



HARDY FALL PROTECTION SYSTEMS, INC.

4288 Clubhouse Drive

Somis, California 93066

805-404-5196

<http://www.hardvfps.com>

garylhardy1@gmail.com

HARDY TIE BACK SYSTEMS

CSI Sections:

05 50 00 Metal Fabrications

06 05 23 Wood, Plastic, and Composite Fastenings

11 81 29 Facility Fall Protection

1.0 RECOGNITION

The Hardy Fall Protection Systems, Inc. Hardy Tie Back Systems recognized in this report has been evaluated for use as roof level tie-back systems. The structural and durability properties of the Hardy Tie Back Systems comply with the intent of the provisions of the following codes and regulations:

- 2018, 2015 and 2012 International Building Code® (IBC)
- 2018, 2015 and 2012 International Residential Code® (IRC)

2.0 LIMITATIONS

Use of the Hardy Roof Tie-Back Systems recognized in this report are subject to the following limitations:

2.1 The Hardy Roof Tie-Back Systems shall be manufactured, identified and installed in accordance with the manufacturer's published installation instructions and this report. A copy of the instructions shall be available at the jobsite continuously during installation. If there is a conflict between this report and the manufacturer's published installation instructions, the more restrictive prevails.

2.2 Calculations showing compliance with this report shall be submitted to the code official. The calculations shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

2.3 The Hardy Roof Tie-Back Systems shall be designed for installation on a specific building roof framing system by a registered design professional and approved by the building official.

2.4 Connected wood members and fasteners shall comply, respectively, with Sections 4.2.2 and 4.2.3 of this report.

2.5 The Hardy Roof Tie-Back Systems shall not be used simultaneously for two different setups.

2.6 Each Hardy Roof Tie-Back System shall be designed to support one worker only.

2.7 Use of Hardy Roof Tie-Back Systems with fire-retardant-treated or preservative-treated lumber shall be in accordance with Section 4.2.1 of this report. Use of fasteners with fire-retardant-treated or preservative-treated lumber shall be in accordance with Section 4.2.3 of this report.

2.8 The Hardy Roof Tie-Back Systems are fabricated in Santa Ana, California.

3.0 PRODUCT USE

3.1 General: The Hardy Tie Back Systems are roof tie-backs for anchoring workers or suspended scaffolding when access to a building exterior façade is necessary or required for maintenance. Buildings constructed three stories or 36 feet (10.9 m) or more in height above grade plane shall have eyebolts installed at the roof level for securing or tying back suspended scaffold hooks or clamps and safety lines. Each system consists of the device and fasteners. The device is fastened to wood. Fasteners include screws, or bolts placed through the device holes into the supporting structure.

3.2 Design:

3.2.1 Capacity: When installed in accordance with this report, the Hardy Roof Tie-Back Systems achieve a 5,000-pound (22.2 kN) peak load without permanent deformation, in the vertical and horizontal directions. This result complies with ANSI/International Window Cleaning Association (IWCA) I-14.1-2001, Window Cleaning Safety Section 9.1 and the California Code of Regulations Title 8, Chapter 4, Subchapter 7, Article 5, Section 3291 (f) (2) (C).

3.2.2 Allowable Stress Design (ASD): In compliance with Section 4.6.5 of ASCE 7-16, the ASD level strength for the Hardy Roof Tie-Back devices is 3,100 pounds (13.8 kN) maximum in the horizontal and vertical directions. The eyebolt shall be oriented parallel to the horizontal load. When placed on and fastened to the structural supports, the device shall be designed to develop the 3,100 pounds (13.8 kN) ASD strength. Fastening to wood is based on $C_D = 1.6$ in accordance with the ANSI/AWC NDS. Design shall comply with IBC Chapter 23 and ANSI/AWC NDS.

3.3 Installation:

3.3.1 General: The Hardy Roof Tie-Back Systems shall be installed in accordance with this report, the IBC or IRC, ANSI/IWCA I-14.1-2001, and the manufacturer's



installation instructions. Where conflicts occur, the more restrictive shall govern. Installation shall be performed only by qualified installers approved by Hardy Fall Protection Systems, Inc. The eyelet shall be oriented to be perpendicular to the structural framing and parallel to blocking framing. The Hardy Roof Tie-Back Systems shall be placed a minimum of six feet (1829 mm) from the edge of the roof to minimize the angle on the device except as otherwise determined by a registered design professional. In addition, placing the device at the center of the roof allows it to be used from each side of the roof.

3.3.2 Existing Construction: Existing wood framing and decking shall be repaired or replaced if damage is evident. Where portions of the roofing are altered to allow installation of the Hardy Roof Tie-Back System, these areas shall be repaired. Wood species and grade shall be verified as complying with provisions in Section 4.2.2 and Table 1 of this report.

3.3.3 Fastening: The Hardy Tie Back System shall be fastened either by screws or bolts directly to the supporting wood framing. Table 1 of this report provides fastening to wood framing schedule. Fastener installation shall conform to Section 11.1 of the ANSI/AWC National Design Specification for Wood Construction (NDS) and, as applicable, the evaluation report for the fastener.

3.3.4 Periodic Inspection and Testing: Where required in accordance with California Code of Regulations, Title 8, Chapter 4, Article 6, Section 3296(b) or as required by the code official or structural designer, a program for annual inspection and on-site proof loading shall be prepared and conform to the following minimum requirements:

1. Frequency of inspection and proof loading;
2. Proof test procedures shall be prescribed by a registered design professional;
3. Proof tests shall be performed by an approved agency under the direction of the registered design professional;
4. Proof loads shall be no more than 50 percent of the rated capacity;
5. Proof loads shall be in both vertical and horizontal directions;
6. A certification record shall be kept for each inspection and test;
7. In the event of failure to achieve proof load, the device shall be removed from service.

4.0 PRODUCT DESCRIPTION

4.1 General: The Hardy Roof Tie-Back Systems described in this report is available as three different types.

4.1.1 HTB-16: The HTB-16 Hardy Roof Tie-Back System consists of a device constructed from ½-inch (12.7 mm) thick steel plate. The Device has four ¼-inch thick (12.7 mm) steel skirts below the ½-inch (12.7 mm) thick plate. Each skirt has six 5/16-inch (7.9 mm) diameter holes in two

rows. In addition, two 15/16-inch (17.5 mm) holes are provided in each skirt for the alternate ⅞ inch (22.2 mm) diameter bolt connection. A 3½ inch (88.9 mm) diameter by 16-inch (406 mm) long round extra strong steel pipe is above the ½-inch (12.7 mm) thick plate. A 1-inch (25.7 mm) thick steel eyelet with 2-1/16-inch (52 mm) diameter opening is welded to a ½ inch (12.7 mm) thick steel cap plate, which is welded to the top of the pipe. The components are welded together with fillet welds, except full penetration welds connect the skirts together. Figure 1 of this report depicts the HTB-16 device.

4.1.2 HTB-24: The HTB-24 Hardy Roof Tie-Back System consists of a device constructed from ¾-inch (19.1 mm) thick steel plate. The device has four ¼-inch thick (6.4 mm) steel skirts below the ¾-inch (19.1 mm) thick plate. Each skirt has eight 5/16-inch (7.9 mm) diameter holes in two rows. In addition, four 15/16-inch (17.5 mm) holes are provided in each skirt for the alternate ⅞ inch (22.2 mm) diameter bolt connection. A 3½ inch (88.9 mm) diameter by 24-inch (610 mm) long round extra strong steel pipe is above the ½-inch (12.7 mm) thick plate. A 1-inch (25.7 mm) thick steel eyelet with 2-1/16-inch (52 mm) diameter opening is welded to a ½ inch (12.7 mm) thick steel cap plate, which is welded to the top of the pipe. The components are welded together with fillet welds, except full penetration welds connect the skirts together. Figure 2 of this report depicts the HTB-24 device.

4.1.3 HTB-32: The HTB-32 Hardy Roof Tie-Back System consists of a device constructed from ¾-inch (19.1 mm) thick steel plate. The device has four ¼-inch thick (6.4 mm) steel skirts below the ¾-inch (19.1 mm) thick plate. Each skirt has eight 5/16-inch (7.9 mm) diameter holes in two rows. In addition, four 15/16-inch (17.5 mm) holes are provided in each skirt for the alternate ⅞ inch (22.2 mm) diameter bolt connection. A 5 inch (127 mm) diameter by ⅜ inch (9.5 mm) thick by 32-inch (813 mm) long round hollow structural steel tube is above the ½-inch (12.7 mm) thick plate. A 1-inch (25.7 mm) thick steel eyelet with 2-1/16-inch (52 mm) diameter opening is welded to a ½ inch (12.7 mm) thick steel cap plate, which is welded to the top of the pipe. The components are welded together with fillet welds, except full penetration welds connect the skirts together. Figure 3 of this report depicts the HTB-32 device.

4.2 Materials

4.2.1 Steel: The HTB16 and HTB24 Hardy Roof Tie-Back Systems described in this report is manufactured from plain steel plates complying with ASTM A36; and plain steel extra strong pipe complying with ASTM A53.

The HTB32 Hardy Roof Tie-Back System described in this report is manufactured from plain steel plates complying with ASTM A36; and round HSS tube plain complying with ASTM A500. The assemblages are provided with a batch hot-dipped galvanized coating in accordance with ASTM A123, with a minimum G60 coating total for both sides for



the exposed post, pipe, eye bolt, and cap plate components. Alternatively, a powder coating system may be provided, subject to the approval of the code official. The unexposed plates and skirts are provided with a paint system.

The holder of this report (Hardy Fall Protection Systems, Inc.) or lumber treater shall be contacted for recommendations on minimum corrosion resistance of steel in contact with specific proprietary preservative-treated or fire-retardant-treated lumber.

4.2.2 Wood: Wood members to which the Hardy Roof Tie-Back System are connected shall be either sawn lumber or engineered lumber complying with ANSI/AWC National Design Specification for Wood Construction and its Supplement (NDS). Sawn Lumber shall be minimum 0.42 specific gravity and engineered lumber shall be of equivalent specific gravity for bolting or 0.50 for SDS screws. Lumber receiving screws or bolts shall be minimum 4 by 10. The thickness (depth) of the wood main member shall be equal to or greater than the length of the fasteners specified by the calculations, unless the reduced penetration effect on the load calculation per the NDS is taken into account, or as required by wood member design, whichever is greater.

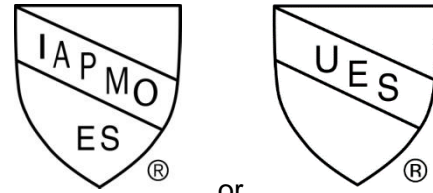
4.2.3 Fasteners: SDS screws shall comply with ICC-ES ESR-2236.

Bolts shall comply with ANSI/ASME B18.2.1 and ASTM A307 when used with the Hardy Roof Tie-Back System described in this report and shall have a 7/8 inch (22.2 mm) shank diameter.

Fasteners used in contact with fire-retardant-treated or preservative-treated lumber shall comply with IBC Section 2304.9.5 or IRC Section R317.3, as applicable. The report holder or lumber treater shall be contacted for recommendations on minimum corrosion resistance and connection capacities of fasteners used with the specific proprietary preservative-treated or fire-retardant-treated lumber.

5.0 IDENTIFICATION

The Hardy Roof Tie-Back Systems are color coded according to depth and identified by the Hardy Fall Protection Systems, Inc. name and trademark, product name, quantity of bolts and screws, and the evaluation report number (ER-461). In addition to the above, each unit will be labeled with the serialized label that will also include the IAPMO ER-461 evaluation report number. The Hardy Roof Tie-Back System identification shall also include the IAPMO Uniform Evaluation Service Mark of Conformity. Either Mark of Conformity may be used as shown below:



or
IAPMO UES ER-461

6.0 SUBSTANTIATING DATA

- 6.1 Manufacturer's descriptive literature and installation instructions.
- 6.2 Reports of physical and mechanical property testing.
- 6.3 Reports of load tests.
- 6.4 Test results are from laboratories in compliance with ISO/IEC 17025.
- 6.5 Engineering calculations.
- 6.6 Quality documentation.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on the Hardy Tie Back System to assess its conformance to the codes shown in Section 1.0 of this report and documents the product's certification. Products are manufactured at the location noted in Section 2.8 of this report under a quality control program with periodic inspections under the surveillance of IAPMO UES.

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 or email us at info@uniform-es.org



Table 1 – Fastening Requirements¹

Device	Fastener	Fastener Diameter (inch)	Minimum Fastener Length ²	No. of Fasteners per opposing skirt (total)	Minimum wood member size (nominal)	Minimum Lumber specific Gravity	Minimum Edge Distance (inch) ⁴	Minimum End Distance ^{3,5}	
								⊥	
HTB-16	Bolt ⁶	7/8	Footnote 2	2(4)	4 by 10 or 2- 2 by 10	0.42	2018 and 2015 NDS Table 12.5.1C	2018 and 2015 NDS Table 12.5.1A	2018 and 2015 NDS Table 12.5.1A
	SDS Screw	0.185	3	6 (12)	4 by 10 or 2- 2 by 10	0.50	1½	3	4
HTB-24	Bolt ⁶	7/8	Footnote 2	4 (8)	4 by 10 or 2- 2 by 10	0.42	2018 and 2015 NDS Table 12.5.1C	2018 and 2015 NDS Table 12.5.1A	2018 and 2015 NDS Table 12.5.1A
	SDS Screw	0.185	3	8 (16)	4 by 10 or 2- 2 by 10	0.50	1½	3	4
HTB-32	Bolt ⁶	7/8	Footnote 2	4 (8)	4 by 10 or 2- 2 by 10	0.42	2018 and 2015 NDS Table 12.5.1C	2018 and 2015 NDS Table 12.5.1A	2018 and 2015 NDS Table 12.5.1A
	SDS Screw	0.185	3	8 (16)	4 by 10 or 2- 2 by 10	0.50	1½	3	4

1. HTB devices shall be placed between structural framing with eyelet oriented perpendicular and fastened to the framing through the skirt. Wood blocking shall be installed perpendicular to the structural framing adjacent to the device.
2. Bolts shall be long enough for a minimum thread protrusion of one full thread beyond the face of the nut.
3. End distance is for loading perpendicular to grain (⊥) or parallel to grain (||).
4. Minimum edge distance shall comply with Table 11.5.1C of the 2012 NDS as applicable.
5. Minimum end distance for loading perpendicular to grain (⊥) or parallel to grain (||) shall comply with Table 11.5.1A of the 2012 NDS, as applicable.
6. Bolted connection only resists the 3,100 pounds (13.8 kN) ASD strength.
7. SDS screw connection only resists the 3,100 pounds (13.8 kN) ASD strength.

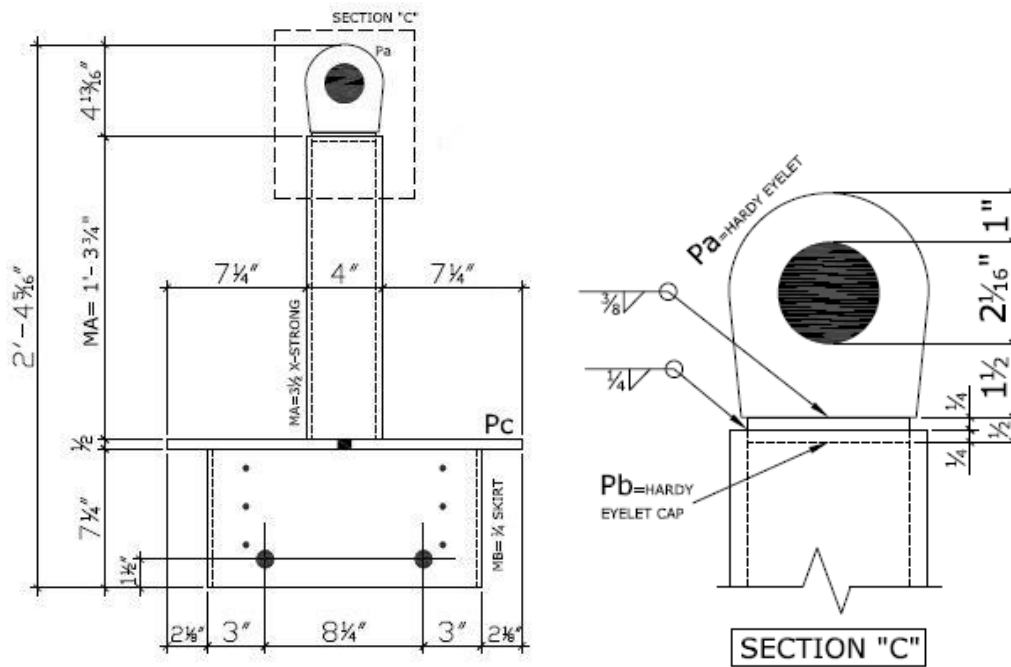


Figure 1—HTB-16 Device

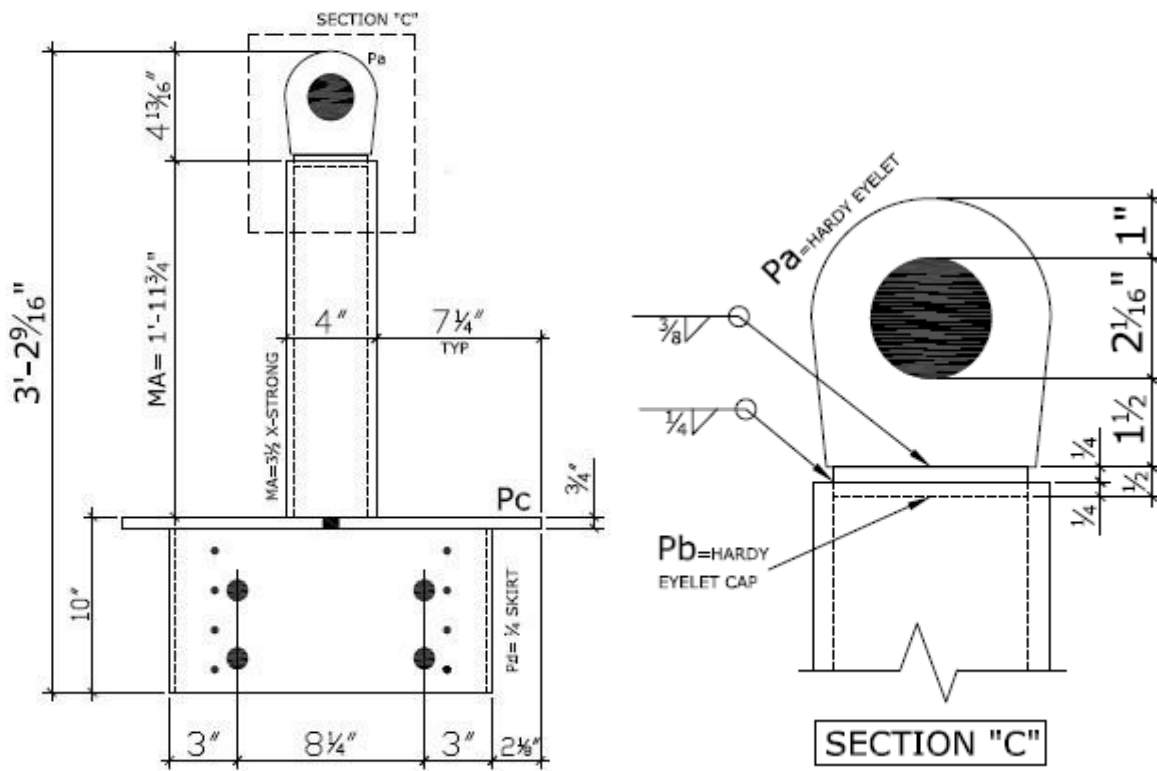


Figure 2—HTB-24 Device

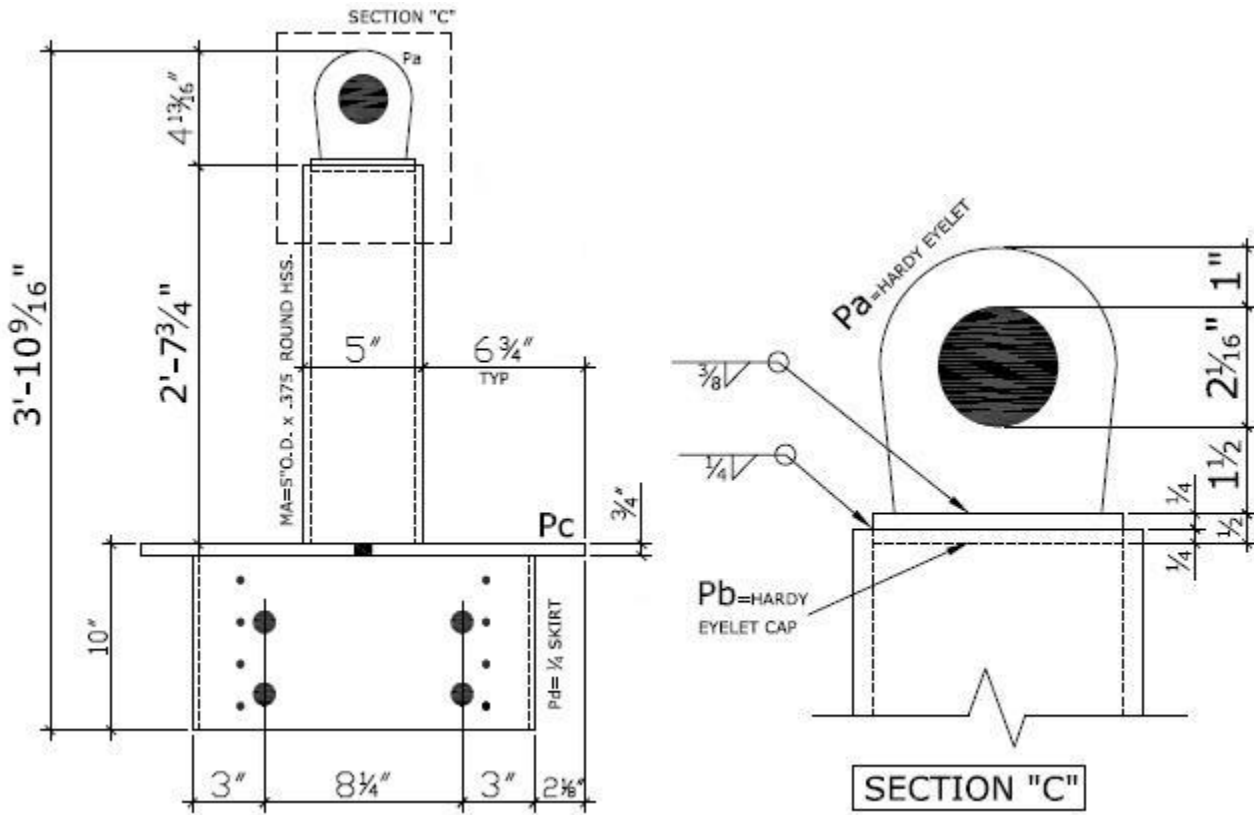


Figure 3—HTB-32 Device