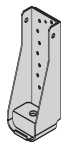
Predeflected Holdowns . . . . . Page 33

- **PHD Series**

Innovative design increases holdown stiffness. Connects to wood post with WS series wood screws.


PHD

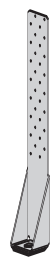
Tension Ties . . . . . Pages 34-35

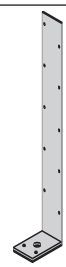
- **HTT Series**

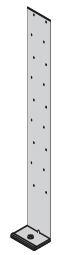
Heavy tension tie. Bolts to foundation and nails to post.

- **LTS Series & LTTI31**

Light-capacity tension tie. Bolts to foundation and nails to post.


HTT


LTS


LTTI31

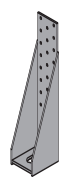
Holdowns . . . . . Pages 36-38

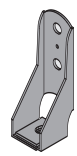
- **TD & TDX Series**

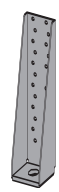
Standard holdown. Connects to post with bolts.

- **UPHD Series**

High capacity holdown. Connects to post with wood screws.


TD


TDX


UPHD

Foundation Straps . . . . . Pages 39-42

- **HPAHD & PAHD42**

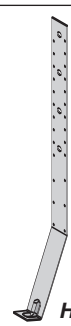
Embedded strap holdowns for solid end posts.

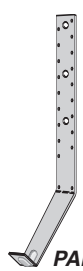
- **LSTAD & STAD Series**

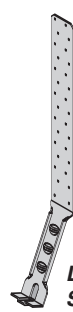
Embedded strap holdowns for built-up 2x end posts.

- **TA Series**

Straps through masonry foundation wall


HPAHD


PAHD42


LSTAD/ STAD


TA

Purlin Anchors. . . . . Pages 43-44

- **HPA, PA, PAI, PAT, PATM Series**

Embedded strap for concrete to purlin connections.


HPA/PA


PAI


PAT


PATM

Concrete Angles. . . . . Page 45

- **TDL Series**

Light-capacity foundation strap. Bolts to foundation and nails or bolts to post.


TDL

Cold Formed Steel Holdowns . . . Page 45

- **LTS20B**

Light capacity tension tie strap

- **HTT14S**

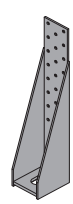
Medium capacity tension tie.

- **TDS Series**

Heavy capacity tension tie.


LTS20B


HTT14S

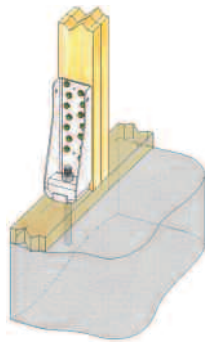

TDS

Innovative double lap design increases holdown stiffness and fastener shear values. Reduces eccentricity in the studs/post decreased centerline dimension. No thru-bolts to countersink.

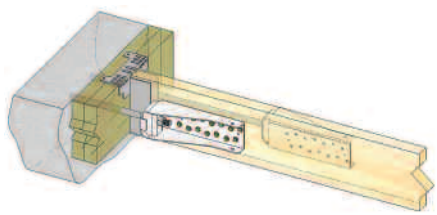
Materials: 12 gauge
Finish: G90 galvanizing
Codes: ESR-1575, FL11838, LA City RR 25756

Installation:

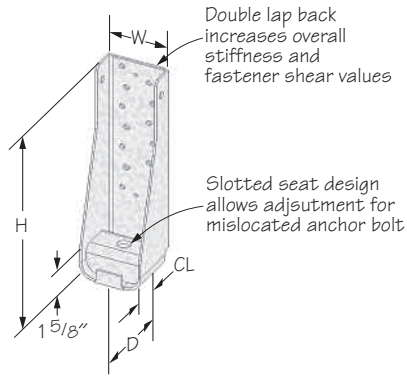
- Use all specified fasteners. See Product Notes, page 10.
- **Place the PHD over the anchor bolt. No washer is required.**
- Install with USP's code evaluated WS3 (1/4″ x 3″) Wood Screws, which are provided with the holdown.
- Tighten anchor bolt nuts finger tight snug to base, plus 1/3 to 1/2 additional turns with a wrench. To prevent loosening of the anchor nut during critical loading, use a locking nut or tighten a second nut over the first to lock nuts in place.
- **PHD Predeflected Holdowns may be installed off sill plate with no load reduction.**
- The design engineer may specify any alternate anchorage calculated to resist the tension load for a specific application. Anchorage exposure length should take the bearing plate height of 1 5/8″ into account, anchor bolt thread should visibly extend above nut.
- If used to anchor a built-up post, such as a double 2 x 4, the post component shall be designed to act as a single unit. Holdown fasteners specified shall not be considered to attach multiple plys together.
- For anchorage options see STBL Anchor Bolt section on pages 25-26.



Typical *PHD5* installation



Typical *PHD5* concrete wall offset installation



PHD5

USP Stock No.	Ref. No.	Steel Gauge	Dimensions				Fastener Schedule			Allowable Tension Loads (Lbs.)[1,4,7]			Code Ref.
							Anchor Bolts[2]		WS3 Wood Screws[6]	DF-L / SP		S-P-F	
			W	H	D	CL	Qty	Dia.	Qty	160%	Δ (in)[3,5]	160%	
PHD2	HDU2-SDS2.5 HDU4-SDS2.5	12	3-1/4	7-1/2	3	1-3/8	1	5/8	10	4815	0.058	4045	3, F21, R11
PHD5	HDU5-SDS2.5	12	3-1/4	10-7/8	3	1-3/8	1	5/8	14	5540	0.056	4655	
PHD6	HDU8-SDS2.5	12	3-1/4	13-1/16	3	1-3/8	1	7/8	18	7295	0.061	6130	
PHD8	-- --	12	3-1/4	16-1/2	3	1-3/8	1	7/8	24	8185	0.062	6875	

1) Allowable loads have been increased 60% for wind and seismic loads; no further increase shall be permitted.
2) The designer must specify anchor bolt type, length, and embedment.
3) Deflections are derived from static, monotonic load tests of devices connected to DF-L wood members with specified fasteners.
4) The designer shall consider the effect of compression, bearing, tension, and combined bending due to device eccentricity when applicable.
5) The PHD may be elevated off the sill.
6) WS3 wood screws are 1/4 ″ x 3″ and are included with PHD models.
7) Minimum post thickness is 3″. Consult USP for installations less than 3″.
New products or updated product information are designated in red.

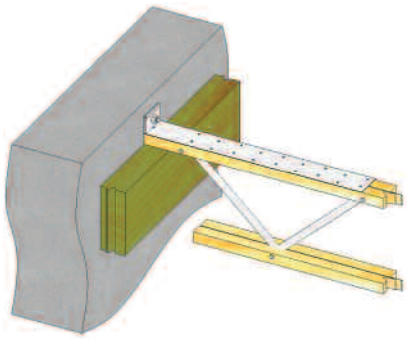
HTT series – Secures multi-ply studs or posts to mudsills or foundation. Nail fastening makes for a convenient connection to studs or posts in cramped retrofit installations.

LTS series – The LTS19 is designed for nail-on installation to 2x joists or studs, and the LTS20B provides a nail or bolt fastening option. The LTS20B will accommodate wood I-Joists if 10d x 1 1/2″ nails are used instead of the specified 16d nails.

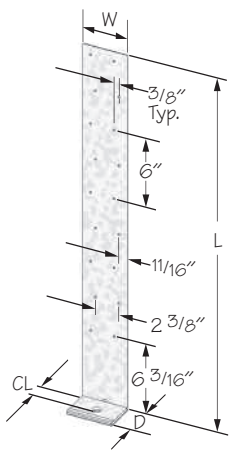
LTTI31 – An open web joist tension tie designed for use with masonry or concrete construction.

Materials: See chart
Finish: G90 galvanizing
Codes: ESR-1575, NER 608, FL821 & FL11838
LA City RR 25756

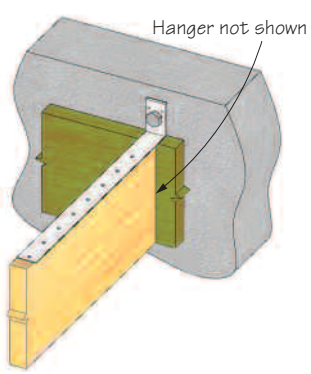
Installation:
- Use all specified fasteners. See Product Notes, page 10.
- Use all specified fasteners to attach the strap portion of the connector to the side of stud, post, joist, purlin, or beam. Secure the base to the concrete or masonry wall with specified anchor bolt. A design professional shall specify the type, length, and embedment of the anchor bolt. No washers required.
- LTTI31 and LTS connectors must be mounted flush to the surface of the mudsill.
- Allowable loads are based on either nail or bolt fastening; nail and bolt values cannot be combined.
- Washers are not required on transfer plates that fit over the anchor bolt.



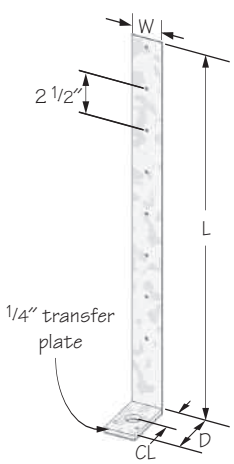
Typical *LTTI31* installation



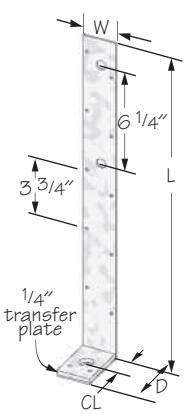
LTTI31



Typical *LTS* installation



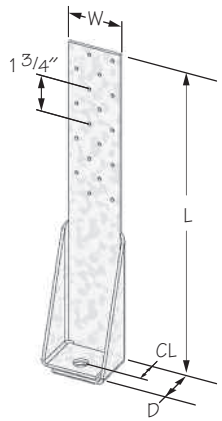
LTS19



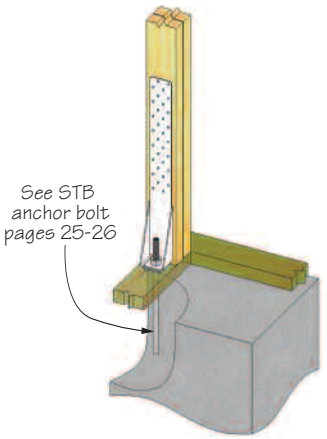
LTS20B

continued on next page

Bolts must be ordered separately. See page 20 for available sizes.



HTT16
***HTT22* similar**



Typical *HTT22* installation

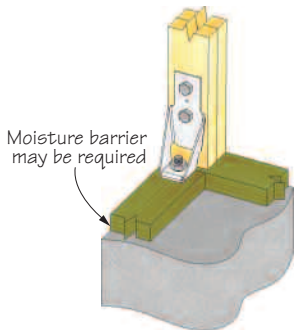
USP Stock No.[7]	Ref. No.	Steel Gauge		Dimensions				Nail Spacing	Fastener Schedule				Allowable Tension Loads (Lbs.)[1]		Code Ref.
									Anchor Bolts[4]		Strap[2,3]		DF-L / SP		
		Strap	Plate	W	L	D	CL		Qty	Dia.	Qty	Type	160%	Δ (in)[5,6]	
HTT16	HTT16	10	-- --	2-1/2	15-5/8	2	1-3/8	1-3/4	1	5/8	18	10d	3250	0.125	L8, F15
											18	16d	4290	0.099	
HTT22	HTT22	10	-- --	2-1/2	21-1/2	2	1-3/8	1-3/4	1	5/8	32	10d	5370	0.125	L8, F15
											32	16d			
LTTI31	LTTI31	18	3	3-3/4	31	2-5/8	1-3/8	3	1	5/8	18	10d x 1-1/2	2805	0.175	3, F21, R11
LTS19	LTT19	16	3	1-3/4	22-1/4	3	1-1/2	2-1/2	1	3/4	8	10d	1205	0.132	3, F21, R11
LTS20B	LTT20B	12	3	2	20	3	1-1/2	3-3/4	1	3/4	10	10d x 1-1/2	1100	0.128	3, F21, R11
											10	16d	1105	0.128	
											2	1/2	1175	0.128	

1) Allowable loads have been increased 60% for wind or seismic loads; no further increase shall be permitted.
2) Minimum nail embedment shall be 1-1/2″ for 10d nails and 1-5/8″ for 16d nails.
Bolts require a minumum length of 1-1/2″ in vertical member for the listed loads.
3) 16d sinkers may be substituted for the specified 10d common nails with no load reduction.
4) The designer must specify anchor bolt type, length and embedment.
5) Deflections are derived from static, monotonic load tests of devices connected to DF-L wood members with specified fasteners.
6) HTT holdowns raised off of the sill plate may have higher deflection values.
7) LTTI and LTS holdowns shall be installed tight to the sill plate.
New products or updated product information are designated in red.

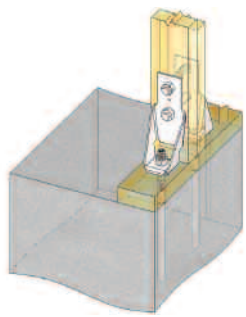
TD15/TDX – The TDX2 and TDX5 feature formed designs, all others are welded.
All models feature a self-jigging design with code required end distances built in. (End distance = 7 bolt diameters from the top of the sill to the center of the first bolt hole in the studs or post.)

Materials: See chart
Finish: TDX2 & TDX5 – G90 galvanizing;
All others – USP primer
Options: TDX2 is available Triple Zinc. To order add TZ to the end of stock number, as in **TDX2-TZ.**
Codes: ESR-1575, FL11838, LA City RR 25756
Patents: #5,092,097 — TDX2 & TDX5

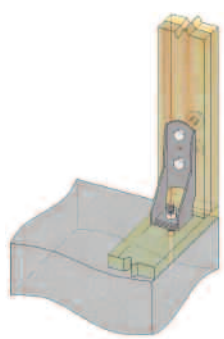
Installation:
• Use all specified fasteners. See Product Notes, page 10.
• Do not use lagbolts. Washers are not required for anchor bolts or between holdown and bolt hex head, but standard washers should be used against stud or post under the nut. See page 20 for BP/LBP Bearing Plates.
• Bolt holes should be a minimum of 1/32″ to a maximum of 1/16″ larger than the bolt diameter (per 2005 NDS®, Section 11.1.2).
• See pages 25-26 for STB Anchor Bolt section for anchorage options. A design professional may specify alternate anchorage with conventional anchor bolts.
• A design professional shall determine the adequacy of the stud to resist published loads. When installing to multi-ply 2x studs, the designer must specify the fasteners required to bind the plys together and resist splitting.
• Self-jigging models are designed to provide the required minimum end distance of 7 bolt diameters from the bottom of the stud or post to the centerline of the first bolt hole.
• Tighten anchor bolt nuts to finger tight, plus 1/3 to 1/2 additional turns with a wrench. Wood members may shrink over time; if possible, nut tightness should be checked periodically. To prevent loosening of the anchor bolt nut during critical loading, use a locking nut or tighten a second nut over the first to lock nuts in place.
• If used to anchor a built-up post, such as a double 2 x 4, the post component shall be designed to act as a single unit. Holdown fasteners specified shall not be considered to attach multiple plys together.



Typical *TDX2* installation

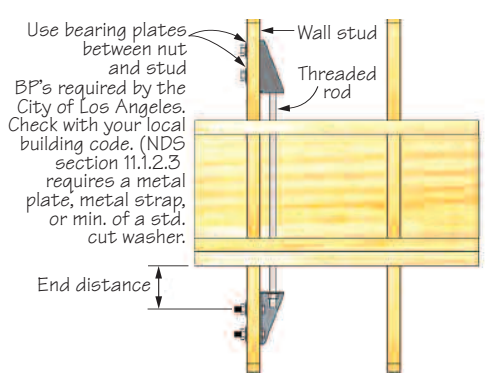


Typical *TDX2* back-to-back installation

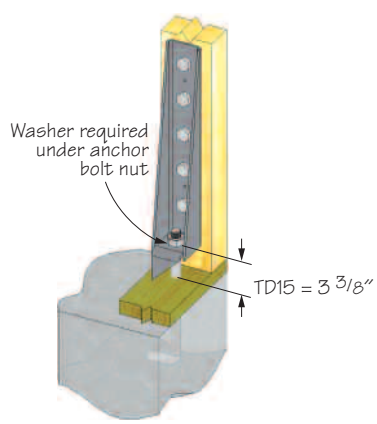


Typical *TDX6* installation

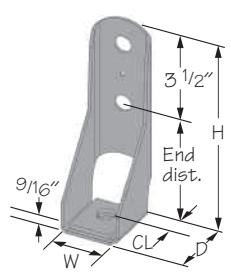
Bolts must be ordered separately. See page 20 for available sizes.



Holdown installation between floors



Typical *TD15* installation



TDX6

continued on next page

USP Stock No.[11]	Ref. No.	Steel Gauge	Dimensions				Bolt Schedule[4]				Min. Required Bolt End Distance[5]	Allowable Tension Loads (Lbs.)[1,2,3]			Code Ref.
							To Sill Plate Anchor Bolts		To Stud Bolts			Minimum Wood Member Size	DF-L / SP		
			W	H	D	CL	Qty	Dia.	Qty	Dia.			160%	Δ (in)[6,8]	
TDX2	HD2A	12	2-1/16	8-1/8	2-3/4	1-1/2	1	5/8	2	5/8	4-1/2	(1) 2x4	1910	0.140	3, F21, R11
												(2) 2x4	3130		
TDX5	HD5A	10	2-1/2	9-3/8	3-7/8	2	1	3/4	2	3/4	5-1/4	(1) 2x4	2350	0.133	
												(2) 2x4	3260		
TDX6	HD6A	7	3-1/2	11-1/8	3-3/4	2	1	7/8	2	7/8	6-1/8	(1) 2x4	2765	0.128	
												(2) 2x4	5320		
												(1) 4x4	5355		
TDX8	HD8A	7	3-1/2	14-5/8	3-3/4	2	1	7/8	3	7/8	6-1/8	(1) 2x6	4065	0.141	
												(2) 2x6	7120		
TDX10	HD10A	7	3-1/2	18-1/8	3-3/4	2	1	7/8	4	7/8	6-1/8	(1) 2x6	5110	0.134	
												(2) 2x6	7845		
TDX14	HD14A	3	3-1/2	20-1/2	3-5/8	2-1/8	1	1	4	1	7	(1) 2x8	6625	0.139	
												(2) 2x6	11995		
												(1) 4x6	13075		
TDX20	HD20A	3	4-3/4	20-3/4	4-1/2	2-3/8	1	1-1/4	4	1	7	(1) 2x8	6485	0.109	
												(2) 2x6	10485		
TD15	HD15	3	3-1/2	25	4-3/8	2-1/8	1	1-1/4	5	1	7	(1) 2x8	7665	0.106	
												(2) 2x8	14315		
												(1) 4x8	16200		
												(1) 6x6	18865		

1) Allowable loads shown are for single shear connections and may be doubled for back-to-back installations. The designer must verify post and anchor bolt capacities.
2) Allowable loads have been increased 60% for wind or seismic loads; no further increase shall be permitted.
3) The designer must specify stud or post to resist published load values.
4) The designer must specify anchor bolt type, length, and embedment.
5) All models may be installed with greater than the required anchor end distance with no chart load reduction.
6) Deflections are derived from static, monotonic load tests of devices connected to DF-L wood members and consider both the deflection of the holdown and cross grain crushing of the wood post.
7) The designer shall consider the effect of compression, bearing, tension, and combined bending due to device eccentricity when applicable.
8) Holdowns raised off of the sill plate may have higher deflection values.
9) TDX5 may be installed to a 5/8″ anchor bolt with no reduction in load, provided a standard washer is used under the nut.

New products or updated product information are designated in red.

SOURCES OF DEFLECTION AT THE SHEARWALL HOLDOWN CONNECTIONS

The following are some of the sources of deflection that should be evaluated by the designer. See the illustration, which applies to other holdown configurations.

A. Improperly-sized stud/post bolt holes – increased bolt slip can occur if stud/post bolt holes are oversized and exceed the 2005 NDS® recommended bolt hole diameter.

B. Stud/Post bolt holes – bolt slip can occur.

C. Wood crushing at stud/post bolt hole perimeters – the use of larger washers/bearing plates can reduce stress-induced wood crushing at bolt bearing locations.

D. Eccentricity in stud/post caused by holdown – holdowns installed on only one side of a stud or post result in an eccentricity which causes increased stresses and movement in a shearwall system.

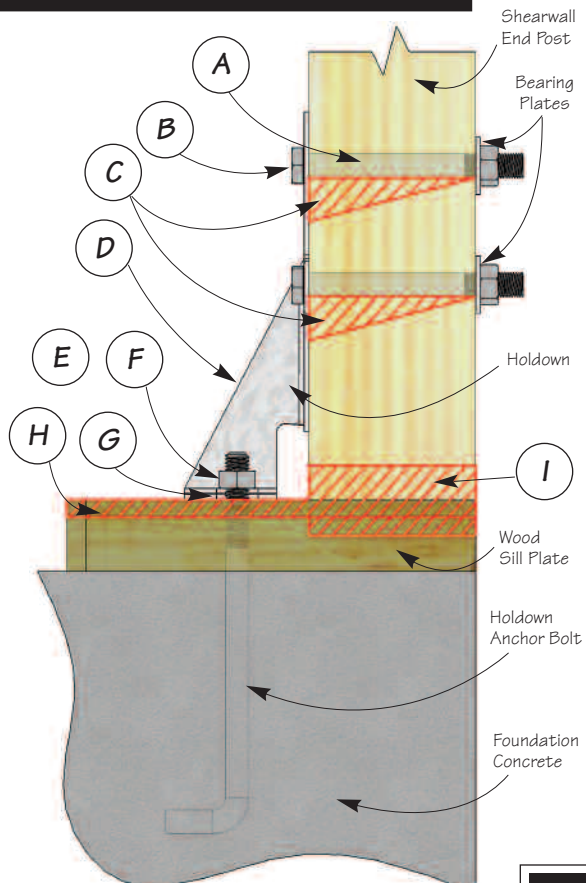
E. Nut spin – anchor bolt nuts that are not restrained can spin loose during cyclic loading, allowing movement; the use of steel nylon locking nuts or thread adhesive may prevent nut spin.

F. Loose nuts – increased movement can occur when nuts are not sufficiently tightened.

G. Holdown deflection – holdown deflection can occur when the shearwall system is subjected to cyclic stress from earthquakes or high wind.

H. Wood Shrinkage – due to drying, wood may shrink and cause bolted connections to become loose; periodic retightening may be required.

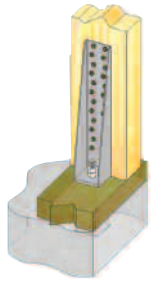
I. Localized crushing at wood-bearing surfaces – excessive crushing at wood-bearing surfaces may result from compressive forces due to overturning during high wind or earthquake loading.



Engineered for high capacity with minimum deflection and low eccentricity.

Materials: 10 gauge
Finish: USP primer
Codes: ESR-1575, FL11838, LA City RR 25756

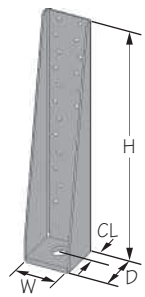
NEW SIZES



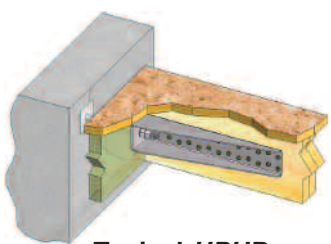
Typical *UPHD* installation

Installation:
- Use all specified fasteners. See Product Notes, page 10.
- Place holdown over anchor bolt and drive screws into post.
- Tighten anchor bolt nuts finger tight snug to base, plus 1/3 to 1/2 additional turns with a wrench.To preventh loosening of the anchor nut during critical loading, use a locking night or tighten a second nut over the first to lock nuts in place.
- Holdown may be installed off of the plate with no load reduction.
- Post may be shimmed provided the shim acts as a single unit with the post. Holdown fasteners specified shall not be considered to attach shim to post. Shim shall be a structural material equal or better than the post material. Consult a designer or an engineer of record for appropriate fastening of shim.

Alternate installations:
- Drill hole in concrete or masonry and insert retrofit anchor (i.e. epoxy anchor) capable of resisting uplift and lateral loading.
- Place holdown over anchor bolt and drive screws into post.
- Tighten anchor bolt nuts finger tight snug to base, plus 2-3 additional turns with a wrench. To prevent loosening of the anchor nut during critical loading, use a locking nut or tighten a second nut over the first to lock nuts in place.
- Post may be shimmed provided the shim acts as a single unit with the post. Holdown fasteners specified shall not be considered to attach shim to post. Shim shall be a structural material equal or better than the post material. Consult a designer or an engineer of record for appropriate fastening of shim.



UPHD



Typical *UPHD* concrete wall installation

USP Stock No.	Ref. No.	Steel Gauge	Dimensions				Fastener Schedule			Allowable Loads (Lbs.)[1,5,7]			Code Ref.
							Anchor Bolts[2]		WS3 Wood Screws[6]	DF-L / SP		S-P-F	
			W	H	D	CL	Qty	Dia.	Qty	160%	Δ (in)[3,5]	160%	
UPHD8	-- --	10	3-1/4	17-1/4	3-1/8	1-3/8	1	7/8	24	9165	0.157	7695	3, F21, R11
UPHD11	HHDQ11-SDS2.5	7	3	15-1/8	3-1/2	1-1/2	1	1	24	14395	0.077	12090	
UPHD14	HHDQ14-SDS2.5	7	3	18-3/4	3-1/2	1-1/2	1	1	30	16695	0.082	14020	

1) Allowable loads have been increased 60% for wind and seismic loads; no further increase shall be permitted.
2) The designer must specify anchor bolt type, length, and embedment.
3) Deflections are derived from static, monotonic load tests of devices connected to DF-L wood members with specified fasteners.
4) The designer shall consider the effect of compression, bearing, tension, and combined bending due to device eccentricity when applicable.
5) The UPHD may be elevated off the sill.
6) WS3 wood screws are 1/4 ″ x 3″ and are included with UPHD models.
7) Minimum post thickness is 3″. Consult USP for installations less than 3″.
New products or updated product information are designated in red.

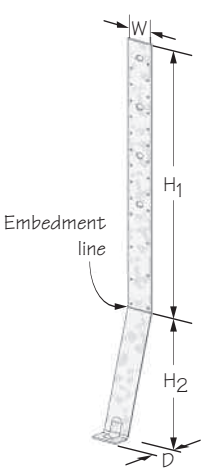
continued on next page

IDesigned to anchor wood framing to poured concrete foundations.

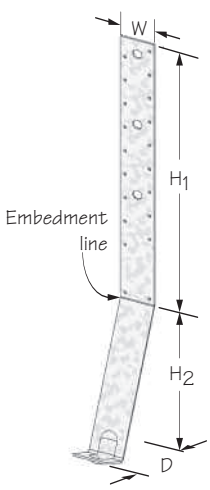
Materials: See chart
Finish: G90 galvanizing
Codes: NER 505

nstallation:

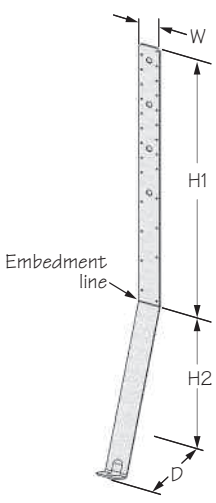
- Use all specified fasteners. See Product Notes, page 10.
- Bending the strap horizontally 90° to facilitate wall placement may cause concrete behind the embedded strap to break away at the top edge (spalling). If the spall is 1″ or less from the top edge of the concrete, no load reduction is necessary. If the spall is between 1″ and 4″, the allowable load is 0.90 of the published chart load.
- When installing on lumber less than 3½″ wide, wood splitting may occur.To reduce splitting, use 10d x 1½″ nails or fill every other hole with 16d common nails. Reduce allowable loads in accordance with code requirements.
- Straps are to be installed at the edge of concrete. Install prior to pour by nailing to form. Drive temporary nails through lowest two nail holes into form. Concrete level should reach embedment line; minimum embedment depths are listed in chart.
- Do not rely on these straps to secure concrete sections together between cold joints; take other measures to transfer the load. If there is a cold joint between slab and foundation, the minimum embedment must be made into the foundation. Fastening opportunities may be reduced because the slab pour level may be higher than some nail holes. Using fewer fasteners will reduce allowable loads. Reduce allowable load by the code capacity for each fastener not installed.
- Allowable loads based on a minimum concrete compressive strength of 2,500 psi at 28 days, with one #4 horizontal rebar in the shear cone. Rebar should be a minimum length of 2x embedment depth plus 12″ (see chart for exceptions in corner installations).
- Where fewer fasteners are used in the structural wood member, reduce loads according to the code.
- There may be an increase in the amount of deflection if the strap is installed on the outside of the sheathing, versus directly to the framing members. For more information, visit USP's Web Site www.USPConnectors.com/techbulletins.html and reference HPAHD/STAD Strap Anchors Installed Over Shear Wall Diaphram Shearing document.
- Strap may be bent one complete cycle to aid installation.



HPAHD

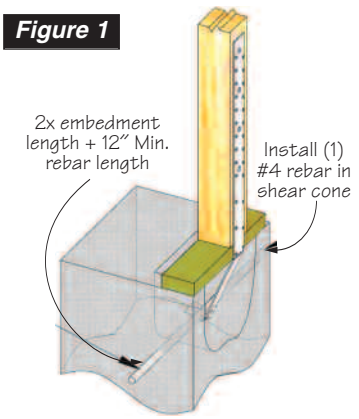


PAHD42



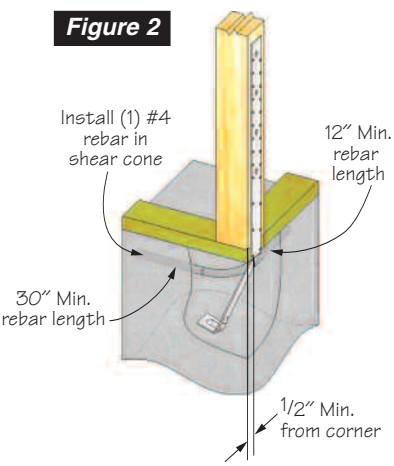
HPAHD22-2P

Figure 1



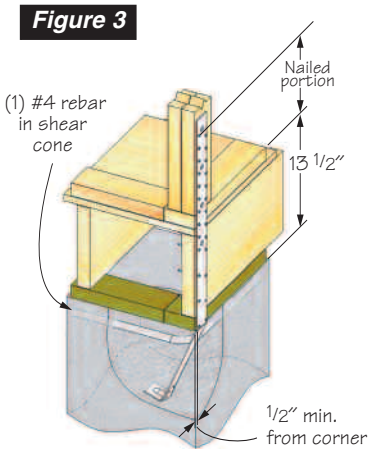
Typical *HPAHD22* single pour edge installation

Figure 2



Typical *HPAHD22* single pour corner and endwall installation

Figure 3

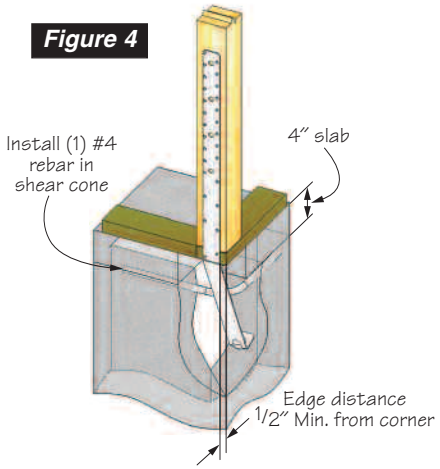


Typical *HPAHD22* single pour rim joist installation

Holdowns

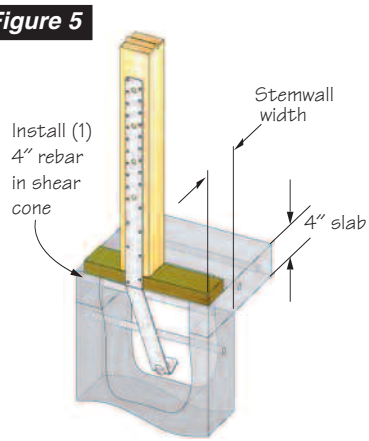
continued on next page

Figure 4

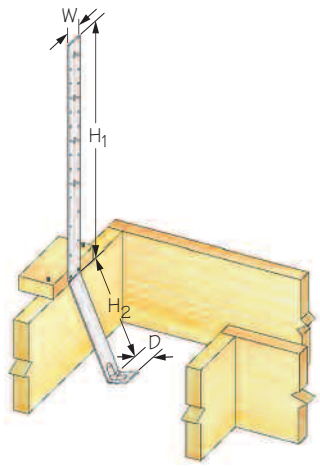


Typical *HPAHD22-2P* double pour corner installation

Figure 5



Typical *HPAHD22-2P* double pour edge installation



***HPAHD22* form board installation**

USP Stock No.	Ref. No.	Steel Gauge	Dimensions W	H1	H2	D	Installation Type	Stemwall Width	Fastener Schedule[2] Min Qty[4]	Type	Allowable Loads (Lbs.)[1] DF-L /SP Uplift 160%	Code Ref.
EDGE INSTALLATION - 2500 psi Concrete												
Single Pour - 8″ min from corner												
PAHD42	PAHD42	12	2-1/16	16-5/8	6-3/8	5-3/4	Figure 1	6	15	16d	3065	L5
								8				
HPAHD22	HPAHD22	10	2-1/16	24-3/4	10	4-1/8	Figure 1	6	23	16d	4990	
								8				
Double Pour Edge Installation - 8″ min from corner												
PAHD42	PAHD42	12	2-1/16	16-5/8	6-3/8	5-3/4	Figure 5	6	14	16d	3065	
								8				
HPAHD22	HPAHD22	10	2-1/16	24-3/4	10	4-1/8	Figure 5	6	20	16d	4990	
								8				
HPAHD22-2P	HPAHD22-2P	10	2-1/16	26-1/4	14	6-1/4	Figure 5	6	24	16d	5170	
								8				
CORNER INSTALLATION - 2500 psi Concrete												
Single Pour Installation - 1/2″ min from corner												
PAHD42	PAHD42	12	2-1/16	16-5/8	6-3/8	5-3/4	Figure 2 & 3	6	18	16d	2220	
								8				
HPAHD22	HPAHD22	10	2-1/16	24-3/4	10	4-1/8	Figure 2 & 3	6	12	16d[3]	3535	
									24	16d	4095	
								8	12	16d[3]	3535	
									24	16d	4095	
Double Pour Edge Installation - 1/2″ min from corner												
PAHD42	PAHD42	12	2-1/16	16-5/8	6-3/8	5-3/4	Figure 4	6	14	16d	2220	
								8				
HPAHD22	HPAHD22	10	2-1/16	24-3/4	10	4-1/8	Figure 4	6	20	16d	4095	
								8				
HPAHD22-2P	HPAHD22-2P	10	2-1/16	26-1/4	14	6-1/4	Figure 4	6	24	16d	4095	
								8				

1) Allowable loads have been increased 60% for wind or seismic loads; no further increase shall be permitted.
2) Nails require a minimum embedment length of 1-5/8″ for 16d nails.
16d sinkers (0.148″ diameter by 3-1/4″ long) or 10d common nails may be substituted for the specified 16d common nails provided the listed alowable loads are reduced 15%.
3) Rim joist application; see Figure 3 for corner condition.
4) Minimum quantity of fasteners to be installed. Product may have additional nail holes not needed to meet published allowable load of product.

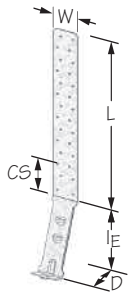
The coined dimples below the embedment line allow for increased concrete bonding. These holdowns retain high uplift capacity even when installed at corners of foundation stemwalls. Ideal for use with built up 2x end posts.

RJ after the model indicates LSTAD or STAD for rim joist applications as in **STAD8RJ**. Rim joist models provide for a 17″ clear span without the loss of strap nailing.

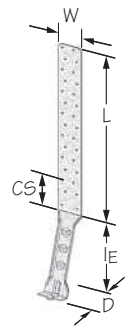
Materials: See Chart
Finish: G90 galvanizing
Codes: NER 608

Installation:

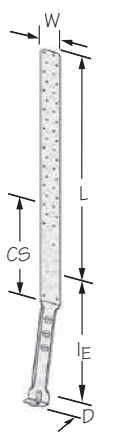
- Use all specified fasteners. See Product Notes, page 10. The bottom (2) nails are for form board attachment only and do not contribute to fastener schedule requirements.
- Embed holdown in concrete to the embedment line (bend line).
- See illustrations for requirements on rebar, edge distances, and clear spans.
- Bending the strap horizontally 90° to facilitate wall placement may cause concrete behind the embedded strap to break away at the top edge (spalling). If the spall is 1″ or less from the top edge of the concrete, no load reduction is necessary. If the spall is between 1″ and 4″ the allowable load is 0.90 of the published chart load.
- When installing on lumber less than 3 1/2″ wide, wood splitting may occur. To reduce splitting, use 10d x 1 1/2″ nails or fill every other hole with 16d common nails. Reduce allowable loads per code requirements accordingly.
- These straps do not secure concrete sections together at cold joints; take other measures to transfer the load. If there is a cold joint between slab and foundation, the minimum embedment must be made into the foundation. Fastening opportunities may be reduced because the slab pour level may be higher than some nail holes. Using fewer fasteners will reduce allowable loads. Reduce allowable load by the code capacity for each fastener not installed.
- To achieve full table loads the minimum center-to-center spacing is twice the embedment depth (IE) when resisting tension loads at the same time.
- Where fewer fasteners are used in the structural wood member, reduce loads according to the code.
- There may be an increase in the amount of deflection if the strap is installed on the outside of the sheathing, versus directly to the framing members.
- Strap may be bent one complete cycle to aid installation.



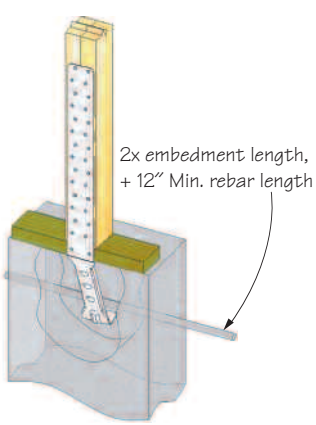
LSTAD



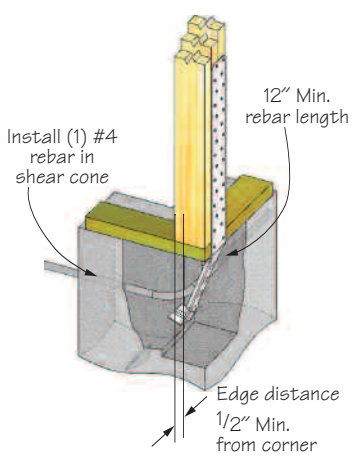
STAD



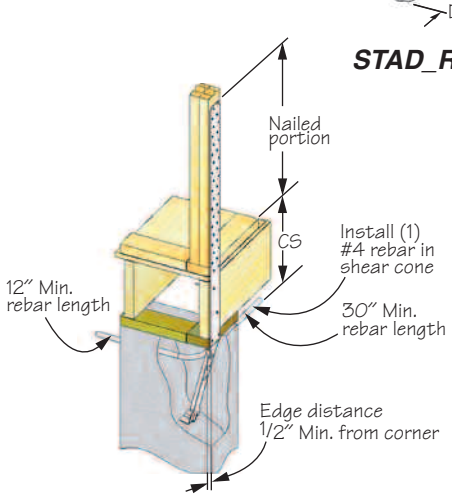
STAD_RJ



Typical *STAD10* edge installation



Typical *STAD10* corner installation



Typical *STAD14RJ* corner rim joist installation

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Foundation Straps – LSTAD & STAD series continued

USP Stock No.[4]	Ref. No.	Steel Gauge	Fastener Schedule[1,2]		Dimensions					Min. Stemwall	Allowable Tension Loads (160%)[3] DF-L / SP Edge Distance - Concrete									Code Ref.
											2000 psi			2500 psi			3000 psi			
			Qty	Type	W	L	I_E	D	CS		1/2″	1-1/2″	I_E	1/2″	1-1/2″	I_E	1/2″	1-1/2″	I_E	
LSTAD8	LSTHD8	14	24	16d Sinker	3	21-5/8	8	5	4-5/8	6	2225	2225	3220	2225	2225	3220	2225	2225	3220	L8
										8										
LSTAD8RJ	LSTHD8RJ	14	24	16d Sinker	3	35-1/8	8	5	18-1/8	6	2225	2225	3220	2225	2225	3220	2225	2225	3220	
										8										
STAD8	STHD8	12	24	16d Sinker	3	21-5/8	8	5	4-5/8	6	3270	3270	3270	3270	3270	3270	3270	3270	3270	
										8										
STAD8RJ	STHD8RJ	12	24	16d Sinker	3	35-1/8	8	5	18-1/8	6	3270	3270	3270	3270	3270	3270	3270	3270	3270	
										8										
STAD10	STHD10	12	28	16d Sinker	3	21-5/8	10	5	1-5/8	6	3270	3270	3625	3270	3270	3625	3270	3270	3625	
										8			4305			4305			4305	
STAD10RJ	STHD10RJ	12	28	16d Sinker	3	36	10	5	16-1/8	6	3270	3270	3625	3270	3270	3625	3270	3270	3625	
										8			4305			4305			4305	
STAD14	STHD14	12	38	16d Sinker	3	32-1/8	14	5	4-5/8	6	4960	4960	4960	4960	4960	4960	4960	4960	4960	
										8			5850			5850			5850	
STAD14RJ[6]	STHD14RJ	12	38	16d Sinker	3	39-5/8	14	5	12-1/8	6	4960	4960	4960	4960	4960	4960	4960	4960	4960	
										8			5850			5850			5850	

1) Specified nails are 16d sinker nails. 10d common nails may be substituted with no load reduction.
2) Wood thickness shall be no less than 2″.
3) Uplift loads have been increased 60% for wind or seismic loads; no further increase shall be permitted.
4) RJ after the model indicates STADs for rim joist applications as in STAD8RJ.
5) Interpolate allowable loads for edge distances between those listed. Nail quantities may be reduced for less than IE corner distance design loads- use the code allowable loads for fasteners in shear.
6) STAD14RJ with 17″ clear span, use (30) 16d sinker nails for a maximum (IE) load of 5040 lbs.
7) Where fewer fasteners are used in the structural wood member, reduce loads according to the code.
8) For two pour with 4" slab or less, install STAD14 and use STAD10 loads.

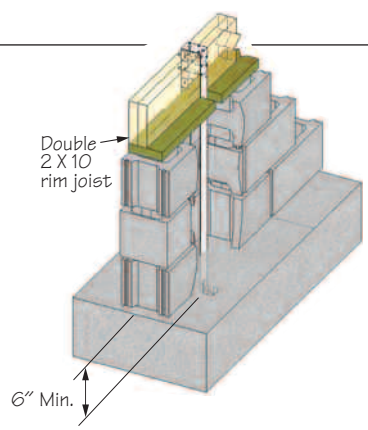
Foundation Straps – TA series

Foundation Straps offer an economical, one-piece method of achieving a continuous load path from a 2 x 8, 2 x 10, 2 x 12, or 2 x 14 rim joist through concrete block to foundation. All models require a 6″ embedment into concrete footings.

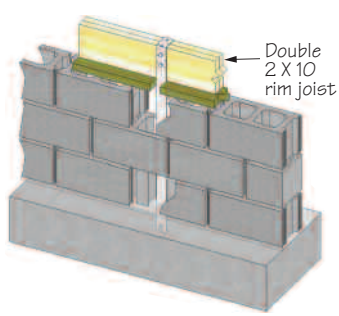
Materials: 12 gauge
Finish: G90 galvanizing
Codes: NER 505

Installation:

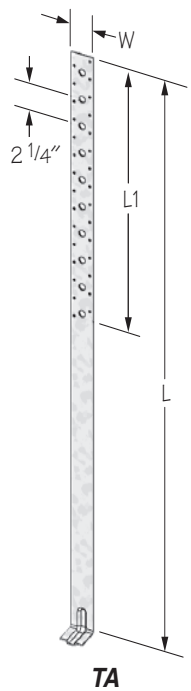
- Use all specified fasteners. See Product Notes, page 10.
- Allowable loads are based on either nail fastening or bolt fastening; nail and bolt values cannot be combined.
- Install by inserting product into footing's wet concrete. All models require a 6″ embedment into concrete foundations. Courses of concrete block must be laid over connector. Notch mudsill at connector locations. Wrap strap over rim joist and fasten.
- Do not rely on these straps to secure concrete sections together between cold joints; take other measures to transfer the load. If there is a cold joint between block and foundation, the minimum embedment must be made into the foundation.
- Based on product embedment the exposed number of fastener holes may be reduced. Using fewer fasteners will reduce allowable loads. Reduce allowable loads by the code prescribed allowable load per fastener, for each fastener not installed.
- Allowable loads are based on a minimum concrete compressive strength of 2,000 psi at 28 days.



Typical *TA* installation



Typical *TA* stud to foundation installation



TA

continued on next page

Bolts must be ordered separately. See page 20 for available sizes.

USP Stock No.	Ref. No.	Dimensions W	L	L1	Allowable Loads (Lbs.) 2 x 8 Fastener Schedule[1,2] Qty	Type	Uplift[3] 160%	2 x 10 Fastener Schedule[1,2] Qty	Type	Uplift[3] 160%	2 x 12 Fastener Schedule[1,2] Qty	Type	Uplift[3] 160%	2 x 14 Fastener Schedule[1,2] Qty	Type	Uplift[3] 160%	Code Ref.
BOLT Uplift Values & Schedules for Rim Joist Sizes Below																	
TA41	-- --	2-1/16	38-1/4	17-5/8	2	1/2	1340	3	1/2	1950	4	1/2	2475	6	1/2	3230	L5
TA51	PA51		48-1/4	22-1/8													
TA61	-- --		58-1/4														
TA71	PA68		68-1/4														
NAIL Uplift Values & Schedules for Rim Joist Sizes Below																	
TA41	-- --	2-1/16	38-1/4	17-5/8	8	16d x 2-1/2	1905	10	16d x 2-1/2	2385	14	16d x 2-1/2	3230	16	16d x 2-1/2	3230	
TA51	PA51		48-1/4	22-1/8													
TA61	-- --		58-1/4														
TA71	PA68		68-1/4														

' 1) Bolt values are for 3″ thick rim joist loaded perpendicular to grain.
2) 16d x 2-1/2 nails are 8 gauge (0.162" diameter) by 2-1/2″ long.
3) Uplift loads have been increased 60% for wind and seismic loads; no further increase shall be permitted.
4) Minimum of (9) 16d nails per strap is required to meet IRC R 404.1.5.
New products or updated product information are designated in red.

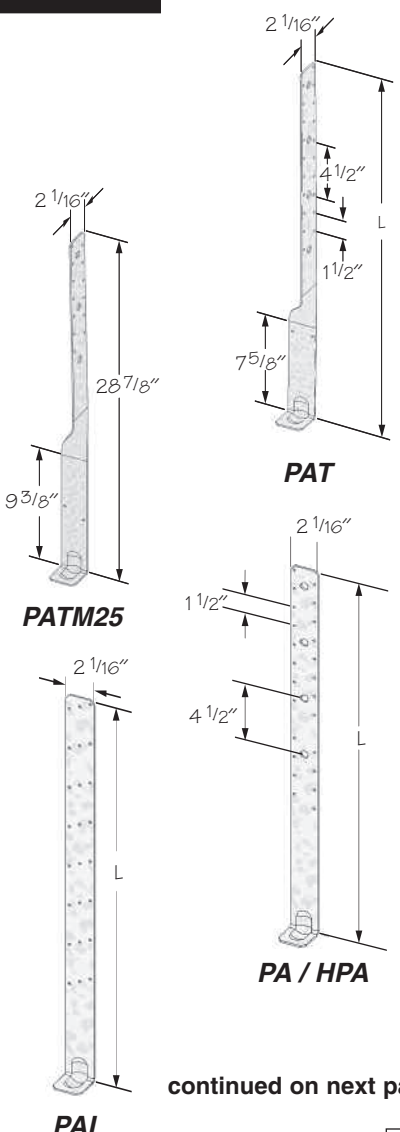
PURLIN ANCHORS – HPA, PA, PAI, PAT SERIES, & PATM25

HPA series – For installation into poured concrete walls, foundations, or masonry. The HPA is the heavy-duty version of the PA anchor.

PA, PAT, & PATM series – For installation into poured concrete or concrete block walls and foundations. The PAT's 90° "wrap" design allows for fastening to the side of the purlin which reduces member splitting. The PATM is sized for concrete block wall installation.

PAI series – For wood I-Joist applications. An expanded 3″ on-center nail spacing reduces splitting along I-Joist flange.

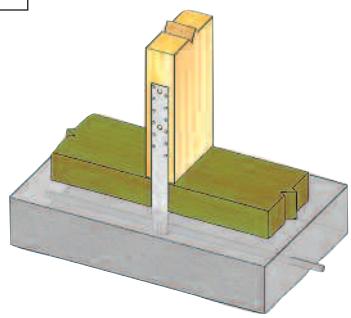
Materials: HPA – 10 gauge; PA, PAT, PATM, & PAI – 12 gauge
Finish: G90 galvanizing
Options: PA18, PA28 & PA35 are available in Triple Zinc. To order, add *TZ* to end of stock number, as in **PA18-TZ**.
Codes: NER 505, ER-2725



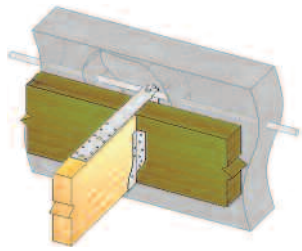
Installation:
- Use all specified fasteners. See Product Notes, page 10.
- Minimum concrete strength is 2,000 psi.
- The allowable loads for bolts are based on parallel to grain loading with a 3″ minimum member thickness, except the HPA which requires a 3½″ thick wood member. Reduce load per code requirements when minimum member thickness is not achieved.
- Minimum concrete edge distance is 4″ for PA, PAI, & PAT series, 6″ for HPA series, and 5″ for PATM25.
- Minimum concrete block edge distance is 20″.
- Designer may specify alternate fastening schedules. Refer to Nail Specification Table on page 14 for nail shear values. Load values shall not exceed published allowable loads.
- No anchor bolts are needed for achieving efficient stress transfer from framing to concrete walls or foundations.

continued on next page

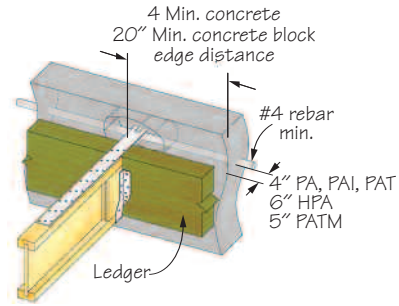
Purlin Anchors – HPA, PA, PAI, PAT series, & PATM25 cont.



Typical *PA* holdown installation



Typical *PA* purlin installation



Typical *PAI* I-Joist purlin face installation

USP Stock No.	Ref. No.	L	Minimum Embedment		Nailer Size	Fastener Schedule[7]				Allowable Loads (Lbs.)[1,3]				Code Ref.
						Min Qty[8]				DF-L / SP				
						Nails[4,5,6]		Bolts		Concrete		Masonry		
			Concrete	Masonry		Qty	Nail	Qty	Dia.	Nails 160%	Bolts[2] 160%	Nails 160%	Bolts[2] 160%	
PA18	PA18	18-1/2	4	6	Max Capacity	12	16d	2	1/2	3035	2260	3035	2260	L5
					2x & 3x Ledger									
					4x Ledger									
PA23	PA23	23-3/4	4	6	Max Capacity	15	16d	3	1/2	3700	3265	3035	3035	
					2x & 3x Ledger									
					4x Ledger									
PA28	PA28	29	4	6	Max Capacity	15	16d	4	1/2	3700	3700	3035	3035	
					2x & 3x Ledger									
					4x Ledger									
PA35	PA35	35	4	6	Max Capacity	15	16d	4	1/2	3700	3700	3035	3035	
					2x & 3x Ledger									
					4x Ledger									
PAT18	-- --	18-1/2	4	6	Max Capacity	8	16d	2	1/2	2060	2260	2060	2260	L5
					2x & 3x Ledger									
PAT23	-- --	23-3/4	4	6	Max Capacity	14	16d	3	1/2	3105	3105	3035	3035	
					2x & 3x Ledger									
PAT28	-- --	29	4	6	Max Capacity	15	16d	4	1/2	3105	3105	3035	3035	
					2x & 3x Ledger									
PAT35	-- --	35	4	6	Max Capacity	15	16d	4	1/2	3105	3105	3035	3035	
					2x & 3x Ledger									
PATM25	-- --	28-7/8	6	6	Max Capacity	13	16d	3	1/2	3105	3105	3035	3035	L3
					2x & 3x Ledger									
					4x Ledger									
HPA28	HPA28	29	6	8	Max Capacity	23	16d	4	1/2	5055	4280	3035	3035	L5
					2x & 3x Ledger									
					4x Ledger									
HPA35	HPA35	35	6	8	Max Capacity	23	16d	4	1/2	5425	4280	3035	3035	
					2x & 3x Ledger									
					4x Ledger									
PAI18	PAI18	18-1/2	4	6	Max Capacity	12	10d x 1-1/2	-- --	-- --	2475	-- --	2475	-- --	L5
					2x & 3x Ledger							1855		
					4x Ledger					2270				
PAI23	PAI23	23-1/2	4	6	Max Capacity	18	10d x 1-1/2	-- --	-- --	3700	-- --	3035	-- --	
					2x & 3x Ledger					3510				
					4x Ledger					3095				
PAI28	PAI28	28-1/2	4	6	Max Capacity	24	10d x 1-1/2	-- --	-- --	3700	-- --	3035	-- --	
					2x & 3x Ledger									
					4x Ledger									
PAI35	PAI35	35-1/2	4	6	Max Capacity	26	10d x 1-1/2	-- --	-- --	3700	-- --	3035	-- --	
					2x & 3x Ledger									
					4x Ledger									

1) Allowable Loads have been increased 60% for wind or seismic loads; no further increase shall be permitted.
2) The allowable loads for bolts are based on parallel-to-grain loading with 3″ minimum member thickness, except HPA which requires a 3-1/2″ thick wood member.
3) Allowable loads are based on the use of either nails or bolts; nail and bolt values cannot be combined.
4) 16d sinkers or 10d common nails may be substituted for the specified 16d common nails at 0.85 of the table loads.
5) Minimum nail penetration is 1-5/8″ for 16d nails.
6) 10d x 1-1/2 nails are 9 gauge (0.148″ diameter) by 1-1/2″ long.
7) For alternate nail schedule and load values consult USP.
8) Minimum quantity of fasteners to be installed. Product may have additional fastener holes not needed to meet published allowable load of product.

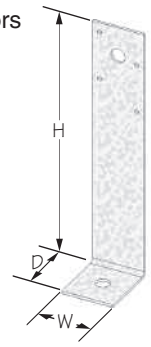
Bolts must be ordered separately. See page 20 for available sizes.

Diaphragm to wall anchorage using embedded straps may need to be hooked around the concrete or masonry wall reinforcing steel. **UBC 1633.2.8, IBC 1620.2.1.**

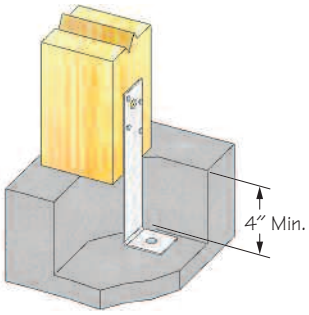
Concrete Angles – TDL series

These angles secure wood posts to concrete or wood floors in light-duty applications.

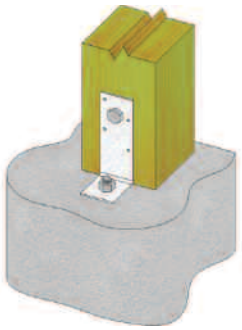
Materials: 12 gauge
Finish: G90 galvanizing
Codes: ER-2039
Options: TDL5 is available in Triple Zinc. To order, add *TZ* to end of stock number, as in **TDL5-TZ.**



TDL10



Typical *TDL10* embedded interior installation



Typical *TDL5* interior installation

Installation:
- Use all specified fasteners. See Product Notes, page 10 .
- The TDL10 can be embedded into concrete. Minimum embedment depth is 4″ to achieve allowable loads.
- Moisture barrier may be required.

USP Stock No.	Ref. No.	Steel Gauge	Dimensions			Fastener Schedule[4,5]						Allowable Loads (Lbs.)[1,2,3]		Code Ref.
						Anchor Bolts		Strap				DF-L / SP		
								Nails		Bolts		Uplift		
												Nails	Bolts	
			W	H	D	Qty	Dia.	Qty	Type	Qty	Dia.	160%	160%	
TDL5	A24	12	2	5-3/16	2-1/4	1	1/2	4	16d	1	1/2	955	1105	L2
TDL10	A311	12	2	9-3/4	2-1/4	1	1/2	4	16d	1	1/2			

1) Allowable loads are based on the use of either nails or bolts; nail and bolt values cannot be combined.
2) The bolt values are based on single shear with a minimum member thickness of 3-1/2″.
3) Allowable loads have been increased in accordance with the code; no further increase shall be permitted.
4) Minimum nail embedment shall be 1-5/8″ for 16d nails.
5) Designer must specify anchor bolt type, length, and embedment.

Bolts must be ordered separately. See page 20 for available sizes.

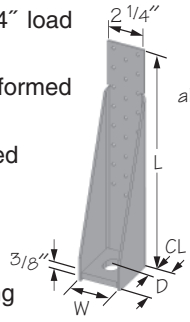
Cold Formed Steel Holdowns – HTT14S, LTS20B, & TDS series

LTS20B – Light capacity tension tie strap with a 1/4″ load transfer plate.

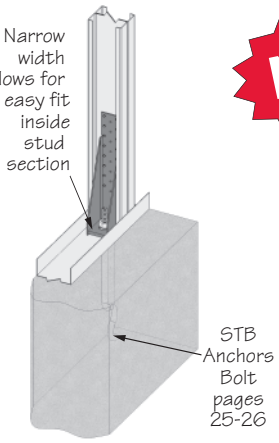
HTT14S – Medium capacity single piece, 3-ply base, formed tension tie.

TDS – Heavy Capacity single piece, 3-ply base, formed tension tie.

Materials: See chart
Finish: TDS models – USP primer, HTT14 and LTS20B – G90 galvanizing

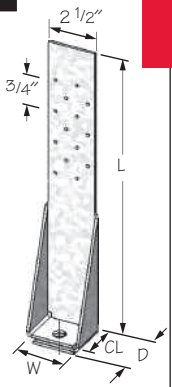


TD8S

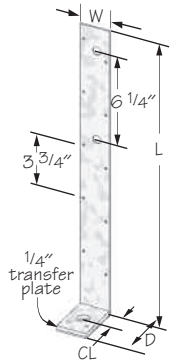


Typical *cold-formed steel* installation
(*TD8S* product shown)

NEW



HTT14S



LTS20B

Installation:
- Use all specified fasteners. See Product Notes, page 10.
- See STB series, pages 25-26, for anchor bolt installation options. A design professional may specify alternate anchorage with conventional anchor bolts.
- Tighten anchor bolt nuts finger tight snug to base, plus 1/3 to 1/2 additional turns with a wrench. To prevent loosening of the anchor nut during critical loading, use a locking night or tighten a second nut over the first to lock nuts in place.

USP Stock No.	Ref. No.	Steel Gauge		Dimensions				Fastener Schedule				Allowable Tension Loads (Lbs.)[1,2,3,4]						Code Ref.
								To Sill Plate		To Stud		2-33 mil (2-20ga)		2-43 mil (2-18ga)		2-54 mil (2-16ga)		
								Anchor Bolts		Screws		Back-to-Back Studs		Back-to-Back Studs		Back-to-Back Studs		
		Strap	Base	W	L	D	CL	Qty	Dia.	Qty	Type	100%	160%	100%	160%	100%	160%	
HTT14S	S/HTT14	10	-- --	2-13/16	16	2-1/16	1-3/8	1	5/8	14	#10	2480	3290	3680	4425	4825	4825	110
LTS20B	S/LTT20	12	3	2	20	3	1-1/2	1	1/2	5	#10	885	1140	1090	1090	1210	1210	
TD8S	S/HD8S	10	3/8	2-1/2	13-7/8	3	1-5/8	1	7/8	24	#10	4655	6210	8110	9665	10310	10310	
TD10S	S/HD10S	10	3/8	2-1/2	16-1/8	3	1-5/8	1	7/8	30	#10	5820	7760	10140	11525	12910	12910	
TD15S	S/HD15S	7	1/2	2-5/8	21-1/2	3	1-11/16	1	1	48	#10	9310	12270	14345	14345	16585	16585	

1) Back-to-back stud members are required unless otherwise noted.
2) The allowable loads at 133% can only be used with codes that permit the use of alternate basic load combinations and when the referenced materials standard permits it.
3) Designer shall specify anchor embedment and configuration.
4) Designer shall verify the adequacy of the steel studs to transfer the required load.

New products or updated product information are designated in red.