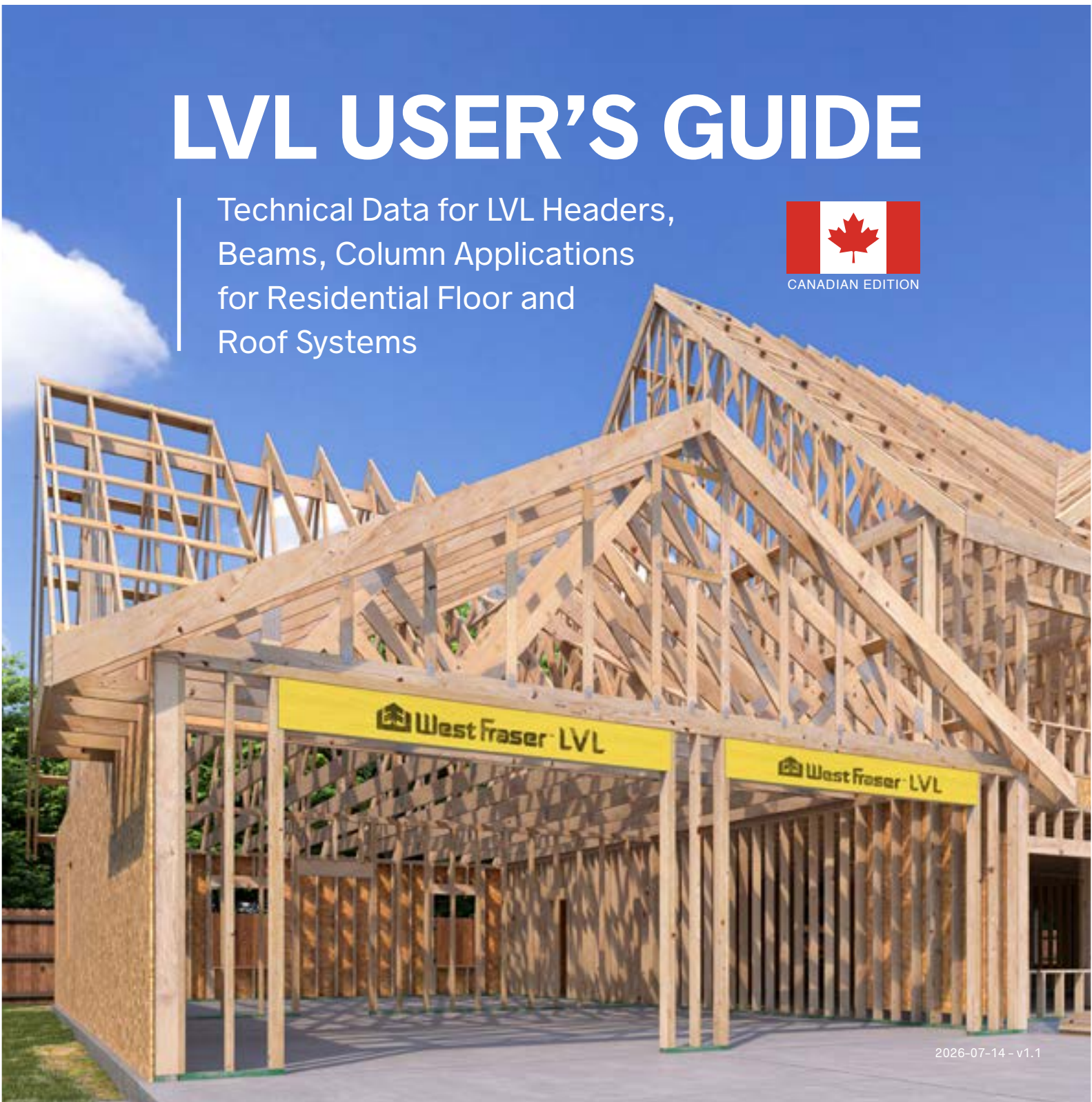




LVL USER'S GUIDE

Technical Data for LVL Headers,
Beams, Column Applications
for Residential Floor and
Roof Systems



A WORD ABOUT LVL GRADES

Did you know that...

If you are using 2.0E beams and headers exclusively in residential wood construction, you are leaving money on the table approximately 85% of the time.



When sizing beams and headers, you need to have sufficient moment capacity (F_b), sufficient shear capacity (F_v), sufficient stiffness (EI) to satisfy the live and total load deflection criteria and you need to have adequate bearing sizes (F_{ci}).

The industry markets LVL beams and headers based on the MOE value (modulus of elasticity = E) which along with the size of the beam (moment of inertia = I) determines the stiffness (EI) of the beam. The stiffness of a beam determines how much deflection a beam will experience under a given load. Deflection is a performance criteria established by building codes ($L/360$). Stiffness is not the same as strength!

Not all applications are controlled by stiffness, many are controlled by strength (F_b and F_v). In some applications, a 1.9E or 2.0E beam cannot be used as a substitute for a 1.8E beam that has superior strength properties (F_b and F_v).



A beam 16' long, carrying 300 PLF, with 1.9E material will deflect 0.0344 inches less ($1/32$ ") under total load compared to the same beam with 1.8E material. This is not much, especially when you consider the premium you pay for high MOE products.

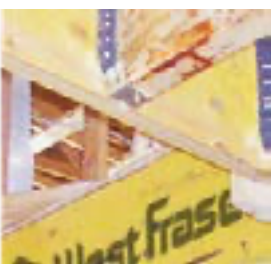


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PRODUCT LINE

With the use of ultrasonic grading technology, West Fraser wisely utilizes the inherent attributes of its wood resources to manufacture products that effectively satisfy the needs of the market while at the same time, contribute to a greener, more sustainable environment. In addition, these attributes also allow for superior fiber bending strength and workability.



West Fraser™ LVL 3100F_b-2.0E

1¾" and 3½" thick in I-Joist and
lumber compatible depths to
24" deep.

West Fraser™ LVL 3000F_b-1.9E

1¾" thick in I-Joist and lumber
compatible depths to 24" deep.

West Fraser™ LVL 3000F_b-1.8E

1½", 1¾" and 3½" thick in I-Joist
and lumber compatible depths to
18" deep. 1¾" & 3½" to 24", 3½"
thick in columns.

West Fraser™ LVL 2750F_b-1.7E

1¾" and 3½" thick in I-Joist and
lumber compatible depths
to 24" deep

All products have face, back and edges sealed for improved performance under normal construction exposure.

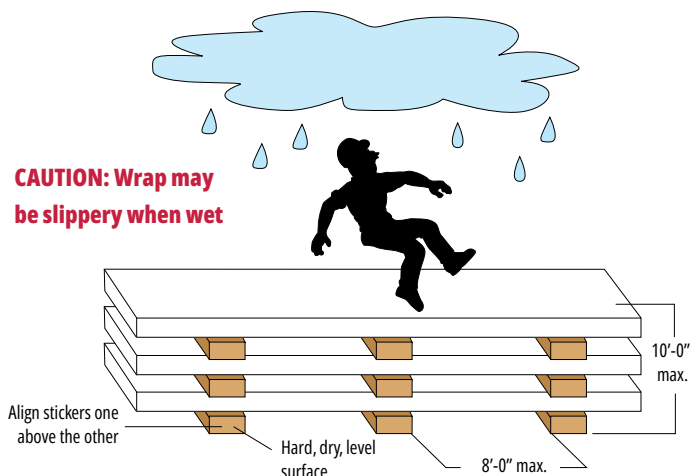
CODE EVALUATION REPORT NUMBERS: CCMC 12904-R

Check product availability with supplier prior to specifying LVL sizes.

STORAGE, HANDLING & INSTALLATION

Failure to follow good procedures for installation, storage and handling could result in unsatisfactory performance and unsafe structures.

- West Fraser™ LVL should be **stored lying flat** and protected from the weather.
- Do not exceed a storage bundle height of 10'-0".
- Report all forklift damage prior to shipment.
- Place first set of stickers on hard, level dry surface.
- **Stickers to be aligned** one above the other and spaced no more than 8'-0" apart.
- Keep the material **above ground** to minimize the absorption of ground moisture and allow circulation of air.
- West Fraser™ LVL is for use in **covered, dry conditions only**. Protect from the weather on the job site both before and after installation.
- Except for cutting to length, West Fraser™ LVL shall **not be cut, drilled or notched**.
- Heel cuts may be possible. Contact your West Fraser representative.
- **Do not install any damaged LVL.**



NOTE: These are general recommendations and in some cases, additional precautions may be required.

3100F_b 2.0E WEST FRASER™ LVL

1 3/4" THICK HEADER & BEAMS

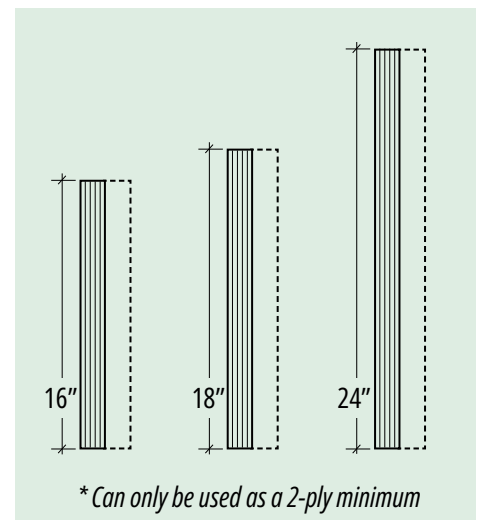
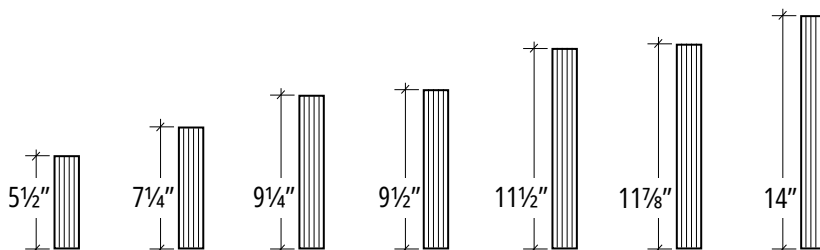
Design Properties

3100F_b 2.0E 1 3/4" WEST FRASER™ LVL Factored Resistances (Standard Term)

Design Property	Depth									
	5 1/2"	7 1/4"	9 1/4"	9 1/2"	11 1/2"	11 7/8"	14"	16"	18"	24"
Moment (ft. lbs.)	4134	6967	11037	11608	16652	17693	24146	31073	38816	66835
Shear (lbs.)	3199	4217	5381	5526	6690	6908	8144	9307	10471	13961
Moment of Inertia (in ⁴)	24	56	115	125	222	244	400	597	851	2016
Weight (lbs./lin. Ft.)	2.7	3.6	4.6	4.7	5.7	5.9	7.0	8.0	9.0	12.0

1. Lateral support of beam compression edge is required at intervals of 24" o/c or closer.
2. Lateral support of beam is required at bearing locations.
3. All 16" and greater beam depths are to be used in multiple member units only.

3100F_b 2.0E 1 3/4" WEST FRASER™ LVL Available sizes



3100F_b 2.0E WEST FRASER™ LVL Specified Strengths (Standard Term)

Modulus of Elasticity	E	=	2.0 x 10 ⁶ psi
Bending Stress	F _b	=	5729 psi
Shear (joist)	F _v	=	554 psi
Compression Perpendicular to Grain (joist)	F _{c(perp)}	=	1300 psi
Compression Parallel to Grain	F _{c(para)}	=	4786 psi

1. F_b based on 12" depths. For others depths, multiply by (12/d)^(1/9).
2. F_{c(perp)} and E shall not be increased for duration of load.

3½" THICK HEADER & BEAMS

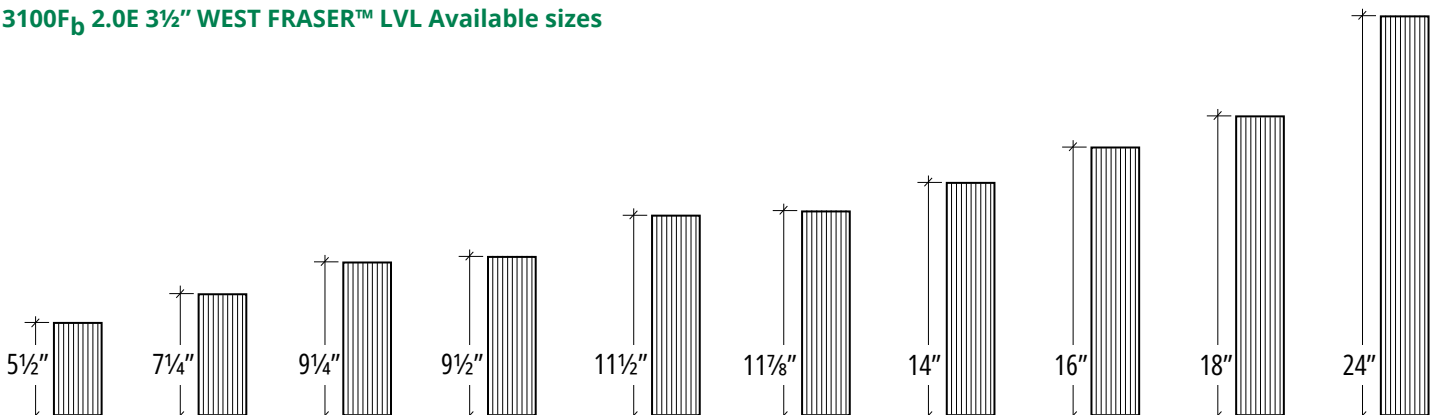
Design Properties

3100F_b 2.0E 3½" WEST FRASER™ LVL Factored Resistances (Standard Term)

Design Property	Depth									
	5½"	7¼"	9¼"	9½"	11½"	11⅞"	14"	16"	18"	24"
Moment (ft. lbs.)	8269	13933	22075	23215	33305	35386	48292	62146	77631	133669
Shear (lbs.)	6398	8434	10762	11052	13380	13816	16288	18614	20942	27922
Moment of Inertia (in ⁴)	49	111	231	250	444	488	800	1194	1701	4032
Weight (lbs./lin. Ft.)	5.5	7.2	9.2	9.5	11.5	11.8	14.0	15.9	17.9	23.9

1. Lateral support of beam compression edge is required at intervals of 24" o/c or closer.
2. Lateral support of beam is required at bearing locations.

3100F_b 2.0E 3½" WEST FRASER™ LVL Available sizes



FACTORED RESISTANCE TABLES

Pounds per lineal foot

General Notes

- Tables are for one-ply 1¾" beams. When properly connected, double the values for two-ply beams, triple for three. Minimum bearing lengths shown for one-ply will be the same for two-ply and three-ply. See page 8 for multiple-ply connection details.
- Resistances shown are the maximum factored and/or unfactored resistances, in pounds per lineal foot, that can be applied to the beam in addition to its own weight.
- Tables are based on uniform loads and the most restrictive of simple or continuous spans and dry-use conditions. Refer to West Fraser's sizing software for other loads or span configurations.
- Lateral support of beam compression edges is required at intervals of 24" o/c or closer.
- Lateral support of beams is required at bearing locations.
- Spans of multiple spans must be at least 40% of adjacent span.
- West Fraser™ LVL beams are made without camber; therefore, in addition to complying with the deflection limits of the applicable building code, other deflection considerations, such as long term deflection under sustained loads (including creep), must be evaluated.
- All 16" and deeper beams are to be used in multiple member units only.
- Unfactored total load resistance is limited to a deflection of L/240. Unfactored live load resistance is based on a deflection of L/360. Check local code requirements for other deflection criteria.
- For an unfactored live load deflection limit of L/480, multiply UNFACTORED LOAD L/360 resistance by 0.75. The resulting unfactored live load shall not exceed the total factored load shown.
- Roof must have positive slope in order to prevent ponding.
- Tables will accommodate beam slopes to a maximum of 2:12.
- Bearing lengths are based on 1300 psi specified strength for 3100Fb-2.0E Grade materials which cannot be increased for duration of load. Bearing length may need to be increased if support member's allowable bearing stress is less.
- Spans shown are measured centre-to-centre of bearing.
- Tables are in accordance with NBC 2020 and CSA 086-19.

Instructions For Use

1. Determine the factored total load and unfactored total and live load on the beam in pounds per lineal foot (plf).
2. Locate a span that meets or exceeds the required beam span, centre-to-centre of bearing.
3. Scan from left to right within the SPAN row until you find a cell where; (1) the UNFACTORED LOAD L/360 resistance meets or exceeds the unfactored live load, (2) the UNFACTORED LOAD L/240 resistance meets or exceeds the unfactored total load and (3) the FACTORED TOTAL LOAD resistance meets or exceeds the factored total load. All three rows must be checked and satisfied. Where no unfactored resistances are shown, factored total load will control.
4. To size a member for a span not shown, use capacities for the next larger span shown.

BEARING = Minimum End / Intermediate Bearing Length (inches)
 * All 16", 18" and 24" beam depths are to be used in multiple member units only.

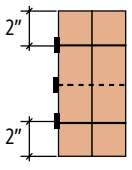
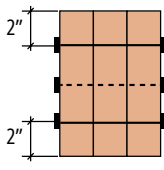
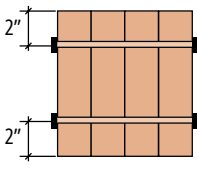
Floor or Roof (Standard Term) – 1¾" Width

Span(ft)	Condition	5½"	7¼"	9¼"	9½"	11½"	11¾"	14"	16"	18"	24"
6	Unfactored Load LL (L/360)	305	660	1263	1353	2186	2363				
	Unfactored Load TL (L/240)	455	986								
	Factored Total Load	916	1337	1802	1863	2391	2496	3145	3843	4645	7966
	BEARING	1.5/3.8	2.5/6.4	3.5/8.7	3.6/9.0	4.6/11.5	4.8/12.0	6.1/15.1	7.4/18.5	8.9/22.4	15.3/38.3
7	Unfactored Load LL (L/360)	197	431	840	903	1488	1614	2423			
	Unfactored Load TL (L/240)	292	643	1256	1349						
	Factored Total Load	672	1115	1488	1537	1952	2035	2531	3052	3633	5866
	BEARING	1.5/3.5	2.2/5.5	3.5/8.6	3.5/8.6	4.4/11.0	4.6/11.4	5.7/14.2	6.9/17.1	8.2/20.4	13.2/32.9
8	Unfactored Load LL (L/360)	134	296	585	629	1052	1144	1746			
	Unfactored Load TL (L/240)	198	440	872	939	1572	1711				
	Factored Total Load	514	867	1268	1308	1649	1717	2117	2423	2983	4642
	BEARING	1.5/3.5	1.9/4.8	3.0/7.6	3.2/7.9	4.2/10.6	4.4/11.0	5.4/13.6	6.5/16.2	7.7/19.1	11.9/29.8
9	Unfactored Load LL (L/360)	95	211	422	454	768	837	1293			
	Unfactored Load TL (L/240)	102	313	628	677	1146	1250				
	Factored Total Load	328	684	1086	1139	1428	1484	1820	2161	2529	3839
	BEARING	1.5/3.5	1.7/4.2	2.7/6.7	2.8/7.1	4.1/10.1	4.3/10.7	5.3/13.1	6.2/15.6	7.3/18.3	11.1/27.7
10	Unfactored Load LL (L/360)	70	156	313	338	576	629	981			
	Unfactored Load TL (L/240)	102	230	465	502	858	938	1464			
	Factored Total Load	328	554	878	924	1258	1307	1595	1885	2195	3273
	BEARING	1.5/3.5	1.5/3.8	2.4/6.0	2.5/6.3	3.6/9.1	3.9/9.7	5.1/12.8	6.1/15.1	7.0/17.6	10.5/26.3
11	Unfactored Load LL (L/360)		118	239	258	442	484	760			
	Unfactored Load TL (L/240)		174	354	382	658	719	1132			
	Factored Total Load		457	725	763	1095	1164	1420	1672	1939	2852
	BEARING		1.5/3.5	2.2/5.5	2.3/5.8	3.3/8.3	3.5/8.3	4.8/12.0	5.9/14.8	6.8/17.1	10.1/25.2
12	Unfactored Load LL (L/360)		92	186	201	346	379	599			
	Unfactored Load TL (L/240)		134	275	297	514	563	892			
	Factored Total Load		383	609	640	919	977	1279	1501	1736	2526
	BEARING		1.5/3.5	2.0/5.0	2.1/5.3	3.0/7.6	3.2/8.1	4.4/11.0	5.7/14.2	6.7/16.7	9.7/24.3
13	Unfactored Load LL (L/360)		73	148	160	276	302	480			
	Unfactored Load TL (L/240)		105	217	235	408	448	713			
	Factored Total Load		326	518	545	783	832	1136	1362	1571	2267
	BEARING		1.5/3.5	1.9/4.6	1.9/4.9	2.8/7.0	3.0/7.4	4.1/10.1	5.2/13.1	6.5/16.3	9.5/23.7
14	Unfactored Load LL (L/360)		58	119	129	223	245	390			
	Unfactored Load TL (L/240)		84	174	188	329	361	579			
	Factored Total Load		281	446	469	674	716	979	1247	1435	2056
	BEARING		1.5/3.5	1.7/4.3	1.8/4.5	2.6/6.5	2.8/6.9	3.8/9.4	4.8/12.1	6.1/15.1	9.2/23.1
15	Unfactored Load LL (L/360)		48	97	105	183	201	321			
	Unfactored Load TL (L/240)		68	141	153	269	296	475			
	Factored Total Load		244	388	408	586	623	852	1097	1321	1881
	BEARING		1.5/3.5	1.6/4.0	1.7/4.2	2.4/6.0	2.6/6.4	3.5/8.8	4.5/11.3	5.6/14.1	9.1/22.7
16	Unfactored Load LL (L/360)			81	87	152	167	268			
	Unfactored Load TL (L/240)			116	126	222	244	394			
	Factored Total Load			340	358	515	547	748	963	1204	1733
	BEARING			1.5/3.7	1.6/3.9	2.3/5.7	2.4/6.0	3.3/8.2	4.2/10.6	5.3/13.2	8.9/22.3
17	Unfactored Load LL (L/360)			67	73	128	140	225			
	Unfactored Load TL (L/240)			97	105	186	204	331			
	Factored Total Load			301	317	455	484	661	852	1066	1607
	BEARING			1.5/3.5	1.5/3.7	2.1/5.3	2.3/5.7	3.1/7.7	4.0/9.9	5.0/12.4	8.6/21.5
18	Unfactored Load LL (L/360)			57	62	108	119	191			
	Unfactored Load TL (L/240)			81	88	156	172	279			
	Factored Total Load			268	282	405	431	589	759	949	1497
	BEARING			1.5/3.5	1.5/3.5	2.0/5.0	2.1/5.3	2.9/7.3	3.8/9.4	4.7/11.7	8.1/20.3
19	Unfactored Load LL (L/360)				53	92	101	163			
	Unfactored Load TL (L/240)				74	133	146	238			
	Factored Total Load				253	363	386	528	681	851	1402
	BEARING				1.5/3.5	1.9/4.7	2.0/5.0	2.8/6.9	3.6/8.9	4.4/11.1	7.7/19.2
20	Unfactored Load LL (L/360)					79	87	141			
	Unfactored Load TL (L/240)					113	125	204			
	Factored Total Load					327	348	476	613	767	1318
	BEARING					1.8/4.5	1.9/4.8	2.6/6.5	3.4/8.4	3.4/10.5	7.3/18.2
21	Unfactored Load LL (L/360)					69	76	122			
	Unfactored Load TL (L/240)					97	107	176			
	Factored Total Load					296	315	431	556	695	1200
	BEARING					1.7/4.3	1.8/4.5	2.5/6.2	3.2/8.0	4.0/10.0	6.9/17.3
22	Unfactored Load LL (L/360)					60	66	107			
	Unfactored Load TL (L/240)					84	93	153			
	Factored Total Load					270	287	392	506	633	1093
	BEARING					1.6/4.1	1.7/4.3	2.4/5.9	3.1/7.6	3.8/9.6	6.6/16.5
23	Unfactored Load LL (L/360)						58	94			
	Unfactored Load TL (L/240)						81	134			
	Factored Total Load						262	358	462	578	999
	BEARING						1.7/4.1	2.3/5.7	2.9/7.3	3.7/9.1	6.3/15.8
24	Unfactored Load LL (L/360)							83			
	Unfactored Load TL (L/240)							117			
	Factored Total Load							328	424	530	916
	BEARING							2.2/5.4	2.8/7.0	3.5/8.7	6.0/15.1
26	Unfactored Load LL (L/360)							65			
	Unfactored Load TL (L/240)							91			
	Factored Total Load							279	360	450	779
	BEARING							2.0/5.0	2.6/6.4	3.2/8.0	5.6/13.9
28	Unfactored Load LL (L/360)							53			
	Unfactored Load TL (L/240)							72			
	Factored Total Load							239	309	309	670
	BEARING							1.8/4.6	2.4/5.9	2.4/5.9	5.2/12.9
30	Unfactored Load LL (L/360)								64	90	207
	Unfactored Load TL (L/240)								87	126	299
	Factored Total Load								268	336	582
	BEARING								2.2/5.5	2.8/6.9	4.8/12.0

Multiple Member Connections For Side-Loaded Beams

Verify adequacy of beam in uniform load tables prior to using values listed below.

3100F_b 2.0E 1¾" WEST FRASER™ LVL

Maximum Uniform Load (PLF) Applied to Either Outside Member			 2-PLY LVL	 3-PLY LVL	 4-PLY LVL*
Connector	Spacing	Rows	Nails On One Side or Through Bolts	Nails Both Sides or Through Bolts	Through Bolts Only
16d (3½") Common Wire Nails	12" o.c.	2 Rows 3 Rows	885 1327	663 995	Not Applicable
	6" o.c.	2 Rows 3 Rows	1770 2654	1326 1990	Not Applicable
	4" o.c.	2 Rows 3 Rows	2655 3981	1989 2985	Not Applicable
½" A307 Through Bolts	24" o.c.	2 Rows	671	503	448
	12" o.c.	2 Rows	1342	1006	895
	6" o.c.	2 Rows	2684	2012	1790

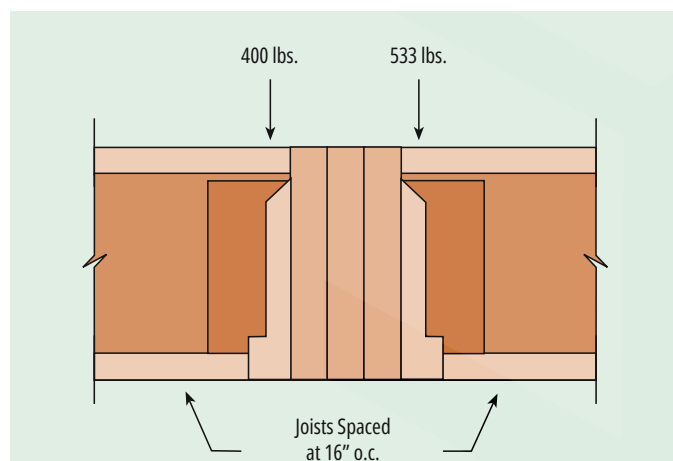
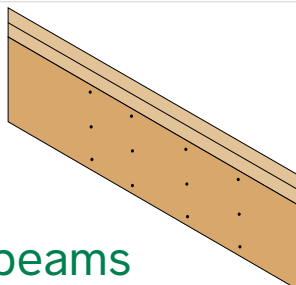
* 4-ply beams should only be side-loaded when loads are applied to both sides of the member.

1. Nails to be located a minimum of 2" from the top and bottom of the member. Start all nails a minimum of 2½" in from ends.
2. Bolts are to be material conforming to ASTM Standard A307. Bolt holes are to be the same diameter as the bolt, and located 2" from the top and bottom of the member. Washers should be used under head and nut. Start all bolts a minimum of 2½" in from ends.
3. Values listed are for standard term loading.

Connection of Multiple Pieces for Top-Loading beams

2.0E (1¾" wide pieces)

- Minimum of 2 rows of 16d (3½") nails at 12" o.c. for 5½" through 11⅞" beams
- Minimum of 3 rows of 16d (3½") nails at 12" o.c. for 14" through 24" beams



Example

First, convert joist reactions to plf load on each side of the beam by taking the joist reactions (lbs.) divided by the joist spacing (ft.). 400 lbs/(16/12) = 300 plf and 533 lbs/(16/12) = 400 plf. Check allowable load tables to verify that 3 pieces can carry the total load of 700 plf. The maximum load applied to either outside member is 400 plf. Use 2 rows of 16d (3½") common wire nails at 12" o.c. (good for 663 plf).

(All loads shown are total factored)

3000F_b 1.9E WEST FRASER™ LVL

1³/₄" THICK HEADER & BEAMS

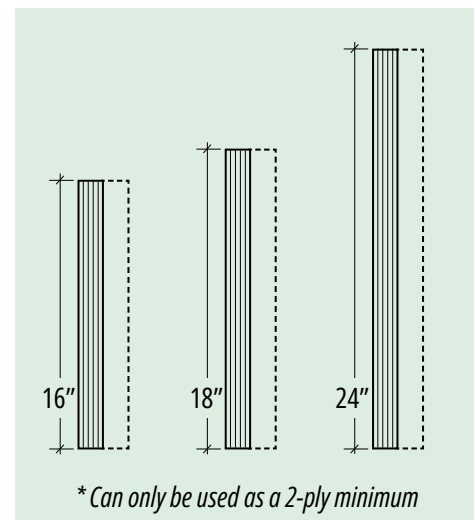
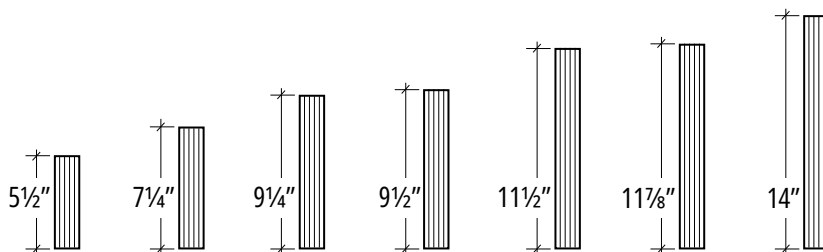
Design Properties

3000F_b 1.9E 1³/₄" WEST FRASER™ LVL Factored Resistances (Standard Term)

Design Property	Depth									
	5½"	7¼"	9¼"	9½"	11½"	11⅞"	14"	16"	18"	24"
Moment (ft. lbs.)	4079	6827	10751	11299	16132	17126	23277	29855	37184	63568
Shear (lbs.)	3199	4217	5381	5526	6690	6908	8144	9307	10471	13961
Moment of Inertia (in ⁴)	24	56	115	125	222	244	400	597	851	2016
Weight (lbs./lin. Ft.)	2.7	3.6	4.6	4.7	5.7	5.9	7.0	8.0	8.1	12.0

1. Lateral support of beam compression edge is required at intervals of 24" o/c or closer.
2. Lateral support of beam is required at bearing locations.
3. All 16" and greater beam depths are to be used in multiple member units only.

3000F_b 1.9E 1³/₄" WEST FRASER™ LVL Available sizes



3000F_b 1.9E WEST FRASER™ LVL Specified Strengths (Standard Term)

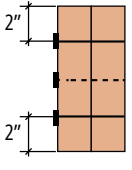
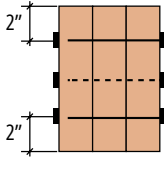
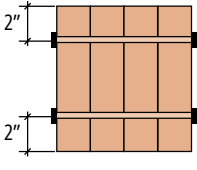
Modulus of Elasticity	E	=	1.9 x 10 ⁶ psi
Bending Stress	F _b	=	5544 psi
Shear (joist)	F _v	=	554 psi
Compression Perpendicular to Grain (joist)	F _{c(perp)}	=	1300 psi
Compression Parallel to Grain	F _{c(para)}	=	4000 psi

1. F_b based on 12" depths. For other depths, multiply by (12/d)^(1/7.35).
2. F_{c(perp)} and E shall not be increased for duration of load.

Multiple Member Connections For Side-Loaded Beams

Verify adequacy of beam in uniform load tables prior to using values listed below.

3000F_b 1.9E 1¾" WEST FRASER™ LVL

Maximum Uniform Load (PLF) Applied to Either Outside Member			 2-PLY LVL	 3-PLY LVL	 4-PLY LVL*
Connector	Spacing	Rows	Nails On One Side or Through Bolts	Nails Both Sides or Through Bolts	Through Bolts Only
16d (3½") Common Wire Nails	12" o.c.	2 Rows 3 Rows	827 1241	620 930	Not Applicable
	6" o.c.	2 Rows 3 Rows	1654 2482	1240 1860	Not Applicable
	4" o.c.	2 Rows 3 Rows	2481 3723	1860 2790	Not Applicable
½" A307 Through Bolts	24" o.c.	2 Rows	671	503	448
	12" o.c.	2 Rows	1342	1006	895
	6" o.c.	2 Rows	2684	2012	1790

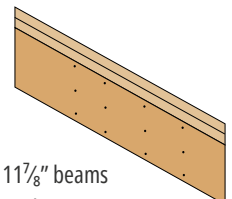
* 4-ply beams should only be side-loaded when loads are applied to both sides of the member.

1. Nails to be located a minimum of 2" from the top and bottom of the member with a minimum spacing of 2" between rows. Start all nails a minimum of 2½" in from ends.
2. Bolts are to be material conforming to ASTM Standard A307. Bolt holes are to be the same diameter as the bolt, and located 2" from the top and bottom of the member. Washers should be used under head and nut. Start all bolts a minimum of 2½" in from ends.
3. Values listed are for standard term loading.

Connection of Multiple Pieces for Top-Loading beams

1.9E (1¾" wide pieces)

- Minimum of 2 rows of 16d (3½") nails at 12" o.c. for 5½" through 11⅞" beams
- Minimum of 3 rows of 16d (3½") nails at 12" o.c. for 14" through 24" beams



FACTORED RESISTANCE TABLES

Pounds per lineal foot

General Notes

- Tables are for one-ply 1¾" beams. When properly connected, double the values for two-ply beams, triple for three. Minimum bearing lengths shown for one-ply will be the same for two-ply and three-ply. See page 11 for multiple-ply connection details.
- Resistances shown are the maximum factored and/or unfactored resistances, in pounds per lineal foot, that can be applied to the beam in addition to its own weight.
- Tables are based on uniform loads and the most restrictive of simple or continuous spans and dry-use conditions. Refer to West Fraser's sizing software for other loads or span configurations.
- Lateral support of beam compression edges is required at intervals of 24" o/c or closer.
- Lateral support of beams is required at bearing locations.
- West Fraser™ LVL beams are made without camber; therefore, in addition to complying with the deflection limits of the applicable building code, other deflection considerations, such as long term deflection under sustained loads (including creep), must be evaluated.
- All 16" and deeper beams are to be used in multiple member units only.
- Unfactored total load resistance is limited to a deflection of L/240. Unfactored live load resistance is based on a deflection of L/360. Check local code requirements for other deflection criteria.
- For an unfactored live load deflection limit of L/480, multiply UNFACTORED LOAD L/360 resistance by 0.75.
- Roof must have positive slope in order to prevent ponding.
- Spans of multiple spans must be at least 40% of adjacent span.
- Bearing lengths are based on 1300 psi specified strength for 3100Fb-2.0E Grade materials which cannot be increased for duration of load. Bearing length may need to be increased if support member's allowable bearing stress is less.
- Tables will accommodate beam slopes to a maximum of 2:12.
- Tables are in accordance with NBC 2020 and CSA 086-19.

Instructions For Use

1. Determine the factored total load and unfactored total and live load on the beam in pounds per lineal foot (plf).
2. Locate a span that meets or exceeds the required beam span, centre-to-centre of bearing.
3. Scan from left to right within the SPAN row until you find a cell where; (1) the UNFACTORED LOAD L/360 resistance meets or exceeds the unfactored live load, (2) the UNFACTORED LOAD L/240 resistance meets or exceeds the unfactored total load and (3) the FACTORED TOTAL LOAD resistance meets or exceeds the factored total load. All three rows must be checked and satisfied. Where no unfactored resistances are shown, factored total load will control.
4. To size a member for a span not shown, use capacities for the next larger span shown.

BEARING = Minimum End / Intermediate Bearing Length (inches)
 * All 16", 18" and 24" beam depths are to be used in multiple member units only.

Floor or Roof (Standard Term) – 1¾" Width

Span(ft)	Condition	5½"	7¼"	9¼"	9½"	11½"	11¾"	14"	16"	18"	24"
6	Unfactored Load LL (L/360)	290	627	1200	1286	2077	2245				
	Unfactored Load TL (L/240)	433	936	1795							
	Factored Total Load	904	1337	1802	1863	2391	2496	3145	3843	4645	7966
	BEARING	1.5/3.7	2.5/6.2	3.5/8.7	3.6/9.0	4.6/11.5	4.8/12.0	6.1/15.1	7.4/18.5	8.9/22.4	15.3/38.3
7	Unfactored Load LL (L/360)	187	409	798	858	1413	1533	2302			
	Unfactored Load TL (L/240)	188	610	1193	1282						
	Factored Total Load	663	1111	1488	1537	1952	2035	2531	3052	3633	5866
	BEARING	1.5/3.5	2.1/5.3	3.5/8.6	3.5/8.6	4.4/11.0	4.6/11.4	5.7/14.2	6.9/17.1	8.2/20.4	13.2/32.9
8	Unfactored Load LL (L/360)	127	281	555	598	999	1087	1658			
	Unfactored Load TL (L/240)	188	418	828	892	1493	1625				
	Factored Total Load	507	850	1268	1308	1649	1717	2117	2302	2983	4642
	BEARING	1.5/3.5	1.9/4.7	2.9/7.4	3.1/7.7	4.2/10.6	4.4/11.0	5.4/13.6	6.5/16.2	7.7/19.1	11.9/29.8
9	Unfactored Load LL (L/360)	90	201	401	431	729	795	1228			
	Unfactored Load TL (L/240)	132	297	596	643	1088	1187				
	Factored Total Load	400	671	1057	1111	1428	1484	1820	2161	2529	3839
	BEARING	1.5/3.5	1.7/4.2	2.6/6.5	2.7/6.9	3.9/9.8	4.2/10.4	5.3/13.1	6.2/15.6	7.3/18.3	11.1/27.7
10	Unfactored Load LL (L/360)	66	148	298	321	547	598	932			
	Unfactored Load TL (L/240)	97	219	442	477	815	890	1390			
	Factored Total Load	324	543	855	899	1258	1307	1595	1885	2195	3273
	BEARING	1.5/3.5	1.5/3.7	2.3/5.9	2.5/6.2	3.5/8.8	3.7/9.4	5.1/12.7	6.1/15.1	7.0/17.6	10.5/26.3
11	Unfactored Load LL (L/360)		112	227	245	420	459	722			
	Unfactored Load TL (L/240)		165	336	363	624	683	1075			
	Factored Total Load		448	706	742	1061	1126	1420	1031	1399	2828
	BEARING		1.5/3.5	2.1/5.3	2.2/5.6	3.2/8.0	3.4/8.5	4.6/11.6	5.9/14.8	6.8/17.1	10.1/25.2
12	Unfactored Load LL (L/360)		87	177	191	329	360	569			
	Unfactored Load TL (L/240)		127	261	282	488	534	847			
	Factored Total Load		176	593	623	890	946	1279	818	1117	2302
	BEARING		1.5/3.5	2.0/4.9	2.1/5.1	2.9/7.3	3.1/7.8	4.2/10.6	5.7/14.2	6.7/16.7	9.7/24.3
13	Unfactored Load LL (L/360)		69	140	152	262	287	456			
	Unfactored Load TL (L/240)		100	206	223	388	425	677			
	Factored Total Load		320	504	530	758	805	1095	659	905	1894
	BEARING		1.5/3.5	1.8/4.5	1.9/4.7	2.7/6.8	2.9/7.2	3.9/9.1	5.0/12.5	6.5/15.6	9.5/23.7
14	Unfactored Load LL (L/360)		55	113	122	212	233	371			
	Unfactored Load TL (L/240)		80	165	179	313	343	549			
	Factored Total Load		275	434	456	653	693	943	742	1104	1574
	BEARING		1.5/3.5	1.7/4.2	1.8/4.4	2.5/6.3	2.7/6.7	3.6/9.1	4.7/11.6	5.8/14.5	9.2/23.1
15	Unfactored Load LL (L/360)		45	93	100	174	191	305			
	Unfactored Load TL (L/240)		64	134	145	255	280	451			
	Factored Total Load		239	378	397	568	603	821	444	615	1321
	BEARING		1.5/3.5	1.6/3.9	1.6/4.1	2.3/5.9	2.5/6.2	3.4/8.5	4.3/10.9	5.4/13.5	9.1/22.7
16	Unfactored Load LL (L/360)			77	83	144	159	254			
	Unfactored Load TL (L/240)			110	119	211	232	374			
	Factored Total Load			331	348	498	529	720	371	515	1117
	BEARING			1.5/3.6	1.5/3.8	3.2/5.5	2.3/5.8	3.2/7.9	4.1/10.2	5.1/12.7	8.7/21.7
17	Unfactored Load LL (L/360)			64	69	121	133	214			
	Unfactored Load TL (L/240)			92	99	176	194	314			
	Factored Total Load			293	308	441	468	637	313	435	953
	BEARING			1.5/3.5	1.5/3.6	2.1/5.1	2.2/5.5	3.0/7.4	4.61	644	1417
18	Unfactored Load LL (L/360)			54	59	103	113	181			
	Unfactored Load TL (L/240)			77	83	148	163	265			
	Factored Total Load			261	274	393	417	568	818	1020	1607
	BEARING			1.5/3.5	1.5/3.5	1.9/4.9	2.1/5.2	2.8/7.0	3.8/9.6	4.8/11.9	8.2/20.4
19	Unfactored Load LL (L/360)				50	88	96	155			
	Unfactored Load TL (L/240)				70	126	138	226			
	Factored Total Load				246	352	374	509	266	371	818
	BEARING				1.5/3.5	1.8/4.6	2.0/4.9	2.7/6.6	3.91	547	1215
20	Unfactored Load LL (L/360)					75	83	134			
	Unfactored Load TL (L/240)					107	118	194			
	Factored Total Load					317	337	459			
	BEARING					1.7/4.4	1.9/4.6	2.5/6.3	729	909	1497
21	Unfactored Load LL (L/360)					65	72	116			
	Unfactored Load TL (L/240)					92	102	167			
	Factored Total Load					287	305	415	228	319	707
	BEARING					1.7/4.1	1.8/4.4	2.4/6.0	334	469	1049
22	Unfactored Load LL (L/360)					57	63	101			
	Unfactored Load TL (L/240)					80	88	145			
	Factored Total Load					261	277	378			
	BEARING					1.6/3.9	1.7/4.2	2.3/5.7	654	815	1397
23	Unfactored Load LL (L/360)						55	89			
	Unfactored Load TL (L/240)						76	127			
	Factored Total Load						253	345	228	319	707
	BEARING						1.6/4.0	2.2/5.4	3.6/9.0	4.5/11.2	7.7/19.3
24	Unfactored Load LL (L/360)							79			
	Unfactored Load TL (L/240)							111			
	Factored Total Load							316			
	BEARING							2.1/5.2	3.4/8.5	4.3/10.6	7.3/18.2
26	Unfactored Load LL (L/360)							62			
	Unfactored Load TL (L/240)							86			
	Factored Total Load							268			
	BEARING							1.9/4.8	2.7/6.7	3.3/8.4	5.7/14.4
28	Unfactored Load LL (L/360)							50			
	Unfactored Load TL (L/240)							68			
	Factored Total Load							231			
	BEARING							1.8/4.4	2.3/5.7	2.8/7.1	4.9/12.3
30	Unfactored Load LL (L/360)										
	Unfactored Load TL (L/240)										
	Factored Total Load								60	85	197
	BEARING								2.1/5.3	2.7/6.6	4.6/11.4

3000F_b 1.8E WEST FRASER™ LVL

1½" THICK HEADER & BEAMS

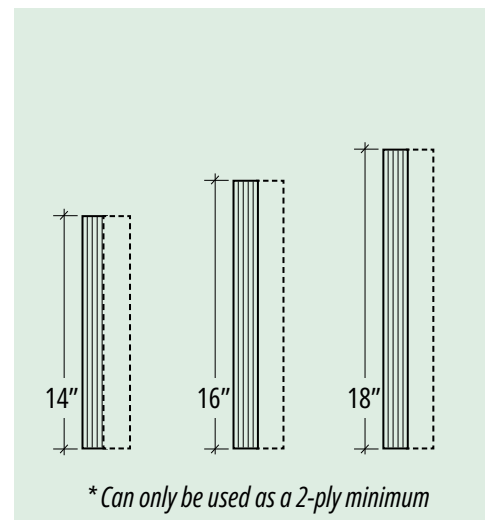
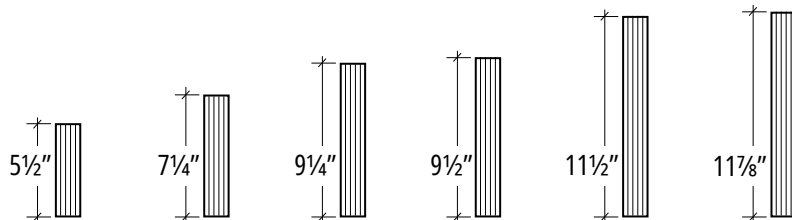
Design Properties

3000F_b 1.8E 1½" WEST FRASER™ LVL Factored Resistances (Standard Term)

Design Property	Depth								
	5½"	7¼"	9¼"	9½"	11½"	11⅞"	14"	16"	18"
Moment (ft. lbs.)	3497	5852	9215	9684	13827	14679	19951	25590	31872
Shear (lbs.)	2653	3497	4462	4583	5548	5729	6754	7718	8683
Moment of Inertia (in ⁴)	21	48	99	107	190	209	343	512	729
Weight (lbs./lin. Ft.)	2.1	2.8	3.6	3.7	4.4	4.6	5.4	6.2	6.9

1. Lateral support of beam compression edge is required at intervals of 24" o/c or closer.
2. Lateral support of beam is required at bearing locations.
3. All 14", 16" and 18" beam depths are to be used in multiple member units only (1½" thick)

3000F_b 1.8E 1½" WEST FRASER™ LVL Available sizes



3000F_b 1.8E WEST FRASER™ LVL Specified Strengths (Standard Term)

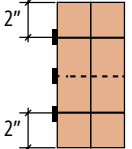
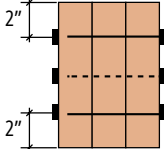
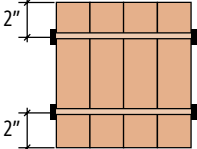
Modulus of Elasticity	E	=	1.9 x 10 ⁶ psi
Bending Stress	F _b	=	5544 psi
Shear (joist)	F _v	=	536 psi
Compression Perpendicular to Grain (joist)	F _{c(perp)}	=	1365 psi
Compression Parallel to Grain	F _{c(para)}	=	3750 psi

1. F_b based on 12" depths. For other depths, multiply by (12/d)^(1/7.35).
2. F_{c(perp)} and E shall not be increased for duration of load.

Multiple Member Connections For Side-Loaded Beams

Verify adequacy of beam in uniform load tables prior to using values listed below.

3000F_b 1.8 E 1½" WEST FRASER™ LVL

Maximum Uniform Load (PLF) Applied to Either Outside Member			 2-PLY LVL	 3-PLY LVL	 4-PLY LVL*
Connector	Spacing	Rows	Nails On One Side or Through Bolts	Nails Both Sides or Through Bolts	Through Bolts Only
16d (3½") Common Wire Nails	12" o.c.	2 Rows 3 Rows	698 1047	524 785	Not Applicable
	6" o.c.	2 Rows 3 Rows	1396 2094	1048 1570	Not Applicable
	4" o.c.	2 Rows 3 Rows	2094 3141	1572 2355	Not Applicable
½" A307 Through Bolts	24" o.c.	2 Rows	575	432	384
	12" o.c.	2 Rows	1150	863	767
	6" o.c.	2 Rows	2300	1726	1534

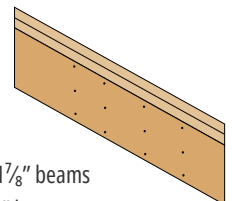
* 4-ply beams should only be side-loaded when loads are applied to both sides of the member.

1. Nails to be located a minimum of 2" from the top and bottom of the member with a minimum spacing of 2" between rows. Start all nails a minimum of 2½" in from ends.
2. Bolts are to be material conforming to ASTM Standard A307. Bolt holes are to be the same diameter as the bolt, and located 2" from the top and bottom of the member. Washers should be used under head and nut. Start all bolts a minimum of 2½" in from ends.
3. Values listed are for standard term loading.

Connection of Multiple Pieces for Top-Loading beams

1.8E (1½" wide pieces)

- Minimum of 2 rows of 10d (3") nails at 12" o.c. for 5½" through 11⅞" beams
- Minimum of 3 rows of 10d (3") nails at 12" o.c. for 14" through 18" beams



FACTORED RESISTANCE TABLES

Pounds per lineal foot

General Notes

- Tables are for one-ply 1½" beams. When properly connected, double the values for two-ply beams, triple for three. Minimum bearing lengths shown for one-ply will be the same for two-ply and three-ply. See page 15 for multiple-ply connection details.
- Resistances shown are the maximum factored and/or unfactored resistances, in pounds per lineal foot, that can be applied to the beam in addition to its own weight.
- Tables are based on uniform loads and the most restrictive of simple or continuous spans and dry-use conditions. Refer to West Fraser's sizing software for other loads or span configurations.
- Lateral support of beam compression edges is required at intervals of 24" o/c or closer.
- Lateral support of beams is required at bearing locations.
- West Fraser™ LVL beams are made without camber; therefore, in addition to complying with the deflection limits of the applicable building code, other deflection considerations, such as long term deflection under sustained loads (including creep), must be evaluated.
- All 14" and deeper beams are to be used in multiple member units only.
- Unfactored total load resistance is limited to a deflection of L/240. Unfactored live load resistance is based on a deflection of L/360. Check local code requirements for other deflection criteria.
- For an unfactored live load deflection limit of L/480, multiply UNFACTORED LOAD L/360 resistance by 0.75.
- Roof must have positive slope in order to prevent ponding.
- Spans of multiple spans must be at least 40% of adjacent span.
- Bearing lengths are based on 1365 psi specified strength for 1.8E Grade materials which cannot be increased for duration of load. Bearing length may need to be increased if support member's allowable bearing stress is less.
- Tables will accommodate beam slopes to a maximum of 2:12.
- Tables are in accordance with NBC 2020 and CSA 086-19.

Instructions For Use

1. Determine the factored total load and unfactored total and live load on the beam in pounds per lineal foot (plf).
2. Locate a span that meets or exceeds the required beam span, centre-to-centre of bearing.
3. Scan from left to right within the SPAN row until you find a cell where; (1) the UNFACTORED LOAD L/360 resistance meets or exceeds the unfactored live load, (2) the UNFACTORED LOAD L/240 resistance meets or exceeds the unfactored total load and (3) the FACTORED TOTAL LOAD resistance meets or exceeds the factored total load. All three rows must be checked and satisfied. Where no unfactored resistances are shown, factored total load will control.
4. To size a member for a span not shown, use capacities for the next larger span shown.

BEARING = Minimum End / Intermediate Bearing Length (inches)
 * All 14", 16" and 18" beam depths are to be used in multiple member units only.

Floor or Roof (Standard Term) – 1½” Width

Span(ft)	Condition	5½”	7¼”	9¼”	9½”	11¼”	11½”	14”	16”*	18”*
6	Unfactored Load LL (L/360)	236	509	974	1044	1686	1823			
	Unfactored Load TL (L/240)	351	760	1458						
	Factored Total Load	775	1109	1494	1545	1983	2071	2609	3188	3852
	BEARING	1.5/3.5	2.0/5.1	2.7/8.7	2.8/7.1	3.6/9.1	3.8/9.5	4.8/11.9	5.8/14.6	7.1/17.6
7	Unfactored Load LL (L/360)	152	332	648	696	1148	1245	1869		
	Unfactored Load TL (L/240)	225	496	969	1041					
	Factored Total Load	569	925	1235	1275	1619	1688	2100	2531	3013
	BEARING	1.5/3.5	2.0/4.9	2.6/6.6	2.7/6.8	3.5/8.6	3.6/9.0	4.5/11.2	5.4/13.5	6.4/16.1
8	Unfactored Load LL (L/360)	103	228	451	485	811	883	1347	1869	2466
	Unfactored Load TL (L/240)	153	339	673	724	1213	1320			
	Factored Total Load	435	729	1052	1085	1368	1424	1756	2099	2474
	BEARING	1.5/3.5	1.8/4.5	2.6/6.4	2.6/6.6	3.3/8.4	3.5/8.7	4.3/10.7	5.1/12.8	6.0/15.1
9	Unfactored Load LL (L/360)	73	163	325	350	592	646	997	1401	1869
	Unfactored Load TL (L/240)	108	242	484	522	884	964	1491		
	Factored Total Load	343	575	907	945	1184	1231	1509	1792	2098
	BEARING	1.5/3.5	1.6/3.9	2.5/6.2	2.6/6.5	3.3/8.1	3.4/8.5	4.1/10.4	4.9/12.3	5.8/14.4
10	Unfactored Load LL (L/360)	54	120	242	261	444	485	757	1072	1445
	Unfactored Load TL (L/240)	78	178	359	387	662	723	1129		
	Factored Total Load	278	465	734	771	1044	1084	1323	1564	1821
	BEARING	1.5/3.5	1.5/3.5	2.2/5.6	2.4/5.9	3.2/8.0	3.3/8.3	4.0/10.1	4.8/11.9	5.6/13.9
11	Unfactored Load LL (L/360)		91	184	199	341	373	586	837	1136
	Unfactored Load TL (L/240)		134	273	295	507	555	874	1249	
	Factored Total Load		384	606	637	910	966	1178	1387	1609
	BEARING		1.5/3.5	2.0/5.1	2.1/5.3	3.1/7.6	3.2/8.1	4.0/9.9	4.7/11.6	5.4/13.5
12	Unfactored Load LL (L/360)		71	144	155	267	292	462	664	907
	Unfactored Load TL (L/240)		103	212	229	396	434	688	990	1354
	Factored Total Load		322	508	534	764	811	1061	1245	1440
	BEARING		1.5/3.5	1.9/4.7	2.0/4.9	2.8/7.0	3.0/7.4	3.9/9.7	4.6/11.4	5.3/13.2
13	Unfactored Load LL (L/360)		56	114	123	213	233	375	535	735
	Unfactored Load TL (L/240)		81	167	181	315	345	550	796	1095
	Factored Total Load		274	433	455	650	690	939	1130	1304
	BEARING		1.5/3.5	1.7/4.3	1.8/4.5	2.6/6.4	2.7/6.8	3.5/8.6	4.5/11.2	5.2/12.9
14	Unfactored Load LL (L/360)		45	92	99	172	189	301	437	602
	Unfactored Load TL (L/240)		65	134	145	254	279	446	649	896
	Factored Total Load		236	373	392	560	595	809	1035	1191
	BEARING		1.5/3.5	1.6/4.0	1.7/4.2	2.4/6.0	2.5/6.4	3.5/8.6	4.4/11.1	5.1/12.7
15	Unfactored Load LL (L/360)		37	75	81	141	155	248	361	499
	Unfactored Load TL (L/240)		52	109	118	208	228	367	535	742
	Factored Total Load		205	324	341	487	517	704	904	1096
	BEARING		1.5/3.5	1.5/3.7	1.6/3.9	2.2/5.6	2.4/5.9	3.2/8.1	4.1/10.3	5.0/12.5
16	Unfactored Load LL (L/360)			62	67	117	129	206	301	418
	Unfactored Load TL (L/240)			90	97	172	188	304	446	620
	Factored Total Load			284	299	428	454	618	794	875
	BEARING			1.5/3.5	1.5/3.7	2.1/5.2	2.2/5.5	3.0/7.5	3.9/9.7	4.8/12.1
17	Unfactored Load LL (L/360)			52	56	98	108	174	254	353
	Unfactored Load TL (L/240)			75	81	143	157	255	375	523
	Factored Total Load			252	264	378	402	547	702	875
	BEARING			1.5/3.5	1.5/3.5	2.0/4.9	2.1/5.2	2.8/7.1	3.6/9.1	4.5/11.4
18	Unfactored Load LL (L/360)			44	48	83	91	147	216	301
	Unfactored Load TL (L/240)			62	68	121	133	216	318	445
	Factored Total Load			224	235	337	358	487	626	780
	BEARING			1.5/3.5	1.5/3.5	1.9/4.6	2.0/4.9	2.7/6.7	3.4/8.6	4.3/10.7
19	Unfactored Load LL (L/360)				41	71	78	126	185	259
	Unfactored Load TL (L/240)				57	102	113	184	271	381
	Factored Total Load				211	302	321	437	561	699
	BEARING				1.5/3.5	1.8/4.4	1.9/4.7	2.5/6.3	3.3/8.1	4.1/10.1
20	Unfactored Load LL (L/360)					61	67	109	160	224
	Unfactored Load TL (L/240)					87	96	158	233	329
	Factored Total Load					272	289	394	506	630
	BEARING					1.7/4.2	1.8/4.4	2.4/6.0	3.1/7.7	3.8/9.6
21	Unfactored Load LL (L/360)					53	58	94	139	195
	Unfactored Load TL (L/240)					75	83	136	202	285
	Factored Total Load					246	262	357	458	571
	BEARING					1.6/3.9	1.6/4.0	2.3/5.7	2.9/7.3	3.7/9.2
22	Unfactored Load LL (L/360)					46	51	82	121	170
	Unfactored Load TL (L/240)					65	72	118	176	249
	Factored Total Load					224	238	324	417	520
	BEARING					1.5/3.8	1.6/4.0	2.2/5.4	2.8/7.0	3.5/8.7
23	Unfactored Load LL (L/360)						45	72	107	150
	Unfactored Load TL (L/240)						62	103	154	218
	Factored Total Load						217	296	381	475
	BEARING						1.5/3.8	2.1/5.2	2.7/6.7	3.3/8.3
24	Unfactored Load LL (L/360)						64	94	133	192
	Unfactored Load TL (L/240)						90	135	192	270
	Factored Total Load						272	349	436	543
	BEARING						2.0/5.0	2.6/6.4	3.2/8.0	
26	Unfactored Load LL (L/360)						50	75	106	151
	Unfactored Load TL (L/240)						70	106	151	211
	Factored Total Load						231	297	370	466
	BEARING						1.8/4.6	2.4/5.9	2.9/7.3	
28	Unfactored Load LL (L/360)						41	60	85	120
	Unfactored Load TL (L/240)						55	84	120	168
	Factored Total Load						198	255	318	396
	BEARING						1.7/4.2	2.2/5.4	2.7/6.8	
30	Unfactored Load LL (L/360)							49	69	97
	Unfactored Load TL (L/240)							67	97	136
	Factored Total Load							221	276	376
	BEARING							2.0/5.1	2.5/6.3	

3000F_b 1.8E WEST FRASER™ LVL

1¾" THICK HEADER & BEAMS

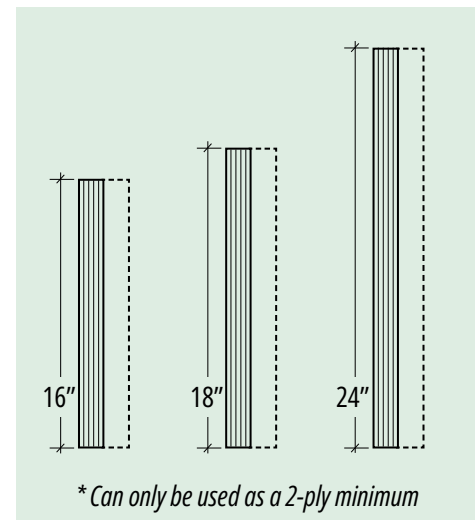
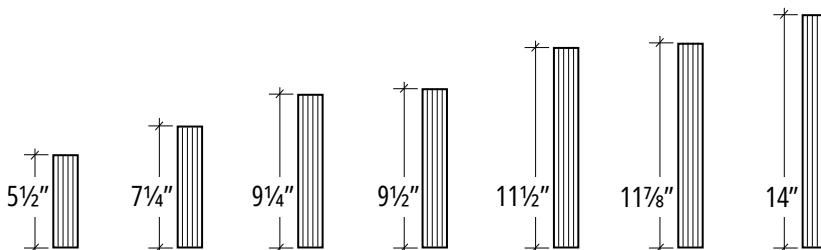
Design Properties

3000F_b 1.8E 1¾" WEST FRASER™ LVL Factored Resistances (Standard Term)

Design Property	Depth									
	5½"	7¼"	9¼"	9½"	11½"	11⅞"	14"	16"	18"	24"
Moment (ft. lbs.)	4079	6827	10751	11299	16132	17126	23277	29855	37184	63568
Shear (lbs.)	3095	4080	5206	5347	6472	6683	7879	9005	10130	13507
Moment of Inertia (in ⁴)	24	56	115	125	222	244	400	597	851	2016
Weight (lbs./lin. Ft.)	2.5	3.3	4.2	4.3	5.2	5.3	6.3	7.2	8.1	10.8

1. Lateral support of beam compression edge is required at intervals of 24" o/c or closer.
2. Lateral support of beam is required at bearing locations.
3. All 16" and greater beam depths are to be used in multiple member units only.

3000F_b 1.8E 1¾" WEST FRASER™ LVL Available sizes



3000F_b 1.8E WEST FRASER™ LVL Allowable design stresses

Modulus of Elasticity	E	=	1.8 x 10 ⁶ psi
Bending Stress	F _b	=	5544 psi
Shear (joist)	F _v	=	536 psi
Compression Perpendicular to Grain (joist)	F _{c(perp)}	=	1365 psi
Compression Parallel to Grain	F _{c(para)}	=	3750 psi

1. F_b based on 12" depths. For other depths, multiply by (12/d)^(1/7.35).
2. F_{c(perp)} and E shall not be increased for duration of load.

3½" THICK HEADER & BEAMS

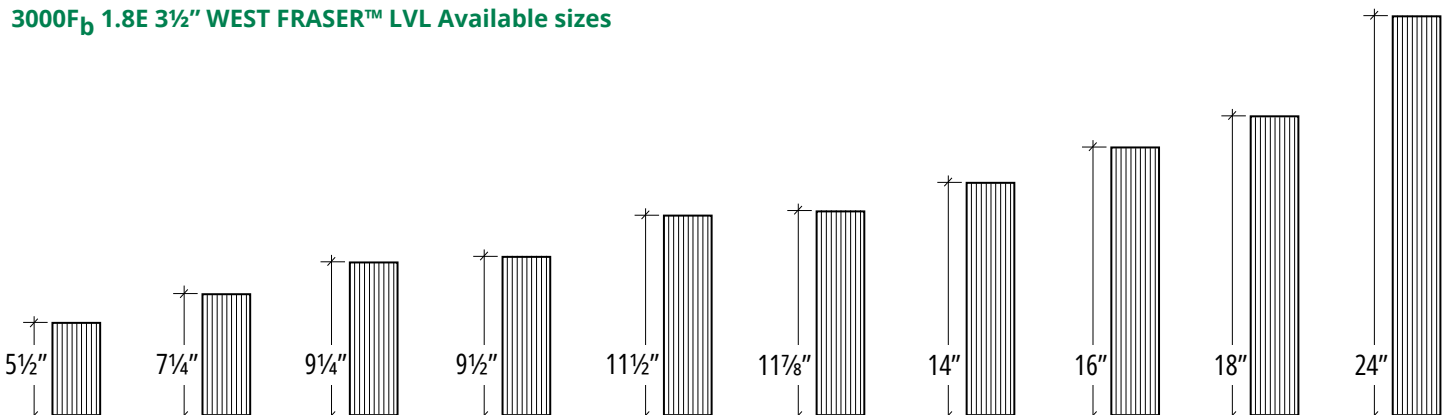
Design Properties

3000F_b 1.8E 3½" WEST FRASER™ LVL Factored Resistances (Standard Term)

Design Property	Depth									
	5½"	7¼"	9¼"	9½"	11½"	11⅞"	14"	16"	18"	24"
Moment (ft. lbs.)	8159	13654	21501	22597	32264	34252	46553	59709	74368	127136
Shear (lbs.)	6191	8161	10412	10693	12944	13367	15758	18010	20261	27014
Moment of Inertia (in ⁴)	49	111	231	250	444	488	800	1195	1701	4032
Weight (lbs./lin. Ft.)	4.9	6.5	8.3	8.5	10.3	10.7	12.6	14.4	16.2	21.6

1. Lateral support of beam compression edge is required at intervals of 24" o/c or closer.
2. Lateral support of beam is required at bearing locations.

3000F_b 1.8E 3½" WEST FRASER™ LVL Available sizes



FACTORED RESISTANCE TABLES

Pounds per lineal foot

General Notes

- Tables are for one-ply 13/4" beams. When properly connected, double the values for two-ply beams, triple for three. Minimum bearing lengths shown for one-ply will be the same for two-ply and three-ply. See page 22 for multiple-ply connection details.
- Resistances shown are the maximum factored and/or unfactored resistances, in pounds per lineal foot, that can be applied to the beam in addition to its own weight.
- Tables are based on uniform loads and the most restrictive of simple or continuous spans and dry-use conditions. Refer to West Fraser's sizing software for other loads or span configurations.
- Lateral support of beam compression edges is required at intervals of 24" o/c or closer.
- Lateral support of beams is required at bearing locations.
- West Fraser™ LVL beams are made without camber; therefore, in addition to complying with the deflection limits of the applicable building code, other deflection considerations, such as long term deflection under sustained loads (including creep), must be evaluated.
- All 16" and deeper beams are to be used in multiple member units only.
- Unfactored total load resistance is limited to a deflection of L/240. Unfactored live load resistance is based on a deflection of L/360. Check local code requirements for other deflection criteria.
- For an unfactored live load deflection limit of L/480, multiply UNFACTORED LOAD L/360 resistance by 0.75.
- Roof must have positive slope in order to prevent ponding.
- Spans of multiple spans must be at least 40% of adjacent span.
- Bearing lengths are based on 1365 psi specified strength for 1.8E Grade materials which cannot be increased for duration of load. Bearing length may need to be increased if support member's allowable bearing stress is less.
- Tables will accommodate beam slopes to a maximum of 2:12.
- Tables are in accordance with NBC 2020 and CSA 086-19.

Instructions For Use

1. Determine the factored total load and unfactored total and live load on the beam in pounds per lineal foot (plf).
2. Locate a span that meets or exceeds the required beam span, centre-to-centre of bearing.
3. Scan from left to right within the SPAN row until you find a cell where; (1) the UNFACTORED LOAD L/360 resistance meets or exceeds the unfactored live load, (2) the UNFACTORED LOAD L/240 resistance meets or exceeds the unfactored total load and (3) the FACTORED TOTAL LOAD resistance meets or exceeds the factored total load. All three rows must be checked and satisfied. Where no unfactored resistances are shown, factored total load will control.
4. To size a member for a span not shown, use capacities for the next larger span shown.

BEARING = Minimum End / Intermediate Bearing Length (inches)
 * All 16", 18" and 24" beam depths are to be used in multiple member units only.

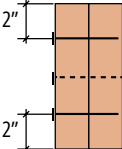
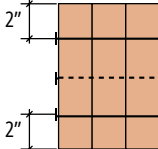
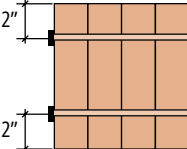
Floor or Roof (Standard Term) – 1¾” Width

Span(ft)	Condition	5½”	7¼”	9¼”	9½”	11½”	11¾”	14”	16”*	18”*	24”*
6	Unfactored Load LL (L/360)	275	594	1137	1218	1967	2126				
	Unfactored Load TL (L/240)	410	887	1701							
	Factored Total Load	904	1294	1743	1803	2313	2416	3044	3719	4494	7708
	BEARING	1.5/3.5	2.0/5.1	2.7/6.8	2.8/7.1	3.6/9.1	3.8/9.5	4.8/11.9	5.8/14.6	7.1/17.6	12.1/30.3
7	Unfactored Load LL (L/360)	177	388	756	812	1339	1453	2181			
	Unfactored Load TL (L/240)	263	578	1131	1214						
	Factored Total Load	664	1079	1440	1488	1889	1969	2450	2953	3516	5676
	BEARING	1.5/3.5	2.0/4.9	2.6/6.6	2.7/6.8	3.5/8.6	3.6/9.0	4.5/11.2	5.4/13.5	6.4/16.1	10.4/26.0
8	Unfactored Load LL (L/360)	120	266	526	566	947	1330	1571			
	Unfactored Load TL (L/240)	178	396	785	845	1415	1539				
	Factored Total Load	507	850	1227	1266	1596	1661	2049	2449	2886	4492
	BEARING	1.5/3.5	1.8/4.4	2.6/6.4	2.6/6.6	3.3/8.4	3.5/8.7	4.3/10.7	5.1/12.8	6.0/15.1	9.4/23.5
9	Unfactored Load LL (L/360)	85	190	379	409	691	753	1163			
	Unfactored Load TL (L/240)	126	282	565	609	1031	1125	1739			
	Factored Total Load	400	671	1058	1102	1382	1436	1761	2091	2448	3715
	BEARING	1.5/3.5	1.6/4.0	2.5/6.2	2.6/6.5	3.3/8.1	3.4/8.5	4.1/10.4	4.9/12.3	5.8/14.4	8.7/21.9
10	Unfactored Load LL (L/360)	63	140	282	304	518	566	883			
	Unfactored Load TL (L/240)	92	207	419	452	772	844	1318			
	Factored Total Load	324	543	856	900	1218	1265	1544	1824	2125	3167
	BEARING	1.5/3.5	1.5/3.6	2.2/5.6	2.4/5.9	3.2/8.0	3.3/8.3	4.0/10.1	4.8/11.9	5.6/13.9	8.3/20.7
11	Unfactored Load LL (L/360)		106	215	232	398	435	684			
	Unfactored Load TL (L/240)		156	318	344	592	647	1019			
	Factored Total Load		448	707	743	1061	1127	1374			
	BEARING		1.5/3.5	2.0/5.1	2.1/5.3	3.1/7.6	3.2/8.1	4.0/9.9	4.7/11.6	5.4/13.5	7.9/19.9
12	Unfactored Load LL (L/360)		83	168	181	312	341	539			
	Unfactored Load TL (L/240)		121	247	267	462	506	803			
	Factored Total Load		376	593	623	891	946	1238			
	BEARING		1.5/3.5	1.9/4.7	2.0/4.9	2.8/7.0	3.0/7.4	3.9/9.7	4.6/11.4	5.3/13.2	7.7/19.2
13	Unfactored Load LL (L/360)		65	133	144	248	272	432			
	Unfactored Load TL (L/240)		95	195	211	368	403	642			
	Factored Total Load		320	505	531	758	805	1096			
	BEARING		1.5/3.5	1.7/4.3	1.8/4.5	2.6/6.4	2.7/6.8	3.7/9.3	4.5/11.2	5.2/12.9	7.5/18.7
14	Unfactored Load LL (L/360)		53	107	116	201	220	351			
	Unfactored Load TL (L/240)		75	157	169	296	325	521			
	Factored Total Load		275	435	457	953	694	944			
	BEARING		1.5/3.5	1.6/4.0	1.7/4.2	2.4/6.0	2.5/6.4	3.5/8.6	4.4/11.1	5.1/12.7	7.3/18.2
15	Unfactored Load LL (L/360)		43	88	95	165	181	289			
	Unfactored Load TL (L/240)		61	127	138	242	266	428			
	Factored Total Load		239	378	397	568	604	821			
	BEARING		1.5/3.5	1.5/3.7	1.6/3.9	2.2/5.6	2.4/5.9	3.4/8.1	4.1/10.3	5.0/12.5	7.1/17.9
16	Unfactored Load LL (L/360)			73	78	137	150	241			
	Unfactored Load TL (L/240)			105	113	200	220	355			
	Factored Total Load			332	349	499	530	721			
	BEARING			1.5/3.5	1.5/3.7	2.1/5.2	2.2/5.5	3.0/7.5	3.9/9.7	4.8/12.1	7.0/17.6
17	Unfactored Load LL (L/360)			61	66	115	126	203			
	Unfactored Load TL (L/240)			87	94	167	184	298			
	Factored Total Load			293	308	441	469	638			
	BEARING			1.5/3.5	1.5/3.5	2.0/4.9	2.1/5.2	2.8/7.1	3.6/9.1	4.5/11.4	6.9/17.3
18	Unfactored Load LL (L/360)			51	56	97	107	172			
	Unfactored Load TL (L/240)			73	79	141	155	252			
	Factored Total Load			261	275	393	418	568			
	BEARING			1.5/3.5	1.5/3.5	1.9/4.6	2.0/4.9	2.7/6.7	3.4/8.6	4.3/10.7	6.8/17.1
19	Unfactored Load LL (L/360)				47	83	91	147			
	Unfactored Load TL (L/240)				67	119	131	214			
	Factored Total Load				246	352	374	510			
	BEARING				1.5/3.5	1.7/4.4	1.9/4.6	2.5/6.3	3.3/8.1	4.1/10.1	6.7/16.9
20	Unfactored Load LL (L/360)				71	78	78	127			
	Unfactored Load TL (L/240)				102	112	112	184			
	Factored Total Load				317	337	337	459			
	BEARING				1.7/4.1	1.8/4.4	2.4/6.0	3.1/7.7	3.9/9.6	4.8/12.1	6.6/16.5
21	Unfactored Load LL (L/360)				62	68	68	110			
	Unfactored Load TL (L/240)				88	97	97	159			
	Factored Total Load				287	305	305	416			
	BEARING				1.6/3.9	1.7/4.2	2.3/5.7	2.9/7.3	3.7/9.1	4.5/11.4	6.3/15.7
22	Unfactored Load LL (L/360)				54	59	59	96			
	Unfactored Load TL (L/240)				76	84	84	138			
	Factored Total Load				261	278	278	378			
	BEARING				1.5/3.8	1.6/4.0	2.2/5.4	2.8/7.0	3.5/8.7	4.3/10.7	6.0/15.0
23	Unfactored Load LL (L/360)					52	52	84			
	Unfactored Load TL (L/240)					73	73	120			
	Factored Total Load					254	254	346			
	BEARING					1.5/3.8	2.1/5.2	2.7/6.7	3.3/8.3	4.0/10.1	5.7/14.3
24	Unfactored Load LL (L/360)					74	74	110			
	Unfactored Load TL (L/240)					105	105	158			
	Factored Total Load					317	317	407			
	BEARING					2.0/5.0	2.6/6.4	3.2/8.0	4.0/10.1	4.8/11.9	6.6/16.5
26	Unfactored Load LL (L/360)					59	59	87			
	Unfactored Load TL (L/240)					82	82	123			
	Factored Total Load					269	269	346			
	BEARING					1.8/4.6	2.4/5.9	2.9/7.3	3.5/8.7	4.3/10.7	6.0/15.0
28	Unfactored Load LL (L/360)					47	47	70			
	Unfactored Load TL (L/240)					65	65	98			
	Factored Total Load					231	231	297			
	BEARING					1.7/4.2	2.2/5.4	2.7/6.8	3.3/8.3	4.0/10.1	5.7/14.3
30	Unfactored Load LL (L/360)							57			
	Unfactored Load TL (L/240)							79			
	Factored Total Load							258			
	BEARING							2.0/5.1	2.5/6.3	3.0/7.5	4.3/10.9

Multiple Member Connections For Side-Loaded Beams

Verify adequacy of beam in uniform load tables prior to using values listed below.

3000F_b 1.8E 1¾" WEST FRASER™ LVL

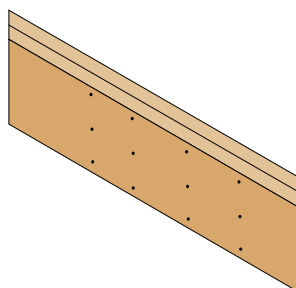
Maximum Uniform Load (PLF) Applied to Either Outside Member			 2-PLY LVL	 3-PLY LVL	 4-PLY LVL*
Connector	Spacing	Rows	Nails On One Side or Through Bolts	Nails Both Sides or Through Bolts	Through Bolts Only
16d (3½") Common Wire Nails	12" o.c.	2 Rows 3 Rows	827 1241	620 930	Not Applicable
	6" o.c.	2 Rows 3 Rows	1654 2482	1240 1860	Not Applicable
	4" o.c.	2 Rows 3 Rows	2481 3723	1860 2790	Not Applicable
½" A307 Through Bolts	24" o.c.	2 Rows	671	503	448
	12" o.c.	2 Rows	1342	1006	895
	6" o.c.	2 Rows	2684	2012	1790

* 4-ply beams should only be side-loaded when loads are applied to both sides of the member.

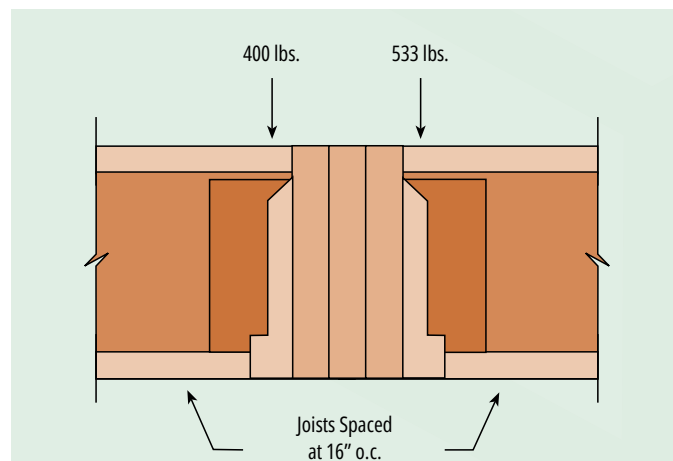
1. Nails to be located a minimum of 2" from the top and bottom of the member with a minimum spacing of 2" between rows. Start all nails a minimum of 2½" in from ends.
2. Bolts are to be material conforming to ASTM Standard A307. Bolt holes are to be the same diameter as the bolt, and located 2" from the top and bottom of the member. Washers should be used under head and nut. Start all bolts a minimum of 2½" in from ends.
3. Values listed are for standard term loading.

Connection of Multiple Pieces for Top-Loading beams

1.8E (1¾" wide pieces)



- Minimum of 2 rows of 16d (3½") nails at 12" o.c. for 5½" through 11¾" beams
- Minimum of 3 rows of 16d (3½") nails at 12" o.c. for 14" through 24" beams



Example

First, convert joist reactions to plf load on each side of the beam by taking the joist reaction (lbs.) divided by the joist spacing (ft.). 400 lbs./ (16/12) = 300 plf and 533 lbs./ (16/12) = 400 plf.

Check factored resistance tables to verify that 3 plys can carry the total factored load of 700 plf. The maximum load applied to either outside member is 400 plf. Use 2 rows of 16d (3½") common wire nails at 12" o.c. (good for 620 plf).

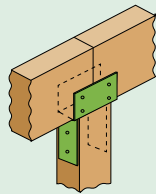
Columns: 3000f_b 1.8E

Allowable Axial Loads (LBS)

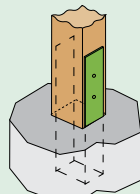
1. Loads are based on the allowable crushing of the LVL material, i.e., steel bearing connections.

Column Length (ft)	3½" x 3½"	3½" x 4¾"	3½" x 5½"	3½" x 7¼"	3½" x 8¾"
3	25500	30050	34800	41000	44600
4	23000	27000	31400	37000	40600
5	19900	23400	27400	32700	36000
6	16800	19900	23400	28200	31400
7	14000	16650	19700	24000	26900
8	11550	13850	16550	20300	23000
9	9550	11500	13850	17150	19550
10	7900	9600	11600	14500	16600
12	5450	6600	8150	10350	11950
14	3820	4700	5800	7440	8650

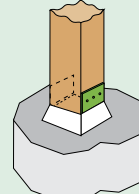
Column Details



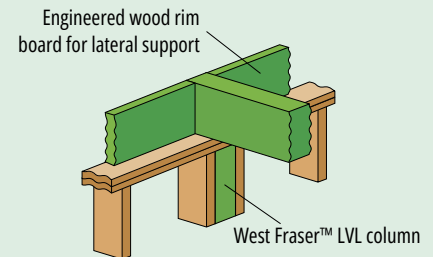
BEAM ON COLUMN CAP



COLUMN BASE



ELEVATED COLUMN BASE



BEAM ON COLUMN

Allowable Axial Loads (LBS) - Wood Plate Bearing Connections

Column Length (ft)	3½" x 3½"	3½" x 4¾"	3½" x 5½"	3½" x 7¼"	3½" x 8¾"
3-9	7526	9408	11827	15590	18547
10	7526	9408	11600	14500	16600
12	5450	6660	8150	10350	11950
14	3820	4700	5800	7440	8650

1. Loads are based on the allowable crushing of a wood plate (SPF, any grade), F_{CP} = 768 psi.

General Notes:

- Tables apply to solid, one-piece members only.
- Tables assumes that columns are unbraced, except at column ends.
- Column members to be used in dry service conditions only.
- Column length is the distance between the centers of restraining members.
- Tables include an eccentricity equal to 1/6 of the larger column dimension (thickness or width).
- Loads are based on simple axial loaded columns. For side loads or other combined bending and axial loads, see the provisions of CSA 086-19.
- Factored resistances are based on standard term loading.

2750F_b 1.7E WEST FRASER™ LVL

1³/₄" THICK HEADER & BEAMS

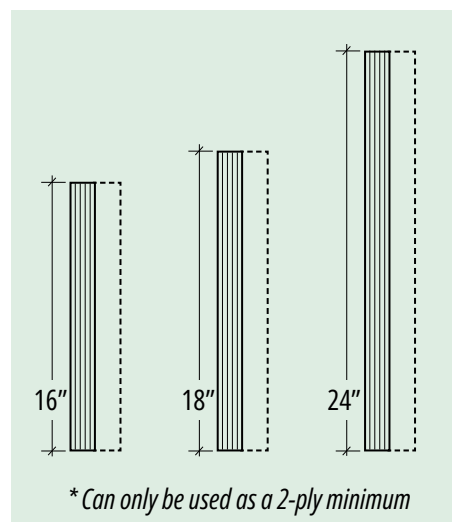
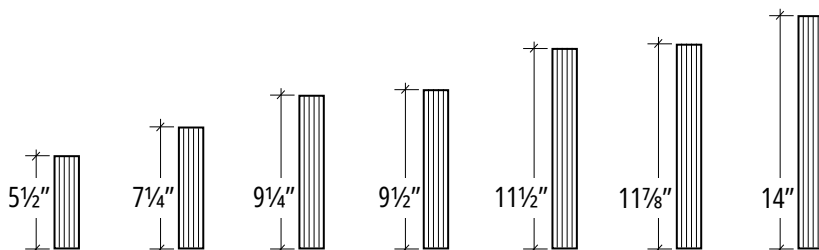
Design Properties

2750F_b 1.7E 1³/₄" WEST FRASER™ LVL Factored Resistances (Standard Term)

Design Property	Depth									
	5½"	7¼"	9¼"	9½"	11½"	11⅞"	14"	16"	18"	24"
Moment (ft. lbs.)	3667	6180	9791	10297	14772	15695	21419	27564	34432	59287
Shear (lbs.)	3095	4080	5206	5347	6472	6683	7879	9005	10130	13507
Moment of Inertia (in ⁴)	24	56	115	125	222	244	400	597	851	2016
Weight (lbs./lin. Ft.)	2.5	3.3	4.2	4.3	5.2	5.3	6.3	7.2	8.1	10.8

1. Lateral support of beam compression edge is required at intervals of 24" o/c or closer.
2. Lateral support of beam is required at bearing locations.
3. All 16" and greater beam depths are to be used in multiple member units only.

2750F_b 1.7E 1³/₄" WEST FRASER™ LVL Available sizes





3½” THICK HEADER & BEAMS

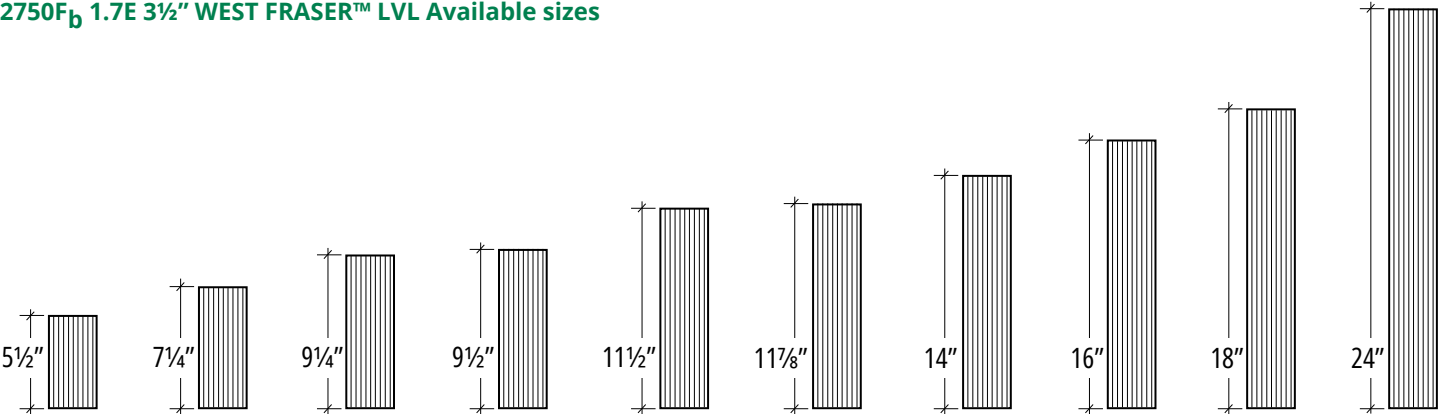
Design Properties

2750F_b 1.7E 3½” WEST FRASER™ LVL Allowable design values

Design Property	Depth									
	5½”	7¼”	9¼”	9½”	11½”	11⅞”	14”	16”	18”	24”
Moment (ft. lbs.)	7335	12360	19582	20592	29544	31390	42838	55128	68864	118573
Shear (lbs.)	6191	8161	10412	10693	12944	13367	15758	18010	20261	27014
Moment of Inertia (in^4)	49	112	231	250	444	488	800	1195	1701	4032
Weight (lbs./lin. Ft.)	4.9	6.5	8.3	8.5	10.3	10.7	12.6	14.4	16.2	21.6

1. Lateral support of beam compression edge is required at intervals of 24” o/c or closer.
2. Lateral support of beam is required at bearing locations.

2750F_b 1.7E 3½” WEST FRASER™ LVL Available sizes

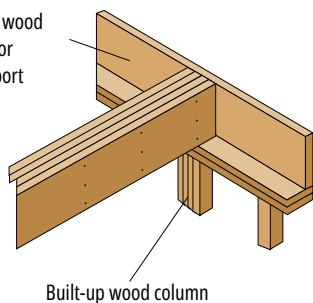


MISC DETAILS & SOFTWARE INFORMATION

Bearing Details

B1 BEARING AT WALL

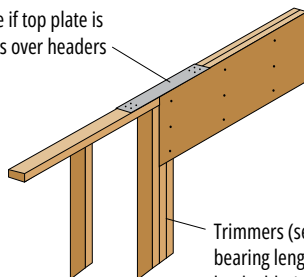
Engineered wood rim board for lateral support



Built-up wood column

B2 BEARING FOR DOOR OR WINDOW HEADER

Strap per code if top plate is not continuous over headers

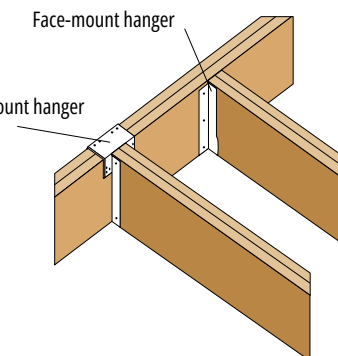


Trimmers (see minimum bearing lengths from uniform load tables)

B3 BEAM-TO-BEAM CONNECTION

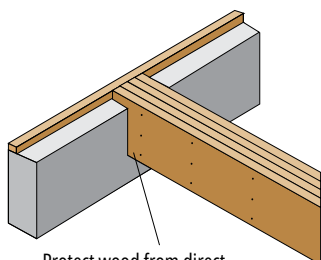
Face-mount hanger

Top-mount hanger



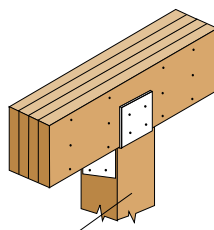
B4 BEARING AT CONCRETE WALL

Protect wood from direct contact with concrete

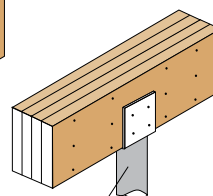


B5 BEARING AT WOOD OR STEEL COLUMN

Verify column capacity and bearing length.



Wood column with column cap



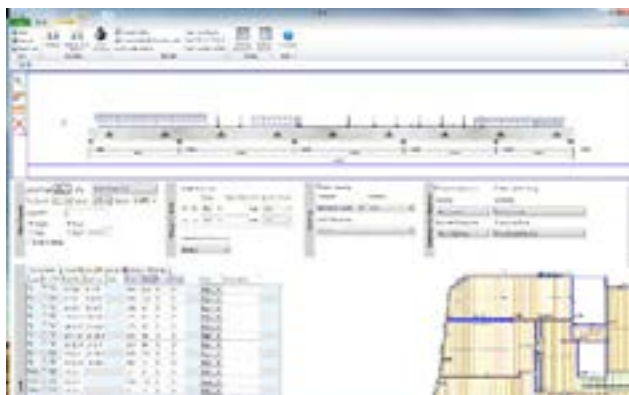
Steel column with column cap

Bearing length is extremely critical and must be considered for each application.

Multiple pieces of West Fraser™ LVL can be nailed or bolted together to form a header or beam of the required size, up to a maximum width of 5 inches for 1 1/4" wide pieces and 7 inches for 1 3/4" wide pieces. See pages 8, 11, 15 and 22 for details.

Our Software

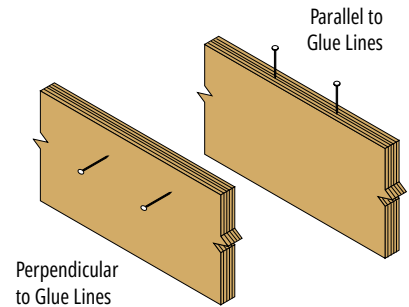
West Fraser provides its LVL customers with quality design software. Using the latest technology it's fast and reliable, providing you with an easy to understand output. Our software will enhance your in-house design capabilities and productivity.



Minimum Nail Spacing

Connector	Nailing Parallel to Glue Line	Nailing Perpendicular to Glue Line
8d Box	3"	2"
8d Common	3"	2"
10d and 12d Box	4"	2"
10d and 12d Common	4"	3"
16d Common	8"*	3"

*Not allowed on product thickness less than 1½"



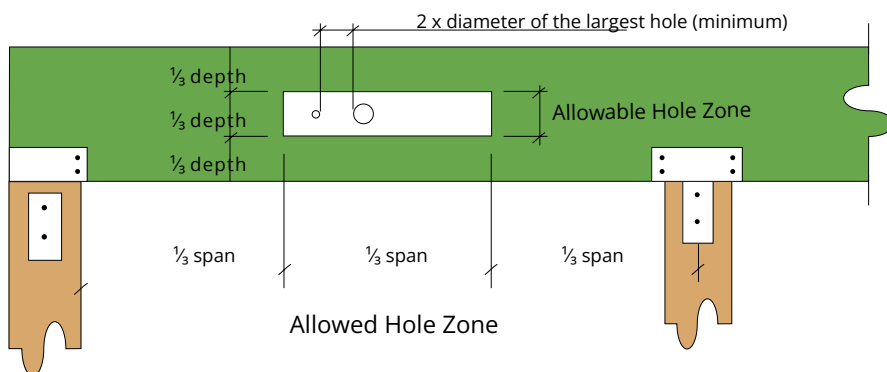
Our Weather Resistant Coating



Photo shows example of the beading that occurs because of our coating process.

One of the inherent problems with LVL is its inability to resist the effects of moisture. West Fraser addresses this problem by coating all our LVL beams and headers with a protective sealer. This sealer gives our LVL superior resistance to warping, cupping, and swelling compared to other unprotected competitive products. While this coating is not intended to provide long-term protection, it does improve protection against the moisture associated with the construction process.

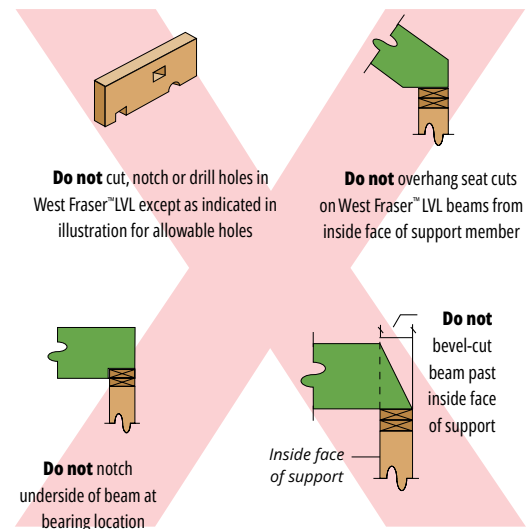
Allowable Holes



General Notes:

The Allowed Hole Zone in this chart is suitable for **Uniformly loaded beams** using maximum loads for any tables listed. For other load conditions or hole configurations, please contact West Fraser.

If more than one hole is to be cut in the beam, the length of the uncut beam between holes must be a minimum of twice the diameter of the largest hole.



Rectangular holes are not allowed. Holes in cantilevers require additional analysis.

For beam depths of 3½", 5½" and 7¼", the maximum hole diameter is ¾", 1⅛" and 1½" respectively. For deeper beams, the maximum hole diameter is 2".

The maximum number of holes for each span is limited to 3.



West FraserTM LVL

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CANADIAN EDITION

2026-07-14 - v1.1