ICC EVALUATION SERVICE

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Joint Evaluation Report

ESR-5105

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 19—Cross-laminated Timber

REPORT HOLDER:

KALESNIKOFF MASS TIMBER INC.

EVALUATION SUBJECT:

KALESNIKOFF CROSS-LAMINATED TIMBER

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2021, 2018, and 2015 *International Building Code*® (IBC)
- 2021, 2018, and 2015 *International Residential Code*® (IRC)
- ANSI/APA PRG 320-2019 Performance Standard for Cross-Laminated Timber

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-5105 LABC and LARC Supplement.

Properties evaluated:

- Structural
- Fire resistance

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

- 2019 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2020, 2015, and 2012 ICC 700 *National Green Building Standard*™ (ICC 700-2020, ICC 700-2015, and ICC 700-2012)

2.0 USES

Kalesnikoff cross-laminated timber (CLT) panels are for use as components in roofs in Types I and II Construction (IBC), in walls (interior only), floors and roofs in Type III Construction (IBC), and in walls (interior and exterior), floors and roofs in Types IV and V Construction (IBC). When CLT panels are installed under the IRC, an engineered design is required in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 General:

The Kalesnikoff CLT panels described in this evaluation report comply with requirements noted in Section 2303.1.4 of the 2021, 2018, and 2015 IBC, for allowable stress design (ASD) in accordance with 2021 and 2018 IBC Section 2302.1(1) (2015 IBC Section 2301.2(1)) and load and resistance factor design (LRFD) in accordance with 2021 and 2018 IBC Section 2302.1(2) (2015 IBC Section 2301.2(2)), and consist of three to nine layers of softwood lumber boards (laminations), as shown in Table 1, stacked with wood grain orientation alternating 90 degrees at each layer except that the outermost two layers are permitted to be parallel to each other. The Kalesnikoff CLT panels are manufactured by face-bonding each layer using an exterior-type structural adhesive, and then are placed in a press to form a dimensionally stable structural element, or plank billet. The Kalesnikoff CLT panels are available in plank billets with gross thickness of 3.4 inches (87 mm) to 13.5 inches (342 mm), nominal widths up to 138 inches (3505 mm), and lengths up to 60 feet (18.3 m). Refer to Table 2 for the grade and layup designations of Kalesnikoff CLT panels.

The attributes of the Kalesnikoff CLT products have been verified as conforming to the provisions of (i) CALGreen Title 24 Part 11 Section A4.404.3 for efficient framing techniques; (ii) ICC 700-2020, 700-2015 and ICC 700-2012 Sections 608.1(2), 11.608.1(2) and 12(A).608.1 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:

3.2.1 Wood Laminations: Wood laminations used in manufacturing Kalesnikoff CLT panels must be in accordance with the approved in-plant manufacturing standard using sawn lumber having reference design values provided in Table 1. The Spruce-pine-fir (SPF) laminations shall be permitted to be substituted by Douglas fir-Larch, Douglas fir-Larch (North), or Hem-fir (North) lumber with the reference design properties that are equal to or greater than the corresponding SPF laminations. When Hem-fir (North) is used to substitute SPF in the CLT layup, the bearing capacity of the CLT shall be based on the compressive stress perpendicular to grain ($F_{c\perp}$) of 405 psi.

3.2.2 Adhesives: Adhesive used to face-bond layers of Kalesnikoff CLT panels is an exterior-type structural adhesive and the adhesive used for finger-joints of wood laminations is a one-component polyurethane-based adhesive, conforming to ANSI/APA PRG 320-2019 and the product specifications in the approved quality documentation.

4.0 DESIGN AND INSTALLATION

4.1 General:

Design and installation of Kalesnikoff CLT panels described in this evaluation report must be in accordance with this

evaluation report, the applicable code provisions and the manufacturer's published design and/or installation instructions. The manufacturer's design and/or installation instructions must be available at the jobsite at all times during installation. Design must be in accodrace with 2021 and 2018 IBC Section 2302.1(1) for Allowable Stress Design (ASD) or Section 2302.1(2) for Load Resistance Factor Design (LRFD), respectively, [2015 IBC Section 2301.2(1) and (2)], Chapter 10 of the 2018 or 2015 *National Design Specificaoitns*® for *Wood Construction* (NDS), and Sections 4.5 and 4.6 of the 2021 Special Design Provisions for Wind and Seismic (SDPWS), as applicable.

4.2 Reference Design Values:

Tables 3 and 4 provide, respectively, reference design values for bending and shear capacities and in-plane shear capacities of Kalesnikoff CLT panels. The reference design values in Tables 3 and 4 are intended for allowable stress design and must be adjusted in accordance with Section 4.3 of this evaluation report. The design values used for the LRFD shall be obtained by multiplying the ASD design values by the factors specified in Table 10.3.1 of the 2018 or 2015 NDS. The unbalanced layup, V2/8-ply EL, listed in Tables 3 and 4 can be only used in wall and simple span applications. The compression side of the unbalanced layup, which consists of a single layer of lumber laminations in the major strength direction, must be stamped with the word "TOP" that shall be installed on the compression (top) side of the simple-span bending member. For unbalanced layup panels used in walls, the compression (TOP) face may be faced either toward the inside or outside in accordance with the registered design professional.

4.3 Adjustment Factors:

The reference design values in Tables 3 and 4 must be adjusted in accordance with Table 10.3.1 of the 2018 or 2015 NDS to determine the allowable stress (ASD) or design stress (LRFD). The reference design values in Table 3 must not be increased for the lumber size adjustment factor in accordance with NDS. The time dependent deformation (creep) factor, K_{cr}, of 2.0, specified in Section 3.5.2 of the NDS must be used to calculate the total deflection due to long-term loading for Kalesnikoff CLT panels used as components in floors and roofs under dry service condition where the moisture content in lumber in service is less than 16 percent, as in most covered structures.

4.4 Fire Resistance:

When fire resistance is required, the fire resistance rating of the exposed Kalesnikoff CLT panels must be determined by calculation in accordance with Chapter 16 of the 2018 or 2015 NDS. As an alternative to the NDS calculation, the Kalesnikoff CLT panels shall be permitted to be tested in accordance with ASTM E119 or UL 263 and must be rated for fire resistance in accordance with the test results and conditions of such tests, and such tests must be submitted to the code official for approval and are outside the scope of this evaluation report.

5.0 CONDITIONS OF USE

The Kalesnikoff CLT 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, design, and installation must comply with this evaluation report and the manufacturer's published design/installation instructions. In the event of a conflict between the manufacturer's published design/installation instructions and this evaluation report, the most restrictive one governs.

5.2 Use of Kalesnikoff CLT panels must be limited to dry service conditions where the moisture content in lumber in service is less than 16 percent, as in most covered structures.

5.3 Kalesnikoff CLT panels may be used as components in walls, floors and roofs under the IRC when an engineered design is submitted in accordance with Section R301.1.3.

5.4 Calculations and drawings demonstrating compliance with this evaluation report must be submitted to the code official. The calculations and drawings must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.5 The reference design values in Table 4 are applicable for in-plane-shear design of CLT diaphragms. The complete diaphragm designs have not been evaluated and are outside the scope of this report. To be considered as part of a floor and roof diaphragm, CLT panels used to resist in-plane shear forces shall be accompanied by complete detailing and diaphragm design in accordance with Section 4.5 of the 2021 SDPWS.

5.6 Kalesnikoff CLT panels used to resist gravity or out-of-plane transverse forces in walls must be accompanied by complete detailing and wall design that are acceptable to the code official.

5.7 Kalesnikoff CLT panels used to resist in-plane shear forces in shear walls must be accompanied by complete detailing and shear wall design in accordance with Appendix B of the 2021 SDPWS.

5.8 Connections of Kalesnikoff CLT panels used as components in walls, floors and roofs must be designed by a registered design professional in accordance with the NDS or proprietary connectors and fasteners evaluated in an ICC-ES Evaluation Report. Connectors and fasteners must be specified to include size, length, dimension, fastener bearing length and location.

5.9 Cutting, drilling, and notching of Kalesnikoff CLT panels when used as components in walls, floors and roofs have not been evaluated and are outside the scope of this evaluation report.

5.10 The exterior surface of Kalesnikoff CLT panel exterior walls must be protected by a weather-resistant exterior wall envelope in accordance with IBC Chapter 14.

5.11 Design properties for Kalesnikoff CLT panels, when used as beams or lintels with loads applied parallel to the face-bond gluelines, other than the edgewise shear properties (see Table 4), are outside the scope of this evaluation report.

5.12 The installations of the unbalanced Kalesnikoff CLT panel layup, V2/8-ply EL, must be in accordance with Section 4.2 of this evaluation report.

5.13 Kalesnikoff CLT panel roofs must be covered with approved roof coverings secured to the building or structure in accordance with applicable provisions of IBC Chapter 15.

5.14 The special inspection shall be conducted in accordance with the applicable requirements of Sections 1704 and 1705 of the IBC.

5.15 Kalesnikoff CLT panels are fabricated in the Kalesnikoff facilities located in South Slocan, British Columbia, Canada, under a quality-control program with inspections by ICC-ES and APA—The Engineered Wood Association.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Cross-laminated Timber Panels for Use as Components in Walls, Floors and Roofs (AC455), approved February 2021.

7.0 IDENTIFICATION

7.1 Kalesnikoff CLT panels are identified with stamps noting the Kalesnikoff Mass Timber Inc. name or logo (Figure 1), plant number, product layup and designation (or thickness), production date and shift, and ICC-ES evaluation report number (ESR-5105).

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

KALESNIKOFF MASS TIMBER INC.
P.O. BOX 3000, HWY 3A
CASTLEGAR, BRITISH COLUMBIA V1N 4N1
CANADA
(250) 399-4211
www.kalesnikoff.com

TABLE 1—ASD REFERENCE DESIGN VALUES[1] FOR LUMBER LAMINATIONS USED IN KALESNIKOFF CLT PANELS

CLT Grade	LAMINATIONS USED IN MAJOR STRENGTH DIRECTION									LAMINATIONS USED IN MINOR STRENGTH DIRECTION								
	Grade & Species	F_b (psi)	E (10^6 psi)	F_t (psi)	F_c (psi)	F_v (psi)	F_s (psi)	$F_{c\perp}$ (psi)	G	Grade & Species	F_b (psi)	E (10^6 psi)	F_t (psi)	F_c (psi)	F_v (psi)	F_s (psi)	$F_{c\perp}$ (psi)	G
E1, E1.1, E1.2, & E1.3	1950f-1.7E SPF[2]	1,950	1.7	1,375	1,800	135	45	425	0.42	No. 3 SPF[2]	500	1.2	250	650	135	45	425	0.42
E1M8	1950f-1.7E SPF[2]	1,950	1.7	1,375	1,800	135	45	425	0.42	1950f-1.7E SPF[2]	1,950	1.7	1,375	1,800	135	45	425	0.42
E1M9	1950f-1.7E SPF[2]	1,950	1.7	1,375	1,800	135	45	425	0.42	No. 1/No. 2 SPF[2]	875	1.4	450	1,150	135	45	425	0.42
E1M11	1650f-1.5E SPF[2]	1,650	1.5	1,020	1,700	135	45	425	0.42	No. 3 SPF[2]	500	1.2	250	650	135	45	425	0.42
V2, V2.2, & V2.4	No. 1/No. 2 SPF[2]	875	1.4	450	1,150	135	45	425	0.42	No. 3 SPF[2]	500	1.2	250	650	135	45	425	0.42
V2M6	No. 1/No. 2 SPF[2]	875	1.4	450	1,150	135	45	425	0.42	No. 1/No. 2 SPF[2]	875	1.4	450	1,150	135	45	425	0.42

For **SI**: 1 psi = 6,895 Pa

[1]Tabulated values are reference design values intended for Allowable Stress Design (ASD) and must be adjusted in accordance with Table 4.3.1 of the 2018 NDS except that the lumber size adjustment factor (C_F) must not be applied. The design values shall be used in conjunction with the section properties provided by the CLT manufacturer based on the actual layup used in manufacturing the CLT panel (see Table 2).

[2]The SPF laminations shall be permitted to be substituted by Douglas fir-Larch, Douglas fir-Larch (North), or Hem-fir (North) lumber of equal or greater design properties. When Hem-fir (North) is used to substitute SPF in the CLT layup, the bearing capacity of the CLT shall be based on the compressive stress perpendicular to grain ($F_{c\perp}$) of 405 psi.

TABLE 2—KALESNIKOFF CLT PANEL LAYUPS

CLT GRADE	LAYUP[1]	THICKNESS t_p[2] (in.)	LAMINATION ACTUAL THICKNESS[3] (in.)						
			∥	⊥	∥	⊥	∥	⊥	∥
E1	3-ply	$4^1/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	-	-	-	-
	5-ply	$6^7/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	-	-
	7-ply	$9^5/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$
	9-ply	$12^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$
E1.1	3-ply	3.67	1.50	0.67	1.50	-	-	-	-
	5-ply	5.84	1.50	0.67	1.50	0.67	1.50	-	-
	7-ply	8.02	1.50	0.67	1.50	0.67	1.50	0.67	1.50
	9-ply	10.19	1.50	0.67	1.50	0.67	1.50	0.67	1.50
E1.2	3-ply	4.50	1.50	1.50	1.50	-	-	-	-
	5-ply	7.50	1.50	1.50	1.50	1.50	1.50	-	-
	7-ply	10.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
	9-ply	13.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
E1.3	3-ply	3.42	1.38	0.67	1.38	-	-	-	-
	5-ply	5.47	1.38	0.67	1.38	0.67	1.38	-	-
	7-ply	7.52	1.38	0.67	1.38	0.67	1.38	0.67	1.38
	9-ply	9.56	1.38	0.67	1.38	0.67	1.38	0.67	1.38
E1M8	3-ply	4.13	1.38	1.38	1.38	-	-	-	-
	5-ply	6.88	1.38	1.38	1.38	1.38	1.38	-	-
	7-ply	9.63	1.38	1.38	1.38	1.38	1.38	1.38	1.38
	9-ply	12.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
E1M9	3-ply	4.13	1.38	1.38	1.38	-	-	-	-
	5-ply	6.88	1.38	1.38	1.38	1.38	1.38	-	-
	7-ply	9.63	1.38	1.38	1.38	1.38	1.38	1.38	1.38
	9-ply	12.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
E1M11	3-ply	4.13	1.38	1.38	1.38	-	-	-	-
	5-ply	6.88	1.38	1.38	1.38	1.38	1.38	-	-
	7-ply	9.63	1.38	1.38	1.38	1.38	1.38	1.38	1.38
	9-ply	12.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38

TABLE 2—KALESNIKOFF CLT PANEL LAYUPS (CONTINUED)

CLT GRADE	LAYUP[1]	THICKNESS t_p[2] (in.)	LAMINATION ACTUAL THICKNESS[3] (in.)						
			∥	⊥	∥	⊥	∥	⊥	∥
V2	3-ply	$4^1/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	-	-	-	-
	5-ply	$6^7/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	-	-
	5-ply EL	$6^7/_8$	$1^3/_8 + 1^3/_8$	$1^3/_8$	$1^3/_8 + 1^3/_8$	-	-	-	-
	7-ply	$9^5/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$
	7-ply EL	$9^5/_8$	$1^3/_8 + 1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8 + 1^3/_8$	-	-
	8-ply EL[4]	11	$1^3/_8 + 1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$
	9-ply	$12^3/_8$	1 3/8	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$
	9-ply EL	$12^3/_8$	$1^3/_8 + 1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8$	$1^3/_8 + 1^3/_8$
V2.2	3-ply	3.42	1.38	0.67	1.38	-	-	-	-
	5-ply	5.47	1.38	0.67	1.38	0.67	1.38	-	-
	5-ply EL	6.17	1.38 + 1.38	0.67	1.38 + 1.38	-	-	-	-
	7-ply	7.52	1.38	0.67	1.38	0.67	1.38	0.67	1.38
	7-ply EL	8.22	1.38 + 1.38	0.67	1.38	0.67	1.38 + 1.38	-	-
	9-ply	9.56	1.38	0.67	1.38	0.67	1.38	0.67	1.38
V2.4	3-ply	4.50	1.50	1.50	1.50	-	-	-	-
	5-ply	7.50	1.50	1.50	1.50	1.50	1.50	-	-
	7-ply	10.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
	9-ply	13.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
V2M6	3-ply	4.14	1.38	1.38	1.38	-	-	-	-
	5-ply	6.90	1.38	1.38	1.38	1.38	1.38	-	-
	7-ply	9.66	1.38	1.38	1.38	1.38	1.38	1.38	1.38
	9-ply	12.42	1.38	1.38	1.38	1.38	1.38	1.38	1.38

For **SI**: 1 in. = 25.4 mm.

[1]The CLT layups are developed based on the 2019 ANSI/APA PRG 320, using visually graded or machine stress rated (MSR) sawn lumber noted in Section 3.2.1 of the evaluation report. "EL" in the layup designation refers to doubled outermost parallel layers.
[2]Gross thickness of CLT panels.
[3]Actual thickness of lamination after planing. "∥": Face laminations are oriented parallel to the major strength direction and "⊥": Face laminations are oriented perpendicular to the major strength direction.
[4]This layup is unbalanced (the top and bottom layers are different in the layer thickness). The side that contains a single outermost layer in the major strength direction must be stamped with the word "TOP". See Section 4.2.

TABLE 3—ASD REFERENCE DESIGN VALUES FOR KALESNIKOFF CLT PANELS[1]

CLT GRADE	LAYUP[2]	MAJOR STRENGTH DIRECTION				MINOR STRENGTH DIRECTION			
		$(F_bS)_{eff,f,0}$ (lb_f-ft/ft)	$(EI)_{eff,f,0}$ ($x10^6$ lb_f-$in.^2$/ft)	$(GA)_{eff,f,0}$ ($x10^6$ lb_f/ft)	$V_{s,0}$ (lb_f/ft)	$(F_bS)_{eff,f,90}$ (lb_f-ft/ft)	$(EI)_{eff,f,90}$ ($x10^6$ lb_f-$in.^2$/ft)	$(GA)_{eff,f,90}$ ($x10^6$ lb_f/ft)	$V_{s,90}$ (lb_f/ft)
E1	3-ply	4,525	115	0.46	1,490	160	3.1	0.61	495
	5-ply	10,400	440	0.92	2,480	1,370	81	1.2	1,490
	7-ply	18,375	1,089	1.4	3,475	3,150	313	1.8	2,480
	9-ply	28,475	2,169	1.8	4,450	5,600	776	2.5	3,475
E1.1	3-ply	3,700	84	0.55	1,320	40	0.36	0.38	240
	5-ply	8,525	307	1.1	2,100	580	24	0.75	1,020
	7-ply	15,150	748	1.6	2,875	1,320	95	1.1	1,810
	9-ply	23,600	1,480	2.2	3,675	2,320	240	1.5	2,600
E1.2	3-ply	5,400	149	0.50	1,620	190	4.0	0.67	540
	5-ply	12,375	572	1.0	2,700	1,630	105	1.3	1,620
	7-ply	21,875	1,413	1.5	3,775	3,750	406	2.0	2,700
	9-ply	33,900	2,816	2.0	4,850	6,650	1,007	2.7	3,775
E1.3	3-ply	3,200	68	0.49	1,230	40	0.36	0.36	240
	5-ply	7,400	249	0.98	1,970	540	21	0.73	980
	7-ply	13,150	608	1.5	2,700	1,230	84	1.1	1,720
	9-ply	20,450	1,204	2.0	3,450	2,170	212	1.5	2,450
E1M8	3-ply	4,525	115	0.64	1,490	615	4.4	0.64	495
	5-ply	10,425	441	1.3	2,480	5,325	115	1.3	1,490
	7-ply	18,450	1,093	1.9	3,475	12,275	441	1.9	2,480
	9-ply	28,625	2,179	2.6	4,450	21,700	1,093	2.6	3,475
E1M9	3-ply	4,525	115	0.53	1,490	275	3.6	0.63	495
	5-ply	10,425	441	1.1	2,480	2,390	95	1.3	1,490
	7-ply	18,400	1,090	1.6	3,475	5,525	364	1.9	2,480
	9-ply	28,525	2,173	2.1	4,450	9,775	903	2.5	3,475

TABLE 3—ASD REFERENCE DESIGN VALUES FOR KALESNIKOFF CLT PANELS[1] (CONTINUED)

CLT GRADE	LAYUP[2]	MAJOR STRENGTH DIRECTION				MINOR STRENGTH DIRECTION			
		$(F_bS)_{eff,f,0}$ (lb_f-ft/ft)	$(EI)_{eff,f,0}$ ($x10^6$ lb_f-in.^{2}/ft)	$(GA)_{eff,f,0}$ ($x10^6$ lb_f/ft)	$V_{s,0}$ (lb_f/ft)	$(F_bS)_{eff,f,90}$ (lb_f-ft/ft)	$(EI)_{eff,f,90}$ ($x10^6$ lb_f-in.^{2}/ft)	$(GA)_{eff,f,90}$ ($x10^6$ lb_f/ft)	$V_{s,90}$ (lb_f/ft)
E1M11	3-ply	3,825	101	0.46	1,490	160	3.1	0.55	495
	5-ply	8,800	389	0.92	2,480	1,370	81	1.1	1,490
	7-ply	15,575	962	1.4	3,475	3,150	312	1.7	2,480
	9-ply	24,125	1,917	1.8	4,450	5,575	774	2.2	3,475
V2	3-ply	2,030	95	0.46	1,490	160	3.1	0.52	495
	5-ply	4,675	363	0.91	2,480	1,370	81	1.0	1,490
	5-ply EL	5,825	451	0.95	2,480	160	3.1	0.61	495
	7-ply	8,275	898	1.4	3,475	3,150	312	1.6	2,480
	7-ply EL	10,650	1,156	1.4	3,475	1,370	81	1.1	1,490
	8-ply EL[3]	11,000	1,463	1.6	3,950	3,150	312	1.6	2,480
	9-ply	12,800	1,791	1.8	4,450	5,575	773	2.1	3,475
	9-ply EL	16,475	2,303	1.8	4,450	3,150	312	1.6	2,480
V2.2	3-ply	1,440	56	0.48	1,230	40	0.36	0.30	240
	5-ply	3,325	205	0.95	1,970	540	21	0.61	980
	5-ply EL	4,725	329	1.2	2,220	40	0.36	0.43	240
	7-ply	5,900	501	1.4	2,700	1,220	84	0.91	1,720
	7-ply EL	8,125	753	1.6	2,950	540	21	0.73	980
	9-ply	9,200	993	1.9	3,450	2,150	211	1.2	2,450
	9-ply EL	12,250	1,421	2.0	3,700	1,220	84	1.0	1,720
V2.4	3-ply	2,420	123	0.50	1,620	190	4.0	0.56	540
	5-ply	5,575	471	0.99	2,700	1,630	105	1.1	1,620
	7-ply	9,825	1,166	1.5	3,775	3,750	405	1.7	2,700
	9-ply	15,250	2,325	2.0	4,850	6,650	1,004	2.3	3,775
V2M6	3-ply	2,050	96	0.53	1,490	280	3.7	0.53	495
	5-ply	4,725	367	1.1	2,480	2,410	96	1.1	1,490
	7-ply	8,350	910	1.6	3,475	5,500	367	1.6	2,480
	9-ply	12,925	1,814	2.1	4,475	9,800	910	2.1	3,475

For **SI**: 1 in. = 25.4 mm; 1 ft. = 304.8 mm; 1 lb_f = 4.448 N

[1]The tabulated values are reference design values intended for ASD and must be adjusted in accordance with Section 4.2.
[2]The CLT layups are developed based on the 2019 ANSI/APA PRG 320, using visually graded or machine stress rated (MSR) sawn lumber noted in Section 3.2.1 of the evaluation report. "EL" in the layup designation refers to doubled outermost parallel layers.
[3]This layup is unbalanced (the top and bottom layers are different in the layer thickness). The side that contains a single outermost layer in the major strength direction must be stamped with the word "TOP". See Section 4.2.

TABLE 4—REFERENCE DESIGN VALUES FOR IN-PLANE SHEAR OF THE KALESNIKOFF CLT PANELS[1]

CLT GRADE	LAYUP[2]	THICKNESS t_p (in.)	IN-PLANE SHEAR STRESS		IN-PLANE SHEAR CAPACITY[3]	
			$F_{v,e,0}$ (psi)	$F_{v,e,90}$ (psi)	$F_{v,e,0}\,t_p$ (lbf/ft of width)	$F_{v,e,90}\,t_p$ (lbf/ft of width)
E1	3-ply	4 1/8	105[4]	105[4]	5,200[4]	5,200[4]
	5-ply	6 7/8	165[5]	165[5]	13,600[5]	13,600[5]
	7-ply	9 5/8	165[5]	165[5]	19,100[5]	19,100[5]
	9-ply	12 3/8	165[5]	165[5]	24,500[5]	24,500[5]
E1.1	3-ply	3.67	105[4]	105[4]	4,600[4]	4,600[4]
	5-ply	5.84	165[5]	165[5]	11,600[5]	11,600[5]
	7-ply	8.02	165[5]	165[5]	15,900[5]	15,900[5]
	9-ply	10.19	165[5]	165[5]	20,200[5]	20,200[5]
E1.2	3-ply	4.50	105[4]	105[4]	5,700[4]	5,700[4]
	5-ply	7.50	165[5]	165[5]	14,900[5]	14,900[5]
	7-ply	10.50	165[5]	165[5]	20,800[5]	20,800[5]
	9-ply	13.50	165[5]	165[5]	26,700[5]	26,700[5]
E1.3	3-ply	3.42	105[4]	105[4]	4,300[4]	4,300[4]
	5-ply	5.47	165[5]	165[5]	10,800[5]	10,800[5]
	7-ply	7.52	165[5]	165[5]	14,900[5]	14,900[5]
	9-ply	9.56	165[5]	165[5]	18,900[5]	18,900[5]
E1M8	3-ply	4.13	105[4]	105[4]	5,200[4]	5,200[4]
	5-ply	6.88	165[5]	165[5]	13,600[5]	13,600[5]
	7-ply	9.63	165[5]	165[5]	19,100[5]	19,100[5]
	9-ply	12.38	165[5]	165[5]	24,500[5]	24,500[5]

TABLE 4—REFERENCE DESIGN VALUES FOR IN-PLANE SHEAR OF THE KALESNIKOFF CLT PANELS[1] (CONTINUED)

CLT GRADE	LAYUP[2]	THICKNESS t_p (in.)	IN-PLANE SHEAR STRESS		IN-PLANE SHEAR CAPACITY[3]	
			$F_{v,e,0}$ (psi)	$F_{v,e,90}$ (psi)	$F_{v,e,0}\,t_p$ (lbf/ft of width)	$F_{v,e,90}\,t_p$ (lbf/ft of width)
E1M9	3-ply	4.13	105[4]	105[4]	5,200[4]	5,200[4]
	5-ply	6.88	165[5]	165[5]	13,600[5]	13,600[5]
	7-ply	9.63	165[5]	165[5]	19,100[5]	19,100[5]
	9-ply	12.38	165[5]	165[5]	24,500[5]	24,500[5]
E1M11	3-ply	4.13	105[4]	105[4]	5,200[4]	5,200[4]
	5-ply	6.88	165[5]	165[5]	13,600[5]	13,600[5]
	7-ply	9.63	165[5]	165[5]	19,100[5]	19,100[5]
	9-ply	12.38	165[5]	165[5]	24,500[5]	24,500[5]
V2	3-ply	4 1/8	105[4]	105[4]	5,200[4]	5,200[4]
	5-ply	6 7/8	165[5]	165[5]	13,600[5]	13,600[5]
	5-ply EL	6 7/8	165[5]	165[5]	13,600[5]	13,600[5]
	7-ply	9 5/8	165[5]	165[5]	19,100[5]	19,100[5]
	7-ply EL	9 5/8	165[5]	165[5]	19,100[5]	19,100[5]
	8-ply EL[6]	11	165[5]	165[5]	21,800[5]	21,800[5]
	9-ply	12 3/8	165[5]	165[5]	24,500[5]	24,500[5]
	9-ply EL	12 3/8	165[5]	165[5]	24,500[5]	24,500[5]
V2.2	3-ply	3.42	105	105[4]	4,300	4,300[4]
	5-ply	5.47	165	165[5]	10,800	10,800[5]
	5-ply EL	6.17	165[5]	165[5]	12,200[5]	12,200[5]
	7-ply	7.52	165[5]	165[5]	14,900[5]	14,900[5]
	7-ply EL	8.22	165[5]	165[5]	16,300[5]	16,300[5]
	9-ply	9.56	165[5]	165[5]	18,900[5]	18,900[5]
	9-ply EL	10.27	165[5]	165[5]	20,300[5]	20,300[5]
V2.4	3-ply	4.50	105[4]	105[4]	5,700[4]	5,700[4]
	5-ply	7.50	165[5]	165[5]	14,900[5]	14,900[5]
	7-ply	10.50	165[5]	165[5]	20,800[5]	20,800[5]
	9-ply	13.50	165[5]	165[5]	26,700[5]	26,700[5]
V2M6	3-ply	4.14	105[4]	105[4]	5,200[4]	5,200[4]
	5-ply	6.90	165[5]	165[5]	13,600[5]	13,600[5]
	7-ply	9.66	165[5]	165[5]	19,100[5]	19,100[5]
	9-ply	12.42	165[5]	165[5]	24,500[5]	24,500[5]

For **SI**: 1 in = 25.4 mm, 1 psi = 6,895 Pa

[1]The tabulated values are reference design values intended for ASD and must be adjusted in accordance with Section 4.2.
[2]The CLT layups are developed based on the 2019 ANSI/APA PRG 320, using visually graded or machine stress rated (MSR) sawn lumber noted in Section 3.2.1 of the evaluation report. "EL" in the layup designation refers to doubled outermost parallel layers.
[3]The tabulated values are for the full thickness (t_p) of the CLT. The values shall be reduced when the CLT panel thickness is less than the full thickness.
[4]Based on test results from 3-ply of V2.2.
[5]Based on test results from 5-ply of V2.2.
[6]This layup is unbalanced (the top and bottom layers are different in the layer thickness). The side that contains a single outermost layer in the major strength direction must be stamped with the word "TOP". See Section 4.2.

KALESNIKOFF
Mass Timber Inc.

FIGURE 1—COMPANY LOGO FOR KALESNIKOFF MASS TIMBER INC.

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 19—Cross-laminated Timber

REPORT HOLDER:

KALESNIKOFF MASS TIMBER INC.

EVALUATION SUBJECT:

KALESNIKOFF CROSS-LAMINATED TIMBER

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Kalesnikoff Cross-Laminated Timber (CLT) panels, described in ICC-ES evaluation report ESR-5105, 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:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Kalesnikoff CLT panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-5105, comply with the LABC Chapters 6 and 23, and the LARC, and are subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Kalesnikoff CLT panels, described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-5105.
- The design, installation, conditions of use and identification of the Kalesnikoff CLT panels are in accordance with the 2018 *International Building Code®* (IBC) provisions noted in the evaluation report ESR-5105.
- The design, installation and inspection of the Kalesnikoff CLT panels 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, issued September 2022.

DIVISION: 06 00 00—WOOD, PLASTIC AND COMPOSITES
Section: 06 17 19—Cross-laminated Timber

REPORT HOLDER:

KALESNIKOFF MASS TIMBER INC.

EVALUATION SUBJECT:

KALESNIKOFF CROSS-LAMINATED TIMBER

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Kalesnikoff Cross-Laminated Timber (CLT) panels, described in the ICC-ES evaluation report ESR-5105, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2019 *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 Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code* (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The Kalesnikoff CLT panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-5105, comply with CBC Chapters 6 and 23, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report ESR-5105 and the additional requirements of CBC Chapters 6, 16, 17, and 23, 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 Kalesnikoff CLT panels described in Sections 2.0 through 7.0 of the evaluation report ESR-5105, complies with CRC Chapters 5, 6 and 8, provided the design and installation are in accordance with the 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report and the additional requirements of CRC Chapter 3, as applicable.

This supplement expires concurrently with the evaluation report, issued September 2022.