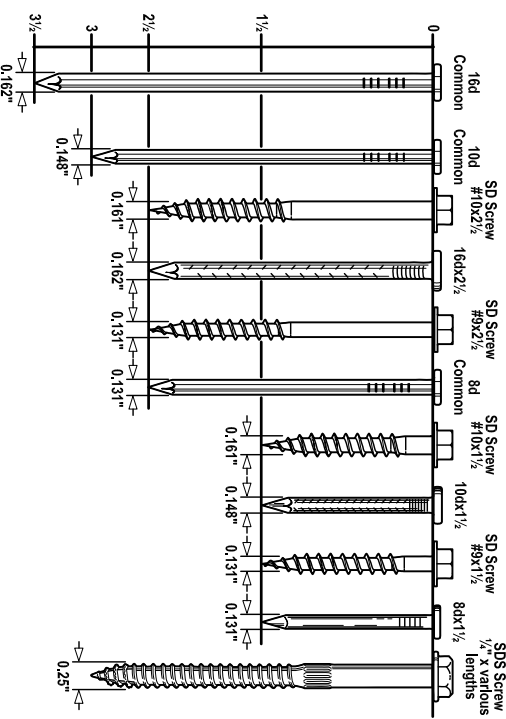


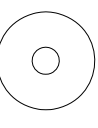
**General Notes:**

1. Outdoor environments are generally more corrosive to steel. If you choose to use ZMAX® or HDG finish or stainless steel material on an outdoor project, you should periodically inspect your connectors and fasteners or have a professional inspection performed. Regular maintenance, including water-proofing of the wood used in your outdoor project is also a good practice.
2. Coatings Available:
  - 2.1. ZMAX: Galvanized (G185) 1.85 oz. of zinc per square foot of surface area. (hot-dip galvanized per ASTM A653 total both sides). These products require hot-dip galvanized fasteners (fasteners which meet the specifications of ASTM A153).
  - 2.2. HDG - Hot Dip Galvanized: Products are hot-dip galvanized after fabrication (14 ga. and thicker). The coating weight increases with material thickness. The minimum specified coating weight is 2.0 oz. per square foot. (per ASTM A123 total both sides). These products require hot-dip galvanized fasteners (fasteners which meet the specifications of ASTM A153).
  - 2.3. SS - Stainless Steel: Connectors are manufactured from Type 316L stainless steel, and provide greater durability against corrosion. Stainless-steel nails are required with stainless-steel products, and are available from Simpson Strong-Tie.
3. When using stainless steel connectors, use stainless steel fasteners. When applications allow the use of ZMAX/HDG galvanized connectors, use HDG fasteners that meet the specifications of ASTM A153 or equivalent coating offered on Simpson Strong-Tie fasteners.
4. Due to many variables involved with outdoor construction, Simpson Strong-Tie cannot provide estimates on service life of connectors, anchors or fasteners.
5. To obtain optimal performance from Simpson Strong-Tie products, the products must be installed properly and used in accordance with the installation instructions and design limits provided by Simpson Strong-Tie.
6. All installation notes and guidelines within the current *Wood Construction Connectors* catalog shall apply for the connectors, anchors, and fasteners shown.
7. Simpson Strong-Tie reserves the right to change the specifications, design and models shown without notice or liability for such changes.
8. Simpson Strong-Tie does not guarantee the performance or safety of products that are modified, improperly installed or not used in accordance with the design.
9. All references to bolts or machine bolts (MB) are structural quality through bolts (not lag screws or carriage bolts) equal to or better than ASTM A307, grade A. Bolt holes shall be at least a minimum 1/32" and no more than a maximum of 1/16" larger than the bolt diameter per 2005 NDS Section 11.1.2.
10. Unless noted otherwise, all references to standard cut washers refer to Type A plain washers (W) conforming to the dimensions shown in ASME B18.22.1 for the appropriate rod sizes.
11. Unless stated otherwise, Simpson Strong-Tie cannot and does not make any representation regarding the suitability of use or load-carrying capacities of connectors installed with improper fasteners.

**D01 General Notes**



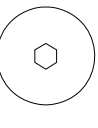
- Fastener Notes:**
1. The specified quantity, type and size of fastener must be installed in the correct holes on the connector to achieve published loads.
  2. Incorrect fastener selection or installation can compromise connector performance and could lead to failure.
  3. The Simpson Strong-Tie® SD structural-connector screw is the only screw approved for use with our connectors.
  4. **NAIL reference in tables:** 16d = 16d common, 10d = 10d common



**Round Holes**  
**Purpose:** to fasten a connector.  
**Fill requirements:** always fill, unless noted otherwise.



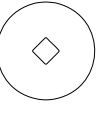
**Obround Holes**  
**Purpose:** to make fastening a connector in a light location easier.  
**Fill requirements:** always fill.



**Hexagonal Holes**  
**Purpose:** to fasten a connector to concrete or masonry.  
**Fill requirements:** always fill when fastening a connector to concrete or masonry.



**Triangular Holes**  
**Purpose:** to increase a connector's strength or to achieve Max strength.  
**Fill requirements:** when the designer specifies Max nailing.



**Diamond Holes**  
**Purpose:** to temporarily fasten a connector to make installing easier.  
**Fill requirements:** none.



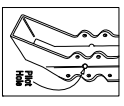
**Speed Prongs**  
 Used to temporarily position and secure the connector for easier and faster installation.



**Dome Nailing**  
 This feature guides the nail into the joist and header at a 45° angle.



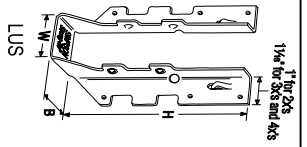
**Double Shear Nailing**  
 The nail is installed in the joist and header, distributing the load through two points on each joist nail for greater strength.



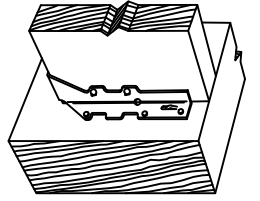
**Pilot Holes**  
 Tooling holes for manufacturing purposes. No fasteners required.

**Fastening Identification**

**D02 Fasteners**



Typical LUS28Z Installation



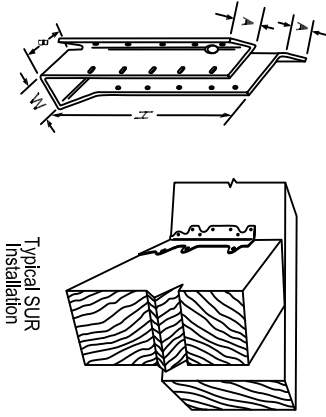
**Installation:**

- LUS hangers install with double shear nailing.
- For installations into single 2x headers or ledgers, use the specified full length fasteners into the joist and the following fasteners into the header for reduced loads in accordance with [www.strongtie.com](http://www.strongtie.com):
- 100x1 1/2 nails for installations with Nails
- SD #9x1 1/2 for LUS28Z and LUS210Z installations with SD Screws
- SD #10x1 1/2 for LUS26-ZZ and LUS210-ZZ installations with SD Screws

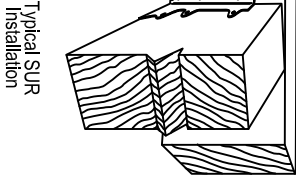
Model No.	Dimensions (in.)			Fasteners		
	W	H	B	Nails	SD Screws	
□ LUS26Z	1 9/16	4 3/4	1 3/4	4-10d	4-10d	-
□ LUS28Z	1 9/16	6 5/8	1 3/4	6-10d	4-10d	4-SD #9x2 1/2
□ LUS210Z	1 9/16	7 13/16	1 3/4	8-10d	4-10d	8-SD #9x2 1/2 4-SD #9x2 1/2
□ LUS26-ZZ	3 1/8	4 7/8	2	4-16d	4-16d	4-SD #10x2 1/2 4-SD #10x2 1/2
□ LUS210-ZZ	3 1/8	9	2	8-16d	6-16d	8-SD #10x2 1/2 6-SD #10x2 1/2

1. □ indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.  
2. Refer to current Wood Construction Connectors catalog for additional information.

**D03 LUS Joist Hangers**



SUL Skewed Left Hanger (SUR is Skewed Right)

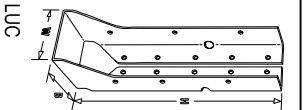


- Installation:**
- The joist may be square cut or bevel cut.
  - These hangers will normally accommodate a 40° to 50° skew.

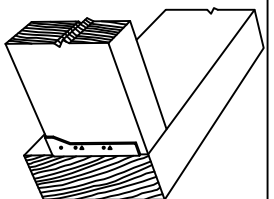
Model No.	Joist Size	Dimensions (in.)				Fasteners	
		W	H	B	A1	Header	Joist
SURL26Z	2x6, 8	1 9/16	5	2	1 1/8	1 5/16	6-16d 6-100x1 1/2
SURL210Z	2x10, 12	1 9/16	8 1/8	2	1 1/8	1 5/16	10-16d 10-100x1 1/2
SURL210-ZZ	(2) 2x10, 12	3 1/8	8 11/16	2 5/8	1 7/16	2 3/8	14-16d 6-160x2 1/2

1. □ indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.  
2. Refer to current Wood Construction Connectors catalog for additional information.

**D05 SUR/SUL 45° Skewed Joist Hangers**



Typical HUC Installation (LUC Similar)



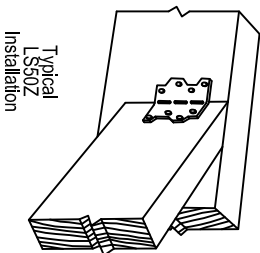
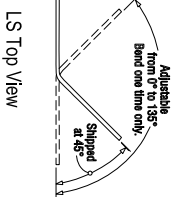
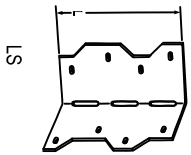
**Installation:**

- For HUC installations, models have triangle and round holes. To achieve maximum loads, fill both round and triangle holes (fastener quantities listed in both holes).
- For installations into single 2x headers or ledgers, use the specified full length fasteners into the joist and the following fasteners into the header for reduced loads in accordance with [www.strongtie.com](http://www.strongtie.com):
- 100x1 1/2 nails for installations with Nails
- SD #9x1 1/2 for LUC26Z and LUC210Z installations with SD Screws

Model No.	Dimensions (in.)			Fasteners		
	W	H	B	Nails	SD Screws	
□ LUC26Z	1 9/16	4 3/4	1 3/4	6-10d	4-100x1 1/2	4-SD #9x1 1/2
□ LUC210Z	1 9/16	7 3/4	1 3/4	10-10d	6-100x1 1/2	6-SD #9x1 1/2
□ HUC26-ZZ	3 1/8	5 3/8	2 1/2	12-16d	6-10d	-
□ HUC28-ZZ	3 1/8	7	2 1/2	14-16d	6-10d	-
□ HUC210-ZZ	3 1/8	8 13/16	2 1/2	18-16d	10-10d	-

1. □ indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.  
2. Refer to current Wood Construction Connectors catalog for additional information.

**D04 LUC, HUC Joist Hangers**

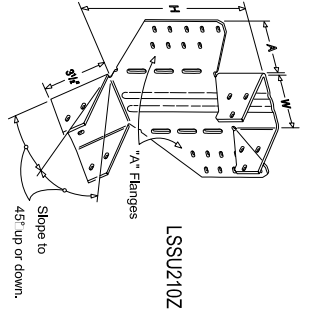


- Installation:**
- Field skewed; bend one time only.
  - Joist must be constrained against rotation (for example, with solid blocking) when using a single LS per connection.

Model No.	L (in)	Fasteners
LS30Z	3 3/8	6-10d
LS50Z	4 7/8	8-10d
LS70Z	6 3/8	10-10d

1. □ indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.  
2. Refer to current Wood Construction Connectors catalog for additional information.

**D06 LS Framing Angles**

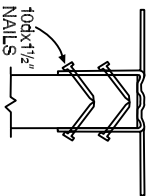


LSSU210Z

- Installation:**
- Follow 3-step installation sequence for skewed or sloped/skewed applications.
  - Do not substitute 10dx1½ nails for face nails.
  - To see an installation video on this product, visit [www.strongtie.com](http://www.strongtie.com)

Model No.	Dimensions (in.)			Fasteners	
	W	H	A	Header	Joist
LSU26Z	1 9/16	4 7/8	1 1/2	6-10d	5-10dx1 1/2
LSSU210Z	1 9/16	8 1/2	1 5/8	10-10d	7-10dx1 1/2

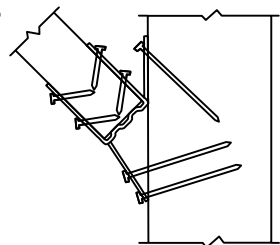
1. For skewed LSSU, the inner most face fasteners on the acute angle side are not installed.
2. Refer to current Wood Construction Connectors catalog for additional information.



**STEP 1**  
Nail hanger to slope-cut carried member, installing seat nail first. No bevel necessary for skewed installation. Install joist nails at 45° angle.

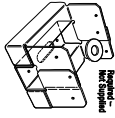


**STEP 2**  
Skew flange from 0-45°. Bend other flange back along centerline of slots until it meets the header. Bend one time only.

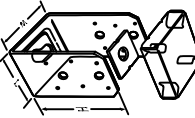


**STEP 3**  
Attach hanger to the carrying member, acute angle side first (see footnote 1). Install nails at an angle.

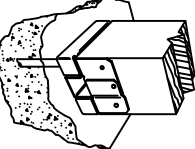
## D07 LSU, LSSU Adjustable Joist Hangers



ABA44Z



ABU44Z



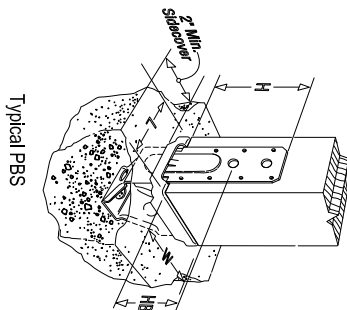
Typical ABA Installation (ABU Similar)

- Installation:**
- ABA, ABU - for pre-pour installed anchors. For Simpson Strong-Tie epoxy or mechanical anchors, select and install in accordance with [www.strongtie.com](http://www.strongtie.com).
  - Products require washers between the nut and the base. Washers are supplied with the ABU but not the ABA, which requires a standard cut washer.

Model No.	Dimensions (in.)				Anchor Dia.	Post Fasteners			
	W	L	H	HB		Nails	SD Screws	Machine Bolts Qty. Dia.	
ABA44Z	4x4	3 9/16	3 1/8	3 1/16	-	1/2	6-SD #9x1½	-	-
ABU44Z	4x4	3 9/16	3	5 1/2	1 3/4	5/8	12-SD #10x1½	2	1/2
ABA46Z	4x6	3 9/16	5 3/16	3 1/8	-	5/8	8-SD #10x1½	-	-
ABU46Z	4x6	3 9/16	5	7	2 5/8	5/8	12-16d	2	1/2
ABA66Z	6x6	5 1/2	5 1/4	3 1/8	-	5/8	8-SD #10x1½	-	-
ABU66Z	6x6	5 1/2	5	6 1/16	1 3/4	5/8	12-16d	2	1/2
ABU88Z	8x8	7 1/2	7	7	-	2 - 5/8	18-16d	-	-

1. D indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.
2. Refer to current Wood Construction Connectors catalog for additional information.

## D08 ABA, ABU Post Bases



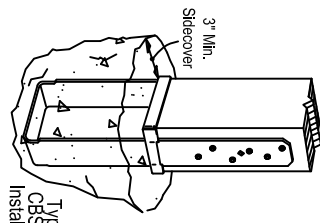
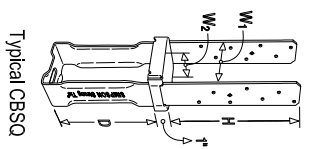
Typical PBS

- Installation:**
- Embed into wet concrete up to the bottom of the 1" standoff base plate. A 2" minimum side covers required to obtain the full load. Holes in the bottom of the straps allow for the concrete flow.
  - Allow concrete to cure before installation of the post.

Model No.	Dimensions (in.)				Post Fasteners		
	W	L	H	HB	Nails	SD Screws	Machine Bolts Qty. Dia.
PBS44AHDG	3 9/16	3 1/2	6 1/4	3 7/16	14-16d	14-SD #10x1½	2 1/2
PBS66HDG	5 1/2	5 3/8	6 1/2	3 11/16	14-16d	-	2 1/2

1. Refer to current Wood Construction Connectors catalog for additional information.

## D09 PBS Post Bases

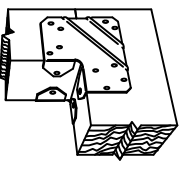
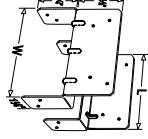
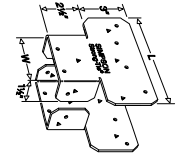


- Installation:**
- Install Simpson Strong-Tie SDS  $\frac{1}{2}$ " x 2" wood screws, which are provided with the column base, with a  $\frac{3}{8}$ " hex head driver. (Lag screws will not achieve the same load)
  - Allow concrete to cure before installation of the post.
  - For full loads, a minimum of 3" site cover shall be provided.

Model No.	Post Size	Dimensions (in.)			Number of SDS Screws	
		W1	W2	D		H
CBSQ44-SDS2H DG	4x4	3 9/16	3 1/2	7 1/8	8 3/8	14-SDS $\frac{1}{4}$ "x2"
CBSQ46-SDS2H DG	4x6	3 9/16	5 5/16	7 13/16	8 1 1/16	14-SDS $\frac{1}{4}$ "x2"
CBSQ66-SDS2H DG	6x6	5 1/2	5 1/2	6 7/8	8 3/4	14-SDS $\frac{1}{4}$ "x2"
CBSQ86-SDS2H DG	6x8	7 1/2	5 3/8	6 1/8	8 1 1/16	12-SDS $\frac{1}{4}$ "x2"
CBSQ88-SDS2H DG	8x8	7 1/2	7 3/8	6 1/8	8 1 1/16	12-SDS $\frac{1}{4}$ "x2"

1.  $\Delta$  Indicates connector is available in stainless steel. Replace -SDS2H DG in model number with SS when ordering.  
 2. Refer to current Wood Construction Connectors catalog for additional information.

**D10 CBSQ Post Bases**

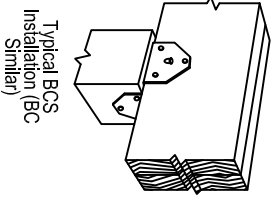
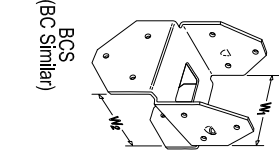


- Installation:**
- Install in pairs.
  - For LCEAZ installations on milled corner conditions, refer to [www.strongtie.com](http://www.strongtie.com) for more information.

Model No.	Dimensions (in.)		Fasteners			
	W	L	Beam Nails	Post Nails	Beam SD Screws	Post SD Screws
AC4Z	3 9/16	6 1/2	14-16d	14-16d	14-SD #10x1 1/2	14-SD #10x1 1/2
AC6Z	5 1/2	8 1/2	14-16d	14-16d	14-SD #10x1 1/2	14-SD #10x1 1/2
LPC4Z	3 9/16	3 1/2	8-10d	8-10d	8-SD #9x1 1/2	8-SD #9x1 1/2
LPC6Z	5 9/16	5 1/2	8-10d	8-10d	-	-
LCE4Z	-	5 3/8	14-16d	10-16d	14-SD #10x1 1/2	10-SD #10x1 1/2

1.  $\Delta$  Indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.  
 2. Refer to current Wood Construction Connectors catalog for additional information.

**D12 AC, LPC, LCE Post Caps**

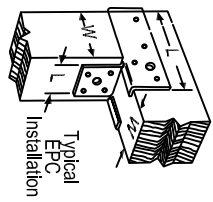
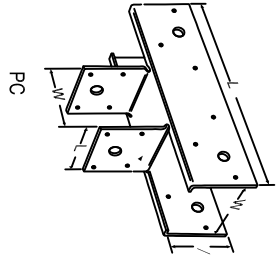


- Installation:**
- BCS: Install dome nails on beam; drive nails at an angle through the beam into the post below.
  - BC: Do not install nails into pilot holes.

Model No.	Dimensions (in.)						Fasteners			
	W1	W2	L1	L2	H1	H2	Beam Nails	Post Nails	Beam SD Screws	Post SD Screws
BC4Z	3 9/16	3 9/16	2 7/8	2 7/8	3	3	6-16d	6-16d	6-SD #10x1 1/2	6-SD #10x1 1/2
BC6Z	5 1/2	5 1/2	4 3/8	4 3/8	3 3/8	3 3/8	12-16d	12-16d	-	-
BCS2-24Z	3 1/8	3 9/16	2 7/8	2 7/8	2 15/16	2 15/16	8-10d	6-10d	8-SD #9x2 1/2	6-SD #9x2 1/2
BCS2-36Z	4 5/8	5 9/16	4 3/8	2 7/8	3 5/16	2 15/16	12-16d	6-16d	-	-

1.  $\Delta$  Indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.  
 2. Refer to current Wood Construction Connectors catalog for additional information.

**D11 BC, BCS Post Caps**



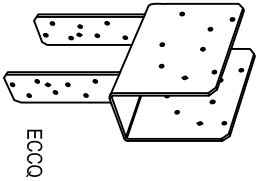
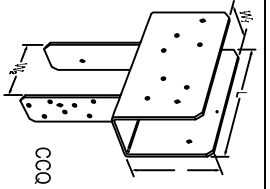
- Installation:**
- For end condition, specify EPC
  - Use all specified fasteners.
  - Do not install bolts into pilot holes.

Model No.	Dimensions (in.)						Fasteners			
	Post Size	W1	W2	L1	L2	L3	Beam Nails	Post Nails	Beam SD Screws	Post SD Screws
PC4-16Z	4x4	3 9/16	3 9/16	2 5/8	11	7 5/16	8-16d	8-16d	8-SD #10x1 1/2	12-SD #10x1 1/2
PC4-6-16Z	4x6	3 9/16	5 1/2	2 5/8	13	9 1/4	8-16d	12-16d	-	-
PC6-6-16Z	6x6	5 1/2	5 1/2	4 9/16	13	9 1/4	8-16d	12-16d	-	-

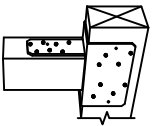
1. Refer to current Wood Construction Connectors catalog for additional information.

**D13 PC, EPC Post Caps**





- Installation:**
- For end conditions, specify ECCO
  - Install Simpson Strong-Tie SDS  $\frac{1}{2}$ " x  $2\frac{1}{2}$ " screws, which are provided with the column cap, with a  $\frac{1}{8}$ " hex head driver. SDS screws install best with a low speed  $\frac{1}{2}$ " drill.
  - Beam depth must be a minimum 7".

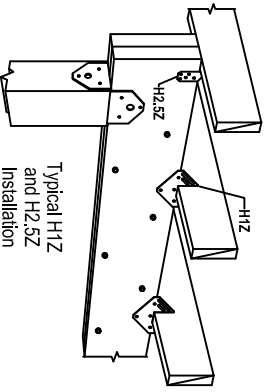


Typical CCOQ Installation

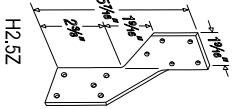
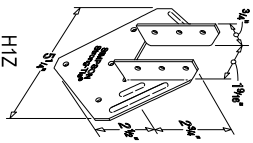
Model No.	Beam Width	Dimensions (in.)				No. of SPS $\frac{1}{2}$ " x $2\frac{1}{2}$ " Screws		
		W1	W2	L1	H			
CCQ3-6HDG	3/18	3/14	5/12	11	8 1/2	7	16	14
CCQ44HDG	4x	3/5/8	3/5/8	11	8 1/2	7	16	14
CCQ46HDG	4x	3/5/8	5/12	11	8 1/2	7	16	14
CCQ48HDG	4x	3/5/8	7/12	11	8 1/2	7	16	14
CCQ66HDG	6x	5/12	5/12	11	8 1/2	7	16	14
CCQ68HDG	6x	5/12	7/12	11	8 1/2	7	16	14

1.  $\square$  Indicates connector is available in stainless steel. Replace HDG in model number with SS when ordering.  
 2. Refer to current Wood Construction Connectors catalog for additional information.

### D14 CCO, ECCO Post Caps



Typical H1Z and H2.5Z Installation

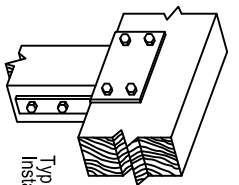
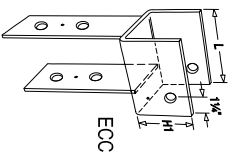
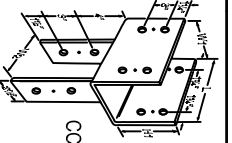


- Installation:**
- Use all specified fasteners.

Model No.	Fasteners			
	Nails	To Joist	To Joist	To Beam
H1Z	6-8d x 1 1/2"	4-8d x 1 1/2"	6-SD #9 x 1 1/2"	4-SD #9 x 1 1/2"
H2.5Z	5-8d x 1 1/2"	5-8d x 1 1/2"	5-SD #9 x 1 1/2"	5-SD #9 x 1 1/2"
H8Z	5-10d x 1 1/2"	5-10d x 1 1/2"	5-SD #9 x 1 1/2"	5-SD #9 x 1 1/2"

1.  $\square$  Indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.  
 2. Refer to current Wood Construction Connectors catalog for additional information.

### D16 H Hurricane Ties

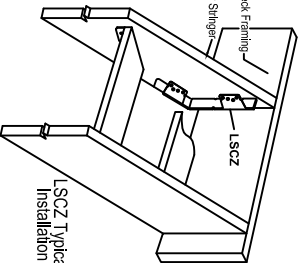
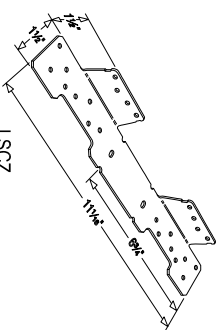


- Installation:**
- For end conditions, specify ECC
  - Bolt holes shall be a minimum  $\frac{1}{2}$ " to a maximum  $\frac{1}{8}$ " larger than the bolt diameter.
  - Contact engineered wood manufacturers for conditions that are not through the wide face.
  - Beam depth must be at least as tall as H1.

Model No.	Beam Width	Dimensions (in.)				Machine Bolts				
		W1	W2	L	H1	Dia.	Beam	Post		
CC3-1/4-4HDG	3/18	3/14	3/5/8	11	7 1/2	6 1/2	5/8	4	2	2
CC3-1/4-6HDG	3/18	3/14	5/12	11	7 1/2	6 1/2	5/8	4	2	2
CC44HDG	4x	3/5/8	3/5/8	7	5 1/2	4	5/8	2	1	2
CC66HDG	6x	5/12	5/12	11	7 1/2	6 1/2	5/8	4	2	2

1.  $\square$  Indicates connector is available in stainless steel. Replace HDG in model number with SS when ordering.  
 2. Refer to current Wood Construction Connectors catalog for additional information.

### D15 CC, ECC Post Caps



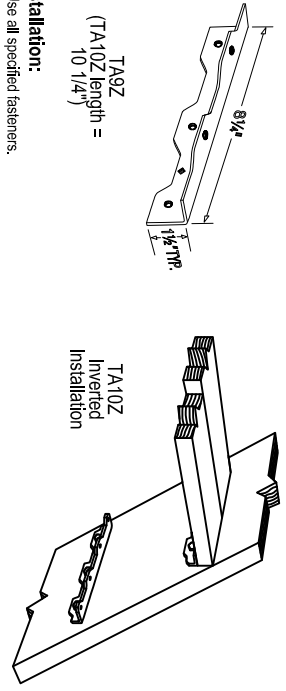
- Installation:**
- Before fastening, position the stair stringer with the LSCZ on the carrying member to verify where the bend should be located.
  - Tabs on the LSCZ must be positioned to the inside of the stairs.
  - The fastener that is installed into the bottom edge of the stringer must go into the second-to-last hole.
  - A minimum distance of  $\frac{1}{4}$ " measured from the lowest rim joist fastener to the edge of rim joist is required.

Model No.	Nails				Fasteners			
	Rim Joist	Stringer Wide Face	Stringer Narrow Face	Rim Joist	Stringer Wide Face	Stringer Wide Face	Stringer Narrow Face	
LSCZ	8-10d x 1 1/2"	8-10d x 1 1/2"	1-10d x 1 1/2"	8-SD #9 x 1 1/2"	8-SD #9 x 1 1/2"	8-SD #9 x 1 1/2"	1-SD #9 x 1 1/2"	

1.  $\square$  Indicates connector is available in stainless steel. Replace Z in model number with SS when ordering. Stainless steel models must be fastened with nails.  
 2. Refer to current Wood Construction Connectors catalog for additional information.

### D17 LSC Stair Stringer Connector





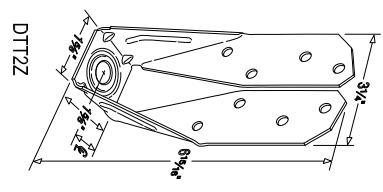
- Installation:**
- Use all specified fasteners.
  - For double 2x6 treads, install TA10Z inverted with 4 screws installed into the treads.

Model No.	Stringer	Fasteners	Tread
TA9Z	3-SDS 1/4"x1 1/2"	2-SDS 1/4"x1 1/2"	
TA10Z	3-SDS 1/4"x1 1/2"	4-SDS 1/4"x1 1/2"	
TA10Z	4-SDS 1/4"x1 1/2"	3-SDS 1/4"x1 1/2"	

- 1.  $\square$  Indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.
- 2. Refer to current *Wood Construction Connectors* catalog for additional information.

### D18 TA Tread Angle

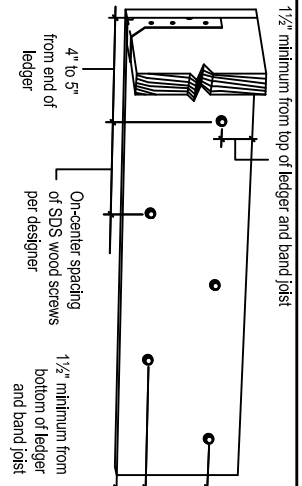
- Installation:**
- Install Simpson Strong-Tie SDS wood screws with a 3/8" hex head driver. SDS screws install best with a low speed high torque drill.
  - A standard cut washer (provided) must be installed between the nut and the DTT2Z seal.
  - Bolt holes shall be a minimum 1/2" to a maximum 5/8" larger than the bolt diameter.



Model No.	CL	Anchor Dia.	Fasteners
DTT2Z	13/16	1/2"	8-SDS 1/4"x1 1/2"

- 1.  $\square$  Indicates connector is available in stainless steel. Replace Z in model number with SS when ordering.
- 2. Refer to T-GRDRLPST and T-DECKLALLOAD for additional information.

### D20 DTT2Z Deck Tension Tie



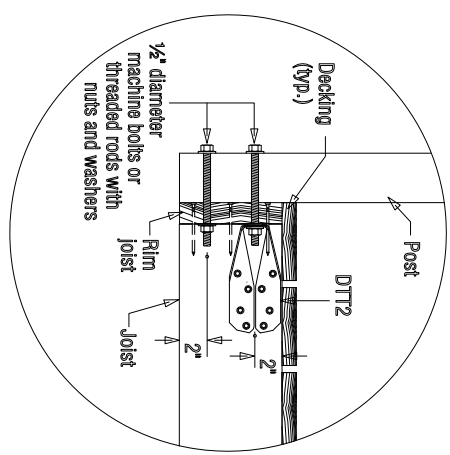
Size (in.)	Model No.	Thread Length (in.)
1/4" x 3 1/2"	SDS25312	2 1/4
1/4" x 5"	SDS25500	2 3/4

- 1.  $\square$  Indicates connector is available in stainless steel. Add SS to model number when ordering.
- 2. Refer to current T-SDSLDGR for spacing and additional information.
- 3. The screws shall be staggered from the top to the bottom along the horizontal run of the deck ledger per IRC 2009 Section R502.2.2.1.1.

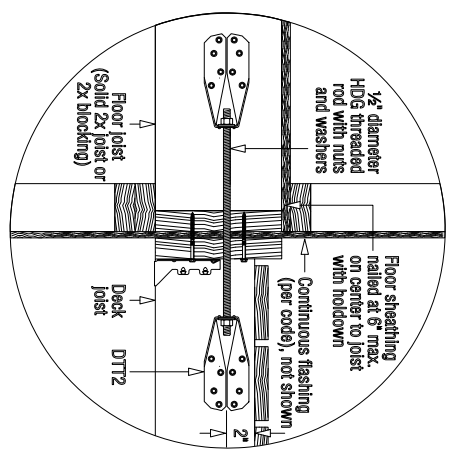
### D19 SDS Screws



- Installation:**
- Install Simpson Strong-Tie SDS wood screws with a 3/8" hex head driver.
  - SDS screws install best with a low speed 1/2" drill.



**DTT2Z Installed as a Lateral Connector for a Deck Guardrail Post.**  
For more information on guardrail post connections, and installation instructions, see technical bulletin T-GRDRLPST (available at [www.strongtie.com](http://www.strongtie.com)).



**DTT2Z Installed as a Lateral Connector for a Deck-to-House Lateral Load Connection.**  
For more information on this connection, and installation instructions, see technical bulletin T-DECKLALLOAD (available at [www.strongtie.com](http://www.strongtie.com)).