

PAHD/HPAHD Strap Tie Holdowns

Holdowns & Tension Ties

Wood-to-concrete connectors that satisfy engineering and code requirements.

MATERIAL: HPA—10 gauge; all others—12 gauge **FINISH:** Galvanized

INSTALLATION: • Use all specified fasteners. See General Notes.

- Install before concrete pour with a StrapMate®, or other holding device.
- Strap may be bent one full cycle. Bending the strap 90° to aid wall placement may cause spalling behind the strap. If the spall is 1" or less, measured from the embedment line to the bottom of the spall, full loads apply. For spalls between 1" and 4" (see illustration on page 45), the allowable load is 0.90 of the table loads.
- For two pour installations spalling is measured from the first pour.
- Nail strap from bottom up.
- Where fewer fasteners are used in the structural wood member, reduce loads according to the code. A wood splitting problem may occur when holdowns are nailed to lumber less than 3½" wide. To lessen splitting of 3x's or double 2x's, either fill every nail hole with 10dx1½" nails or fill every other nail hole with 16d commons. Reduce the allowable load based on the size and quantity of fasteners used.
- Unless otherwise noted, do NOT install where: (a) a horizontal cold joint exists within the embedment depth between the slab and foundation wall or footing beneath, unless provisions are made to transfer the load, or the slab is designed to resist the load imposed by the anchor; or (b) slabs are poured over concrete block foundation walls.
- To get the full table load, the minimum center-to-center spacing is twice the embedment depth when resisting tension loads at the same time.
- To tie multiple 2x members together, the Designer must determine the fasteners required to join members to act as one unit without splitting the wood.
- Additional studs attached to the shearwall studs or post may be required by the Designer for wall sheathing nailing.

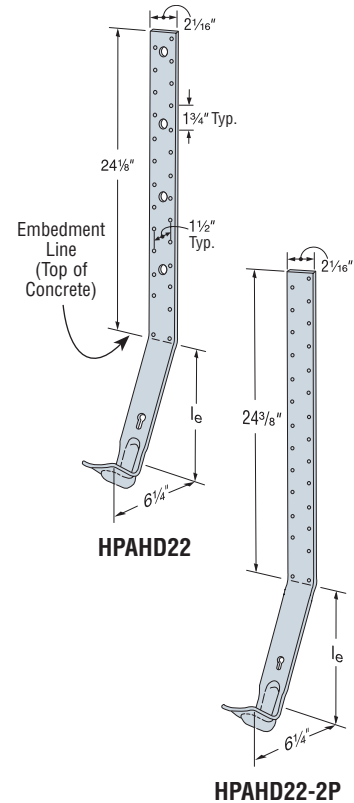
FOUNDATION CORNERS: Nail and bolt quantities have been reduced when the load is limited by tested concrete pullout strength (fill holes from bottom up); additional nail holes need not be filled. Nail and bolt quantities may be reduced further for less than 8" corner distance design loads—use code allowable loads for fasteners used in shear.

TWO-POUR SYSTEMS: When a cold joint exists between slab and foundation, the holddown will be lower on the stud wall since the embedded portion of the holddown must be in the foundation (see table footnote 1 for exception). Fewer fasteners are used, reducing allowable loads. Loads are calculated using a 4" slab over 6" and 8" foundation walls.

PAHD42, HPAHD22, HPAHD22-2P HOLDOWNS: Designed to be installed at the edge of concrete. Tests determined the pullout strength with one horizontal #4 rebar in the shear cone. Rebar should be a minimum length of 2x embedment depth + 12" (except corner installations, page 45). Install before pouring concrete by nailing to form. Installation holes allow nailing to the form, resulting in 1" deeper embedment; see illustration.

OPTIONS: See also STHD Holdowns, LTT, HTT Tension Ties.

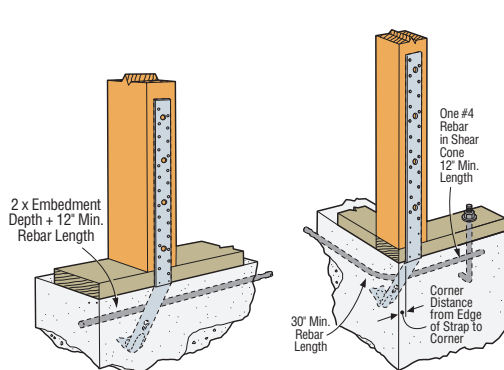
CODES: See page 12 for Code Reference Key Chart.



Model No.	Min. Stem Wall	Embed. Depth le	Nails	Allowable Tension Loads DF/SP (160)								Code Ref.	
				2000 psi Concrete				2500 psi Concrete					
				End Distance									
				½"		8"		½"		8"			
				133	160	133	160	133	160	133	160		
SINGLE POUR													
PAHD42	6	6½"	12-16d	920	920	2030	2030	1225	1225	2205	2205	IL1 ¹³ , F24	
	8		16-16d	1050	1050	2715	2715	1400	1400	2945	2945		
HPAHD22	6	10"	16-16d	1315	1315	3335	3335	1750	1750	3335	3335		
	8		23-16d	2030	2030	4745	4745	2210	2210	4875	5160		
TWO POUR													
PAHD42	6	6½"	12-16d	920	920	2030	2030	1225	1225	2205	2205	IL1 ¹³ , F24	
	8		12-16d	1050	1050	2305	2715	1400	1400	2305	2765		
HPAHD22	6	10"	16-16d	1315	1315	3335	3335	1750	1750	3335	3335		
	8		19-16d	2030	2030	4030	4745	2210	2210	4030	4835		
HPAHD22-2P	6	14¾"	16-16d	2455	2455	3335	3335	2455	2455	3335	3335		
	8		23-16d	2455	2455	4745	4745	2455	2455	4875	5160		

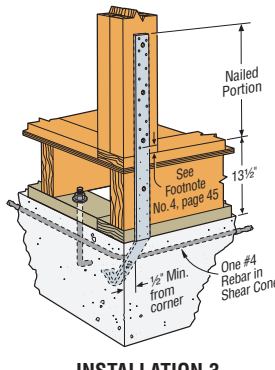
1. HPAHD22 may be embedded 4" into the slab and 6" into the 8" stemwall beneath for a maximum load of 2810 lbs. at 8" minimum from the closest corner, and 1200 lbs. at ½" from the closest corner (like installation 4).
2. Allowable loads have been increased for wind or earthquake load durations with no further increase allowed; reduce where other load durations govern.
3. 16d sinkers (0.148" dia. x 3¼" long) or 10d commons may be substituted for specified 16d commons at 0.85 of table loads.
4. Minimum nail end distance to prevent splitting is 10x the nail diameter, or 1½" for 16d nails.
5. Calculate loads using straight line interpolation for corner distances between ½" and 8".
6. Optional fastener holes are provided on selected products. Because the product is limited by the concrete foundation, you may not need to install optional fasteners.
7. Strap may be bent one full cycle. (Bent horizontal 90° then bent vertical.)
8. Rim Joist application: see Installation 3 for corner condition.
9. Loads shown apply to post-tension slabs when one #4 rebar (minimum) is installed as shown on page 45.
10. Post design shall be by Designer.
11. For SCL columns the PAHD/HPAHD straps should be used into the wide face only.
12. There is an increase in the amount of deflection if the strap is installed on the outside of the shear panel instead of directly to the framing. Refer to technical bulletin T-PLYWOOD (see page 191 for details).
13. Testing to new ICC-ES acceptance criteria to be completed in 2009. Reference www.strongtie.com for latest loads and information.
13. **NAILS:** 16d = 0.162" dia. x 3¾" long. See page 16-17 for other nail sizes and information.

SINGLE POUR INSTALLATIONS

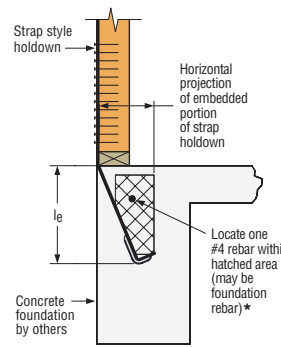


INSTALLATION 1
Typical HPAHD Single Pour Edge Installation

INSTALLATION 2
Typical HPAHD Single Pour Corner and Endwall Installation



INSTALLATION 3
Typical HPAHD Single Pour Rim Joist Installation (Reduce allowable load based on quantity of effective nails used.)

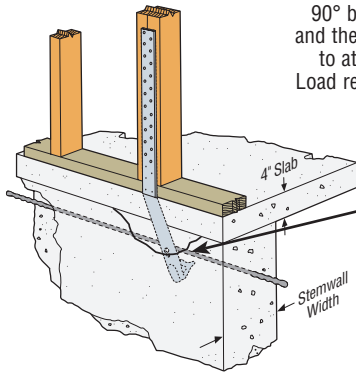


Single Pour Rebar Installation
*Maintain minimum rebar cover, per ACI-318 concrete code requirements.

PAHD/HPAHD Strap Tie Holdowns

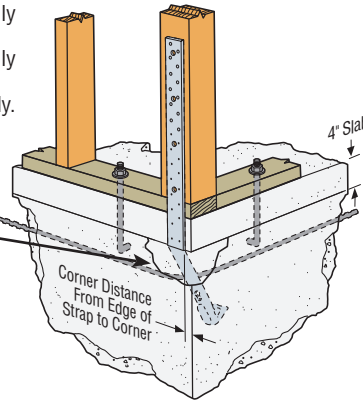
TWO POUR INSTALLATIONS

Spalling may occur if the anchor is bent horizontally 90° before installation, and then bent up vertically to attach to the stud. Load reduction may apply.



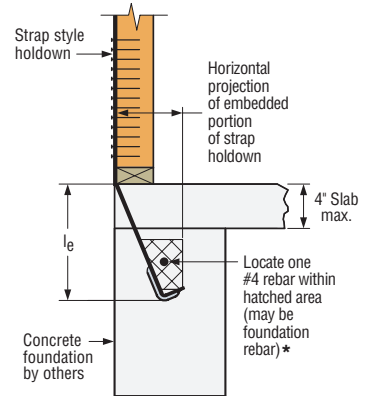
INSTALLATION 4

Typical HPAHD22-2P Two Pour Edge Installation. Unless noted, install other models with bend embedment line at cold joint between slab and foundation.



INSTALLATION 5

Typical HPAHD Two Pour Corner Installation



Two Pour Rebar Installation

*Maintain minimum rebar cover, per ACI-318 concrete code requirements.

SPALL REDUCTION SYSTEM FOR PAHD AND HPAHD

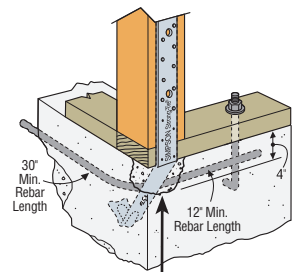
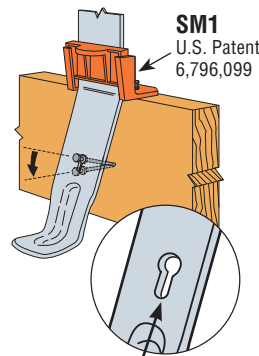
FEATURES

- Secures holddown to wood form-board.
- Allows for proper side-cover.
- Keeps strap vertical.
- Prevents tilting or twisting of strap during the concrete pour.
- Uses one 16d duplex nail.

BENEFITS

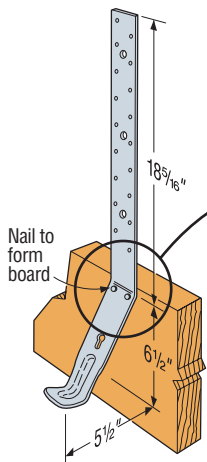
- Greatly reduces spalling and costly retrofits.
- Helps prevent strap movement parallel and perpendicular to plate.
- Decreases possibility of misinstallation of strap to wood member.
- Simple to use:
 - Common jobsite nail.
 - No additional expense.

When using keyhole feature, care should be taken when removing form boards. If concrete is not set, the duplex nail will move the strap placement.



SPALLING

Spalling may occur if the anchor is bent horizontally 90° before installation, and then bent up vertically to attach to the stud. Load reduction may apply.



Typical PAHD42 before the Concrete Pour

PA Strap Tie Holdowns

Wood-to-concrete connectors that satisfy engineering and code requirements.

MATERIAL: 12 gauge

FINISH: Galvanized or ZMAX® coating

INSTALLATION: • Use all specified fasteners. See General Notes.

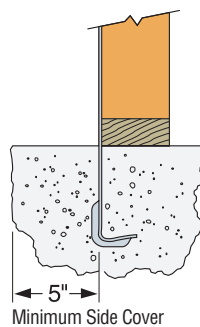
- Refer to technical bulletin T-PAUPLIFT (see page 191 for details) for additional information.

CODES: See page 12 for Code Reference Key Chart.

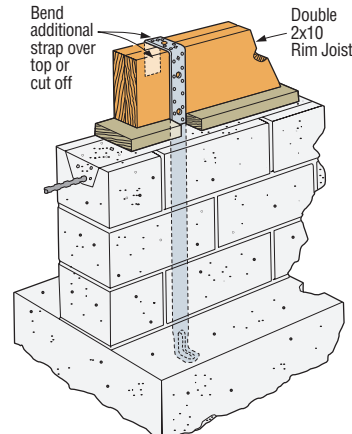
These products are available with additional corrosion protection. Additional products on this page may also be available with this option, check with Simpson Strong-Tie for details.

Model No.	L	Min. Embed. Depth	Nails	Allowable Uplift Loads		Code Ref.
				(160)	(2030)	
PA51	51	4	9-16d	2030		IL6 ⁴
PA68	70	4	9-16d	2030		

1. Loads have been increased 60% for wind or earthquake loading with no further increase allowed; reduce where other loads govern.
2. 16d sinkers (9 ga x 3 3/4") or 10d commons may be substituted for the specified 16d commons at 0.84 of the table loads.
3. Optional fastener holes provided. Calculate loads according to the code to a maximum of 3685 lbs. Minimum embedment is 4"; 5" to the nearest edge.



Typical PA connecting Stud to Foundation
(use PAHD42 or HPAHD22 for edge applications)



Typical PA51 Installation
(PA68 similar)

4. Testing to new ICC-ES acceptance criteria to be completed in 2009. Reference www.strongtie.com for latest loads and information.

