

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

MARSHA L. BROWN
PRESIDENT

VAN AMBATIELOS
VICE-PRESIDENT

VICTOR H. CUEVAS
HELENA JUBANY
ELENORE A. WILLIAMS

CITY OF LOS ANGELES

CALIFORNIA



ANTONIO R. VILLARAIGOSA
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

ROBERT R. "BUD" OVROM
GENERAL MANAGER

RAYMOND S. CHAN, P.E., S.E.
EXECUTIVE OFFICER

Simpson Strong-Tie Co., Inc.
260 N. Palm Street
Brea, CA 92821

Attn: Tim Kaucher, P.E.
(800) 999-5099

RESEARCH REPORT: RR 25726
(CSI #06090)

BASED UPON ICC EVALUATION
REPORT NO. ESR-2616

REEVALUATION DUE DATE:
September 1, 2012
Issued Date: August 1, 2010
Code: 2008 LABC

GENERAL APPROVAL – Reevaluation - Simpson Strong-Tie - FA, UFP10, FJA, FSA, GH, GLB, and HGLB - Connectors for wood members supported by concrete or masonry construction

DETAILS

The above products are approved when in compliance with the description, use, identification and findings of Report No. ESR-2616 dated April 1, 2008, revised June, 2009, of the ICC Evaluation Service, Incorporated. The Report in its entirety is attached and made part of this general approval.

The parts of Report No. 2616 marked by the asterisks have been deleted by the City of Los Angeles Building and Safety Department from this approval.

The approval is subjected to the following conditions:

1. Calculations and details to show compliance with this report shall be submitted to Structural Plan Check for review and approval. Calculations and details shall be prepared, signed, and sealed by California licensed engineer.
2. The connections are not approved to resist uplift forces from wood shear walls.

RR 25726
Page 1 of 2

Simpson Strong-Tie Co., Inc.

Re: Simpson Strong-Tie - FA, UFP10, FJA, FSA, GH, GLB, and HGLB - Connectors for wood members supported by concrete or masonry construction

3. Allowable loads must be reduced when load durations with lower value of C_D (than what is in the tables) govern.

DISCUSSION

The report is in compliance with 2008 Los Angeles Building Code.

The approval is based on tests in accordance with ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC 13), dated October 2006 (corrected March 2007).

This general approval will remain effective provided the Evaluation Report is maintained valid and unrevised with the issuing organization. Any revision to the report must be submitted to this Department for review with appropriate fee to continue the approval of the revised report.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.

The status of the referenced Report No.ESR-2616 dated April 1, 2008, revised June, 2009, which is currently beyond its reexamination date are still valid. The validity of the Report was verified with ICC.

WILLIAM STUTSMAN, Chief
Engineering Research Section
201 N. Figueroa St., Room 880
Los Angeles, CA 90012
Phone - 213-202-9812
Fax - 213-202-9943

TV: tvo
RR25726/MSWord2007
R08/01/10
5D2/2304.9

Attachment: ICC ES Report No. ESR-2616 (13 Pages)

ICC-ES Evaluation Report

ESR-2616*

Issued April 1, 2008

This report is subject to re-examination in two years.

www.icc-es.org | (800) 423-6587 | (562) 699-0543

A Subsidiary of the International Code Council®

DIVISION: 06—WOOD AND PLASTICS
Section: 06090—Wood and Plastics Fastenings
REPORT HOLDER:
SIMPSON STRONG-TIE COMPANY, INC.
 5956 WEST LAS POSITAS BOULEVARD
 PLEASANTON, CALIFORNIA 94588
 (800) 925-5099
www.strongtie.com
EVALUATION SUBJECT:
SIMPSON STRONG-TIE CONNECTORS FOR WOOD MEMBERS SUPPORTED BY CONCRETE OR MASONRY CONSTRUCTION
1.0 EVALUATION SCOPE
Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- ~~2006 *International Residential Code*® (IRC)~~
- Other Codes (see Section 6.0)

Property evaluated:

Structural

2.0 USES

Simpson Strong-Tie connectors for wood members supported by concrete or masonry construction are used as wood framing connectors in accordance with Section 2304.9.3 of the IBC. ~~The products may also be used in structures regulated under the IRC when an engineered design is submitted in accordance with Section R301.1.3 of the IRC.~~

3.0 DESCRIPTION
3.1 General:

The allowable loads for connectors described in this report are based on the reference design values of fasteners in wood, the allowable perpendicular-to-grain values of wood members, the steel strength of the connectors, and testing, as applicable. The anchorage of the connectors to concrete or masonry construction, inclusive of cast-in-place and post-installed anchor bolts, is outside of the scope of this report.

3.1.1 FA Foundation Anchors: The FA foundation anchors connect wood sill plates to concrete foundation stem walls. They are fabricated from No. 12 gage

galvanized steel and have one 90-degree bend with slot holes at the bend line permitting field adjustment of the anchor for attachment to sloped stem walls. Anchor bolts are used to attach the connectors to the foundation and nails are used to connect it to the wood sill plate. See Table 1 for FA model numbers, required fasteners, and allowable lateral loads. See Figure 1 for drawings of the FA connector and a typical installation detail.

~~**3.1.2 HFA Heavy Foundation Anchors:** The HFA foundation anchors connect sill plates to concrete foundation stem walls. They are fabricated No. 12 gage galvanized steel and have one 90-degree bend with slot holes at the bend line permitting field adjustment of the anchor for attachment to sloped stem walls. Anchor bolts are used to attach the connectors to the foundation and nails are used connect it to the wood sill plate. See Table 2 for HFA model numbers, required fasteners, and allowable lateral loads. See Figure 2 for drawings of the FA connector and a typical installation detail.~~

3.1.3 UFP10 Universal Foundation Plate: The UFP10 foundation plate connects wood sill plates to concrete foundation stem walls. It is fabricated from No. 14 gage galvanized steel. The UFP10 has an S-shape profile that is designed for connecting different size wood sill plates and concrete foundation stem walls. Anchor bolts are used to attach the anchor to the concrete foundation and SDS screws connect the UFP10 to the wood sill plate. See Table 3 for required fasteners and allowable lateral loads. See Figure 3 for drawings of the UFP10 connector and a typical installation detail.

3.1.4 FJA and FSA Foundation Joist/Stud Anchor: The FJA and FSA foundation anchors connect floor joists or studs to concrete foundation stem walls. They are fabricated from No 12 gage galvanized steel. Anchor bolts connect the anchor to the concrete foundation, and nails or bolts connect the anchor to the floor joist or stud. See Table 4 for the anchor dimensions, required fasteners, and allowable loads. See Figure 4 for drawings of the FJA/FSA connector, and typical installation details.

~~**3.1.5 MBHA Beam Hangers:** The MBHA beam hangers connect wood beams to structural concrete or masonry members. They are fabricated from No. 10 gage galvanized steel. The hangers have a U-shaped stirrup that supports the wood member and have a top flange that bears on top of the supporting concrete or masonry member. See Table 5 for the hanger model numbers, U-shaped stirrup height and width, required fasteners, and allowable loads. See Figure 5 for drawings of the MBHA hanger and typical installation details.~~

*Revised June 2009

3.1.6 GH Girder Hangers: The GH girder hangers connect wood floor girders to concrete foundation stem walls. They are fabricated from No. 12 gage steel, and have a U-shaped stirrup, which supports the wood girder, factory welded to an inverted U-shaped channel, which bears on top of the concrete foundation stem wall. A wood sill plate must be installed on top of the inverted U-shaped channel. See Table 6 for hanger model numbers, nominal size of wood girders that may be used with specific hangers, hanger dimensions, required fasteners, and allowable downloads. See Figure 6 for drawings of the GH girder hanger and a typical installation detail.

3.1.7 HGT Heavy Girder Tiedowns: The HGT heavy girder tiedowns connect 2-, 3- and 4-ply metal plate connected wood trusses to bond beams located at the top of structural concrete or masonry wall construction. The HGT tiedowns are fabricated from No. 7 gage steel and factory-welded insert plates. The HGT tiedowns have slotted holes at each end for 3/4-inch diameter anchor bolts that are used to connect the tiedown to the structural concrete or masonry member. The threaded end of the anchor bolts are fastened with a standard cut washer and nut. Between anchor bolt nut and washer is a crescent-shaped washer that is supplied with the tiedowns. The curved top of the crescent-shaped washers permit the tiedown to be rotated and field adjusted to accommodate top chord slopes from 3:12 (14 degrees) minimum to 8:12 (34 degrees) maximum. See Table 7 for the tiedown model numbers, anchor dimensions, required fasteners and allowable loads.

3.1.8 GLB/HGLB/GLBT Glulam Bearing Plates: The GLB, HGLB, and GLBT glulam bearing plates connect glued laminated wood beams to structural concrete members. The GLB, HGLB, and GLBT bearing plate connectors have two No. 3 gage vertical steel plates, which are factory-welded to the top of the steel bearing plate, with one bolt hole for the GLB bearing plate connectors and two bolt holes for the HGLB and GLBT bearing plate connectors. The GLB and GLBT have two 12-inch-long (305 mm) deformed rebars factory-welded to the underside of the bearing plate, and the HGLB has three 12-inch-long (305 mm) rebars factory-welded to the underside of the steel bearing plate. The bearing plates of the GLB and HGLB connectors are flat, rectangular steel plates having the dimensions shown in Tables 8 and 9, respectively, and the bearing plate GLBT connector is a structural steel tee with its 3¹³/₁₆-inch-long (97 mm) web embedded into the concrete member. See Table 8 for GLB model numbers, bearing plate dimensions, required fasteners, and allowable downloads; and see Table 9 for HGLB and GLBT model numbers, bearing plate dimensions, required fasteners, and allowable downloads and lateral loads. See Figure 8 drawings related to the GLB bearing plate connector, and Figure 9 for drawings related to the HGLB and GLBT bearing plate connectors.

3.2 Materials:

3.2.1 Steel: The FA (Table 1), ~~HFA (Table 2)~~, UFP (Table 3), FJA and FSA (Table 4), ~~and MBHA (Table 5)~~ connectors are fabricated from ASTM A 653, SS designation, Grade 33, galvanized sheet steel with a minimum yield strength, F_y , of 33,000 psi (227 MPa) and a minimum tensile strength, F_u , of 45,000 psi (310 MPa). The GH (Table 6), ~~HGT (Table 7)~~, and GLB (Table 8) connectors, and the vertical plates only of the HGLB and GLBT (Table 9) connectors are fabricated from ASTM A 1011, SS designation, Grade 33, hot-rolled steel with a minimum yield strength of 33,000 psi (227 MPa) and a minimum tensile strength of 52,000 psi (359 MPa). The

insert plates of the HGT (Table 7) connectors are made from ASTM A 36 hot-rolled steel with a minimum yield strength of 36,000 psi (248 MPa) and a tensile strength of 58,000 psi (400 MPa). The bearing plate of the GLBT (Table 9) connectors is a WT4x9 structural tee made from ASTM A 36 hot-rolled steel with minimum yield strength of 36,000 psi (248 MPa) and a minimum tensile strength of 58,000 psi (400 MPa). Rebars factory welded to GLB (Table 8) connectors and HGLB and GLBT (Table 9) connectors the are No. 6 deformed steel reinforcement bars complying with ASTM A 706 with minimum yield strength of 40,000 psi (276 MPa) and a minimum tensile strength of 70,000 psi (482 MPa).

The FA (Table 1), ~~HFA (Table 2)~~, UFP (Table 3), FJA and FSA (Table 4), ~~and MBHA (Table 5)~~ connectors have a minimum G90 zinc coating in accordance with ASTM A 653. Some models (designated with a model number ending with Z) are available with a G185 zinc coating specification in accordance with ASTM A 653. Some models (designated with a model number ending with HDG) are available with a hot-dip galvanization, also known as "batch" galvanization, in accordance with ASTM A 123, with a minimum specified coating weight of 2.0 ounces of zinc per square foot of surface area (610 g/m²), total for both sides. Model numbers in this report do not include the Z or HDG ending, but the information shown applies. The GH (Table 6), ~~HGT (Table 7)~~, and GLB (Table 8), and HGLB and GLBT (Table 9) connectors have a painted finish. The lumber treater and the holder of this report (Simpson Strong-Tie Company) should be contacted for recommendations on the appropriate coating or material to specify for use of the steel connectors in contact with the specific proprietary preservative treated or fire retardant treated lumber.

The steel connectors described in this report have the following minimum base-metal thicknesses:

| NOMINAL THICKNESS (Gage) | MINIMUM BASE METAL THICKNESS (inches) |
|--------------------------|---------------------------------------|
| No. 3 | 0.2285 |
| No. 7 | 0.1705 |
| No. 10 | 0.1275 |
| No. 12 | 0.0975 |
| No. 14 | 0.0685 |

For SI: 1 inch = 25.4 mm.

3.2.2 Wood: Wood members with which the connectors are used must be either sawn lumber or engineered lumber having a minimum specific gravity of 0.50 (minimum equivalent specific gravity of 0.50 for engineered lumber), and having a maximum moisture content of 19 percent (16 percent for engineered lumber) except as noted in Section 4.1. The thickness of the supporting wood member must be equal to or greater than the length of the fasteners specified in the tables in this report, or as required by wood member design, whichever is greater. For installation in engineered wood members, minimum allowable nail spacing and end and edge distances, as specified in the applicable evaluation report for the engineered wood product, must be met.

3.2.3 Fasteners: Nails used for hangers described in this report must comply with the material requirements, physical properties, tolerances, workmanship, protective coating and finishes, certification, and packaging and package marking requirements specified in ASTM F 1667. The nails must have the following minimum fastener dimensions and bending yield strengths (F_{yb}):

| NAIL | SHANK DIAMETER (inches) | FASTENER LENGTH (inches) | F _{yb} (psi) |
|--------|-------------------------|--------------------------|-----------------------|
| 10dx1½ | 0.148 | 1½ | 90,000 |
| 10d | 0.148 | 3 | 90,000 |
| 16d | 0.162 | 3½ | 90,000 |

For SI: 1 inch = 25.4 mm, 1 psi = 6.895 kPa.

At a minimum, bolts must comply with ASTM A 36 or A 307. SDS screws must comply with [ESR-2236](#).

* Nails and bolts used in contact with preservative treated or fire retardant treated lumber must comply with IBC Section 2304.9.5 or ~~IRC Section R319.3~~, as applicable. SDS screws used in contact with preservative-treated or fire-retardant-treated lumber must, as a minimum, comply with [ESR-2236](#). For use with treated lumber, the lumber treater or this report holder (Simpson Strong-Tie Company), or both, should be contacted for recommendations on the appropriate coating or material to specify for the fasteners as well as the connection capacities of fasteners used with the specific proprietary preservative treated or fire retardant treated lumber.

3.2.4 Concrete and Masonry Construction: Materials and quality of concrete and masonry construction must comply with the applicable provisions of Chapter 19 and 21 of the IBC. The compressive strength of the concrete and masonry construction must be in accordance with the approved design and applicable provisions of the building code.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The tabulated allowable loads shown in the product tables of this report are based on allowable stress design and include the load duration factor, C_D, corresponding with the applicable loads in accordance with the National Design Specification for Wood Construction and its supplement (NDS).

Tabulated allowable loads apply to products connected to wood used under dry conditions and where sustained temperatures are 100°F (37.8°C) or less. When products are installed to wood having a moisture content greater than 19 percent (16 percent for engineered wood products), or where wet service is expected, the allowable tension loads must be adjusted by the wet service factor, C_M, specified in the NDS for dowel-type fasteners. When connectors are installed in wood that will experience sustained exposure to temperatures exceeding 100°F (37.8°C), the allowable loads in this report must be adjusted by the applicable temperature factor, C_t, specified in the NDS. Connected wood members must be analyzed for load-carrying capacity at the connection in accordance with the NDS.

4.2 Installation:

Installation of the connectors must be in accordance with this evaluation report and the manufacturer's published installation instructions. Bolts installed in wood or engineered wood members must be installed in accordance with the applicable provisions of the NDS. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.

4.3 Special Inspection:

4.3.1 IBC: For jurisdictions adopting the IBC, periodic special inspection must be provided for components within the seismic-force-resisting system in Seismic Design

Categories C, D, E or F in accordance with Section 1707.3 or 1707.4, with the exception of those structures that qualify under Section 1704.1.

* ~~4.3.2 IRC: For jurisdictions adopting the IRC, special inspections shall not be required.~~

5.0 CONDITIONS OF USE

The Simpson Strong-Tie products described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The connectors must be manufactured, identified and installed in accordance with this report and the manufacturer's published installation instructions. A copy of the instructions must be available at the jobsite at all times during installation.
- 5.2 Calculations showing compliance with this report must be submitted to the code official. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3 Adjustment factors noted in Section 4.1 and the applicable codes must be considered, where applicable.
- 5.4 Connected wood members and fasteners must comply, respectively, with Sections 3.2.2 and 3.2.3 of this report.
- 5.5 Use of connectors with preservative treated or fire retardant treated lumber must be in accordance with Section 3.2.1 of this report. Use of fasteners with preservative treated or fire retardant treated lumber must be in accordance with Section 3.2.3 of this report.
- 5.6 The design of the anchorage to concrete or masonry construction specified in this report, inclusive of cast-in-place and post-installed, used to attached the connectors described in this report to concrete or masonry construction, is outside of the scope of this report.
- 5.7 Welded connectors are manufactured under a quality control program with inspections by Professional Service Industries, Inc. (AA-660) or by Intertek Testing Services NA, Inc. (AA-688).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices (AC13), dated October 2006 (corrected March 2007).

7.0 IDENTIFICATION

The products described in this report are identified with a die-stamped label indicating the name of the manufacturer (Simpson Strong-Tie), the model number, and the number of an index evaluation report ([ESR-2523](#)) that is used as an identifier for the products recognized in this report. Additionally, the factory-welded connectors manufactured in the United States are identified with the acronym of the inspection agency (PSI), and factory-welded connectors manufactured in Canada are identified with the name of the inspection agency (Intertek).

~~**8.0 OTHER CODES**~~

~~**8.1 Evaluation Scope:**~~

~~In addition to the codes referenced in Section 1.0, the products in this report were evaluated for compliance with the requirements of the following codes:~~

*

- 2003 *International Building Code*® (2003 IBC)
- 2003 *International Residential Code*® (2003 IRC)
- 2000 *International Building Code*® (2000 IBC)
- 2000 *International Residential Code*® (2000 IRC)
- 1997 *Uniform Building Code*™ (UBC)

The products described in this report comply with, or are suitable alternatives to what is specified in, the codes listed above, subject to the provisions of Sections 8.2 through 8.7.

8.2 Uses:

8.2.1 2003 IBC, 2003 IRC, 2000 IBC, and 2000 IRC: See Section 2.0 of this report.

8.2.2 1997 UBC: Replace the information in Section 2.0 with the following: Simpson Strong-Tie connectors to concrete are used as wood framing connectors in accordance with Section 2318.4.8 of the UBC.

8.3 Description:

8.3.1 2003 IBC and 2003 IRC: See Section 3.0 of this report.

8.3.2 2000 IBC and 2000 IRC: See Section 3.0 of this report, except modify Section 3.2.3 of this report to reference IRC Section R323.3.

8.3.3 1997 UBC: See Section 3.0 of this report, except modify the first sentence in the last paragraph of Section 3.2.3 as follows: Nails and bolts used in contact with preservative treated or fire retardant treated lumber must, as a minimum, comply with UBC Section 2304.3.

8.4 Design and Installation:

8.4.1 2003 IBC, 2003 IRC, 2000 IBC, and 2000 IRC: See Section 4.0 of this report.

*

8.4.2 1997 UBC: See Section 4.0 of this report, except delete Section 4.3 (Special Inspection) since the UBC has no provisions for special inspection when installing the connectors described in this report.

8.5 Conditions of Use:

8.5.1 2003 IBC, 2003 IRC 2000 IBC, and 2000 IRC: The Simpson Strong-Tie products described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 8.0, subject to the same conditions of use indicated in Section 5.0 of this report.

8.5.2 UBC: The Simpson Strong-Tie products described in this report comply with, or are suitable alternatives to what is specified in, the UBC, subject to the same conditions of use indicated in Section 5.0 of this report, except the last sentence of Section 5.5 is replaced with the following: Nails and bolts used in contact with preservative treated or fire retardant treated lumber must, as a minimum, comply with UBC Section 2304.3.

8.6 Evidence Submitted: 2003 IBC, 2003 IRC 2000 IBC, 2000 IRC, and UBC:
See Section 6.0 of this report.

8.7 Identification: 2003 IBC, 2003 IRC 2000 IBC, 2000 IRC, and UBC:
See Section 7.0 of this report.

TABLE 1—FA SERIES FOUNDATION ANCHOR

| MODEL NO. | FASTENERS | | ALLOWABLE LATERAL LOADS ^{1,2,3,4} (lbs) | |
|-----------|-----------------------------------------------|----------------------------------------------|--------------------------------------------------|----------------|
| | Anchor Bolt ⁵ (Quantity – Dia.) | Nails Fastened to Plate (Quantity – Type) | C _D = 1.33 C _D = 1.6 | |
| | | | F ₁ | F ₂ |
| FA6 | 2 – 1/2" | 7 – 10d x 1 1/2 | 400 | 225 |
| FA8 | | | | |

For SI: 1 inch = 25.4 mm, 1 lbs = 4.45 N 1 psi = 6.895 kPa.

¹Allowable loads have been increased for wind or earthquake loading with no further increase allowed. Allowable loads must be reduced when other load durations govern.

²The footing must be normal-weight concrete having a minimum compressive strength consistent with Section 1805.4.2 of the 2006, 2003, and 2000 IBC or Section R402.2 of the 2006, 2003, and 2000 IRC, as applicable; or Section 1701.5 of the UBC.

³Not for use to resist uplift.

⁴The allowable shear (F₁) and pullout (F₂) loads or nominal strengths of the anchor bolts must be greater than the tabulated allowable shear (F₁) and pullout (F₂) loads of the FA connector.

⁵Design of the 1/2-inch diameter anchor bolts into the concrete footing must be determined in accordance with Section 1911 or 1912 of the 2006 IBC, applicable; or Section 1912 or Section 1913 of the 2003 or 2000 IBC, as applicable; or Sections 1915.8.3.3 and 1923 of the UBC, depending on the code used to regulate construction. Alternatively, the anchorage to concrete or masonry may be in accordance with a current evaluation report.

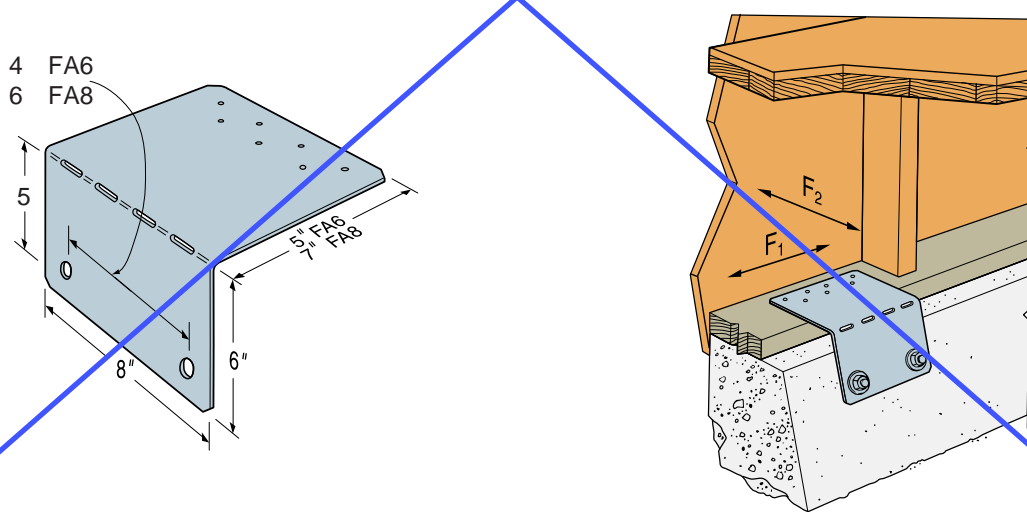


FIGURE 1 FA FOUNDATION ANCHOR

TABLE 2—HEA SERIES HEAVY FOUNDATION ANCHOR

| MODEL NO. | FASTENERS | | ALLOWABLE LATERAL LOADS ^{1,2,3,4} (lbs) | |
|-----------|-----------------------------------------------|-------------------------------------------------------|--------------------------------------------------|----------------|
| | Anchor Bolt ⁵ (Quantity – Dia.) | Nails Fastened to Stud/Joist/Plate (Quantity-Type) | C _D = 1.33 C _D = 1.6 | |
| | | | F ₁ | F ₂ |
| HFA6 | 3 – 1/2" | 11 – 10d x 1 1/2 | 1,350 | 225 |
| HFA8 | 3 – 1/2" | 11 – 10d x 1 1/2 | 1,350 | 225 |

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

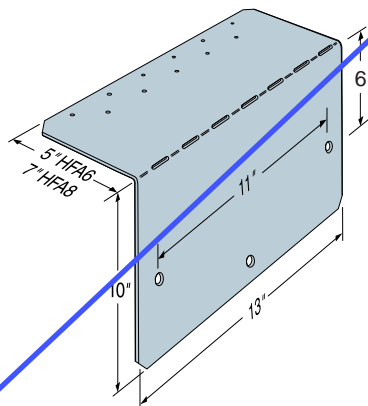
¹Allowable loads have been increased for wind or earthquake loading with no further increase allowed. Allowable loads must be reduced when other load durations govern.

²The footing must be normal-weight concrete having a minimum compressive strength consistent with Section 1805.4.2 of the 2006, 2003, and 2000 IBC or Section R402.2 of the 2006, 2003, and 2000 IRC, as applicable; or Section 1701.5 of the UBC.

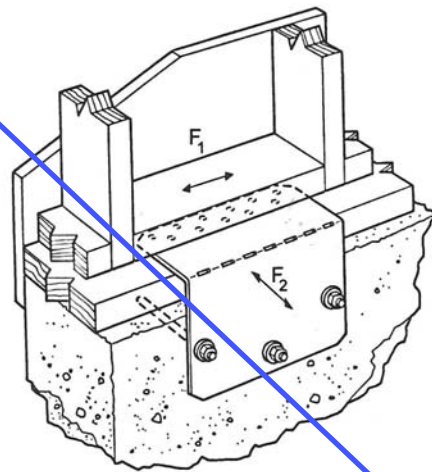
³Not for use to resist uplift.

⁴The allowable shear (F₁) and pullout (F₂) loads or nominal strengths of the anchor bolts must be greater than the tabulated allowable shear (F₁) and pullout (F₂) loads of the HFA connector.

⁵Design of the 1/2-inch diameter anchor bolts into the concrete footing must be determined in accordance with Section 1911 or 1912 of the 2006 IBC, applicable; or Section 1912 or Section 1913 of the 2003 or 2000 IBC, as applicable; or Sections 1915.8.3.3 and 1923 of the UBC, depending on the code used to regulate construction. Alternatively, the anchorage to concrete or masonry may be in accordance with a current evaluation report.



HFA6 Foundation Anchor (HFA8 similar)



HFA6 Installed

FIGURE 2—HEA HEAVY FOUNDATION ANCHOR

TABLE 3—UFP UNIVERSAL FOUNDATION PLATE

| MODEL NO. | FASTENERS | | ALLOWABLE LATERAL (F_1) LOADS ^{1,2,3,4} (lbs) |
|------------|-----------------------------------------------|---------------------------------------------|------------------------------------------------------------|
| | Anchor Bolt ⁵ (Quantity – Dia.) | Screws Fastened to Plate (Quantity-Type) | $C_D = 1.33$ $C_D = 1.6$ |
| UFP10-SDS3 | 2 – 1/2" | 5 - SDS ^{1/4} x 3 | 1,340 |

For **SI**: 1 inch = 25.4 mm, 1 lbs = 4.45 N.

¹Allowable loads have been increased for wind or earthquake loading with no further increase allowed. Allowable loads must be reduced when other load durations govern.

* ²The footing must be normal-weight concrete having a minimum compressive strength consistent with Section 1805.4.2 of the 2006, ~~2009~~, and 2009 IBC or Section R402.2 of the 2006, 2009, and 2009 IRC, as applicable, or Section 1701.5 of the UBC.

³Not for use to resist uplift.

⁴The allowable shear (F_1) load or nominal strength of the anchor bolts must be greater than the tabulated allowable lateral (F_1) load of the UFP connector.

* ⁵Design of the 1/2-inch diameter anchor bolts into the concrete footing must be determined in accordance with Section 1911 or 1912 of the 2006 IBC, applicable; ~~or Section 1912 of the 2009 or 2009 IBC, as applicable, or Sections 1045.8.3.3 and 1029 of the UBC,~~ depending on the code used to regulate construction. Alternatively, the anchorage to concrete or masonry may be in accordance with a current evaluation report.

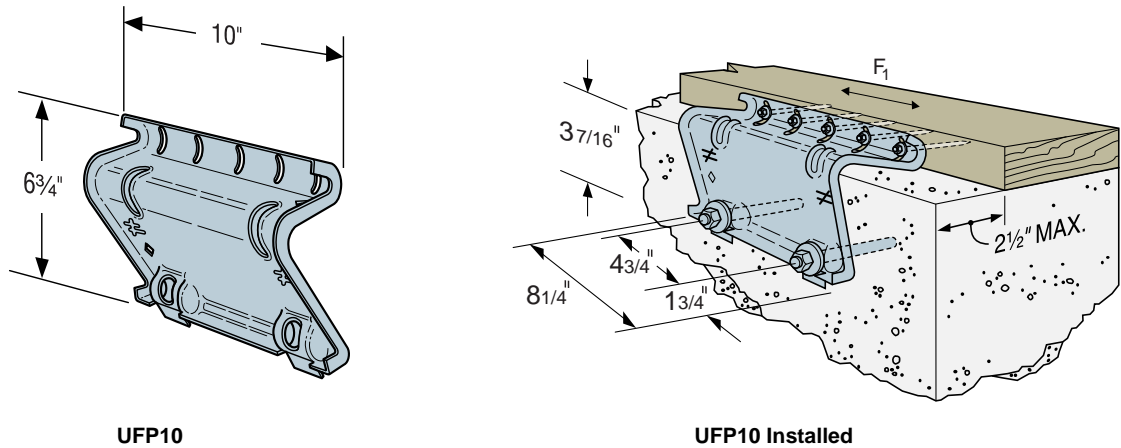


FIGURE 3—UFP UNIVERSAL FOUNDATION PLATE

TABLE 4—FJA AND FSA JOIST/STUD FOUNDATION ANCHORS

| MODEL NO. | DIMENSIONS (inches) | | FASTENERS | | ALLOWABLE LOADS ^{1,2,3} (lbs) C _D = 1.33 C _D = 1.6 | | | |
|-----------|---------------------|-------|------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------|----------------|----------------|
| | Length | Width | Anchor Bolts ⁴ (Quantity – Dia.) | Nails Fastened to Stud or Joist ⁵ (Quantity-Type) | Uplift ⁶ | | Lateral | |
| | | | | | Nails | Bolts | F ₁ | F ₂ |
| FJA | 19½ | 2½ | 2 – ½" | 8–10d x 1½ Nails | 1,000 | 575 | 185 | 60 |
| | | | 2 – ½" | 2–½" Dia. Bolts | 1,000 | 575 | 185 | 60 |
| FSA | 25½ | 2½ | 2 – ½" | 8–10d x 1½ Nails | 1,000 | 575 | — | — |
| | | | 2 – ½" | 2–½" Dia. Bolts | 1,000 | 575 | — | — |

For SI: 1 inch = 25.4 mm, 1 lbs = 4.45 N 1 psi = 6.895 kPa.

¹Allowable loads have been increased for wind or earthquake loading with no further increase allowed. Allowable loads must be reduced when other load durations govern.

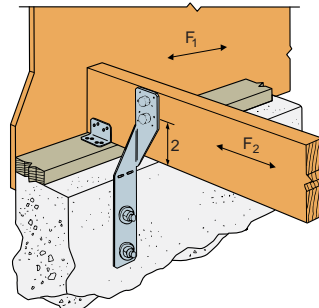
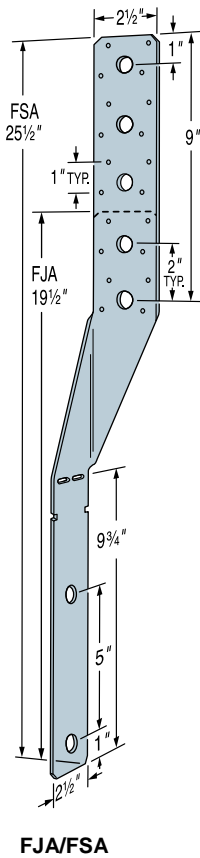
* ²The footing must be normal-weight concrete having a minimum compressive strength consistent with Section 1805.4.2 of the 2006, 2003, and 2000 IBC or Section R402.2 of the 2006, 2003, and 2000 IRC, as applicable; or Section 1701.5 of the UBC.

³The allowable shear (F₁) and pullout (F₂) loads or nominal strengths of the anchor bolts must be greater than the tabulated allowable shear (F₁) and pullout (F₂) loads of the FJA and FSA connectors.

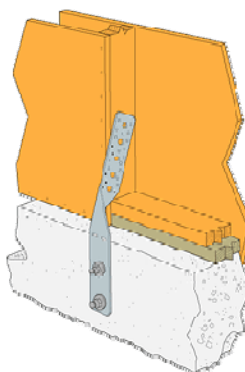
* ⁴Design of the ½-inch diameter anchor bolts into the concrete footing must be determined in accordance with Section 1911 or 1912 of the 2006 IBC, applicable; or Section 1912 or Section 1913 of the 2003 or 2000 IBC, as applicable, or Sections 1915.8.3.3 and 1923 of the UBC, depending on the code used to regulate construction. Alternatively, the anchorage to concrete or masonry may be in accordance with a current evaluation report.

⁵Nails used with the FJA and FSA connectors and engineered wood lumber products must also comply with the minimum edge and spacing limitations specified in the evaluation report for the specific engineered wood lumber products.

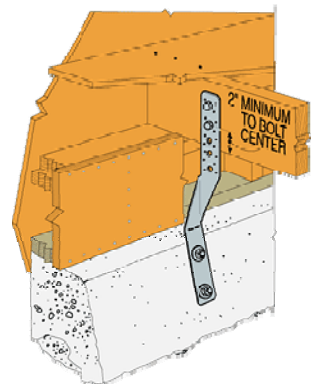
⁶Allowable uplift loads are for bolts installed into wood joist members and loaded perpendicular-to-grain.



Typical FJA Foundation-to-joist Installation



Typical FSA Foundation-to-Stud Installation



Typical FSA Foundation-to-joist Installation

FIGURE 4—FJA AND FSA JOIST/STUD FOUNDATION ANCHORS

TABLE 5—MBHA SERIES WOOD BEAM HANGERS SUPPORTED BY CONCRETE OR MASONRY CONSTRUCTION¹

| MODEL NO. | DIMENSIONS (inches) | | FASTENERS | | ALLOWABLE LOADS (lbs) | | |
|----------------|---------------------|--------|----------------------------------------------|--------------------------------------------------------|-----------------------|----------------------|------------------------------------------------------------------------|
| | W | H | Concrete or Masonry Anchorage ^{4,5} | Nails Fastened to Joist ⁶ (Quantity – Type) | Uplift ² | | Download ³ |
| | | | | | C _D = 1.33 | C _D = 1.6 | C _D = 1.0 C _D = 1.15 C _D = 1.25 |
| MBHA3.12/9.25 | 3 1/8 | 9 1/4 | 2 – 3/4" Dia. | 18 – 10d | 3,145 | 3,775 | 6,050 |
| MBHA3.12/11.25 | 3 1/8 | 11 1/4 | | | | | |
| MBHA3.56/9.25 | 3 9/16 | 9 1/4 | | | | | |
| MBHA3.56/11.25 | 3 9/16 | 11 1/4 | | | | | |
| MBHA3.56/11.88 | 3 9/16 | 11 7/8 | | | | | |
| MBHA3.56/14 | 3 9/16 | 14 | | | | | |
| MBHA3.56/16 | 3 9/16 | 16 | | | | | |
| MBHA3.56/18 | 3 9/16 | 18 | | | | | |
| MBHA5.50/9.25 | 5 1/2 | 9 1/4 | | | | | |
| MBHA5.50/11.25 | 5 1/2 | 11 1/4 | | | | | |
| MBHA5.50/11.88 | 5 1/2 | 11 7/8 | | | | | |
| MBHA5.50/14 | 5 1/2 | 14 | | | | | |
| MBHA5.50/16 | 5 1/2 | 16 | | | | | |
| MBHA5.50/18 | 5 1/2 | 18 | | | | | |

For **SI**: 1 inch = 25.4 mm, 1 lbs = 4.45 N, 1 psi = 6.895 kPa.

- ¹The hangers are designed to be supported by normal-weight concrete or masonry construction complying with the applicable code.
- ²Allowable uplift loads have been increased for wind or earthquake loading with no further increase allowed. Allowable uplift loads must be reduced when other load durations govern.
- ³Allowable download is the same value regardless of the duration of load as permitted by the applicable building code.
- ⁴Design of the 3/4"-inch diameter anchor bolts into concrete construction must be determined in accordance with Section 1911 or 1912 of the 2006 IBC, or Section 1912 or Section 1913 of the 2003 or 2000 IBC, or Sections 1915.8.3.3 and 1923 of the UBC, depending on the code used to regulate construction. Design of the 3/4"-inch diameter anchor bolts into masonry construction must be determined in accordance with Section 2.1.4 or Section 3.1.6 of ACI 530 (2006, 2003 and 200 IBC and IRC), or Section 2107.1.5 or Section 2108.1.5 of the UBC, depending on the code used to regulate construction. Alternatively, the anchorage to concrete or masonry may be in accordance with a current evaluation report.
- ⁵The combined allowable shear and pullout capacity or nominal strength of the anchorage to concrete needs to be greater than the tabulated allowable uplift load of the MBHA hangers.
- ⁶Nails used with the MBHA connector and engineered wood lumber products must also comply with the minimum edge and spacing limitations specified in the evaluation report for the specific engineered wood lumber products.

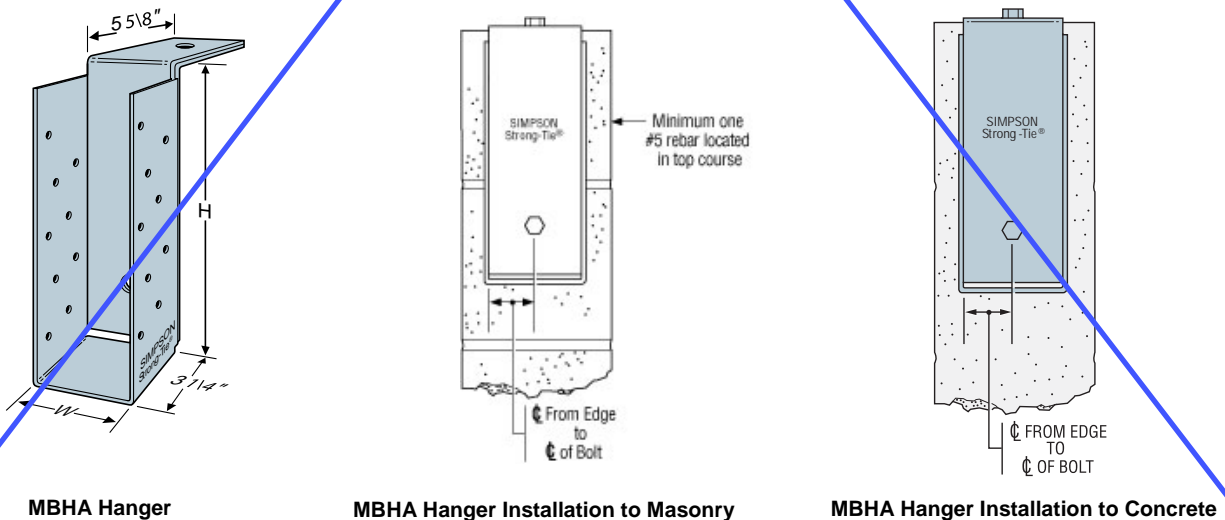


FIGURE 5—MBHA SERIES WOOD BEAM HANGERS SUPPORTED BY CONCRETE OR MASONRY CONSTRUCTION

TABLE 6—GH SERIES GIRDER HANGER^{1,2}

| MODEL NO. | NOMNAL GIRDER SIZE | DIMENSIONS (inches) | | | | NAILS FASTENED TO GIRDER (Quantity – Type) | ALLOWABLE DOWNLOAD ³ (lbs) C _D = 1.0 C _D = 1.15 C _D = 1.25 |
|-----------|--------------------|---------------------|--------------------------------|---|---|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| | | H ⁴ | W | L | S | | |
| GH46-6 | 4x6 | 4 | 3 ⁹ / ₁₆ | 6 | 6 | 4 – 16d | 2,000 |
| GH46-8 | 4x6 | 4 | 3 ⁹ / ₁₆ | 6 | 8 | | 2,000 |
| GH48-6 | 4x8 | 6 | 3 ⁹ / ₁₆ | 6 | 6 | | 2,000 |
| GH48-8 | 4x8 | 6 | 3 ⁹ / ₁₆ | 6 | 8 | | 2,000 |

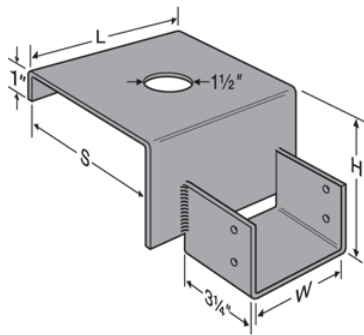
For SI: 1 inch = 25.4 mm, 1 lb = 4.45 N.

¹GH girder hangers must be mounted on top of concrete or concrete masonry wall construction and under a minimum nominal 2-inch by 6-inch wood plate. The 1¹/₂-inch diameter clearance hole accommodates anchor bolts used to attach the wood plate to the concrete or masonry construction. Anchorage of the GH hanger to concrete or masonry wall construction is not necessary since a nominal 2-inch-thick wood plate (mudsill) placed on top of the GH is required to achieve the tabulated loads.

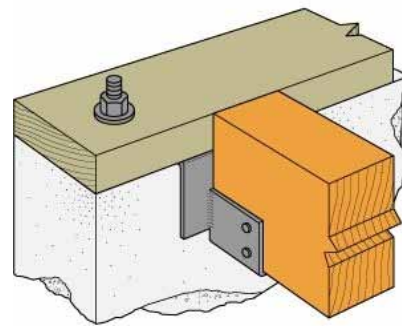
²Uplift loads do not apply for GH hangers.

³Allowable download is the same value regardless of the duration of load as permitted by the applicable building code.

⁴Dimension H, the hanger height, is equal to the girder height minus the wood plate thickness.



GH Girder Hanger



Typical GH Girder Hanger Installation

FIGURE 6—GH GIRDER HANGERS

TABLE 7 HGT SERIES HEAVY GIRDER TIEDOWN¹

| MODEL NO. | DIMENSIONS (inches) | | FASTENERS | | ALLOWABLE UPLIFT LOADS ^{2,3} (lbs) C _D = 1.33 C _D = 1.6 |
|--------------------|---------------------------------|-------------------------------|-----------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------|
| | W | Anchor Spacing | Anchor Bolts ^{4,5} (Quantity – Dia.) | Nails Fastened to Girder (Quantity – Type) | |
| HGT-2 | 3 ⁵ / ₁₆ | 5 ³ / ₄ | 2 – 3/4" | 16 – 10d | 10,980 |
| HGT-3 ⁶ | 4 ¹⁵ / ₁₆ | 7 ³ / ₈ | 2 – 3/4" | 16 – 10d | 16,530 |
| HGT-4 | 6 ⁹ / ₁₆ | 9 | 2 – 3/4" | 16 – 10d | 9,520 |

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

¹The HGT is available in sizes for 2-, 3-, and 4-ply metal plate connected wood trusses.

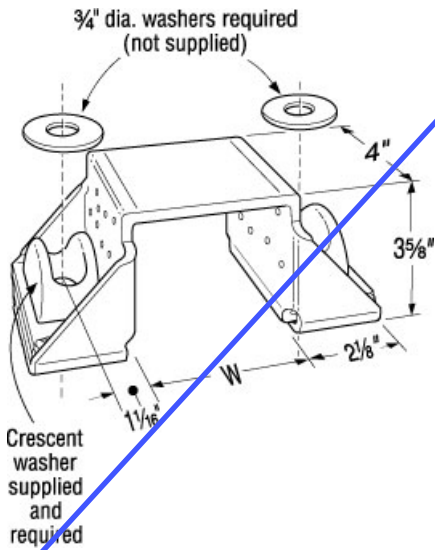
²The allowable uplift loads have been increased for wind or earthquake loading with no further increase is allowed. Allowable uplift loads must be reduced when other load durations govern.

³Attached members must be designed to resist applied loads.

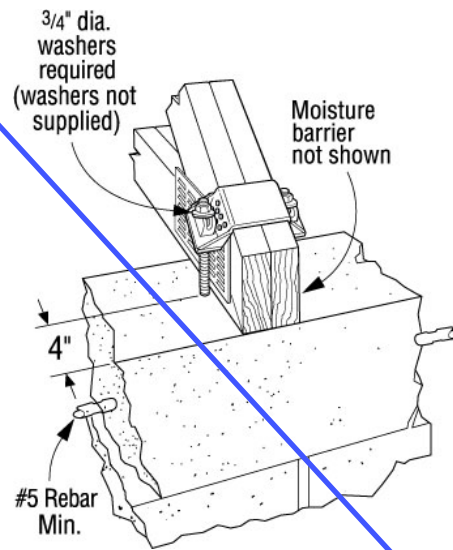
⁴Design of the 3/4"-inch diameter anchor bolts into concrete construction must be determined in accordance with Section 1911 or 1912 of the 2006 IBC, or Section 1912 or Section 1913 of the 2003 or 2000 IBC, or Sections 1915.8.3.3 and 1926 of the UBC, depending on the code used to regulate construction. Design of the 3/4"-inch diameter anchor bolts into masonry construction must be determined in accordance with Section 2.1.4 or Section 3.1.6 of ACI 530 (2006, 2003 and 200 IBC and IRC), or Section 2107.1.5 or Section 2108.1.5 of the UBC, depending on the code used to regulate construction. Alternatively, the anchorage to concrete or masonry may be in accordance with a current evaluation report.

⁵The allowable pullout capacity or nominal strength of the anchorage to concrete or masonry needs to be greater than the tabulated allowable uplift load of the HGT tiedowns.

⁶When the HGT-3 is used with a 2-ply truss, shimming must be provided. Shimming must be a similar size and grade of lumber as the girder, and the entire assembly must be fastened to act as one unit.



HGT-2 Heavy Girder Tiedown (HGT-3 and HGT-4 similar)



Typical HGT-2 Installation into Masonry Construction

FIGURE 7—HGT HEAVY GIRDER TIEDOWNS

TABLE 8—GLB SERIES GLULAM BEARING PLATE

| MODEL NO. | DIMENSIONS (inches) | | | BOLTS (Quantity – Dia.) | ALLOWABLE DOWNLOADS ^{1,2,3,4} (lbs) C _D = 1.0 C _D = 1.15 C _D = 1.25 | |
|-----------|---------------------|---------------|------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|----------------|
| | Width for Beam (W) | Bearing Plate | | | | |
| | | Depth (PD) | Width (PW) | | | Thickness (PT) |
| GLB5A | 5 1/4 | 5 | 7 | 0.2285 | 1 – 1/2 | 14,350 |
| GLB5B | | 6 | 7 | 3/8 | 1 – 1/2 | 17,220 |
| GLB5C | | 7 | 7 | 3/8 | 1 – 1/2 | 20,090 |
| GLB5D | | 8 | 7 | 3/8 | 1 – 1/2 | 22,960 |
| GLB7A | 6 7/8 | 5 | 9 | 0.2285 | 1 – 3/4 | 14,350 |
| GLB7B | | 6 | 9 | 3/8 | 1 – 3/4 | 17,220 |
| GLB7C | | 7 | 9 | 3/8 | 1 – 3/4 | 20,090 |
| GLB7D | | 8 | 9 | 3/8 | 1 – 3/4 | 22,960 |

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.895 kPa.

¹Allowable download is the same value regardless of the duration of load as permitted by the applicable building code since it is based on the allowable perpendicular-to-grain stress, F_{c⊥}, value of 560 psi for the supported wood girder bearing on the full depth (PD) of the GLB connector.

²Design of the structural concrete member and the anchorage of the GLB connector to the concrete must be in accordance with the applicable provisions of the code, including code requirements for a continuous load path and interconnection resisting horizontal lateral loads acting parallel to the beam when seismic design governs.

³The connector plates must bear fully on the supporting structural concrete member.

⁴The supported glued laminated wood member must bear the full depth (PD) of the bearing plate.

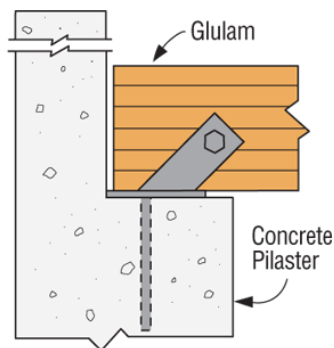


Figure 8a: Typical GLB installation on a concrete pilaster, except the supported glued laminated wood beam must bear on the full depth (PD) of the bearing plate. This drawing is intended to emphasize the code requirement of providing a 1/2-inch air space between the end of the glulam wood member and exterior concrete as required by Section 2304.11.2.5 of the 2006 IBC.

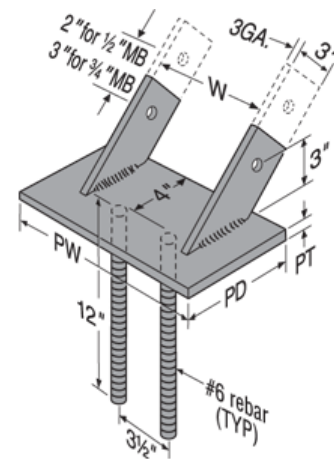


Figure 8b: GLB Bearing Plate Connector

FIGURE 8— GLB GLULAM BEARING PLATE CONNECTOR

TABLE 9—GLBT AND HGLB SERIES GLULAM BEARING PLATES

| MODEL NO. | DIMENSIONS (in.) | | | | BOLTS (Qty. - Dia.) | ALLOWABLE LOADS ¹ (lbs) | | | | | |
|-----------|-------------------------------------|-------------------------------|------------|--------------------------------|-----------------------------------|------------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|---------------------------------------------------------|
| | Width for Beam (W) | Bearing Plate | | | | Download ^{2,3,4} | | | | | Lateral Load ^{5,6} Parallel to the Glulam Beam |
| | | Depth (PD) | Width (PW) | Thickness (PT) | | Glulam Beam Width (in.) | | | | | |
| | | | | | | 3 ¹ / ₈ | 5 ¹ / ₈ | 6 ³ / ₄ | 8 ³ / ₄ | 10 ³ / ₄ | C _D = 1.33 C _D = 1.6 |
| HGLBA | 3 ¹ / ₄ to 9 | 5 | 10 | 3 ³ / ₈ | 2 - 3 ³ / ₄ | 8,750 | 14,350 | 18,900 | 24,500 | — | 8,260 |
| HGLBB | | 6 | 10 | 3 ³ / ₈ | 2 - 3 ³ / ₄ | 10,500 | 17,220 | 22,680 | 29,400 | — | 8,260 |
| HGLBC | | 7 | 10 | 3 ³ / ₈ | 2 - 3 ³ / ₄ | 12,250 | 20,090 | 26,460 | 34,300 | — | 8,260 |
| HGLBD | | 8 | 10 | 3 ³ / ₈ | 2 - 3 ³ / ₄ | 14,000 | 22,960 | 30,240 | 39,200 | — | 8,260 |
| GLBT512 | 3 ¹ / ₄ to 11 | 5 ¹ / ₄ | 12 | 5 ⁵ / ₁₆ | 2 - 3 ³ / ₄ | 9,190 | 15,070 | 19,845 | 25,725 | 31,605 | 8,260 |
| GLBT612 | | 6 ¹ / ₂ | 12 | 3 ³ / ₈ | 2 - 3 ³ / ₄ | 11,375 | 18,655 | 24,570 | 31,850 | 39,130 | 8,260 |
| GLBT516 | 3 ¹ / ₄ to 15 | 5 ¹ / ₄ | 16 | 5 ⁵ / ₁₆ | 2 - 3 ³ / ₄ | 9,190 | 15,070 | 19,845 | 25,725 | 31,605 | 8,260 |
| GLBT616 | | 6 ¹ / ₂ | 16 | 3 ³ / ₈ | 2 - 3 ³ / ₄ | 11,375 | 18,655 | 24,570 | 31,850 | 39,130 | 8,260 |
| GLBT520 | 3 ¹ / ₄ to 19 | 5 ¹ / ₄ | 20 | 5 ⁵ / ₁₆ | 2 - 3 ³ / ₄ | 9,190 | 15,070 | 19,845 | 25,725 | 31,605 | 8,260 |
| GLBT620 | | 6 ¹ / ₂ | 20 | 3 ³ / ₈ | 2 - 3 ³ / ₄ | 11,375 | 18,655 | 24,570 | 31,850 | 39,130 | 8,260 |

For SI: 1 inch = 25.4 mm, 1 lbs = 4.45 N, 1 psi = 6.895 kPa.

¹Design of the concrete member and the anchorage of the GLB connector to the concrete must be in accordance with the applicable provisions of the code, including code requirements for a continuous load path and interconnection resisting horizontal lateral loads acting along the long axis of the beam when seismic design governs.

²Allowable downloads have the same value regardless of the duration of load as permitted by the applicable building code since their capacity are based on the allowable perpendicular-to-grain stress, F_{c⊥}, value of 560 psi of supported wood girders bearing on the full depth (PD) of the GLB connector.

³The connector plates must bear fully on the supporting structural concrete member.

⁴The supported glued laminated wood member must bear the full depth (PD) of the bearing plate.

⁵Allowable lateral loads acting along the long axis of the beam have been increased for wind or earthquake loading with no further increase is allowed. Allowable lateral loads must be reduced when other load durations govern.

⁶Tabulated allowable lateral loads are based on reference lateral design values for of 3/4-inch diameter bolts used in symmetric double shear connections, with applied loading parallel-to-grain of the connected glued-laminated wood member.

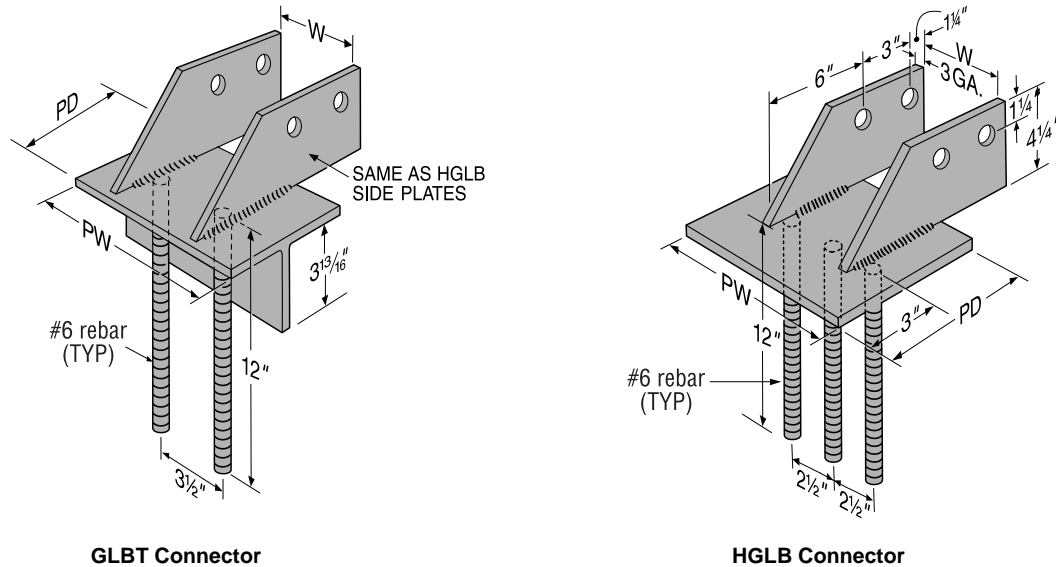


FIGURE 9— HGLB AND GLBT GLULAM BEARING PLATE CONNECTORS