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ESR-3147

Reissued March 2015
This report is subject to renewal March 2016

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
SECTION: 06 17 13—LAMINATED VENEER LUMBER

REPORT HOLDER:

MODERN LUMBER TECHNOLOGY LTD. (MLT. LTD.)

14, BOLSHAYA MORSKAYA STREET
SAINT PETERSBURG 191186
RUSSIA

EVALUATION SUBJECT:

MLT ULTRALAM™ 1.8E AND 2.0E LAMINATED VENEER LUMBER (LVL)

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ICC-ES Evaluation Report

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

REPORT HOLDER:

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EVALUATION SUBJECT:

MLT ULTRALAM™ 1.8E AND 2.0E LAMINATED VENEER LUMBER (LVL)

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2012, 2009 and 2006 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Property evaluated:

Structural

2.0 USES

MLT Ultralam 1.8E and 2.0E laminated veneer lumber (LVL) is used for structural applications such as beams, headers, joists, and rafters. MLT Ultralam 1.8E and 2.0E LVL also may be used as a component in built-up structural members such as flanges for prefabricated wood I-joists and chords for trusses.

3.0 DESCRIPTION

3.1 General:

The MLT Ultralam LVL described in this report complies with the requirements noted in Section 2303.1.9 of the IBC for allowable stress design (ASD). MLT Ultralam LVL may also be used in structures regulated under the IRC, when an engineered design is submitted in accordance with IRC Section R301.1.3.

3.2 Material:

MLT LVL consists of layers of wood veneers of a single wood species, or species combination, laminated together using an exterior-type structural adhesive complying with ASTM D2559. The wood veneer properties and species, adhesive, manufacturing parameters and finished product dimensions and tolerances are specified in the approved quality documentation and manufacturing standard.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: The requirements specified for ASD in accordance with IBC Section 2301.2(1), and the design provisions for structural composite lumber in the ANSI/AF&PA National Design Specification for Wood Construction (NDS), are applicable to MLT Ultralam LVL, except as modified within this report. Reference design values for each grade of MLT Ultralam LVL are given in Table 1.

4.1.2 Connections: The design of mechanical connections in MLT Ultralam LVL must be in accordance with the NDS. Equivalent specific gravities for the design of nail and bolt connections under dry use conditions are given in Table 2. Connections, other than nailed and bolted connections described herein, are outside the scope of this report.

Spacing, edge distance, and end distance of nails installed into the wide face (perpendicular to the glue lines) of LVL are the same as those permitted in the applicable code for sawn lumber. Spacing of nails installed into the narrow face, or edge (parallel to the glue lines), of the LVL 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 LVL that is at least $1^3/_4$ inches thick by $5^1/_2$ 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 LVL. Additionally, maximum nail penetration into the LVL must be limited as necessary to prevent splitting.

4.2 Installation:

The installation of MLT Ultralam LVL must be in accordance with this report, the applicable code provisions, and the manufacturer's published installation instructions. The manufacturer's installation instructions must be available at the jobsite at all times during installation.

5.0 CONDITIONS OF USE

The MLT Ultralam™ LVL 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, installation and connection restrictions must comply with this report, the manufacturer's published installation instructions, and applicable code provisions. In the event of a conflict

between this report and the manufacturer's published installation instructions, this report governs.

5.2 Use of MLT Ultralam LVL must be limited to dry, well-ventilated interior applications in which the in-service equivalent moisture content of solid lumber is less than 16 percent.

5.3 Calculations and/or drawings demonstrating compliance with this report must be submitted to 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.

5.4 MLT Ultralam LVL is produced by Modern Lumber Technology at its manufacturing facility in Torzhok, Russia, under a quality-control program with inspections by PFS Corporation (AA-652).

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Structural Wood-based Products (AC47), dated January 2015.

6.2 Data in accordance with the ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014.

7.0 IDENTIFICATION

MLT Ultralam LVL is identified with a label noting the Modern Lumber Technology name, assigned plant number, product designation, grade, product date and shift, the ICC-ES evaluation report number (ESR-3147), and the third-party inspection agency name (PFS Corporation).

TABLE 1—ALLOWABLE STRESS REFERENCE DESIGN VALUES FOR MLT ULTRALAM LVL[1,2,3.8]

PROPERTY		DESIGN STRESS (psi)	
		2200F_b-1.8E (Grade)	**2900F_b-2.0E (Grade)**
Modulus of Elasticity (E)[4]	Joist	1,800,000	2,000,000
	Plank	1,800,000	2,000,000
Flexural Stress (F_b)[5,6]	Joist	2,200	2,900
	Plank	2,400	3,300
Tensile Strength (F_t)[7]		1,650	2,100
Longitudinal Shear (F_v)	Joist	200	200
	Plank	150	150
Compression Parallel Strength ($F_{c\|\|}$)		2,350	2,600
Compression Perpendicular Strength ($F_{c\perp}$)	Joist	590	590

For **SI:** 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psi = 6.89 kPa.

[1]Reference design values in the above table apply only to dry, well ventilated interior applications where the equivalent moisture content in solid lumber is less than 16 percent.

[2]Reference design values in the above table are for normal load duration. Tabulated values must be adjusted by the applicable adjustment factors in accordance with the NDS. Modulus of elasticity (E), and compression perpendicular-to-grain, $F_{c\perp}$, must not be adjusted for duration of load.

[3]Reference design values given for the joist orientation refer to loads applied parallel to the wide face of the veneers (applied to the edge of the member). Plank orientation refers to loads applied perpendicular to the wide face of the veneers (applied to the face of the member).

[4]For uniformly loaded simply-supported beams, deflection is calculated as follows:

$$\delta = \frac{270wL^4}{Ebd^3} + \frac{28.8wL^2}{Ebd}$$

where: δ = estimated deflection, inches; w = uniform load, plf; L = span, feet; E = tabulated modulus of elasticity, psi; b = beam width, inches; d = beam depth, inches

[5]Reference bending design values in joist orientation, F_b, may be increased by 4% when the member qualifies as a repetitive member, in accordance with Section 8.3.7 of the NDS.

[6]Reference bending design values in joist orientation, F_b, are assigned for a standard depth of 12 inches. For other depths, multiply F_b by a volume factor of $(12/d)^{0.17}$, as shown in the following table, where d is the depth of the member in inches. The volume factor cannot be taken as greater than 1.23.

Depth (in.)	$3^1/_2$	$5^1/_2$	$7^1/_4$	$9^1/_2$	12	14	16	18	24
Multiply by	1.23	1.14	1.09	1.04	1	0.97	0.95	0.93	0.89

[7]Reference tension design values, F_t, are assigned for a standard length of 3 feet. For lengths longer than 3 feet, multiply F_t by $(3/L)^{0.125}$, where L is the length in feet. For lengths less than 3 feet, use the reference tension design value given in Table 1.

[8]The reference E for beam and column stability calculations, E_{min}, must be calculated in accordance with Appendix D of the NDS. When calculating E_{min}, the coefficient of variation of modulus of elasticity, COV_E, may be taken as 0.10.

TABLE 2—EQUIVALENT SPECIFIC GRAVITY FOR FASTENER DESIGN[1,2,3,4]

GRADE	EQUIVALENT SPECIFIC GRAVITY					
	Nails				Bolts	
	Withdrawal		Dowel Bearing		Dowel Bearing (Installed in Face)	
	Installed in Edge	Installed in Face	Installed in Edge	Installed in Face	Load Applied Parallel to Grain	Load Applied Perpendicular to Grain
2200F_b-1.8E	0.58	0.58	0.40	0.40	0.58	0.44
2900F_b-2.0E						

[1]Fastener types and orientation not specifically described above are outside the scope of this report.

[2]Fastener design values calculated using the tabulated equivalent specific gravities given above must be adjusted by the applicable adjustment factors specified in the NDS for connections.

[3]Minimum nail spacing, edge distance, and end distance must be as specified in Section 4.1.2 of this report.

[4]Minimum bolt spacing, end and edge distances must be as specified in the NDS. Equivalent specific gravities apply only to bolts installed into the face of the LVL, such that the bolt axis is perpendicular to the wide faces of the veneers.