DrJ CERTIFICATION

Technical Evaluation Report™

TER 1401-01

Lamco Laminated Finger-Jointed Lumber (LFL®)

Produits Forestiers Lamco Inc.

Product:

Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber

Issue Date:

December 21, 2012

Revision Date:

June 16, 2023

Subject to Renewal:

July 1, 2024

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DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 02 00 - Design Information

SECTION: 06 17 00 - Shop-Fabricated Structural Wood

1 Innovative Product Evaluated[1,2]

1.1 Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber

2 Applicable Codes and Standards[3,4]

2.1 *Codes*

2.1.1 *IBC—15, 18, 21: International Building Code®*

2.1.2 *IRC—15, 18, 21: International Residential Code®*

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

2.1.4 *FBC-B—17, 20: Florida Building Code – Building*

2.1.5 *FBC-R—17, 20: Florida Building Code – Residential*

2.1.6 *CALGreen—19: California Green Building Standards Code*

2.1.7 *O Reg. 332/12: Ontario Building Code (OBC)[5]*

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

2 24 CFR 3280.2 "Listed or certified" means included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner. **Listed**. Equipment, materials, products or services included in a list published by an organization acceptable to the building official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose Listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. **Labeled.** Equipment, materials or products to which has been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

3 This Listing is a code defined research report, which is also known as a duly authenticated report, provided by an approved agency (see IBC Section 1703.1) and/or an approved source (see IBC Section 1703.4.2). An approved agency is "approved" as an approved agency when it is ANAB accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory). A professional engineer is "approved" as an approved source when that professional engineer is properly licensed to transact engineering commerce. Where sealed by a professional engineer, it is also a duly authenticated report certified by an approved source. (i.e., Registered Design Professional). DrJ is an ANAB accredited product certification body.

4 Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.

5 References in this TER to the National Building Code of Canada (NBC) apply to the Ontario Building Code (OBC), unless noted otherwise.

2.2 *Standards and Referenced Documents*

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

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

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

2.2.4 *ASTM D5764: Standard Test Method for Evaluating Dowel-Bearing Strength of Wood and Wood-Based Products*

2.2.5 *CSA O86: Engineering Design in Wood*

2.2.6 *EN 14374: Timber Structures Structural Laminated Veneer Lumber Requirements*

3 Performance Evaluation

3.1 Tests, testing, test reports, research reports, duly authenticated reports and related engineering evaluations are defined as intellectual property and/or trade secrets and protected by Defend Trade Secrets Act 2018 (DTSA).[6]

3.2 Testing and/or inspections conducted for this TER were performed an ISO/IEC 17025 accredited testing laboratory,[7] an ISO/IEC 17020 accredited inspection body,[8] which are internationally recognized accreditations through International Accreditation Forum (IAF), and/or a licensed Registered Design Professional (RDP).

3.3 Lamco LFL® was tested and evaluated to determine its resistance properties, which are used to develop reference design values for allowable stress design (ASD) and limit states design (LSD). This TER examines Lamco LFL® for:

3.3.1 Use as an alternative material to that described in IBC Chapter 23, in particular, compliance with the requirements noted in Section 2301.2 for ASD.

3.3.2 Compliance with IBC Section 2304 and Section 2308 and IRC Chapter 5, Chapter 6 and Chapter 8 for conventional light-frame construction applications.

3.3.3 Use as an alternative material and method of construction in compliance with IBC Section 104.11 and IRC Section R104.11.

3.3.3.1 When used in an application that exceeds the limits of IRC Section R301, an engineered design shall be submitted in accordance with Section R301.1.3 and this TER.

3.3.4 Structural capacities in accordance with IBC Section 2303.1.10:

> **2303.1.10 Structural composite lumber.** Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D5456.

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[6] https://www.law.cornell.edu/uscode/text/18/part-I/chapter-90. Whoever, with intent to convert a trade secret, that is related to a product or service used in or intended for use in or intended for use in interstate or foreign commerce, to the economic benefit or anyone other than the owner thereof, and intending or knowing that the offense will injure any owner of that trade secret, knowingly (1) steals, or without authorization appropriates, takes, carries away, or conceals, or by fraud, artifice, or deception obtains such information; (2) without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information; (3) receives, buys, or possesses such information, knowing the same to have been stolen or appropriated, obtained, or converted without authorization; (4) attempts to commit any offense described in paragraphs (1) through (3); or (5) conspires with one or more other persons to commit any offense described in paragraphs (1) through (3), and one or more of such persons do any act to effect the object of the conspiracy, shall, except as provided in subsection (b), be fined under this title or imprisoned not more than 10 years, or both. (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided.
The federal government and each state have a public records act. As the National Society of Professional Engineers states, “Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve.” Therefore, to protect intellectual property (IP) and TS, and to achieve compliance with public records and trade secret legislation, requires approval through the use of Listings, certified reports, technical evaluation reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.

[7] Internationally recognized accreditations are performed by members of the International Accreditation Forum (IAF). Accreditation Body and Regional Accreditation Group Members of IAF are admitted to the IAF MLA only after a stringent evaluation of their operations by a peer evaluation team, which is charged to ensure that the applicant complies fully with both international standards and IAF requirements. Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.

[8] Ibid.

3.3.5 Structural capacity in accordance with NBC Parts 4 and 9, and CSA O86.

3.3.6 Fire-resistance properties of Lamco LFL® are evaluated with regard to equivalence to solid-sawn lumber in accordance with the IBC, IRC and NBC.

3.4 Any building code and/or accepted engineering evaluations (i.e. research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDPs / approved sources. DrJ is qualified[9] to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.

3.5 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope, which are also its areas of professional engineering competence.

3.6 Any regulation specific issues not addressed in this section are outside the scope of this TER.

4 Product Description and Materials

4.1 Lamco LFL® is manufactured by Produits Forestiers Lamco, Inc. at its facility in Saint-Félicien, Quebec.

4.2 The product is made from rough sawn Black Spruce predominantly, classified according to LAMCO's Quality Control Manual or spruce-pine-fir (SPF) #2 and better or machine stress rated (MSR) lumber. Short segments of the lumber are assembled with tongue and groove joints along the length of the members and finger joints across the width of the members.

4.3 All joints are adhered with a heat-resistant adhesive (HRA) of phenol-resorcinol-formaldehyde (PRF) or polyurethane adhesive.

4.3.1 HRAs are classified and qualified in accordance with ASTM D2559.

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

4.5 *Material Availability*

4.5.1 Grades: 1.6E, 1.7E, 1.9E, and 2.1E

4.5.2 Thickness: $1^{7}/_{16}$" (36.5 mm) and 1½" (38.1 mm)

4.5.3 Width: 2½" to 16" (63.5mm to 406 mm)

4.5.4 Length: Up to 32' 2" (9.8 m)

5 Applications

5.1 Lamco LFL® is an alternative to sawn lumber/structural composite lumber (SCL) for floor, roof and wall structural members.

5.2 Structural applications include use as beams, columns, headers, joists, rafters, I-joist flanges, and wall studs.

5.2.1 Design properties for rimboard applications and for truss plates are outside the scope of this TER.

5.3 Lamco LFL® is used as an equivalent alternative to sawn lumber for use where fire resistance is required as follows:

5.3.1 Lamco LFL® with a minimum thickness of $1^{7}/_{16}$" may be used as an equivalent alternative to 1½" thick solid-sawn lumber/SCL in accordance with the IBC, IRC and NBC.

[9] Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.

5.4 *Design*

5.4.1 Design of Lamco LFL® is governed by the applicable code and the provisions for SCL in NDS or CSA O86.

5.4.2 Cuts, notches, and holes in structural members shall comply with the applicable building code for sawn lumber/SCL and this TER. For applications outside of the scope of the applicable code, consult the manufacturer's installation instructions or a Registered Design Professional.

5.4.2.1 Taper cuts at the ends of ceiling joists shall not exceed ¼ the depth of the joist measured at the inside of the bearing.

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

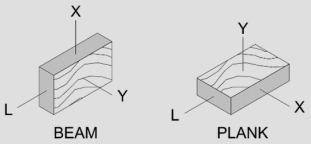
5.4.4 The design provisions for wood construction noted in IBC Section 2303.2 and IRC Section R301.1.3 apply to Lamco LFL® for ASD, unless otherwise noted in this TER. Allowable unit stresses for Lamco LFL® for dry conditions of use are specified in Table 1.

Table 1. Reference Design Values for Lamco LFL® (ASD)[1,2,3,4]

Grade	Bending, F_b (psi)	Tension,[6,7,8] F_t (psi)	Compression, F_c (psi)		Horizontal Shear, F_v (psi)	Modulus of Elasticity, E (x10^6 psi)	Modulus of Elasticity for Beam & Column Stability, E_{min} (x10^6 psi)
	Beam[5,9]	Parallel-to-Grain	Parallel-to-Grain	Perpendicular-to-Grain	Beam	True[5]	
1.6E	1200	1300[7]	1600	425	135	1.6	0.793
1.7E	1800	1585[8]	1925	595	180	1.7	0.862
1.9E	2300	1800[8]	2190	675	205	1.9	0.968
2.1E	2300	2175[9]	2660	675	250	2.1	1.039

SI: 1 psi = 0.00689 MPa

1. The reference design values in this table are applicable for the product used in dry, well-ventilated interior applications, in which the equivalent moisture content of sawn lumber is less than 16%.
2. 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 $F_{c\perp}$, E or E_{min}.
3. Orientation nomenclature for Lamco LFL®.



4. Using True (shear free) 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 (mm)
   W = uniform load in lbs./in. (N/mm)
   L = span in inches (mm)
   E = modulus of elasticity in psi (MPa)
   b = width of beam in inches (mm)
   h = depth of beam in inches (mm)

5. The bending values in these tables are based on a reference depth of 12" (305 mm). For other depths, the bending value for 1.6E grade shall be adjusted by a volume factor of $(12/d)^{0.34}$, where d is measured in inches with a minimum depth of 2.5" (64 mm). For other depths of the 1.7E, 1.9E and 2.1E grades, the bending values shall be adjusted by a volume adjustment of $(12/d)^{0.25}$ where d is measured in inches with a minimum depth of 2.5" (64 mm). Bending values are further limited to 2455 psi for 1.9E and 2795 psi for 2.1E grades. For flatwise bending, values are permitted to be increased by a factor of 1.1 for 2" thick and 4" and larger widths.
6. The tension, F_t value for the 1.6E grade is based on a reference length of 24". For lengths up to 24', multiply F_t by a volume factor of $(24/L)^{0.15}$, where L is the length in inches.
7. The tension, F_t values for 1.7E and 1.9E grades are based on a reference length of 88" (7'4"). For lengths greater than 88", multiply F_t by a volume factor of $(88/L)^{0.1335}$, where L is the length in inches.
8. The tension, F_t value for the 2.1E grade is based on a reference length of 88" (7'4"). For lengths greater than 88", multiply F_t by K_L. $K_L = (88/L)^{0.125}$, where L is the length in inches.
9. When structural members qualify as repetitive members in accordance with the applicable code, a 4% increase is permitted to F_b.

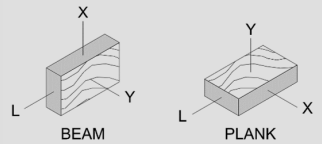
5.4.5 For compliance with the NBC, limit states design shall be in accordance with CSA O86. Specified Strength Values for Lamco LFL® for dry conditions of use are specified in Table 2.

Table 2. Specified Strengths for Lamco LFL® (LSD)[1,2,3]

Grade	Bending, F_b (MPa)	Tension,[6,7,8] F_t (MPa)	Compression, F_c (MPa)		Horizontal Shear, F_v (MPa)	Modulus of Elasticity, E (MPa)	Modulus of Elasticity for Beam & Column Stability, E_{min} (MPa)
	Beam[5,9]	Parallel-to-Grain	Parallel-to-Grain	Perpendicular-to-Grain	Beam	True[4]	
1.6E	14.25	16.41[7]	17.61	5.33	1.72	10,859	8,998
1.7E	22.71	20.19[8]	21.21	7.46	2.29	11,802	9,778
1.9E	29.27	22.95[8]	24.10	8.47	2.60	13,257	10,984
2.1E	29.27	27.69[9]	29.31	8.47	3.20	14,227	11,788

SI: 1 psi = 0.00689 MPa

1. The reference design values in this table are applicable for the product used in dry, well-ventilated interior applications, in which the equivalent moisture content of sawn lumber is less than 16%.
2. 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 $F_{c\perp}$, E and E_{min}.
3. Orientation nomenclature for Lamco LFL®.



4. Using True (shear free) 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 (mm)
   W = uniform load in lbs./in. (N/mm)
   L = span in inches (mm)
   E = modulus of elasticity in psi (MPa)
   b = width of beam in inches (mm)
   h = depth of beam in inches (mm)
5. The bending values in these tables are based on a reference depth of 12" (305 mm). For other depths, the bending value for 1.6E grade shall be adjusted by a in bending of $(12/d)^{0.34}$, where d is measured in inches with a minimum depth of 2.5" (64 mm). For other depths of the 1.7E, 1.9E and 2.1E grades, the bending values shall be adjusted by a size factor in bending of $(12/d)^{0.25}$ where d is measured in inches with a minimum depth of 2.5" (64 mm). Bending values are further limited to 31.28 MPa for 1.9E and 35.61 MPa for 2.1E grades.
6. The tension, F_t value for the1.6E grade is based on a reference length of 24". For lengths up to 24', multiply F_t by a size factor in tension of $(24/L)^{0.15}$, where L is the length in inches.
7. The tension, F_t values for 1.7E and 1.9E grades are based on a reference length of 88" (7'4"). For lengths greater than 88", multiply F_t by a size factor in tension of $(88/L)^{0.1335}$, where L is the length in inches.
8. The tension, F_t value for the 2.1E grade is based on a reference length of 88" (7'4"). For lengths greater than 88", multiply F_t by a size factor in tension of $(88/L)^{0.125}$, where L is the length in inches.
9. When structural members qualify as repetitive members in accordance with the applicable code, a 4% increase is permitted to F_b.

5.4.6 *Connections:*

5.4.6.1 Lateral loads for nails, screws and bolts, and withdrawal loads for nails and screws, installed in Lamco LFL® shall be in accordance with the NDS and CSA O86 for sawn lumber having a minimum specific gravity equal to that shown in Table 3.

5.4.6.2 Fastener spacing shall be as prescribed in the applicable code (for sawn lumber) unless specifically indicated in Figure 1 or Table 4 or as prescribed in NDS Chapter 12.

5.4.6.3 Other nail spacing for specific applications, such as prefabricated steel components or hangers, may be used. Nail spacing for these applications should follow what is specified and detailed in the proprietary catalogues for the specific gravities as defined in Table 3.

5.4.6.4 Allowable lateral loads for machine bolts installed perpendicular to the wide face of Lamco LFL® with loads applied parallel or perpendicular to the grain shall be as prescribed in the applicable code or in accordance with NDS or CSA O86 for sawn lumber with the minimum specific gravity at least equivalent to that defined in Table 3.

Table 3. Equivalent Specific Gravities & Minimum Fastener Spacing for Design of Mechanical Connections

Product	Fastener	Fastener Axis Location	Load Direction	Angle to Grain	Equivalent Specific Gravity for Design Purposes			Minimum Spacing
					Grades 1.6E & 1.7E	Grade 1.9E	Grade 2.1E	
Lamco LFL®	Nails & Screws (<0.25" dia.)	Wide Face	Lateral	Any	0.42	0.46	0.50	Per Applicable Code for Solid-Sawn Material
		Narrow Face	Lateral	Any				
		X & Y Axes	Withdrawal	–				
	Bolts	Wide Face	Lateral	0 degrees				
		Wide Face	Lateral	90 degrees				
		Narrow Face	Lateral	0 degrees				

5.4.6.5 Connection requirements for multiple member side-loaded beams are defined in the following assembly details and have the maximum uniformly distributed load carrying capacity as defined in Table 4.

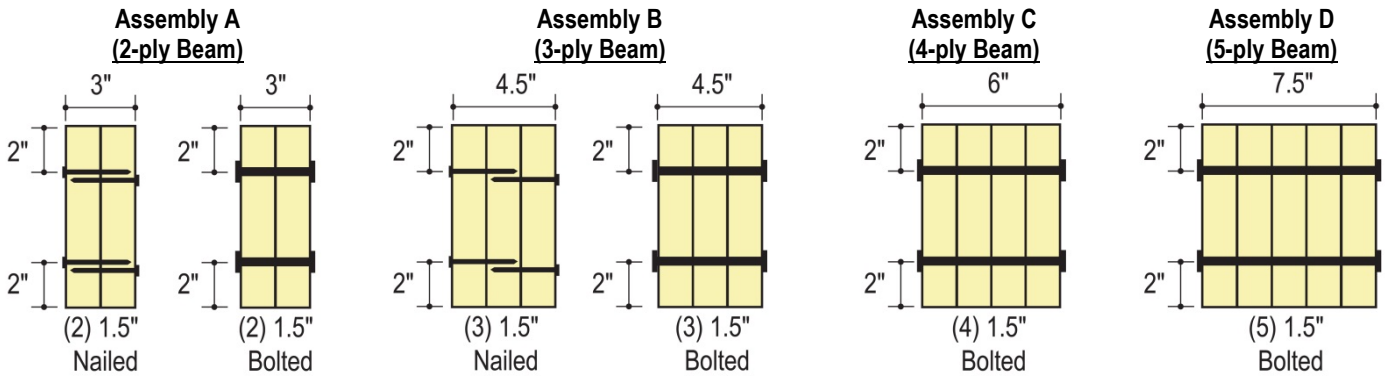


Figure 1. Connection Requirements for Multiple Member Side-Loaded Beams

Table 4. Connection Requirements & Allowable Uniform Loads for Multiple Member Side-Loaded Beams[1,2,4,5,10,11]

Assembly Detail (See Figure 1)	Allowable Load for Connection of Beams Loaded from One Side Only (lb)			Allowable Load (per side) for Connection of Beams Loaded from Both Sides[10] (lb)		
	2 Rows of 10d (0.148" x 3") Nails at 12" o.c.	3 Rows of 10d (0.148" x 3") Nails at 12" o.c.	2 Rows of ½" Bolts at 12" o.c.[3,7,8]	2 Rows of 10d (0.148" x 3") Nails at 12" o.c.	3 Rows of 10d (0.148" x 3") Nails at 12" o.c.	2 Rows of ½" Bolts at 12" o.c.[3,7,8]
A	415	625	650	210	310	325
B[9]	310	465	485	210	310	325
C	–	–	430	–	–	325
D[6]	–	–	405	–	–	325

SI: 1 lb = 4.45 N

1. Multiply the appropriate table value by:
   a. 1.5 for nails or bolts spaced at 8" o.c. per row
   b. 2 for nails or bolts spaced at 6" o.c. per row
   c. 3 for nails or bolts spaced at 4" o.c. per row
   d. 0.5 for bolts spaced at 24" o.c. per row
2. Determine the appropriate beam size required to support the load before determining the connection requirements.
3. Screws can be used in place of bolts, provided additional fasteners are used such that the sum of the screw capacities is equal to or greater than that of the ½"-diameter bolts. Refer to the screw manufacturer's literature.
4. Tabulated values assume adequate end distance, edge distance and spacing per Chapter 12 of NDS or Chapter 12 of CSA O86.
5. Tabulated values are for normal load duration. Adjustment of the design stresses for duration of load shall be in accordance with the applicable code or NDS, as applicable.
6. For beams greater than 5-plies wide, consult a Registered Design Professional for the attachment requirements.
7. A standard cut steel washer of minimum 0.118" thickness, with a minimum outside dimension of 1⅜", is required on each side of the beam between the wood and bolt head and nut.
8. Bolted connections assume full diameter bolts with bending yield strength (F_{yb}) of 45,000 psi and a SG of 0.42.
9. Nailing is required from both sides for 3-ply beams.
10. The allowable loads provided above for connection of beams loaded from both sides are the maximum that can be applied to each side of the beam.
11. Tabulated loads are for allowable stress design only, and should not be used for limit states design.

5.4.7 *Stair Stringer:*

5.4.7.1 Lamco LFL® is approved for use in stair stringer applications when designed and installed in accordance with Figure 2, Table 5, Table 6, Table 7, Table 8, and Table 9.

5.4.7.1.1 The stair stringer design tables listed above are intended to be used for allowable stress design only.

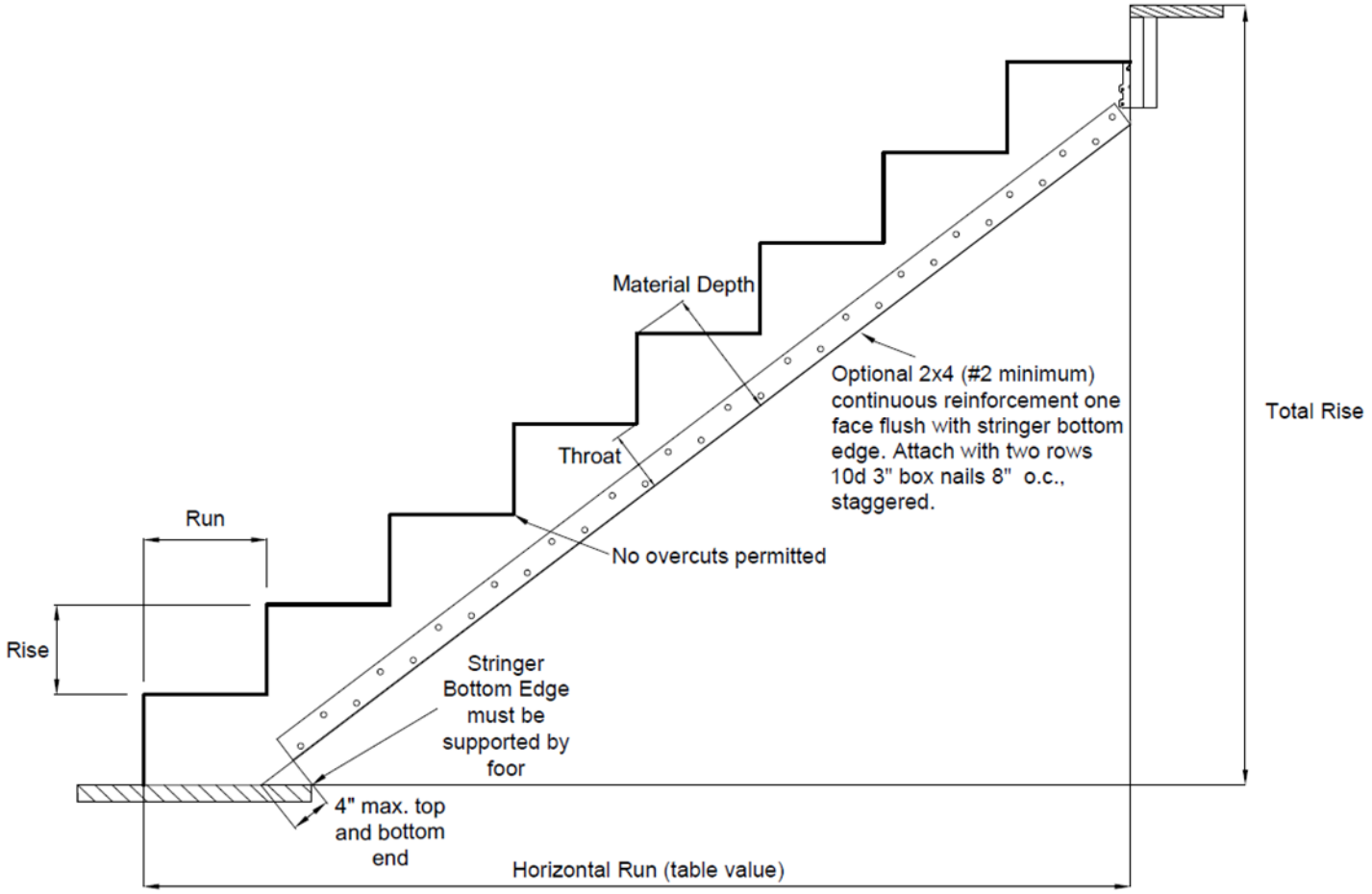


Figure 2. Lamco LFL® Star Stringer Specifications

Table 5. Lamco LFL® Minimum Throat Depth

Stringer Depth (in)	Residential (7 ¾" rise/10" run)	Commercial (7" rise/11" run)
9 1/4	3 1/8"	3 3/8"
9 1/2	3 3/8"	3 5/8"
11 1/4	5 1/8"	5 3/8"
11 7/8	5 3/4"	6"
14	7 7/8"	8 1/8"
SI: 1 in = 25.4 mm		

Table 6. Residential Horizontal Stringer Run Length of Lamco LFL® 1.6E – 40 psf Live Load + 12 psf Dead Load[1-14]

Stringer Depth (in)	36" Tread Width				42" Tread Width		44" Tread Width		48" Tread Width	
	2 stringers		3 stringers		3 stringers		3 stringers		3 stringers	
	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing
9 1/4	5' 0"	N/A	5' 0"	N/A	5' 0"	N/A	5' 0"	N/A	5' 0"	N/A
9 1/2	5' 0"	5' 0"	5' 10"	6' 8"	5' 10"	5' 10"	5' 10"	5' 10"	5' 0"	5' 10"
11 1/4	8' 4"	8' 4"	9' 2"	10' 0"	8' 4"	9' 2"	8' 4"	9' 2"	8' 4"	9' 2"
11 7/8	9' 2"	9' 2"	10' 0"	10' 10"	10' 0"	10' 0"	10' 0"	10' 0"	9' 2"	10' 0"
14	12' 6"	12' 6"	14' 2"	14' 2"	13' 4"	14' 2"	13' 4"	13' 4"	13' 4"	13' 4"
16	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"

SI: 1 in = 25.4 mm

1. N/A=Bracing not permitted due to interference with step notches.
2. Stringer runs are based on a tread rise of 7.75" (maximum per 2015 IRC), a tread run of 10" (minimum per 2015 IRC), rounded down to the whole tread run.
3. Table based on deflection requirement of L/360 live load and L/240 total load; material thickness of 1.43475 in.; interior bearing length of 3 inches and a bearing plate capacity of 425 psi.
4. Stringers are unstable until treads are installed.
5. Use subfloor adhesive between treads and stringers to minimize squeaks.
6. Avoid direct contact between stringers and concrete or masonry by using flashing or a vapor barrier.
7. Bracing must be 2x4 No. 1/No. 2 SPF (E=1.4), one face (see details above).
8. Do not ship precut stringers. Cut on job site or ship as complete stair units.
9. Table presumes stair width is equally shared by all stringers.
10. Maximum stair stringer run is capped based on the difference between floors of 12.25 ft (Residential) & 12 ft (Commercial).
11. Design of tread is done by others; a tread thickness of 1 in. was assumed for geometry.
12. Stringer self-weight is considered in addition to the stated design dead load.
13. Do not overcut the notch corner. Drill 0.25 in. diameter hole at stringer notch corner during fabrication.
14. Repetitive bending factor of 1.04 used where permitted by NDS.

Table 7. Residential Horizontal Stringer Run Length of Lamco LFL® 1.7E – 40 psf Live Load + 12 psf Dead Load[1-14]

Stringer Depth (in)	36" Tread Width				42" Tread Width		44" Tread Width		48" Tread Width	
	2 stringers		3 stringers		3 stringers		3 stringers		3 stringers	
	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing
9 1/4	5' 0"	N/A	5' 10"	N/A	5' 0"	N/A	5' 0"	N/A	5' 0"	N/A
9 1/2	5' 0"	6' 8"	5' 10"	7' 6"	5' 10"	6' 8"	5' 10"	6' 8"	5' 10"	6' 8"
11 1/4	8' 4"	9' 2"	9' 2"	10' 0"	9' 2"	10' 0"	8' 4"	10' 0"	8' 4"	9' 2"
11 7/8	9' 2"	10' 0"	10' 10"	11' 8"	10' 0"	10' 10"	10' 0"	10' 10"	10' 0"	10' 10"
14	12' 6"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	13' 4"	14' 2"	13' 4"	14' 2"
16	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"	14' 2"

SI: 1 in = 25.4 mm

1. N/A=Bracing not permitted due to interference with step notches.
2. Stringer runs are based on a tread rise of 7.75" (maximum per 2015 IRC), a tread run of 10" (minimum per 2015 IRC), rounded down to the whole tread run.
3. Table based on deflection requirement of L/360 live load and L/240 total load; material thickness of 1.43475 in.; and interior bearing length of 3 inches and a bearing plate capacity of 425 psi.
4. Stringers are unstable until treads are installed.
5. Use subfloor adhesive between treads and stringers to minimize squeaks.
6. Avoid direct contact between stringers and concrete or masonry by using flashing or a vapor barrier.
7. Bracing must be 2x4 No. 1/No. 2 SPF (E=1.4), one face (see details above).
8. Do not ship precut stringers. Cut on job site or ship as complete stair units.
9. Table presumes stair width is equally shared by all stringers.
10. Maximum stair stringer run is capped based on the difference between floors of 12.25 ft (Residential) & 12 ft (Commercial).
11. Design of tread is done by others; a tread thickness of 1 in. was assumed for geometry.
12. Stringer self-weight is considered in addition to the stated design dead load.
13. Do not overcut the notch corner. Drill 0.25 in. diameter hole at stringer notch corner during fabrication.
14. Repetitive bending factor of 1.04 used where permitted by NDS.

Table 8. Commercial Horizontal Stringer Run Length of Lamco LFL® 1.6E – 100 psf Live Load + 12 psf Dead Load[1-14]

Stringer Depth (in)	36" Tread Width				42" Tread Width		44" Tread Width		48" Tread Width	
	2 stringers		3 stringers		3 stringers		3 stringers		3 stringers	
	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing
9 1/4	3' 8"	3' 8"	4' 7"	4' 7"	4' 7"	4' 7"	4' 7"	4' 7"	3' 8"	3' 8"
9 1/2	3' 8"	3' 8"	4' 7"	4' 7"	4' 7"	4' 7"	4' 7"	4' 7"	4' 7"	4' 7"
11 1/4	6' 5"	6' 5"	7' 4"	7' 4"	7' 4"	7' 4"	6' 5"	6' 5"	6' 5"	6' 5"
11 7/8	6' 5"	6' 5"	8' 3"	8' 3"	7' 4"	7' 4"	7' 4"	7' 4"	7' 4"	7' 4"
14	9' 2"	9' 2"	11' 0"	11' 0"	10' 1"	10' 1"	10' 1"	10' 1"	10' 1"	10' 1"
16	11' 0"	11' 0"	13' 9"	13' 9"	12' 10"	12' 10"	12' 10"	12' 10"	11' 11"	11' 11"

SI: 1 in = 25.4 mm

1. N/A=Bracing not permitted due to interference with step notches.
2. Stringer runs are based on a tread rise of 7.75" (maximum per 2015 IRC), a tread run of 10" (minimum per 2015 IRC), rounded down to the whole tread run.
3. Table based on deflection requirement of L/360 live load and L/240 total load; material thickness of 1.43475 in.; and interior bearing length of 3 inches and a bearing plate capacity of 425 psi.
4. Stringers are unstable until treads are installed.
5. Use subfloor adhesive between treads and stringers to minimize squeaks.
6. Avoid direct contact between stringers and concrete or masonry by using flashing or a vapor barrier.
7. Bracing must be 2x4 No. 1/No. 2 SPF (E=1.4), one face (see details above).
8. Do not ship precut stringers. Cut on job site or ship as complete stair units.
9. Table presumes stair width is equally shared by all stringers.
10. Maximum stair stringer run is capped based on the difference between floors of 12.25 ft (Residential) & 12 ft (Commercial).
11. Design of tread is done by others; a tread thickness of 1 in. was assumed for geometry.
12. Stringer self-weight is considered in addition to the stated design dead load.
13. Do not overcut the notch corner. Drill 0.25 in. diameter hole at stringer notch corner during fabrication.
14. Repetitive bending factor of 1.04 used where permitted by NDS.

Table 9. Commercial Horizontal Stringer Run Length of Lamco LFL® 1.7E – 100 psf Live Load + 12 psf Dead Load[1-14]

Stringer Depth (in)	36" Tread Width				42" Tread Width		44" Tread Width		48" Tread Width	
	2 stringers		3 stringers		3 stringers		3 stringers		3 stringers	
	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing	No Bracing	Bracing
9 1/4	3' 8"	4' 7"	4' 7"	5' 6"	4' 7"	5' 6"	4' 7"	5' 6"	4' 7"	4' 7"
9 1/2	4' 7"	4' 7"	4' 7"	6' 5"	4' 7"	5' 6"	4' 7"	5' 6"	4' 7"	5' 6"
11 1/4	6' 5"	7' 4"	7' 4"	8' 3"	7' 4"	8' 3"	7' 4"	8' 3"	7' 4"	7' 4"
11 7/8	7' 4"	8' 3"	8' 3"	9' 2"	8' 3"	9' 2"	8' 3"	9' 2"	7' 4"	8' 3"
14	10' 1"	11' 0"	11' 11"	12' 10"	11' 0"	11' 11"	11' 0"	11' 11"	11' 0"	11' 11"
16	12' 10"	12' 10"	14' 8"	16' 6"	13' 9"	15' 7"	13' 9"	14' 8"	13' 9"	13' 9"

SI: 1 in = 25.4 mm

1. N/A=Bracing not permitted due to interference with step notches.
2. Stringer runs are based on a tread rise of 7.75" (maximum per 2015 IRC), a tread run of 10" (minimum per 2015 IRC), rounded down to the whole tread run.
3. Table based on deflection requirement of L/360 live load and L/240 total load; material thickness of 1.43475 in.; and interior bearing length of 3 inches and a bearing plate capacity of 425 psi.
4. Stringers are unstable until treads are installed.
5. Use subfloor adhesive between treads and stringers to minimize squeaks.
6. Avoid direct contact between stringers and concrete or masonry by using flashing or a vapor barrier.
7. Bracing must be 2x4 No. 1/No. 2 SPF (E=1.4), one face (see details above).
8. Do not ship precut stringers. Cut on job site or ship as complete stair units.
9. Table presumes stair width is equally shared by all stringers.
10. Maximum stair stringer run is capped based on the difference between floors of 12.25 ft (Residential) & 12 ft (Commercial).
11. Design of tread is done by others; a tread thickness of 1 in. was assumed for geometry.
12. Stringer self-weight is considered in addition to the stated design dead load.
13. Do not overcut the notch corner. Drill 0.25 in. diameter hole at stringer notch corner during fabrication.
14. Repetitive bending factor of 1.04 used where permitted by NDS.

5.5 Where the application falls outside of the performance evaluation, conditions of use and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

6 Installation

6.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this TER and the applicable building code.

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

6.3 Lamco LFL® shall be installed in accordance with the applicable code, the approved construction documents, this TER, the manufacturer's installation instructions, NDS, or CSA O86 and standard framing practice as applied to solid-sawn lumber.

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 Mechanical properties testing in accordance with ASTM D5456 and EN 14374

7.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., RDPs), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.

7.3 Where pertinent, testing and/or engineering analysis is based upon provisions that have been codified into law through state or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ's engineering practice may use a code-adopted provision as the control sample. A control sample versus a test sample establishes a product as being equivalent to the code-adopted provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

7.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, Listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of products, materials, designs, assemblies and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this TER, may be dependent upon published design properties by others.

7.5 Testing and engineering analysis: The strength, rigidity and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[10]

7.6 Where additional condition of use and/or code compliance information is required, please search for Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber on the DrJ Certification website.

8 Findings

8.1 As delineated in Section 3, Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber [has/have] performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.

8.2 When used and installed in accordance with this TER and the manufacturer installation instructions, Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber shall be approved for the following applications:

8.2.1 Lamco LFL® complies with, or is a suitable alternative to, the requirements of IBC Chapter 23; IRC Chapter 5, Chapter 6 and Chapter 8; NBC Articles, 1.2, 4.3.1.1 and 9.23; and CSA O86.

8.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Produits Forestiers Lamco Inc..

8.4 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[11] are similar) in pertinent part 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.

8.5 **Approved**:[12] Building codes require that the building official shall accept duly authenticated reports[13] or research reports[14] from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.

8.5.1 Acceptability of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).

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[10] See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

[11] 2018 IFC Section 104.9

[12] Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

[13] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1

[14] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2

8.5.2 Acceptability of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.

8.5.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved, as denial without written reason deprives a protected right to free and fair competition in the marketplace.

8.6 DrJ is an engineering company, employs RDPs and is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.

8.7 Through ANAB accreditation and the IAF Multilateral Agreements, this TER 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*." IAF specifically says, "*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope*."[15]

9 Conditions of Use

9.1 Material properties shall not fall outside the boundaries defined in Section 3.

9.2 As defined in Section 3, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.

9.3 Lamco LFL® shall be installed in accordance with the applicable code, the approved construction documents, this TER and the manufacturer's installation instructions. If there is a conflict between this TER and the manufacturer's instructions, the more restrictive governs.

9.4 The manufacturer's published installation instructions shall be available at the jobsite at all times during installation.

9.5 Lamco LFL® complies with, or is a suitable alternative to, sawn lumber/SCL as permitted by the codes listed in Section 2, subject to the following conditions:

9.5.1 The service conditions for Lamco LFL® are dry conditions of use, for which the equilibrium moisture content must be less than 16%. Use in applications exceeding 16% moisture content is outside the scope of this TER.

9.5.2 The service conditions for Lamco LFL® with fire-retardant or preservative chemical treatments are outside the scope of this TER.

9.5.3 Fastener design values shall be determined using equivalent specific gravities specified in Table 3 of this TER.

9.5.4 Cutting and notching of Lamco LFL® is prohibited, except where specifically permitted by the manufacturer's recommendations, this TER or where the effects of such alterations are specifically considered in the design of the member by a Registered Design Professional.

9.5.5 Increases for duration of load shall be in accordance with the limitations of the applicable building code for sawn lumber.

9.5.6 The product is considered acceptable for using the creep factors applicable to sawn lumber in accordance with the applicable building code.

9.5.7 Where use of Lamco LFL® qualifies as repetitive members as defined in NDS, an increase of 4% is permitted in allowable bending stresses.

9.5.8 Lamco LFL® may be cut to the specified length and width as appropriate for the application, provided the depth is no less than 2½". The thickness may not be cut.

[15] https://iaf.nu/en/about-iaf-mla/#:~:text=required%20to%20recognise

9.5.9 Minimum bearing length and anchorage of Lamco LFL® shall meet the requirements of IBC Chapter 23 or Division B, Article 9.23 of the NBC, and CSA O86 for sawn lumber.

9.5.10 Lamco LFL® shall be fabricated by Produits Forestiers Lamco Inc. at its facility in Saint-Félicien, Quebec, with quality control inspections by an approved third-party quality control inspection agency.

9.6 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:

9.6.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice, and, when prepared by an approved source, shall be approved when requirements of adopted legislation are met.

9.6.2 This TER and the installation instructions shall be submitted at the time of permit application.

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

9.6.4 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and IBC Section 105.4.

9.6.5 This product has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.

9.6.6 The application of this product in the context of this TER is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.

9.7 The approval of this TER by the AHJ shall comply with IBC Section 1707.1, where legislation states in pertinent part, "*the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.11*", all of IBC Section 104, and IBC Section 105.4.

9.8 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 (i.e., owner or RDP).

9.9 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.

10 Identification

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

10.2 Additional technical information can be found at lamcofp.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 status of this TER, contact DrJ Certification.

12 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

12.1 Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber are included in this TER published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER meets the legislative intent and definition of being acceptable to the AHJ.

Appendix A

1 Legislation that Authorizes AHJ Approval

1.1 **Fair Competition**: State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:

1.1.1 Advance Innovation,

1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and

1.1.3 Benefit consumers through lower prices, better quality, and greater choice.

1.2 **Adopted Legislation**: The following local, state, and federal regulations affirmatively authorize Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:

1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to "protect economic freedom and opportunity by promoting free and fair competition in the marketplace."

1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation, and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.

1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2018 (DTSA).

1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.

1.2.4 For new materials[16] that are not specifically provided for in any building code, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.

1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.[17]

1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence, provided in writing, that specific legislation has been violated by an individual registered PE.

1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.[18]

[16] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2

[17] IBC 2021, Section 1706.1 Conformance to Standards

[18] IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

1.3 **Approved**[19] **by Los Angeles**: The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards, which apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.[20] The Superintendent of Building roster of approved testing agencies is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a CBI Listing are LAMC approved. In addition, the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.[21]

1.4 **Approved by Chicago**: The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).

1.5 **Approved by New York City**: The NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed[22] an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement[23] (i.e., ANAB, International Accreditation Forum (IAF), etc.).

1.6 **Approved by Florida**: Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation, by 1) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity; 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods; 1) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 3) A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code; 4) A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code; 5) A statewide product approval issued by the Florida Building Commission. The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).

[19] See Section 8 for the distilled building code definition of **Approved**

[20] Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

[21] https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

[22] New York City, The Rules of the City of New York, § 101-07 Approved Agencies

[23] New York City, The Rules of the City of New York, § 101-07 Approved Agencies

1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA])**: A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.

1.8 **Approved by New Jersey**: Pursuant to Building Code 2018 of New Jersey in IBC Section 1707.1 General,[24] it states: "In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)".[25] Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) Approvals**: Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations. 1. A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. 2. Reports of engineering findings issued by nationally recognized evaluation service programs, such as, but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item 2 given that the listed entities are no longer in existence and/or do not provide "reports of engineering findings".

1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards**: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[26] and Part 3280,[27] the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) "All construction methods shall be in conformance with accepted engineering practices"; 2) "The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur."; and 3) "The design stresses of all materials shall conform to accepted engineering practice."

1.10 **Approval by US, Local, and State Jurisdictions in General**: In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:

1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.[28]

1.10.2 For innovative alternative products, materials, designs, services and/or methods of construction, in the absence of approved rules or other approved standards…the building official shall accept duly authenticated reports (i.e., listing and/or research report) from approved agencies with respect to the quality and manner of use of new materials or assemblies.[29] A building official approved agency is deemed to be approved via certification from an accreditation body that is listed by the International Accreditation Forum[30] or equivalent.

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[24] https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

[25] https://www.nj.gov/dca/divisions/codes/codreg/ucc.html

[26] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14

[27] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

[28] IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.

[29] IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.

[30] Please see the ANAB directory for building official approved agencies.

1.10.3 The design strengths and permissible stresses of any structural material…shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.[31] An approved source is defined as a PE subject to professional engineering laws, where a research and/or a technical evaluation report certified by a PE, shall be approved.

1.11 **Approval by International Jurisdictions**: The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements:

1.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country,

1.11.2 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.

1.11.3 State that conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.

1.11.4 **Approved**: The purpose of the IAF MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA, and subsequently acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.

[31] IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.

Appendix B

Design Assumptions for Lamco LFL® Joist & Rafter Tables (ASD only, these tables are not valid for LSD)

SUPPORT REQUIREMENTS

Joists and rafters must have adequate support. Ridge beams must be installed at roof peaks with rafters bearing directly on the ridge beam or supported by hangers or framing anchors. Ceiling joists are not required when properly designed ridge beams are used. A ridge board may be substituted for a ridge beam when the roof slope equals or exceeds 3 in 12, except that ridge beams are required for cathedral ceilings. Ridge boards must be at least 1" nominal in thickness and not less than the depth of the cut end of the rafter. Rafters must be placed directly opposite each other, and ceiling joists must be installed parallel to the rafters to provide a continuous tie between exterior walls.

SPANS

The spans provided in these tables were determined on the same basis as those given in the code-recognized Span Tables for Joists and Rafters and Wood Structural Design Data, both published by AF&PA. Maximum spans were computed using Allowable Stress Design (ASD) and standard engineering design formulas for simple span beams with uniformly distributed gravity loads. The calculated spans assume fully supported members, properly sheathed and nailed on the top edge of the joist or rafter. Rafter spans do not include composite action of adhesive and sheathing. However, floor applications for joists do consider the effect of partial composite action using 23/32" 24" o.c. OSB subfloor. Listed spans also do not include checks for concentrated or partition loads that may be required by building codes for specific occupancy or use categories. Uplift loads caused by wind also have not been considered. Spans in the tables are given in feet and inches and are the maximum allowable horizontal span of the member from inside to inside of bearings (i.e. clear span). Span tables assume a 2.0" bearing length to account for the end of the joist or rafter bearing on a 2x4 wall with a 1½" rim board applied along the outside edge of the wall. For sloping rafters, the span is also measured along the horizontal projection.

REFERENCE DESIGN VALUES

The reference design values used to determine the spans in the accompanying tables are as published in TER No. 1401-01: Lamco Laminated Finger-Jointed Lumber (LFL®). Reference design values are based on normal load duration and dry service conditions.

ADJUSTMENT FACTORS

Reference design values must be multiplied by all applicable adjustment factors to determine adjusted design values. Adjusted design values are then used to calculate the maximum allowable span for a specified load condition. The adjustment factors used to develop the accompanying span tables are described below. For more information on adjustment factors, refer to TER 1211-01 and NDS.

REPETITIVE MEMBER FACTOR, C_r

Bending design values, Fb, for the Lamco LFL® products listed in these tables are multiplied by the repetitive member factor, C_r = 1.04, when such members are in contact or spaced not more than 24" on-center, are not less than three (3) in number, and are joined by floor, roof or other load distributing elements adequate to support the design load.

LOAD DURATION FACTOR, C_D

Wood has the ability to carry substantially greater maximum loads for short durations than for long durations. Reference design values apply to the normal 10-year load duration. With the exception of modulus of elasticity, E and E_{min}, and compression perpendicular-to grain, $F_{c\perp}$, reference design values may be multiplied by the appropriate load duration factor, C_D. Floor joist and ceiling joist tables are based on the normal load duration, which implies C_D = 1.0. For rafters, the load duration factor, C_D, is typically either 1.15 for two-month snow loads or 1.25 for seven-day construction loads, or 1.6 for wind load. All rafter tables are labeled to indicate the load duration factor used. Rafter spans have been evaluated for wind loads up to and including V_{asd} = 110 mph (Exposure B, Mean Roof Height of 30') to determine that wind does not control design. For wind greater than V_{asd} = 110 mph, an engineered design is required.

CALCULATIONS

The spans provided in these tables are limited to the minimum value calculated for the following design parameters using ASD:

- BENDING (FLEXURE)
- DEFLECTION (BASED ON LIVE LOAD)
- COMPRESSION PERPENDICULAR-TO-GRAIN
- SHEAR PARALLEL-TO-GRAIN (HORIZONTAL SHEAR)

BENDING

Bending design values assume a fully supported member, properly sheathed and nailed on the top edge of the joist or rafter. The repetitive member factor, C_r, of 1.04 was included due to the assumption of the installation of at least three (3) joists or rafters spaced not more than 24" on-center. The load duration factor, C_D, has also been applied as appropriate.

DEFLECTION

Deflection may be the controlling factor in determining the member size required when appearance or rigidity is important. Control of floor vibration is another important reason to limit deflection. Deflection limits are expressed as a fraction of the span length in inches (l), and consider only live load in accordance with established engineering practice for the design of joists and rafters. The live load deflection ratio used to develop each table is listed.

COMPRESSION PERPENDICULAR-TO-GRAIN

The compression perpendicular-to-grain check used to develop these span tables assumes a 2.0" bearing length to account for the end of the joist or rafter bearing on a 2x4 wall with a 1½" rim board applied along the outside edge of the wall. An additional check is required for shorter bearing lengths, such as for 1.5" ledgers.

SHEAR PARALLEL-TO-GRAIN (HORIZONTAL SHEAR)

All uniformly distributed loads within a distance from the inside face of each support equal to the depth of the member have been ignored for determining the maximum allowable span based on horizontal shear.

Floor Joists – 30 psf Live Load, 10 psf Dead Load, l/ 360 Deflection						Floor Joists – 30 psf Live Load, 15 psf Dead Load, l/360 Deflection			
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	16-8	15-3	13-11	12-6	16-4	14-5	13-2	11-9
	1.7E	17-0	15-9	15-1	14-3	16-8	15-5	14-9	13-11
	1.9E	17-7	16-3	15-6	14-8	17-3	15-11	15-2	14-4
	2.1E	17-11	16-7	15-10	14-11	17-7	16-3	15-6	14-7
1 7/16" x 9¼"	1.6E	20-10	18-8	17-1	15-3	20-4	17-7	16-1	14-5
	1.7E	21-4	19-9	18-10	17-9	21-0	19-4	18-5	17-4
	1.9E	22-0	20-4	19-5	18-3	21-8	20-0	19-0	17-11
	2.1E	22-5	20-9	19-9	18-7	22-1	20-5	19-4	18-3
1 7/16" x 9½"	1.6E	21-4	19-1	17-5	15-7	20-10	18-0	16-5	14-9
	1.7E	21-10	20-3	19-3	18-2	21-6	19-10	18-10	17-9
	1.9E	22-7	20-10	19-10	18-9	22-3	20-6	19-6	18-4
	2.1E	23-0	21-3	20-3	19-1	22-8	20-11	19-10	18-8
1 7/16" x 11 1/4"	1.6E	25-0	22-0	20-1	17-11	23-11	20-9	18-11	16-11
	1.7E	25-7	23-8	22-6	21-2	25-3	23-3	22-1	20-8
	1.9E	26-6	24-5	23-3	21-10	26-1	24-0	22-10	21-5
	2.1E	27-0	24-11	23-8	22-3	26-8	24-6	23-3	21-10
1 7/16" x 11 7/8"	1.6E	26-4	23-0	21-0	18-9	25-0	21-8	19-10	17-8
	1.7E	26-11	24-10	23-8	22-3	26-7	24-5	23-3	21-8
	1.9E	27-10	25-8	24-5	23-0	27-6	25-3	24-0	22-7
	2.1E	28-5	26-2	24-11	23-5	28-1	25-10	24-6	23-0
1 7/16" x 14"	1.6E	30-5	26-4	24-1	21-6	28-8	24-10	22-8	20-4
	1.7E	31-6	29-0	27-7	25-11	31-1	28-7	27-2	25-0
	1.9E	31-8	30-0	28-6	26-9	31-8	29-7	28-1	26-4
	2.1E	31-8	30-7	29-1	27-4	31-8	30-2	28-7	26-10
1 7/16" x 16"	1.6E	31-8	29-5	26-11	24-1	31-8	27-9	25-4	22-8
	1.7E	31-8	31-8	31-3	29-5	31-8	31-8	30-9	28-2
	1.9E	31-8	31-8	31-8	30-4	31-8	31-8	31-8	29-10
	2.1E	31-8	31-8	31-8	30-11	31-8	31-8	31-8	30-6

Floor Joists – 30 psf Live Load, 10 psf Dead Load, l/ 480 Deflection						Floor Joists – 30 psf Live Load, 15 psf Dead Load, l/480 Deflection			
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	14-10	13-9	13-1	12-4	14-10	13-9	13-1	11-9
	1.7E	15-2	14-0	13-4	12-7	15-2	14-0	13-4	12-7
	1.9E	15-8	14-6	13-9	13-0	15-8	14-6	13-9	13-0
	2.1E	16-0	14-9	14-1	13-3	16-0	14-9	14-1	13-3
1 7/16" x 9 1/4"	1.6E	18-7	17-2	16-4	15-3	18-7	17-2	16-1	14-5
	1.7E	19-1	17-7	16-9	15-9	19-1	17-7	16-9	15-9
	1.9E	19-8	18-2	17-3	16-3	19-8	18-2	17-3	16-3
	2.1E	20-1	18-6	17-7	16-7	20-1	18-6	17-7	16-7
1 7/16" x 9 1/2"	1.6E	19-1	17-7	16-9	15-7	19-1	17-7	16-5	14-9
	1.7E	19-6	18-0	17-2	16-2	19-6	18-0	17-2	16-2
	1.9E	20-2	18-7	17-8	16-8	20-2	18-7	17-8	16-8
	2.1E	20-7	19-0	18-1	17-0	20-7	19-0	18-1	17-0
1 7/16" x 11 1/4"	1.6E	22-5	20-8	19-7	17-11	22-5	20-8	18-11	16-11
	1.7E	22-11	21-1	20-1	18-11	22-11	21-1	20-1	18-11
	1.9E	23-9	21-10	20-9	19-6	23-9	21-10	20-9	19-6
	2.1E	24-3	22-3	21-2	19-10	24-3	22-3	21-2	19-10
1 7/16" x 11 7/8"	1.6E	23-7	21-8	20-8	18-9	23-7	21-8	19-10	17-8
	1.7E	24-2	22-3	21-1	19-10	24-2	22-3	21-1	19-10
	1.9E	25-0	23-0	21-10	20-6	25-0	23-0	21-10	20-6
	2.1E	25-6	23-5	22-3	20-11	25-6	23-5	22-3	20-11
1 7/16" x 14"	1.6E	27-7	25-4	24-1	21-6	27-7	24-10	22-8	20-4
	1.7E	28-3	26-0	24-8	23-2	28-3	26-0	24-8	23-2
	1.9E	29-3	26-10	25-6	23-11	29-3	26-10	25-6	23-11
	2.1E	29-11	27-5	26-0	24-5	29-11	27-5	26-0	24-5
1 7/16" x 16"	1.6E	31-4	28-9	26-11	24-1	31-4	27-9	25-4	22-8
	1.7E	31-8	29-6	28-0	26-3	31-8	29-6	28-0	26-3
	1.9E	31-8	30-6	28-11	27-2	31-8	30-6	28-11	27-2
	2.1E	31-8	31-2	29-6	27-8	31-8	31-2	29-6	27-8

Floor Joists – 30 psf Live Load, 10 psf Dead Load, l/600 Deflection						Floor Joists – 30 psf Live Load, 15 psf Dead Load, l/600 Deflection			
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	13-9	12-9	12-2	11-6	13-9	12-9	12-2	11-6
	1.7E	14-1	13-0	12-5	11-9	14-1	13-0	12-5	11-9
	1.9E	14-6	13-5	12-10	12-1	14-6	13-5	12-10	12-1
	2.1E	14-10	13-8	13-0	12-4	14-10	13-8	13-0	12-4
1 7/16" x 9¼"	1.6E	17-3	15-11	15-2	14-4	17-3	15-11	15-2	14-4
	1.7E	17-8	16-4	15-6	14-8	17-8	16-4	15-6	14-8
	1.9E	18-3	16-10	16-0	15-1	18-3	16-10	16-0	15-1
	2.1E	18-8	17-2	16-4	15-4	18-8	17-2	16-4	15-4
1 7/16" x 9 1/2"	1.6E	17-9	16-4	15-7	14-8	17-9	16-4	15-7	14-8
	1.7E	18-2	16-9	15-11	15-0	18-2	16-9	15-11	15-0
	1.9E	18-9	17-3	16-5	15-6	18-9	17-3	16-5	15-6
	2.1E	19-2	17-7	16-9	15-9	19-2	17-7	16-9	15-9
1 7/16" x 11 1/4"	1.6E	20-9	19-2	18-2	17-2	20-9	19-2	18-2	16-11
	1.7E	21-3	19-7	18-8	17-6	21-3	19-7	18-8	17-6
	1.9E	22-0	20-3	19-3	18-1	22-0	20-3	19-3	18-1
	2.1E	22-6	20-8	19-8	18-5	22-6	20-8	19-8	18-5
1 7/16" x 11 7/8"	1.6E	21-10	20-2	19-2	18-0	21-10	20-2	19-2	17-8
	1.7E	22-5	20-8	19-7	18-5	22-5	20-8	19-7	18-5
	1.9E	23-2	21-4	20-3	19-0	23-2	21-4	20-3	19-0
	2.1E	23-8	21-9	20-8	19-5	23-8	21-9	20-8	19-5
1 7/16" x 14"	1.6E	25-7	23-6	22-4	21-0	25-7	23-6	22-4	20-4
	1.7E	26-3	24-1	22-11	21-6	26-3	24-1	22-11	21-6
	1.9E	27-2	24-11	23-8	22-2	27-2	24-11	23-8	22-2
	2.1E	27-9	25-6	24-2	22-8	27-9	25-6	24-2	22-8
1 7/16" x 16"	1.6E	29-1	26-9	25-4	23-10	29-1	26-9	25-4	22-8
	1.7E	29-10	27-5	26-0	24-4	29-10	27-5	26-0	24-4
	1.9E	30-11	28-4	26-10	25-2	30-11	28-4	26-10	25-2
	2.1E	31-7	28-11	27-5	25-8	31-7	28-11	27-5	25-8

Floor Joists – 40 psf Live Load, 10 psf Dead Load, l/360 Deflection						Floor Joists – 40 psf Live Load, 15 psf Dead Load, l/360 Deflection			
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	14-10	13-8	12-6	11-2	14-10	13-0	11-11	10-8
	1.7E	15-2	14-0	13-4	12-7	15-2	14-0	13-4	12-7
	1.9E	15-8	14-6	13-9	13-0	15-8	14-6	13-9	13-0
	2.1E	16-0	14-9	14-1	13-3	16-0	14-9	14-1	13-3
1 7/16" x 9 1/4"	1.6E	18-7	16-9	15-3	13-8	18-5	15-11	14-7	13-0
	1.7E	19-1	17-7	16-9	15-9	19-1	17-7	16-9	15-9
	1.9E	19-8	18-2	17-3	16-3	19-8	18-2	17-3	16-3
	2.1E	20-1	18-6	17-7	16-7	20-1	18-6	17-7	16-7
1 7/16" x 9 1/2"	1.6E	19-1	17-1	15-7	13-11	18-10	16-4	14-11	13-4
	1.7E	19-6	18-0	17-2	16-2	19-6	18-0	17-2	16-2
	1.9E	20-2	18-7	17-8	16-8	20-2	18-7	17-8	16-8
	2.1E	20-7	19-0	18-1	17-0	20-7	19-0	18-1	17-0
1 7/16" x 11 1/4"	1.6E	22-5	19-8	17-11	16-1	21-8	18-9	17-1	15-4
	1.7E	22-11	21-1	20-1	18-11	22-11	21-1	20-1	18-8
	1.9E	23-9	21-10	20-9	19-6	23-9	21-10	20-9	19-6
	2.1E	24-3	22-3	21-2	19-10	24-3	22-3	21-2	19-10
1 7/16" x 11 7/8"	1.6E	23-7	20-7	18-9	16-10	22-8	19-7	17-11	16-0
	1.7E	24-2	22-3	21-1	19-10	24-2	22-3	21-1	19-7
	1.9E	25-0	23-0	21-10	20-6	25-0	23-0	21-10	20-6
	2.1E	25-6	23-5	22-3	20-11	25-6	23-5	22-3	20-11
1 7/16" x 14"	1.6E	27-3	23-7	21-6	19-3	26-0	22-6	20-6	18-4
	1.7E	28-3	26-0	24-8	23-2	28-3	26-0	24-8	22-8
	1.9E	29-3	26-10	25-6	23-11	29-3	26-10	25-6	23-11
	2.1E	29-11	27-5	26-0	24-5	29-11	27-5	26-0	24-5
1 7/16" x 16"	1.6E	30-5	26-4	24-1	21-6	29-0	25-1	22-11	20-6
	1.7E	31-8	29-6	28-0	26-3	31-8	29-6	28-0	25-5
	1.9E	31-8	30-6	28-11	27-2	31-8	30-6	28-11	27-2
	2.1E	31-8	31-2	29-6	27-8	31-8	31-2	29-6	27-8

Floor Joists – 40 psf Live Load, 10 psf Dead Load, l/480 Deflection						Floor Joists – 40 psf Live Load, 15 psf Dead Load, l/480 Deflection			
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	13-6	12-6	11-11	11-2	13-6	12-6	11-11	10-8
	1.7E	13-9	12-9	12-2	11-6	13-9	12-9	12-2	11-6
	1.9E	14-3	13-2	12-6	11-10	14-3	13-2	12-6	11-10
	2.1E	14-6	13-5	12-9	12-0	14-6	13-5	12-9	12-0
1 7/16" x 9 1/4"	1.6E	16-11	15-7	14-10	13-8	16-11	15-7	14-7	13-0
	1.7E	17-4	16-0	15-2	14-4	17-4	16-0	15-2	14-4
	1.9E	17-11	16-6	15-8	14-9	17-11	16-6	15-8	14-9
	2.1E	18-3	16-10	16-0	15-1	18-3	16-10	16-0	15-1
1 7/16" x 9 1/2"	1.6E	17-4	16-0	15-3	13-11	17-4	16-0	14-11	13-4
	1.7E	17-9	16-4	15-7	14-8	17-9	16-4	15-7	14-8
	1.9E	18-4	16-11	16-1	15-2	18-4	16-11	16-1	15-2
	2.1E	18-9	17-3	16-5	15-5	18-9	17-3	16-5	15-5
1 7/16" x 11 1/4"	1.6E	20-4	18-9	17-10	16-1	20-4	18-9	17-1	15-4
	1.7E	20-10	19-2	18-3	17-2	20-10	19-2	18-3	17-2
	1.9E	21-7	19-10	18-10	17-8	21-7	19-10	18-10	17-8
	2.1E	22-0	20-3	19-2	18-1	22-0	20-3	19-2	18-1
1 7/16" x 11 7/8"	1.6E	21-5	19-9	18-9	16-10	21-5	19-7	17-11	16-0
	1.7E	21-11	20-2	19-2	18-0	21-11	20-2	19-2	18-0
	1.9E	22-8	20-10	19-10	18-7	22-8	20-10	19-10	18-7
	2.1E	23-2	21-4	20-3	19-0	23-2	21-4	20-3	19-0
1 7/16" x 14"	1.6E	25-1	23-0	21-6	19-3	25-1	22-6	20-6	18-4
	1.7E	25-8	23-7	22-5	21-0	25-8	23-7	22-5	21-0
	1.9E	26-7	24-5	23-2	21-9	26-7	24-5	23-2	21-9
	2.1E	27-2	24-11	23-8	22-2	27-2	24-11	23-8	22-2
1 7/16" x 16"	1.6E	28-6	26-2	24-1	21-6	28-6	25-1	22-11	20-6
	1.7E	29-2	26-10	25-5	23-10	29-2	26-10	25-5	23-10
	1.9E	30-3	27-9	26-3	24-8	30-3	27-9	26-3	24-8
	2.1E	30-11	28-4	26-10	25-2	30-11	28-4	26-10	25-2

Floor Joists – 40 psf Live Load, 10 psf Dead Load, l/600 Deflection						Floor Joists – 40 psf Live Load, 15 psf Dead Load, l/600 Deflection			
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	12-6	11-7	11-0	10-5	12-6	11-7	11-0	10-5
	1.7E	12-10	11-10	11-3	10-8	12-10	11-10	11-3	10-8
	1.9E	13-3	12-3	11-8	11-0	13-3	12-3	11-8	11-0
	2.1E	13-6	12-5	11-10	11-2	13-6	12-5	11-10	11-2
1 7/16" x 9 1/4"	1.6E	15-8	14-6	13-10	13-0	15-8	14-6	13-10	13-0
	1.7E	16-1	14-10	14-1	13-3	16-1	14-10	14-1	13-3
	1.9E	16-7	15-4	14-7	13-8	16-7	15-4	14-7	13-8
	2.1E	16-11	15-7	14-10	14-0	16-11	15-7	14-10	14-0
1 7/16" x 9 1/2"	1.6E	16-1	14-10	14-2	13-4	16-1	14-10	14-2	13-4
	1.7E	16-6	15-2	14-6	13-7	16-6	15-2	14-6	13-7
	1.9E	17-0	15-8	14-11	14-1	17-0	15-8	14-11	14-1
	2.1E	17-5	16-0	15-3	14-4	17-5	16-0	15-3	14-4
1 7/16" x 11 1/4"	1.6E	18-11	17-5	16-6	15-7	18-11	17-5	16-6	15-4
	1.7E	19-4	17-10	16-11	15-11	19-4	17-10	16-11	15-11
	1.9E	20-0	18-5	17-6	16-5	20-0	18-5	17-6	16-5
	2.1E	20-5	18-9	17-10	16-9	20-5	18-9	17-10	16-9
1 7/16" x 11 7/8"	1.6E	19-10	18-4	17-5	16-4	19-10	18-4	17-5	16-0
	1.7E	20-4	18-9	17-10	16-9	20-4	18-9	17-10	16-9
	1.9E	21-1	19-4	18-5	17-3	21-1	19-4	18-5	17-3
	2.1E	21-6	19-9	18-9	17-7	21-6	19-9	18-9	17-7
1 7/16" x 14"	1.6E	23-3	21-5	20-4	19-1	23-3	21-5	20-4	18-4
	1.7E	23-10	21-11	20-9	19-6	23-10	21-11	20-9	19-6
	1.9E	24-8	22-8	21-6	20-2	24-8	22-8	21-6	20-2
	2.1E	25-2	23-2	21-11	20-7	25-2	23-2	21-11	20-7
1 7/16" x 16"	1.6E	26-5	24-3	23-0	21-6	26-5	24-3	22-11	20-6
	1.7E	27-1	24-11	23-7	22-2	27-1	24-11	23-7	22-2
	1.9E	28-1	25-9	24-5	22-11	28-1	25-9	24-5	22-11
	2.1E	28-8	26-3	24-11	23-4	28-8	26-3	24-11	23-4

Floor Joists – 50 psf Live Load, 10 psf Dead Load, l/360 Deflection						Floor Joists – 50 psf Live Load, 20 psf Dead Load, l/360 Deflection			
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	13-9	12-6	11-5	10-2	13-4	11-7	10-6	9-5
	1.7E	14-1	13-0	12-5	11-9	14-1	13-0	12-5	11-3
	1.9E	14-6	13-5	12-10	12-1	14-6	13-5	12-10	12-1
	2.1E	14-10	13-8	13-0	12-4	14-10	13-8	13-0	12-4
1 7/16" x 9 1/4"	1.6E	17-3	15-3	13-11	12-6	16-4	14-2	12-11	11-6
	1.7E	17-8	16-4	15-6	14-8	17-8	16-4	15-6	14-0
	1.9E	18-3	16-10	16-0	15-1	18-3	16-10	16-0	15-1
	2.1E	18-8	17-2	16-4	15-4	18-8	17-2	16-4	15-4
1 7/16" x 9 1/2"	1.6E	17-9	15-7	14-3	12-9	16-8	14-5	13-2	11-10
	1.7E	18-2	16-9	15-11	15-0	18-2	16-9	15-11	14-4
	1.9E	18-9	17-3	16-5	15-6	18-9	17-3	16-5	15-6
	2.1E	19-2	17-7	16-9	15-9	19-2	17-7	16-9	15-9
1 7/16" x 11 1/4"	1.6E	20-9	17-11	16-5	14-8	19-2	16-7	15-2	13-7
	1.7E	21-3	19-7	18-8	17-6	21-3	19-7	18-6	16-7
	1.9E	22-0	20-3	19-3	18-1	22-0	20-3	19-3	18-1
	2.1E	22-6	20-8	19-8	18-5	22-6	20-8	19-8	18-5
1 7/16" x 11 7/8"	1.6E	21-8	18-9	17-2	15-4	20-1	17-5	15-10	14-2
	1.7E	22-5	20-8	19-7	18-5	22-5	20-8	19-5	17-5
	1.9E	23-2	21-4	20-3	19-0	23-2	21-4	20-3	19-0
	2.1E	23-8	21-9	20-8	19-5	23-8	21-9	20-8	19-5
1 7/16" x 14"	1.6E	24-10	21-6	19-8	17-7	23-0	19-11	18-2	16-3
	1.7E	26-3	24-1	22-11	21-6	26-3	24-1	22-5	20-1
	1.9E	27-2	24-11	23-8	22-2	27-2	24-11	23-8	22-2
	2.1E	27-9	25-6	24-2	22-8	27-9	25-6	24-2	22-8
1 7/16" x 16"	1.6E	27-9	24-1	21-11	19-8	25-9	22-3	20-4	17-1
	1.7E	29-10	27-5	26-0	24-4	29-10	27-5	25-3	22-7
	1.9E	30-11	28-4	26-10	25-2	30-11	28-4	26-10	25-2
	2.1E	31-7	28-11	27-5	25-8	31-7	28-11	27-5	25-6

Floor Joists – 50 psf Live Load, 10 psf Dead Load, l/480 Deflection						Floor Joists – 50 psf Live Load, 20 psf Dead Load, l/480 Deflection			
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	12-6	11-7	11-0	10-2	12-6	11-7	10-6	9-5
	1.7E	12-10	11-10	11-3	10-8	12-10	11-10	11-3	10-8
	1.9E	13-3	12-3	11-8	11-0	13-3	12-3	11-8	11-0
	2.1E	13-6	12-5	11-10	11-2	13-6	12-5	11-10	11-2
1 7/16" x 9 1/4"	1.6E	15-8	14-6	13-10	12-6	15-8	14-2	12-11	11-6
	1.7E	16-1	14-10	14-1	13-3	16-1	14-10	14-1	13-3
	1.9E	16-7	15-4	14-7	13-8	16-7	15-4	14-7	13-8
	2.1E	16-11	15-7	14-10	14-0	16-11	15-7	14-10	14-0
1 7/16" x 9 1/2"	1.6E	16-1	14-10	14-2	12-9	16-1	14-5	13-2	11-10
	1.7E	16-6	15-2	14-6	13-7	16-6	15-2	14-6	13-7
	1.9E	17-0	15-8	14-11	14-1	17-0	15-8	14-11	14-1
	2.1E	17-5	16-0	15-3	14-4	17-5	16-0	15-3	14-4
1 7/16" x 11 1/4"	1.6E	18-11	17-5	16-5	14-8	18-11	16-7	15-2	13-7
	1.7E	19-4	17-10	16-11	15-11	19-4	17-10	16-11	15-11
	1.9E	20-0	18-5	17-6	16-5	20-0	18-5	17-6	16-5
	2.1E	20-5	18-9	17-10	16-9	20-5	18-9	17-10	16-9
1 7/16" x 11 7/8"	1.6E	19-10	18-4	17-2	15-4	19-10	17-5	15-10	14-2
	1.7E	20-4	18-9	17-10	16-9	20-4	18-9	17-10	16-9
	1.9E	21-1	19-4	18-5	17-3	21-1	19-4	18-5	17-3
	2.1E	21-6	19-9	18-9	17-7	21-6	19-9	18-9	17-7
1 7/16" x 14"	1.6E	23-3	21-5	19-8	17-7	23-0	19-11	18-2	16-3
	1.7E	23-10	21-11	20-9	19-6	23-10	21-11	20-9	19-6
	1.9E	24-8	22-8	21-6	20-2	24-8	22-8	21-6	20-2
	2.1E	25-2	23-2	21-11	20-7	25-2	23-2	21-11	20-7
1 7/16" x 16"	1.6E	26-5	24-1	21-11	19-8	25-9	22-3	20-4	17-1
	1.7E	27-1	24-11	23-7	22-2	27-1	24-11	23-7	22-2
	1.9E	28-1	25-9	24-5	22-11	28-1	25-9	24-5	22-11
	2.1E	28-8	26-3	24-11	23-4	28-8	26-3	24-11	23-4

Floor Joists – 50 psf Live Load, 10 psf Dead Load, l/600 Deflection						Floor Joists – 50 psf Live Load, 20 psf Dead Load, l/600 Deflection			
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	11-7	10-9	10-3	9-8	11-7	10-9	10-3	9-5
	1.7E	11-10	11-0	10-6	9-11	11-10	11-0	10-6	9-11
	1.9E	12-3	11-4	10-10	10-2	12-3	11-4	10-10	10-2
	2.1E	12-6	11-7	11-0	10-4	12-6	11-7	11-0	10-4
1 7/16" x 9 1/4"	1.6E	14-7	13-5	12-10	12-1	14-7	13-5	12-10	11-6
	1.7E	14-11	13-9	13-1	12-4	14-11	13-9	13-1	12-4
	1.9E	15-5	14-3	13-6	12-9	15-5	14-3	13-6	12-9
	2.1E	15-9	14-6	13-9	13-0	15-9	14-6	13-9	13-0
1 7/16" x 9 1/2"	1.6E	14-11	13-9	13-1	12-4	14-11	13-9	13-1	11-10
	1.7E	15-4	14-1	13-5	12-8	15-4	14-1	13-5	12-8
	1.9E	15-10	14-7	13-10	13-0	15-10	14-7	13-10	13-0
	2.1E	16-2	14-10	14-2	13-3	16-2	14-10	14-2	13-3
1 7/16" x 11 1/4"	1.6E	17-6	16-2	15-4	14-5	17-6	16-2	15-2	13-7
	1.7E	17-11	16-6	15-9	14-9	17-11	16-6	15-9	14-9
	1.9E	18-7	17-1	16-3	15-3	18-7	17-1	16-3	15-3
	2.1E	19-0	17-5	16-7	15-7	19-0	17-5	16-7	15-7
1 7/16" x 11 7/8"	1.6E	18-5	17-0	16-2	15-2	18-5	17-0	15-10	14-2
	1.7E	18-11	17-5	16-6	15-6	18-11	17-5	16-6	15-6
	1.9E	19-7	18-0	17-1	16-1	19-7	18-0	17-1	16-1
	2.1E	20-0	18-4	17-5	16-4	20-0	18-4	17-5	16-4
1 7/16" x 14"	1.6E	21-7	19-10	18-10	17-7	21-7	19-10	18-2	16-3
	1.7E	22-1	20-4	19-4	18-1	22-1	20-4	19-4	18-1
	1.9E	22-11	21-0	19-11	18-9	22-11	21-0	19-11	18-9
	2.1E	23-5	21-6	20-4	19-1	23-5	21-6	20-4	19-1
1 7/16" x 16"	1.6E	24-6	22-6	21-5	19-8	24-6	22-3	20-4	17-1
	1.7E	25-2	23-1	21-11	20-7	25-2	23-1	21-11	20-7
	1.9E	26-1	23-11	22-8	21-3	26-1	23-11	22-8	21-3
	2.1E	26-7	24-5	23-1	21-8	26-7	24-5	23-1	21-8

Rafters – 20 psf Live Load, 10 psf Dead Load, l/240 Deflection, CD = 1.15					
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	19-8	17-10	16-10	15-5
	1.7E	20-3	18-4	17-3	16-1
	1.9E	21-0	19-1	18-0	16-8
	2.1E	21-6	19-7	18-5	17-1
1 7/16" x 9¼"	1.6E	25-1	22-10	21-2	18-11
	1.7E	25-10	23-5	22-1	20-6
	1.9E	26-10	24-4	22-11	21-3
	2.1E	27-5	24-11	23-6	21-10
1 7/16" x 9 1/2"	1.6E	25-9	23-5	21-7	19-4
	1.7E	26-6	24-1	22-8	21-0
	1.9E	27-7	25-0	23-7	21-10
	2.1E	28-2	25-7	24-1	22-5
1 7/16" x 11 1/4"	1.6E	30-6	27-3	24-10	22-3
	1.7E	31-5	28-6	26-10	24-11
	1.9E	31-8	29-8	27-11	25-11
	2.1E	31-8	30-4	28-7	26-6
1 7/16" x 11 7/8"	1.6E	31-8	28-6	26-0	23-3
	1.7E	31-8	30-1	28-4	26-3
	1.9E	31-8	31-3	29-5	27-4
	2.1E	31-8	31-8	30-2	28-0
1 7/16" x 14"	1.6E	31-8	31-8	29-10	26-8
	1.7E	31-8	31-8	31-8	31-0
	1.9E	31-8	31-8	31-8	31-8
	2.1E	31-8	31-8	31-8	31-8
1 7/16" x 16"	1.6E	31-8	31-8	31-8	29-9
	1.7E	31-8	31-8	31-8	31-8
	1.9E	31-8	31-8	31-8	31-8
	2.1E	31-8	31-8	31-8	31-8

Rafters – 20 psf Live Load, 15 psf Dead Load, l/240 Deflection, CD = 1.15					
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	19-8	17-6	16-0	14-4
	1.7E	20-3	18-4	17-3	16-1
	1.9E	21-0	19-1	18-0	16-8
	2.1E	21-6	19-7	18-5	17-1
1 7/16" x 9 1/4"	1.6E	24-9	21-5	19-7	17-6
	1.7E	25-10	23-5	22-1	20-6
	1.9E	26-10	24-4	22-11	21-3
	2.1E	27-5	24-11	23-6	21-10
1 7/16" x 9 1/2"	1.6E	25-4	21-11	20-0	17-11
	1.7E	26-6	24-1	22-8	21-0
	1.9E	27-7	25-0	23-7	21-10
	2.1E	28-2	25-7	24-1	22-5
1 7/16" x 11 1/4"	1.6E	29-1	25-3	23-0	20-7
	1.7E	31-5	28-6	26-10	24-11
	1.9E	31-8	29-8	27-11	25-11
	2.1E	31-8	30-4	28-7	26-6
1 7/16" x 11 7/8"	1.6E	30-5	26-4	24-1	21-6
	1.7E	31-8	30-1	28-4	26-3
	1.9E	31-8	31-3	29-5	27-4
	2.1E	31-8	31-8	30-2	28-0
1 7/16" x 14"	1.6E	31-8	30-3	27-7	24-8
	1.7E	31-8	31-8	31-8	30-5
	1.9E	31-8	31-8	31-8	31-8
	2.1E	31-8	31-8	31-8	31-8
1 7/16" x 16"	1.6E	31-8	31-8	30-10	27-7
	1.7E	31-8	31-8	31-8	31-8
	1.9E	31-8	31-8	31-8	31-8
	2.1E	31-8	31-8	31-8	31-8

Rafters – 30 psf Live Load, 10 psf Dead Load, l/240 Deflection, CD = 1.15					
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	17-2	15-7	14-8	13-4
	1.7E	17-8	16-1	15-1	14-0
	1.9E	18-4	16-8	15-8	14-7
	2.1E	18-10	17-1	16-1	14-11
1 7/16" x 9 1/4"	1.6E	21-11	19-11	18-4	16-4
	1.7E	22-6	20-6	19-3	17-11
	1.9E	23-5	21-3	20-0	18-7
	2.1E	24-0	21-10	20-6	19-0
1 7/16" x 9 1/2"	1.6E	22-6	20-5	18-8	16-9
	1.7E	23-2	21-0	19-9	18-4
	1.9E	24-1	21-10	20-7	19-1
	2.1E	24-8	22-5	21-1	19-7
1 7/16" x 11 1/4"	1.6E	26-8	23-7	21-6	19-3
	1.7E	27-5	24-11	23-5	21-9
	1.9E	28-6	25-11	24-4	22-7
	2.1E	29-2	26-6	24-11	23-2
1 7/16" x 11 7/8"	1.6E	28-2	24-8	22-6	20-2
	1.7E	28-11	26-3	24-9	23-0
	1.9E	30-1	27-4	25-9	23-10
	2.1E	30-10	28-0	26-4	24-5
1 7/16" x 14"	1.6E	31-8	28-3	25-10	23-1
	1.7E	31-8	31-0	29-2	27-1
	1.9E	31-8	31-8	30-4	28-2
	2.1E	31-8	31-8	31-0	28-10
1 7/16" x 16"	1.6E	31-8	31-7	28-10	25-9
	1.7E	31-8	31-8	31-8	30-11
	1.9E	31-8	31-8	31-8	31-8
	2.1E	31-8	31-8	31-8	31-8

Rafters – 30 psf Live Load, 15 psf Dead Load, l/240 Deflection, CD = 1.15					
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	17-2	15-5	14-1	12-7
	1.7E	17-8	16-1	15-1	14-0
	1.9E	18-4	16-8	15-8	14-7
	2.1E	18-10	17-1	16-1	14-11
1 7/16" x 9 1/4"	1.6E	21-10	18-11	17-3	15-5
	1.7E	22-6	20-6	19-3	17-11
	1.9E	23-5	21-3	20-0	18-7
	2.1E	24-0	21-10	20-6	19-0
1 7/16" x 9 1/2"	1.6E	22-4	19-4	17-8	15-9
	1.7E	23-2	21-0	19-9	18-4
	1.9E	24-1	21-10	20-7	19-1
	2.1E	24-8	22-5	21-1	19-7
1 7/16" x 11 1/4"	1.6E	25-8	22-3	20-4	18-2
	1.7E	27-5	24-11	23-5	21-9
	1.9E	28-6	25-11	24-4	22-7
	2.1E	29-2	26-6	24-11	23-2
1 7/16" x 11 7/8"	1.6E	26-10	23-3	21-3	19-0
	1.7E	28-11	26-3	24-9	23-0
	1.9E	30-1	27-4	25-9	23-10
	2.1E	30-10	28-0	26-4	24-5
1 7/16" x 14"	1.6E	30-9	26-8	24-4	21-9
	1.7E	31-8	31-0	29-2	26-10
	1.9E	31-8	31-8	30-4	28-2
	2.1E	31-8	31-8	31-0	28-10
1 7/16" x 16"	1.6E	31-8	29-9	27-2	24-4
	1.7E	31-8	31-8	31-8	30-2
	1.9E	31-8	31-8	31-8	31-8
	2.1E	31-8	31-8	31-8	31-8

Rafters – 50 psf Live Load, 10 psf Dead Load, l/240 Deflection, CD = 1.15					
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	14-6	13-2	12-2	10-11
	1.7E	14-11	13-6	12-9	11-10
	1.9E	15-6	14-1	13-3	12-4
	2.1E	15-10	14-5	13-7	12-7
1 7/16" x 9 1/4"	1.6E	18-6	16-4	14-11	13-4
	1.7E	19-0	17-3	16-3	15-1
	1.9E	19-9	17-11	16-11	15-8
	2.1E	20-3	18-5	17-4	16-1
1 7/16" x 9 1/2"	1.6E	19-0	16-9	15-3	13-8
	1.7E	19-6	17-9	16-8	15-6
	1.9E	20-4	18-5	17-4	16-1
	2.1E	20-9	18-11	17-9	16-6
1 7/16" x 11¼"	1.6E	22-3	19-3	17-7	15-9
	1.7E	23-1	21-0	19-9	18-4
	1.9E	24-0	21-10	20-7	19-1
	2.1E	24-7	22-4	21-0	19-6
1 7/16 x 11 7/8"	1.6E	23-3	20-2	18-5	16-5
	1.7E	24-5	22-2	20-10	19-4
	1.9E	25-4	23-1	21-8	20-2
	2.1E	26-0	23-7	22-2	20-7
1 7/16" x 14"	1.6E	26-8	23-1	21-1	18-10
	1.7E	28-9	26-2	24-7	22-10
	1.9E	29-11	27-2	25-7	23-9
	2.1E	30-7	27-10	26-2	24-4
1 7/16" x 16"	1.6E	29-9	25-9	23-7	20-0
	1.7E	31-8	29-10	28-1	26-1
	1.9E	31-8	31-1	29-3	27-2
	2.1E	31-8	31-8	29-11	27-9

Rafters – 50 psf Live Load, 15 psf Dead Load, l/240 Deflection, CD = 1.15					
Size	**Grade**	**12"**	**16"**	**19.2"**	**24"**
1 7/16" x 7 1/4"	1.6E	14-6	12-10	11-9	10-6
	1.7E	14-11	13-6	12-9	11-10
	1.9E	15-6	14-1	13-3	12-4
	2.1E	15-10	14-5	13-7	12-7
1 7/16" x 9 1/4"	1.6E	18-2	15-9	14-4	12-10
	1.7E	19-0	17-3	16-3	15-1
	1.9E	19-9	17-11	16-11	15-8
	2.1E	20-3	18-5	17-4	16-1
1 7/16" x 9 1/2"	1.6E	18-7	16-1	14-8	13-2
	1.7E	19-6	17-9	16-8	15-6
	1.9E	20-4	18-5	17-4	16-1
	2.1E	20-9	18-11	17-9	16-6
1 7/16" x 11 1/4"	1.6E	21-4	18-6	16-11	15-1
	1.7E	23-1	21-0	19-9	18-4
	1.9E	24-0	21-10	20-7	19-1
	2.1E	24-7	22-4	21-0	19-6
1 7/16" x 11 7/8"	1.6E	22-4	19-4	17-8	15-10
	1.7E	24-5	22-2	20-10	19-4
	1.9E	25-4	23-1	21-8	20-2
	2.1E	26-0	23-7	22-2	20-7
1 7/16" x 14"	1.6E	25-7	22-2	20-3	18-1
	1.7E	28-9	26-2	24-7	22-4
	1.9E	29-11	27-2	25-7	23-9
	2.1E	30-7	27-10	26-2	24-4
1 7/16" x 16"	1.6E	28-7	24-9	22-7	18-6
	1.7E	31-8	29-10	28-1	25-1
	1.9E	31-8	31-1	29-3	27-2
	2.1E	31-8	31-8	29-11	27-9

Issue Date: June 1, 2022
Subject to Renewal: July 1, 2024

FBC Supplement to TER 1401-01

REPORT HOLDER: Produits Forestiers Lamco Inc.

1 Evaluation Subject

1.1 Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Technical Evaluation Report (TER) supplement is to show Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber, recognized in TER 1401-01, has also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 *Applicable Code Editions*

2.2.1 *FBC-B—17, 20: Florida Building Code – Building*

2.2.2 *FBC-R—17, 20: Florida Building Code – Residential*

3 Conclusions

3.1 Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber, described in TER 1401-01, complies with the FBC-B and FBC-R and is subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the FBC-B and FBC-R applicable to this TER, they are listed here:

3.2.1 FBC-B Section 104.4 and Section 110.4 are reserved.

3.2.2 FBC-R Section R104 and Section R109 are reserved.

3.2.3 FBC-B Section 2301.3 replaces IBC Section 2301.2

3.2.4 FBC-B Section 2308 is reserved.

4 Conditions of Use

4.1 Lamco LFL® (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber, described in TER 1401-01, must comply with all of the following conditions:

4.1.1 All applicable sections in TER 1401-01

4.1.2 The design, installation, and inspections are in accordance with additional requirements of FBC-B Chapter 16 and Chapter 17, as applicable.