

**LTT/HTT** Tension Ties

The HTT22 is a single-piece formed tension tie—no rivets, and a 4-ply formed seat which won't unfold during loading. No washers required. The LTT19 Light Tension Tie is designed for 2x joists or purlins and the LTT20B is for nail- or bolt-on applications. The 3" nail spacing makes the LTT20B suitable for wood I-joists if 10dx1½" nails are substituted for the specified 16d's.

The LTTI31 is designed for wood chord open web truss attachments to concrete or masonry walls.

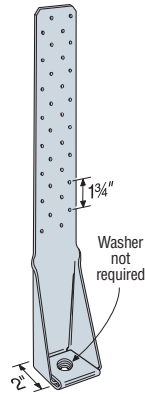
**MATERIAL:** See table

**FINISH:** Galvanized

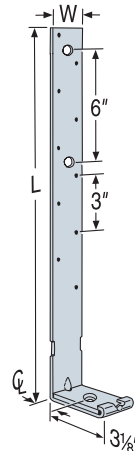
**INSTALLATION:** • Use all specified fasteners.

See General Notes.

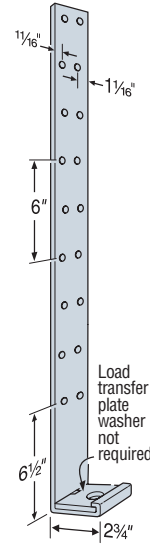
- Use the specified number and type of nails to attach the strap portion to the top or side of purlin or beam (minimum 4x width (2-2x4 or 4x4), except LTT19). Bolt the base to the wall or foundation with a suitable anchor; see table for the required bolt diameter.
- Do not install LTT tension ties raised off the mudsill.
- See Acrylic-Tie® Adhesive System, page 31.
- To tie multiple 2x members together, the designer must determine the fasteners required to join members to act as one unit without splitting the wood.



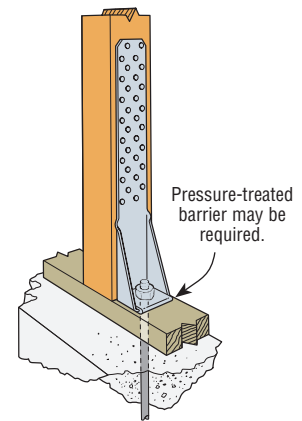
**HTT22**  
(HTT16 similar)  
U.S. Patent 5,467,570



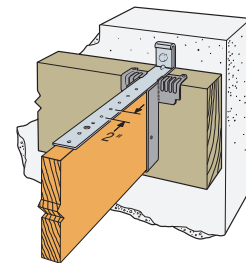
**LTT20B**  
(LTT19 similar)



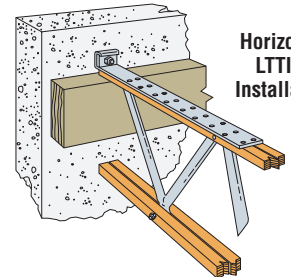
**LTTI31**



**Vertical HTT22 Installation**



**Horizontal LTT19 Installation**  
(LTT20B similar)



**Horizontal LTTI31 Installation**

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

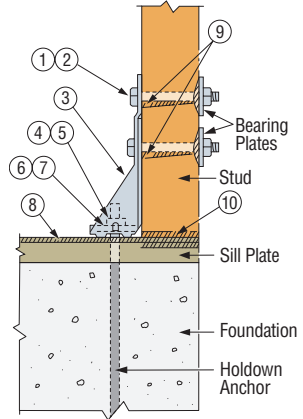
Model No.	Material (Ga)		Dimensions (in)			Seat Thickness (in)	Fasteners				Avg. Ult.	Factored Tensile Resistance (K <sub>0</sub> =1.15)				
	Strap	Plate	W	L	ϕ		Anchor Bolts	Nails	Bolts	D.Fir-L		S-P-F				
										Qty		Dia	Nails	Bolts	Nails	Bolts
													lbs	lbs	lbs	lbs
kN	kN	kN	kN													
LTT19	16	3	1 3/4	19 1/8	1 1/8	5/16	3/4	8-10d	—	—	4250	1550	—	1335	—	
LTT20B	12	3	2	19 3/4	1 1/8	5/16	1/2, 5/8 or 3/4	10-16d	2	1/2	8733	2180	2140	1535	1535	
LTTI31	18	3	3 3/4	31	1 1/8	1/4	5/8	18-10dx1 1/2	—	—	7807	3355	—	2400	—	
HTT16	11	—	2 1/2	16	1 3/8	7/16	5/8	18-16d	—	—	13150	5800	—	4080	—	
HTT22	11	—	2 1/2	22	1 3/8	7/16	5/8	32-10d	—	—	13150	6490	—	4650	—	
											58.57	25.83	—	18.17	—	
											58.57	28.91	—	20.71	—	

1. Factored tensile resistances for HTT are based on the lower of the factored lateral value of the fasteners or the ultimate load tested on wood posts.
2. The designer must specify the anchor bolt type, length and embedment.
3. Factored tensile resistances have been increased 15% for earthquake or wind loading with no further increase allowed.
4. Bolt values are based on a minimum lumber thickness of 1 1/2".
5. If a 1/2" or 5/8" diameter anchor bolt is used for the LTT19 or LTT20B, add a standard cut washer to the seat. No additional washer is required for a 3/4" diameter anchor bolt. See table for appropriate anchor bolt sizes.
6. 10d commons may be substituted for the specified 16d commons at 0.82 of the table value.
7. Post design shall be by Designer.
8. **NAILS:** 16d = 0.162" dia. x 3 1/2" long, 10dx1 1/2 = 0.148" dia. x 1 1/2" long, 10d = 0.148" dia. x 3" long. See page 16-17 for other nail sizes and information.

For tension ties, per ASTM test standards, anchor bolt nut should be finger-tight plus 1/3 to 1/2 turn with a hand wrench, with consideration given to possible future wood shrinkage. Care should be taken to not over-torque the nut. Impact wrenches should not be used.

**SOURCES OF DEFLECTION AT SHEARWALL HOLDOWN CONNECTIONS**

- A. Bolt slip can occur at holdown stud bolts.
- B. Increased bolt slip can occur if oversized holes are drilled through the stud for holdown stud bolts (oversized holes are when the hole diameter is greater than the bolt diameter plus 2mm per 10.4.1.2 CSA 086-01).
- C. When a holdown is installed on only one side of the stud, an eccentricity exists during loading which can cause more movement in the shearwall system.
- D. Unrestrained anchor bolt nuts can spin loose during cyclic loading; using steel nylon locking nuts or thread adhesive may prevent nut spin.
- E. Movement can occur when nuts are not tightened enough. Retightening bolts before covering wall may prevent this.
- F. Deflection can occur in the holdown under load caused by stresses due to earthquake or high wind.
- G. Lateral displacement at the top of the wall rotates the stud around its base causing the holdown base plate to displace vertically.
- H. Wood shrinkage can occur due to drying of the sill plate, rim joist, and/or top plate; nuts may require retightening.
- I. Uplift forces on the bolts can cause localized wood crushing at bolt bearing locations. Using larger bearing plates may prevent this.
- J. Wood at the end of the studs (sill plates, rim joists, etc.) may crush under normal dead and live loading; additional compressive forces due to overturning during earthquake and high wind loads add to the deflection.



① ② and ⑥ do not apply to the PHD, HDU and HDQ.