ICC-ES Evaluation Report

ESR-4568

Reissued March 2024

Subject to renewal March 2026

This report also contains:

- CBC Supplement

- LABC Supplement

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES **Section: 06 05 23—Wood, Plastic, and Composite Fastenings**	**SEKISUI HOUSE, LTD** **ADDITIONAL LISTEE:** **SH RESIDENTIAL HOLDINGS, LLC**	**EVALUATION SUBJECT:** **SHAWOOD MJ BRACKET SYSTEMS**	

1.0 EVALUATION SCOPE

Compliance with the following codes:

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

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-4568 LABC and LARC Supplement.

Property evaluated:

- Structural

2.0 USES

The SHAWOOD MJ Bracket Systems described in this evaluation report are concealed connecting systems used as wood framing connectors in wood construction in accordance with Section 2304.10.4 of the 2021 IBC and Section 2304.10.3 of the 2018 and 2015 IBC. The SHAWOOD MJ Bracket Systems 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 SHAWOOD MJ Bracket Systems, described in this evaluation report, are used to support the structural glued-laminated timber (glulam) beams or joists to resist uplift and downward forces, as well as lateral tension forces. The SHAWOOD MJ Bracket Systems consist of steel brackets (MJ brackets), dowel pins, and bolts. The MJ brackets are installed onto the supporting structural glulam members (posts or beams) by using bolts and then installed into the pre-cut slots on the ends of the supported structural glulam beams or joists by using dowel pins. The structural glulam members are pre-cut to the design dimensional specifications and pre-drilled with holes at the factory for installations of pins and bolts at the jobsites.

3.1.1 MJ Brackets: The MJ brackets are U-shaped connectors, formed from steel having a minimum tensile yield strength and a minimum tensile strength as noted Section 3.2.1. The MJ brackets have prepunched holes on legs for installations of dowel pins driven into the side grain of the supported glulam beams, and holes on

webs for bolts installed into supporting glulam beams or posts. See Tables 1A and 1B for bracket models, the required number and size of dowel pins and bolts. Figure 1 depicts MJ backets and typical installation of MJ brackets.

3.1.2 Dowel Pins: Dowel pins are in size of Φ12x119 long (4.69 inches) and are manufactured from carbon steel as noted in Section 3.2.3 of this evaluation report.

3.1.3 Bolts: Bolts used to install MJ brackets shall be as noted in Section 3.2.4 of this evaluation report.

3.2 Materials:

3.2.1 Steel: The MJ brackets are formed from carbon steel, having a minimum tensile yield strength, F_y, of 35,550 psi (245 MPa) and a minimum tensile strength, F_u, of 58,000 psi (400 MPa). The minimum base design thickness for the brackets is 0.09 inch (2.3 mm actual). The MJ brackets have a proprietary corrosion resistance coating complying with the specifications in the manufacturer's Quality Documentation.

3.2.2 Wood: Glulam beams and posts with which the MJ brackets are used must be manufactured with sawn lumber having a minimum specific gravity of 0.42, as specified in Table 4F of the NDS for Norway Spruce, and are used for dry service conditions where the service moisture content is less 16 percent, as in most covered structures, except as noted in Section 4.1. The glulam posts have a cross-sectional dimension of approximately 4.724 inches (120 mm actual) by 4.724 inches (120 mm actual). The glulam beams have a width of approximately 4.724 inches (120 mm actual) and depths ranging approximately from 4.724 inches (120 mm actual) to 17.72 inches (450 mm actual). The sawn lumber grade, glulam layup combinations and grades must comply with the specifications in the manufacturer's approved Quality Control Documentation.

3.2.3 Fasteners:

3.2.3.1 Dowel Pins: The dowel pins used with the MJ brackets are proprietary pins manufactured from carbon steel wire, having a minimum tensile yield strength, F_y, of 47,850 psi (330 MPa) and a minimum tensile strength, F_u, of 60,900 psi (420 MPa); and in accordance with the specifications, including size and corrosion resistance coating requirements, in the manufacturer's approved Quality Control Documentation.

3.2.3.2 Bolts: The bolts used to install MJ brackets are M16 bolts, complying with ASTM F568, Class 4.8. The lengths of the bolts are 5.4 inches (137 mm). The bolts are manufactured in accordance with the specifications, including the size and corrosion resistance coating requirements, in the manufacturer's Quality Control Documentation.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The tabulated allowable loads shown in the Tables 1A and 1B of this evaluation report are based on Allowable Stress Design (ASD) and include the load duration factor, C_D, corresponding with the applicable loads and the group action factor, C_g, in accordance with the AWC *National Design Specification® for Wood Construction* (NDS) and its Supplement. Figure 2 illustrates the loading directions.

The tabulated allowable loads apply to structural glulam members used under dry conditions and where sustained temperatures are 100ºF (37.8ºC) or less. When the MJ brackets are installed to structural glulam members having a moisture content greater than 16 percent, or where wet service is expected, the allowable loads must be adjusted by the applicable wet service factor, C_M, specified for lateral loads for dowel-type fasteners in the NDS. When MJ brackets are installed in structural glulam members that will experience sustained exposure to temperatures exceeding 100ºF (37.8ºC), the allowable loads in this report must be adjusted by the applicable temperature factor, C_t, specified in the NDS. Both supporting and supported structural glulam members must be analyzed for load-carrying capacity at the connection in accordance with the NDS.

4.2 Installation:

Installation of the MJ brackets must be in accordance with this evaluation report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.

The MJ brackets, pins, and bolts used in contact the preservative-treated or fire-retardant treated lumber must comply with IBC Sections 2303.1.9 and 2303.2, and IRC Section R317.3. The lumber treater, this report holder (Sekisui House, Ltd), or both should be contacted for recommendations on minimum corrosion resistance protection of steel connectors in contact with the specific proprietary preservative-treated or fire-retardant treated lumber.

5.0 CONDITIONS OF USE:

The SHAWOOD MJ Systems 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 MJ brackets and structural glulam members must be manufactured, identified and installed in accordance with applicable codes, this evaluation report and the manufacturer's published installation instructions. A copy of the published installation 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 statues 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 structural glulam members and fasteners must comply, respectively, with Sections 3.2.2 and 3.2.3 of this evaluation report.

5.5 Use of MJ brackets with preservative treated or fire retardant treated lumber must be in accordance with Section 4.2 of this evaluation report. Use of fasteners with preservative treated or fire retardant treated lumber must be in accordance with Section 4.2 of this evaluation report.

5.6 The MJ brackets, pins, and bolts are manufactured under a quality program 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 MJ bracket described in this report is identified with a die-stamped label indicating the report holder's name (Sekisui House, Ltd), or the name of listee (SH Residential Holdings, LLC), the model designation and lot number, and the evaluation report (ESR-4568).

The cartons of MJ brackets, dowel pins, and bolts shall bear a label indicating the report holder's name (Sekisui House, Ltd), or the name of listee (SH Residential Holdings, LLC), the model designation and lot number, the dowel pin size, and the evaluation report (ESR-4568).

7.2 The report holder's contact information is the following:

SEKISUI HOUSE, LTD.
TOWER EAST, UMEDA SKY BUILDING, 1-1-88, OYODONAKA, KITA-KU, OSAKA
JAPAN
+81 6 6440 3723
www.sekisuihouse.co.jp
kokusai@sekisuihouse.co.jp

7.3 The additional listee's contact information is the following:

SH RESIDENTIAL HOLDINGS, LLC
460 W 50 N, SUITE 250
SALT LAKE CITY, UTAH 84101
(801) 869-3950
www.shawood.com
info@shawood.com

TABLE 1A—ALLOWABE DESIGN LOAD VALUES FOR BEAM-TO-BEAM CONNECTIONS[1]

MODEL DESIGNATION	PINS			BOLTS			ALLOWABLE LOAD				
	No	Size		No	Size		Download[2] (lbf)			Lateral (lbf)	Uplift[3] (lbf)
		Dia.	L		Dia.	L					
		(in.)			(in.)		(C_D = 1.0)	(C_D = 1.15)	(C_D = 1.25)	(C_D = 1.6)	(C_D = 1.6)
MJ150	2	0.47	4.69	2	0.63	5.4	1,155	1,325	1,445	—	1,500
MJ210	3	0.47	4.69	3	0.63	5.4	1,600	1,840	2,000	—	2,560
MJ270	4	0.47	4.69	4	0.63	5.4	1,920	2,205	2,400	—	3,070
MJ330	5	0.47	4.69	5	0.63	5.4	2,130	2,450	2,660	—	3,405
MJ390	6	0.47	4.69	6	0.63	5.4	2,260	2,600	2,825	—	3,615
MJ450	7	0.47	4.69	7	0.63	5.4	2,340	2,690	2,925	—	3,740

For **SI**: 1 in. = 25.4 mm, 1 lbf = 4.448 N

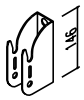
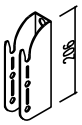
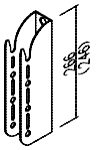
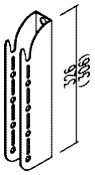
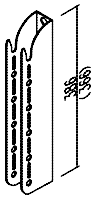
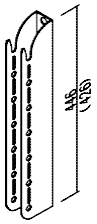
[1]The tabulated allowable design loads have been adjusted for the group action factor, C_g, in accordance with the NDS and are for one bracket in the wood-to-wood connetions.
[2]The tabulated allowable downloads have been adjusted for the different duration of loading and must not exceed the glulam beam and post capacity.
[3]The tabulated allowable uplift loads have been increased for wind and earthquake load with no further increase allowed. Reduce where other load durations govern.

TABLE 1B—ALLOWABE DESIGN LOAD VALUES FOR BEAM-TO-POST CONNECTIONS[1]

MODEL DESIGNATION	PINS			BOLTS			ALLOWABLE LOAD				
	No	Size		No	Size		Download[2] (lbf)			Lateral[3,4] (lbf)	Uplift[3] (lbf)
		Dia.	L		Dia.	L					
		(in.)			(in.)		(C_D = 1.0)	(C_D = 1.15)	(C_D = 1.25)	(C_D = 1.6)	(C_D = 1.6)
MJ150	2	0.47	4.69	2	0.63	5.4	2,015	2,320	2,520	1,325	1,115
MJ210	3	0.47	4.69	3	0.63	5.4	2,945	3,390	3,685	2,190	2,895
MJ270	4	0.47	4.69	4	0.63	5.4	3,630	4,175	4,540	3,055	4,675
MJ330	5	0.47	4.69	5	0.63	5.4	4,055	4,665	5,070	3,235	6,065
MJ390	6	0.47	4.69	6	0.63	5.4	4,335	4,985	5,420	3,415	6,935
MJ450	7	0.47	4.69	7	0.63	5.4	4,510	5,190	5,640	3,595	7,220

For **SI**: 1 in. = 25.4 mm, 1 lbf = 4.448 N

[1]The tabulated allowable design loads have been adjusted for the group action factor, C_g, in accordance with the NDS and are for one bracket in the wood-to-wood connetions.
[2]The tabulated allowable downloads have been adjusted for the different duration of loading and must not exceed the beam and post capacity.
[3]The tabulated allowable lateral (tensile) and uplift loads have been increased for wind and earthquake load with no further increase allowed. Reduce where other load durations govern.
[4]The lateral load is parallel along the length of the beam.

MJ150	MJ210	MJ270	MJ330	MJ390	MJ450
					

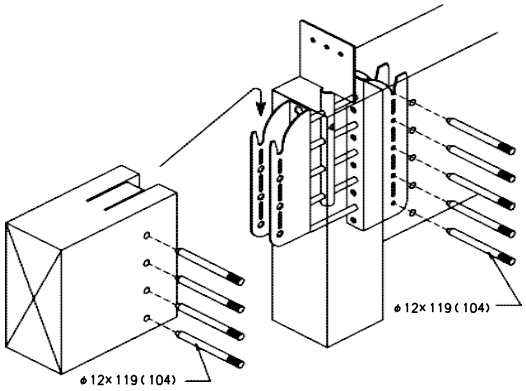


FIGURE 1—SHAWOOD MJ BRACKETS (ABOVE) AND INSTALLATION (TYP) OF MJ BRACKETS (BELOW)

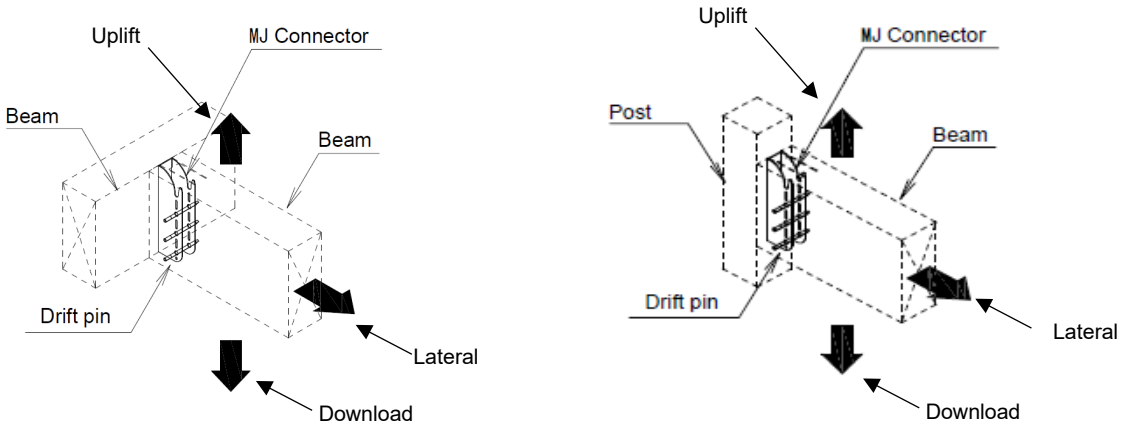


FIGURE 2—LOADING DIRECIONS FOR BEAM-TO-BEAM (LEFT) AND BEAM-TO-COLUMN (RIGHT) CONNECTIONS (BOLTS USED TO INSTALL BRACKETS ARE NOT SHOWN)

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

REPORT HOLDER:

SEKISUI HOUSE, LTD.

EVALUATION SUBJECT:

SHAWOOD MJ BRACKET SYSTEMS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Shawood MJ Bracket Systems described in ICC-ES evaluation report ESR-4568, 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 Shawood MJ Bracket Systems, described in Sections 2.0 through 7.0 of the evaluation report ESR-4568, comply with the LABC Chapter 23, and the LARC, and are subject to the conditions of use described in this evaluation report supplement.

3.0 CONDITIONS OF USE

The Shawood MJ Bracket Systems, described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-4568.
- 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-4568.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued March 2024.

ICC-ES Evaluation Report

ESR-4568 CBC and CRC Supplement

Reissued March 2024

This report is subject to renewal March 2026.

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

REPORT HOLDER:

SEKISUI HOUSE, LTD.

EVALUATION SUBJECT:

SHAWOOD MJ BRACKET SYSTEMS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Shawood MJ Bracket Systems described in ICC-ES evaluation report ESR-4568, have also been evaluated for compliance with the codes noted below.

Applicable code edition*(s)*:

- 2022 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 *California Residential Code* (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The Shawood MJ Bracket Systems, described in Sections 2.0 through 7.0 of the evaluation report ESR-4568, comply with CBC Chapter 23, provided the design and installation are in accordance with the 2021 *International Building Code®* (IBC) provisions, noted in the evaluation report ESR-4568 and the additional requirements of CBC Chapters 16 and 17, as applicable.

2.1.1 OSHPD: The applicable OSHPD Sections of the CBC are beyond the scope of this evaluation report supplement.

2.1.2 DSA: The applicable DSA Sections of the CBC are beyond the scope of this evaluation report supplement.

2.2 CRC:

The Shawood MJ Bracket Systems, described in Sections 2.0 through 7.0 of the evaluation report ESR-4568, comply with CRC Section R301, provided the design and installation are in accordance with the 2021 *International Residential Code®* (IRC) provisions noted in the evaluation report ESR-4568.

This supplement expires concurrently with the evaluation report, reissued March 2024.