

# ICC-ES Evaluation Report

ESR-3456

Reissued February 2024

This report also contains:


- FBC Supplement

Subject to renewal February 2026

- LABC Supplement

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<p><b>DIVISION: 06 00 00—</b> <b>WOOD, PLASTICS AND COMPOSITES</b></p> <p><b>Section: 06 05 23—</b> <b>Wood, Plastic, and Composite Fastenings</b></p>	<p><b>REPORT HOLDER:</b> <b>MITEK INC.</b></p>	<p><b>EVALUATION SUBJECT:</b> <b>MITEK CONNECTORS FOR WOOD-FRAMED CONSTRUCTIONS— BRIDGING AND WALL BRACING</b></p>	
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## 1.0 EVALUATION SCOPE

### Compliance with the following codes:

- 2021, 2018, 2015 and 2012 *International Building Code*® (IBC)
- 2021, 2018, 2015 and 2012 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted with Los Angeles Department of Building and Safety (LADBS), see [ESR-3456 LABC and LARC Supplement](#).

### Property evaluated:

Structural

## 2.0 USES

The MiTek connectors described in this report are used for connecting wood framing members in accordance with Section 2304.10.4 of the 2021 IBC, Section 2304.10.3 of the 2018, 2015 and 2012 IBC, or Section 2304.9.3 of the 2012 IBC. The connectors may also be used in structures regulated under the IRC when an engineered design is submitted to, and approved by, the code official, in accordance with Section R301.1.3 of the IRC.

## 3.0 DESCRIPTION

### 3.1 Bridging:

**3.1.1 MB16 and MBG Series Bridging:** The MB16 and MBG series bridging products are cold-formed from No. 22 gage steel. The MB16 series bridging is designed to be installed without the use of nails, and MBG series bridging is prepunched for installation with 8d by 1½-inch-long nails. See [Table 1](#) and [Figure 1](#) for product dimensions, fastener schedule, joist sizes and spacings, and typical installation details.

**3.1.2 N and O Series Bridging:** The N series bridging, designed to span between two joists, is cold-formed from No. 20 gage steel or No. 22 gage steel. The O series bridging, designed to span across three joists in an over-and-under configuration, is cold-formed from No. 22 gage steel. The ends of both the N and O series bridging are prepunched for installation with 8d by 1½-inch-long nails, and the O series bridging is also partially punched in the middle to allow prongs to be pressed into the middle joist. See [Figure 2](#) and [Tables 2A](#) and [2B](#) for product dimensions, fastener schedule, joist depths and spacings, and typical installation details.

### 3.2 Wall Bracing:

See [Figure 3](#) and [Table 3](#) for product dimensions, fastener schedule, angle of installation, and a typical installation detail.

**3.2.1 RWB and WB Series Wall Bracing:** The RWB and WB series wall bracing products are designed for use with stud spacings of either 16 or 24 inches (406 or 610 mm) on center. The RWB series wall bracing is cold-formed from No. 16 gage steel and is available in a standard 35-pound pack (15.9 kg). The RWB wall bracing is prepunched for installation with 8d common nails. The WB series bracing is cold-formed from No. 16 gage steel, and is prepunched for installation with 8d common nails into each stud and 16d common nails into the top plate and sill plate.

**3.2.2 WBC and WBT Wall Bracing:** The WBC and WBT series wall bracing products are designed for use with stud spacings of either 12 or 16 inches (305 or 406 mm) on center. The WBC series wall bracing is cold-formed from No. 18 gage steel, and is available in a flat configuration. The WBC series wall bracing is prepunched for installation with 16d common nails into the top and bottom plates and 8d common nails into each intervening stud. The WBT series wall bracing is cold-formed with rolled edges in a T-style from No. 22 gage steel and is prepunched for installation with 8d common nails.

### 3.3 Materials:

**3.3.1 Steel:** The connectors described in this report are formed from ASTM A653, SS designation, Grade 40 galvanized steel and have a G90 zinc coating complying with ASTM A653. Minimum steel base-steel thicknesses for the different gages are shown in the following table:

GAGE NO.	MINIMUM BASE-STEEL THICKNESS (inch)
22	0.029
20	0.033
18	0.044
16	0.055

For SI: 1 inch = 25.4 mm.

**3.3.2 Wood:** Wood members used in braced walls must comply with the IBC or IRC, as applicable. For bridging and wall bracing installed with nails, the thickness of each wood member must be sufficient such that the specified fasteners do not protrude through the opposite side of the member, unless otherwise permitted in the applicable table within this report. Refer to Section 3.3.4 for issues related to treated wood.

**3.3.3 Fasteners:** Nails used for connectors described in this report must comply with ASTM F1667; and must have dimensions and bending yield strengths as shown in the following table:

FASTENER DESIGNATION	FASTENER LENGTH (inches)	SHANK DIAMETER (inch)	MINIMUM REQUIRED $F_{yb}$ (psi)
8d x 1 $\frac{1}{2}$	1.5	0.131	100,000
8d common	2.5	0.131	100,000
16d common	3.5	0.162	90,000

For SI: 1 inch = 25.4 mm, 1 psi = 6.89 kPa.

**3.3.4 Use in Treated Wood:** Connectors and fasteners used in contact with preservative-treated or fire-retardant-treated wood must comply with Section 2304.10.6 of the 2021 IBC (Section 2304.10.5 of the 2018 and 2015 IBC, Section 2304.9.5 of the 2012 IBC) or Section R317.3 of the IRC. The lumber treater or the report holder (MiTek), or both, should be contacted for recommendations on the appropriate level of corrosion resistance to specify for the connectors and fasteners as well as the connection capacities of the fasteners used with the specific proprietary preservative-treated or fire-retardant-treated lumber.

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

The MiTek Bridging products are used prescriptively to span between wood joists to provide lateral bridging and bracing meeting the requirements of IBC Sections 2308.4.6 and 2308.7.8 (Sections 2308.8.5 and 2308.10.6 of the 2012 IBC) and IRC Section R502.7.1 and R802.8.1. For engineered designs, the bridging is used to address the requirement of Section 4.4.1.2(d) of the NDS. The MiTek Wall Bracing products are used to provide lateral resistance in dimensional 2-by solid sawn lumber stud framed walls, as shown for wall Let-in-bracing (LIB) in IBC Table 2308.6.3(1) and IRC Table R602.10.4 and as an alternate to the bracing methods prescribed in 2012 IBC Section 2308.9.3.

### 4.2 Installation

Installation of the connectors must be in accordance with this evaluation report and the manufacturer's published installation instructions.

**4.2.1 Bridging:** Bridging units should be installed in pairs at intervals of 8-ft or less. Bridging pairs should form an “X” between joists; leave a slight space between the units to avoid noise-generating contact. See [Figures 1](#) and [2](#).

**4.2.2 Wall Bracing:** RWB and WB series bracing is for use with 16 or 24 inch (406 or 610 mm) on-center studs. They must be installed in pairs forming an “X” or opposing “V” at each end of a maximum 25-foot-long wall panel. WBC and WBT series bracing is for use with 12 or 16 inch (305 or 406 mm) on-center studs. Install one brace at each end of wall section, not exceeding 25-feet, in an opposing “V” pattern. See [Figure 3](#).

#### **4.3 Special Inspection:**

**4.3.1 Main Windforce-resisting Systems under the IBC:** Periodic special inspection must be conducted for components within the main windforce-resisting system, where required in accordance with Sections 1704.2 and 1705.12 of the 2021 IBC, Sections 1704.2 and 1705.11 of the 2018 and 2015 IBC and Sections 1704.2 and 1705.10 of the 2012 IBC.

**4.3.2 Seismic-force-resisting Systems under the IBC:** Periodic special inspection must be conducted for components within the seismic-force-resisting system, where required in accordance with Sections 1704.2 and 1705.13 of the 2021 IBC, Sections 1704.2 and 1705.12 of the 2018 and 2015 IBC and Sections 1704.2 and 1705.11 of the 2012 IBC.

### **5.0 CONDITIONS OF USE:**

The MiTek connectors described in this evaluation 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 evaluation report and the manufacturer’s published installation instructions. A copy of the manufacturer’s published installation instructions must be available at the jobsite at all times during installation. In the event of a conflict between this report and the manufacturer’s published installation instructions, the most stringent requirements govern.
- 5.2** Connected wood members and fasteners must comply with Sections 3.3.2 and 3.3.3, respectively.
- 5.3** Use of connectors and fasteners with preservative-treated or fire-retardant-treated lumber must be in accordance with Section 3.3.4.
- 5.4** The bridging and wall bracing products are manufactured under a quality control system with inspections by ICC-ES.

### **6.0 EVIDENCE SUBMITTED**

Data in accordance with the [ICC-ES Acceptance Criteria for Joist Hangers and Similar Devices \(AC13\)](#), dated October 2018 (editorially revised December 2020).

### **7.0 IDENTIFICATION**

- 7.1** Each connector described in this evaluation report is identified by the product model (stock) number, the number of the ICC-ES index evaluation report for MiTek ([ESR-2685](#)), and by one or more of the following designations: MiTek, USP Structural Connectors, or USP.
- 7.2** The report holder’s contact information is the following:

**MITEK INC.**  
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CHESTERFIELD, MISSOURI 63017  
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[www.mitek-us.com](http://www.mitek-us.com)  
[uspcustomerservice@mii.com](mailto:uspcustomerservice@mii.com)

TABLE 1—MB16 and MBG SERIES BRIDGING <sup>1,2,3</sup>

JOIST SIZE	STOCK NO.	STEEL GAGE	DIMENSIONS (in.)		FASTENER SCHEDULE		JOIST SPACING O.C. (in.)
			W	L	Qty	Type	
2 x 8 - 10 - 12	MB16	22	1 <sup>1</sup> / <sub>16</sub>	(adjustable)	-- --	-- --	16
2 x 8	MBG812	22	1 <sup>5</sup> / <sub>16</sub>	11 <sup>3</sup> / <sub>4</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	12
2 x 8	MBG816	22	1 <sup>5</sup> / <sub>16</sub>	15 <sup>9</sup> / <sub>16</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	16
2 x 8	MBG824	22	1 <sup>5</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>2</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	24
2 x 10	MBG1012	22	1 <sup>5</sup> / <sub>16</sub>	12 <sup>3</sup> / <sub>4</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	12
2 x 10	MBG1016	22	1 <sup>5</sup> / <sub>16</sub>	16 <sup>5</sup> / <sub>16</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	16
2 x 10	MBG1024	22	1 <sup>5</sup> / <sub>16</sub>	24	1	8d x 1 <sup>1</sup> / <sub>2</sub>	24
2 x 12	MBG1212	22	1 <sup>5</sup> / <sub>16</sub>	14	1	8d x 1 <sup>1</sup> / <sub>2</sub>	12
2 x 12	MBG1216	22	1 <sup>5</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	16
2 x 12	MBG1224	22	1 <sup>5</sup> / <sub>16</sub>	24 <sup>3</sup> / <sub>4</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	24
2 x 14	MBG1412	22	1 <sup>5</sup> / <sub>16</sub>	16	1	8d x 1 <sup>1</sup> / <sub>2</sub>	12
2 x 14	MBG1416	22	1 <sup>5</sup> / <sub>16</sub>	18 <sup>7</sup> / <sub>16</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	16
2 x 14	MBG1424	22	1 <sup>5</sup> / <sub>16</sub>	25 <sup>5</sup> / <sub>8</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	24
2 x 16	MBG1612	22	1 <sup>5</sup> / <sub>16</sub>	17	1	8d x 1 <sup>1</sup> / <sub>2</sub>	12
2 x 16	MBG1616	22	1 <sup>5</sup> / <sub>16</sub>	19 <sup>5</sup> / <sub>8</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	16
2 x 16	MBG1624	22	1 <sup>5</sup> / <sub>16</sub>	26 <sup>5</sup> / <sub>8</sub>	1	8d x 1 <sup>1</sup> / <sub>2</sub>	24

For SI: 1 inch = 25.4 mm.

<sup>1</sup>See Section 3.3.3 for required fastener dimensions and mechanical properties.

<sup>2</sup>MB16 and MBG series bridging must be attached to wood framing members complying with Section 3.3.2

<sup>3</sup>Joist spacing values are based on one 1 1/2-inch joist width.

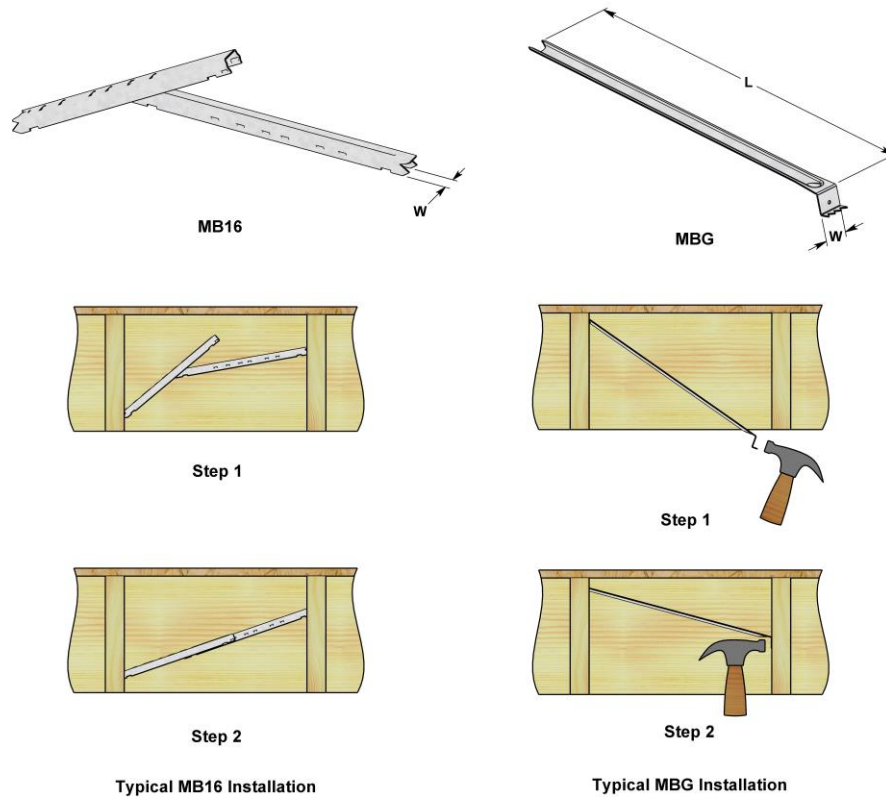


FIGURE 1—MB16 AND MBG BRIDGING

TABLE 2A—N AND O SERIES BRIDGING

STOCK NO.	STEEL GAGE	DIMENSIONS (in)		FASTENER SCHEDULE	
		W	L	Qty	Type
N16	22	3/4	19 <sup>3/4</sup>	4	8d x 1 1/2
N27	20	3/4	26 <sup>13/16</sup>	4	8d x 1 1/2
N30	20	3/4	29 <sup>13/16</sup>	4	8d x 1 1/2
N36	20	3/4	35 <sup>13/16</sup>	4	8d x 1 1/2
N42	20	3/4	42	4	8d x 1 1/2
N48	20	3/4	48	4	8d x 1 1/2
N54	20	3/4	54	4	8d x 1 1/2
N56	20	1	56	4	8d x 1 1/2
N60	20	1	60	4	8d x 1 1/2
O40	22	3/4	39 <sup>3/4</sup>	4	8d x 1 1/2

TABLE 2B—N AND O SERIES BRIDGING INSTALLATION<sup>1,2</sup>

STOCK NUMBER FOR JOIST-TO-JOIST X BRIDGING										
Joist Type	Joist Depth (in)	Joist Spacing (in)								
		12"	16"	19.2"	24"	30"	32"	36"	42"	48"
2x Sawn Dimensional	7 1/4	--	N16/O40	N27	N27/N30	N36	N36	N42	N48	N54/N56
	9 1/4	N16	N16/O40	N27	N30	N36	N36	N42	N48	N54/N56
	11 1/4	N16/O40	O40	N27	N30	N36	N36	N42	N48	N54/N56
1 3/4" SCL	9 1/2	N16	N16	N27	N30	N36	N36	N42	N48	N54/N56
	11 7/8	N16	N16	N27	N30	N36	N36	N42	N48	N54/N56
	14	N16	N27	N27/N30	N30	N36	N36	N42	N48	N54/N56
	16	N27	N27	N27/N30	N30	N36	N42	N42	N48	N54/N56
I-Joists: 2 1/2" and 3 1/2" Wide	9 1/2	N16	N16	N16	N27/N30	N36	N36	N36	N42	N56
	11 7/8	N16	N16	N27	N30	N36	N36	N42	N48	N56
	14	N16	N16	N27	N30	N36	N36	N42	N48	N54/N56
	16	N16	N27	N27/N30	N30	N36	N36	N42	N48	N54/N56
	18	N27	N27	N30	N30	N36	N36	N42	N48	N54/N56
	20	N27	N30	N30	N36	N36	N42	N42	N48	N54/N56
	22	N30	N30	N30	N36	N42	N42	N42	N48	N54/N56/N60
24	N30	N30	N36	N36	N42	N42	N48	N56	N56/N60	

For SI: 1 inch = 25.4 mm.

<sup>1</sup>Gray shaded cells represent bridging installed on the face of the joist; web stiffeners are required for I-Joists.

<sup>2</sup>See Section 3.3.3 for required fastener dimensions and mechanical properties.

<sup>3</sup>N and O series bridging must be attached to wood framing members complying with Section 3.3.2.

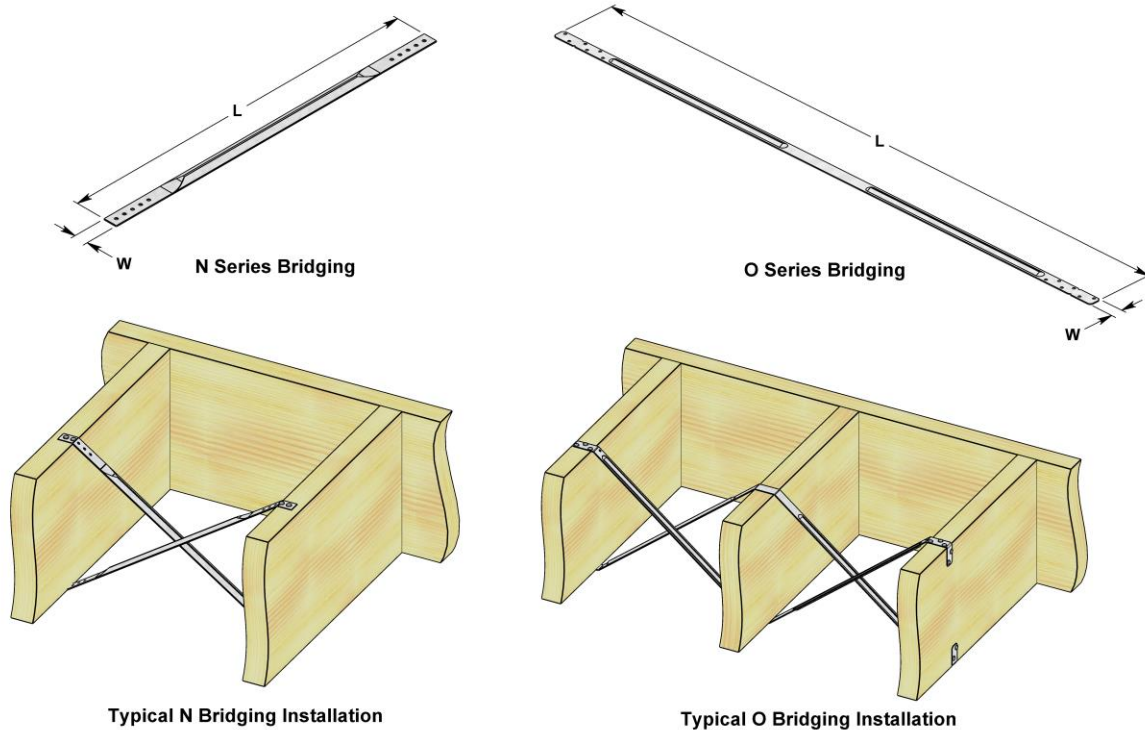


FIGURE 2—N AND O SERIES BRIDGING

TABLE 3—RWB, WB, WBC AND WBT WALL BRACING<sup>1,2,3,4,5,6</sup>

STOCK NO.	STEEL GAGE	WALL HEIGHT (ft)	ANGLE OF INSTALLATION <sup>6</sup> (Degrees)	QTY. AT EACH END <sup>1</sup>	DIMENSIONS (in)		FASTENER SCHEDULE			
					W	L	Into Each Plate		Into Each Stud	
							Qty.	Type	Qty.	Type
RWB 96	16	8	60	2	1 1/4	9' 6"	4	8d Common	1	8d Common
RWB 114	16	8	45	2	1 1/4	11' 4 3/8"	4	8d Common	1	8d Common
RWB 143	16	10	45	2	1 1/4	14' 3"	4	8d Common	1	8d Common
WB 106	16	8	60	2	1 1/4	9'-5 1/2"	3	16d Common	1	8d Common
WB 126	16	8	45	2	1 1/4	11'-4 1/4"	3	16d Common	1	8d Common
WBC 10	18	8	60	1	7/8	9' 5 3/4"	2	16d Common	1	8d Common
WBC 12	18	8	45	1	7/8	11' 4 3/8"	2	16d Common	1	8d Common
WBT 10	22	8	60	1	1 3/8	9' 3"	4	8d Common	1	8d Common
WBT 12	22	8	45	1	1 3/8	11' 4"	2	8d Common	1	8d Common
WBT 14	22	10	45	1	1 3/8	14' 2"	2	8d Common	1	8d Common

For SI: 1 inch = 25.4 mm, 1 foot = 0.305 m.

<sup>1</sup>The RWB and WB braces must be installed in pairs forming either an "X" or "V" pattern at each end of a maximum twenty-five-foot-long stud wall section. The WBC and WBT straps must be installed such that there are two straps for a maximum twenty-five-foot-long stud wall section, one at each end of the wall in an opposing "V" pattern.

<sup>2</sup>The RWB, WB, WBC and WBT wall braces are not designed to replace shear wall load carrying components.

<sup>3</sup>The RWB, WB, WBC and WBT wall braces must be attached to wood framing members complying with Section 3.3.2.

<sup>4</sup>Wall bracing connectors are intended to be an alternative to the nominal 1 x 4 continuous diagonal wood brace as described in the prescriptive wall bracing provisions of the applicable code.

<sup>5</sup>The fastener schedule applies to each strap. See Section 3.3.3 for required fastener dimensions and mechanical properties.

<sup>6</sup>The tabulated angle of installation is the required angle from horizontal, in degrees, at which the bracing must be installed. An angle of 45 degrees is equivalent to a slope of 12 units vertical in 12 units horizontal. An angle of 60 degrees is approximately equivalent to 21 units vertical in 12 units horizontal.

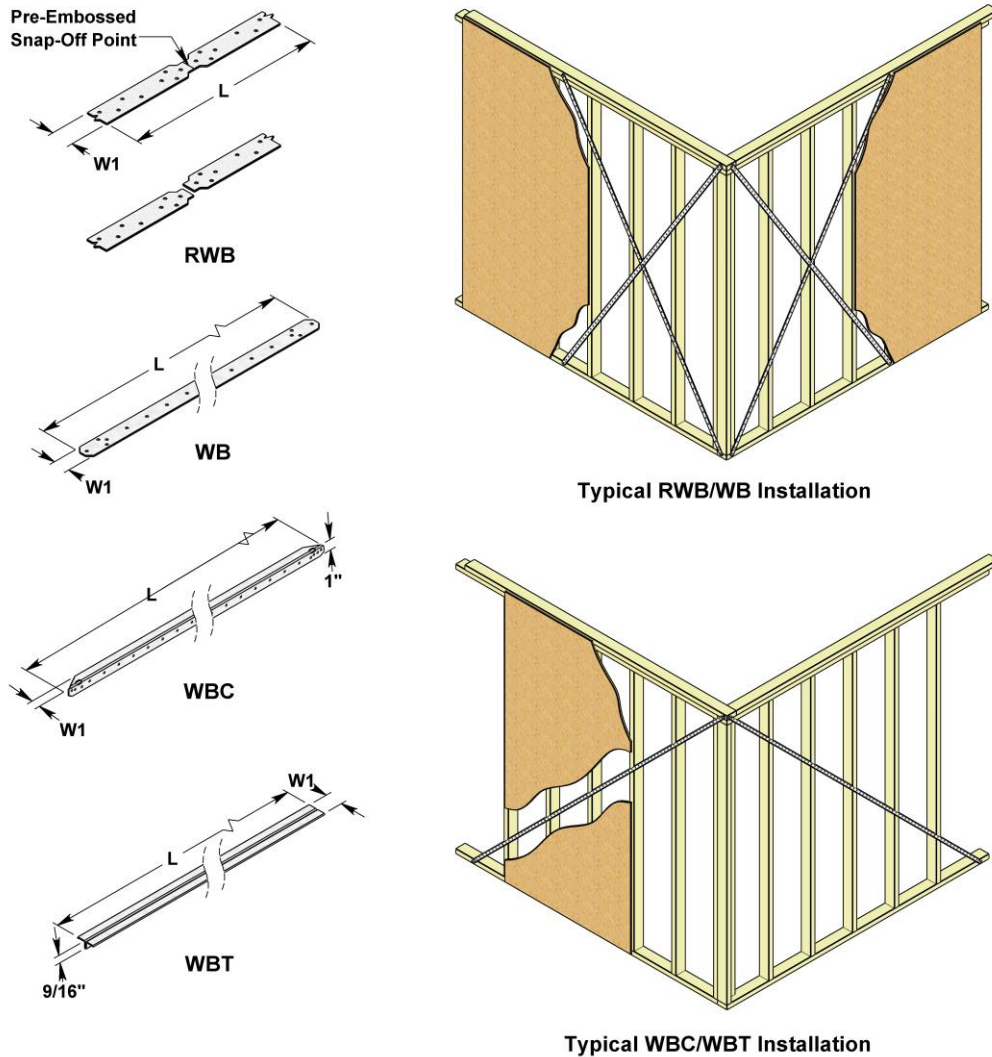


FIGURE 3—RWB, WB, WBC, AND WBT WALL BRACING

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES  
Section: 06 05 23—Wood, Plastics, and Composite Fastenings

**REPORT HOLDER:**

MITEK® INC.

**EVALUATION SUBJECT:**

MITEK® CONNECTORS FOR WOOD-FRAMED CONSTRUCTIONS—FRAMING BRACES AND BRIDGING

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that the MiTek connectors, described in ICC-ES evaluation report [ESR-3456](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

**Applicable code editions:**

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

**2.0 CONCLUSIONS**

The MiTek connectors, described in Sections 2.0 through 7.0 of the evaluation report [ESR-3456](#), comply with the LABC Chapter 23, and the LARC, and are subject to the conditions of use described in this supplement.

**3.0 CONDITIONS OF USE**

The MiTek connectors, described in this evaluation report supplement, must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-3456](#).
- The design, installation, conditions of use and identification are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-3456](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16, 17 and 23 as applicable.
- The tabulated allowable loads in the evaluation report [ESR-3456](#) must not be increased for duration of loading.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This evaluation report supplement expires concurrently with the evaluation report ESR-3456, reissued February 2024.

**DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES**  
**Section: 06 05 23—Wood, Plastics, and Composite Fastenings**

**REPORT HOLDER:**

MITEK® INC.

**EVALUATION SUBJECT:**

MITEK® CONNECTORS FOR WOOD-FRAMED CONSTRUCTIONS—FRAMING BRACES AND BRIDGING

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that the MiTek connectors, described in ICC-ES evaluation report ESR-3456, have also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2023 and 2020 *Florida Building Code—Building*
- 2023 and 2020 *Florida Building Code—Residential*

**2.0 CONCLUSIONS**

The MiTek connectors, described in Sections 2.0 through 7.0 of the evaluation report ESR-3456, comply with the *Florida Building Code—Building*, and the *Florida Building Code—Residential*, provided the design requirements are determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-3456 for the 2021 and 2018 *International Building Code*® meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable, with the following conditions.

Use of the MiTek connectors has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building*, and the *Florida Building Code—Residential*, and the following conditions apply:

- a. For connections subject to uplift, the connection must be designed for no less than 700 pounds (3114 N).
- b. Fasteners must be galvanized.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This evaluation report supplement expires concurrently with the evaluation report ESR-3456, reissued February 2024.