INTERNATIONAL BEAMS

LVL - Limit States Design Guide

INTERNATIONAL BEAMS

A lebcorp COMPANY

The GREEN Building Solution

NOVEMBER 2010

Our Company

At International Beams, Inc. we take pride in providing our customers with premium quality products and services. Our LVL is manufactured to provide consistent, high performance floor and roof systems.

Our technical services consist of highly trained technical experts available to assist you with any design or construction question and to provide full support for our software.

About LVL

Providing the superior performance and durability of engineered wood, International Beams, Inc. LVL is perfectly suited to spans bearing heavy loads and multi-span applications. The normal problems associated with increased lumber sizes – like decreased dimensional stability and uniformity – do not apply to our LVL, which utilizes ultrasonically tested and graded Douglas Fir veneer with evenly dispersed natural defects.

Engineered for Quality

Checking is minimized because International Beams, Inc. LVL is cured in a controlled process in which waterproof adhesives boost stability and reduce warps and twists. All products are machine-ripped to generate uniform size and rigid, flat surfaces with inherently superior nail-holding characteristics.

We are confident that our products will provide our customers with consistent high performance when handled and installed in accordance with our Installation Guide.

Tested for strength and engineered for quality, International Beams, Inc. LVL represents our ongoing commitment to unsurpassed performance and service.

General notes for this product guide:

1. All tables assume dry conditions. Calculations are based on CSA Standard 086-09 and the National Building Code of Canada (NBCC).
2. Lateral support of the compression edge of all beams must be provided at 24" on center.
3. Application tables include live load reductions applied in accordance with the NBCC.
4. Tables apply to Dead, Floor Live, Roof Live and Snow loads. Lateral loads must be considered by the building designer.
5. This design manual is intended to be used for preliminary design purposes; a complete structural analysis should be preformed by a design professional.
6. Beams that are $1\frac{3}{4}$" x 16" and deeper require multiple plies.

2.0E LVL Design Properties

Factored Resistance (Standard Term) - 1¾"

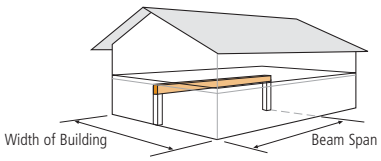
Depth (in)	Factored Shear Resistance V_r (lb)	Factored Moment Resistance M_r (lb)	EI (lb.in² x 10⁶)	Weight (plf)
5½	3113	4363	49	2.8
7¼	4103	7213	111	3.7
9¼	5235	11237	231	4.7
9½	5377	11796	250	4.8
11¼	6367	16046	415	5.7
11⅞	6721	17706	488	6.1
14	7923	23891	800	7.1
16	9055	30463	1195	8.2
18	10187	37746	1701	9.2
20	11319	45725	2333	10.2
22	12451	54386	3106	11.2
24	13583	63718	4032	12.3

Factored Resistance (Standard Term) - 3½"

Depth (in)	Factored Shear Resistance V_r (lb)	Factored Moment Resistance M_r (lb)	EI (lb.in² x 10⁶)	Weight (plf)
5½	6225	8725	97	5.6
7¼	8206	14425	222	7.4
9¼	10470	22474	462	9.4
9½	10753	23592	500	9.7
11¼	12734	32093	831	11.5
11⅞	13441	35411	977	12.1
14	15847	47782	1601	14.3
16	18110	60927	2389	16.3
18	20374	75493	3402	18.4
20	22638	91450	4667	20.4
22	24902	108772	6211	22.5
24	27166	127437	8064	24.5

Notes:
1. The values have been calculated in accordance with CSA Standard O86-09.
2. The values are valid for dry service conditions, single member applications, standard term loading, and no treatment. Full lateral support is required for the compression edge, and both edges in the case of cantilevered and continuous beams.
3. Specified Strengths for 3100Fb-2.0E grade LVL for the beam orientation (edgewise):
   Bending f_b* = 5729 psi
   Shear f_v = 539 psi
   Modulus of Elasticity E = 2.0 x 10^6 psi
   Compression perpendicular to grain f_{cp} = 1365 psi
   Compression parallel to grain f_c = 5107 psi
   *Adjust f_b by a factor of $(12/d)^{0.18}$ where d = depth (in).

2.0E LVL Floor Beams



Application Table - 2.0E Floor Beams - 1¾" Width

Width of Building	Beam Span									
	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'
24'	2- 11¼	2- 11¼	2- 11⅞	2- 14	2- 14	2- 16	2- 16	2- 16	2- 18	2- 18
	3- 9¼	3- 9½	3- 11¼	3- 11¼	3- 11⅞	3- 14	3- 14	3- 14	3- 16	3- 16
28'	2- 11¼	2- 11¼	2- 14	2- 14	2- 14	2- 16	2- 16	2- 18*	2- 18*	3- 16
	3- 9¼	3- 11¼	3- 11¼	3- 11⅞	3- 14	3- 14	3- 14	3- 16	3- 16	4- 16
32'	2- 11¼	2- 11⅞	2- 14	2- 14	2- 16	2- 16*	2- 18*	2- 18*	2- 18*	3- 18
	3- 9½	3- 11¼	3- 11¼	3- 11⅞	3- 14	3- 14	3- 16	3- 16	3- 16	4- 16
36'	2- 11¼	2- 14	2- 14	2- 14	2- 16*	2- 16*	2- 18*	2- 18*	3- 16	3- 18
	3- 11¼	3- 11¼	3- 11⅞	3- 14	3- 14	3- 14	3- 16	3- 16	4- 16	4- 16
40'	2- 11⅞	2- 14	2- 14*	2- 16*	2- 16*	2- 18*	2- 18*	2- 18*	3- 18	3- 18
	3- 11¼	3- 11¼	3- 11⅞	3- 14	3- 14	3- 16	3- 16	3- 16	4- 16	4- 16

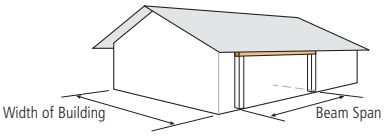
Notes:
1. The table indicates the number of 1¾" wide LVL plies to be used for the given application.
2. Beam Span is the distance from centre to centre of supports, and is based on the more restrictive of simple or continuous span. The ratio of the short span to the long span should be greater than 0.4.
3. The beam must be centered in the building if the floor joists are continuous over the top. The beam may be located off-centre and the "width of building" may be taken as 80% of the actual width if the joists are simply supported and hang from the face of the beam.
4. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
5. The table is based on an unfactored live load of 40 psf, and an unfactored dead load of 12 psf.
6. Provide a minimum 3" bearing at each end, 7½" bearing length at interior supports (* indicates that 4½" is required at end supports and 11¼" at interior supports). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
7. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration has not been considered.

2.0E LVL Garage Door Headers

These tables provide two selections for supporting roof loads over standard garage-door openings in various conditions.

1-Storey Application Table - 2.0E Garage Door Headers - 1 3/4" Width

Width of Building	25 psf snow load			30 psf snow load			40 psf snow load			50 psf snow load		
	15 psf roof dead load			15 psf roof dead load			15 psf roof dead load			15 psf roof dead load		
	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"
20'	2-7 1/4	2-14	2-14	2-9 1/4	2-14	2-16	2-9 1/4	2-14	2-16	2-9 1/4	2-16	2-18
	3-7 1/4	3-11 1/4	3-14	3-7 1/4	3-11 1/4	3-14	3-7 1/4	3-14	3-14	3-9 1/4	3-14	3-16
24'	2-9 1/4	2-14	2-16	2-9 1/4	2-14	2-16	2-9 1/4	2-16	2-18	2-9 1/4	2-16*	2-18*
	3-7 1/4	3-11 7/8	3-14	3-7 1/4	3-11 7/8	3-14	3-9 1/4	3-14	3-16	3-9 1/4	3-14	3-16
28'	2-9 1/4	2-14	2-16	2-9 1/4	2-16	2-16	2-9 1/4	2-16	2-18*	2-9 1/2	2-18*	3-18
	3-7 1/4	3-11 7/8	3-14	3-7 1/4	3-14	3-14	3-9 1/4	3-14	3-16	3-9 1/4	3-16	-
32'	2-9 1/4	2-16	2-16	2-9 1/4	2-16	2-18*	2-9 1/4	2-18*	3-16	2-11 1/4	2-18*	3-18
	3-7 1/4	3-14	3-14	3-9 1/4	3-14	3-16	3-9 1/4	3-14	-	3-9 1/4	3-16	-
36'	2-9 1/4	2-16	2-18*	2-9 1/4	2-16*	2-18*	2-11 1/4	2-18*	3-18	2-11 1/4	2-18*	3-18*
	3-7 1/4	3-14	3-16	3-9 1/4	3-14	3-16	3-9 1/4	3-16	-	3-9 1/4	3-16	-



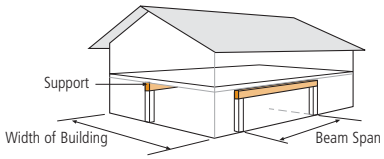
Notes:

1. The table indicates the number of 1 3/4" wide LVL plies to be used for the given application.
2. The listed span is the clear distance from face to face of supports. The design is based on a simple span for the unfactored roof loads shown in the table.
3. The roof structure is assumed to span from exterior wall to exterior wall and have a 24" overhang.
4. An unfactored live load of 10 psf has been included for an attic space with limited accessibility above the second floor ceiling.
5. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
6. Provide a minimum 3" bearing at each end (* indicates that 4 1/2" is required). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
7. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration and creep have not been considered.

Accounting for a second-story floor and wall, these tables provide two selections for supporting roof loads over standard garage-door openings in various conditions.

2-Storey Application Table - 2.0E Garage Door Headers - 1 3/4" Width

Width of Building	25 psf snow load			30 psf snow load			40 psf snow load			50 psf snow load		
	15 psf roof dead load			15 psf roof dead load			15 psf roof dead load			15 psf roof dead load		
	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"
20'	2-9 1/4	2-14	2-16	2-9 1/4	2-16	2-18	2-9 1/4	2-16	2-18*	2-9 1/4	2-16*	2-18*
	3-7 1/4	3-14	3-14	3-7 1/4	3-14	3-14	3-9 1/4	3-14	3-16	3-9 1/4	3-14	3-16
24'	2-9 1/4	2-16	2-18	2-9 1/4	2-16	2-18*	2-9 1/4	2-16*	2-18*	2-9 1/2	2-18*	3-18
	3-7 1/4	3-14	3-16	3-9 1/4	3-14	3-16	3-9 1/4	3-14	3-16	3-9 1/4	3-16	-
28'	2-9 1/4	2-16	2-18*	2-9 1/4	2-16*	2-18*	2-9 1/2	2-18*	3-18	2-11 1/4	2-18*	3-18*
	3-9 1/4	3-14	3-16	3-9 1/4	3-14	3-16	3-9 1/4	3-16	-	3-9 1/4	3-16	-
32'	2-9 1/4	2-16*	2-18*	2-9 1/2	2-18*	3-16	2-11 1/4	2-18*	3-18*	2-11 1/4	3-16*	3-18*
	3-7 1/4	3-14	3-16	3-9 1/4	3-16	-	3-9 1/4	3-16	-	3-9 1/4	-	-
36'	2-9 1/2	2-18*	3-18	2-11 1/4	2-18*	3-18	2-11 1/4	3-16*	3-18*	2-11 1/4*	3-18*	-
	3-9 1/4	3-16	-	3-9 1/4	3-16	-	3-9 1/4	-	-	3-9 1/2	-	-

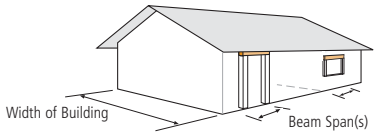


Notes:

1. The table indicates the number of 1 3/4" wide LVL plies to be used for the given application.
2. The listed span is the clear distance from face to face of supports. The design is based on a simple span for the unfactored roof loads shown in the table.
3. The roof structure is assumed to span from exterior wall to exterior wall and have a 24" overhang.
4. The floor joists must be supported at the centre of the building by a wall or beam.
5. The table is based on an unfactored floor live load of 40 psf, and an unfactored floor dead load of 12 psf. An unfactored dead load of 80 plf has been included for the second floor wall, and an unfactored live load of 10 psf has been included for an attic space with limited accessibility above the second floor ceiling.
6. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
7. Provide a minimum 3" bearing at each end (* indicates that 4 1/2" is required). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
8. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration and creep have not been considered.

2.0E LVL Window & Door Headers

These tables provide two selections for supporting roof loads over rough openings in various conditions.



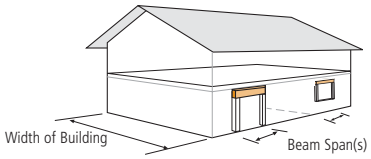
1-Storey Application Table - 2.0E Window & Door Headers - 1 3/4" Width

Width of Building	25 psf snow load					30 psf snow load					40 psf snow load					50 psf snow load				
	15 psf roof dead load					15 psf roof dead load					15 psf roof dead load					15 psf roof dead load				
	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'
20'	2-5 1/2	2-7 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-5 1/2	2-7 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-9 1/4	2-11 1/4
	3-5 1/2	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-5 1/2	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-11 1/4
24'	2-5 1/2	2-7 1/4	2-7 1/4	2-9 1/4	2-11 1/4	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-5 1/2	2-9 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8
	3-5 1/2	3-7 1/4	3-7 1/4	3-7 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-7 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/2	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4
28'	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14
	3-5 1/2	3-7 1/4	3-7 1/4	3-7 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4
32'	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-5 1/2	2-9 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14
	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/2	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-9 1/4	3-11 1/4
36'	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-9 1/2	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/2	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14*
	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/2	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-11 7/8

Notes:

1. The table indicates the number of 1 3/4" wide LVL plies to be used for the given application.
2. The listed span is the clear distance from face to face of supports. The design is based on a simple span for the unfactored roof loads shown in the table.
3. The roof structure is assumed to span from exterior wall to exterior wall and have a 24" overhang.
4. An unfactored live load of 10 psf has been included for an attic space with limited accessibility above the second floor ceiling.
5. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
6. Provide a minimum 3" bearing at each end (* indicates that 4 1/2" is required). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
7. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration and creep have not been considered.

Accounting for a second-story floor and wall, these tables provide two selections for supporting roof loads over rough openings in various conditions.



2-Storey Application Table - 2.0E Window & Door Headers - 1 3/4" Width

Width of Building	25 psf snow load					30 psf snow load					40 psf snow load					50 psf snow load				
	15 psf roof dead load					15 psf roof dead load					15 psf roof dead load					15 psf roof dead load				
	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'
20'	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-5 1/2	2-9 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8
	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4
24'	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/2	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14
	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/2	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4
28'	2-7 1/4	2-9 1/4	2-9 1/4	2-9 1/2	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14*
	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/2	3-9 1/4	3-9 1/4	3-9 1/2	3-11 1/4
32'	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14*	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14*
	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/2	3-9 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-11 7/8
36'	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-9 1/2	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14*	2-7 1/4	2-9 1/2	2-11 1/4	2-11 7/8*	2-16*
	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/2	3-9 1/4	3-9 1/4	3-11 1/4	3-11 7/8	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-14

Notes:

1. The table indicates the number of 1 3/4" wide LVL plies to be used for the given application.
2. The listed span is the clear distance from face to face of supports. The design is based on a simple span for the unfactored roof loads shown in the table.
3. The roof structure is assumed to span from exterior wall to exterior wall and have a 24" overhang.
4. The floor joists must be supported at the centre of the building by a wall or beam.
5. The table is based on an unfactored floor live load of 40 psf, and an unfactored floor dead load of 12 psf. An unfactored dead load of 80 plf has been included for the second floor wall, and an unfactored live load of 10 psf has been included for an attic space with limited accessibility above the second floor ceiling.
6. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
7. Provide a minimum 3" bearing at each end (* indicates that 4 1/2" is required). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
8. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration and creep have not been considered.

2.0E LVL Uniform Load Resistance (plf) - Floor 100% 1 3/4"

Uniform Load Resistance (plf) - 2.0E- Floor 100% - 1 3/4" Width

Span (ft)	1 3/4" x 7 1/4"				1 3/4" x 9 1/4"				1 3/4" x 9 1/2"				1 3/4" x 11 1/4"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240	
	L/480	L/360			L/480	L/360			L/480	L/360			L/480	L/360		
6	571	762	1139	1299	1187	1583		1751	1286	1715		1811	2136			2256
7	360	480	716	1083	747	997		1446	810	1080		1494	1345	1793		1845
8	241	321	478	896	500	667	997	1231	542	723	1080	1271	901	1201		1560
9	169	225	335	707	351	469	698	1072	381	508	757	1106	632	843	1260	1351
10	123	164	243	572	256	341	508	893	277	370	550	937	461	615	917	1191
11	92	123	181	472	192	256	380	737	208	278	412	773	346	462	687	1053
12	71	95	139	396	148	197	292	618	160	214	316	649	267	356	528	884
13	56	74	108	336	116	155	228	526	126	168	248	552	210	280	414	752
14	45	60	86	289	93	124	182	452	101	135	197	475	168	224	330	647
15	-	48	69	251	75	101	147	393	82	109	159	413	136	182	267	563
16	-	40	56	220	62	83	120	345	67	90	130	362	112	150	219	494
17	-	-	-	-	52	69	99	305	56	75	108	320	93	125	182	437
18	-	-	-	-	43	58	83	271	47	63	90	285	79	105	152	389
20	-	-	-	-	-	42	59	218	-	46	64	229	57	76	109	313
22	-	-	-	-	-	-	-	-	-	-	-	-	43	57	80	258
24	-	-	-	-	-	-	-	-	-	-	-	-	-	44	61	215
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span (ft)	1 3/4" x 11 7/8"				1 3/4" x 14"				1 3/4" x 16"				1 3/4" x 18"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240	
	L/480	L/360			L/480	L/360			L/480	L/360			L/480	L/360		
6	-	-	-	2427	-	-	-	3058	-	-	-	3736	-	-	-	4516
7	1582	-	-	1977	-	-	-	2460	-	-	-	2967	-	-	-	3532
8	1059	1413	-	1668	1736	-	-	2058	-	-	-	2459	-	-	-	2899
9	744	992	-	1442	1219	1626	-	1768	1820	-	-	2099	-	-	-	2458
10	542	723	1079	1270	889	1185	-	1549	1327	1769	-	1831	1890	-	-	2133
11	407	543	809	1134	668	890	1329	1379	997	1329	-	1624	1419	-	-	1884
12	314	418	622	976	514	686	1022	1242	768	1024	-	1458	1093	1458	-	1686
13	247	329	488	830	404	539	802	1122	604	805	1200	1323	860	1147	-	1526
14	197	263	389	715	324	432	641	966	483	644	959	1210	688	918	1368	1393
15	160	214	315	622	263	351	519	840	393	524	778	1073	560	746	1110	1282
16	132	176	259	545	217	289	427	737	324	432	640	941	461	615	913	1168
17	110	147	214	482	181	241	354	652	270	360	532	833	384	512	760	1033
18	93	124	180	429	152	203	297	581	227	303	447	742	324	432	639	920
20	67	90	129	346	111	148	215	469	165	221	323	599	236	315	463	743
22	50	67	95	285	83	111	160	386	124	166	241	493	177	236	345	612
24	-	52	72	238	64	85	121	323	96	128	184	413	136	182	264	512
26	-	41	55	202	50	67	94	273	75	100	143	350	107	143	206	435
28	-	-	-	-	40	54	74	235	60	80	112	300	86	114	163	373
30	-	-	-	-	-	43	58	203	49	65	90	260	70	93	130	324
32	-	-	-	-	-	-	-	-	40	54	73	227	57	76	106	283
34	-	-	-	-	-	-	-	-	-	45	59	200	48	64	87	249

Notes:

1. The values in these tables meet the requirements of the National Building Code of Canada and CSA Standard O86-09 for dry service conditions and standard term loads. The live load must be greater than the dead load in order to use these tables.
2. All values listed are based on uniform loads applied to the top of the beam.
3. Span is defined as centre-to-centre of bearings and is valid for simple span and equal, continuous span conditions.
4. These tables assume full lateral support of the compression edge.
5. The designer must check both the Factored Total Resistance and the Total L/240 Deflection Resistance, AND the appropriate Live Load column, either the L/480 or L/360 deflection limit. Unfactored Deflection Resistance values that are blank are governed by the Factored Total Resistance.
6. The Unfactored Deflection Resistance for Total L/240 does not include the effects of long term loading (creep).
7. The total load values have been adjusted to account for the self-weight of the beam.
8. Proper bearing must be provided at each support. The required bearing can be determined from the Maximum Factored Reaction Table.
9. Depths of 16" or greater should be used with a minimum of two plies.
10. The values in this table are for a single ply of 1 3/4" LVL. Double the values for a 2-ply (3 1/2" thick) beam, triple the values for a 3-ply (5 1/4" thick) beam, and quadruple the values for 4-ply (7" thick) beam.

2.0E LVL Uniform Load Resistance (plf) - Floor 100% 1 3/4"

Uniform Load Resistance (plf) - 2.0E- Floor 100% - 1 3/4" Width

Span (ft)	1 3/4" x 20"				1 3/4" x 22"				1 3/4" x 24"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240	
	L/480	L/360			L/480	L/360			L/480	L/360		
6	-	-	-	5420	-	-	-	6482	-	-	-	7746
7	-	-	-	4166	-	-	-	4884	-	-	-	5704
8	-	-	-	3383	-	-	-	3918	-	-	-	4512
9	-	-	-	2847	-	-	-	3269	-	-	-	3731
10	-	-	-	2457	-	-	-	2805	-	-	-	3180
11	1947	-	-	2160	-	-	-	2455	-	-	-	2771
12	1500	-	-	1927	1996	-	-	2183	-	-	-	2454
13	1180	1573	-	1740	1570	-	-	1965	2039	-	-	2202
14	944	1259	-	1585	1257	1676	-	1786	1632	-	-	1997
15	768	1024	-	1455	1022	1363	-	1637	1327	1769	-	1826
16	632	843	1255	1345	842	1123	-	1510	1093	1458	-	1682
17	527	703	1045	1251	702	936	1393	1402	911	1215	-	1559
18	444	592	879	1116	591	788	1172	1308	768	1024	-	1453
20	324	432	638	901	431	575	851	1073	560	746	1107	1259
22	243	324	476	743	324	432	637	885	420	560	829	1038
24	187	250	365	622	249	332	488	741	324	432	636	869
26	147	196	285	528	196	261	381	629	254	339	497	739
28	118	157	226	454	157	209	303	541	204	272	396	635
30	96	128	182	393	127	170	244	469	165	221	319	551
32	79	105	148	344	105	140	199	411	136	182	261	482
34	65	87	121	303	87	117	164	362	113	151	215	425

Notes:

1. The values in these tables meet the requirements of the National Building Code of Canada and CSA Standard O86-09 for dry service conditions and standard term loads. The live load must be greater than the dead load in order to use these tables.
2. All values listed are based on uniform loads applied to the top of the beam.
3. Span is defined as centre-to-centre of bearings and is valid for simple span and equal, continuous span conditions.
4. These tables assume full lateral support of the compression edge.
5. The designer must check both the Factored Total Resistance and the Total L/240 Deflection Resistance, AND the appropriate Live Load column, either the L/480 or L/360 deflection limit. Unfactored Deflection Resistance values that are blank are governed by the Factored Total Resistance.
6. The Unfactored Deflection Resistance for Total L/240 does not include the effects of long term loading (creep).
7. The total load values have been adjusted to account for the self-weight of the beam.
8. Proper bearing must be provided at each support. The required bearing can be determined from the Maximum Factored Reaction Table.
9. Depths of 16" or greater should be used with a minimum of two plies.
10. The values in this table are for a single ply of 1 3/4" LVL. Double the values for a 2-ply (3 1/2" thick) beam, triple the values for a 3-ply (5 1/4" thick) beam, and quadruple the values for 4-ply (7" thick) beam.

2.0E LVL Uniform Load Resistance (plf) - Roof 100 % 1 3/4"

Uniform Load Resistance (plf) - 2.0E- Roof 100% - 1 3/4" Width

Span (ft)	1 3/4" x 7 1/4"				1 3/4" x 9 1/4"				1 3/4" x 9 1/2"				1 3/4" x 11 1/4"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180	
	L/360	L/240			L/360	L/240			L/360	L/240			L/360	L/240		
6	762	1143	-	1299	1583	-	-	1751	1715	-	-	1811	-	-	-	2256
7	480	720	956	1083	997	-	-	1446	1080	-	-	1494	1793	-	-	1845
8	321	482	639	896	667	1001	-	1231	723	1085	-	1271	1201	-	-	1560
9	225	338	448	707	469	703	933	1072	508	762	1011	1106	843	1265		1351
10	164	246	325	572	341	512	679	893	370	555	736	937	615	922		1191
11	123	185	243	472	256	385	509	737	278	417	551	773	462	693	918	1053
12	95	142	186	396	197	296	391	618	214	321	423	649	356	534	706	884
13	74	112	146	336	155	233	306	526	168	252	332	552	280	420	554	752
14	60	90	116	289	124	186	244	452	135	202	265	475	224	336	442	647
15	48	73	93	251	101	151	197	393	109	164	214	413	182	273	358	563
16	40	60	76	220	83	125	162	345	90	135	176	362	150	225	294	494
17	-	50	63	195	69	104	134	305	75	113	145	320	125	187	244	437
18	-	42	52	173	58	87	112	271	63	95	122	285	105	158	205	389
20	-	-	-	-	42	64	80	218	46	69	87	229	76	115	148	313
22	-	-	-	-	-	48	59	179	-	52	64	188	57	86	109	258
24	-	-	-	-	-	-	-	-	-	40	48	157	44	66	83	215
26	-	-	-	-	-	-	-	-	-	-	-	-	-	52	64	182
28	-	-	-	-	-	-	-	-	-	-	-	-	-	42	50	156
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span (ft)	1 3/4" x 11 7/8"				1 3/4" x 14"				1 3/4" x 16"				1 3/4" x 18"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180	
	L/360	L/240			L/360	L/240			L/360	L/240			L/360	L/240		
6	-	-	-	2427	-	-	-	3058	-	-	-	3736	-	-	-	4516
7	-	-	-	1977	-	-	-	2460	-	-	-	2967	-	-	-	3532
8	1413	-	-	1668	-	-	-	2058	-	-	-	2459	-	-	-	2899
9	992	-	-	1442	1626	-	-	1768	-	-	-	2099	-	-	-	2458
10	723	1085	-	1270	1185	-	-	1549	1769	-	-	1831	-	-	-	2133
11	543	815	1081	1134	890	1336	-	1379	1329	-	-	1624	-	-	-	1884
12	418	628	831	976	686	1029	-	1242	1024	-	-	1458	1458	-	-	1686
13	329	494	652	830	539	809	1072	1122	805	1208	-	1323	1147	-	-	1526
14	263	395	521	715	432	648	857	966	644	967	-	1210	918	1377	-	1393
15	214	321	422	622	351	526	695	840	524	786	1040	1073	746	1120	-	1282
16	176	264	347	545	289	434	571	737	432	648	856	941	615	922	-	1168
17	147	220	288	482	241	362	475	652	360	540	712	833	512	769	1016	1033
18	124	186	242	429	203	304	399	581	303	455	598	742	432	648	855	920
20	90	135	174	346	148	222	289	469	221	331	434	599	315	472	620	743
22	67	101	129	285	111	167	215	386	166	249	324	493	236	354	464	612
24	52	78	98	238	85	128	164	323	128	192	248	413	182	273	355	512
26	41	61	76	202	67	101	127	273	100	151	193	350	143	215	277	435
28	-	49	59	173	54	81	101	235	80	120	153	300	114	172	220	373
30	-	40	47	149	43	65	80	203	65	98	123	260	93	140	177	324
32	-	-	-	-	-	54	65	177	54	81	100	227	76	115	144	283
34	-	-	-	-	-	45	53	156	45	67	82	200	64	96	119	249

Notes:

1. The values in these tables meet the requirements of the National Building Code of Canada and CSA Standard O86-09 for dry service conditions and standard term loads. The live load must be greater than the dead load in order to use these tables.
2. All values listed are based on uniform loads applied to the top of the beam.
3. Span is defined as centre-to-centre of bearings and is valid for simple span and equal, continuous span conditions.
4. These tables assume full lateral support of the compression edge.
5. The designer must check both the Factored Total Resistance and the Total L/180 Deflection Resistance, AND the appropriate Live Load column, either the L/360 or L/240 deflection limit. Unfactored Deflection Resistance values that are blank are governed by the Factored Total Resistance.
6. The Unfactored Deflection Resistance for Total L/180 does not include the effects of long term loading (creep).
7. The total load values have been adjusted to account for the self-weight of the beam.
8. Proper bearing must be provided at each support. The required bearing can be determined from the Maximum Factored Reaction Table.
9. Depths of 16" or greater should be used with a minimum of two plies.
10. The values in this table are for a single ply of 1 3/4" LVL. Double the values for a 2-ply (3 1/2" thick) beam, triple the values for a 3-ply (5 1/4" thick) beam, and quadruple the values for 4-ply (7" thick) beam.

2.0E LVL Uniform Load Resistance (plf) - Roof 100% 1 3/4"

Uniform Load Resistance (plf) - 2.0E- Roof 100% - 1 3/4" Width

Span (ft)	1 3/4" x 20"				1 3/4" x 22"				1 3/4" x 24"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180	
	L/360	L/240			L/360	L/240			L/360	L/240		
6	-	-	-	5420	-	-	-	6482	-	-	-	7746
7	-	-	-	4166	-	-	-	4884	-	-	-	5704
8	-	-	-	3383	-	-	-	3918	-	-	-	4512
9	-	-	-	2847	-	-	-	3269	-	-	-	3731
10	-	-	-	2457	-	-	-	2805	-	-	-	3180
11	-	-	-	2160	-	-	-	2455	-	-	-	2771
12	-	-	-	1927	-	-	-	2183	-	-	-	2454
13	1573	-	-	1740	-	-	-	1965	-	-	-	2202
14	1259	-	-	1585	1676	-	-	1786	-	-	-	1997
15	1024	-	-	1455	1363	-	-	1637	1769	-	-	1826
16	843	1265	-	1345	1123	-	-	1510	1458	-	-	1682
17	703	1055	-	1251	936	-	-	1402	1215	-	-	1559
18	592	889	-	1116	788	1183	-	1308	1024	-	-	1453
20	432	648	854	901	575	862	-	1073	746	1120	-	1259
22	324	486	639	743	432	648	853	885	560	841	-	1038
24	250	375	490	622	332	499	654	741	432	648	852	869
26	196	295	383	528	261	392	512	629	339	509	667	739
28	157	236	304	454	209	314	408	541	272	408	532	635
30	128	192	246	393	170	255	329	469	221	331	430	551
32	105	158	200	344	140	210	269	411	182	273	352	482
34	87	131	165	303	117	175	223	362	151	227	291	425

Notes:

1. The values in these tables meet the requirements of the National Building Code of Canada and CSA Standard O86-09 for dry service conditions and standard term loads. The live load must be greater than the dead load in order to use these tables.
2. All values listed are based on uniform loads applied to the top of the beam.
3. Span is defined as centre-to-centre of bearings and is valid for simple span and equal, continuous span conditions.
4. These tables assume full lateral support of the compression edge.
5. The designer must check both the Factored Total Resistance and the Total L/180 Deflection Resistance, AND the appropriate Live Load column, either the L/360 or L/240 deflection limit. Unfactored Deflection Resistance values that are blank are governed by the Factored Total Resistance.
6. The Unfactored Deflection Resistance for Total L/180 does not include the effects of long term loading (creep).
7. The total load values have been adjusted to account for the self-weight of the beam.
8. Proper bearing must be provided at each support. The required bearing can be determined from the Maximum Factored Reaction Table.
9. Depths of 16" or greater should be used with a minimum of two plies.
10. The values in this table are for a single ply of 1 3/4" LVL. Double the values for a 2-ply (3 1/2" thick) beam, triple the values for a 3-ply (5 1/4" thick) beam, and quadruple the values for 4-ply (7" thick) beam.

1.5E LVL Design Properties

Factored Resistance (Standard Term) - 1¾"

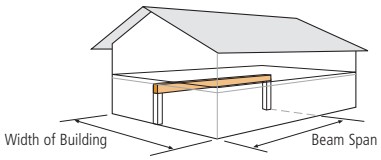
Depth (in)	Factored Shear Resistance V_r (lb)	Factored Moment Resistance M_r (lb)	EI (lb.in² x 10⁶)	Weight (plf)
5½	3061	3166	36	2.8
7¼	4035	5235	83	3.7
9¼	5148	8156	173	4.7
9½	5287	8561	188	4.8
11¼	6261	11646	311	5.7
11⅞	6608	12850	366	6.1
14	7791	17340	600	7.1
16	8904	22110	896	8.2
18	10017	27396	1276	9.2
20	11130	33186	1750	10.2
22	12243	39472	2329	11.2
24	13356	46246	3024	12.3

Factored Resistance (Standard Term) - 3½"

Depth (in)	Factored Shear Resistance V_r (lb)	Factored Moment Resistance M_r (lb)	EI (lb.in² x 10⁶)	Weight (plf)
5½	6122	6333	73	5.6
7¼	8069	10470	167	7.4
9¼	10295	16311	346	9.4
9½	10574	17123	375	9.7
11¼	12521	23292	623	11.5
11⅞	13217	25701	733	12.1
14	15582	34679	1201	14.3
16	17808	44219	1792	16.3
18	20034	54791	2552	18.4
20	22260	66373	3500	20.4
22	24486	78945	4659	22.5
24	26712	92491	6048	24.5

Notes:
1. The values have been calculated in accordance with CSA Standard O86-09.
2. The values are valid for dry service conditions, single member applications, standard term loading, and no treatment.
   Full lateral support is required for the compression edge, and both edges in the case of cantilevered and continuous beams.
3. Specified Strengths for 2250Fb-1.5E grade LVL for the beam orientation (edgewise):
   Bending f_b* = 4158 psi
   Shear f_v = 530 psi
   Modulus of Elasticity E = 1.5 x 10^6 psi
   Compression perpendicular to grain f_{cp} = 1365 psi
   Compression parallel to grain f_c = 3751 psi
   *Adjust f_b by a factor of $(12/d)^{0.18}$ where d = depth (in).

1.5E LVL Floor Beams



Application Table - 1.5E Floor Beams - 1¾" Width

Width of Building	Beam Span									
	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'
24'	2- 11¼	2- 11⅞	2- 14	2- 14	2- 16	2- 16	2- 18	2- 18	3- 18	3- 18
	3- 9½	3- 11¼	3- 11¼	3- 14	3- 14	3- 14	3- 16	3- 16	4- 16	4- 16
28'	2- 11⅞	2- 14	2- 14	2- 16	2- 16	2- 18	2- 18	3- 16	3- 18	3- 18
	3- 11¼	3- 11¼	3- 11⅞	3- 14	3- 14	3- 16	3- 16	4- 16	4- 16	4- 16
32'	2- 11⅞	2- 14	2- 14	2- 16	2- 16	2- 18*	2- 18*	3- 18	3- 18	3- 18
	3- 11¼	3- 11¼	3- 14	3- 14	3- 14	3- 16	3- 16	4- 16	4- 16	4- 18
36'	2- 14	2- 14	2- 16	2- 16	2- 18*	2- 18*	3- 16	3- 18	3- 18	4- 18
	3- 11¼	3- 11⅞	3- 14	3- 14	3- 16	3- 16	4- 16	4- 16	4- 16	-
40'	2- 14	2- 14	2- 16*	2- 16*	2- 18*	2- 18*	3- 18	3- 18	4- 18	4- 18
	3- 11¼	3- 14	3- 14	3- 14	3- 16	3- 16	4- 16	4- 16	-	-

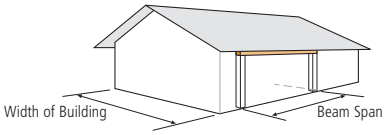
Notes:
1. The table indicates the number of 1¾" wide LVL plies to be used for the given application.
2. Beam Span is the distance from centre to centre of supports, and is based on the more restrictive of simple or continuous span.
   The ratio of the short span to the long span should be greater than 0.4.
3. The beam must be centered in the building if the floor joists are continuous over the top. The beam may be located off-centre and the "width of building" may be taken as 80% of the actual width if the joists are simply supported and hang from the face of the beam.
4. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
5. The table is based on an unfactored live load of 40 psf, and an unfactored dead load of 12 psf.
6. Provide a minimum 3" bearing at each end, 7½" bearing length at interior supports (* indicates that 4½" is required at end supports and 11¼" at interior supports). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
7. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration has not been considered.

1.5E LVL Garage Door Headers

These tables provide two selections for supporting roof loads over standard garage-door openings in various conditions.

1-Storey Application Table - 1.5E Garage Door Headers - 1 3/4" Width

Width of Building	25 psf snow load			30 psf snow load			40 psf snow load			50 psf snow load		
	15 psf roof dead load			15 psf roof dead load			15 psf roof dead load			15 psf roof dead load		
	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"
20'	2-9 1/4	2-14	2-16	2-9 1/4	2-16	2-16	2-9 1/4	2-16	2-18	2-9 1/2	2-18	3-18
	3-7 1/4	3-11 7/8	3-14	3-7 1/4	3-14	3-14	3-9 1/4	3-14	3-16	3-9 1/4	3-16	-
24'	2-9 1/4	2-16	2-16	2-9 1/4	2-16	2-18	2-9 1/4	2-18	3-16	2-11 1/4	2-18*	3-18
	3-7 1/4	3-14	3-14	3-9 1/4	3-14	3-16	3-9 1/4	3-16	-	3-9 1/4	3-16	-
28'	2-9 1/4	2-16	2-18	2-9 1/4	2-16	2-18	2-11 1/4	2-18	3-18	2-11 1/4	3-16	3-18
	3-9 1/4	3-14	3-16	3-9 1/4	3-14	3-16	3-9 1/4	3-16	-	3-9 1/4	-	-
32'	2-9 1/4	2-16	2-18	2-9 1/4	2-18	3-16	2-11 1/4	2-18*	3-18	2-11 1/4	3-18	-
	3-9 1/4	3-14	3-16	3-9 1/4	3-16	-	3-9 1/4	3-16	-	3-9 1/2	-	-
36'	2-9 1/4	2-18	3-16	2-11 1/4	2-18*	3-18	2-11 1/4	3-16	3-18	2-11 1/4	3-18	-
	3-9 1/4	3-14	-	3-9 1/4	3-16	-	3-9 1/4	-	-	3-11 1/4	-	-

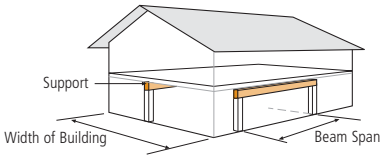


Notes:
1. The table indicates the number of 1 3/4" wide LVL plies to be used for the given application.
2. The listed span is the clear distance from face to face of supports. The design is based on a simple span for the unfactored roof loads shown in the table.
3. The roof structure is assumed to span from exterior wall to exterior wall and have a 24" overhang.
4. An unfactored live load of 10 psf has been included for an attic space with limited accessibility above the second floor ceiling.
5. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
6. Provide a minimum 3" bearing at each end (* indicates that 4 1/2" is required). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
7. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration and creep have not been considered.

Accounting for a second-story floor and wall, these tables provide two selections for supporting roof loads over standard garage-door openings in various conditions.

2-Storey Application Table - 2.0E Garage Door Headers - 1 3/4" Width

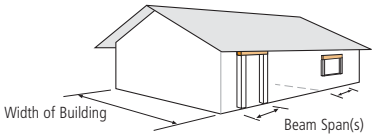
Width of Building	25 psf snow load			30 psf snow load			40 psf snow load			50 psf snow load		
	15 psf roof dead load			15 psf roof dead load			15 psf roof dead load			15 psf roof dead load		
	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"	9' 3"	16' 3"	18' 3"
20'	2-9 1/4	2-16	2-18	2-9 1/4	2-16	2-18	2-9 1/2	2-18	3- 18	2-11 1/4	2-18*	3- 18
	3-9 1/4	3-14	3-16	3-9 1/4	3-14	3-16	3-9 1/4	3-16	-	3-9 1/4	3-16	-
24'	2-9 1/4	2-18	3-16	2-9 1/2	2-18	3-18	2-11 1/4	2-18*	3- 18	2-11 1/4	3-16	3-18
	3-9 1/4	3-16	-	3-9 1/4	3-16	-	3-9 1/4	3-16	-	3-9 1/4	-	-
28'	2-11 1/4	2-18	3-18	2-11 1/4	2-18*	3-18	2-11 1/4	3-16	3-18	2-11 1/4	3-18	-
	3-9 1/4	3-16	-	3-9 1/4	3-16	-	3-9 1/4	-	-	3-11 1/4	-	-
32'	2-11 1/4	2-18*	3-18	2-11 1/4	3-16	3-18	2-11 1/4	3-18	-	2-11 7/8	3-18*	-
	3-9 1/4	3-16	-	3-9 1/4	-	-	3-9 1/2	-	-	3-11 1/4	-	-
36'	2-11 1/4	3-16	3-18	2-11 1/4	3-18	-	2-11 7/8	3-18*	-	2-14*	-	-
	3-9 1/4	-	-	3-9 1/4	-	-	3-11 1/4	-	-	3-11 1/4	-	-



Notes:
1. The table indicates the number of 1 3/4" wide LVL plies to be used for the given application.
2. The listed span is the clear distance from face to face of supports. The design is based on a simple span for the unfactored roof loads shown in the table.
3. The roof structure is assumed to span from exterior wall to exterior wall and have a 24" overhang.
4. The floor joists must be supported at the centre of the building by a wall or beam.
5. The table is based on an unfactored floor live load of 40 psf, and an unfactored floor dead load of 12 psf. An unfactored dead load of 80 plf has been included for the second floor wall, and an unfactored live load of 10 psf has been included for an attic space with limited accessibility above the second floor ceiling."
6. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
7. Provide a minimum 3" bearing at each end (* indicates that 4 1/2" is required). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
8. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration and creep have not been considered.

1.5E LVL Window & Door Headers

These tables provide two selections for supporting roof loads over rough openings in various conditions.



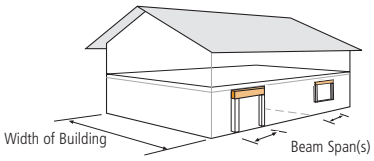
1-Storey Application Table - 1.5E Window & Door Headers - 1 3/4" Width

Width of Building	25 psf snow load					30 psf snow load					40 psf snow load					50 psf snow load				
	15 psf roof dead load					15 psf roof dead load					15 psf roof dead load					15 psf roof dead load				
	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'
20'	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-9 1/2	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14
	3-5 1/2	3-7 1/4	3-7 1/4	3-7 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4
24'	2-5 1/2	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-5 1/2	2-9 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14
	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-9 1/2	3-11 1/4
28'	2-5 1/2	2-9 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/2	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14
	3-5 1/2	3-7 1/4	3-7 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-9 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-11 7/8
32'	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/2	2-11 1/4	2-11 7/8	2-16
	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-9 1/2	3-11 7/8	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-14
36'	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/2	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-14	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-16*
	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-11 7/8	3-7 1/4	3-9 1/4	3-9 1/2	3-11 1/4	3-14

Notes:

1. The table indicates the number of 1 3/4" wide LVL plies to be used for the given application.
2. The listed span is the clear distance from face to face of supports. The design is based on a simple span for the unfactored roof loads shown in the table.
3. The roof structure is assumed to span from exterior wall to exterior wall and have a 24" overhang.
4. An unfactored live load of 10 psf has been included for an attic space with limited accessibility above the second floor ceiling.
5. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
6. Provide a minimum 3" bearing at each end (* indicates that 4 1/2" is required). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
7. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration and creep have not been considered.

Accounting for a second-story floor and wall, these tables provide two selections for supporting roof loads over rough openings in various conditions.



2-Storey Application Table - 1.5E Window & Door Headers - 1 3/4" Width

Width of Building	25 psf snow load					30 psf snow load					40 psf snow load					50 psf snow load				
	15 psf roof dead load					15 psf roof dead load					15 psf roof dead load					15 psf roof dead load				
	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'	6'	8'	9'	10'	12'
20'	2-7 1/4	2-9 1/4	2-9 1/4	2-9 1/2	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14
	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-9 1/2	3-11 1/4
24'	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-9 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-14
	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-11 7/8
28'	2-7 1/4	2-9 1/4	2-9 1/2	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/2	2-11 1/4	2-11 7/8	2-16*
	3-5 1/2	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-11 7/8	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-14
32'	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/2	2-11 1/4	2-11 7/8	2-16*	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-16*
	3-7 1/4	3-9 1/4	3-9 1/4	3-9 1/2	3-11 7/8	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-11 7/8	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-14	3-7 1/4	3-9 1/4	3-11 1/4	3-11 1/4	3-14
36'	2-7 1/4	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-7 1/4	2-9 1/4	2-11 1/4	2-11 7/8	2-14	2-9 1/4	2-11 1/4	2-11 1/4	2-14	2-16*	2-9 1/4	2-11 1/4	2-11 7/8	2-14*	2-18*
	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-11 7/8	3-7 1/4	3-9 1/4	3-9 1/4	3-11 1/4	3-14	3-7 1/4	3-9 1/4	3-9 1/2	3-11 1/4	3-14	3-7 1/4	3-9 1/4	3-11 1/4	3-11 1/4	3-14

Notes:

1. The table indicates the number of 1 3/4" wide LVL plies to be used for the given application.
2. The listed span is the clear distance from face to face of supports. The design is based on a simple span for the unfactored roof loads shown in the table.
3. The roof structure is assumed to span from exterior wall to exterior wall and have a 24" overhang.
4. The floor joists must be supported at the centre of the building by a wall or beam.
5. The table is based on an unfactored floor live load of 40 psf, and an unfactored floor dead load of 12 psf. An unfactored dead load of 80 plf has been included for the second floor wall, and an unfactored live load of 10 psf has been included for an attic space with limited accessibility above the second floor ceiling.
6. Live load deflection is limited to L/360. Total load deflection, including beam weight, is limited to L/240.
7. Provide a minimum 3" bearing at each end (* indicates that 4 1/2" is required). Bearing length is based on the compression perpendicular resistance of the LVL. For bearing on materials with a lower compressive resistance the designer shall calculate the required bearing length.
8. Calculations are in accordance with CSA O86-09 and the National Building Code of Canada. Live loads have been reduced in accordance with 4.1.5.9 (3) of the NBCC. Vibration and creep have not been considered.

1.5E LVL Uniform Load Resistance (plf) - Floor 100% 1 3/4"

Uniform Load Resistance (plf) - 1.5E- Floor 100% - 1 3/4" Width

Span (ft)	1 3/4" x 7 1/4"				1 3/4" x 9 1/4"				1 3/4" x 9 1/2"				1 3/4" x 11 1/4"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240	
	L/480	L/360			L/480	L/360			L/480	L/360			L/480	L/360		
6	428	571	853	1158	890	1187	-	1722	964	1286	-	1781	1602	2136	-	2218
7	270	360	536	850	560	747	1116	1325	607	810	1210	1391	1008	1345		1814
8	180	241	358	649	375	500	746	1013	407	542	809	1064	675	901	1346	1448
9	127	169	250	512	263	351	523	799	285	381	566	839	474	632	943	1143
10	92	123	181	414	192	256	380	646	208	277	411	678	346	461	686	924
11	69	92	135	341	144	192	284	533	156	208	308	560	260	346	514	762
12	53	71	103	286	111	148	217	447	120	160	236	469	200	267	394	639
13	42	56	80	243	87	116	170	380	94	126	184	399	157	210	309	544
14	-	45	63	209	70	93	135	327	75	101	147	343	126	168	246	468
15	-	-	-	-	56	75	109	284	61	82	118	298	102	136	199	406
16	-	-	-	-	46	62	89	248	50	67	96	261	84	112	163	356
17	-	-	-	-	-	52	73	219	42	56	80	230	70	93	135	315
18	-	-	-	-	-	43	61	195	-	47	66	205	59	79	112	280
20	-	-	-	-	-	-	-	-	-	-	-	-	43	57	80	225
22	-	-	-	-	-	-	-	-	-	-	-	-	-	43	59	185
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span (ft)	1 3/4" x 11 7/8"				1 3/4" x 14"				1 3/4" x 16"				1 3/4" x 18"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240	
	L/480	L/360			L/480	L/360			L/480	L/360			L/480	L/360		
6	1884	-	-	2386	-	-	-	3007	-	-	-	3674	-	-	-	4440
7	1186	1582	-	1944	1944	-	-	2419	2902	-	-	2917	-	-	-	3472
8	794	1059	1583	1598	1302	1736	-	2023	1944	-	-	2418	2768	-	-	2850
9	558	744	1110	1261	914	1219	-	1703	1365	1820	-	2064	1944	-	-	2417
10	407	542	808	1020	666	889	1326	1378	995	1327	-	1758	1417	1890	-	2097
11	305	407	605	842	501	668	995	1137	747	997	-	1451	1064	1419	-	1800
12	235	314	465	706	385	514	764	954	576	768	1144	1218	820	1093	-	1510
13	185	247	364	600	303	404	600	812	453	604	898	1036	645	860	1281	1285
14	148	197	290	517	243	324	479	698	362	483	717	892	516	688	1024	1106
15	120	160	235	449	197	263	388	607	294	393	581	776	420	560	830	962
16	99	132	192	394	162	217	318	533	243	324	478	680	346	461	683	844
17	82	110	159	348	135	181	264	471	202	270	397	602	288	384	568	747
18	69	93	133	309	114	152	221	419	170	227	333	535	243	324	477	665
20	50	67	95	249	83	111	159	338	124	165	240	432	177	236	345	536
22	-	50	70	204	62	83	118	277	93	124	178	355	133	177	257	441
24	-	-	-	-	48	64	89	232	72	96	136	297	102	136	196	369
26	-	-	-	-	-	50	68	196	56	75	105	251	80	107	152	312
28	-	-	-	-	-	40	53	168	45	60	82	215	64	86	120	268
30	-	-	-	-	-	-	-	-	-	49	65	186	52	70	95	232
32	-	-	-	-	-	-	-	-	-	40	52	162	43	57	77	202
34	-	-	-	-	-	-	-	-	-	-	-	-	-	48	63	178

Notes:

1. The values in these tables meet the requirements of the National Building Code of Canada and CSA Standard O86-09 for dry service conditions and standard term loads. The live load must be greater than the dead load in order to use these tables.
2. All values listed are based on uniform loads applied to the top of the beam.
3. Span is defined as centre-to-centre of bearings and is valid for simple span and equal, continuous span conditions.
4. These tables assume full lateral support of the compression edge.
5. The designer must check both the Factored Total Resistance and the Total L/240 Deflection Resistance, AND the appropriate Live Load column, either the L/480 or L/360 deflection limit. Unfactored Deflection Resistance values that are blank are governed by the Factored Total Resistance.
6. The Unfactored Deflection Resistance for Total L/240 does not include the effects of long term loading (creep).
7. The total load values have been adjusted to account for the self-weight of the beam.
8. Proper bearing must be provided at each support. The required bearing can be determined from the Maximum Factored Reaction Table.
9. Depths of 16" or greater should be used with a minimum of two plies.
10. The values in this table are for a single ply of 1 3/4" LVL. Double the values for a 2-ply (3 1/2" thick) beam, triple the values for a 3-ply (5 1/4" thick) beam, and quadruple the values for 4-ply (7" thick) beam.

1.5E LVL Uniform Load Resistance (plf) - Floor 100% 1 3/4"

Uniform Load Resistance (plf) - 1.5E- Floor 100% - 1 3/4" Width

Span (ft)	1 3/4" x 20"				1 3/4" x 22"				1 3/4" x 24"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/240		Live Load		Total L/240		Live Load		Total L/240	
	L/480	L/360			L/480	L/360			L/480	L/360		
6	-	-	-	5329	-	-	-	6373	-	-	-	7616
7	-	-	-	4097	-	-	-	4803	-	-	-	5608
8	-	-	-	3326	-	-	-	3852	-	-	-	4436
9	2667	-	-	2799	-	-	-	3215	-	-	-	3669
10	1944	-	-	2415	2588	-	-	2758	-	-	-	3127
11	1460	1947	-	2124	1944	-	-	2414	2524	-	-	2724
12	1125	1500	-	1831	1497	1996	-	2146	1944	-	-	2413
13	885	1180	-	1558	1177	1570	-	1854	1529	2039	-	2165
14	708	944	-	1342	943	1257	-	1597	1224	1632	-	1872
15	576	768	1142	1167	766	1022	-	1389	995	1327	-	1629
16	474	632	939	1024	631	842	-	1219	820	1093	-	1430
17	395	527	781	906	526	702	1042	1078	683	911	-	1265
18	333	444	656	806	443	591	876	960	576	768	-	1126
20	243	324	476	651	323	431	636	775	420	560	827	909
22	182	243	355	536	243	324	475	638	315	420	619	749
24	140	187	271	448	187	249	363	534	243	324	474	627
26	110	147	211	380	147	196	283	453	191	254	370	532
28	88	118	167	326	117	157	224	389	153	204	294	456
30	72	96	134	282	95	127	180	337	124	165	236	396
32	59	79	108	246	78	105	146	294	102	136	193	346
34	49	65	88	217	65	87	120	259	85	113	158	305

Notes:

1. The values in these tables meet the requirements of the National Building Code of Canada and CSA Standard O86-09 for dry service conditions and standard term loads. The live load must be greater than the dead load in order to use these tables.
2. All values listed are based on uniform loads applied to the top of the beam.
3. Span is defined as centre-to-centre of bearings and is valid for simple span and equal, continuous span conditions.
4. These tables assume full lateral support of the compression edge.
5. The designer must check both the Factored Total Resistance and the Total L/240 Deflection Resistance, AND the appropriate Live Load column, either the L/480 or L/360 deflection limit. Unfactored Deflection Resistance values that are blank are governed by the Factored Total Resistance.
6. The Unfactored Deflection Resistance for Total L/240 does not include the effects of long term loading (creep).
7. The total load values have been adjusted to account for the self-weight of the beam.
8. Proper bearing must be provided at each support. The required bearing can be determined from the Maximum Factored Reaction Table.
9. Depths of 16" or greater should be used with a minimum of two plies.
10. The values in this table are for a single ply of 1 3/4" LVL. Double the values for a 2-ply (3 1/2" thick) beam, triple the values for a 3-ply (5 1/4" thick) beam, and quadruple the values for 4-ply (7" thick) beam.

1.5E LVL Uniform Load Resistance (plf) - Roof 100% 1 3/4"

Uniform Load Resistance (plf) - 1.5E- Roof 100% - 1 3/4" Width

Span (ft)	1 3/4" x 7 1/4"				1 3/4" x 9 1/4"				1 3/4" x 9 1/2"				1 3/4" x 11 1/4"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180	
	L/360	L/240			L/360	L/240			L/360	L/240			L/360	L/240		
6	571	857	1139	1158	1187	-	-	1722	1286	-	-	1781	2136	-	-	2218
7	360	540	716	850	747	1121	-	1325	810	1215	-	1391	1345	-	-	1814
8	241	361	478	649	500	751	997	1013	542	814	-	1064	901	1351	-	1448
9	169	254	335	512	351	527	698	799	381	571	757	839	632	949	-	1143
10	123	185	243	414	256	384	508	646	277	416	550	678	461	692	917	924
11	92	139	181	341	192	289	380	533	208	313	412	560	346	520	687	762
12	71	107	139	286	148	222	292	447	160	241	316	469	267	400	528	639
13	56	84	108	243	116	175	228	380	126	189	248	399	210	315	414	544
14	45	67	86	209	93	140	182	327	101	151	197	343	168	252	330	468
15	-	54	69	181	75	113	147	284	82	123	159	298	136	205	267	406
16	-	45	56	158	62	93	120	248	67	101	130	261	112	168	219	356
17	-	-	-	-	52	78	99	219	56	84	108	230	93	140	182	315
18	-	-	-	-	43	65	83	195	47	71	90	205	79	118	152	280
20	-	-	-	-	-	48	59	157	-	52	64	165	57	86	109	225
22	-	-	-	-	-	-	-	-	-	-	-	-	43	65	80	185
24	-	-	-	-	-	-	-	-	-	-	-	-	-	50	61	154
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span (ft)	1 3/4" x 11 7/8"				1 3/4" x 14"				1 3/4" x 16"				1 3/4" x 18"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180	
	L/360	L/240			L/360	L/240			L/360	L/240			L/360	L/240		
6	-	-	-	2386	-	-	-	3007	-	-	-	3674	-	-	-	4440
7	1582	-	-	1944	-	-	-	2419	-	-	-	2917	-	-	-	3472
8	1059	1589	-	1598	1736	-	-	2023	-	-	-	2418	-	-	-	2850
9	744	1116	-	1261	1219	-	-	1703	1820	-	-	2064	-	-	-	2417
10	542	814	-	1020	889	1333	-	1378	1327	-	-	1758	1890	-	-	2097
11	407	611	809	842	668	1002	-	1137	997	-	-	1451	1419	-	-	1800
12	314	471	622	706	514	771	-	954	768	1152	-	1218	1093	-	-	1510
13	247	370	488	600	404	607	802	812	604	906	-	1036	860	-	-	1285
14	197	296	389	517	324	486	641	698	483	725	-	892	688	1033	-	1106
15	160	241	315	449	263	395	519	607	393	589	-	776	560	840	-	962
16	132	198	259	394	217	325	427	533	324	486	640	680	461	692	-	844
17	110	165	214	348	181	271	354	471	270	405	532	602	384	577	-	747
18	93	139	180	309	152	228	297	419	227	341	447	535	324	486	639	665
20	67	101	129	249	111	166	215	338	165	248	323	432	236	354	463	536
22	50	76	95	204	83	125	160	277	124	186	241	355	177	266	345	441
24	-	58	72	171	64	96	121	232	96	144	184	297	136	205	264	369
26	-	46	55	144	50	75	94	196	75	113	143	251	107	161	206	312
28	-	-	-	-	40	60	74	168	60	90	112	215	86	129	163	268
30	-	-	-	-	-	49	58	145	49	73	90	186	70	105	130	232
32	-	-	-	-	-	40	47	126	40	60	73	162	57	86	106	202
34	-	-	-	-	-	-	-	-	-	50	59	142	48	72	87	178

Notes:

1. The values in these tables meet the requirements of the National Building Code of Canada and CSA Standard O86-09 for dry service conditions and standard term loads. The live load must be greater than the dead load in order to use these tables.
2. All values listed are based on uniform loads applied to the top of the beam.
3. Span is defined as centre-to-centre of bearings and is valid for simple span and equal, continuous span conditions.
4. These tables assume full lateral support of the compression edge.
5. The designer must check both the Factored Total Resistance and the Total L/180 Deflection Resistance, AND the appropriate Live Load column, either the L/360 or L/240 deflection limit. Unfactored Deflection Resistance values that are blank are governed by the Factored Total Resistance.
6. The Unfactored Deflection Resistance for Total L/180 does not include the effects of long term loading (creep).
7. The total load values have been adjusted to account for the self-weight of the beam.
8. Proper bearing must be provided at each support. The required bearing can be determined from the Maximum Factored Reaction Table.
9. Depths of 16" or greater should be used with a minimum of two plies.
10. The values in this table are for a single ply of 1 3/4 LVL. Double the values for a 2-ply (3 1/2" thick) beam, triple the values for a 3-ply (5 1/4"thick) beam, and quadruple the values for 4-ply (7" thick) beam.

1.5E LVL Uniform Load Resistance (plf) - Roof 1 3/4"

Uniform Load Resistance (plf) - 1.5E- Roof 100% - 1 3/4" Width

Span (ft)	1 3/4" x 20"				1 3/4" x 22"				1 3/4" x 24"			
	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance	Unfactored Defl. Resistance			Factored Total Resistance
	Live Load		Total L/180		Live Load		Total L/180		Live Load		Total L/180	
	L/360	L/240			L/360	L/240			L/360	L/240		
6	-	-	-	5329	-	-	-	6373	-	-	-	7616
7	-	-	-	4097	-	-	-	4803	-	-	-	5608
8	-	-	-	3326	-	-	-	3852	-	-	-	4436
9	-	-	-	2799	-	-	-	3215	-	-	-	3669
10	-	-	-	2415	-	-	-	2758	-	-	-	3127
11	1947	-	-	2124	-	-	-	2414	-	-	-	2724
12	1500	-	-	1831	1996	-	-	2146	-	-	-	2413
13	1180	-	-	1558	1570	-	-	1854	2039	-	-	2165
14	944	-	-	1342	1257	-	-	1597	1632	-	-	1872
15	768	1152	-	1167	1022	-	-	1389	1327	-	-	1629
16	632	949	-	1024	842	-	-	1219	1093	-	-	1430
17	527	791	-	906	702	1053	-	1078	911	-	-	1265
18	444	666	-	806	591	887	-	960	768	-	-	1126
20	324	486	638	651	431	647	-	775	560	840	-	909
22	243	365	476	536	324	486	637	638	420	631	-	749
24	187	281	365	448	249	374	488	534	324	486	-	627
26	147	221	285	380	196	294	381	453	254	382	497	532
28	118	177	226	326	157	235	303	389	204	306	396	456
30	96	144	182	282	127	191	244	337	165	248	319	396
32	79	118	148	246	105	157	199	294	136	205	261	346
34	65	98	121	217	87	131	164	259	113	170	215	305

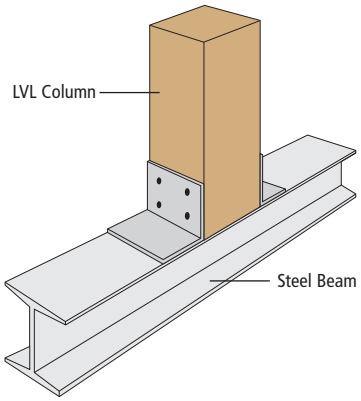
Notes:

1. The values in these tables meet the requirements of the National Building Code of Canada and CSA Standard O86-09 for dry service conditions and standard term loads. The live load must be greater than the dead load in order to use these tables.
2. All values listed are based on uniform loads applied to the top of the beam.
3. Span is defined as centre-to-centre of bearings and is valid for simple span and equal, continuous span conditions.
4. These tables assume full lateral support of the compression edge.
5. The designer must check both the Factored Total Resistance and the Total L/180 Deflection Resistance, AND the appropriate Live Load column, either the L/360 or L/240 deflection limit. Unfactored Deflection Resistance values that are blank are governed by the Factored Total Resistance.
6. The Unfactored Deflection Resistance for Total L/180 does not include the effects of long term loading (creep).
7. The total load values have been adjusted to account for the self-weight of the beam.
8. Proper bearing must be provided at each support. The required bearing can be determined from the Maximum Factored Reaction Table.
9. Depths of 16" or greater should be used with a minimum of two plies.
10. The values in this table are for a single ply of 1 3/4" LVL. Double the values for a 2-ply (3 1/2" thick) beam, triple the values for a 3-ply (5 1/4" thick) beam, and quadruple the values for 4-ply (7" thick) beam.

2.0 E Factored Column Axial Loads (lbs)

Steel or Column Bearing

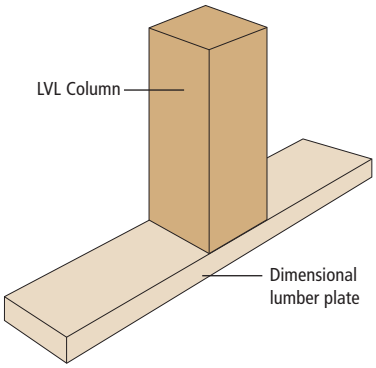
Column Length (ft)	3 1/2" x 3 1/2"	3 1/2" x 5 1/2"	3 1/2" x 7"
6	18875	29661	37750
7	15732	24721	31463
8	13061	20525	26122
9	10843	17038	21685
10	9015	14167	18031
11	7513	11806	15026
12	6277	9864	12554
13	5261	8267	10521
14	4424	6953	8849
> 14	Not Permitted	Not Permitted	Not Permitted



Column to beam connection
by design professional

SPF Plate Bearing

Column Length (ft)	3 1/2" x 3 1/2"	3 1/2" x 5 1/2"	3 1/2" x 7"
6	8663	13614	17326
7	8663	13614	17326
8	8663	13614	17326
9	8663	13614	17326
10	8663	13614	17326
11	7513	11806	15026
12	6277	9864	12554
13	5261	8267	10521
14	4424	6953	8849
> 14	Not Permitted	Not Permitted	Not Permitted



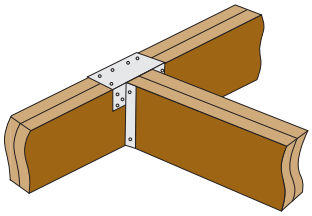
Column base not shown; verify capacity
with manufacturer

Notes:

1. This table has been prepared in accordance with the National Building Code of Canada and CSA Standard 086-09 for standard term loads and dry service conditions.
2. The compressive resistance is based on the following assumptions:
   - The effective column height is the clear height of the column between the top and bottom supports.
   - Columns are braced in both directions at the top and bottom supports.
   - The vertical load is applied with an eccentricity of 1/6 of the column width or depth, whichever controls.
   - No lateral loads are applied to the column.
   - No notching or drilling except as required for the installation of the column caps or bases.
3. These tables are for solid one-piece members. Built-up columns are beyond the scope of the tables.
4. Steel bearing refers to end-grain bearing of the column on a steel plate or beam designed by others to adequately carry the column load.
5. SPF plate bearing refers to bearing of the column on 1 1/2" thick Spruce-Pine-Fir dimension lumber plate (fcp = 769 psi). For other conditions, the designer must check the compressive resistance of the bearing material. No increase is allowed with out a complete analysis of the column resistance.

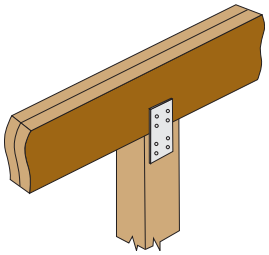
Connection Details

Beam-to-Beam Connection



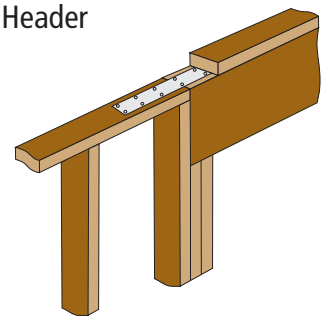
Install hanger per manufacturer's instructions. Hanger must distribute load to each ply of the assemble. Contact International Beams, Inc. technical support with questions.

Bearing on Wood Column



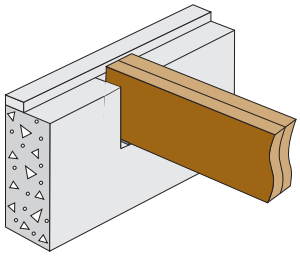
Install column cap per manufacturer's instructions; verify cap and column capacity.

Bearing for Door or Window Header



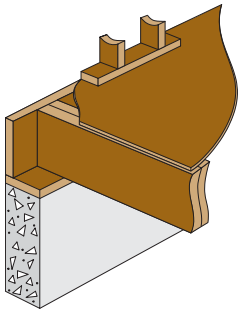
Strap per building code if top plate is not continuous over header.

Beam Pocket in Masonry Wall



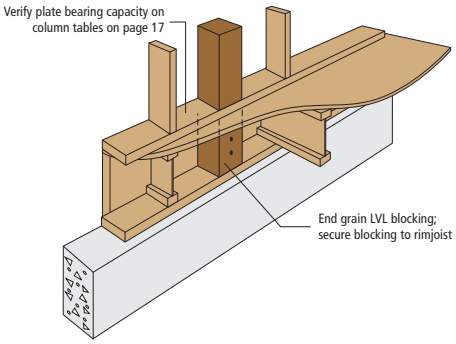
Protect LVL from moisture with a vapor barrier and airspace. LVL should not directly contact contact concrete.

Bearing on Exterior Wall



LVL should not directly contact concrete. Verify plate bearing capacity on page 19.

Solid Blocking at Post



Provide a continuous load path to concrete.

Minimum Nail Spacing

for nails installed parallel to the glueline

Nail Size	Single Row	Multiple Rows[1]
8d Common (2 1/2")	3"	4"
10d Common (3")	4"	5"
12d Common (3 1/4")	4"	5"
16d Common (3 1/2")	5"	6"[2]

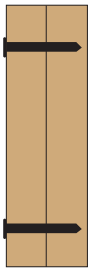
1. Offset multiple rows 1/2" and stagger nails on equal-equal layout
2. Minimum nail spacing may be reduced to 5" for 1 3/4" wide members
3. Nail penetration shall not exceed 2 1/2" for 10d and 12d nor 2" for 16d

Multiple Piece Assembly & Side Load Capacity

When assembling more than one LVL ply into a single load-bearing beam, follow the appropriate guidelines:

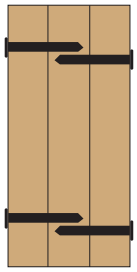
Detail A

Maximum
3 1/2" wide
2-ply beams



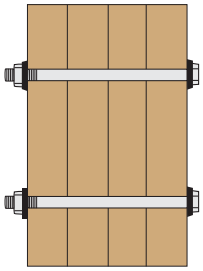
Detail B

Maximum
5 1/4" wide
3-ply beams



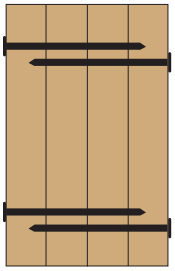
Detail C

Maximum
7" wide
4-ply beam



Detail D

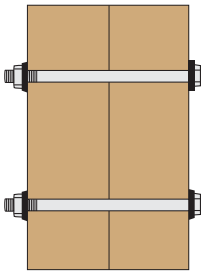
Maximum
7" wide
4-ply beam



Simpson SDS
1/4" x 6" screws
(or equal)

Detail E

Maximum
7" wide
2-ply beam



3 1/2" 3 1/2"

Max. Factored Uniform Load Applied to Either Outside Piece (plf)

Connection Detail	2 Rows of 3 1/2" Spiral Nails at 12" oc	3 Rows of 3 1/2" Spiral Nails at 12" oc	2 Rows of 1/2" dia. Bolts at 24" oc	2 Rows of 1/2" dia. Bolts at 12"oc
A	788	1182	680	1360
B	591	887	510	1020
C	-	-	453	907
D	Refer to Simpson Strong-Tie catalog for SDS capacities			
E	-	-	1362	2724

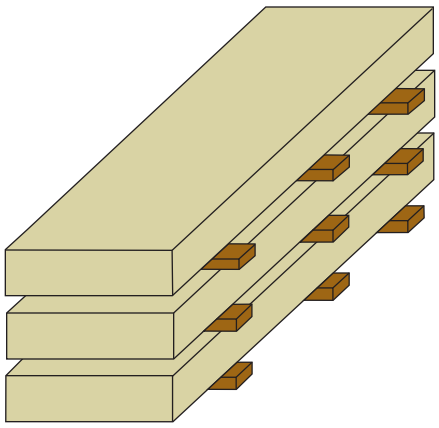
Notes:
1. The values have been calculated in accordance with CSA O86-09 for standard term loads and dry service conditions.
2. Use the sizing software or load tables to size the beam, then determine the required fastening.
3. The specified nailing applies to both faces of a 3 ply beam.
4. Four ply beams may not be loaded from one side only. They must be loaded from both sides or top loaded.
5. 3 1/2" spiral nails shall have a diameter of 0.152".
6. Bolts shall conform to ASTM A307. Bolt holes must be centered at least two inches from the top and bottom edges of the beam. Washers must be used under the bolt heads and nuts. Offset or stagger rows of bolt holes by one-half of the bolt spacing.
7. Use 3 rows of nails for beams between 12"and 18" deep.

Maximum Factored Reaction (lbs)

	Bearing Length																						
Width (in)[1]	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"	6 1/2"	7"	7 1/2"	8"	8 1/2"	9"	9 1/2"	10"	10 1/2"	11"	11 1/2"	12"
1 3/4"	2870	3820	4780	5730	6690	7640	8600	9560	10510	11470	12420	13380	14330	15290	16240	17200	18150	19110	20070	21020	21980	22930
3 1/2"	5730	7640	9560	11470	13380	15290	17200	19110	21020	22930	24840	26750	28670	30580	32490	34400	36310	38220	40130	42040	43950	45860
5 1/4"	8600	11470	14330	17200	20070	22930	25800	28670	31530	34400	37260	40130	43000	45860	48730	51600	54460	57330	60200	63060	65930	68800
7"	11470	15290	19110	22930	26750	30580	34400	38220	42040	45860	49690	53510	57330	61150	64970	68800	72620	76440	80260	84080	87910	91730

Notes:
1. Use any combination of 1 3/4" and 3 1/2" members using proper nailing or bolting guidelines.
2. Minimum bearing length is 1 1/2". Bearing across the full width of the beam is required.
3. The tabulated values are based on the compressive perpendicular to grain strength of the LVL. (F_{cp} = 1365 psi).
   Beams bearing on #2 and better, 2x plates must be increased by the following factor:
   - Spruce-Pine-Fir 1.78
   - Douglas Fir-L 1.35
   - Hem-Fir 2.05
4. Values are in accordance with CSA 086-09 for standard term loads and dry service conditions.

Handling and Storage Guidelines



- LVL should be protected from the weather and stored lying flat.
- Product must not be stored in contact with the ground.
- Store LVL in wrapped bundles, provide air circulation and support bundles with 2x4 stickers.
- Protect from the weather on the job site both before and after installation. LVL is intended for use in covered, dry conditions only.
- Except as described in this product guide, LVL should not be cut, drilled or notched.
- Do not install wet or visually damaged product.

Sizing Software

To better assist engineers, designers and specifiers, International Beams, Inc. has partnered with Keymark of Boulder Colorado, an industry leader in design software to provide KeyBeam®. This single member sizing system will aid in the specification of framing members to structurally resist engineering problems described by the software user.

KeyBeam recognizes the National Building Code of Canada (NBCC) and offers printable design calculations and beam capabilities. The software user can specify simple span applications, point loads, cantilevers and many more common applications. Please contact International Beams, Inc. Sales to learn more about receiving a complimentary copy of KeyBeam Software.

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