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Technical Evaluation Report

TER 1603-03

MLT Ultralam™ Laminated Veneer Lumber (LVL) TOPplank

Modern Lumber Technology, Ltd. (MLT Ltd.)

Product:

MLT Ultralam™ 2.0E Fb 2900 TOPplank

Issue Date:

April 28, 2016

Revision Date:

April 19, 2022

Subject to Renewal:

April 19, 2022

COMPANY
INFORMATION:

Modern Lumber Technology, Ltd. (MLT Ltd.)

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ultralam.com

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 17 00 - Shop-Fabricated Structural Wood

SECTION: 06 17 13 - Laminated Veneer Lumber

1 Product Evaluated[1]

1.1 MLT Ultralam™ 2.0E Fb 2900 TOPplank

2 Applicable Codes and Standards[2,3]

2.1 *Codes*

2.1.1 *IBC—12, 15, 18: International Building Code®*

2.1.2 *IRC—12, 15, 18: International Residential Code®*

2.1.3 *NBC—10, 15: National Building Code of Canada*

2.2 *Standards and Referenced Documents*

2.2.1 *ANSI A10.8: Scaffolding Safety Requirements*

2.2.2 *ANSI/AWC NDS®: National Design Specification (NDS®) for Wood Construction*

2.2.3 *ASTM D143: Standard Test Methods for Small Clear Specimens of Timber*

2.2.4 *ASTM D198: Standard Test Methods of Static Tests of Lumber in Structural Sizes*

2.2.5 *ASTM D2559: Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions*

2.2.6 *ASTM D5456: Standard Specification for Evaluation of Structural Composite Lumber Products*

2.2.7 *CSA O86: Engineering Design in Wood*

2.2.8 *CSA S269.2: Access Scaffolding for Construction Purposes*

2.2.9 *OSHA 29 CFR 1910.28: Duty to Have Fall Protection and Falling Object Protection*

2.2.10 *OSHA 29 CFR 1926 Subpart L App A: Scaffold Specifications*

[1] For more information, visit drjcertification.org or call us at 608-310-6748.

[2] Unless otherwise noted, all references in this TER are from the 2018 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

[3] All terms defined in the applicable building codes are italicized.

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3 Performance Evaluation

3.1 MLT Ultralam™ 2.0E LVL TOPplank was evaluated to determine its resistance properties, which are used to develop reference design values for Allowable Stress Design (ASD) and specified strength and modulus of elasticity values for Limit States Design (LSD). This TER examines MLT Ultralam™ 2.0E LVL TOPplank for the following:

3.1.1 Use in flatwise bending as a scaffold plank as defined by *ANSI A10.8* Section 3.59

3.1.2 Use in flatwise bending as a scaffold plank as defined by *OSHA 29 CFR* 1926.450(b)

3.1.3 Use in flatwise bending as a scaffold plank as defined by *CSA S269.2*

3.2 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

3.3 Any engineering evaluation conducted for this TER was performed within DrJ's ANAB accredited ICS code scope and/or the defined professional engineering scope of work on the dates provided herein.

4 Product Description and Materials

4.1 MLT Ultralam™ 2.0E LVL TOPplank is manufactured by Modern Lumber Technology, Ltd. (MLT) at its facility in Torzhok, Russia.

4.2 The product is manufactured by laminating wood veneers with an exterior type adhesive (complying with *ASTM D2559*) in a continuous process with the grain of the wood oriented parallel to the length of the member in accordance with an ISO 9001 quality certification system.

4.3 The wood veneer properties and species, adhesive, manufacturing parameters, and finished product dimensions and tolerances are specified in the approved quality documentation and MLT's in-plant manufacturing standard.

4.4 *Material Availability*

4.4.1 Thickness: 1½" (38 mm), $1^5/_8$" (42 mm)

4.4.2 Widths: $8^7/_8$" (225 mm), 9¼" (235 mm), 9½" (241 mm), and 11¼" (286 mm)

4.4.3 Lengths: up to 60' (18.3 m)

5 Applications

5.1 Structural applications include use in flatwise bending as a scaffold plank.

5.2 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

5.3 *Design*

5.3.1 Design of MLT Ultralam™ 2.0E LVL TOPplank is governed by the applicable code and the provisions for Structural Composite Lumber (SCL) in *NDS* and Structural Composite Lumber Products in *CSA O86*.

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5.3.2 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.

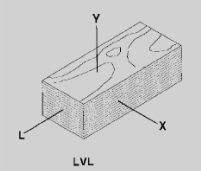
5.3.2.1 The design provisions for wood construction noted in *IBC* Section 2302.1[4] and *IRC* Section R301.1.3 apply to MLT Ultralam™ 2.0E LVL TOPplank for ASD, unless otherwise noted in this report. Allowable unit stresses for MLT Ultralam™ 2.0E LVL TOPplank are specified in Table 1.

TABLE 1. FLATWISE USE REFERENCE DESIGN VALUES FOR MLT ULTRALAM™ 2.0E LVL TOPPLANK (ALLOWABLE STRESS DESIGN)[2,6,7,8]

Moisture Content	Bending, F_b psi (MPa)	Horizontal Shear, F_v psi (MPa)	Plank Modulus of Elasticity, E psi (MPa)	
	Plank[1,4]	Plank[1,5]	Apparent[3]	True[3]
MC ≤ 16%	2,900 (20.0)	100 (0.69)	1,900,000 (13,100)	2,000,000 (13,790)
16% < MC ≤ 30%	2,300 (15.9)	100 (0.69)	1,500,000 (10,342)	1,600,000 (11,032)

SI: 1 psi = 0.00689 MPa

1. The reference design values in this table are for normal load duration. Loads of longer or shorter duration shall be adjusted in accordance with the applicable code. Duration of load adjustments shall not be applied to E.
2. Orientation nomenclature for MLT Ultralam™ 2.0E LVL TOPplank



3. The Apparent E can be used directly in traditional beam deflection formulas. Using True E, deflection is calculated as follows for uniformly loaded simple span beams.
   $\Delta = [5WL^4/(32Ebh^3)] + [12WL^2/(5Ebh)]$
   where: Δ = deflection in inches
   W = uniform load in pounds/inch
   L = span in inches
   E = modulus of elasticity in psi
   b = width of beam in inches
   h = depth of beam in inches
4. The bending values in these tables are based on a referenced depth of 1½".
5. Horizontal shear value for L-X plane only
6. TOPplank are generally used in elevated locations with good air circulation conducive to drying of the wood fibers.
7. These design values have been developed in accordance with *ANSI A10.8* Appendix C.
8. Values are for new or like-new product.

[4] 2015 *IBC* Section 2301.2

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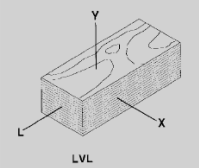
5.3.2.2 The design provisions for wood construction noted in *CSA O86* Section 13.4 apply to MLT Ultralam™ 2.0E LVL TOPplank for Limit States Design, unless otherwise noted in this report. Specified strength and modulus of elasticity values for MLT Ultralam™ 2.0E LVL TOPplank are specified in Table 2.

TABLE 2. FLATWISE USE SPECIFIED STRENGTH AND MODULUS OF ELASTICITY VALUES FOR MLT ULTRALAM™ 2.0E LVL TOPPLANK (LIMIT STATES DESIGN)[2,6,7,8]

Moisture Content	Bending, F_b psi (MPa)	Horizontal Shear, F_v psi (MPa)	Plank Modulus of Elasticity, E psi (MPa)	
	Plank[1,4]	Plank[1,5]	Apparent[3]	True[3]
MC ≤ 16%	5,200 (35.9)	190 (1.31)	1,900,000 (13,100)	2,000,000 (13,790)
16% < MC ≤ 30%	4,100 (28.3)	190 (1.31)	1,500,000 (10,342)	1,600,000 (11,032)

SI: 1 MPa = 145 psi

1. The reference design values in this table are for normal load duration. Loads of longer or shorter duration shall be adjusted in accordance with the applicable code. Duration of load adjustments shall not be applied to E.
2. Orientation nomenclature for MLT Ultralam™ 2.0E LVL TOPplank



3. The Apparent E can be used directly in traditional beam deflection formulas. Using True E, deflection is calculated as follows for uniformly loaded simple span beams.

   $\Delta = [5WL^4/(32Ebh^3)] + [12WL^2/(5Ebh)]$

   Where: Δ = deflection in inches
   W = uniform load in pounds/inch
   L = span in inches
   E = modulus of elasticity in psi
   b = width of beam in inches
   h = depth of beam in inches
4. The bending values in these tables are based on a referenced depth of 1½".
5. Horizontal shear value for L-X plane only
6. TOPplanks are generally used in elevated locations with good air circulation conducive to drying of the wood fibers.
7. These design values have been developed in accordance with *ANSI A10.8* Appendix C.
8. Values are for new or like-new product.

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5.3.2.3 Allowable spans for live load conditions defined in *ANSI A10.8* are provided in Table 3 for various member sizes.

TABLE 3. ALLOWABLE SPANS FOR TOPPLANK LVL SCAFFOLD PLANK USED IN THE UNITED STATES

Size	Live Load[2]	Allowable Span, ft (mm)[1]	
		MC ≤ 16 %	16% ≤ MC ≤ 30%
1.5" x 8.85" (38mm x 225mm)	One Person Load	9' - 10" (2,995)	8' - 8" (2,652)
	Two Person Load	7' - 11" (2,403)	7' - 2" (2,178)
	Three Person Load	6' - 2" (1,885)	5' - 4" (1,618)
	Light Duty (25 psf)	9' - 10" (2,995)	8' - 8" (2,652)
	Medium Duty (50 psf)	9' - 10" (2,995)	8' - 8" (2,652)
	Heavy Duty (75 psf)	8' - 11" (2,724)	8' - 3" (2,506)
1.5" x 9.25" (38mm x 235mm)	One Person Load	10' - 0" (3,054)	8' - 10" (2,703)
	Two Person Load	8' - 0" (2,444)	7' - 3" (2,214)
	Three Person Load	6' - 4" (1,941)	5' - 5" (1,662)
	Light Duty (25 psf)	10' - 0" (3,054)	8' - 10" (2,703)
	Medium Duty (50 psf)	10' - 0" (3,054)	8' - 10" (2,703)
	Heavy Duty (75 psf)	8' - 11" (2,724)	8' - 3" (2,506)
1.5" x 11.25" (38mm x 286mm)	One Person Load	10' - 11" (3,322)	9' - 8" (2,938)
	Two Person Load	8' - 8" (2,640)	7' - 10" (2,383)
	Three Person Load	7' - 2" (2,174)	6' - 2" (1,881)
	Light Duty (25 psf)	10' - 11" (3,322)	9' - 8" (2,938)
	Medium Duty (50 psf)	10' – 2 (3,087)	9' - 4" (2,834)
	Heavy Duty (75 psf)	8' - 11" (2,724)	8' - 3" (2,506)

SI: 1 in = 25.4 mm

1. Allowable spans are determined through an evaluation of bending stress, horizontal shear stress, and an allowable deflection of L/60 using the live loads shown. The member self-weight is included in all span determinations. Spans shown are center of bearing to center of bearing. Always use appropriate length planks for the span condition. Refer to OSHA for minimum and maximum cantilever requirements.
2. Live loads are as defined in *ANSI A10.8* Section 5.1.2. Proper scaffold plank selection must be based on the most restrictive load case anticipated when planks are in service.

5.3.2.4 Allowable spans for several live load conditions defined in *CSA S269.2* are provided in Table 4 for various member sizes.

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TABLE 4. ALLOWABLE SPANS FOR TOPPLANK LVL SCAFFOLD PLANK USED IN CANADA

Size	Live Load[2]	Allowable Spans, ft (mm)[1]	
		MC ≤ 16 %	16% ≤ MC ≤ 30%
1.5" x 8.85" (38mm x 225mm)	50 psf	9' - 6" (2,895)	8' - 9" (2,667)
	75 psf	8' - 3" (2,514)	7' - 8" (2,336)
	500 lbs	5' - 1" (1,549)	4' - 1" (1,244)
	25 psf + 250 plf	8' - 4" (2,540)	7' - 6" (2,286)
	75 psf + 265 plf	6' - 8" (2,032)	5' - 8" (1,727)
1.5" x 9.25" (38mm x 235mm)	50 psf	9' - 6" (2,895)	8' - 9" (2,667)
	75 psf	8' - 3" (2,514)	7' - 8" (2,336)
	500 lbs	5' - 4" (1,633)	4' - 3" (1,295)
	25 psf + 250 plf	8' - 4" (2,554)	7' - 6" (2,286)
	75 psf + 265 plf	6' - 8" (2,032)	5' - 8" (1,730)
1.5" x 11.25" (38mm x 286mm)	50 psf	9' - 6" (2,895)	8' - 9" (2,667)
	75 psf	8' - 3" (2,514)	7' - 8" (2,336)
	500 lbs	6' - 5" (1,995)	5' - 1" (1,549)
	25 psf + 250 plf	8' - 4" (2,540)	7' - 6" (2,286)
	75 psf + 265 plf	6' - 8" (2,032)	5' - 8" (1,727)

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m^2

1. Allowable spans are determined through an evaluation of ultimate bending strength/4, ultimate horizontal shear strength/4, Live Load/80. The member self-weight is included in the span checks for bending and shear strength. Spans shown are center of bearing to center of bearing. Always use appropriate length planks for the span condition. Refer to CSA for minimum and maximum cantilever requirements.
2. Loads are as defined in Clause 6 of *CSA S269.2*. PLF loads are applied across the plank width at mid span. Proper scaffold plank selection must be based on the most restrictive load case anticipated when planks are in service.

6 INSTALLATION

6.1 TOPplank is part of an overall scaffolding system. Consult the OSHA or OHS regulations on installation and the use of TOPplank referenced in Section 2.2.

6.2 Installation shall comply with the manufacturer's installation instructions and this TER. In the event of a conflict between the manufacturer's installation instructions and this TER, the more restrictive shall govern.

7 SUBSTANTIATING DATA

7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

7.1.1 Bending testing in accordance with *ASTM D198* and *ASTM D5456*

7.1.2 Shear testing in accordance with *ASTM D143* and *ASTM D5456*

7.1.3 Adhesive testing in accordance with *ASTM D2559* and *ASTM D5456*

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7.2 Information contained herein is the result of testing and/or data analysis by sources which conform to *IBC* Section 1703 and/or professional engineering regulations. DrJ relies upon accurate data to perform its ISO/IEC 17065 evaluations.

7.3 Where appropriate, DrJ's analysis is based on provisions that have been codified into law through state or local adoption of codes and standards. The providers of the codes and standards are legally responsible for their content. DrJ analysis may use code-adopted provisions as a control sample. A control sample versus a test sample establishes a product as being equivalent to that prescribed in this code in quality, *strength*, effectiveness, *fire resistance*, durability, and safety. Where the accuracy of the provisions provided herein is reliant upon the published properties of materials, DrJ relies upon the grade mark, grade stamp, mill certificate, and/or test data provided by material suppliers to be minimum properties. DrJ analysis relies upon these properties to be accurate.

8 Findings

8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product listed in Section 1.1 is approved for the following:

8.1.1 TOPplank meets all applicable requirements for use as scaffold plank in accordance with *ANSI A10.8*, *CSA O86*, and *CSA S269.2*.

8.1.2 TOPplank meets the requirements of *OSHA 29 CFR* 1926.451 and *NBC*.

8.2 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this TER, they are listed here.

8.2.1 No known variations

8.3 Building codes require data from valid *research reports* be obtained from *approved sources* (i.e., licensed *registered design professionals* [RDPs]).

8.3.1 Building official approval of a licensed RDP is performed by verifying the RDP and/or their business entity is listed by the licensing board of the relevant *jurisdiction*.

8.4 Agencies who are accredited through ISO/IEC 17065 have met the code requirements for approval by the *building official*. DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131 and employs RDPs.

8.5 Through ANAB accreditation and the IAF MLA, DrJ certification can be used to obtain product approval in any *jurisdiction* or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – "certified once, accepted everywhere."

8.6 *IBC* Section 104.11 (*IRC* Section R104.11 and *IFC* Section 104.9 are similar) states:

> **104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code…Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.

9 Conditions of Use

9.1 Where required by the *building official*, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of *permit* application.

9.2 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.

9.3 Design loads shall be determined in accordance with the building code adopted by the *jurisdiction* in which the project is to be constructed and/or by the building designer (e.g., *owner* or RDP).

9.4 At a minimum, this product shall be installed per Section 6 of this TER.

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9.5 This product has an internal quality control program and a third-party quality assurance program in accordance with *IBC* Section 104.4 and Section 110.4 and *IRC* Section R104.4 and Section R109.2.

9.6 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the *owner* or the owner's authorized agent.

9.7 This TER shall be reviewed for code compliance by the AHJ in concert with *IBC* Section 104.

9.8 The implementation of this TER for this product is dependent on the design, quality control, third-party quality assurance, proper implementation of installation instructions, inspections required by *IBC* Section 110.3, and any other code or regulatory requirements that may apply.

10 Identification

10.1 The product(s) listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.

10.2 Additional technical information can be found at ultralam.com.

11 Review Schedule

11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.

11.2 For information on the current status of this TER, contact DrJ Certification.

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