EVALUATION SUBJECT:
SIMPSON STRONG-TIE BOLT HOLD-DOWNS

REPORT HOLDER:
Simpson Strong-Tie Company, Inc.
5956 West Las Positas Boulevard
Pleasanton, California 94588
(800) 925-5099
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CSI Division: 06-WOOD, PLASTICS AND COMPOSITES
CSI Section: 06 05 23-Wood, Plastic, and Composite Fastenings

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:
- 2017 City of Los Angeles Building Code – attached Supplement
- 2017 City of Los Angeles Residential Code – attached Supplement

1.2 Evaluated in accordance with:
- ICC-ES AC155, Acceptance Criteria for Hold-Downs (Tie-Downs) Attached to Wood Members

1.3 Properties assessed:
- Structural

2.0 PRODUCT USE

Simpson Strong-Tie bolt hold-down connectors are used as wood framing anchorage, such as to connect wood posts to concrete foundations or to connect an upper–story wood post to a lower-story supporting wood post, pursuant to 2018 and 2015 IBC Sections 2304.10.3 and 2305.1, 2012 and 2009 IBC Sections 2304.9.3, 2305.1, 2308.9.3.1, 2308.9.3.2, or 2006 IBC Sections 2304.9.3, 2305.1, 2305.3.2, 2305.3.7, 2305.3.8.2.4 and 2308.9.3.1, ANSI/AWC SDPWS-2015 Special Design Provisions for Wind and Seismic Sections 4.3.6.4.2 and 4.3.6.1.3 and AFWA SDPWS-2008 (2005) Special Design Provisions for Wind and Seismic Sections 4.3.6.4.2 and 4.3.6.1.2. As required by IBC Section 1604.8, the hold-down connectors are used as anchorage of concrete and masonry walls to structural wood elements to provide lateral support for the walls.

When regulated under the IRC, the hold-down connectors may also be used when the tabulated loads equal or exceed the load requirements in the IRC, when an engineered design is submitted in accordance with IRC Section R301.1.3, or in alternate braced wall panels complying with 2018, 2015, or 2012 IRC Sections R602.10.2.2.1, R602.10.6.1, R602.10.6.2 and R602.10.7, 2009 IRC Sections R502.2.2.3, R602.10.1.4.1(2), R602.10.3.2, R602.10.3.3, R602.10.4.4, and R602.10.5.3, or 2006 IRC Sections R602.10.6.1 and R602.10.6.2. In addition, the hold-down connectors may be used as anchorage of concrete and masonry walls to structural wood elements to provide lateral support for the walls in accordance with 2018 IRC Sections R606.12.2.3, 2015 IRC Sections R606.12.2.3, R608.9.1, 2012 or 2009 IRC Sections R606.12.2.3 and R611.9.1, or 2006 IRC Sections R606.12.2.2 and R611.8.2.1.

3.0 PRODUCT DESCRIPTION

3.1 Product information

3.1.1 HD Bolt Hold-downs: The HD bolt hold-downs consist of a main structural steel component with pre-punched holes along their side for installation of bolts used to connect the hold-down to the wood member. The hold-downs have a factory welded load transfer plate at the base with a pre-punched hole for an anchor rod or bolt. HD12 and HD19 hold-downs have a tapered leg that extends below the base, which positions the first bolt in the wood member seven bolt diameters from the end of the wood member. HD12 and HD19 bodies are formed from No. 3 gage steel. The base plate component is manufactured from 3/16-inch-thick (9.5 mm) steel for the HD12 and HD19. Figure 1, Table 1 and Table 3 of this report provide product dimensions, required fasteners, allowable loads, and displacements.

3.1.2 HDB Bolt Hold-downs: HD3B hold-down is a single-piece formed hold-down consisting of a steel strap with a four-ply formed seat element for an anchor bolt. The straight-strap portion of the hold-down has pre-punched bolt holes for installation of bolts used to connect the hold-down to the wood member. HD3B is die-formed from No. 12 gage galvanized steel. HD5B, HD7B and HD9B bolt hold-downs consist of a main structural steel component with pre-punched holes for installation of bolt fasteners used to connect the hold-down to the wood member. HD5B and HD7B bodies are formed from No. 10 gage galvanized steel. Crossbars are steel bar stock 3/8-inch (9.5 mm) thick by 3/16-inch (19 mm) deep and the washers are formed from 3/16-inch-thick (9.5 mm) steel plate. The HD9B body is formed from No. 7 gage galvanized steel and its crossbars are 3/4 inch (9.5 mm) thick by 1 inch (25.4 mm) deep. The washer for HD9B is formed using 3/4-inch (9.5 mm) thick steel plate. Figure 2, Table 2 and Table 3 of this report provide product dimensions, required fasteners, allowable loads, and displacements.
3.2 Material Information

3.2.1 Steel: HD12, HD19 and HD9B base plates are manufactured from steel complying with ASTM A36 having a minimum yield strength of 36,000 psi (248 MPa) and minimum tensile strength of 58,000 psi (400 MPa). Base metal thicknesses for the bolt hold-downs in this report are as follows:

<table>
<thead>
<tr>
<th>Thickness/ Gage</th>
<th>Base Metal Thickness (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 inch</td>
<td>0.3600</td>
</tr>
<tr>
<td>5/16 inch</td>
<td>0.2975</td>
</tr>
<tr>
<td>No. 3</td>
<td>0.2285</td>
</tr>
<tr>
<td>3/16 inch</td>
<td>0.1775</td>
</tr>
<tr>
<td>No. 7 (A 653)</td>
<td>0.1715</td>
</tr>
<tr>
<td>No. 7 (A 1011)</td>
<td>0.1705</td>
</tr>
<tr>
<td>No. 10</td>
<td>0.1275</td>
</tr>
<tr>
<td>No. 12</td>
<td>0.0975</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm

Model numbers do not list the Z or HDG ending in this report, but the information shown is applicable. HD series bolt hold-downs have a painted finish and hot-dipped galvanizing is available. The HDB hold-downs are provided with hot-dipped galvanized finishes.

The holder of this report (Simpson Strong-Tie Company) or the lumber treater shall be notified for recommendations on minimum corrosion resistance of steel connectors in contact with the specific proprietary preservative-treated or fire-retardant-treated lumber.

3.2.2 Wood: Wood members connected to hold-downs shall be either sawn lumber or engineered lumber. Sawn lumber shall have a minimum specific gravity of 0.50 and a maximum moisture content of 19 percent. Engineered lumber shall have a minimum equivalent specific gravity of 0.50 and a maximum moisture content of 16 percent. Minimum wood member thickness (depth) is specified in Table 1 and Table 2 of this report.

3.2.3 Fasteners

3.2.3.1 Bolts: Machine bolts shall comply with ANSI/ASME Standard B18.2.1 and with ASTM A307. Minimum bending yield strength (Fyb) of the bolt shall be 45,000 psi (310 MPa).

3.2.3.2 Threaded Anchor Rods: As a minimum, threaded steel anchor rods shall comply with ASTM F1554 Grade 36 or equivalent.


4.0 Design and Installation

4.1 Design

4.1.1 Hold-Down Assembly: As shown in Table 1 and Table 2 of this report, the allowable loads are for hold-down assemblies consisting of the following components: (1) hold-down device; (2) an anchor bolt/rod attached to the seat of the device; (3) a wood member having minimum specified dimensions and properties; (4) quantity and size of fasteners used to attach the hold-down device to the wood member; and, in one case as noted, (5) a standard cut washer (Type A plain steel washer (W)) with dimensions conforming to ASME B18.22.1. As shown in the product tables of this report, the allowable loads are based on allowable stress design (ASD). The load values include the load duration factor (Cd) corresponding with the applicable loads in accordance with the ANSI/AWC NDS-2018, (2015) (2012) (2005) National Design Specification (NDS) for Wood Construction.

Where design load combinations include earthquake loads or effects, story drifts of the structure shall be determined in accordance with Section 12.8.6 of ASCE/SEI 7-16 (10) (7-05) except for those structures analyzed using the Simplified Design Procedure pursuant to Section 12.14. When using the basic load combinations in accordance with IBC Section 1605.3.1, the tabulated allowable loads for the hold-down (tie-down) shall not be increased for wind or earthquake loading. When using the alternative ASD basic load combinations in IBC Section 1605.3.2 that include wind or earthquake loads, the tabulated allowable loads for the hold-down (tie-down) shall not be increased by 33 1/3 percent, nor shall the alternative basic load combinations be reduced by a factor of 0.75.

Deflection of a shear wall restrained from overturning by hold-downs installed in accordance with this report shall be determined in accordance with 2018, 2015, or 2012 IBC Section 2305.3, 2009 IBC Section 2305.1, or 2006 IBC Section 2305.3.1.

Total deflection values Δall and Δe at ASD-level and strength-level forces, respectively, for hold-down assemblies shown in Tables 1 and Table 2 of this report, include all sources of hold-down device rotation and extension and anchor rod elongation where the length of the anchor rod is a maximum of 6 inches (152 mm) for the HDB hold-down and a maximum of 8 inches (203 mm) for the HD series hold-downs. Addition of the hold-down anchor rod elongation to the total elongation (deflection) of the hold-down assembly needs to be evaluated when the actual diameter, length or ASTM steel specification of the anchor rod differs from that
shown in this report. When hold-downs are used in series, the cumulative deformation of all hold-downs within that series should be accounted for.

Symbol $\Delta_s$ as used in this report refers to the symbol $d_s$ in 2018, (2015), (2012) (2009) (2006) IBC Section 2305.3.2 and to the symbol $\Delta_s$ in 2015 (2008) (2005) ANSI/AWC NDS when hold-downs are fastened to wood having a moisture content greater than 19 percent (16 percent for engineered lumber), or where wet service is anticipated.

Tabulated allowable loads are for hold-downs connected to wood used under continuously dry interior conditions and where sustained temperatures are 100°F (37.8°C) or less. Allowable loads shown in Table 1 and Table 2 of this report shall be adjusted by the wet service factor ($C_w$) specified in the ANSI/AWC NDS when hold-downs are fastened to wood that will experience sustained exposure to temperatures, exceeding 100°F (37.8°C).

Design of wood members fastened to bolt hold-down devices shall consider combined stresses due to axial tension and flexural bending induced by eccentricity in the connection. Stresses shall be evaluated at the critical net section and shall consider combined flexural bending due to hold-down (tie-down) eccentricity relative to the centroid of the connected wood member ($M_{xx}$ and $M_{yy}$), and tension ($T$).

4.1.2 Hold-Down Devices Used as Anchorage of Structural Walls: Allowable steel strengths are detailed in Table 3 of this report for the HDB and HD hold-down devices. Values are for the steel anchorage device independent of the bolts used to attach the hold-down to the wood member and anchor rod. Values are used when designing structural wall anchorage in accordance with Section 12.10 and 12.11.2 of ASCE/SEI 7.

Hold-down assembly strengths in Table 1 and Table 2 of this report may be used for wall anchorage in accordance with 2018, (2015), IBC Sections 606.12.2.3 and R608.9.1, 2012 (2009) IRC Sections R606.12.2.3 and R611.9.1 or 2006 IRC Sections R606.12.2.2 and R611.8.2.1.

4.1.3 Anchorage to Concrete or Masonry: Adequate embedment length and anchorage details, including edge and end distances shall be determined in accordance with Chapters 19 or 21 of the IBC as applicable, for design of anchorage to concrete and masonry structural members except for those structures designed in accordance with the IRC or the conventional light-frame construction provisions of Section 2308 of the IBC. Where anchors are designed to resist seismic loads, the seismic load effects shall include overstrength in accordance with ASCE-7-10 with Supplement 1 or ASCE 7-16.

4.2 Installation: Installation of the Simpson Strong-Tie hold-down connectors shall be in accordance with the manufacturer’s published installation instructions and this evaluation report. Where a conflict exists between this report and the manufacturers published installation instructions, the more restrictive shall prevail.

4.3 Special Inspection

4.3.1 A statement of special inspection shall be prepared by the registered design professional in responsible charge and submitted to the building official for approval when required by 2018, 2015, or 2012 IBC Section 1704.3 or 2009 or 2006 IBC Section 1705. A statement of responsibility shall be submitted to the building official for approval when required by 2018, 2015, or 2012 IBC Section 1704.4, 2009 IBC Section 1709 or 2006 IBC Section 1706 as applicable.

4.3.2 Periodic special inspection shall be conducted when the HDB or HD series hold-downs are components within the main wind-force-resisting system of structures constructed in areas listed in 2018 IBC Section 1705.11, 2015 IBC Section 1705.11, 2012 IBC Section 1705.10, 2009 IBC Section 1706.1 or 2006 IBC Section 1705.4. Special inspection requirements do not apply to structures, or portions thereof, that qualify for an exception pursuant to 2018 IBC Sections 1704.2, 1705.3 or 1705.11.1, 2015 IBC Sections 1704.2, 1705.3 or 1705.11.1, 2012 IBC Sections 1704.2, 1705.3 or 1705.10.1, 2009 IBC Sections 1704.1, 1704.4, 1706.2 or 1706.3 or 2006 IBC Sections 1704.1 or 1704.4.

4.3.3 Periodic special inspection for seismic resistance shall be conducted in accordance with 2018 IBC Section 1705.12, 2015 IBC Section 1705.12, 2012 IBC Section 1705.11 or 2009 (2006) Section 1707 where required. Special inspection requirements for seismic resistance do not apply to structures, or portions thereof, that qualify for an exception pursuant to 2018 IBC Sections 1704.2, 1705.12 or 1705.12.2, 2015 IBC Sections 1704.2, 1705.12 or 1705.12.2, 2012 IBC Sections 1704.2, 1705.11 or 1705.11.2 or 2009 (2006) Sections 1704.1, 1705.3, 1707.3 or 1707.4.

4.3.4 For installations under the IRC, special inspection is not normally required. However, when an engineered design is submitted or required pursuant to IRC Section 301.1.3, periodic special inspection requirements and exemptions are as stated in Sections 4.3.1, 4.3.2 and 4.3.3 of this report as applicable.

5.0 LIMITATIONS

Simpson Strong-Tie bolt hold-down connectors detailed in this report comply with or are acceptable alternatives to what is specified in the codes and regulations listed in Section 1.0 of this report subject to the following limitations:

5.1 Hold-downs shall be manufactured, identified and installed in concurrence with the manufacturer’s published installation instructions and this report. Where conflicts
occur, the more restrictive governs. During installation, a copy of the instructions shall be available at the jobsite at all times.

5.2 Calculations, drawings, and details shall be submitted to the building official showing compliance with this report. A registered design professional shall prepare the calculations where required by the statutes of the jurisdiction in which the project is to be constructed.

5.3 Adjustment factors shall be considered, where applicable, as noted in Section 4.1 of this report and the applicable codes. No further duration of load increase for wind or earthquake loading shall be allowed.

5.4 Connected wood members and fasteners shall comply, respectively, with Sections 3.2.2 and 3.2.3 of this report.

5.5 Use of hold-down connectors with fire-retardant-treated or preservative-treated lumber shall be in accordance with Section 3.2.1 of this report. Use of fasteners with fire-retardant-treated or preservative-treated lumber shall be in accordance with Section 3.2.3.3 of this report. All such uses are subject to the approval of the code official, since the effects of corrosion of metal in contact with chemically treated wood on the structural performance of the devices is outside the scope of this report.

5.6 Anchorage to masonry structural members or concrete shall be provided in accordance with Section 4.1.3 of this report.

5.7 Special inspections for the hold-downs shall be provided in accordance with Section 4.3 of this report.

5.8 Special inspections for anchor bolts in concrete or masonry shall be conducted in accordance with Section 1705.3 or 1705.4 of the 2018, (2015), (2012) IBC or Section 1704.4 or 1704.5 of the 2009 IBC.

6.0 SUBSTANTIATING DATA

Data in accordance with ICC-ES Acceptance Criteria for Hold-Downs (Tie-Downs) Attached to Wood Members (AC155), Approved May 2015, editorially revised January 2018, inclusive of tests and calculations. Test results are from laboratories in compliance with ISO/IEC 17025.

7.0 IDENTIFICATION

Products described in this report are identified with a die-stamped label indicating the name of the manufacturer (Simpson Strong-Tie), the model number, the IAPMO Uniform ES Mark of Conformity, and the number of the index evaluation report (ER-143) that identifies products recognized in this report. Either Mark of Conformity as shown below may be used:

![IAPMO ER-143](image)

Brian Gerber, P.E., S.E.
Vice President, Technical Operations
Uniform Evaluation Service

Richard Beck, PE, CBO, MCP
Vice President, Uniform Evaluation Service

GP Russ Chaney
CEO, The IAPMO Group

For additional information about this evaluation report please visit [www.uniform-es.org](http://www.uniform-es.org) or email at [info@uniform-es.org](mailto:info@uniform-es.org)
TABLE 1 — ALLOWABLE TENSION LOADS AND DISPLACEMENTS FOR HD BOLT HOLD-DOWN ASSEMBLIES \(^{1,2,3}\)

| MODEL NO. | DIMENSIONS (in.) | FASTENERS | MINIMUM WOOD MEMBER THK\(^{10}\) | ALLOWABLE TENSION LOADS\(^4\) \(P_{all} (lbs)\) | DISPLACEMENT\(^5,6\) \\
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANCHOR BOLT DIA. (in.)</td>
<td>WOOD MBR BOLTS(^8) QTY.</td>
<td>DIA. (in.)</td>
<td>(CP=1.6)</td>
<td>(\Delta_s) (in.)</td>
</tr>
<tr>
<td></td>
<td>HB(^9)</td>
<td>SB</td>
<td>W</td>
<td>H</td>
<td>B</td>
</tr>
<tr>
<td>HD12(^7)</td>
<td>7</td>
<td>4</td>
<td>3½</td>
<td>20(^\frac{1}{16})</td>
<td>4½</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4½</td>
<td>12,665</td>
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<tr>
<td></td>
<td>1½</td>
<td>4</td>
<td>1</td>
<td>5½ (^{11})</td>
<td>14,220</td>
</tr>
<tr>
<td>HD19(^7)</td>
<td>7</td>
<td>4</td>
<td>3½</td>
<td>24(^\frac{1}{16})</td>
<td>4½</td>
</tr>
<tr>
<td></td>
<td>1½</td>
<td>5</td>
<td>1</td>
<td>7½</td>
<td>16,735</td>
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<tr>
<td></td>
<td>5½ (^{11})</td>
<td>16,775</td>
<td>0.200</td>
<td>0.250</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1½</td>
<td>5</td>
<td>1</td>
<td>5½ (^{11})</td>
<td>18,550</td>
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<td></td>
<td>5½ (^{12})</td>
<td>19,070</td>
<td>0.137</td>
<td>0.207</td>
<td></td>
</tr>
</tbody>
</table>

\(\Delta = 1\) inch = 25.4 mm, 1 lbs = 4.45 N.

1. Tabulated allowable loads are for a hold-down assembly consisting of the hold-down device attached to a wood structural member(s) with the fasteners as specified in this table (Table 1 of this report).
2. Allowable loads for the hold-down assemblies are based on allowable stress design (ASD) and include the load duration factor, \(C_D = 1.6\), corresponding with wind/earthquake loading in accordance with the NDS. No further increase is allowed. The tabulated values shall be reduced where other load durations govern.
3. Anchorage to concrete or masonry shall be determined in accordance with Section 4.1.3 of this report. Anchorage to concrete or masonry walls shall be in accordance with Section 4.1.2 of this report.
4. Tabulated allowable (ASD) tension loads shall be multiplied by 1.4 to obtain the strength-level resistance loads related with the tabulated \(\Delta_s\) deformations.
5. Tabulated displacement values, \(\Delta_{all}\) and \(\Delta_s\), for hold-down assemblies include all sources of hold-down assembly elongation, such as hold-down device extension and rotation fastener slip, and anchor rod elongation, at ASD-level and strength level forces respectively.
6. Elongation of the hold-down anchor rod shall be calculated when the actual unbraced length is greater than 8 inches for the HD series hold-downs, or the ASTM steel specification of the anchor rod differs from that described in the Section 3.2.3 of this report. In lieu of calculating the elongation of the hold-down anchor rod for hold-downs raised 6 inches to 18 inches above the concrete for the HD2A and 8 inches to 18 inches for the HD series, it is permitted to add an additional anchor rod elongation of 0.01 to the tabulated hold-down deflection.
7. HD12 and HD19 require a standard cut washer, conforming to Section 4.1.1 of this report, to be installed between the anchor bolt nut and the seat of the hold-down when a 1½ inch diameter anchor bolt is used.
8. Hold-down bolts attaching the hold-down to the wood member shall be in accordance with Section 3.2.3.1 of this report and they each shall have a minimum of a standard cut washer installed between the wood post and the nut.
9. HB is the required minimum distance from the end of the post to the center of the first post bolt hole. End distance may be increased as necessary for installation. Tension values are valid for hold-downs installed flush to, or raised off of, the sill plate provided that the minimum HB distance is maintained.
10. Wood structural member(s) shall have a minimum width of 3½ inches and be a minimum Grade No. 2 with specific gravity of 0.50 to satisfy NDS Appendix E for tension loading, unless otherwise noted.
11. Wood structural member(s) shall have a minimum width of 5½ inches and be a minimum Grade No. 2 with specific gravity of 0.50 to satisfy NDS Appendix E for tension loading.
12. Wood structural member(s) shall have a minimum width of 5½ inches and be a minimum Grade No. 1 with specific gravity of 0.50 to satisfy NDS Appendix E for tension loading.
FIGURE 1 – HD BOLT HOLD-DOWNS

HD19 Vertical Typical Installation  
( HD12 Similar )

HD19
HD12 Similar
### TABLE 2 — ALLOWABLE TENSION LOADS AND DISPLACEMENTS FOR HDB BOLT HOLD-DOWN ASSEMBLIES ¹,²

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DIMENSIONS (in.)</th>
<th>FASTENERS</th>
<th>MINIMUM WOOD MEMBER THK (in.)</th>
<th>ALLOWABLE TENSION LOADS ³ Pₐₜ (lbs.)</th>
<th>DISPLACEMENT ⁴,⁵ ∆ₚ (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANCHOR BOLT DIA (in.)</td>
<td>WOOD MEMBER BOLTS</td>
<td>QTY.</td>
<td>DIA. (in.)</td>
<td>∆ₚться</td>
</tr>
<tr>
<td>HB</td>
<td>SB</td>
<td>W</td>
<td>H</td>
<td>B</td>
<td>SO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2½</td>
<td>2½</td>
<td>85/8</td>
<td>2¼</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3,130</td>
<td>0.120</td>
<td>0.250</td>
<td></td>
</tr>
<tr>
<td>HD5B</td>
<td>5¼</td>
<td>3</td>
<td>2½</td>
<td>9¼</td>
<td>2½</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4,505</td>
<td>0.156</td>
<td>0.223</td>
<td></td>
</tr>
<tr>
<td>HD7B</td>
<td>5¼</td>
<td>3</td>
<td>2½</td>
<td>12¼</td>
<td>2½</td>
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<tr>
<td></td>
<td>3</td>
<td>6,645</td>
<td>0.142</td>
<td>0.198</td>
<td></td>
</tr>
<tr>
<td>HD9B</td>
<td>6½</td>
<td>3½</td>
<td>2¼</td>
<td>14</td>
<td>2½</td>
</tr>
<tr>
<td></td>
<td>3½</td>
<td>7,740</td>
<td>0.159</td>
<td>0.250</td>
<td></td>
</tr>
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<td></td>
<td>4½</td>
<td>9,920</td>
<td>0.178</td>
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<td></td>
<td>7¼</td>
<td>10,035</td>
<td>0.179</td>
<td>0.241</td>
<td></td>
</tr>
</tbody>
</table>

1. Allowable loads for the hold-down assemblies are based on allowable stress design (ASD) and include the load duration factor, C₀ = 1.6, corresponding with wind/earthquake loading in accordance with the NDS. No further increase is allowed. Tabulated loads may be reduced where other load durations govern.
2. Anchorage to concrete or masonry shall be determined in accordance with Section 4.1.3 of this report. Anchorage to concrete or masonry walls shall be in accordance with Section 4.1.2 of this report.
3. Tabulated allowable (ASD) tension loads shall be multiplied by 1.4 to obtain the strength-level resistance loads associated with the tabulated ∆ₛ deformations.
4. Tabulated displacement values, ∆ₚ and ∆ₛ, for hold-down assemblies include all sources of hold-down assembly elongation, such as fastener slip, hold-down device extension and rotation, and 6 inches of anchor rod elongation, at ASD-level and strength level forces respectively.
5. Elongation of the hold-down anchor rod shall be calculated when the actual unbraced length is greater than 6 inches, or the ASTM steel specification of the anchor rod differs from that described in the Section 3.2.3 of this report. In lieu of calculating the elongation of the hold-down anchor rod for hold-downs raised 6 inches to 18 inches above the concrete, it is permitted to add an additional anchor rod elongation of 0.01 inch to the tabulated hold-down deflection.
6. Hold-down bolts attaching the hold-down to the wood member shall be in accordance with Section 3.2.3.1 of this report and each shall have a minimum of a standard cut washer installed between the wood post and the nut.
7. Allowable Tension loads are valid for hold-downs installed flush to, or raised off of, the sill plate.
8. Wood structural member(s) shall have a minimum width of 3½ inches wide and be a minimum Grade No. 2 with specific gravity of 0.50.

SI: 1 inch = 25.4 mm, 1 lbs = 4.45 N.
FIGURE 2 – HDB BOLT HOLD-DOWNS

HD3B
Vertical Installation

HD5B
(HD7B, HD9B Similar)

HD7B Horizontal Purlin Installation
### TABLE 3 — ALLOWABLE STEEL STRENGTH FOR HDB, AND HD BOLT HOLD-DOWN CONNECTORS

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>ASD STEEL STRENGTH (lbs.)</th>
</tr>
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<tbody>
<tr>
<td>HD3B</td>
<td>3,940</td>
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<tr>
<td>HD5B</td>
<td>6,700</td>
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<tr>
<td>HD7B</td>
<td>8,330</td>
</tr>
<tr>
<td>HD9B</td>
<td>11,290</td>
</tr>
<tr>
<td>HD12</td>
<td>15,510</td>
</tr>
<tr>
<td>HD19² (1¼&quot; A.B)</td>
<td>21,965</td>
</tr>
<tr>
<td>HD19² (1½&quot; A.B)</td>
<td>23,630</td>
</tr>
</tbody>
</table>

1. Steel strengths are provided when designing per Section 12.10 and 12.11.2 of ASCE/SEI 7.
2. HD19 requires a standard cut washer, conforming to Section 4.1.1 of this report, to be installed between the anchor bolt nut and seat of hold-down when a 1⅛ inch diameter anchor bolt is used.

SI: 1 inch = 25.4 mm, 1 lbs = 4.45 N.
1.0 RECOGNITION

Simpson Strong-Tie Bolt Hold-Downs evaluated in IAPMO UES ER-143 are acceptable alternatives to what is specified in the following codes and regulations:

- 2017 City of Los Angeles Building Code (LABC)
- 2017 City of Los Angeles Residential Code (LARC)

2.0 LIMITATIONS

2.1 References in IAPMO UES ER-143 to section numbers of the 2018 IBC and 2018 IRC are the same section numbers in the LABC and LARC, as applicable.

2.2 Hold-down connectors designed to resist shear wall overturning moments shall be reduced to 75 percent of the allowable load values shown in Tables 1 and 2 of ER-143, in accordance with LABC Section 2305.5.

2.3 Engineered designs submitted in accordance with LARC Section R301.1.3 shall also comply with LARC Section R301.1.3.1.

2.4 Design, installation and inspection shall be in accordance with Chapters 16 and 17 of the LABC, as applicable.

For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org