

Murphy ConBeam LVL  
Murphy Engineered Wood Division

PR-L307  
Revised September 21, 2016

Product: Murphy ConBeam LVL  
Murphy Engineered Wood Division, 412 West Central, Sutherlin, Oregon 97479  
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1. Basis of the product report:
  - ASTM D5456-14b
  - APA Reports T2008P-10, T2008P-31, T2008P-43, T2008P-113A, T2009P-12, T2009P-15, T2010P-02, T2010P-33, T2012P-03 T2015P-14, and T2015P-16, and other qualification data
2. Product description:

Murphy ConBeam LVL is made with wood veneers laminated with grain parallel to the length of the member in accordance with the in-plant manufacturing standards approved by APA. Murphy ConBeam LVL is available in a range of thicknesses (1-1/2 inches to 5-1/4 inches), depths (3-1/2 inches to 18 inches) and lengths (up to 72 feet). Refer to the manufacturer's technical guide and a local Murphy LVL distributor for product availability.
3. Design properties:

Table 1 lists the design properties, Table 2 lists the equivalent specific gravities for connection design, and Table 3 lists the allowable nail spacing for Murphy ConBeam LVL. The allowable spans for Murphy ConBeam LVL shall be determined based on the design properties provided in this report and/or the recommendations provided by the manufacturer ([http://murphyplywood.com/pdfs/engineered/Murphy\\_Concrete\\_Form\\_Beam\\_Technical\\_Guide.pdf](http://murphyplywood.com/pdfs/engineered/Murphy_Concrete_Form_Beam_Technical_Guide.pdf)).
4. Product installation:

Murphy ConBeam LVL shall be installed in accordance with the recommendations provided by Murphy Engineered Wood Division (see link above) and the engineering drawing(s) approved by the engineer of record. Permissible details shall be in accordance with the engineering drawing(s).
5. Storage, handling, inspection and evaluation:

The storage and handling of Murphy ConBeam LVL shall be in accordance with the recommendations provided by Murphy Engineered Wood Division (see link above). Murphy ConBeam LVL shall be thoroughly visually inspected by a qualified person to ensure it is new or like-new prior to use. A guide for the evaluation of visual defects and subsequent required action are provided by Murphy Engineered Wood Division.
6. Limitations:
  - a) Murphy ConBeam LVL shall be designed using the design properties specified in this report.
  - b) Murphy ConBeam LVL is limited to dry service conditions where the average equilibrium moisture content of sawn lumber is less than 16 percent. Murphy ConBeam LVL shall not be used in wood framed construction as structural members, such as beams or headers.
  - c) Murphy ConBeam LVL is produced at the Murphy Engineered Wood Division facilities in Sutherlin, Oregon under a quality assurance program audited by APA.
  - d) This report is subject to re-examination in one year.

7. Identification:

Murphy ConBeam LVL described in this report are identified by a label bearing the manufacturer's name and/or trademark, the APA assigned plant number (1089), the LVL grade, the APA logo, the report number PR-L307, and a means of identifying the date of manufacture.

Table 1. Design Properties (Allowable Stress Design) for Murphy ConBeam LVL<sup>(a,b)</sup>

Property		2250F <sub>b</sub> - 1.5E	2750F <sub>b</sub> - 1.8E	2950F <sub>b</sub> - 2.0E	3100F <sub>b</sub> - 2.0E
Bending (F <sub>b</sub> ), psi	Joist <sup>(c)</sup>	2,250	2,750	2,950	3,100
	Plank <sup>(d)</sup>	2,250	2,750	2,950	3,100
Modulus of Elasticity (MOE), psi	Joist	1.50 x 10 <sup>6</sup>	1.80 x 10 <sup>6</sup>	2.00 x 10 <sup>6</sup>	2.00 x 10 <sup>6</sup>
	Plank	1.40 x 10 <sup>6</sup>	1.80 x 10 <sup>6</sup>	2.00 x 10 <sup>6</sup>	2.00 x 10 <sup>6</sup>
Tension parallel to grain (F <sub>t</sub> ) <sup>(e)</sup> , psi		1,350	1,950	2,100	2,100
Compression parallel (F <sub>c  </sub> ), psi		2,350	2,350	3,200	3,200
Compression perpendicular (F <sub>c⊥</sub> ), psi	Joist	750	750	750	750
	Plank	450	450	550	550
Longitudinal shear (F <sub>v</sub> ), psi	Joist	285	285	290	290
	Plank	150	150	150	150

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 6.9 kPa.

- (a) The tabulated design values are for normal duration of load. All values, except for E and F<sub>c⊥</sub>, are permitted to be adjusted for other load durations as permitted by the code. The design stresses are limited to conditions in which the average equivalent moisture content of sawn lumber is less than 16 percent.
- (b) Joist = load parallel to glueline. Plank = load perpendicular to glueline.
- (c) The tabulated values are based on a reference depth of 12 inches. For depths less than 12 inches, multiply F<sub>b</sub> by  $(12/d)^{0.18}$ , where d is the LVL depth in inches. For depths less than 3-1/2 inches, use the adjustment factor for 3-1/2 inches.
- (d) For face-bonded multiple-layer LVL up to 7 inches in depth, the allowable bending stress (F<sub>b</sub>) in plank orientation shall be modified by  $(1.75/d)^{0.25} \leq 1.0$ , where d = the LVL depth in inches.
- (e) The tabulated values are based on a reference length of 3 feet. For other lengths, the allowable tensile stress shall be modified by  $(3/\ell)^{0.11}$ , where  $\ell$  = length in feet. For lengths less than 3 feet, use the allowable tension stresses in Table 1 unadjusted.

Table 2. Fastener Design for Murphy LVL<sup>(a,b)</sup>

Equivalent Specific Gravity (S.G.)				
Nails				Bolts
Withdrawal Load		Lateral Load		Lateral Load
Installed in Edge	Installed in Face	Installed in Edge	Installed in Face	Installed in Face
0.49	0.50	0.50	0.50	0.50

- (a) Fastener values based on the equivalent specific gravities in the above table are for normal load duration and shall be permitted to be adjusted using the load duration factors in accordance with the code.
- (b) The bolt edge distance when loaded parallel and perpendicular to the grain shall be a minimum of four times the bolt diameter.

Table 3. Minimum Allowable Nail Spacings for Murphy LVL<sup>(a)</sup>

Thickness (in.)	Orientation	Nail Size <sup>(b,c)</sup> (Common or Box)	Minimum End Distance (in.)	Minimum Nail Spacing (in.)	
				Single Row	Multiple Rows <sup>(d,e)</sup>
1-1/4 ≤ thickness < 1-1/2	Edge <sup>(f)</sup>	8d & smaller	2-1/2	4	NR <sup>(h)</sup>
		10d & 12d	2-1/2	4	
		16d	3-1/2	5	
	Face <sup>(g)</sup>	8d & smaller	1-1/2	3	3
		10d & 12d	1-1/2	3	3
		16d	1-1/2	5	5
≥ 1-1/2	Edge <sup>(f)</sup>	8d & smaller	2-1/2	3	4
		10d & 12d	3-1/2 <sup>(i)</sup>	4	5
		16d	3-1/2	5	6 <sup>(j)</sup>
	Face <sup>(g)</sup>	8d & smaller	1-1/2	3	3
		10d & 12d	1-1/2	3	3
		16d	1-1/2	5	5

For SI: 1 inch = 25.4 mm.

- (a) Edge distance shall be sufficient to prevent splitting.
- (b) 16d sinkers (0.148 x 3-1/4 inches) may be spaced the same as a 12d common wire nail (0.148 x 3-1/4 inches).
- (c) Fastener sizes and closest on-center spacing not specifically described above are beyond the scope of this report.
- (d) Multiple rows in the edge orientation must be spaced 1/2 inch or more from each other and offset one-half of the tabulated minimum nail spacing, as shown in Figure 1.
- (e) Multiple rows must be equally spaced from the centerline of the narrow face axis.
- (f) Nail penetration for edge nailing shall not exceed 2 inches for 16d nails (common or box) and 2-1/2 inches for 10d and 12d nails (common or box).
- (g) Tabulated closest on-center spacing for face orientation is applicable to nails that are installed in rows parallel to the grain (length) of the LVL. For nails installed in rows perpendicular to the direction of grain (width/depth) of the LVL, the closest on-center spacing for face orientation shall be sufficient to prevent splitting of the LVL.
- (h) Not recommended.
- (i) Minimum end distance may be reduced to 2-1/2 inches for single row nailing.
- (j) Minimum nail spacing may be reduced to 5 inches when the LVL is 1-3/4 inches or thicker.

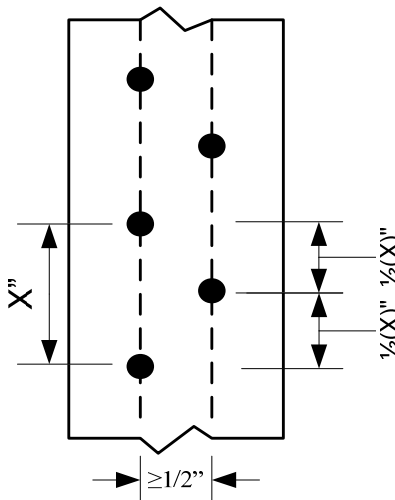


Figure 1. Spacing of multiple rows of nails.

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