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About the Reference Numbers

Reference numbers shown throughout the charts in this catalog are part numbers which may be more familiar to customers in various regions of the United States. These are included for the convenience of our new customers who have recently switched from a competitor's product line to USP.

The reference numbers in this catalog are for general application comparison only and should not be used as a substitution tool. The user is responsible to compare specific load values, fastener schedules, material specifications, and other factors to determine suitability of use for any particular product.

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PREDEFLECTED HOLDOWNS PAGE 41

- **PHD Series**

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



PHD

TENSION TIES PAGES 42-43

- **HTT Series**

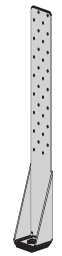
Heavy tension tie. Bolts to foundation and nails to post.

- **LTS Series & LTTI31**

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

- **MTS27B**

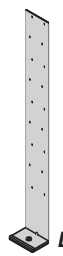
Heavy-capacity tension tie. Bolts to foundation and nails or bolts to post.



HTT



LTS



LTTI31



MTS27B

HOLDOWNS PAGES 44-46

- **TD & TDX Series**

Standard holddown. Connects to post with bolts.

- **UPHD8**

High capacity holddown. Connects to post with wood screws.



TD



TDX



UPHD8

FOUNDATION STRAPS PAGES 47-50

- **HPAHD, MPAHD, PAHD42**

Embedded strap holdowns for solid end posts.

- **LSTAD & STAD Series**

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

- **TA Series**

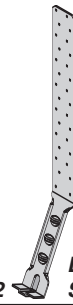
Straps through masonry foundation wall.



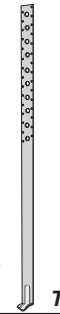
HPAHD/
MPAHD



PAHD42



LSTAD/
STAD



TA

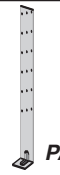
PURLIN ANCHORS PAGES 51-52

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

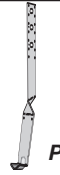
Embedded strap for concrete to purlin connections.



HPA/PA



PAI



PAT



PATM

CONCRETE ANGLES PAGE 53

- **TDL Series**

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



TDL

HOLDOWNS PAGE 53

- **TDS Series**

Holdowns for cold formed steel construction.



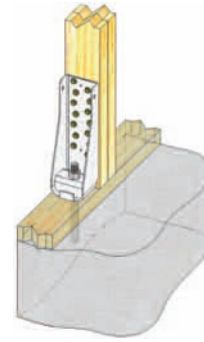
TDS

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.

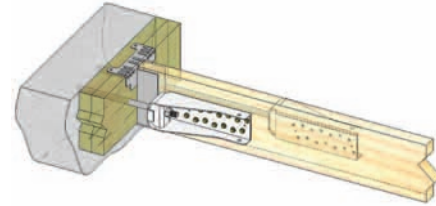
Materials: 12 gauge
Finish: G90 galvanizing
Codes: NER 564, FL817

Installation:

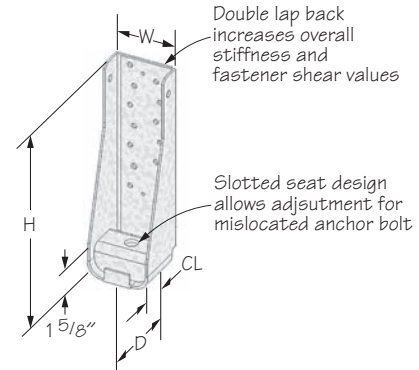
- Use all specified fasteners. See Product Notes, page 16.
- **Place the PHD over the anchor bolt. No washer is required.**
- Install with USP’s code evaluated WS3 (1/4” x 3”) Wood Screws, which are provided with the holdown.
- Tighten anchor bolt nuts finger tight snug to base, plus 1/3 to 1/2 additional 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 15/8” 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. Holddown fasteners specified shall not be considered to attach multiple plys together.
- For anchorage options see STBL Anchor Bolt section on pages 34-35.



Typical PHD5 installation



Typical PHD5 concrete wall offset installation



PHD5

USP Stock No.	Ref. No.	Steel Gauge	Dimensions				Fastener Schedule		Allowable Loads (Lbs.) ^{1,2,5,8}				Deflection at 133% Allowable Design Load ^{4,6}
			W	H	D	CL	Anchor Bolts ³	Wood Screws ⁷	DF-L / SP		S-P-F		
									133%	160%	133%	160%	
PHD2	PHD2-SDS3	12	3-1/4	7-1/2	3	1-3/8	(1) 5/8	(10) WS3	4230	4770	3000	3600	0.039
PHD5	PHD5-SDS3	12	3-1/4	10-7/8	3	1-3/8	(1) 5/8	(14) WS3	5920	6125	4200	5040	0.049
PHD6	PHD6-SDS3	12	3-1/4	13-1/16	3	1-3/8	(1) 7/8	(18) WS3	7155	7155	5400	6480	0.048
PHD8	--	12	3-1/4	16-1/2	3	1-3/8	(1) 7/8	(24) WS3	8295	8295	7200	8640	0.054

1) Allowable loads are based on the 1997 NDS®.
 2) Allowable loads have been increased 33-1/3% or 60% for wind and seismic loads; no further increase shall be permitted.
 3) The designer must specify anchor bolt type, length, and embedment.
 4) Deflections are derived from static, monotonic load tests of devices connected to DF-L wood members with specified fasteners.
 5) The designer shall consider the effect of compression, bearing, tension, and combined bending due to device eccentricity when applicable.
 6) The PHD may be elevated off the sill.
 7) WS3 wood screws are 1/4” x 3” and are included with PHD models.
 8) Minimum post thickness is 3”. Consult USP for installations less than 3”.

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 and LTS20 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.

MTS27B – Accommodates more demanding wood-to-concrete connections. The heavy 10 gauge strap and riveted heavy-duty holdown provides a strong connector for either bolt or nail fastening to joists or studs.

Materials: See chart

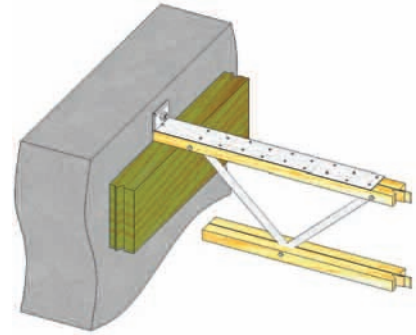
Finish: HTT30, HTT50 – USP primer;

HTT16, HTT22, LTS, LTTI31, & MTS27B – G90 galvanizing

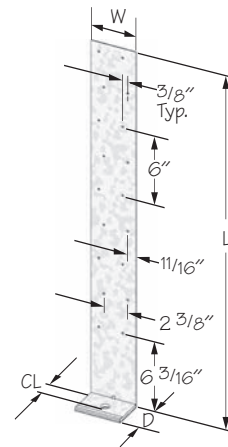
Codes: ICC-ES ESR-1178, NER 530 & NER 608, ICBO 5531, FL821, FL822, L.A. City RR 25337 & RR 25357

Installation:

- Use all specified fasteners. See Product Notes, page 16.
- 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**, **LTS**, and **MTS** 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.



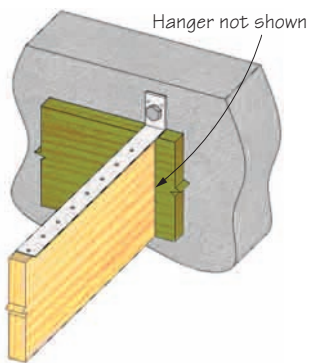
Typical LTTI31 installation



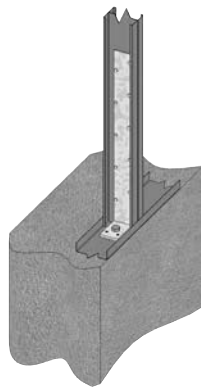
LTTI31

Holdowns

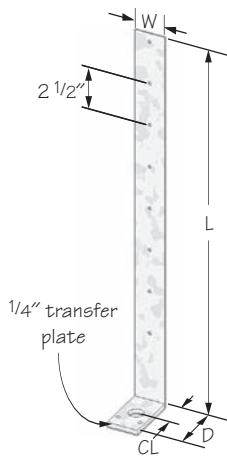
© Copyright 2007 USP Structural Connectors®



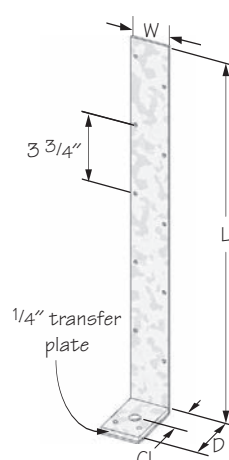
Typical LTS installation



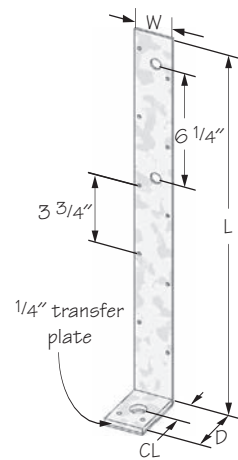
Typical LTS cold-formed steel installation



LTS19



LTS20

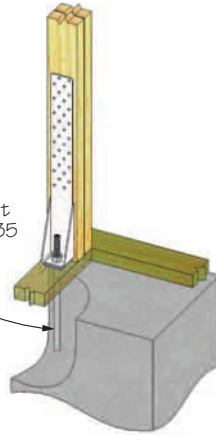


LTS20B

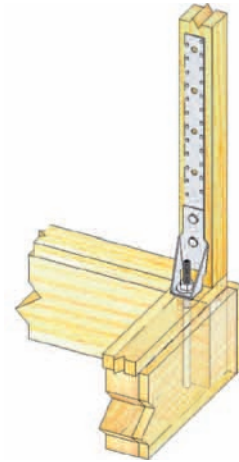
continued on next page

Bolts must be ordered separately. See page 26 for available sizes.

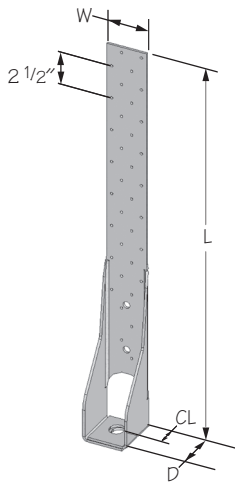
See STB anchor bolt pages 34-35



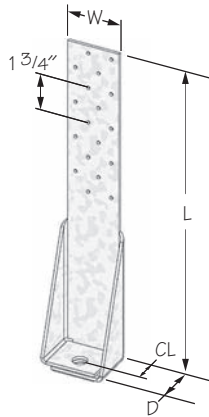
Typical HTT22 installation



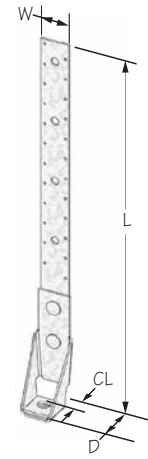
Typical MTS27B installation



HTT30



**HTT16
HTT22 similar**



MTS27B

USP Stock No.	Ref. No.	Steel Gauge		Dimensions				Nail Spacing	Anchor Bolts ⁵	Fastener Schedule		Allowable Loads (Lbs.) ¹				Deflection ^{6,7} at 133% Allowable Design Load
		Strap	Plate	W	L	D	CL			Strap		DF-L / SP				
										Nails ^{2,4}	Bolts	Nails		Bolts		
												133%	160%	133%	160%	
HTT16	HTT16	10	---	2-1/2	15-5/8	2	1-3/8	1-3/4	(1) 5/8	(18) 10d (18) 16d	---	3250 3790	3250 4290	---	---	0.125 0.099
HTT22	HTT22	10	---	2-1/2	21-1/2	2	1-3/8	1-3/4	(1) 5/8	(32) 10d (32) 16d	---	5370	5370	---	---	0.125
HTT30	---	7	---	3	29-3/4	3-1/4	1-3/8	2-1/2	(1) 7/8	(36) 10d (36) 16d	---	7220	7220	---	---	0.125
HTT50	---	7	---	3	42-5/16	3-1/4	1-3/8	2-1/2	(1) 7/8	(56) 10d (56) 16d	---	9250	9250	---	---	0.110
LTTI31 ^f	LTTI31	18	3	3-3/4	31	2-5/8	1-3/8	3	(1) 5/8	(18) 10d x 1-1/2	---	2680	2825	---	---	0.066
LTS19 ^g	LTT19	16	3	1-3/4	22-1/4	3	1-1/2	2-1/2	(1) 3/4	(8) 10d	---	1225	1390	---	---	0.076
LTS20 ^g	S/LTT20	12	3	2	20	3	1-1/2	3-3/4	(1) 1/2	(10) 16d (10) 10d x 1-1/2	---	1910 1575	1910 1890	---	---	0.125 0.120
LTS20B ^g	LTT20B	12	3	2	20	3	1-1/2	3-3/4	(1) 3/4	(10) 16d (10) 10d x 1-1/2	(2) 1/2	1910 1575	1910 1890	1260	1515	0.125 0.120
MTS27B ⁸	MTT28B	10	3	2-1/16	27	2-3/4	2	1-1/2	(1) 3/4	(24) 16d	(4) 1/2	4635	4635	2570	3085	0.115

1) Allowable loads have been increased 33-1/3% or 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 minimum length of 1-1/2" in vertical member for the listed loads.
 3) For MTS27B: 16d sinkers or 10d common nails may be substituted for the specified 16d common nails provided the listed allowable loads are reduced 15%.
 4) 16d sinkers may be substituted for the specified 10d common nails with no load reduction.
 5) The designer must specify anchor bolt type, length and embedment.
 6) Deflections are derived from static, monotonic load tests of devices connected to DF-L wood members with specified fasteners.
 7) HTT holdowns raised off of the sill plate may have higher deflection values.
 8) LTTI, LTS, and MTS holdowns shall be installed tight to the sill plate.

TD – Different welded configurations and sizes achieve a great deal of versatility within the TD series.

TDX – The TDX2 and TDX5 feature formed designs, all others are welded. All are self-jigging.

All models, except the TD2, TD5, and TD7, 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**. TDX2, TDX6 & TDX8 are available in Hot-dip galvanized. To order, add *HDG* to end of stock number, as in **TDX2-HDG**.

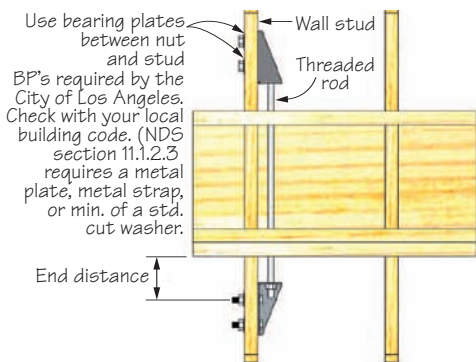
Codes: NER 505, ICBO 5125, FL816, L.A. City RR 25303 & RR 25332

Patents: #5,092,097 — TDX2 & TDX5

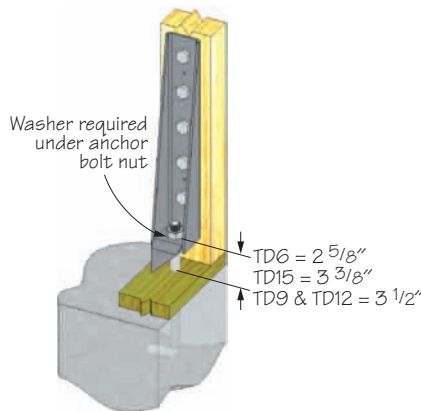
Installation:

- Use all specified fasteners. See Product Notes, page 16.
- 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 26 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 34-35 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 plies 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. Holddown fasteners specified shall not be considered to attach multiple plies together.

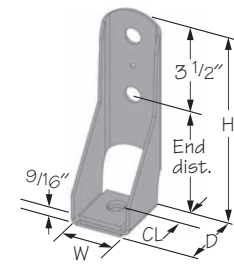
**Bolts must be ordered separately.
See page 26 for available sizes.**



**Holdown installation
between floors**

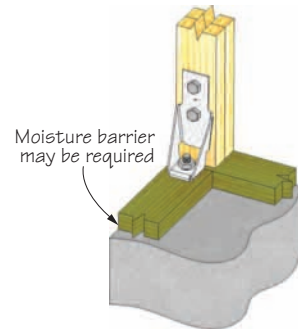


**Typical TD15
installation**

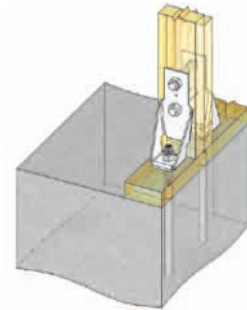


TDX6

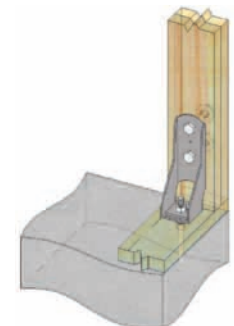
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**Typical TDX2
installation**



**Typical TDX2
back-to-back
installation**



**Typical TDX6
installation**

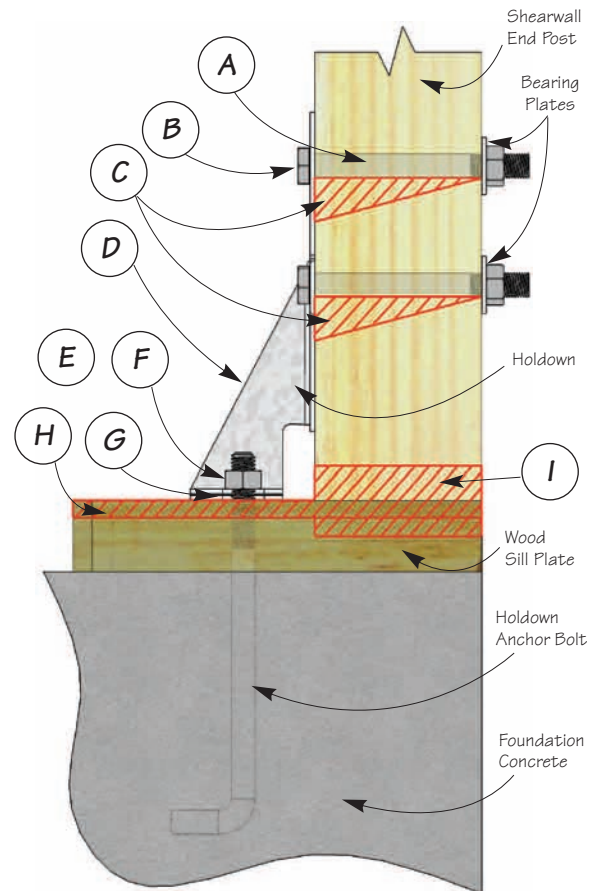
USP Stock No.	Ref. No.	Steel Gauge	Dimensions				Bolt Schedule ⁴		Minimum Required Bolt End Distance ⁵	Allowable Uplift Loads (Lbs.) ^{1,2,3}										Deflection at 133% Allowable Design Load ^{6,10}															
			W	H	D	CL	To Stud Bolts	To Sill Plate Anchor Bolts		DF-L / SP					Length of Bolt in Vertical Member																				
										1-1/2"					3"						3-1/2"					5-1/2"					3-1/2"				
										133%	160%	133%	160%	133%	160%	133%	160%	133%	160%		133%	160%	133%	160%	133%	160%	Division 91 ^{8,9}								
TD2	---	7	2-3/8	5-3/4	2-3/4	1-1/2	(2) 5/8	(1) 5/8	4-1/2	1680	2020	2950	3545	2950	3535	2940	3525	1725	0.058																
TD5	---	7	2-7/8	6-3/8	3-1/2	2-1/8	(2) 3/4	(1) 3/4	5-1/4	2000	2400	3810	4180	4180	4180	4170	4180	2565	0.089																
TD6	---	3	3	12-3/8	3-1/4	1-3/4	(3) 3/4	(1) 1	5-1/4	3185	3820	5755	6720	6525	6720	6530	6720	---	0.062																
TD7	---	3	3-1/2	11-3/4	3-3/4	2-1/8	(3) 7/8	(1) 1-1/8	6-1/8	3585	4300	6600	7600	7600	7600	7600	7600	6330	0.048																
TD9	---	3	3-1/2	16-1/2	4-1/4	2-1/8	(3) 1	(1) 1-1/8	7	3955	4745	7435	8920	8690	10425	10485	10485	8435	0.067																
TD12	---	3	3-1/2	20-1/2	4-1/4	2-1/8	(4) 1	(1) 1-1/8	7	4625	5550	9295	11150	10995	13195	13260	13260	10680	0.099																
TD15	---	3	3-1/2	25	4-3/8	2-1/8	(5) 1	(1) 1-1/4	7	5030	6040	10735	12880	12870	15440	17285	20745	11700	0.092																
TDX2	HD2A	12	2-1/16	8-1/8	2-3/4	1-1/2	(2) 5/8	(1) 5/8	4-1/2	1575	1890	2510	3015	2510	3010	2500	3000	1243	0.090																
TDX5 ¹	HD5A	10	2-1/2	9-3/8	3-7/8	2	(2) 3/4	(1) 3/4	5-1/4	1910	2295	3735	4480	3945	4730	3920	4705	1718	0.090																
TDX6	HD6A	7	3-1/2	11-1/8	3-3/4	2	(2) 7/8	(1) 7/8	6-1/8	2310	2770	4425	5310	5160	6195	5635	6765	2495	0.049																
TDX8	HD8A	7	3-1/2	14-5/8	3-3/4	2	(3) 7/8	(1) 7/8	6-1/8	3225	3870	6480	7780	7615	9140	8255	9905	3920	0.067																
TDX10	HD10A	7	3-1/2	18-1/8	3-3/4	2	(4) 7/8	(1) 7/8	6-1/8	3895	4675	8300	9960	9855	10860	10590	10860	3795	0.093																
TDX14	HD14A	3	3-1/2	20-1/2	3-5/8	2-1/8	(4) 1	(1) 1	7	4625	5550	9295	11150	10995	13195	14435	14700	---	0.085																
TDX20	HD20A	3	4-3/4	20-3/4	4-1/2	2-3/8	(4) 1	(1) 1-1/4	7	4535	5445	9085	10900	10745	12895	14400	14700	5083	0.106																

- 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 33-1/3% or 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) Division 91 loads may be required in City of Los Angeles area only.
- 9) Division 91 loads per City of Los Angeles P/BC 2002-071, revised 11-01-02.
- 10) Holdowns raised off of the sill plate may have higher deflection values.
- 11) TDX5 may be installed to a 5/8" anchor bolt with no reduction in load, provided a standard washer is used under the nut.

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.

- 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.
- Stud/Post bolt holes** – bolt slip can occur.
- 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.
- 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.
- 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.
- Loose nuts** – increased movement can occur when nuts are not sufficiently tightened.
- Holdown deflection** – holdown deflection can occur when the shearwall system is subjected to cyclic stress from earthquakes or high wind.
- Wood Shrinkage** – due to drying, wood may shrink and cause bolted connections to become loose; periodic retightening may be required.
- 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: NER 564, FL817

Installation:

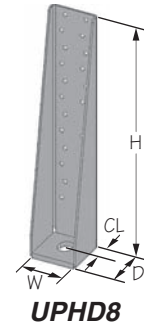
- Use all specified fasteners. See Product Notes, page 16.
- Place holddown over anchor bolt and drive screws into post.
- Tighten anchor bolt nuts finger tight snug to base, plus 1/3 to 1/2 additional turns with a wrench. To prevent loosening of the anchor nut during critical loading, use a locking nut or tighten a second nut over the first to lock nuts in place.
- Holddown 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. Holddown 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:

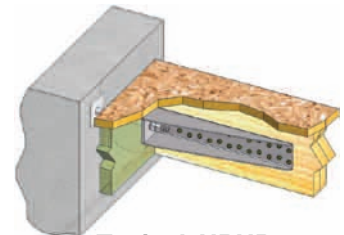
- Drill hole in concrete or masonry and insert retrofit anchor (i.e. epoxy anchor) capable of resisting uplift and lateral loading.
- Place holddown over anchor bolt and drive screws into post.
- Tighten anchor bolt nuts finger tight snug to base, plus 2-3 additional turns with a wrench. To prevent loosening 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. Holddown 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.



Typical UPHD8 installation



UPHD8



Typical UPHD8 concrete wall installation

Holdowns

USP Stock No.	Ref. No.	Steel Gauge	Dimensions				Fastener Schedule		Allowable Loads (Lbs.) ^{1,2,5,8}		Deflection at 133% Allowable Design Load ^{4,6}
			W	H	D	CL	Anchor Bolts ³	Wood Screws ⁷	DF-L / SP		
									Uplift		
UPHD8	--	10	3-1/4	17-1/4	3	1-3/8	(1) 7/8	(24) WS3	9900	11250	0.033

1) Allowable loads are based on the 1997 NDS®.
 2) Allowable loads have been increased 33-1/3% or 60% for wind and seismic loads; no further increase shall be permitted.
 3) The designer must specify anchor bolt type, length, and embedment.
 4) Deflections are derived from static, monotonic load tests of devices connected to DF-L wood members with specified fasteners.
 5) The designer shall consider the effect of compression, bearing, tension, and combined bending due to device eccentricity when applicable.
 6) The UPHD may be elevated off the sill.
 7) WS3 wood screws are 1/4" x 3" and are included with UPHD models.
 8) Minimum post thickness is 3". Consult USP for installations less than 3".



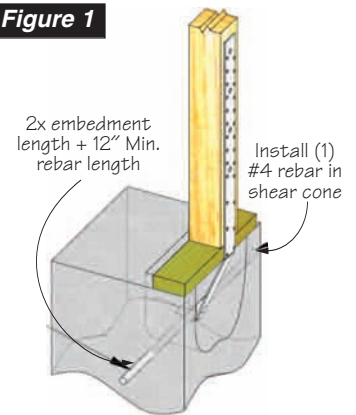
Designed to anchor wood framing to poured concrete foundations.

Materials: See chart
Finish: G90 galvanizing
Codes: NER 505, FL816

Installation:

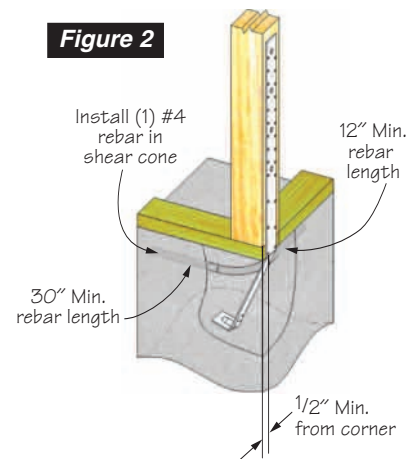
- Use all specified fasteners. See Product Notes, page 16.
- Bending the strap horizontally 90° to facilitate wall placement may cause concrete behind the embedded strap to break away at the top edge (spalling). If the spall is 1" or less from the top edge of the concrete, no load reduction is necessary. 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 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 Diaphragm Shearing document.
- Strap may be bent one complete cycle to aid installation.

Figure 1



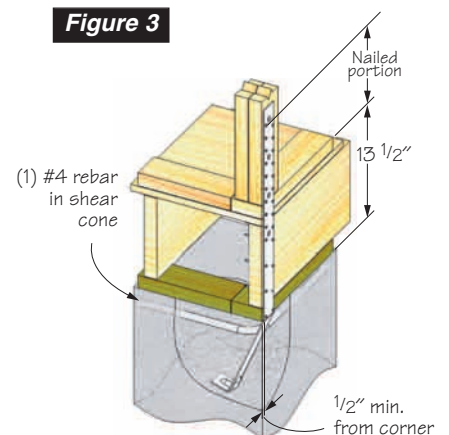
Typical HPAHD22 single pour edge installation

Figure 2



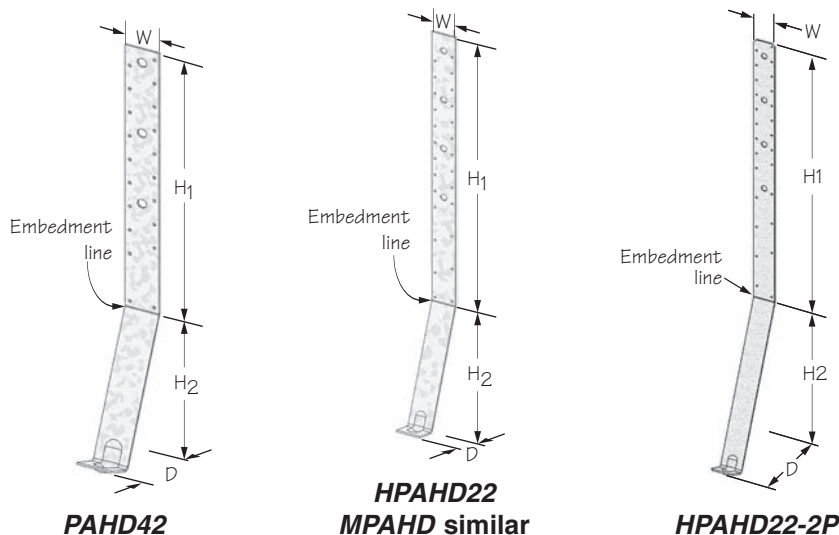
Typical HPAHD22 single pour corner and endwall installation

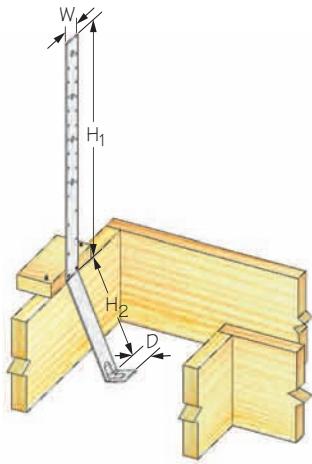
Figure 3



Typical HPAHD22 single pour rim joist installation

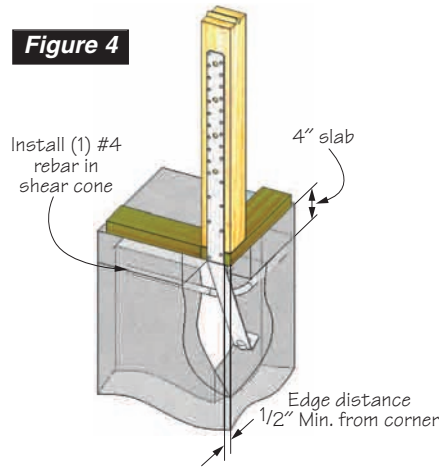
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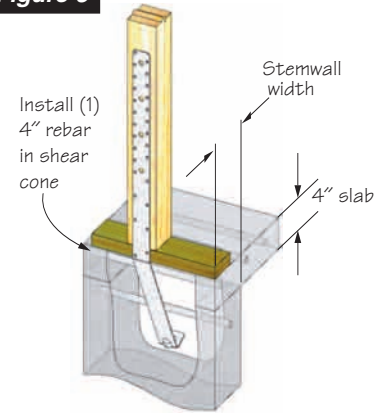
HPAHD22 form board installation

Figure 4



Typical HPAHD22-2P double pour corner installation

Figure 5



Typical HPAHD22-2P double pour edge installation

USP Stock No.	Ref. No.	Steel Gauge	Dimensions				Installation Type	Stemwall Width	Fastener Schedule ²	Allowable Loads (Lbs.) ¹	
			W	H1	H2	D				DF-L / SP	
										Uplift	
										133%	160%
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 8	(15) 16d	3065	3065
MPAHD	---	12	2-1/16	24-3/4	9-1/2	4-5/8	Figure 1	6 8	(15) 16d	3065	3065
HPAHD22	HPAHD22	10	2-1/16	24-3/4	10	4-1/8	Figure 1	6 8	(23) 16d	4990	4990
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 8	(14) 16d	3005	3065
MPAHD	---	12	2-1/16	24-3/4	9-1/2	4-5/8	Figure 5	6 8	(15) 16d	3065	3065
HPAHD22	HPAHD22	10	2-1/16	24-3/4	10	4-1/8	Figure 5	6 8	(20) 16d	4905	4990
HPAHD22-2P	HPAHD22-2P	10	2-1/16	26-1/4	14	6-1/4	Figure 5	6 8	(24) 16d	5170	5170
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 8	(18) 16d	2220	2220
MPAHD	---	12	2-1/16	24-3/4	9-1/2	4-5/8	Figure 2 & 3	6 8	(22) 16d	2120	2120
HPAHD22	HPAHD22	10	2-1/16	24-3/4	10	4-1/8	Figure 2 & 3	6	(12) 16d ³	2945	3535
								8	(24) 16d	4095	4095
								8	(12) 16d ³	2945	3535
								8	(24) 16d	4095	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 8	(14) 16d	2220	2220
MPAHD	---	12	2-1/16	24-3/4	9-1/2	4-5/8	Figure 4	6 8	(18) 16d	2120	2120
HPAHD22	HPAHD22	10	2-1/16	24-3/4	10	4-1/8	Figure 4	6 8	(20) 16d	4095	4095
HPAHD22-2P	HPAHD22-2P	10	2-1/16	26-1/4	14	6-1/4	Figure 4	6 8	(24) 16d	4095	4095

1) Allowable loads have been increased 33-1/3% or 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 allowable 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.

LSTAD – 14 gauge one-piece design allows labor effective installation without holdowns.

STAD – 12 gauge design.

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.

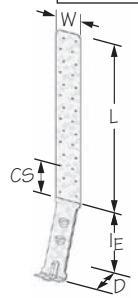
Materials: LSTAD – 14 gauge; STAD – 12 gauge

Finish: G90 galvanizing

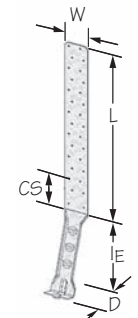
Codes: NER 608, FL821

Installation:

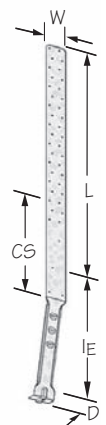
- Use all specified fasteners. See Product Notes, page 16. The bottom (2) nails are for form board attachment only and do not contribute to fastener schedule requirements.
- Embed holddown in concrete to the embedment line (bend line).
- See illustrations for requirements on rebar, edge distances, and 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.



LSTAD8



STAD



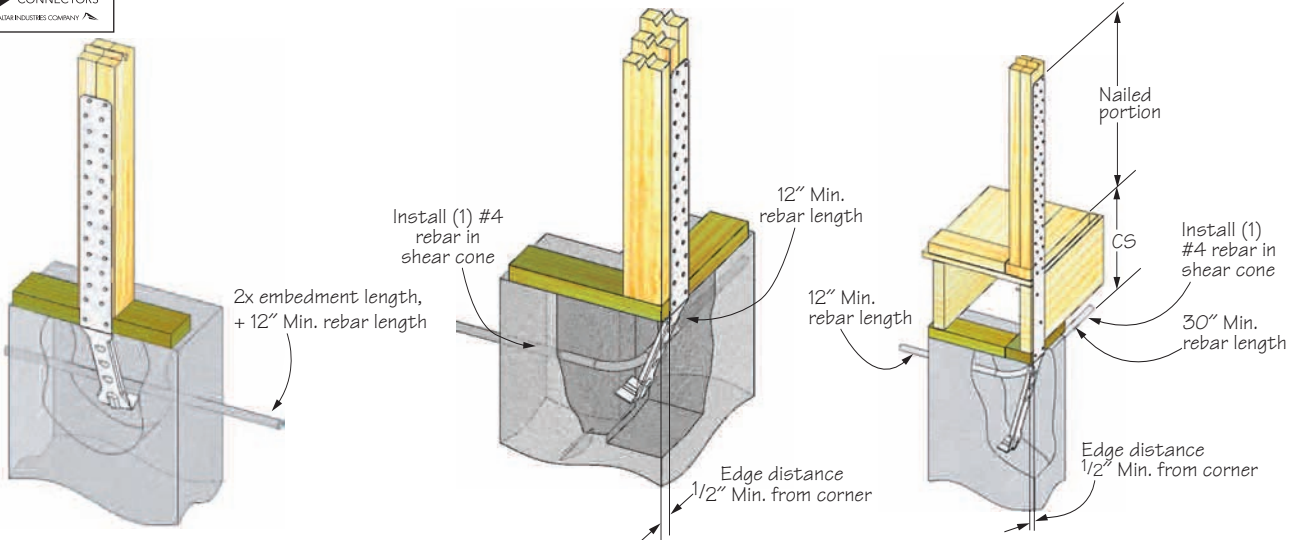
STAD_RJ

Holdowns

USP Stock No. ⁴	Ref. No.	Steel Gauge	Fastener Schedule ^{1,2}	Dimensions					Min. Stemwall	Allowable Uplift Loads (133% & 160%) ³								
				W	L	I _E	D	CS		DF-L / SP								
										Edge Distance - Concrete								
										2000 psi			2500 psi			3000 psi		
1/2"	1-1/2"	I _E	1/2"	1-1/2"	I _E	1/2"	1-1/2"	I _E										
LSTAD8	LSTD8	14	(24) 16d Sinker	3	21-5/8	8	5	4-5/8	6/8	2225	2225	3220	2225	2225	3220	2225	2225	3220
LSTAD8RJ	LSTD8RJ	14	(24) 16d Sinker	3	35-1/8	8	5	18-1/8	6/8	2225	2225	3220	2225	2225	3220	2225	2225	3220
STAD8	STHD8	12	(24) 16d Sinker	3	21-5/8	8	5	4-5/8	6/8	3270	3270	3270	3270	3270	3270	3270	3270	3270
STAD8RJ	STHD8RJ	12	(24) 16d Sinker	3	35-1/8	8	5	18-1/8	6/8	3270	3270	3270	3270	3270	3270	3270	3270	3270
STAD10	STHD10	12	(28) 16d Sinker	3	21-5/8	10	5	1-5/8	6/8	3270	3270	3625/4305	3270	3270	3625/4305	3270	3270	3625/4305
STAD10RJ	STHD10RJ	12	(28) 16d Sinker	3	36	10	5	16-1/8	6/8	3270	3270	3625/4305	3270	3270	3625/4305	3270	3270	3625/4305
STAD14	STHD14	12	(38) 16d Sinker	3	32-1/8	14	5	4-5/8	6/8	4960	4960	4960/5850	4960	4960	4960/5850	4960	4960	4960/5850
STAD14RJ ^f	STHD14RJ	12	(38) 16d Sinker	3	39-5/8	14	5	12-1/8	6/8	4960	4960	4960/5850	4960	4960	4960/5850	4960	4960	4960/5850

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 33-1/3% or 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.

continued on next page



Typical STAD10 edge installation

Typical STAD10 corner installation

Typical STAD14RJ corner rim joist installation

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

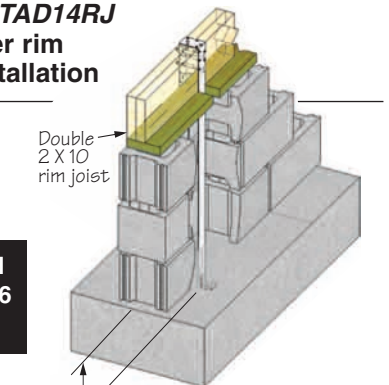
Finish: G90 galvanizing

Options: TA51 & TA71 are available in Triple Zinc.

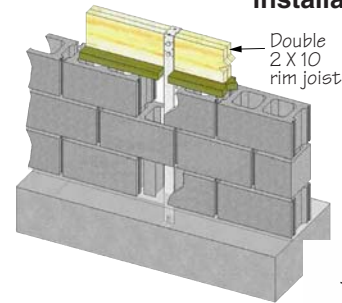
To order, add TZ to stock number, as in TA51-TZ.

Codes: NER 505, FL816

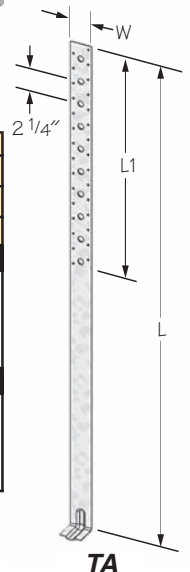
Bolts must be ordered separately. See page 26 for available sizes.



Typical TA installation



Typical TA stud to foundation installation



Installation:

- Use all specified fasteners. See Product Notes, page 16.
- 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 muddsill 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.

USP Stock No.	Ref. No.	Dimensions			Allowable Loads (Lbs.)											
		W	L	L1	2 x 8		2 x 10		2 x 12		2 x 14					
					Fastener Schedule ^{1,2}	Uplift ³	Fastener Schedule ^{1,2}	Uplift ³	Fastener Schedule ^{1,2}	Uplift ³	Fastener Schedule ^{1,2}	Uplift ³				
BOLT Uplift Values & Schedules for Rim Joist Sizes Below																
TA41	--	2-1/16	38-1/4	17-5/8	(2) 1/2	1115	1340	(3) 1/2	1625	1950	(4) 1/2	2065	2475	(6) 1/2	2720	3230
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	1590	1905	(10) 16d x 2-1/2	1985	2385	(14) 16d x 2-1/2	2780	3230	(16) 16d x 2-1/2	3180	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 33-1/3% or 60% for wind and seismic loads; no further increase shall be permitted.

Updated product information is designated in red.

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

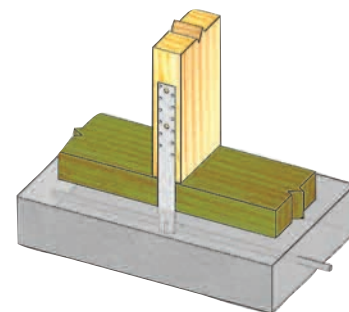
Finish: G90 galvanizing

Options: PA18, PA23, PA28 & PA35 are available in Triple Zinc and HPA35 is available in Hot-dip galvanized. To order, add *TZ* or *HDG* to end of stock number, as in **PA18-TZ**.

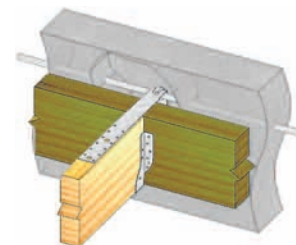
Codes: NER 505, ICBO 2725, FL816

Installation:

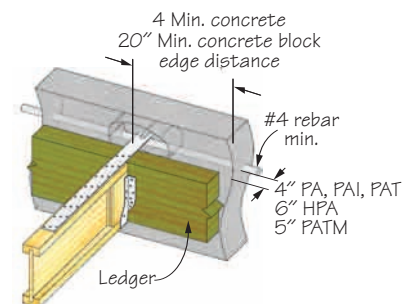
- Use all specified fasteners. See Product Notes, page 16.
- Minimum concrete strength is 2,000 psi.
- The allowable loads for bolts are based on parallel to grain loading with a 3" minimum member thickness, except the **HPA** which requires a 3 1/2" thick wood member. Reduce load per code requirements 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 20 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.



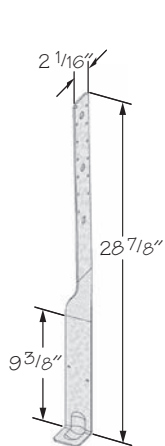
Typical PA holdown installation



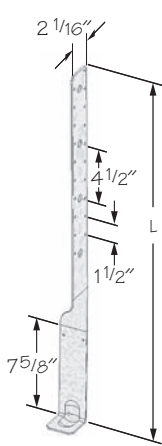
Typical PA purlin installation



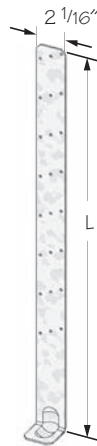
Typical PAI I-Joist purlin face installation



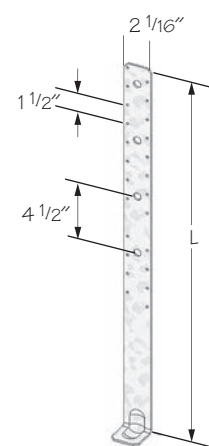
PATM25



PAT



PAI



PA / HPA

continued on next page

Bolts must be ordered separately. See page 26 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.

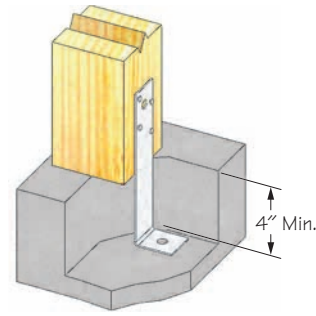
Holdowns

USP Stock No.	Ref. No.	L	Minimum Embedment		Nailer Size	Fastener Schedule ⁷		Allowable Loads (Lbs.) ^{1,3}							
			Concrete	Masonry		Min Qty ⁸		DF-L / SP							
						Nails ^{4,5,6}	Bolts	Concrete				Masonry			
								Nails		Bolts ²		Nails		Bolts ²	
						133%	160%	133%	160%	133%	160%	133%	160%		
PA18	PA18	18-1/2	4	6	Max Capacity	(12) 16d	(2) 1/2	2575	3035	1885	2260	2575	3035	1885	2260
					2x & 3x Ledger										
					4x Ledger										
PA23	PA23	23-3/4	4	6	Max Capacity	(15) 16d	(3) 1/2	3360	3700	2720	3265	3035	3035	2720	3035
					2x & 3x Ledger										
					4x Ledger										
PA28	PA28	29	4	6	Max Capacity	(15) 16d	(4) 1/2	3360	3700	3370	3700	3035	3035	3035	3035
					2x & 3x Ledger										
					4x Ledger										
PA35	PA35	35	4	6	Max Capacity	(15) 16d	(4) 1/2	3360	3700	3370	3700	3035	3035	3035	3035
					2x & 3x Ledger										
					4x Ledger										
PAT18	--	18-1/2	4	6	Max Capacity	(8) 16d	(2) 1/2	1715	2060	1885	2260	1715	2060	1885	2260
					2x & 3x Ledger										
					4x Ledger										
PAT23	--	23-3/4	4	6	Max Capacity	(14) 16d	(3) 1/2	3005	3105	2685	3105	3005	3035	2685	3035
					2x & 3x Ledger										
					4x Ledger										
PAT28	--	29	4	6	Max Capacity	(15) 16d	(4) 1/2	3105	3105	3105	3105	3035	3035	3035	3035
					2x & 3x Ledger										
					4x Ledger										
PAT35	--	35	4	6	Max Capacity	(15) 16d	(4) 1/2	3105	3105	3105	3105	3035	3035	3035	3035
					2x & 3x Ledger										
					4x Ledger										
PATM25	--	28-7/8	6	6	Max Capacity	(13) 16d	(3) 1/2	2790	3105	2775	3105	2790	3035	2775	3035
					2x & 3x Ledger										
					4x Ledger										
HPA28	HPA28	29	6	8	Max Capacity	(23) 16d	(4) 1/2	5055	5055	3570	4280	3035	3035	3035	3035
					2x & 3x Ledger										
					4x Ledger										
HPA35	HPA35	35	6	8	Max Capacity	(23) 16d	(4) 1/2	5425	5425	3570	4280	3035	3035	3035	3035
					2x & 3x Ledger										
					4x Ledger										
PAI18	PAI18	18-1/2	4	6	Max Capacity	(12) 10d x 1-1/2	---	2065	2475	---	---	2065	2475	---	---
					2x & 3x Ledger			1895	2270			1550	1855		
					4x Ledger										
PAI23	PAI23	23-1/2	4	6	Max Capacity	(18) 10d x 1-1/2	---	3095	3700	---	---	3035	3035	---	---
					2x & 3x Ledger			2925	3510			2925			
					4x Ledger			2580	3095			2580			
PAI28	PAI28	28-1/2	4	6	Max Capacity	(24) 10d x 1-1/2	---	3700	3700	---	---	3035	3035	---	---
					2x & 3x Ledger										
					4x Ledger										
PAI35	PAI35	35-1/2	4	6	Max Capacity	(26) 10d x 1-1/2	---	3700	3700	---	---	3035	3035	---	---
					2x & 3x Ledger										
					4x Ledger										

- 1) Allowable Loads have been increased 33-1/3% or 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.

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

- Materials:** 12 gauge
Finish: G90 galvanizing
Codes: ICBO 2039, LA City RR 23888
Options: TDL5 and TDL10 are available in Triple Zinc. To order, add TZ to end of stock number, as in TDL5-TZ.



Typical TDL10 embedded interior installation



Typical TDL5 interior installation

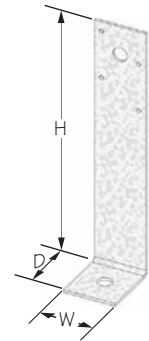
Installation:

- Use all specified fasteners. See Product Notes, page 16.
- The TDL10 can be embedded into concrete. Minimum embedment depth is 4" to achieve allowable loads.
- Moisture barrier may be required.

Bolts must be ordered separately. See page 26 for available sizes.

USP Stock No.	Ref. No.	Steel Gauge	Dimensions			Fastener Schedule ^{4,5}			Allowable Loads (Lbs.) ^{1,2,3}			
			W	H	D	Anchor Bolts	Strap		DF-L / SP			
							Nails	Bolts	Uplift			
			Nails		Bolts				133%		160%	
TDL5	A24	12	2	5-3/16	2-1/4	(1) 1/2	(4) 16d	(1) 1/2	795	955	920	1105
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.



TDL10

COLD FORMED STEEL HOLDOWNS – TDS SERIES

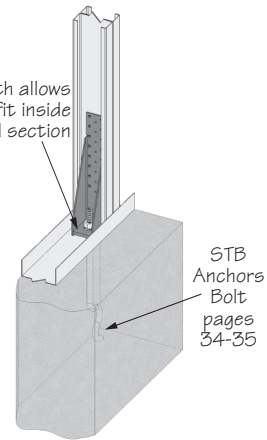
- Materials:** 10 gauge with 3/8" plate
Finish: USP primer

NEW SIZE

Installation:

- Use all specified fasteners. See Product Notes, page 16.
- See STB series, pages 34-35, 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.

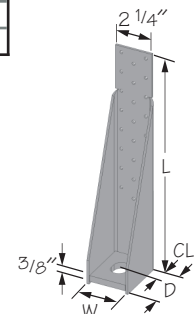
Narrow width allows for easy fit inside stud section



Typical TD8S installation

USP Stock No.	Ref. No.	Steel Gauge		Dimensions			Fastener Schedule		Allowable Tension Loads (Lbs.) ^{1,2,3,4}					
		Strap	Base	W	L	CL	To Sill Plate	To Stud	2-33 mil (2-20ga) Back-to-Back Studs		2-43 mil (2-18ga) Back-to-Back Studs		2-54 mil (2-16ga) Back-to-Back Studs	
							Anchor Bolts	Screws	100%	133%	100%	133%	100%	133%
TD8S	S/HD8S	10	3/8	2-1/2	13-7/8	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	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	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.



TD8S