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ICC-ES Evaluation Report

ESR-1898

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

REPORT HOLDER:

GLOBAL LVL, INC.

EVALUATION SUBJECT:

GLOBAL™ LAMINATED VENEER LUMBER



“2014 Recipient of Prestigious Western States Seismic Policy Council (WSSPC) Award in Excellence”



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

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1.0 EVALUATION SCOPE

1.1 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.

Properties evaluated:

Structural

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

- 2016 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2015, 2012 and 2008 ICC 700 *National Green Building Standard*™ (ICC 700-2015, ICC 700-2012 and ICC 700-2008)

Attributes verified:

See Section 3.0

2.0 USES

Global™ Laminated Veneer Lumber (LVL) is intended for structural applications such as beams, headers, joists, rafters and columns. It is also used as components in built-up structural members such as flanges for I-joists, chords for trusses and laminations for glue laminated members.

3.0 DESCRIPTION

Global™ LVL is a structural composite lumber consisting of aspen or a combination of birch and aspen veneers laminated with the grain of the veneers parallel to the length of the member. An exterior-type phenol-formaldehyde adhesive, complying with the durability requirements of ASTM D2559, is used in the manufacturing of the LVL to bond veneers in the layout pattern specified in the quality control manual. Veneer

thickness, width, and length are as specified in the quality control manual. Joints of veneers are scarf or lapped joints. Global™ LVL members are available in thicknesses from 1.19 inches to 1³/₄ inches (30 to 44 mm), depths of 1³/₄ to 72 inches (45 to 1829 mm) and lengths up to 60 feet (18.3 m).

The attributes of the LVLs have been verified as conforming to the provisions of (i) CALGreen Sections A4.404.3 for efficient framing techniques; (ii) ICC 700-2015 and ICC 700-2012 Section 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.

4.0 DESIGN AND INSTALLATION

4.1 General:

Application and installation of Global™ LVL must comply with this report and the applicable code. Drawings, and/or manufacturer's published installation instructions for the erection and installation on each job, must be available on the jobsite at all times during installation.

4.2 Design and Allowable Stresses:

Allowable unit stresses are given in Table 1 for designs based on Allowable Stress Design (ASD). The tabulated stresses are for loads of normal duration and for LVL installed in covered, dry locations where the maximum moisture content of the LVL will not exceed 16 percent. The structural design provisions for sawn lumber in the American Forest and Paper Association's National Design Specification for Wood Construction (NDS) is applicable to Global™ LVL, except where noted otherwise in this report.

For member depths other than 12 inches (305 mm), tabulated bending stresses must be adjusted by the applicable depth effect factor, C_V , given in Table 2. The allowable design stresses noted in Table 1 may be adjusted for duration of load as provided by the NDS, with the exception of compression perpendicular-to-grain and modulus of elasticity. The allowable bending stresses may be increased 4 percent where members qualify as repetitive members, as defined by the NDS.

4.3 Connections:

4.3.1 Nails:

4.3.1.1 Nail Reference Design Values: For purposes of

determining reference lateral and withdrawal design values for nailed connections, Global™ LVL has equivalent specific gravities as shown in Table 3.

4.3.1.2 Nail Edge Distance and Spacing: Nails installed perpendicular to the gluelines on the wide face (see Figure 1) are permitted, with the same spacing, and edge and end distances, in accordance with the NDS for sawn lumber. Nails installed parallel to the gluelines on the narrow face of material at least 3/4 inch (19 mm) thick and 3 1/2 inches (89 mm) wide must be spaced as shown in Table 4.

4.3.2 Bolts: For purposes of determining reference lateral design values for bolted connections, where bolts are installed perpendicular to the gluelines, Global™ LVL has equivalent specific gravities as shown in Table 3.

4.3.3 Other Types of Fasteners: Connections, other than the nailed and bolted connections described in this report, are outside the scope of this report.

5.0 CONDITIONS OF USE

The Global™ Laminated Veneer Lumber (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** Design and installation must comply with this report, the manufacturer’s published installation instructions and the applicable code. If there is a conflict between the installation instructions and this report, this report governs.
- 5.2** Design calculations and details for specific applications must be furnished to the code official for verification of compliance with this report and the applicable code. The 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.

5.3 Global™ LVL must not be used in applications where it will obtain a moisture content greater than 16 percent.

5.4 Fasteners other than nails and bolts described in Section 4.0 are outside the scope of this report.

5.5 Except for cutting an LVL member to length for installation during construction, cutting, drilling, or notching of the LVL member is outside the scope of this report.

5.6 Global™ 2800F_b-1.7E and 2850F_b-1.9E aspen LVL and Global™ 3025F_b-1.9E and 3300F_b-2.0E birch/aspen LVL are produced in Ville-Marie, Quebec, Canada, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Structural Wood-based Products (AC47), dated February 2011 (editorially revised February 2012).

7.0 IDENTIFICATION

7.1 Each piece of Global™ Laminated Veneer Lumber covered by this report must be identified by a stamp containing the manufacturer’s name (Global LVL, Inc.), the product trade name (Global™), the LVL grade, the evaluation report number (ESR-1898), the production shift and date of manufacture.

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

GLOBAL LVL, INC.
48 RUE BOIVIN
VILLE-MARIE, QUEBEC J9V 1B6
CANADA
(819) 629-3600
www.lvlglobal.com

TABLE 1—GLOBAL™ LVL REFERENCE DESIGN VALUES¹

PROPERTY	VENEER SPECIES			
	Aspen		Birch / Aspen	
	LVL Grade			
	2800F _b -1.7E	2850F _b -1.9E	3025F _b -1.9E	3300F _b -2.0E
Bending Stress ² (psi) (F _b)	2,800	2,850	3,025	3,300
Modulus of Elasticity ³ (×10 ⁶ psi) (E)	1.7	1.9	1.9	2.0
Tension parallel to grain ⁴ (psi) (F _t)	1,850	2,000	2,100	2,300
Compression parallel to grain (psi) (F _c)	2,600	2,900	2,700	2,700
Compression perpendicular to grain (psi) (F _{cperp})	Joist/beam	475	550	575
	Plank	280	450	500
Horizontal Shear (psi) (F _v)	Joist/beam	220	250	290
	Plank	150	150	150

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

¹The allowable design values provided are based on covered dry conditions of use. See Section 5.2.

²Tabulated bending stress (F_b) design values are based on loads of a normal duration and a reference depth of 12 inches. For other depths, the tabulated bending stress (F_b) must be adjusted by a depth effect factor, C_v, as shown in Table 2.

³When determining deflection, shear deflection must be considered. For example, for uniformly loaded simple span beams, mid-span deflection is calculated as follows:

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

where: δ = Deflection (in) w = Applied uniform load (lb/ft)
 L = Design span (ft) d = Beam depth (in)
 b = Beam thickness (in) E = True (shear-free) modulus of elasticity (psi)

⁴The tabulated tension parallel to grain (F_t) design values for Global™ are applicable for lengths up to 20 feet (6096 mm). For lengths (L) greater than 20 feet (6096 mm), the tabulated tension parallel to grain (F_t) design value must be adjusted by the length effect factor (K_L) calculated as follows:

$K_L = (20/L)^{0.075}$ for 2800f-1.7E and 2850f-1.9E.
 $K_L = (20/L)^{0.075}$ for 3025f-1.9E and 3300f-2.0E.

TABLE 2—GLOBAL™ LVL DEPTH EFFECT FACTORS^{1,2}

VENEER SPECIES	LVL GRADE	DEPTH EFFECT FACTOR				
		Beam Depth, d (in.)				
		3 ¹ / ₂	9 ¹ / ₂	12	14	18
Aspen	2800F _b -1.7E	1.35	1.06	1.00	0.96	0.90
	2850F _b -1.9E	1.35	1.06	1.00	0.96	0.90
Birch / Aspen	3025F _b -1.7E	1.20	1.04	1.00	0.98	0.94
	3300F _b -2.0E	1.20	1.04	1.00	0.98	0.94

For SI: 1 inch = 25.4 mm.

¹The maximum depth effect factor permitted 1.35 for 2800f-1.7E and 2850f-1.9E grade LVL and 1.20 for 3025f-1.9E and 3300f-2.0E grade LVL. Where members qualify as repetitive members as defined by the NDS, a repetitive member factor, C_r, of 1.04 may be applied to the tabulated bending stress (F_b) design values. The depth effect factor (C_v) is cumulative with the duration of load (C_D) and the repetitive member C_r adjustment factors as provided by the NDS.

²For depths other than those shown but greater than 3¹/₂ inches (89 mm), the depth factor is calculated as follows:

$$C_v = (12/d)^{0.25} \text{ for } 2800f-1.9E \text{ and } 2850f-1.9E.$$

$$C_v = (12/d)^{0.15} \text{ for } 3025f-1.9E \text{ and } 3300f-2.0E.$$

TABLE 3—GLOBAL™ LVL EQUIVALENT SPECIFIC GRAVITY FOR FASTENER DESIGN

VENEER SPECIES	LVL GRADE	NAILS				BOLTS
		Lateral		Withdrawal		
		Narrow Face	Wide Face	Narrow Face	Wide Face	Lateral Wide Face
Aspen	2800F _b -1.7E	0.42	0.43	0.46	0.46	0.38
	2850F _b -1.9E	0.43	0.43	0.46	0.46	0.43
Birch / aspen	3025F _b -1.7E	0.50	0.50	0.50	0.50	0.50
	3300F _b -2.0E	0.50	0.50	0.50	0.50	0.50

TABLE 4—GLOBAL™ LVL ALLOWABLE NAIL SPACING¹

NAIL TYPE	NAILS INSTALLED IN NARROW FACE ²
	SPACING (in.)
8d box and common	3
10d box and common	4
16d sinker (12d common)	4
16d common ³	8

For SI: 1 inch = 25.4 mm.

¹Nails installed in the wide face, perpendicular to the glue-lines, are permitted to have the spacing as allowed by the NDS for sawn lumber.

²Unless noted otherwise, where nails are installed in the narrow face, parallel to the glue-lines, the LVL must be at least 3/4 inch thick and 3 1/2 inches wide.

³Where nails are installed in the narrow face, parallel to the glue-lines, the LVL must be at least 1 1/2 inches thick and 3 1/2 inches wide.

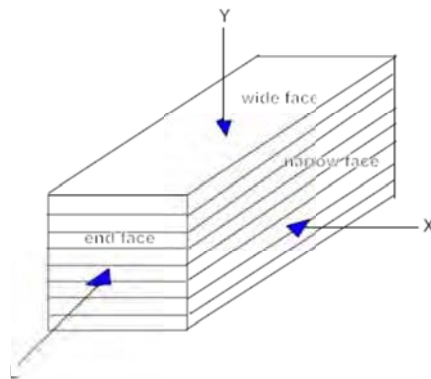


FIGURE 1