Holdowns & Tension Ties

HDU/DTT2Z Holdowns

HDU holdowns are pre-deflected during the manufacturing process, virtually eliminating deflection under load due to material stretch. They use Simpson Strong-Tie® Strong-Drive® SDS screws which install easily, reduce fastener slip and provide a greater net section when compared to bolts.

The HDU series of holdowns is designed to replace previous versions of the product such as PHD’s as well as bolted holdowns. The HDU2, 4 and 5 are direct replacements for the PHD2, 5 and 6, respectively.

The DTT2Z tension tie is suitable for lighter-duty holdown applications on single or double 2x posts, and installs easily with Strong-Drive SDS screws (included). The DTT2Z has been tested in accordance with the ICC-ES acceptance criteria for Holdowns Attached to Wood Members (AC155) and meets the minimum requirements for many alternate braced wall panels per section R602.10.3.2 of the 2009 IFC (see table R802.10.6, item 1).

For more information on holdown options, contact Simpson Strong-Tie.

**HDU SPECIAL FEATURES:**
- Pre-deflected body virtually eliminates deflection due to material stretch.
- Uses SDS screws which install easily, reduce fastener slip, and provide a greater net section area of the post compared to bolts.
- SDS screws are supplied with the holdowns to ensure proper fasteners are used.
- No stud bolts to countersink at openings.

**MATERIAL:** See table

**FINISH:** HDU – Galvanized; DTT2Z – ZMAX® coating; DTT2SS – stainless steel

**INSTALLATION:** Use all specified fasteners. See General Notes.
- For use in vertical and horizontal applications.
- The HDU requires no additional washer, the DTT requires a standard cut washer (included) be installed between the nut and the seat.
- To tie multiple 2x members together, the Designer must determine the fasteners required to join the members without splitting the wood. See page 26 for SDS values.
- See SB and SSTB Anchor Bolts on pages 33-37 for anchorage options.
- SDS screws install best with a low speed high torque drill with a 9/16" hex head driver.

**CODES:** See page 13 for Code Reference Key Chart.

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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.

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**Holdown Raised Off Sill Plate**

For holdowns, per ASTM test standards, anchor bolt nut should be finger-tight plus ⅛ to ½ 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.

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**Holdover Tension Ties**

HDU holds are pre-deflected during the manufacturing process, virtually eliminating deflection under load due to material stretch. They use Simpson Strong-Tie® Strong-Drive® SDS screws which install easily, reduce fastener slip and provide a greater net section when compared to bolts.

The HDU series of holdowns is designed to replace previous versions of the product such as PHD’s as well as bolted holdowns. The HDU2, 4 and 5 are direct replacements for the PHD2, 5 and 6, respectively.

The DTT2Z tension tie is suitable for lighter-duty holdown applications on single or double 2x posts, and installs easily with Strong-Drive SDS screws (included). The DTT2Z has been tested in accordance with the ICC-ES acceptance criteria for Holdowns Attached to Wood Members (AC155) and meets the minimum requirements for many alternate braced wall panels per section R602.10.3.2 of the 2009 IFC (see table R802.10.6, item 1).

For more information on holdown options, contact Simpson Strong-Tie.

**HDU SPECIAL FEATURES:**
- Pre-deflected body virtually eliminates deflection due to material stretch.
- Uses SDS screws which install easily, reduce fastener slip, and provide a greater net section area of the post compared to bolts.
- SDS screws are supplied with the holdowns to ensure proper fasteners are used.
- No stud bolts to countersink at openings.

**MATERIAL:** See table

**FINISH:** HDU – Galvanized; DTT2Z – ZMAX® coating; DTT2SS – stainless steel

**INSTALLATION:** Use all specified fasteners. See General Notes.
- For use in vertical and horizontal applications.
- The HDU requires no additional washer, the DTT requires a standard cut washer (included) be installed between the nut and the seat.
- To tie multiple 2x members together, the Designer must determine the fasteners required to join the members without splitting the wood. See page 26 for SDS values.
- See SB and SSTB Anchor Bolts on pages 33-37 for anchorage options.
- SDS screws install best with a low speed high torque drill with a 9/16" hex head driver.

**CODES:** See page 13 for Code Reference Key Chart.

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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.
The HDQ8 series of holdowns combines low deflection and high loads with ease of installation. The unique seat design of the HDQ8 greatly minimizes deflection under load. Both styles of holdown employ the Simpson Strong-Tie® Strong-Drive® SDS screws which install easily, reduce fastener slip and provide a greater net section when compared to bolts. They may be installed either flush or raised off the mudsill without a reduction in load value.

**SPECIAL FEATURES:**
- Uses SDS screws which install easily, reduce fastener slip, and provide a greater net section area of the post compared to bolts.
- SDS screws are used with the holdowns to ensure proper fasteners are used.
- No stud bolts to countersink at openings.

**MATERIAL:** HDQ8—7 gauge; HDQ—Body: 7 gauge, washer: ½” plate

**FINISH:** HDQ8—Galvanized; HDQ—Simpson Strong-Tie® gray paint

**INSTALLATION:** Use all specified fasteners. See General Notes.
- For use in vertical and horizontal applications.
- No additional washer is required.
- To tie multiple 2x members together, the Designer must determine the fasteners required to join members without splitting the wood.
- See SB and SSTB Anchor Bolts on pages 33-37 for anchorage options.
- SDS screws install best with a low speed high torque drill with a ¾” hex head driver.

**HDQ8:**
- ¼” of adjustability perpendicular to the wall.

**HHDQ11/14:**
- No additional washer is required.
- HHDQ14 requires a heavy hex anchor nut (supplied with holdown)

**CODES:** See page 13 for Code Reference Key Chart.

### HDQ8/HHDQ Holdowns

For holdowns, per ASTM test standards, anchor bolt nut should be finger-tight plus ½ to ¾ 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.

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>W</td>
<td>H</td>
<td>B</td>
<td>Q</td>
<td>SO</td>
</tr>
<tr>
<td>HDQ8-SDS3</td>
<td>7</td>
<td>2 1⁄4</td>
<td>14</td>
<td>2 1⁄2</td>
<td>1 1⁄8</td>
<td>2 1⁄2</td>
</tr>
<tr>
<td>HHDQ11-SDS2.5</td>
<td>7</td>
<td>3 1 1⁄2</td>
<td>15</td>
<td>3 1⁄4</td>
<td>1 1⁄4</td>
<td>1 1⁄2</td>
</tr>
<tr>
<td>HHDQ14-SDS2.5</td>
<td>7</td>
<td>3 1 1⁄2</td>
<td>18</td>
<td>3 1⁄2</td>
<td>1 1⁄2</td>
<td>1 1⁄2</td>
</tr>
</tbody>
</table>

1. Allowable loads have been increased for earthquake or wind load durations with no further increase allowed; reduce where other load durations govern.
2. The Designer must specify anchor bolt type, length and embedment. See SB and SSTB Anchor Bolts (pages 33-37).
3. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers. Values in the tables reflect installation into the wide face. See technical bulletin T-SLCLLSUH2 for values on the narrow face (edge) (see page 232 for details).
4. Post design by Specifier. Tabulated loads are based on a minimum 3⁄8” wide post (in a 3 3⁄8” wall). Post may consist of multiple members provided they are connected independently of the holdown fasteners. See pages 226-227 for common post allowable loads.
5. Tension values are valid for holdowns flush or raised off of sill plate.
6. Deflection at Allowable Tension Load includes fastener slip, holdown deformation and anchor rod elongation for holdowns installed up to 6” above top of concrete. Holdowns may be installed raised up to 18” above top of concrete with no load reduction provided that additional elongation of the anchor rod is accounted for.
7. Tabulated loads may be doubled when holdowns are installed on opposite sides of the wood member provided either the post is large enough to prevent opposing holdown screw interference or the holdowns are offset to eliminate screw interferences.
8. Noted HHDQ14 allowable loads are based on a 5 3⁄8” wide post (6x6 min.). All other loads are based on 3 3⁄8” wide post minimum.
9. Requires heavy hex anchor nut to achieve tabulated loads (supplied with holdown).
10. HDQ and HHDQ installed horizontally achieve compression loads with the addition of a standard nut on the underside of the load transfer plate. Refer to ICC-ES ESR-2330 for design values. HDQ8 requires a standard nut and B P-1/2 (sold separately) load washer on the underside of the holdown for compression load. Design of anchorage rods for compression force shall be per the Designer.

**Not sure you have the right holdown?**

The new Holdown Selector software is a great tool to help you select the best product for the job. Visit www.strongtie.com/software.
**Holdowns & Tension Ties**

**HDC**

**Concentric Holdown**

The unique design of the HDC holdowns eliminate eccentricity. They install with Simpson Strong-Tie® Strong-Drive® SDS screws (included) to reduce slip and provide a greater net section area of the post compared to bolts.

**MATERIAL:** 10 gauge strap **FINISH:** Galvanized strap, aluminum base

**INSTALLATION:** • Use all specified fasteners. See General Notes.
  - Install on concrete.
  - For use in vertical and horizontal applications.
  - Sized for 2x, and 4x. Center 2x posts on holdown.
  - Uses SDS screws supplied with the holdowns to ensure proper fasteners are used.
  - Slot in the seat allows for ¼” of adjustment perpendicular to plate.
  - Cut washer required between base and anchor nut. HDC10 models use narrow cut washer with outside diameter of 1⅛”.
  - Witness slot in the base to inspect the nut.
  - Maximum anchor bolt height above concrete is 2⅛”.
  - To tie multiple 2x members together, the Designer must determine the fasteners required to join members without splitting the wood.
  - Aluminum standoff cannot be in contact with preservative-treated wood.
  - SDS screws install best with a low speed high torque drill with a ¾” hex head driver.

**CODES:** See page 13 for Code Reference Key Chart.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Post Size</th>
<th>W</th>
<th>H</th>
<th>B</th>
<th>C</th>
<th>Anchor Bolt</th>
<th>Number of SDS</th>
<th>Allowable Tension Loads</th>
<th>Allowable Tension Loads</th>
<th>Allowable Download</th>
<th>Allowable Download</th>
<th>Deflection at</th>
<th>Code Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDC10/22-SDS2.5</td>
<td>2x4x4</td>
<td>3⅛</td>
<td>14⅛</td>
<td>3</td>
<td>1⅛</td>
<td>⅛</td>
<td>24</td>
<td>9135</td>
<td>6575</td>
<td>7070</td>
<td>9255</td>
<td>0.054</td>
<td></td>
</tr>
<tr>
<td>HDC10/4-SDS2.5</td>
<td>2x4x4</td>
<td>3⅛</td>
<td>14⅛</td>
<td>3</td>
<td>1⅛</td>
<td>⅛</td>
<td>24</td>
<td>9135</td>
<td>6575</td>
<td>9600</td>
<td>10550</td>
<td>0.054</td>
<td></td>
</tr>
</tbody>
</table>

1. The Designer must specify anchor bolt type, length and embedment. See SB and SSTB Anchor Bolts (pages 33-37).
2. Loads are based on static tests on wood studs, limited by the lowest of 0.125" deflection, tested lowest ultimate divided by 3, or the wood screw value.
3. Deflection at Highest Allowable Tension Load includes fastener slip, holdown elongation, and anchor bolt elongation.
4. The HDCs will be limited by wood compression capacity if installed on a sill plate. HDC10/22 will achieve an allowable load of 4005 lbs.

**MSTSD**

**Marriage Strap**

The MSTSD marriage strap provides an overlapping, in-line splice between an HTT tension tie and a CMSTC16 coiled strap for panelized-roof applications where the roof member adjacent to the wall is too short to develop the required load into the roof diaphragm. The MSTSD provides continuity of load without the need to splice the CMSTC16 alongside the HTT which requires additional blocking. Use MSTSD4 with HTT4 and MSTSD5 with HTT5.

**MATERIAL:** 16 gauge **FINISH:** Galvanized (G90)

**INSTALLATION:** • Use all specified fasteners. See General Notes.
  - The CMSTC and HTT must be spliced end-to-end without any gap.
  - Suitable for use with both 10d and 16d sinker nailing options for the HTT and CMSTC as specified per the Designer.
  - To install:
    - Position HTT over the framing (do not install fasteners yet).
    - Align CMSTC16 with the end of the HTT.
    - Position MSTSD over the two connectors so that nail holes align correctly.
    - Install specified fasteners, filling all nail holes.

**CODES:** See page 13 for Code Reference Key Chart.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Total</th>
<th>Tension</th>
<th>Fasteners</th>
<th>Allowable Tension Loads</th>
<th>Code Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSTSD4</td>
<td>18</td>
<td>HTT4</td>
<td>CMSTC16</td>
<td>16 - 16d Sinker</td>
<td>3100</td>
</tr>
<tr>
<td>MSTSD5</td>
<td>27</td>
<td>HTT5</td>
<td>CMSTC16</td>
<td>24 - 16d Sinker</td>
<td>4545</td>
</tr>
</tbody>
</table>

1. Install on minimum 4x4 blocking.
2. 10d common nails may be substituted at 100% of table load.
3. Allowable tension loads include a load duration increase on the fasteners for wind or earthquake with no further increase allowed.
4. NAILS: 10d common = 0.143” dia. x 3” long, 16d sinker = 0.148” dia. x 3½” long. See page 22-23 for other nail sizes and information.
Holdowns & Tension Ties

**LTT/HTT Tension Ties**

Tension ties offer a solution for resisting tension loads that is fastened with nails. The entire line of tension ties has been tested and evaluated to the requirements of ACI-318.

The HTT4 and HTT5 are the latest generation of tension ties. They feature an optimized nailing pattern which results in better performance with less deflection. Designed to meet new code standards, the HTT4 and HTT5 offer higher loads than their predecessors.

The LTT19 Light Tension Tie is designed for 2x joists or purlins and the LTT20B is for nail- or bolt-on applications. The 3” nailing spacing makes the LTT20B suitable for wood chord open web truss attachments to concrete or masonry walls and may also be installed vertically on a minimum 2x6 stud.

**MATERIAL:** See table

**FINISH:** Galvanized. May be ordered HDG; contact Simpson Strong-Tie.

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

- For use in vertical and horizontal applications.
- To tie multiple 2x members together, the Designer must determine the fasteners required to join members without splitting the wood.
- The Designer shall specify anchor bolt type, length and embedment. See SB and SSTB anchor bolts on pages 33-37.

**CODES:** See page 13 for Code Reference Key Chart.

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</tr>
</thead>
<tbody>
<tr>
<td>LTT19</td>
<td>16</td>
<td>3</td>
<td>1½</td>
<td>¾</td>
<td>8-10d 1½</td>
<td>1310 1125 0.180</td>
<td>L19, IP2, F4</td>
</tr>
<tr>
<td>LTT20B</td>
<td>12</td>
<td>3</td>
<td>2</td>
<td>¾</td>
<td>10-10d 1½</td>
<td>1550 1290 0.185</td>
<td>L19, IP2, F4</td>
</tr>
<tr>
<td>LTT31</td>
<td>18</td>
<td>3</td>
<td>3½</td>
<td>¾</td>
<td>18-10d 1½</td>
<td>1550 1290 0.185</td>
<td>L19, IP2, F4</td>
</tr>
<tr>
<td>HTT4</td>
<td>11</td>
<td>—</td>
<td>2½</td>
<td>¾</td>
<td>18-10d 1½</td>
<td>3610 3105 0.086</td>
<td>L19, IP2, F4</td>
</tr>
<tr>
<td>HTT5</td>
<td>11</td>
<td>—</td>
<td>2½</td>
<td>¾</td>
<td>26-10d</td>
<td>4670 4015 0.116</td>
<td>L19, IP2, F4</td>
</tr>
<tr>
<td>HTT5KT</td>
<td>11</td>
<td>—</td>
<td>2½</td>
<td>¾</td>
<td>26-10d 1½</td>
<td>5445 5360 0.103</td>
<td>L19, IP2, F4</td>
</tr>
</tbody>
</table>

1. Allowable loads have been increased for wind or earthquake with no further increase allowed. Reduce where other loads govern.
2. Post design by Specifier. Tabulated loads are based on minimum 3”x3½” (2x2½) post (in 3½” wall). Post may consist of multiple members provided they are connected independently of the holdown fasteners. See pages 226-227 for common post allowable loads.
3. A standard cut washer is required under anchor nut for LTT19 and LTT20B when using 1½” or 1¾” anchor bolts. No additional washer is required when using a ¾” anchor bolt.
4. Deflection at Highest Allowable Tension Load includes fastener slip holdown deformation, and anchor bolt elongation for holdowns installed up to 4½” above top of concrete. HTT4 and HTT5 may be installed raised up to 18” above top of concrete with no load reduction provided that additional elongation of the anchor rod is accounted for.
5. If the base of the LTT31 is installed flush with a concrete or masonry wall, the allowable load is 2250 lbs.
6. Allowable tension load for HTT5 with a bearing plate washer BPS/8-2 (sold separately) installed in the seat of the holdown is 5200 for DF/SP and 4555 for SPF/HF.
7. HTT5KT is sold as a kit with the holdown, BP¼-2 bearing plate washer and 28-SD #10x2½ screws.
8. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers. Values in the tables reflect installation into the wide face. See technical bulletin T-SCOLUMN for values on the narrow face (edge) (see page 223 for details).
9. HTT4 with SD #10x1½ screws achieves full load on a single 2x6 stud or joist.
10. FASTENERS: 10dx1½ = 0.148 dia. x 1½ long, 10dx1 = 0.148 dia. x 1 long, 16dx2½ = 0.162 dia. x 2½ long, SD #10x2½ = 0.161 dia. x 2½, SD #10x1½ = 0.161 dia. x 1½.

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These products are approved for installation with the Strong-Drive SD Structural-Connector screw. See page 27 for more information.
**Holdowns & Tension Ties**

**HDB/HD Holdowns**

Simpson Strong-Tie offers a wide variety of bolted holdowns offering low-deflection performance for a range of load requirements. All of these holdowns have been tested in accordance with ICC-ES’s AG 155 acceptance criteria and are approved for use in vertical and horizontal applications.

The HDB is a light-duty holdown designed for use in shearwalls and braced-wall panels, as well as other lateral applications.

The HD5B, HD7B and HD9B bolted holdowns incorporate the proven design of our HD6 SDS-style holdown and feature a unique seat design which greatly minimizes deflection under load. HDB holdowns are self-jigging, ensuring that the code-required minimum of seven bolt diameters from the end of the post is met. They can be installed directly on the sill plate or raised above it and are suitable for back-to-back applications where eccentricity is a concern. HDBs are designed to provide loads for intermediate-load-range shearwalls, braced-wall panels and lateral applications.

HD holdowns offer the highest allowable loads, providing high capacity for both vertical and horizontal applications. The HD12 and HD19 are self-jigging, ensuring that the code-required minimum of seven bolt diameters from the end of the post is met. They can be installed back-to-back when eccentricity is an issue.

**Material:** See Table

**Finish:** HDB/HD5B/HD7B/HD9B — Galvanized; HD — Simpson Strong-Tie® gray paint

**Installation:** Use all specified fasteners. See General Notes.

- Bolt holes shall be a minimum of 3/8” to a maximum of 3/4” larger than the bolt diameter (per NDS, section 11.1.2).
- Stud bolts should be snugly tightened with standard cut washers between the wood and nut (BP’s are required in the City and County of Los Angeles).
- The Designer must specify anchor bolt type, length, and embedment. See SB and SSTB Anchor bolts (pages 33-37).
- To tie multiple 2x members together, the Designer must determine the fasteners required to join members without splitting the wood.

**Codes:** See page 13 for Code Reference Key Chart.

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

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**Model No.**

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</tr>
</thead>
<tbody>
<tr>
<td>HDB5</td>
<td>12</td>
<td>4% 2% 8% 20%</td>
<td>1% 2%</td>
<td>1895 1610 0.156</td>
<td></td>
<td></td>
<td>IP3</td>
</tr>
<tr>
<td>HD19</td>
<td>3</td>
<td>3% 4% 2% 2% 3%</td>
<td>1% 2%</td>
<td>1895 1610 0.156</td>
<td></td>
<td></td>
<td>F28</td>
</tr>
<tr>
<td>HD3B</td>
<td>12</td>
<td>4% 2% 8% 20%</td>
<td>1% 2%</td>
<td>1895 1610 0.156</td>
<td></td>
<td></td>
<td>L21</td>
</tr>
<tr>
<td>HD5B</td>
<td>10/3</td>
<td>3% 5% 9% 2% 1%</td>
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<td>2525 2145 0.169</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>HD7B</td>
<td>10/3</td>
<td>3% 5% 3% 5% 1%</td>
<td>2% 2%</td>
<td>2525 2145 0.169</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>HD9B</td>
<td>8</td>
<td>6% 8% 12% 1% 2%</td>
<td>2% 3%</td>
<td>7310 6215 0.154</td>
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<td>HD12</td>
<td>3</td>
<td>5% 7% 2% 3% 1%</td>
<td>2% 3%</td>
<td>9920 8435 0.178</td>
<td></td>
<td></td>
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</tbody>
</table>

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1. Allowable loads have been increased for wind or earthquake with no further increase allowed; reduce where other loads govern.
2. Post design by Specifier. Tabulated loads are based on 3/8” member minimum unless noted otherwise. Post may consist of multiple members provided they are connected independently of the holdown fasteners. See pages 226-227 for common post allowable loads.
3. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers. Values in the tables reflect installation into the wide face. See technical bulletin T-SCLCOLUMN for values on the narrow face (edge) (see page 228 for details).
4. HD and HDB holdowns are self-jigging and will ensure minimum bolt end distance, HB, when installed flush with the sill plate.
5. Deflection at Highest Allowable Tension Load includes fastener slip drop deformation, and anchor bolt elongation for holdowns installed up to 6” above top of concrete. Holdowns may be installed raised up to 18” above top of concrete with no load reduction provided that additional elongation of the anchor rod is accounted for.
6. To achieve published loads, machine bolts shall be installed with the nut on the opposite side of the holdown. If reversed, the Designer shall reduce the allowable loads shown per NDS requirements when bolt threads are in the shear plane.
7. Lag bolts will not develop the listed loads.
8. Tabulated values may be doubled when the HD holdown is installed on opposite sides of the wood member. The Designer must evaluate the capacity of the wood member and the anchorage.
9. Standard cut washer is required under anchor nut for HD12 with 1” anchor and HD19 with 1½” anchors.

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**Notes:**

- For holdowns, per ASTM test standards, anchor bolt nut should be finger-tight plus 1/4 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.

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**HD19 Installation (Plan View)**

- Stand-off provided minimum end distance to end of post bolt

**HD3B Installation**

- Hanger not shown

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**HD12 Vertical Installation**

- Minimum wood member thickness

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**HD3B Vertical Installation**

- Minimum wood member thickness

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**Footnote:**

- See Technical Bulletin T-SCLCOLUMN for values on the narrow face (edge) (see page 228 for details).
The STHD is an embedded strap-tie holdown offering high load capacity and a staggered nail pattern to help minimize splitting. The STHD incorporates many features that aid correct installation and improve performance. When installed on the forms with the StrapMate and a staggered nail pattern to help minimize splitting. The STHD incorporates many perpendicular movement enhanced stability before and during the pour to help prevent both parallel and perpendicular movement (relative to the form). This results in accurate positioning of the strap and reduced possibility of splitting.

FEATURES:
- The nailing pattern allows for nailing to the edges of double 2x’s
- Strap nail slots are countersunk to provide a lower nail head profile
- The slots below the embedment line enable increased front-to-back concrete bond and help to reduce spalling
- Rim joist models accommodate up to a 17” clear span without any loss of strap nailing

MATERIAL: LSTHD8, LSTHD8RU—14 gauge, all others—12 gauge

INSTALLATION:
- Use all specified fasteners. See General Notes.
- Use table below for both standard concrete and post-tension slab installations.
- Install before concrete pour with a StrapMate, or other holding device.
- Nail strap from the bottom up.
- Strap may be bent one full cycle (bent horizontal 90° then bent vertical) to aid wall placement, but may cause spalling behind the strap. If the spall is 1” or less, measured from the embedment line to the bottom of the spall, full loads apply. 1” to 4” spalls for LSTHD8 achieve 0.9 times table loads. STHD10 and STHD14 achieve full load for spalls less than 4". Any portion of the strap left exposed should be protected against corrosion.
- Other than where noted in the two-pour detail, do not install where:
  (a) A horizontal cold joint exists within the embedment depth between the slab and foundation wall or footing beneath, unless provisions are made to transfer the load, or the slab is designed to resist the load imposed by the anchor; or
  (b) Slabs are poured over concrete block foundation walls.
- Additional studs attached to the shearwall studs or post may be required by the Designer for wall sheathing nailing.
- Wood shrinkage after strap installation across horizontal members may cause strap to buckle outward.

Tension Loads for STHD Installations

**WIND AND SDC A & B – ALLOWABLE TENSION LOADS FOR DF/SP/SPF/HF (160)**

<table>
<thead>
<tr>
<th>Min. Stem Wall (in)</th>
<th>Model No.</th>
<th>Strap Length (L)</th>
<th>Req’d Nails</th>
<th>Non Cracked</th>
<th>Cracked</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rim Joist</td>
<td>Rim Joist</td>
<td>Rim Joist</td>
<td>Midwall</td>
<td>Corner</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Midwall</td>
<td>Corner</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Midwall</td>
<td>Corner</td>
</tr>
<tr>
<td>6</td>
<td>LSTHD8</td>
<td>18% 32”</td>
<td>8</td>
<td>20-16 Sinkers</td>
<td>3115</td>
</tr>
<tr>
<td></td>
<td>STHD10</td>
<td>24% 38”</td>
<td>10</td>
<td>24-16 Sinkers</td>
<td>3820</td>
</tr>
<tr>
<td></td>
<td>STHD14</td>
<td>26% 39”</td>
<td>14</td>
<td>30-16 Sinkers</td>
<td>5150</td>
</tr>
<tr>
<td>8</td>
<td>LSTHD8</td>
<td>18% 32”</td>
<td>8</td>
<td>20-16 Sinkers</td>
<td>3115</td>
</tr>
<tr>
<td></td>
<td>STHD10</td>
<td>24% 38”</td>
<td>10</td>
<td>24-16 Sinkers</td>
<td>3820</td>
</tr>
<tr>
<td></td>
<td>STHD14</td>
<td>26% 39”</td>
<td>14</td>
<td>30-16 Sinkers</td>
<td>5150</td>
</tr>
</tbody>
</table>

**SDC C - F – ALLOWABLE TENSION LOADS FOR DF/SP/SPF/HF (160)**

<table>
<thead>
<tr>
<th>Min. Stem Wall (in)</th>
<th>Model No.</th>
<th>Strap Length (L)</th>
<th>Req’d Nails</th>
<th>Non Cracked</th>
<th>Cracked</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rim Joist</td>
<td>Rim Joist</td>
<td>Rim Joist</td>
<td>Midwall</td>
<td>Corner</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Midwall</td>
<td>Corner</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Midwall</td>
<td>Corner</td>
</tr>
<tr>
<td>6</td>
<td>LSTHD8</td>
<td>18% 32”</td>
<td>8</td>
<td>16-16 Sinkers</td>
<td>2270</td>
</tr>
<tr>
<td></td>
<td>STHD10</td>
<td>24% 38”</td>
<td>10</td>
<td>18-16 Sinkers</td>
<td>2750</td>
</tr>
<tr>
<td></td>
<td>STHD14</td>
<td>26% 39”</td>
<td>14</td>
<td>22-16 Sinkers</td>
<td>3695</td>
</tr>
<tr>
<td>8</td>
<td>LSTHD8</td>
<td>18% 32”</td>
<td>8</td>
<td>16-16 Sinkers</td>
<td>2270</td>
</tr>
<tr>
<td></td>
<td>STHD10</td>
<td>24% 38”</td>
<td>10</td>
<td>18-16 Sinkers</td>
<td>2750</td>
</tr>
<tr>
<td></td>
<td>STHD14</td>
<td>26% 39”</td>
<td>14</td>
<td>22-16 Sinkers</td>
<td>3695</td>
</tr>
</tbody>
</table>

1. Allowable loads are for wind or seismic loading. Nail quantities reflect an increase for duration of load with no further increase allowed. Reduce where other loads govern.
2. Concrete shall have a minimum concrete strength, f’c, of 2500 psi.
3. 10d common (3’ long 0.148” diameter) nails may be used with no load reduction. 10d x 2½” (2 ½” long 0.148” diameter) nails may be used with no load reduction when installed directly over framing. For installation over structural sheathing, use 10d common or 16d sinkers.
4. Use the specified number of nails listed in table or as specified. In many cases, not all nail holes will be filled. Nail strap from the bottom up.
5. Deflection at highest allowable loads for install over wood double studs are as follows: Installed on framing: LSTHD8 = 0.089", STHD10 = 0.117" and STHD14 = 0.118”. Installed over structural sheathing: LSTHD8 = 0.114", STHD10 = 0.146” and STHD14 = 0.164”.
6. Multiply Seismic and Wind ASD load values by 1.4 or 1.6 respectively to obtain LRFD capacities.
8. Minimum center-to-center spacing is 3 times the required embedment (S_{min} = 3 \times \text{X}_{d}) for STHD’s acting in tension simultaneously. Midwall install is based on 1.5 \times \text{X}_{d} end distance.
9. See T-SCOLUMN for installation on structural composite lumber posts or columns (see page 232 for details).
10. For brick ledge applications, use full loads shown for STHD14 installed in 8” stemwall.
11. NAILS: 16d sinker = 0.148” dia. x 3¼” long. See page 22-23 for other nail sizes and information.
**Holdowns & Tension Ties**

**LSTHD/STHD** Strap-Tie Holdown

**FEATURES**
- Built-in tab.
- StrapMate® locator line.
- Additional diamond hole in RJ versions.

**BENEFITS**
**Built-in Tab:**
- Reduces spalling and costly retrofits.
- No additional labor to install.
- Holds STHD away from form board.

**StrapMate Locator Line:**
- Easy inspection to ensure proper location.
- Allows adjustment without removing STHD.

**Additional Diamond Hole:**
- One more fastener to help prevent the STHD RJ models from bowing out at the rim joist section.

**SPALL REDUCTION SYSTEM FOR STHD STRAP TIE HOLDOWN**

**FEATUDES**
- Strap may be bent one full cycle which includes bending the strap straight and aiding for wall placement. For brick ledge, bend straight to be vertical to inside face of wall.

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

**Two Pour Installation for Downturn Footings**

**Brick Ledge Installation with Step**

**Brick Ledge Installation without Step**

**Typical STHD14 Corner Installation**

**Typical STHD14 Mid Wall Installation**

**Typical STHD14 End Wall Installation**

**Concrete foundation by others**

**One #4 rebar. May be foundation rebar or post-tension tendon.**

**Min. rebar length is 2 x l_e**

**Min. rebar length is 2 x l_e 1/2 Min. end distance**

**2 x l_e min. or 24”**

**Min. rebar length**

**2 x l_e**

**1/2 Min. end distance**

**3” to 5”**

**Min. rebar length is 2 x l_e**

**8” Min.**

**8” Min.**

**SBP REDUCTION SYSTEM FOR STHD STRAP TIE HOLDOWN**

**FEATURES**
- Built-in tab.
- StrapMate® locator line.
- Additional diamond hole in RJ versions.

**BENEFITS**
**Built-in Tab:**
- Reduces spalling and costly retrofits.
- No additional labor to install.
- Holds STHD away from form board.

**StrapMate Locator Line:**
- Easy inspection to ensure proper location.
- Allows adjustment without removing STHD.

**Additional Diamond Hole:**
- One more fastener to help prevent the STHD RJ models from bowing out at the rim joist section.
Holdowns & Tension Ties

**PA Strap Tie Holdowns**

Wood-to-concrete connectors that satisfy engineering and code requirements. The PA is code listed in ICC-ES ESR-2920 under the 2009 and 2012 IBC and have been tested to meet the requirements of ICC-ES acceptance criteria AC-398 for cracked and un-cracked concrete.

**MATERIAL:** 12 gauge

**FINISH:** Galvanized or ZMAX® coating

**INSTALLATION:**
- Use all specified fasteners. See General Notes.
  - For additional length, an MST strap can be attached using 1/2" bolts through existing holes.
  - Refer to technical bulletin T-PAUPLIFT (see page 231 for details) for additional information.

**CODES:** See page 13 for Code Reference Key Chart.

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These products are available with additional corrosion protection.

These products are approved for installation with the Strong-Drive SD Structural-Connector screw. See page 27 for more information.

### Wind and SDC A & B – Allowable Tension Loads (lbs.)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Strap Length (L in.)</th>
<th>l₀ (in.)</th>
<th>Non Cracked Concrete</th>
<th>Cracked Concrete</th>
<th>Code Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required Nails</td>
<td>Tension</td>
<td>Required Nails</td>
<td>Tension</td>
<td></td>
</tr>
<tr>
<td>PA51</td>
<td>51</td>
<td>4</td>
<td>10 -10d Common</td>
<td>2025</td>
<td>125</td>
</tr>
<tr>
<td>PA68</td>
<td>70</td>
<td>4</td>
<td>10 -10d Common</td>
<td>2025</td>
<td>125</td>
</tr>
</tbody>
</table>

### SDC C-F – Allowable Tension Loads (lbs.)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Strap Length (L in.)</th>
<th>l₀ (in.)</th>
<th>Non Cracked Concrete</th>
<th>Cracked Concrete</th>
<th>Code Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required Nails</td>
<td>Tension</td>
<td>Required Nails</td>
<td>Tension</td>
<td></td>
</tr>
<tr>
<td>PA51</td>
<td>51</td>
<td>4</td>
<td>10 -10d Common</td>
<td>2025</td>
<td>1980</td>
</tr>
<tr>
<td>PA68</td>
<td>70</td>
<td>4</td>
<td>10 -10d Common</td>
<td>2025</td>
<td>1980</td>
</tr>
</tbody>
</table>

1. Allowable loads have been increased for earthquake or wind load durations with no further increases allowed.
2. Concrete shall have a minimum concrete strength, f’c of 2500 psi.
3. Strong-Drive® SD9x1½ (0.131”x1½”) screws may be substituted for nails with no reduction.
4. NAILS: 10d = 0.148” dia. x 3” long. See page 22-23 for other nail sizes and information.

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**NEED A HIGHER CAPACITY HOLDOWN?**

When one of our conventional holdowns doesn’t offer enough overturning capacity for a multi-story project, consider specifying the Simpson Strong-Tie® Anchor Tiedown System (ATS). ATS is a high-capacity, overturning-restraint system commonly used in 3-6 story wood structures to anchor stacked shearwalls. This continuous rod system features our patented shrinkage take-up devices and extends from the foundation to the top of the structure and is restrained (tied off) at each level. Designed properly, it can provide more than 50,000 lbs. of overturning restraint; important when designing for the cumulative overturning forces in multi-story buildings.

For more information, see page 68 of this catalog; and for specification options, see our Anchor Tiedown Systems Options for Specification brochure (F-ATSD10) or visit [www.strongtie.com/ats](http://www.strongtie.com/ats).
PA/HPA purlin anchors offer solutions for wood to concrete and concrete block connections which satisfy code requirements. The PAs dual embedment line allows installation in concrete or concrete block. The PA and HPA are code listed in ICC-ES ESR-2920 under the 2009 and 2012 IBC and IRC and have been tested to meet the requirements of ICC-ES acceptance criteria AC-398 for cracked and un-cracked concrete.

**MATERIAL:** PA—12 gauge; HPA—10 gauge

**FINISH:** Galvanized. PAs available HDG or ZMAX® coating

**INSTALLATION:** Use all specified fasteners; some models have extra fastener holes.

See General Notes.

- Purlin Anchor must hook around rebar.
- Allowable loads are for a horizontal installation into the side of a concrete or masonry wall.
- Strap may be bent one full cycle. (Bent vertical 90° then bent horizontal.)

**EDGE DISTANCE**—Minimum concrete edge distance is 5”.

Minimum concrete block left-to-right edge distance is 20”.

**CONCRETE BLOCK WALL**—The minimum wall specifications are:

- A One #4 vertical rebar, 32” long, 16” each side of anchor;
- B Two courses of grout filled block above and below the anchor (no cold joints allowed);
- C A horizontal bond beam with two #4 rebars, 40” long, a maximum of two courses above or below the anchor.
- D Minimum masonry compressive strength, f’c of 3000 psi.

**OPTIONS:** See LTT and HTT Tension Ties for alternate retrofit solutions.

**CODES:** See page 13 for Code Reference Key Chart.

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

### Wind and SDC A & B - Allowable Tension Loads (lbs.)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>L (in.)</th>
<th>Non Cracked Concrete</th>
<th>Cracked Concrete</th>
<th>Max. Allowable Strap Tensile Capacity</th>
<th>Masonry Installation</th>
<th>Code Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA18</td>
<td>18½” 4</td>
<td>12 -10d Common</td>
<td>2430</td>
<td>12 -10d Common</td>
<td>2360</td>
<td>NA</td>
</tr>
<tr>
<td>PA23</td>
<td>23½” 4</td>
<td>16 -10d Common</td>
<td>3220</td>
<td>12 -10d Common</td>
<td>2360</td>
<td>NA</td>
</tr>
<tr>
<td>PA28</td>
<td>28½” 4</td>
<td>22 -10d Common</td>
<td>5145</td>
<td>20 -10d Common</td>
<td>4675</td>
<td>NA</td>
</tr>
<tr>
<td>PA35</td>
<td>35½” 6</td>
<td>22 -10d Common</td>
<td>5145</td>
<td>22 -10d Common</td>
<td>5145</td>
<td>NA</td>
</tr>
<tr>
<td>HPA28</td>
<td>32½” 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPA35</td>
<td>38½” 8½</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SDC C-F - Allowable Tension Loads (lbs.)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>L (in.)</th>
<th>Non Cracked Concrete</th>
<th>Cracked Concrete</th>
<th>Max. Allowable Strap Tensile Capacity</th>
<th>Masonry Installation</th>
<th>Code Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA18</td>
<td>18½” 4</td>
<td>12 -10d Common</td>
<td>2430</td>
<td>10 -10d Common</td>
<td>1980</td>
<td>3220</td>
</tr>
<tr>
<td>PA23</td>
<td>23½” 4</td>
<td>14 -10d Common</td>
<td>3230</td>
<td>10 -10d Common</td>
<td>3230</td>
<td>2815</td>
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<tr>
<td>PA28</td>
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<td>18 -10d Common</td>
<td>5145</td>
<td>18 -10d Common</td>
<td>5145</td>
<td>5145</td>
</tr>
</tbody>
</table>

For use on Spruce Pine-Fir (SPF) or Hem Fir (HF) nail quantities must be increased by 1.4 or 1.6 respectively to obtain LRFD capacities.

Minimum center-to-center spacing is 3 times the required embedment. For installation over sheathing use 10dx1 ½” nails with no load reduction allowed. The maximum allowable strap tensile capacity shall not be less than 0.9 times the ASD anchor design load per ASCE7-10 12.11.2.2.2.

1. Allowable loads have been increased for earthquake or wind load durations with no further increases allowed.
2. Deflection at highest allowable loads are as follows: PA18 = 0.087”, PA23 = 0.118”, PA28 = 0.085”, PA35 = 0.085”, PAl & 68 = 0.010”, HPA28 = 0.133” and HPA35 = 0.132”.
3. Multiply Seismic and Wind ASD load values by 1.4 or 1.6 respectively to obtain LRFD capacities.
4. Minimum center-to-center spacing is 3 times the required embedment. Standard installation is based on minimum 5” end distance.
5. For wall anchorage systems in SDC C-F, the maximum allowable strap tensile capacity shall not be less than 1.4 times the ASD anchor design load per ASCE7-10 12.11.2.2.2.
6. Nail quantities are based on Douglas Fir (DF) and Southern Pine (SP).
7. Concrete shall have a minimum f’c of 3000 psi.
8. For Masonry Installation Loads, see ‘Non-Cracked Concrete’ for Required Nails.
9. 10dx1 ½” nails may be substituted for 10d commons with no load reduction and with a 15% increase in deflection. For installation over sheathing use 3” minimum nail lengths.
10. Minimum f’m = 1500 psi for masonry.
11. NAILS: 10d = 0.148” dia. x 3” long. See page 22-23 for other nail sizes and information.