Listing and Technical Evaluation Report™

Report No: 1401-01

Issue Date: December 21, 2012

Revision Date: February 21, 2025

Subject to Renewal: February 28, 2025

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

Trade Secret Report Holder:

Produits Forestiers Lamco, Inc.

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CSI Designations:

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]

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

2 Product Description and Materials

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

2.2 Lamco LFL 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.

2.3 All joints are adhered with a Heat-Resistant Adhesive (HRA) of Phenol-Resorcinol-Formaldehyde (PRF) or polyurethane adhesive.

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

2.4 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.

2.5 *Material Availability*

2.5.1 *Grades:*

2.5.1.1 1.6E

2.5.1.2 1.7E

2.5.1.3 1.9E

2.5.1.4 2.1E

2.5.2 *Thickness:*

2.5.2.1 $1^{7}/_{16}$" (36.5 mm)

2.5.2.2 $1^{1}/_{2}$" (38.1 mm)

2.5.3 *Width:*

2.5.3.1 $2^{1}/_{2}$" to 16" (63.5mm to 406 mm)

2.5.4 *Length:*

2.5.4.1 Up to 32' 2" (9.8 m)

2.6 As needed, review material properties for design in **Section 6** and to regulatory evaluation in **Section 8**.

3 Definitions

3.1 New Materials[2] are defined as building materials, equipment, appliances, systems, or methods of construction not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.[3] The design strengths and permissible stresses shall be established by tests[4] and/or engineering analysis.[5]

3.2 Duly Authenticated Reports[6] and Research Reports[7] are test reports and related engineering evaluations, which are written by an approved agency[8] and/or an approved source.[9]

3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).[10]

3.3 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory.

3.4 An approved source is "approved" when a professional engineer (i.e., Registered Design Professional) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[11]

3.5 Testing and/or inspections conducted for this Duly Authenticated Report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed Registered Design Professional (RDP).

3.5.1 The Center for Building Innovation (CBI) is ANAB[12] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[13] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[14] stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept Duly Authenticated Reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.[15]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope, shall be approved.[16] Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.[17]

3.9 Approval equity is a fundamental commercial and legal principle.[18]

4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation[19]

4.1 *Standards*

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

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

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

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

4.1.5 *CSA O86: Engineering Design in Wood*

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

4.2 *Regulations*

4.2.1 *IBC – 15, 18, 21: International Building Code®*

4.2.2 *IRC – 15, 18, 21: International Residential Code®*

4.2.3 *NBC—15, 20: National Building Code of Canada*

4.2.4 *FBC-B—20, 23: Florida Building Code – Building*

4.2.5 *FBC-R—20, 23: Florida Building Code – Residential*

4.2.6 *CALGreen—22: California Green Building Standards Code*

4.2.7 *O Reg. 332/12: Ontario Building Code (OBC)[20]*

5 Listed[21]

5.1 Equipment, materials, products or services included in a List published by a nationally recognized testing laboratory (i.e., CBI), approved agency (i.e., CBI and DrJ), and/or approved source (i.e., DrJ) or other organization concerned with product evaluation (i.e., DrJ) that maintains periodic inspection (i.e., CBI) 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.

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 Lamco LFL is an alternative to sawn lumber/Structural Composite Lumber (SCL) for floor, roof and wall structural members.

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

6.2.1 Design properties for rimboard applications and for truss plates are outside the scope of this report.

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

6.3.1 Lamco LFL with a minimum thickness of $1^{7}/_{16}$", may be used as an equivalent alternative to $1^{1}/_{2}$" thick solid sawn lumber/SCL in accordance with the IBC, IRC and NBC.

6.4 *Design*

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

6.4.2 Cuts, notches and holes in structural members shall comply with the applicable building code for sawn lumber/SCL and this report. For applications outside of the scope of the applicable code, consult the manufacturer installation instructions or an RDP.

6.4.2.1 Taper cuts at the ends of ceiling joists shall not exceed $^{1}/_{4}$ the depth of the joist measured at the inside of the bearing.

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

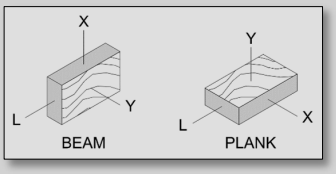
6.4.4 The design provisions for wood construction noted in IBC Section 2303.2 and IRC Section R301.1.3 apply to Lamco LFL for ASD, unless otherwise noted in this report. Allowable unit stresses for Lamco LFL for dry conditions of use are specified in **Table 1**.

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	1,200	1,300[7]	1,600	425	135	1.6	0.793
1.7E	1,800	1,585[8]	1,925	595	180	1.7	0.862
1.9E	2,300	1,800[8]	2,190	675	205	1.9	0.968
2.1E	2,300	2,175[9]	2,660	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 sixteen percent (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 2,455 psi for 1.9E and 2,795 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 four percent (4%) increase is permitted to F_b.

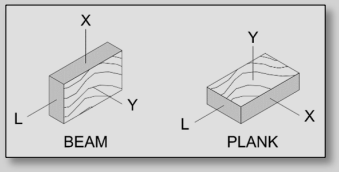
6.4.5 For compliance with the NBC, limit states design shall be in accordance with CSA O86. Specified Strength Values for Lamco LFL for dry conditions of use are specified in **Table 2**.

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 sixteen percent (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 four percent (4%) increase is permitted to F_b.

6.4.6 *Connections:*

6.4.6.1 Lateral loads for nails, screws, 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**.

6.4.6.2 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.

6.4.6.3 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**.

6.4.6.4 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°				
		Wide Face	Lateral	90°				
		Narrow Face	Lateral	0°				

6.4.6.5 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**.

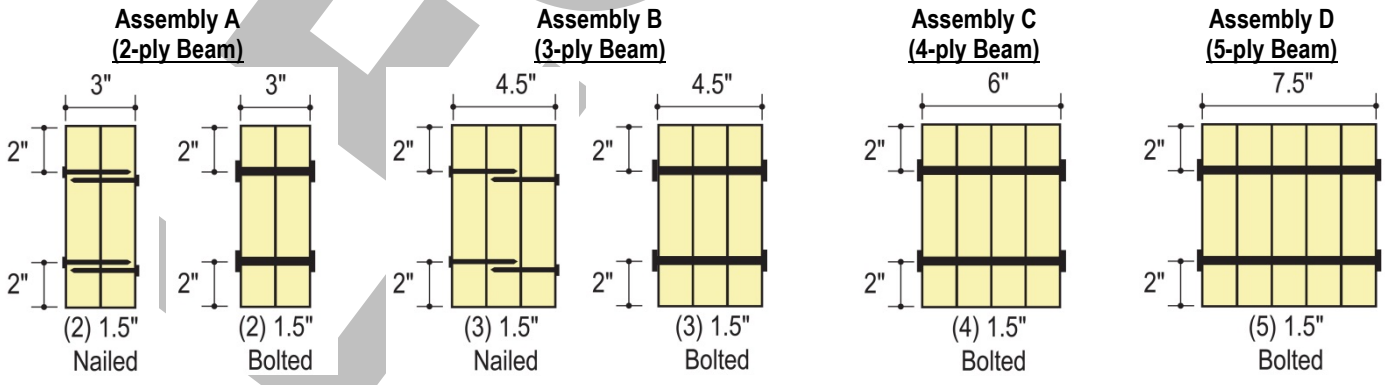


Figure 1. Connection Requirements for Multiple Member Side-Loaded Beams

Table 4. Connection Requirements and 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 1/2" 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 1/2" 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 1/2" diameter bolts. Refer to the screw manufacturer 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 an RDP for the attachment requirements.
7. A standard cut steel washer of minimum 0.118" thickness, with a minimum outside dimension of 1 3/8", 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 Specific Gravity (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.

6.4.7 *Stair Stringer:*

6.4.7.1 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**.

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

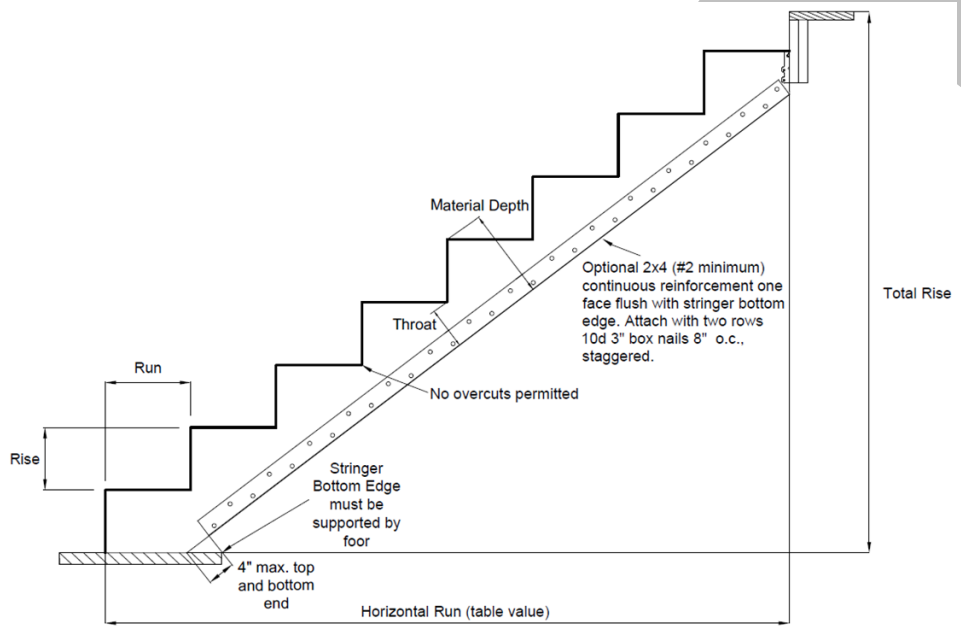


Figure 2. Lamco LFL Star Stringer Specifications

Table 5. Lamco LFL Minimum Throat Depth

Stringer Depth (in)	Residential ($7^3/_4$" 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 the 2021 IRC), a tread run of 10" (minimum per the 2021 IRC), rounded down to the whole tread run. ***Note:*** Per IRC Section R311.7.5.2, the greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8".
3. Table based on deflection requirement of L/360 live load and L/240 total load; material thickness of 1 7/16", interior bearing length of 3", 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 ($E=1.4x10^6$ psi), 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" 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" 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 the 2021 IRC), a tread run of 10" (minimum per the 2021 IRC), rounded down to the whole tread run. ***Note:*** Per IRC Section R311.7.5.2, the greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8".
3. Table based on deflection requirement of L/360 live load and L/240 total load; material thickness of 1 7/16", interior bearing length of 3", 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 x10^6 psi), 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" 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" 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 the 2021 IRC), a tread run of 10" (minimum per the 2021 IRC), rounded down to the whole tread run. ***Note:*** Per IRC Section R311.7.5.2, the greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8".
3. Table based on deflection requirement of L/360 live load and L/240 total load; material thickness of 1 7/16", interior bearing length of 3", 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 ($E=1.4 \times 10^6$ psi), 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" 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" 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 the 2021 IRC), a tread run of 10" (minimum per the 2021 IRC), rounded down to the whole tread run. ***Note:*** Per IRC Section R311.7.5.2, the greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8".
3. Table based on deflection requirement of L/360 live load and L/240 total load; material thickness of 1 7/16", interior bearing length of 3", 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" 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" diameter hole at stringer notch corner during fabrication.
14. Repetitive bending factor of 1.04 used where permitted by NDS.

6.5 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.

7 Certified Performance[22]

7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.[23]

7.2 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.[24]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 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 report examines Lamco LFL for:

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

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

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

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

8.1.4 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.

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

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

8.2 Any building code, regulation, 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 RDP/approved sources. DrJ is qualified[25] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.

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

8.4 Any regulation specific issues not addressed in this section are outside the scope of this report.

9 Installation

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

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

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

10 Substantiating Data

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

10.1.1 Mechanical properties testing in accordance with ASTM D5456 and EN 14374

10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or RDPs. Accuracy of external test data and resulting analysis is relied upon.

10.3 Where pertinent, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

10.4 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, or Duly Authenticated Reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this Duly Authenticated Report, may be dependent upon published design properties by others.

10.5 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.[26]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for Lamco LFL on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, Lamco LFL has performance characteristics that were tested and/or meet applicable regulations and is suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this Duly Authenticated Report and the manufacturer installation instructions, Lamco LFL shall be approved for the following applications:

11.2.1 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.

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

11.4 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[27] 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.

11.5 **Approved**:[28] Building regulations require that the building official shall accept Duly Authenticated Reports.[29]

11.5.1 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited.

11.5.2 An approved source is "approved" when an RDP is properly licensed to transact engineering commerce.

11.5.3 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. Denial without written reason deprives a protected right to free and fair competition in the marketplace.

11.6 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB-Accredited Product Certification Body – Accreditation #1131.

11.7 Through the IAF Multilateral Agreements (MLA), this Duly Authenticated Report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 Duly Authenticated Reports are equivalent.[30]

12 Conditions of Use

12.1 Material properties shall not fall outside the boundaries defined in **Section 6**.

12.2 As defined in **Section 6**, 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.

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

12.4 The manufacturer published installation instructions shall be available at the jobsite at all times during installation.

12.5 Lamco LFL complies with, or is a suitable alternative to, sawn lumber/SCL as permitted by the codes listed in **Section 4**, subject to the following conditions:

12.5.1 The service conditions for Lamco LFL are dry conditions of use for which the equilibrium moisture content must be less than sixteen percent (16%). Use in applications exceeding sixteen percent (16%) moisture content is outside the scope of this report.

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

12.5.3 Fastener design values shall be determined using equivalent specific gravities specified in **Table 3** of this report.

12.5.4 Cutting and notching of Lamco LFL is prohibited, except where specifically permitted by the manufacturer recommendations, this report, or where the effects of such alterations are specifically considered in the design of the member by an RDP.

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

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

12.5.7 Where use of Lamco LFL qualifies as repetitive members as defined in NDS, an increase of four percent (4%) is permitted in allowable bending stresses.

12.5.8 Lamco LFL may be cut to the specified length and width as appropriate for the application, provided the depth is no less than $2^1/_2$". The thickness may not be cut.

12.5.9 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.

12.5.10 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.

12.6 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:

12.6.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.

12.6.2 This report and the installation instructions shall be submitted at the time of permit application.

12.6.3 This innovative product has an internal quality control program and a third-party quality assurance program.

12.6.4 At a minimum, this innovative product shall be installed per **Section 9** of this report.

12.6.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.

12.6.6 This innovative 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.

12.6.7 The application of this innovative product in the context of this report 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.

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

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

12.9 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

13 Identification

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

13.2 Additional technical information can be found at www.lamcofp.com.

14 Review Schedule

14.1 This report is subject to periodic review and revision. For the latest version, visit drjcertification.org.

14.2 For information on the status of this report, please contact DrJ Certification.

15 Approved for Use Pursuant to U.S. and International Legislation Defined in Appendix A

15.1 Lamco LFL (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber are included in this report 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. This report states either that the material, product, or service meets recognized standards or has been tested and found suitable for a specified purpose. This report 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

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 this innovative product 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 2016 (DTSA),[31] where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years[32] and/or a $5,000,000 fine or 3 times the value of[33] the Intellectual Property (IP) and Trade Secrets (TS).

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[34] that are not specifically provided for in any regulation, 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.[35]

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 have 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.[36]

1.3 **Approved**[37] **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 that 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.[38] The Superintendent of Building Approved Testing Agency Roster 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 DrJ 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.[39]

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 2022 NYC Building Code (NYCBC) states in part that an approved agency shall be deemed[40] 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[41] (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:

1.6.1 A certification mark or listing of an approved certification agency,

1.6.2 A test report from an approved testing laboratory,

1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or

1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed and sealed by a professional engineer or architect, licensed in Florida.

1.6.5 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:

1.6.5.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,

1.6.5.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,

1.6.5.3 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,

1.6.5.4 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, or

1.6.5.5 A statewide product approval issued by the Florida Building Commission.

1.6.6 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).

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 the 2018 Building Code of New Jersey in IBC Section 1707.1 General,[42] 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)*".[43] Furthermore N.J.A.C 5:23-3.7 states: "*Municipal approvals of alternative materials, equipment, or methods of construction*."

1.8.1 **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.

1.8.1.1 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 the above.

1.8.1.2 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 the above.

1.8.2 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 the previous paragraph, 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[44] and Part 3280,[45] the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform to the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow:

1.9.1 "*All construction methods shall be in conformance with accepted engineering practices*."

1.9.2 "*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*."

1.9.3 "*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.[46]

1.10.2 For innovative alternatives and/or methods of construction, the building official shall accept Duly Authenticated Reports from approved agencies with respect to the quality and manner of use of new materials or assemblies.[47]

1.10.2.1 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is in the ANAB directory.

1.10.2.2 An approved source is "approved" when an RDP is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[48]

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.[49]

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

1.11.1 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.

1.11.2 **Approved**: The purpose of the 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, designs, services, and/or methods of construction.

1.11.3 ANAB is an IAF-MLA signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope, shall be approved.[50]

1.11.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.[51]

1.12 Approval equity is a fundamental commercial and legal principle.[52]

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 $1^1/_2$" 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 Report Number 1401-01: Lamco LFL (Laminated Finger Jointed Lumber) Structural Wood Based Lumber or Advanced Engineered Lumber. 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 Report Number 1211-01 and NDS.

REPETITIVE MEMBER FACTOR, C_r

Bending design values, F_b, 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 $1^1/_2$" 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: February 28, 2025

FBC Supplement to Report Number 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 Report Supplement is to show Lamco LFL, recognized in Report Number 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—20, 23: Florida Building Code – Building

2.2.2 *FBC-R—20, 23: Florida Building Code – Residential*

3 Conclusions

3.1 Lamco LFL, described in Report Number 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 report, they are listed here:

3.2.1 FBC-B Section 104.4, Section 110.4 and Section 2308 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

4 Conditions of Use

4.1 Lamco LFL, described in Report Number 1401-01, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 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.

Notes

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

[2] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702

[3] Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11

[4] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests%20as

[5] The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706:~:text=shall%20conform%20to%20the%20specifications%20and%20methods%20of%20design%20of%20accepted%20engineering%20practice

[6] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies

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

[8] https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency

[9] https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source

[10] https://www.law.cornell.edu/uscode/text/18/1832 (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. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

[11] https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

[12] https://www.cbitest.com/accreditation/

[13] https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104:~:text=to%20enforce%20the%20provisions%20of%20this%20code

[14] https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11:~:text=Where%20the%20alternative%20material%2C%20design%20or%20method%20of%20construction%20is%20not%20approved%2C%20the%20building%20official%20shall%20respond%20in%20writing%2C%20stating%20the%20reasons%20why%20the%20alternative%20was%20not%20approved AND https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#105.3.1:~:text=If%20the%20application%20or%20the%20construction%20documents%20do%20not%20conform%20to%20the%20requirements%20of%20pertinent%20laws%2C%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%2C%20stating%20the%20reasons%20therefore

[15] https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.11

[16] https://iaf.nu/en/about-iaf-mla/#:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

[17] True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

[18] https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission

[19] 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.

[20] References in this report to the National Building Code of Canada (NBC) apply to the Ontario Building Code (OBC), unless noted otherwise.

[21] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2(Listed%20or%20certified); https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#listed AND https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#labeled

[22] https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4

[23] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades

[24] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur

[25] 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.

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

[27] 2018 IFC Section 104.9

[28] 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.

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

30 Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.
31 http://www.drjengineering.org/AppendixC AND https://www.drjcertification.org/cornell-2016-protection-trade-secrets
32 https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years
33 https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided
34 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2
35 IBC 2021, Section 1706.1 Conformance to Standards
36 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General
37 See Section 11 for the distilled building code definition of **Approved**
38 Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES
39 https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1
40 New York City, The Rules of the City of New York, § 101-07 Approved Agencies
41 New York City, The Rules of the City of New York, § 101-07 Approved Agencies
42 https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1
43 https://www.nj.gov/dca/divisions/codes/codreg/ucc.html
44 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14
45 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280
46 IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.
47 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.
48 https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/
49 IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.
50 https://iaf.nu/en/about-iaf-mla/#:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope
51 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
52 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission