

# ICC-ES Evaluation Report

ESR-3633

Reissued July 2024


This report also contains:

- FBC Supplement

Subject to renewal July 2025

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<p><b>DIVISION: 06 00 00—</b> <b>WOOD, PLASTICS AND COMPOSITES</b></p> <p><b>Section: 06 17 13—</b> <b>Laminated Veneer Lumber</b></p>	<p><b>REPORT HOLDER:</b> <b>METSÄLIITTO COOPERATIVE</b></p> <p><b>ADDITIONAL LISTEE:</b> <b>METSÄ WOOD USA</b></p>	<p><b>EVALUATION SUBJECT:</b> <b>KERTO LVL S-BEAM</b></p>	
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## 1.0 EVALUATION SCOPE

### 1.1 Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015, 2012, 2009 and 2006 [International Residential Code® \(IRC\)](#)

### Property evaluated:

- Structural

### 1.2 Evaluation to the following green code(s) and/or standards:

- 2022 [California Green Building Standards Code \(CALGreen\)](#), Title 24, Part 11
- 2020, 2015, 2012 and 2008 ICC 700 [National Green Building Standard™](#) (ICC 700-2020, ICC 700-2015, ICC 700-2012, and ICC 700-2008)

### Attributes verified:

- See Section 3.1

## 2.0 USES

The product, Kerto LVL S-beam, also known as Master Plank® LVL, is used as joists, rafters, beams, headers, stair headers, truss chords and planks.

## 3.0 DESCRIPTION

### 3.1 General:

Kerto LVL S-beam is manufactured by Metsäliitto Cooperative Metsä Wood, of Finland, distributed by Metsä Wood USA, of Norwalk, Connecticut.

The attributes of the Kerto LVL S-beam have been verified as conforming to the provisions of (i) CALGreen Sections 4.404.3 for efficient framing techniques; (ii) ICC 700-2020 Sections 608.1(2), 11.608.1(2) and 13.104.3.1 for resource-efficient materials and ICC 700-2015 and ICC 700-2012 Sections 608.1(2), 11.608.1(2) and 12(A).608.1 for resource-efficient materials; and (iii) ICC 700-2008 Section 607.1(2) for resource-efficient materials. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

### 3.2 Material:

Kerto LVL S-beam is manufactured from laminated veneer lumber (LVL) billets and is available in nominal thicknesses from  $3/4$  to  $3\frac{1}{2}$  inches (19 to 89 mm), depths of  $3\frac{1}{2}$  to 24 inches (89 to 610mm), and lengths up to 82 feet (25 m). The LVL billets are manufactured by laminating wood veneers in a continuous process with the grain parallel to the length of the member in accordance with the Quality Control Manual for Kerto LVL S-beam and has a nominal width up to 98 inches (2500 mm). Wood veneers are between 0.122 and 0.133 inches (3.1 and 3.4 mm) in thickness.

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

Allowable unit stresses are presented in [Table 1](#) of this report and are for loads of a normal duration. The allowable stresses are for covered dry conditions of use as described in Section 5.3 of this report. The structural design provisions for solid-sawn lumber, as contained in the IBC, apply to Kerto LVL S-beam except where noted otherwise in this report.

The allowable stresses noted in [Table 1](#) of this report are to be adjusted for other durations of loads. Where Kerto LVL S-beam members are qualified as repetitive beam members, the allowable flexural stress (beam) is permitted to be increased by 4 percent.

### 4.2 Installation:

Kerto LVL S-beam must be installed in accordance with the applicable code, the approved construction documents, this report, and manufacturer's installation instructions. This report must be complied with should the manufacturer's installation instructions conflict with this report.

Allowable withdrawal nail values, for nails installed perpendicular or parallel to glue lines, must be as provided for in the applicable code for solid-sawn lumber with a specific gravity of 0.48.

Allowable lateral nail values, for nails installed perpendicular to glue lines, must be as provided for in the applicable code for solid-sawn lumber with a specific gravity of 0.46.

Allowable lateral nail values, for nails installed parallel to glue lines, must be as provided for solid-sawn lumber with a specific gravity of 0.44.

Spacing of nails installed into the narrow face, or edge (parallel to the glue lines), of the Kerto LVL S-beam must be a minimum of 3 inches (76 mm) for 8d common nails and 4 inches (102 mm) for 10d and 12d common nails. The end distances must be a minimum of 2 inches (51 mm) for 8d common nails and 3 inches (76 mm) for 10d and 12d common nails. The minimum nail spacing must be 8 inches (204 mm) for 16d common nails installed into the narrow face of Kerto LVL S-beam that is at least  $1\frac{3}{4}$  inches thick by  $5\frac{1}{2}$  inches wide (44.5 by 133 mm), and the minimum end distance must be 3 inches (76 mm). Minimum edge distance must be sufficient to prevent splitting of the Kerto LVL S-beam. Additionally, maximum nail penetration into the Kerto LVL S-beam must be limited as necessary to prevent splitting.

Allowable lateral bolt values for bolts installed perpendicular to glue lines must be as provided in the applicable code for solid-sawn lumber with a specific gravity of 0.51. Allowable lateral bolt values installed perpendicular to the glue line are beyond the scope of this report.

Reference design values for nailed and bolted connections must be adjusted by applicable adjustment factors noted in the code and NDS, except as otherwise noted in the report.

Connections, other than nailed and bolted connections described in this report, are outside the scope of this report.

Holes are not allowed in stair headers or truss chord applications. When used as a beam or a header, holes may be cut into the beam if load conditions permit within the parameters given in [Table 2](#) and [Table 3](#) in this report.

## 5.0 CONDITIONS OF USE:

The Kerto LVL S-beam described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Fabrication must be in the Metsä Wood facilities, located in Lohja or Punkaharju, Finland, under a quality-control program with inspections by ICC-ES.
- 5.2 The design stresses must not exceed those set forth in this report and must be adjusted with the applicable load duration factor specified in accordance with the 2018 National Design Specification® for Wood Construction (NDS).
- 5.3 The service conditions for Kerto LVL S-beam must be in covered dry conditions of use. Dry conditions of use are those conditions of use represented by sawn lumber at which the moisture content is less than 16 percent.

- 5.4 Kerto LVL S-beam having fire-retardant or preservative chemical treatments is outside the scope of this report.
- 5.5 Fastener design values must be as specified in Section 4.2 of this report.
- 5.6 Cutting and notching of Kerto LVL S-beam is permitted only when stress levels permit and as detailed for maximum circular hole sizes noted in [Tables 2](#) and [3](#) of this report.
- 5.7 Minimum bearing length and anchorage of Kerto LVL S-beam must meet the requirements of Chapter 23 of the IBC and IRC, IRC as applicable, for solid sawn lumber.
- 5.8 Design calculations and details for specific applications must be furnished to the code official verifying compliance with this report and the IBC and IRC, as applicable. The individual preparing such 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.
- 5.9 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. In the event of a conflict, this report governs.

## 6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Structural Wood-based Products \(AC47\)](#), dated June 2017 (editorially revised February 2021).

## 7.0 IDENTIFICATION

- 7.1 Product labeling shall include, the name of the report holder or listee, and the ICC-ES mark of conformity. The listing or evaluation report number (ICC-ES ESR-3633) may be used in lieu of the mark of conformity. Kerto LVL S-beam must be identified with a stamp noting the product manufacturer (Metsäliitto Cooperative Metsä Wood), product distributor (Metsä Wood USA), product name, product grade, and the evaluation report number (ESR-3633).
- 7.2 The report holder's contact information is the following:  
**METSÄLIITTO COOPERATIVE**  
**METSÄ WOOD**  
**POST OFFICE BOX 24**  
**08101 LOHJA**  
**FINLAND**  
[www.metsawood.com](http://www.metsawood.com)
- 7.3 The Additional Listee's contact information is the following:  
**METSÄ WOOD USA**  
**301 MERRITT, 2ND FLOOR**  
**NORWALK, CONNECTICUT 06851**  
**(800) 622-5850**  
[www.metsawood.us](http://www.metsawood.us)

TABLE 1—ALLOWABLE STRESSES FOR KERTO LVL S-BEAM<sup>1</sup>

FLEXURAL STRESS (BEAM)  F <sub>b</sub> <sup>2,4</sup> (psi)	FLEXURAL STRESS (PLANK)  F <sub>b</sub> (psi)	TENSION PARALLEL TO GRAIN  F <sub>t</sub> <sup>5</sup> (psi)	COMPRESSION PARALLEL TO GRAIN  F <sub>c</sub> (psi)	COMPRESSION PERPENDICULAR TO GRAIN  F <sub>c⊥</sub> <sup>3</sup> (psi)		HORIZONTAL SHEAR  F <sub>v</sub> (psi)		TRUE MOE <sup>3,6</sup> (psi)		APPARENT MOE <sup>3,7</sup> (psi)	
				Directions:		Directions:		Directions:		Directions:	
				Beam	Plank	Beam	Plank	Beam	Plank	Beam	Plank
2,900	3,400	2,300	2,700	840	535	320	150	2.0x10 <sup>6</sup>	2.0x10 <sup>6</sup>	1.9x10 <sup>6</sup>	1.9x10 <sup>6</sup>

For SI: 1 psi = 0.00689 MPa

Notes to Table 1:

- <sup>1</sup> The tabulated allowable stresses are for covered dry conditions of use. See Section 5.3 of this evaluation report.
- <sup>2</sup> The tabulated flexural stress (beam) is based on a referenced depth of 12 inches. For other depths, the tabulated flexural stress must be adjusted by a depth adjustment factor of (12/d)<sup>0.15</sup>, where d is the depth of the beam. For depths less than 3 1/2 inches, use the value for 3 1/2 inches.
- <sup>3</sup> The tabulated allowable stresses are based on a normal duration of load. Loads of longer or shorter duration must be adjusted in accordance with the 2018 *National Design Specification® for Wood Construction* (NDS). Duration of load adjustments must not be applied to F<sub>c⊥</sub> and E (MOE).
- <sup>4</sup> The allowable bending stress increase for repetitive members must not exceed 4 percent.
- <sup>5</sup> The tabulated tension stress, F<sub>t</sub>, is based on a length of 55 inches (1397 mm). For lengths longer than 55 inches, the tabulated tension stress must be adjusted by a length adjustment factor of (55/L)<sup>0.125</sup>, where L is the length of the member. The tabulated tension stress values for lengths shorter than 55 inches must not be increased.
- <sup>6</sup> The values in this column reflect the true MOE which is the shear-free modulus of elasticity. When calculating deflection, both bending and shear deformations must be included. Equations for various span and load conditions are available in engineering references. For example, the equation for a simply-supported beam under uniform load is:

$$\Delta = 270wL^4/Ebd^3 + 28.8wL^2/Ebd$$

where:

- Δ = Deflection in inches (in),
- w = Uniform load in pounds per linear foot (plf),
- L = Design span in feet (ft),
- b = Beam width in inches (in),
- d = Beam depth in inches (in), and
- E = Shear free modulus of elasticity in pounds per square inch (psi).

<sup>7</sup> The apparent MOE which includes the effect of shear deformation for both the beam and plank direction is 1.9 x 10<sup>6</sup> psi. When calculating deflection using the apparent MOE, standard engineering formulae for pure bending deflection are sufficient, and the second term in the footnote 6 equation may be ignored.

TABLE 2—ALLOWABLE SHEAR (Pounds) FOR 1 3/4-INCH-THICK KERTO LVL S-BEAM WITH HOLES

BEAM DEPTH (INCHES)	MAXIMUM SIZE HOLE ALLOWED (INCHES)	NO HOLE	HOLE SIZE IN INCHES					
			2	3	4	5	6	7
9.25	3.7	3,450	2,450	2,235	2,030	NA	NA	NA
9.5	3.8	3,545	2,515	2,300	2,090	NA	NA	NA
11.25	4.5	4,200	3,010	2,770	2,525	2,280	NA	NA
11.875	4.75	4,430	3,190	2,930	2,675	2,420	NA	NA
14	5.6	5,225	3,805	3,510	3,220	2,930	2,635	NA
16	6.4	5,970	4,390	4,070	3,745	3,420	3,090	NA
18	7.2	6,720	4,990	4,635	4,280	3,920	3,565	3,210

For SI: 1 in. = 25.4 mm, 1 lbf. = 4.45 N, 1 ft-lb = 1.356 Nm

See Notes on Next Page.

TABLE 3—ALLOWABLE MOMENT CAPACITY (ft-lbs) FOR 1¾-INCH-THICK KERTO LVL S-BEAM WITH HOLES

BEAM DEPTH (INCHES)	MAXIMUM SIZE HOLE ALLOWED (INCHES)	NO HOLE	HOLE SIZE IN INCHES					
			2	3	4	5	6	7
9.25	3.7	6,270	5,370	5,330	5,330	NA	NA	NA
9.5	3.8	6,590	5,650	5,595	5,595	NA	NA	NA
11.25	4.5	9,010	7,805	7,650	7,650	7,650	NA	NA
11.875	4.75	9,955	8,660	8,470	8,470	8,470	NA	NA
14	5.6	13,500	11,890	11,560	11,460	11,460	11,460	NA
16	6.4	17,280	15,380	14,925	14,705	14,675	14,675	NA
18	7.2	21,490	19,305	18,710	18,375	18,245	18,245	18,245

For SI: 1 in. = 25.4 mm, 1 lbf. = 4.45 N, 1 ft-lb = 1.356 Nm

**Notes for Table 2 and Table 3:**

<sup>1</sup>Only circular holes are allowed. Holes must be clean cut and smooth.

<sup>2</sup>Holes must be less than 40% of the overall beam depth.

<sup>3</sup>Holes must be located in the middle half of the beam depth (leaving at least ¼ of the total beam depth remaining above or below the hole).

<sup>4</sup>No adjustment to MOE is required for holes.

<sup>5</sup>Multiple holes must be 3 diameters apart (edge to edge) apart and three diameters from any bearing or supports.

<sup>6</sup>Only two holes are allowed in any beam and conditions with more than two holes are beyond the scope of this report.

<sup>7</sup>If two holes are used, multiply values given in Table 2 and Table 3 by 0.70 to determine allowable shear or moment capacity at that location.

<sup>8</sup>Interpolation of the above charts is permitted. For example, the allowable shear capacity for a 9.5-inch-deep beam having a 3.8-inch-diameter hole would be:  $2300 - [(2300 - 2090) \times 0.8] = 2132$  lbs. If two 3.8-inch-diameter holes are installed in this beam, the allowable shear capacity would be  $2132 \times 0.70 = 1492$  lbs.

<sup>9</sup>Reductions in capacity only apply at the point in the beam where the hole(s) are located.

<sup>10</sup>For thicknesses other than 1¾ inch a ratio of the thicknesses can be used to determine the capacity (e.g. for a 1.5" member the allowable capacity would be  $1.5/1.75$  or 85% of the allowable values in the tables).

**DIVISION: 06 00 00— WOOD, PLASTICS AND COMPOSITES**  
**Section: 06 17 13—Laminated Veneer Lumber**

**REPORT HOLDER:**

**METSÄLIITTO COOPERATIVE**  
**METSÄ WOOD**

**EVALUATION SUBJECT:**

**KERTO LVL S-BEAM**

## 1.0 REPORT PURPOSE AND SCOPE

**Purpose:**

The purpose of this evaluation report supplement is to indicate that Kerto LVL S-beam laminated veneer lumber, described in ICC-ES evaluation report ESR-3633, has also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2020 Florida Building Code—Building
- 2020 Florida Building Code—Residential

## 2.0 CONCLUSIONS

The Kerto LVL S-beam laminated veneer lumber, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-3633, complies with the *Florida Building Code—Building* and the *Florida Building Code—Residential*. The design requirements must be determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation noted in ICC-ES evaluation report ESR-3633 for the 2018 *International Building Code*® meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the Kerto LVL S-beam laminated veneer lumber has been found to be complying with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* or the *Florida Building Code—Residential*.

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 supplement expires concurrently with the evaluation report, reissued July 2024.