

ICC-ES Evaluation Report

ESR-5466

Issued July 2026

Revised September 2026

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DIVISION: 06 00 00— WOOD, PLASTICS AND COMPOSITES Section: 06 05 23.35— Mass Timber Connectors	REPORT HOLDER: MY-TI-CON TIMBER CONNECTORS INC. DBA MTC SOLUTIONS	EVALUATION SUBJECT: APEX AND RIDGE CONNECTORS	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2024, 2021 and 2018 [International Building Code® \(IBC\)](#)
- 2024, 2021 and 2018 [International Residential Code® \(IRC\)](#)

Property evaluated:

- Structural

2.0 USES

The APEX and RIDGE Connectors described in this report are face-mounted hangers used as wood framing connectors complying with Section 2304.10.4 of the 2024 and 2021 IBC (Section 2304.10.3 of the 2018 IBC), to transfer loads from a supported beam to a supporting column or beam. The hangers 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 APEX and RIDGE Connectors are pairs of connector plates that mate together, with each plate fabricated from a single piece of aluminum. The plates have predrilled holes for the installation of self-tapping screws.

The APEX and RIDGE Connectors are installed in inverted pairs and are face-mounted to structural glued-laminated timber (glulam) or sawn lumber, for beam-to-beam and beam-to-column connections. The connectors are installed using screws complying with Section 3.2.3. The total nominal thickness of an APEX connector pair is 2 inches (50 mm) and the total nominal thickness of a RIDGE connector pair is 1½ inches (38 mm). [Table 1](#) lists model designations, dimensions, fastening schedules and allowable loads for the APEX Connectors; [Table 2](#) lists model designations, dimensions, fastening schedules and allowable loads for the RIDGE Connectors. See [Figure 1](#) for depictions of the APEX Connector models and [Figure 2](#) for depictions of the RIDGE Connector models.

3.2 Materials:

3.2.1 Aluminum: The APEX and RIDGE Connectors are fabricated from ASTM B221 6061-T6 aluminum alloy with a specified minimum yield strength, F_y , of 35 ksi (241 MPa) and a specified minimum tensile strength, F_u , of 38 ksi (262 MPa).

3.2.2 Wood: Wood beams and columns to which the APEX and RIDGE connector plates are face-mounted must be glulam complying with Section 2303.1.3 of the IBC or sawn lumber complying with Section 2303.1.1 of the IBC. The wood must have an assigned specific gravity as shown in the ANSI/AWC *National Design Specification for Wood Construction*[®] (NDS), SG_{NDS} , corresponding to the design values in [Tables 1](#) and [2](#) and must have a moisture content of no more than 19 percent at the time of fastener installation. The dimensions of the wood members must be sufficient to ensure all screw tips remain completely embedded in the member when fully installed and must be as required by wood member design.

3.2.3 Screws: The screws used for installation of the beam hangers described in this report are $\frac{5}{16}$ -inch x $6\frac{1}{4}$ inch (8 mm x 160 mm) and $\frac{3}{8}$ -inch x $7\frac{7}{8}$ inch (10 mm x 200 mm) fully-threaded, countersunk head (FTC) screws evaluated under [ESR-3178](#) and packaged with the MTC connectors.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The tabulated allowable loads shown in [Tables 1](#) and [2](#) are for Allowable Stress Design (ASD) and include the load duration factor, C_D , addressed in the NDS.

Tabulated allowable loads apply to beam-to-beam and beam-to-column connections formed with the beam hangers described in this report, when the glulam or sawn lumber is used under dry service conditions and where sustained temperatures are 100°F (37.8°C) or less. When connectors are fastened to glulam or sawn lumber that will experience sustained exposure to temperatures exceeding 100°F (37.8°C), the allowable loads in this report must be adjusted by the temperature factor, C_t , specified in the NDS.

Connected wood members must be analyzed for load-carrying capacity in accordance with the NDS, including Appendix E to the NDS. This must take into account effects from multiple connectors attached to different faces of each supporting column or beam, as applicable. When wood members are routed, notched, slotted or similarly fabricated to accommodate concealed hanger products, the design of the wood member must account for this.

4.2 Installation:

The wood members must be prepared and installation of the APEX and RIDGE connectors must be in accordance with this evaluation report and the installation instructions under the MTC Solutions APEX Installation Guide or the MTC Solutions RIDGE Installation Guide, as applicable. In the event of a conflict between this report and the MTC Solutions installation instructions, this report governs.

The connector plates must be installed symmetrically about the vertical axis of the cross-section of the supported beam. On the supported beam, the connector plate must be oriented with the pocket at the top and the tongue at the bottom. On the supporting beam or column, the companion connector plate must be oriented with the pocket at the bottom and the tongue at the top. The minimum distances from the edges of the connector plates to the edge of the wood must be in accordance with the published installation instructions. The screws must be installed in accordance with the screw manufacturer's published installation instructions.

The connector plates may be recessed into one of the wood members, to conceal the hardware and to minimize the gap between the supported beam and the supporting beam or column, as shown in the MTC installation instructions. The shear screws must be installed first and then the inclined screws. The connection is completed by lowering the supported beam until the tongue of the beam connector plate is fully seated within the pocket of the supporting connector plate.

4.3 Special Inspection

Special inspection of offsite connector installation is required in accordance with IBC Section 1704.2.5. Special inspection of site-installed connectors and pairing of connectors is required in accordance with Section 1705.5.3 of the 2024 and 2021 IBC.

5.0 CONDITIONS OF USE:

The APEX and RIDGE Connectors 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 connector plates must be manufactured, identified and installed in accordance with this report and the distributor's published installation instructions. A copy of the instructions must be available at the jobsite at all times during installation.
- 5.2** Calculations and construction documents showing compliance with this report must be submitted to the code official. The calculations and construction documents 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 The APEX and RIDGE Connectors do not resist uplift loads. If uplift loads are anticipated, additional fastening of the beam, designed in accordance with the code, is needed to prevent uplift.
- 5.4 The APEX and RIDGE Connectors have only been evaluated for downward load capacity. Evaluation of resistance to other loads is outside the scope of this evaluation report but may be addressed by others in accordance with the code.
- 5.5 The APEX and RIDGE Connectors have not been evaluated for corrosion resistance and is outside the scope of this report.
- 5.6 Use of APEX and RIDGE Connectors and screws with preservative or fire-retardant treated lumber is outside the scope of this report.
- 5.7 The APEX and RIDGE Connectors are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the [ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices \(AC13\)](#), dated April 2024.
- 6.2 Reports of single-fastener tests for aluminum to wood end grain connections in accordance with the [ICC-ES Acceptance Criteria for Dowel-type Threaded Fasteners Used in Wood \(AC233\)](#), dated June 2023 (editorially revised June 2024).
- 6.3 Engineering analysis to determine allowable loads based on AC13 and the single fastener data for the proprietary screws.

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-5466) along with the name, registered trademark, or registered logo of the report holder (MTC Solutions Inc.) must be included in the product label.
- 7.2 In addition, the APEX or RIDGE name and model designation must be included on the product label.
- 7.3 The report holder's contact information is the following:

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TABLE 1—APEX CONNECTORS: BEAM-TO-BEAM AND BEAM-TO-COLUMN ALLOWABLE DOWNLOADS⁴

MODEL	DIMENSIONS ¹ (inches)				FASTENERS ² (Quantity - Size)				ALLOWABLE DOWNLOADS ³ (lbf)
	T	W	H ₁	H ₂	Supported Beam (shear)	Supported Beam (inclined)	Supporting Beam/Column (shear)	Supporting Beam/Column (inclined)	C _D = 1.00
APEX S	2	4	18 ¹ / ₄	19 ¹ / ₄	7 – ³ / ₈ " x 7 ⁷ / ₈ "	10 – ³ / ₈ " x 7 ⁷ / ₈ "	7 – ³ / ₈ " x 7 ⁷ / ₈ "	10 – ³ / ₈ " x 7 ⁷ / ₈ "	20,850
APEX M	2	4	20 ¹ / ₂	21 ³ / ₄	8 – ³ / ₈ " x 7 ⁷ / ₈ "	12 – ³ / ₈ " x 7 ⁷ / ₈ "	8 – ³ / ₈ " x 7 ⁷ / ₈ "	12 – ³ / ₈ " x 7 ⁷ / ₈ "	24,850
APEX L	2	6	16 ³ / ₄	17 ¹ / ₂	14 – ³ / ₈ " x 7 ⁷ / ₈ "	15 – ³ / ₈ " x 7 ⁷ / ₈ "	14 – ³ / ₈ " x 7 ⁷ / ₈ "	15 – ³ / ₈ " x 7 ⁷ / ₈ "	31,950
APEX XL	2	6	21 ³ / ₈	22 ¹ / ₈	16 – ³ / ₈ " x 7 ⁷ / ₈ "	18 – ³ / ₈ " x 7 ⁷ / ₈ "	16 – ³ / ₈ " x 7 ⁷ / ₈ "	18 – ³ / ₈ " x 7 ⁷ / ₈ "	39,050

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

¹Refer to [Figure 1](#) for definitions of hanger dimensions.

²Structural fasteners must be fully threaded self-tapping screws as defined in Section 3.2.3 of this report.

³Tabulated allowable loads apply to normal (10-year) load duration only.

⁴The assigned specific gravity of the wood, *S_{GND}*, is 0.50.

⁵The tabulated capacities are for the following installation conditions:

- One connector must be installed at the center of the width of the supported beam, with the pocket toward the top of the beam. The opposing connector must be installed with the pocket towards the bottom of the connection.
- The beam width must be a minimum of 1/2 inches greater than the W dimension of the connector for APEX S and APEXM, and a minimum of 9/16 inches greater than the W dimension of the connector for APEX L and XL.
- The distance measured vertically from the top of the connector to the top fibers of the supported beam must be a minimum of 5/16 inches for the APEX S and M, and a minimum of 1/16 inches for the APEX L and XL.
- The distance measured vertically from the bottom of the connector to the bottom fibers of the supported beam must be a minimum of 1-5/16 inches for the APEX S and M, and a minimum of 27/32 inches for the APEX L and XL.
- The supporting beam or column must be as wide or wider than the supported beam and deep enough to allow the fasteners to be fully encapsulated in the wood.
- The back of the connector plate must be in full contact with the connected wood member.

TABLE 2—RIDGE CONNECTORS: BEAM-TO-BEAM AND BEAM-TO-COLUMN ALLOWABLE DOWNLOADS⁴

MODEL	DIMENSIONS ¹ (inches)				FASTENERS ² (Quantity - Size)				ALLOWABLE DOWNLOADS ³ (lbf)
	T	W	H ₁	H ₂	Supported Beam (shear)	Supported Beam (inclined)	Supporting Beam/Column (shear)	Supporting Beam/Column (inclined)	
RIDGE XS	1½	3½	7	7¾	6 – 5/16" x 6¼"	3 – 5/16" x 6¼"	6 – 5/16" x 6¼"	3 – 5/16" x 6¼"	5,100
RIDGE S	1½	3½	8½	9¼	8 – 5/16" x 6¼"	6 – 5/16" x 6¼"	8 – 5/16" x 6¼"	6 – 5/16" x 6¼"	9,000
RIDGE M	1½	3½	10⅞	10⅞	10 – 5/16" x 6¼"	9 – 5/16" x 6¼"	10 – 5/16" x 6¼"	9 – 5/16" x 6¼"	12,850
RIDGE L	1½	3½	11⅝	12⅜	12 – 5/16" x 6¼"	12 – 5/16" x 6¼"	12 – 5/16" x 6¼"	12 – 5/16" x 6¼"	16,750
RIDGE XL	1½	3½	14¼	15	6 – 5/16" x 6¼"	19 – 5/16" x 6¼"	6 – 5/16" x 6¼"	19 – 5/16" x 6¼"	22,400

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

¹Refer to Figure 2 for definitions of hanger dimensions.

²Structural fasteners must be fully threaded self-tapping screws as defined in Section 3.2.3 of this report.

³Tabulated allowable loads apply to normal (10-year) load duration only.

⁴The assigned specific gravity of the wood, SG_{NDS} , is 0.50.

⁵The tabulated capacities are for the following installation conditions:

- One connector must be installed at the center of the width of the supported beam, with the pocket toward the top of the beam. The opposing connector must be installed with the pocket towards the bottom of the connection.
- The beam width must be a minimum of 31/32 inches greater than the W dimension of the connector.
- The distance measured vertically from the top of the connector to the top fibers of the supported beam must be a minimum of 3/8 inches.
- The distance measured vertically from the bottom of the connector to the bottom fibers of the supported beam must be a minimum of 1-5/32 inch.
- The supporting beam or column must be as wide or wider than the supported beam and deep enough to allow the fasteners to be fully encapsulated in the wood.
- The back of the connector plate must be in full contact with the connected wood member.

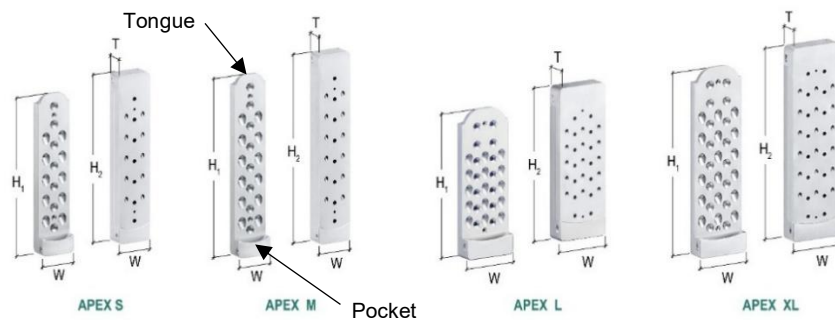


FIGURE 1—APEX CONNECTORS MODELS

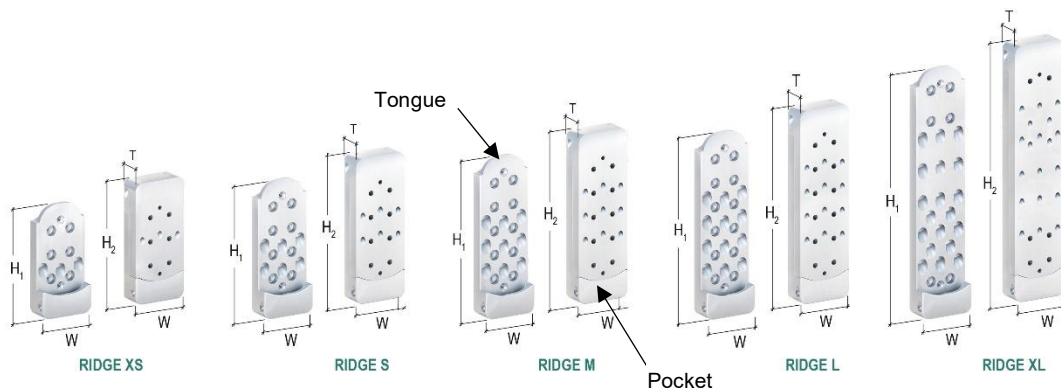


FIGURE 2—RIDGE CONNECTORS MODELS