



Cast In Place Anchor Solutions





← Barnwell Elementary PTO added a new p...



Barnwell Elementary PTO

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Barnwell Elementary PTO





IRC

- 1/2" J/L Bolt
- 6' on center spacing
- 7" Embedment
- Middle 1/3 of the plate

Benefits

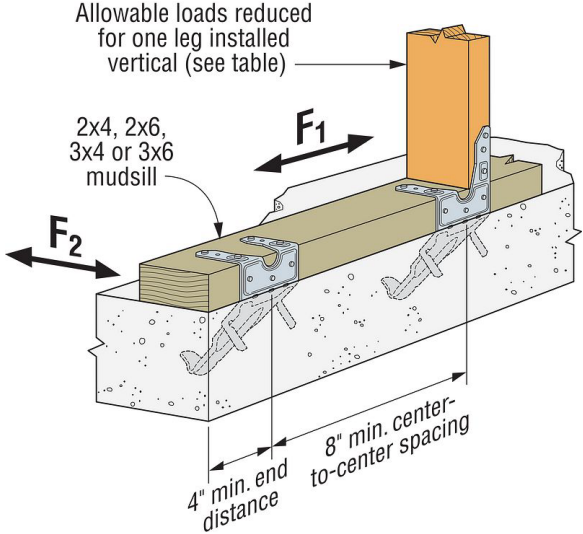
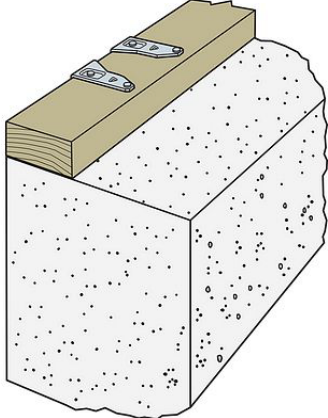
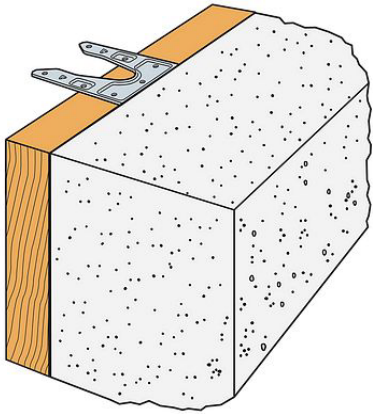
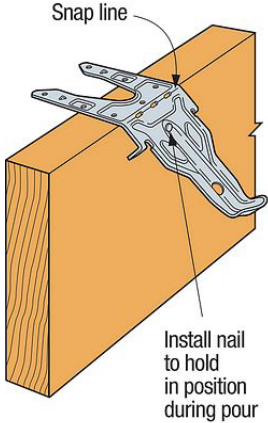
- Cost





MASA (Page 6)

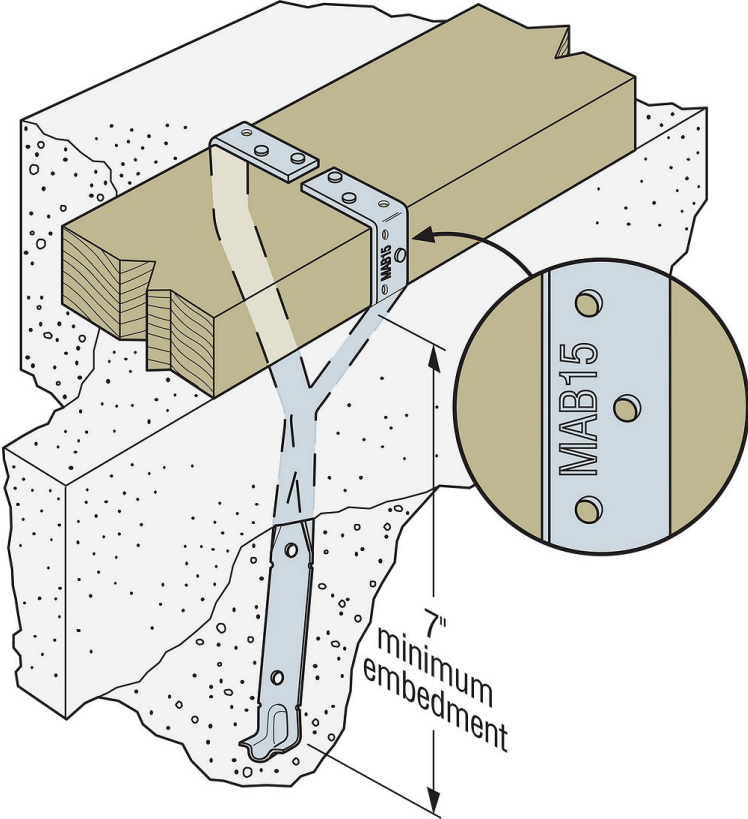
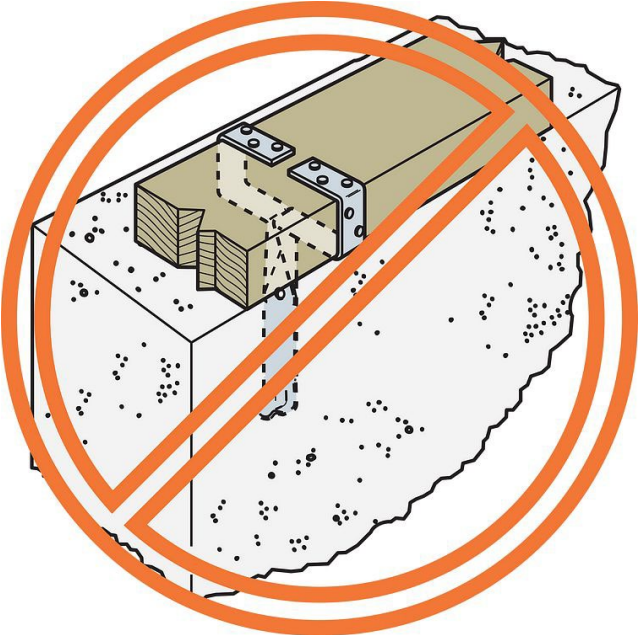
- Installation
- Spacing





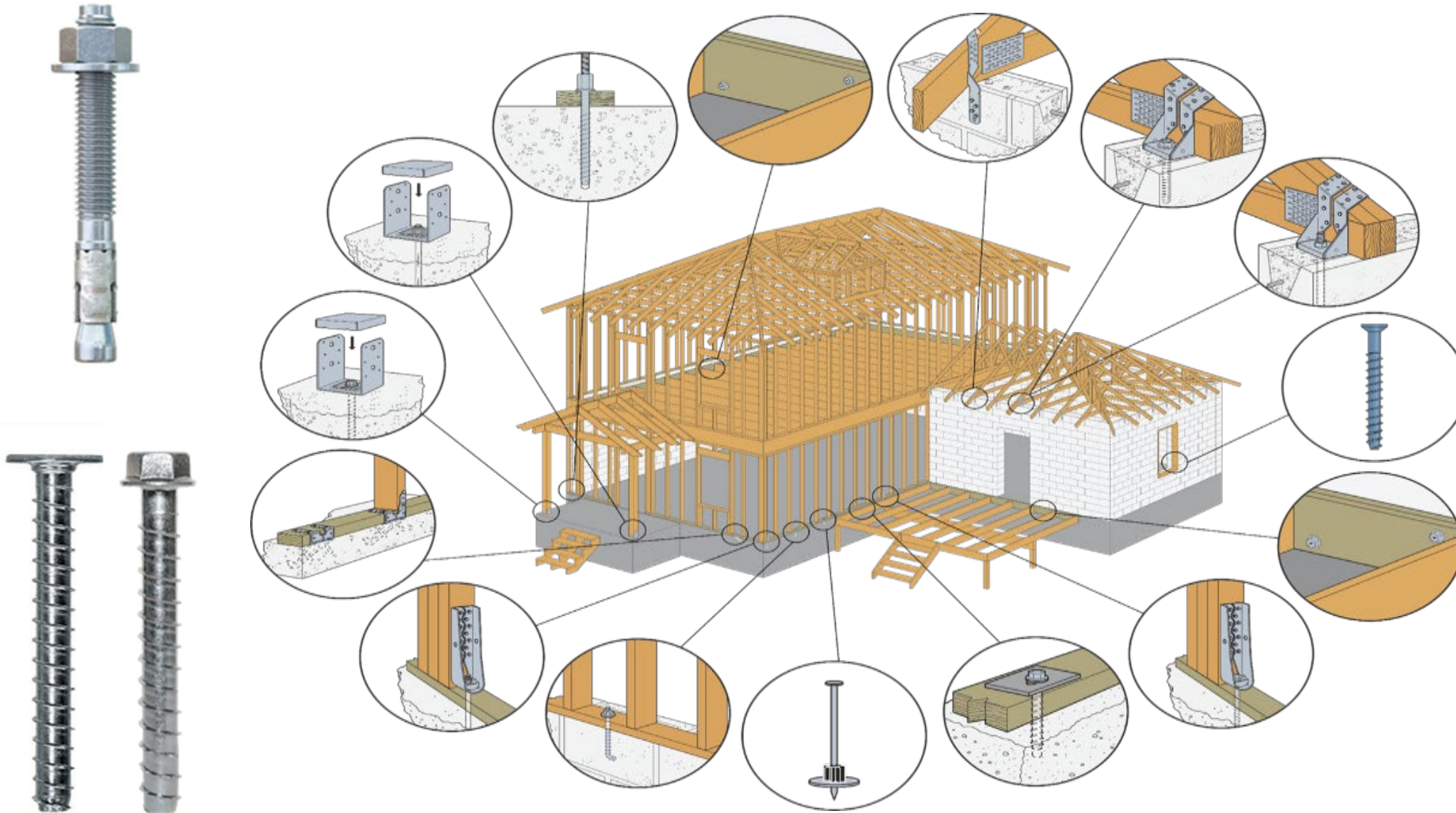
MAB15 (Page 16/17)

- Installation
- Spacing (3'10")



Post Installed Anchors – Residential

SIMPSON
Strong-Tie



Post Installed Anchor Benefits

- Eliminates mis-positioned anchors
- Speeds up placement of prefab walls
- Eliminates “wet set” issues



Working Principals- Mechanical Anchors

Mechanical Anchors

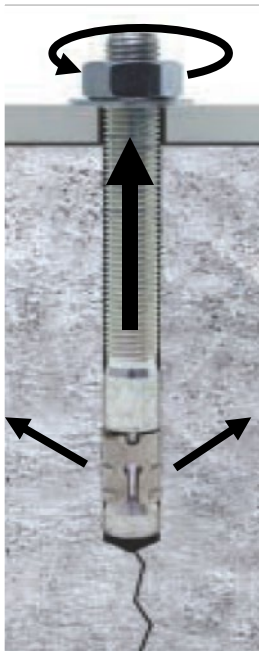
Expansion Anchors

Screw Anchors

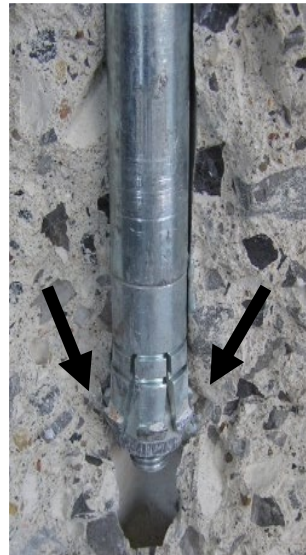
Wedge

Deformation Controlled

Undercutting

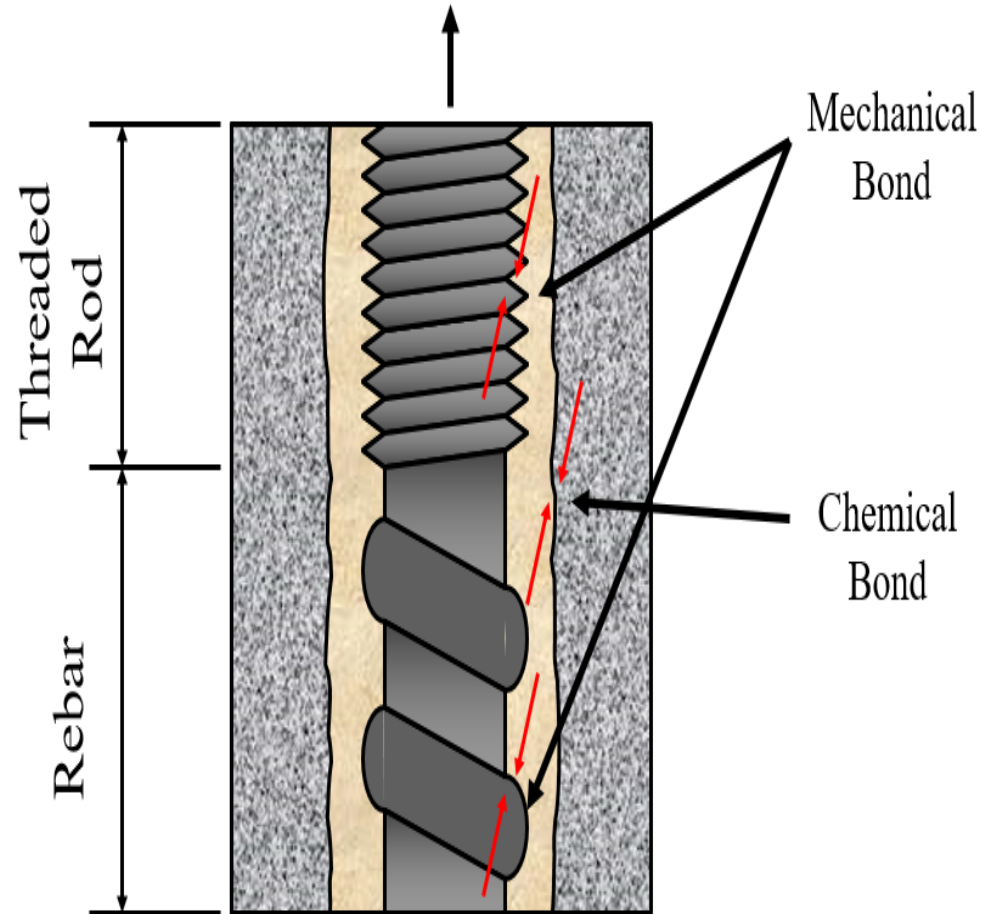


(Setting tool)



Working Principals- Adhesive Anchors

- Performance – chemical and mechanical bond
- Superior small edge distance performance
- Long life expectancy
- Proper mixing needed
- Hole preparation critical
- Shelf Life





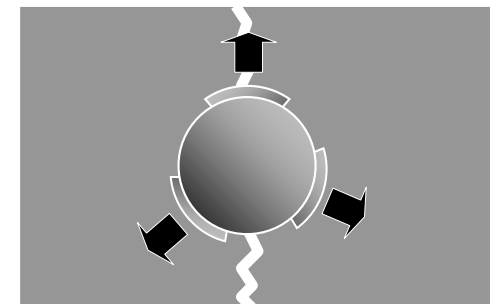
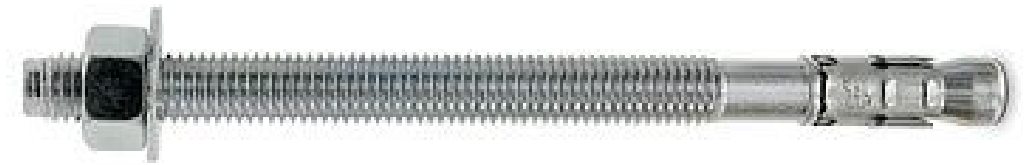
Mechanical Anchor Overview



Strong-Bolt® 2 Wedge Anchor

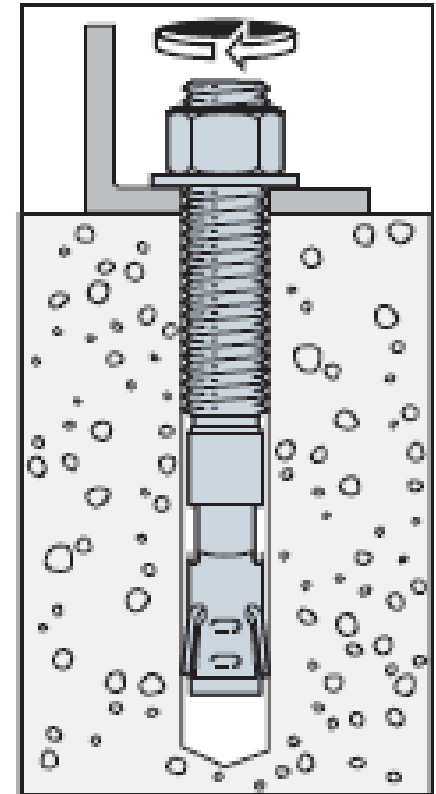
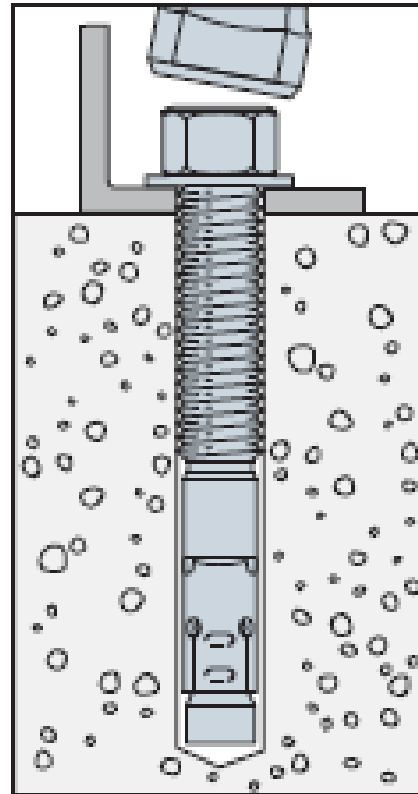
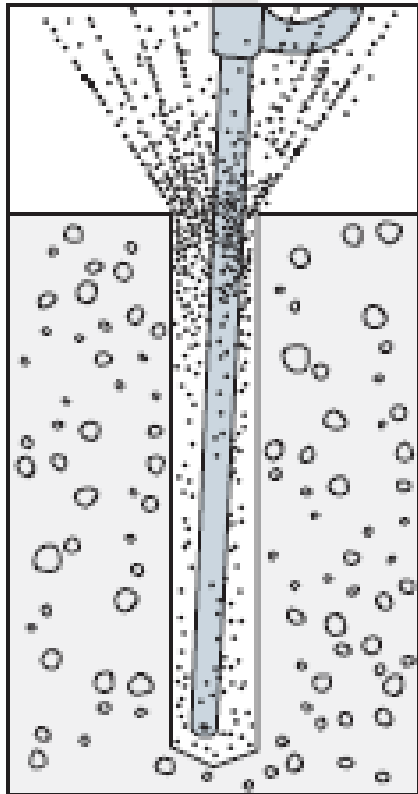
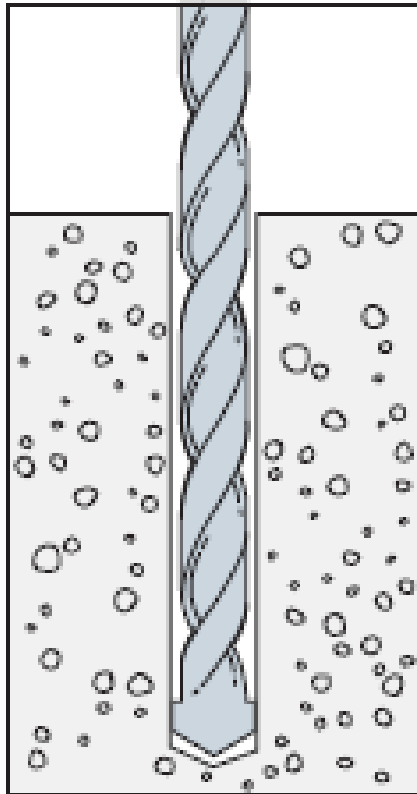
SIMPSON
Strong-Tie

- Code listed
- Dual undercutting embossments on each clip segment enable secondary expansion should a crack form and intersect the anchor
- 1/4" to 3/4" Diameters
- Available in zinc plated, Type 304SS and 316SS.
 - Mech. Galv Q4 2023



Tri-segmented Clip Design

Strong-Bolt[®] 2 – Installation Sequence



Torque Wrench
required!

Heavy Duty Screw Anchor

- High Strength
- $\frac{1}{4}$ " to $\frac{3}{4}$ " Diameters and Lengths 1-7/8" to 15"
- Available in Zinc, Mechanically Galvanized, and 304/316SS
- Easy to install
- Code Listed
- Head stamped for inspection



New Titen HD® Washer Head

- Washer-head provides unobstructed surface
- No need for notching framing
- Head diameter matches cut washer sizes
- Drive bits included in each box
- Code Listed
- Available in Zinc finish (Mechanically Galvanized late 2023)

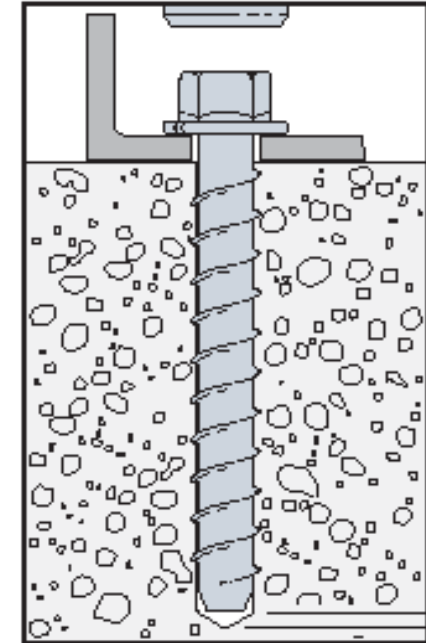
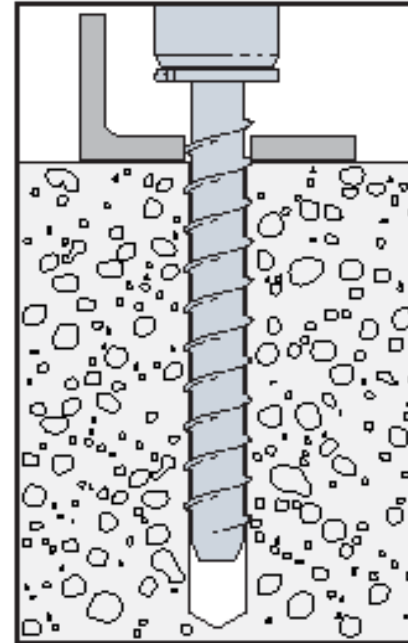
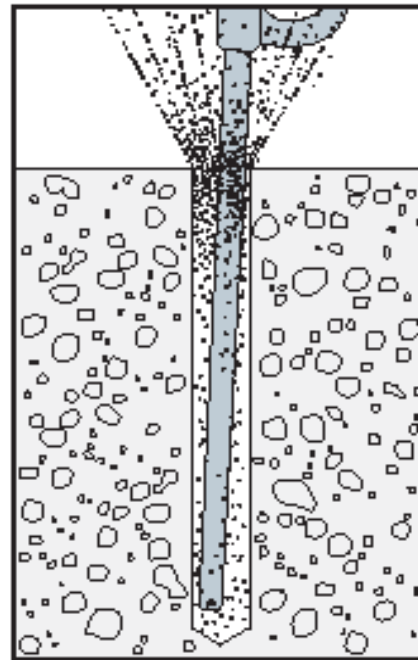
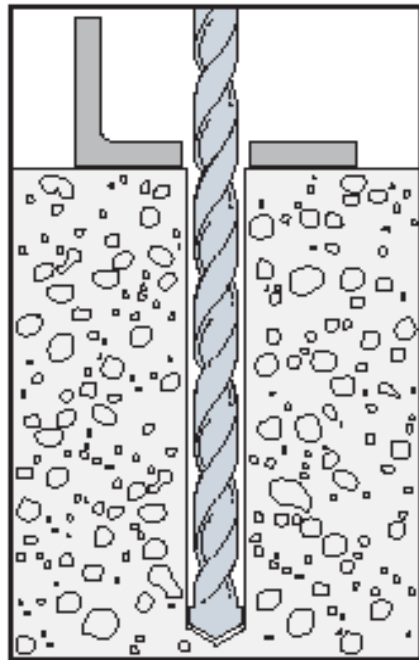


SIMPSON
Strong-Tie

Titen HD/Screw Anchor

Installation Procedure

Impact wrench
Recommended but not required



1/2" min

Simpson Strong-Tie
Titen HD®

Brand X

vs.



**INSTALL
SHOWDOWN**

THD vs Wedge Anchor

SIMPSON
Strong-Tie

THD installs **5 times** faster than a wedge anchor resulting in increased productivity

Able to install close to an edge and closer anchor to anchor spacing

Can be easily removed if placed in the wrong location

Lower profile solutions



Why THD vs Wedge Anchor



Titen HD Installation Information and Additional Data¹



Characteristic	Symbol	Units	Nominal Anchor Diameter, d_a (in.)										
			1/4		3/8		1/2		5/8		3/4		
Installation Information													
Drill Bit Diameter	d_{bit}	in.	1/4		3/8		1/2		5/8		3/4		
Baseplate Clearance Hole Diameter	d_c	in.	3/8		1/2		5/8		3/4		7/8		
Maximum Installation Torque	$T_{inst,max}$	ft.-lbf	24 ²		50 ²		65 ²		100 ²		150 ²		
Maximum Impact Wrench Torque Rating	$T_{impact,max}$	ft.-lbf	125 ³		150 ³		340 ³		340 ³		385 ³		
Minimum Hole Depth	h_{hole}	in.	1 3/4	2 5/8	2 3/4	3 1/2	3 3/4	4 1/2	4 1/2	6	4 1/2	6 3/4	
Nominal Embedment Depth	h_{nom}	in.	1 5/8	2 1/2	2 1/2	3 3/4	3 3/4	4	4	5 1/2	4	5 1/2	6 1/4
Critical Edge Distance	c_{ac}	in.	3	6	2 11/16	3 5/8	3 9/16	4 1/2	4 1/2	6 3/8	6	6 3/8	7 5/16
Minimum Edge Distance	c_{min}	in.	1 1/2		1 3/4								
Minimum Spacing	s_{min}	in.	1 1/2		3					2 3/4	3		
Minimum Concrete Thickness	h_{min}	in.	3 3/4	3 1/2	4	5	5	6 1/4	6	8 1/2	6	8 3/4	10

THD

Min Edge:

1/2" Dia = 1-3/4"

5/8" Dia = 1-3/4"

Zinc-Plated Carbon-Steel Strong-Bolt 2 Installation Information and Additional Data¹



Characteristic	Symbol	Units	Nominal Anchor Diameter, d_a (in.)															
			1/4		3/8		1/2			5/8			3/4		1			
Installation Information																		
Nominal Diameter	d_a	in.	1/4		3/8		1/2			5/8			3/4		1			
Drill Bit Diameter	d	in.	1/4		3/8		1/2			5/8			3/4		1			
Baseplate Clearance Hole Diameter ²	d_c	in.	5/16		7/16		9/16			1 1/16			7/8		1 1/8			
Installation Torque	T_{inst}	ft.-lbf	4		30		60			90			150		230			
Nominal Embedment Depth	h_{nom}	in.	1 3/4	1 7/8	2 7/8	2 1/4	2 3/4	3 3/8	2 3/4	3 3/8	3 3/8	5 1/8	3 3/8	4 1/8	5 1/8	9 3/4		
Effective Embedment Depth	h_{ef}	in.	1 1/2	1 1/2	2 1/2	1 3/4	2 1/4	3 3/8	2 1/8	2 3/4	4 1/8	2 3/8	3 3/8	5	4 1/2	9		
Minimum Hole Depth	h_{hole}	in.	1 7/8	2	3	2 1/4	3	4 1/8	3	3 3/8	5 1/8	3 3/8	4 1/8	6	5 1/2	10		
Minimum Overall Anchor Length	l_{anch}	in.	2 1/4	2 3/4	3 1/2	2 3/4	3 3/4	5 1/2	3 1/2	4 1/2	6	4 3/4	5 1/2	7	7	13		
Critical Edge Distance	c_{ac}	in.	2 1/2	6 1/2	6	6	6	6	7 1/2	7 1/2	7 1/2	9	6	6	8	13 1/2		
Minimum Edge Distance	c_{min}	in.	1 3/4	6	6	6	4	4	6 1/2	6 1/2	6 1/2	6 1/2	4 1/4	4 1/4	4 1/4	8		
	for $s \geq$	in.	—	—	6	6	4	4	—	—	5	5	10	10	10	—		
Minimum Spacing	s_{min}	in.	2 1/4	3	2 3/4	2 3/4	2 3/4	2 3/4	5	5	2 3/4	2 3/4	3 1/2	3 1/2	3 1/2	8		
	for $c \geq$	in.	—	—	12	12	12	12	—	—	8	8	6	6	6	—		
Minimum Concrete Thickness	h_{min}	in.	3 3/4	3 3/4	4 1/2	4	4	5 1/2	6	5 1/2	5 1/2	6	7 7/8	6	6	8 3/4	9	13 1/2

STB-2

Min Edge:

1/2" Dia = 4"

5/8" Dia = 6-1/2"

THDs vs CIP

TECHNICAL BULLETIN

Code-Compliant Sill Plate Anchorage Solutions — Concrete



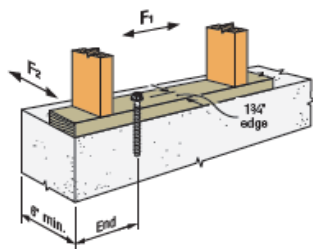
Titen HD® screw anchor for concrete

Simpson Strong-Tie tested the Titen HD screw anchor in accordance with the Acceptance Criteria for Mechanical Anchors in Concrete Elements (AC193) and the results are published in ICC-ES ESR-2713. The Titen HD may be used as a direct 1:1 replacement for ½" and ¾"-diameter cast-in-place anchor bolts used to attach wood sill plates in prescriptive (braced wall) or engineered (shearwall) applications. The Titen HD meets the capacity of cast-in-place anchor bolts for F₁ in-plane and F₂ out-of-plane shear loading.

Titen HD Hex-Washer Head and Flat-Washer Head as 1:1 Replacement for Cast-in-Place Anchor Bolts

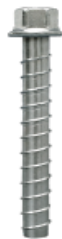
Detail	Anchor Bolt to Replace	Sill Plate Nominal Thickness	Titen HD Model ¹	Drill Bit Diameter (in.)	Min. Nominal Embed. Depth (in.)	Min. Edge Distance (in.)	Min. End Distance (in.)
1	½" diameter with 7" embedment	2x	THD50600H ⁴ or THD50600WH	⅝"	4¼"	1¾"	6"
		Double 2x, 3x	THD50800H ⁴ or THD50800WH	⅝"	4¾"	1¾"	6"
1	¾" diameter with 7" embedment	2x, 3x	THD62100H ⁴ or THD62100WH ⁴	¾"	7"	1¾"	5¾"

1. See strongtie.com for Titen HD installation instructions.
2. Under certain conditions, the code requires a steel plate washer between the sill plate and anchor bolt nut; verify with local code requirements. If the steel plate washer is diagonally slotted, an additional standard cut washer is required. The Simpson Strong-Tie BPS diagonally slotted steel plate washers meet the latest dimensional requirements of the code and can be used without an additional standard cut washer between the steel plate washer and head of the Titen HD.
3. Titen HD models with H denote hex-washer head and Titen HD models with WH denote flat-washer head.
4. Preservative-treated sill plate applications may require the use of mechanically galvanized anchors; verify with local code requirements. If required, add MG to Titen HD hex-washer head model number. THD50800WH, THD50600WH, THD62100H and THD62100WH are only available in zinc plated.
5. The ¾" Titen HD models listed meet Section 1906.1.8 of the 2018 IBC which modifies ACI 318-14 Section 17.2.3 to allow specific alternate design provisions when attaching wood sill plates to foundations or foundation stem walls within light-frame wood structures regardless of seismic design category.



Detail 1

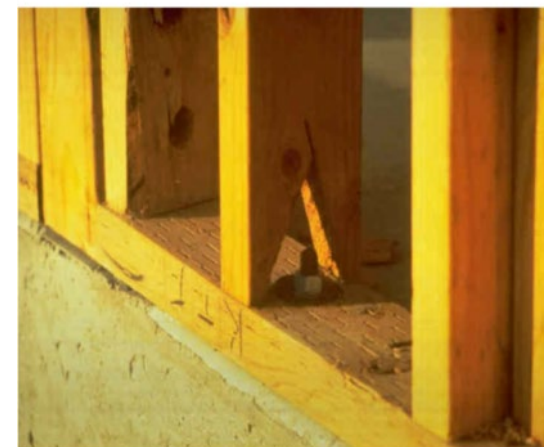
Titen HD Screw Anchor for Concrete



Titen HD (H) hex-washer head



Titen HD (WH) flat-washer head



1:1 Replacement for cast in place anchor bolts

TEB: T-A-SILPLANCH23

UPDATE: THD-MGs now Code Listed for exterior applications

SIMPSON
Strong-Tie

Titen HD[®] Heavy-Duty Screw Anchor Mechanically Galvanized

SIMPSON
Strong-Tie

Now code listed for exterior use

The Titen HD heavy-duty screw anchor is a mechanically galvanized high-strength screw anchor for use in cracked and uncracked concrete, as well as uncracked masonry. Its proprietary heat treatment and ASTM B696 Class B5 mechanically galvanized coating make it ideal for both interior and exterior anchoring applications.

The Titen HD screw anchor is designed for a wide variety of applications such as sill plates, ledgers, post bases, seating, and other hold-down applications. The screw anchor is easy to remove for use in temporary applications such as bracing and formwork, or when a fixture needs to be relocated.

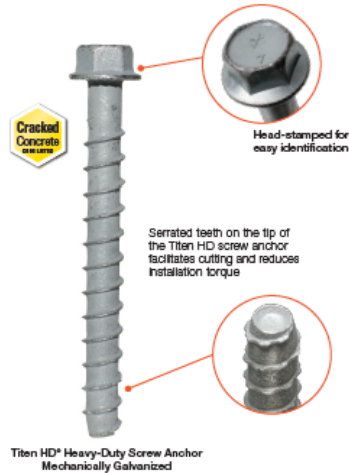
Features

- Thread design undercuts to efficiently transfer the load to the base material
- Standard fractional sizes, hole size equals anchor size
- Specialized heat-treating process creates tip hardness for better cutting without compromising ductility
- Hex washer head requires no separate washer, unless required by code
- Fully and easily removable
- Code listed for exterior applications

Codes: ICC-ES ESR-2713 (concrete), ICC-ES ESR-1056 (masonry)

Material: Carbon steel

Coating: Mechanically galvanized



Exterior Use — Stadium Seating



Ledger Installation



Titen HD Mechanically Galvanized Screw Anchor for Post Base Installation





Adhesive Anchor Overview



Epoxy vs Hybrid-Acrylic

SIMPSON
Strong-Tie

Epoxy

Longer Gel and Cure Time

Standard Manual Dispensing Effort

Higher Load Values

≥ 40°F Minimum Installation Temperature

Suitable in Dry or Wet Installations



Hybrid-Acrylic

Shorter Gel and Cure Time

Reduced Manual Dispensing Effort

High Load Values

≥ 0°F Minimum Installation Temperature

Suitable in Dry and Limited Wet Installations



Understanding the differentiating features is key to understanding how it will benefit the customer.

Current Adhesive Anchor Offering



Epoxy



Hybrid-Acrylic



Future Anchor Adhesive Offering

Epoxy



Economical Performance
General Doweling



High-Performance
Specification Driven




Hybrid-Acrylic



High-Performance
Fast Cure, Cold Weather

3G Family Summary



Characteristic	SET-3G	ET-3G	AT-3G
			
Concrete Performance	HIGH	MED.	HIGH
Concrete Approval	X	X	X
Grout Filled CMU Approval	X	X	-
Hollow CMU Approval	X	X	-
URM Approval	-	X	-
Made in America	X	X	-
Lowest Use Temp. (Concrete)	40 F	50 F	23 F
Cure Speed at Ambient	24 hr	24 hr	30 min
Shelf Life	24 mo.	24 mo.	18 mo.



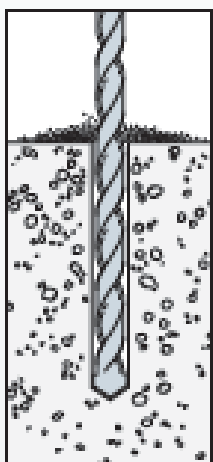
Installation Guidelines – Hole Prep

Conventional Hole Cleaning

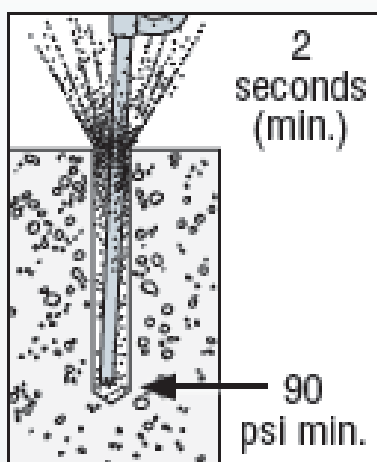
Drill – Blow – Brush – Blow

Hole Preparation – Horizontal, Vertical and Overhead Applications

(SET-3G™ and AT-3G™ for anchor installation) and (AT-3G for post-installed rebar connections)



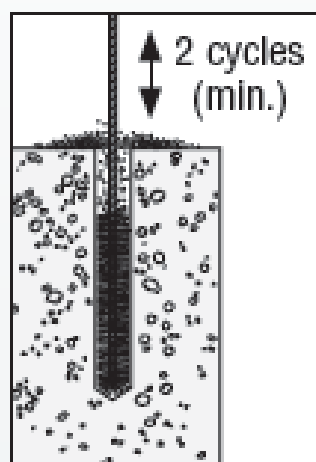
1. Drill.
Drill hole to specified diameter and depth.



2
seconds
(min.)

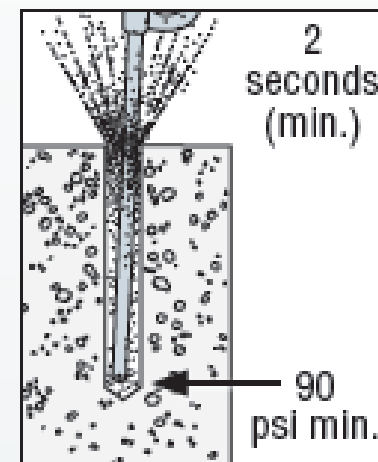
90
psi min.

2. Blow.
Remove dust from hole with oil-free compressed air for a minimum of two seconds. Compressed air nozzle must reach the bottom of the hole.



2 cycles
(min.)

3. Brush.
Clean with a steel wire brush for a minimum of two cycles. Brush should provide resistance to insertion. If no resistance is felt, the brush is worn and must be replaced.*



2
seconds
(min.)

90
psi min.

4. Blow.
Remove dust from hole with oil-free compressed air for a minimum of two seconds. Compressed air nozzle must reach the bottom of the hole.

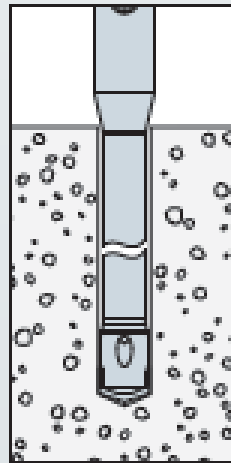
*Note: Visit strongtie.com for proper brush part number.

Hole Prep – Alternate Hole Cleaning Methods

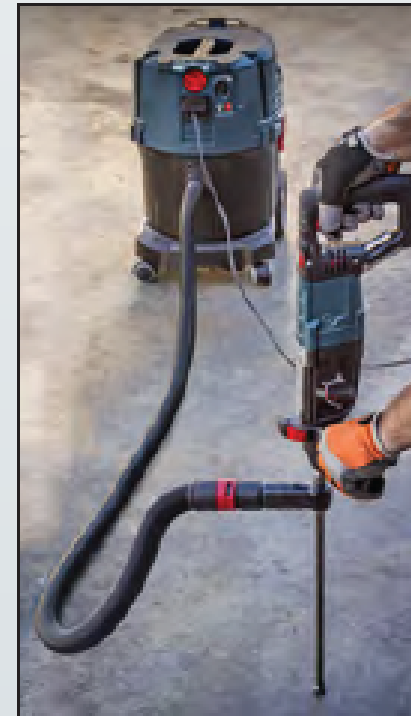
SIMPSON
Strong-Tie

Dustless Hole Cleaning Drill and Fill

Hole Preparation Vacuum Dust Extraction System with the Simpson Strong-Tie DXS Hollow Carbide Drill Bit* – Horizontal, Vertical and Overhead Applications



1. Drill.
Drill hole to specified diameter and depth using the Simpson Strong-Tie DXS hollow carbide drill bit and vacuum dust extraction system.*



Simpson Strong-Tie DXS drill bit used with the vacuum dust extraction system.*

*Note: Visit strongtie.com for tested and accepted hollow carbide drill bit and vacuum dust extraction systems.

Hole Prep – Alternate Hole Cleaning Methods

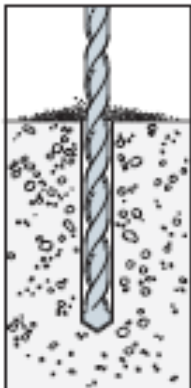
Vacuum in lieu of compressed air

Outside of Code Report Pg 249 C-A-2023

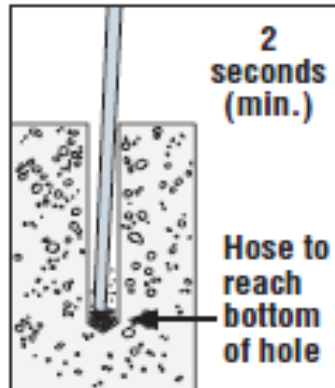
Use of Vacuum in Lieu of Compressed Air

Based on tension tests conducted by Simpson Strong-Tie at our ISO 17025-accredited laboratory, it has been determined that holes for SET-3G™, ET-3G™ and AT-3G™ anchors may alternatively be cleared of concrete dust using a vacuum in place of compressed air. Note that the hose of the vacuum must be capable of reaching the bottom of the hole during vacuuming, similar to the compressed air nozzle. Additionally, the specified time duration for vacuuming must be the same as the time duration specified for compressed air. Lastly, the drilled holes must be brushed as is noted in the applicable evaluation reports. Please see the installation illustrations below for further details.

Hole Preparation — Horizontal, Vertical and Overhead Applications (SET-3G and AT-3G)



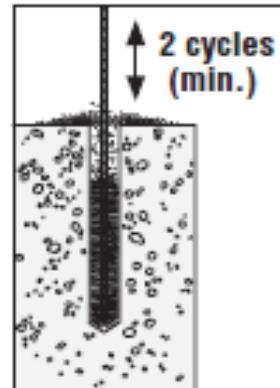
1. Drill.
Drill hole to specified diameter and depth.



2 seconds (min.)

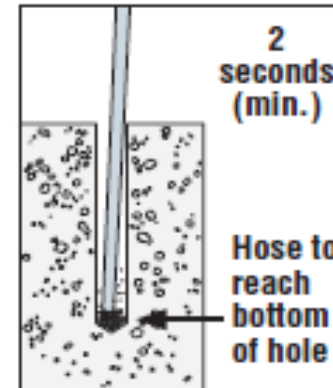
Hose to reach bottom of hole

2. Vacuum.
Remove dust from hole with vacuum for a minimum of two seconds. Vacuum hose must reach bottom of the hole.



2 cycles (min.)

3. Brush.
Clean with a steel wire brush for a minimum of two cycles. Brush should provide resistance to insertion. If no resistance is felt, the brush is worn and must be replaced.



2 seconds (min.)

Hose to reach bottom of hole

4. Vacuum.
Remove dust from hole with vacuum for a minimum of two seconds. Vacuum hose must reach bottom of the hole.

Visit strongtie.com for proper brush part number.

Installation Guidelines – Cartridge Prep

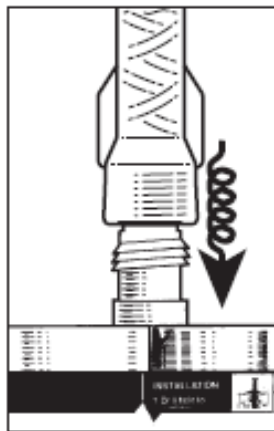
SIMPSON
Strong-Tie

1. Check.

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

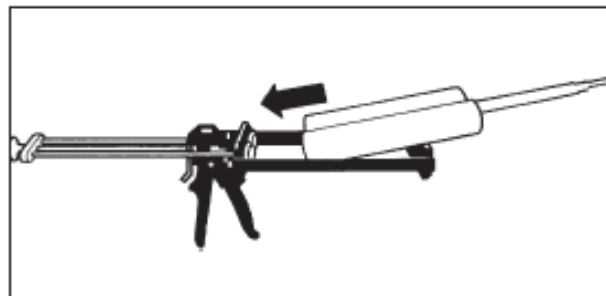
2. Open.

Open cartridge per package instructions.



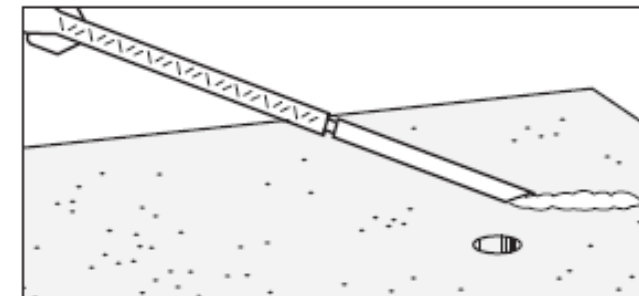
3. Attach.

Attach proper Simpson Strong-Tie® nozzle and extension to cartridge. Do not modify nozzle.



4. Insert.

Insert cartridge into dispensing tool.



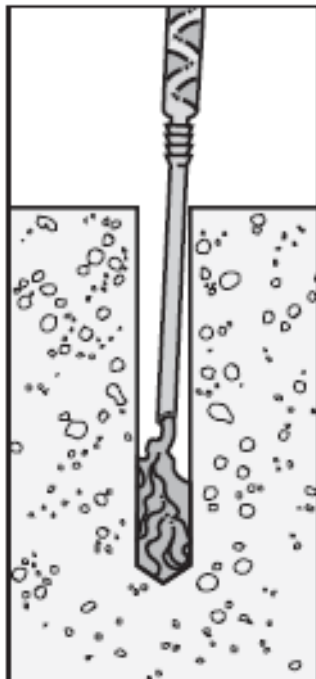
5. Dispense.

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

AT-3G and SET-3G, uniform gray
ET-3G, uniform teal

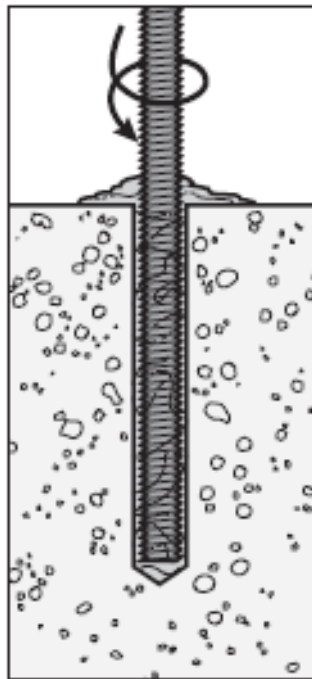
Installation Guidelines – Filling the Hole

DRY AND DAMP HOLES:



1. Fill.

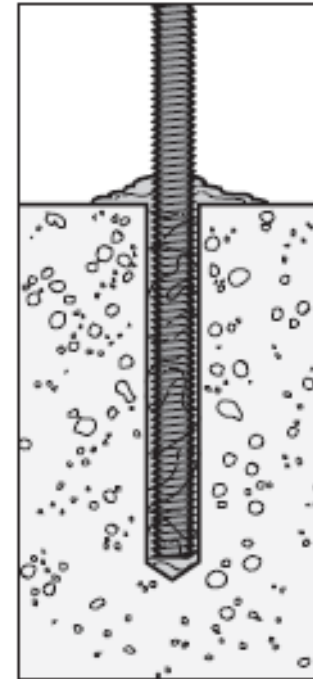
Fill hole $\frac{1}{2}$ to $\frac{2}{3}$ full, starting from bottom of hole to prevent air pockets. Withdraw nozzle as hole fills up.



2. Insert.

Insert clean, oil-free anchor, (marked with the required embedment depth), turning slowly until the anchor contacts the bottom of the hole.

*Threaded rod
or rebar*



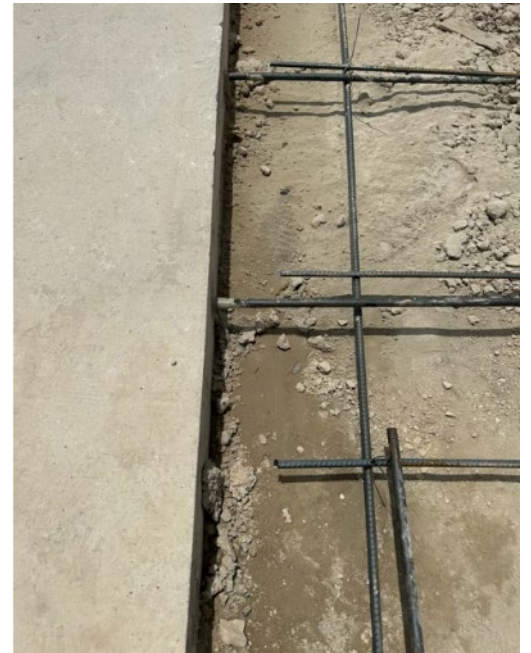
3. Do not disturb.

Do not disturb load or torque anchor until fully cured.

Adhesive Applications- Residential

SIMPSON
Strong-Tie

- Holdowns
- Sill Plates
- Pourbacks
 - Mis-located Plumbing?





(Mis) Applications

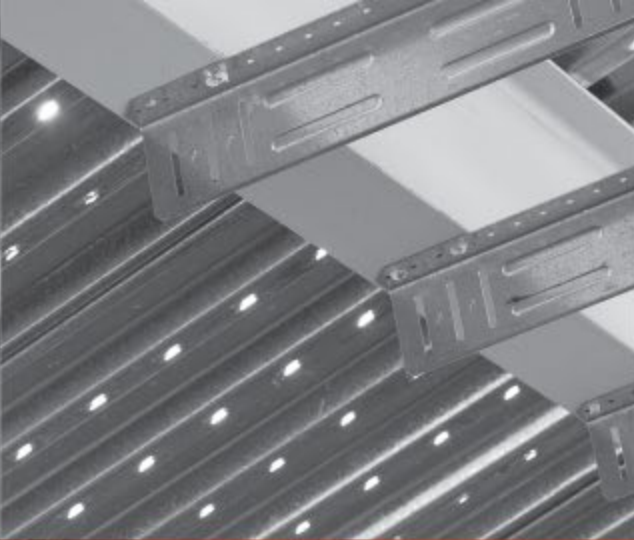
Mechanical Anchors-(Mis) applications

SIMPSON
Strong-Tie



Adhesive Anchors-(Mis) applications





QUESTIONS?