.9)

1. Install with a washer (not supplied with anchor) when used to resist shear loads.
2. The allowable load based on concrete edge distance is based on a factor of safety of 4.0. Steel strength does not control.
3. The minimum concrete thickness is 1.5 times the embedment depth.
4. Tension and shear loads may be combined using the straight-line interaction equation (n=1).



Edge and end distances for Titen HD rod coupler in concrete foundation stemwall corner installation

Errata

Drop-In Internally Threaded Expansion Shell Anchor

From Page 155 of C-SAS-2009 **Anchoring and Fastening Systems for Concrete and Masonry *catalog***

Additional information with respect to the coil-thread drop-in anchor has been added. Please note that the bottom table on page 155 has been omitted.

Tension Loads for Drop-In (Carbon and Stainless Steel), Lipped Drop-In (Carbon Steel) and Coil-Thread Drop-In (Carbon Steel) Anchors in Normal-Weight Concrete

Rod Size in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing in. (mm)	Tension Load						
					f'c ≥ 2000 psi (13.8 MPa) Concrete			f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 4000 psi (27.6 MPa) Concrete		
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)
¼ (6.4)	⅜	1 (25)	3 (76)	4 (102)	1,400 (6.2)	201 (0.9)	350 (1.6)	405 (1.8)	1,840 (8.2)	451 (2.0)	460 (2.0)
⅜ (9.5)	½	1½ (38)	4½ (114)	6 (152)	2,400 (10.7)	251 (1.1)	600 (2.7)	795 (3.5)	3,960 (17.6)	367 (1.6)	990 (4.4)
½ (12.7)	⅝	2 (51)	6 (152)	8 (203)	3,320 (14.8)	372 (1.7)	830 (3.7)	1,178 (5.2)	6,100 (27.1)	422 (1.9)	1,525 (6.8)
⅝ (15.9)	⅞	2½ (64)	7½ (191)	10 (254)	5,040 (22.4)	689 (3.1)	1,260 (5.6)	1,715 (7.6)	8,680 (38.6)	971 (4.3)	2,170 (9.7)
¾ (19.1)	1	3 (76)	9 (229)	12 (305)	8,160 (36.3)	961 (4.3)	2,040 (9.1)	2,365 (10.5)	10,760 (47.9)	1,696 (7.5)	2,690 (12.0)

1. The allowable loads listed are based on a safety factor of 4.0.
2. Refer to allowable load-adjustment factors for edge distance and spacing on page 157.
3. Allowable loads may be linearly interpolated between concrete strengths listed.
4. The minimum concrete thickness is 1½ times the embedment depth.

*See page 5 for an explanation of the load table icons

Coil-Thread Drop-In Anchor

Shear Loads for Drop-In (Carbon and Stainless Steel), Lipped Drop-In (Carbon Steel) and Coil-Thread Drop-In (Carbon Steel) Anchors in Normal-Weight Concrete

Rod Size in. (mm)	Drill Bit Dia. in.	Embed. Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing in. (mm)	Shear Load				
					f'c ≥ 2000 psi (13.8 MPa) Concrete			f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 4000 psi (27.6 MPa) Concrete
					Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)	Allowable lbs. (kN)
¼ (6.4)	⅜	1 (25)	3½ (89)	4 (102)	1,960 (8.7)	178 (0.8)	490 (2.2)	490 (2.2)	490 (2.2)
⅜ (9.5)	½	1½ (38)	5¼ (133)	6 (152)	3,240 (14.4)	351 (1.6)	810 (3.6)	925 (4.1)	1,040 (4.6)
½ (12.7)	⅝	2 (51)	7 (178)	8 (203)	7,000 (31.1)	562 (2.5)	1,750 (7.8)	1,750 (7.8)	1,750 (7.8)
⅝ (15.9)	⅞	2½ (64)	8¾ (222)	10 (254)	11,080 (49.3)	923 (4.1)	2,770 (12.3)	2,770 (12.3)	2,770 (12.3)
¾ (19.1)	1	3 (76)	10½ (267)	12 (305)	13,800 (61.4)	1,781 (7.9)	3,450 (15.3)	3,725 (16.6)	4,000 (17.8)

1. The allowable loads listed are based on a safety factor of 4.0.
2. Refer to allowable load-adjustment factors for edge distance and spacing on page 157.
3. Allowable loads may be linearly interpolated between concrete strengths listed.
4. The minimum concrete thickness is 1½ times the embedment depth.

Errata

Blue Banger Hanger® Cast-in-Place, Internally Threaded Inserts

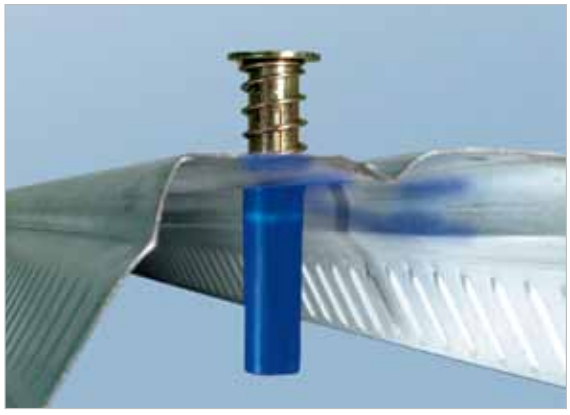
From Page 159 of C-SAS-2009 **Anchoring and Fastening Systems for Concrete and Masonry** ***catalog.***
New code information has been added to the Blue Banger Hanger

Blue Banger Hanger® internally-threaded inserts are cast into the underside of the concrete deck after being fastened to the top of wood forms or metal deck. Once the concrete has cured, the anchor provides an attachment point for threaded rod used to hang electrical, mechanical and plumbing utilities. The Blue Banger Hanger insert is the only pre-pour insert to offer the patented multi-thread design which allows one size insert to handle multiple diameters of threaded rod.

Blue Banger Hanger®
Metal Deck Insert (BBMD)
U.S. Patent 6,240,697B1

FEATURES:

- Quick and easy installation saves time and money- no assembly required.
- Patented multi-thread design allows each hanger to accept multiple diameters of threaded rod. Three sizes of hangers can handle all applications, reducing contractor and distributor inventories.
- Multi-thread design allows threaded rod size to be changed after the anchor is in the concrete.
- Machined steel insert with large flanged head provides high tension and shear loads for overhead attachments.
- Positive attachment to form keeps the hanger vertical and in the correct position.
- Internal threads eliminate the cost of rod couplers.
- The head is stamped with the Simpson Strong-Tie® "≠" sign for easy identification before the concrete pour.



MATERIAL: Carbon steel

FINISH: Yellow-zinc dichromate

CODES: Factory Mutual 3024378 (except roof deck insert); Underwriters Laboratories File EX3605 (except roof deck insert); Metal deck insert (BBMD) in compliance with UL Standard 2043, 2nd edition, "Fire test for heat and visible smoke release for discrete products and their accessories installed in air-handling spaces."

Notes

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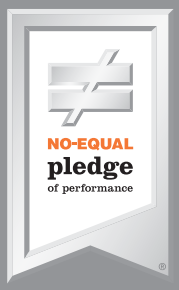

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This flier is effective until December 31, 2011, and reflects information available as of January 1, 2011. This information is updated periodically and should not be relied upon after December 31, 2011; contact Simpson Strong-Tie for current information and limited warranty or see www.simpsonanchors.com.

F-SAS-CSAS2009 1/11 exp.12/11

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