Technical Evaluation Report

TER 1704-01

DuraLam-S Laminated Veneer Lumber (LVL) Scaffold Plank – Limit States Design

McCausey Specialty Products

Product:
DuraLam-S Laminated Veneer Lumber (LVL) Scaffold Plank

Issue Date:
May 24, 2017

Revision Date:
June 28, 2019

Subject to Renewal:
July 1, 2020

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1 PRODUCT EVALUATED

1.1 DuraLam-S Laminated Veneer Lumber (LVL) Scaffold Plank

1.1.1 Where product is used in the United States, see TER 1702-01.

2 APPLICABLE CODES AND STANDARDS

2.1 Codes

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

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

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

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

2.2.6 CSA O86: Engineering Design in Wood

2.2.7 CSA S269.2: Access Scaffolding for Construction Purposes

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1 Building codes require data from valid certification, evaluation, and qualification reports be obtained from accredited third-party organizations. An accredited certifying organization (a type of accredited third-party organization) is a certification body that performs “certification of a product, process, or system.” An accredited third-party organization is accomplished via accreditation using ISO/IEC 17065 evaluation procedures meeting code requirements of independence, accredited testing, and professional personnel. DrJ is an ISO/IEC 17065 ANSI-Accredited Product Certification Body – Accreditation #1131.

Through ANSI accreditation, DrJ certification can be used to obtain product approval in any country that is an IAF MLA Signatory, such as Canada, and covered by an IAF MLA Evaluation per the Purpose of the MLA – “certified once, accepted everywhere.” Manufacturers can go to jurisdictions in any IAF MLA Signatory Country and have their products readily approved by authorities having jurisdiction using DrJ’s ANSI accreditation. For more information about DrJ’s accreditation, refer to this letter from the Standards Council of Canada (SCC).

For more information on any of these topics or our mission, product evaluation policies, product approval process, and engineering law, see drjcertification.org.

2 Unless otherwise noted, all references in this TER are from the 2015 version of the NBC. This alternative solution is also approved for use with the 2010 NBC and the standards referenced therein (e.g., CAN/CSA, CAN/ULC). Where this TER is not approved, the AHJ shall respond in writing stating the reasons this TER was not approved. For any variations in provincial, territorial, and local codes, see Section 8.

3 All terms defined in the applicable building codes are italicized.
3 PERFORMANCE EVALUATION

3.1 DuraLam-S LVL Scaffold Plank was evaluated to determine its resistance properties, which are used to develop specified strength and modulus of elasticity values for Limit States Design (LSD). This TER examines DuraLam-S LVL Scaffold Plank for:

3.1.1 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 on the dates provided in this TER and within DrJ’s professional scope of work.

4 PRODUCT DESCRIPTION AND MATERIALS

4.1 DuraLam-S LVL Scaffold Plank is distributed by McCausey Specialty Products at its facility in Roseville, Michigan.

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 in-plant manufacturing standards.

4.4 Material Availability

4.4.1 Thickness: 1½" (38 mm), 1¾" (41.2 mm)

4.4.2 Widths: 9¼" (235 mm), 9½" (241 mm), and 11¼" (286 mm)

4.4.3 Lengths: up to 48’ (14.6 m)

5 APPLICATIONS

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

5.2 Design

5.2.1 Design of DuraLam-S LVL Scaffold Plank is governed by the applicable code and the provisions for Structural Composite Lumber Products in CSA O86.

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

5.2.2.1 The design provisions for wood construction noted in CSA O86 Section 13.4 apply to DuraLam-S LVL Scaffold Plank for Limit States Design unless otherwise noted in this report. Specified strength and modulus of elasticity values for DuraLam-S LVL Scaffold Plank are specified in Table 1.
<table>
<thead>
<tr>
<th>Moisture Content</th>
<th>Bending, $F_b$ (psi (MPa))</th>
<th>Horizontal Shear, $F_v$ (psi (MPa))</th>
<th>Plank Modulus of Elasticity, $E$ (psi (MPa))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plank$^{1,4}$</td>
<td>Plank$^{1,5}$</td>
<td>Apparent$^3$</td>
</tr>
<tr>
<td>MC $\leq$ 16%</td>
<td>5,200 (35.9)</td>
<td>190 (1.31)</td>
<td>1,900,000 (13,100)</td>
</tr>
<tr>
<td>16% $&lt;$ MC $\leq$ 30%</td>
<td>4,100 (28.3)</td>
<td>190 (1.31)</td>
<td>1,500,000 (10,342)</td>
</tr>
</tbody>
</table>

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 DuraLam-S LVL Scaffold Plank.

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.

$$\Delta = \frac{5WL^4}{32Ebh^3} + \frac{12WL^2}{5Ebh}$$

where: $\Delta$ = deflection in inches
$W$ = uniform load in pli
$L$ = 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 X-L plane only

6. DuraLam-S LVL Scaffold Plank are generally used in elevated locations with good air circulation conducive to drying of the wood fibers.

7. The specified strength and modulus of elasticity values have been developed in accordance with ANSI A10.8 Appendix C and CSA O86.

8. Values are for new or like-new product.
5.2.2.2 Allowable spans for several live load conditions defined in CSA S269.2 are provided in Table 2 for various member sizes.

<table>
<thead>
<tr>
<th>Table 2. ALLOWABLE SPANS FOR DURALAM-S LVL SCAFFOLD PLANK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Live Load</strong></td>
</tr>
<tr>
<td><strong>MC ≤ 16 %</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td><strong>Size</strong></td>
</tr>
<tr>
<td>1.5” x 9.25” (38 mm x 235 mm)</td>
</tr>
<tr>
<td>50 psf</td>
</tr>
<tr>
<td>75 psf</td>
</tr>
<tr>
<td>500 lbs</td>
</tr>
<tr>
<td>Light Duty (25 psf + 250 plf)</td>
</tr>
<tr>
<td>Heavy Duty (75 psf + 265 plf)</td>
</tr>
<tr>
<td>Light Duty (25 psf + 250 plf)</td>
</tr>
<tr>
<td>Heavy Duty (75 psf + 265 plf)</td>
</tr>
<tr>
<td>**1.625” x 9.5” (42 mm x 241 mm)</td>
</tr>
<tr>
<td>50 psf</td>
</tr>
<tr>
<td>75 psf</td>
</tr>
<tr>
<td>500 lbs</td>
</tr>
<tr>
<td>Light Duty (25 psf + 250 plf)</td>
</tr>
<tr>
<td>Heavy Duty (75 psf + 265 plf)</td>
</tr>
</tbody>
</table>

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.

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

6 INSTALLATION

6.1 DuraLam-S LVL Scaffold Plank is part of an overall scaffolding system. Consult the OHS or OSHA regulations on installation and the use of DuraLam-S LVL Scaffold Plank 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 TEST ENGINEERING SUBSTANTIATING DATA

7.1 Test reports and data in accordance with ASTM D143, ASTM D198, ASTM D2559, and ASTM D5456.

7.2 Some information contained herein is the result of testing and/or data analysis by other sources which conform to NBC Volume I commentary on Conformity Assessment and relevant professional engineering law. DrJ relies on accurate data from these sources to perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be credible.
7.3 Where appropriate, DrJ’s analysis is based on design values that have been codified into law through codes and standards (e.g., NBC, NECB, CAN/CSA). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw material suppliers to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8 FINDINGS

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

8.1.1 DuraLam-S LVL Scaffold Plank meets all applicable requirements for use as scaffold plank in accordance with CSA O86 and CSA S269.2.

8.1.2 DuraLam-S LVL Scaffold Plank meets the requirements of the NBC.

8.2 NBC Article 1.2.1.1. states:

1.2.1.1. Compliance with this Code

1) Compliance with this Code shall be achieved by
   a) complying with the applicable acceptable solutions in Division B (see Note A-1.2.1.1.(1)(a)), or
   b) using alternative solutions that will achieve at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the applicable acceptable solutions (see Note A-1.2.1.1.(1)(b)).

2) For the proposes of compliance with this Code as required in Clause 1.2.1.1.(1)(b), the objectives and functional statements attributed to the acceptable solutions in Division B shall be the objectives and functional statements referred to in Subsection 1.1.2. of Division B.

8.3 NBC Division C Section 2.3 includes additional guidance for alternative solutions.

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

8.4.1 No known variations

9 CONDITIONS OF USE

9.1 Where required by the authority having jurisdiction 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 designer (e.g., owner).

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

9.5 This product is manufactured under a third-party quality control program with quality control inspections established by the governing legislation of the adopting province or territory, as described in NBC Volume 1 commentary on Conformity Assessment.

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. Therefore, the TER shall be reviewed for code compliance by the AHJ for acceptance.

9.7 The use of this TER is dependent on the manufacturer’s in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer’s instructions, the AHJ’s inspection, and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.
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 mccausey.com.

11 REVIEW SCHEDULE

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

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