NORDIC

TECHNICAL GUIDE
NORDIC LAM

NS-GT4

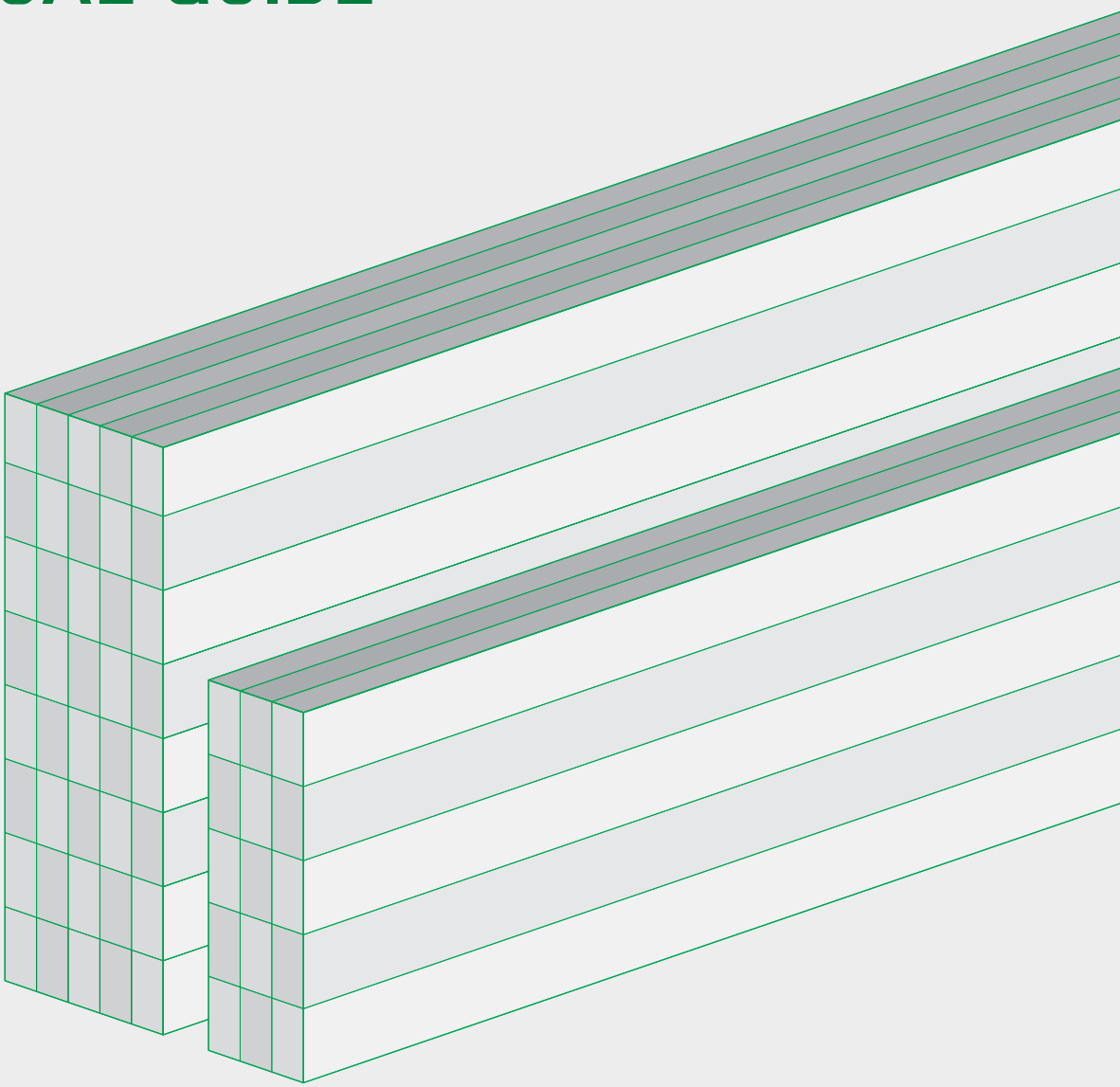
ENGLISH

VERSION
2026-05-01

Engineered Wood Products

NORDIC LAM TECHNICAL GUIDE

NORDIC LAM



NORDIC STRUCTURES

ABOUT NORDIC

NORDIC
STRUCTURES

Nordic Structures is the leading innovator in engineered wood products. Its resource comes from responsibly managed lands within the regional boreal forest. Vertical integration, from forest to structure, bolstered by Nordic's experienced design and development team, ensures consistent quality and unparalleled level of service.

514-871-8526
1 866 817-3418

HEAD OFFICE

Nordic Structures
100-1100 Canadiens-de-Montréal Avenue
Montréal, Québec H3B 2S2
www.nordic.ca

GENERAL INFORMATION

info@nordic.ca

TECHNICAL SUPPORT

tech@nordic.ca

TABLE OF CONTENTS

ENGINEERED WOOD PRODUCTS

Standard size products available
from our distributors

NS-GT3

NORDIC JOIST

NORDIC I-JOISTS

Nordic I-joists are composed of sawn lumber flanges connected by a structural oriented strand board and bonded together with exterior-grade adhesives.

NI-20 — RESIDENTIAL SERIES

2×3 S-P-F No. 2, 3/8 in. web
Depths
9-1/2 and 11-7/8 in.

NI-40x

2×3 1950f MSR, 3/8 in. web
Depths
9-1/2, 11-7/8 and 14 in.

NI-60

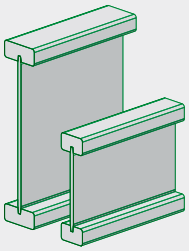
2×3 2100f MSR, 3/8 in. web
Depths
9-1/2, 11-7/8, 14 and 16 in.

NI-80

2×4 2100f MSR, 3/8 in. web
Depths
9-1/2, 11-7/8, 14 and 16 in.

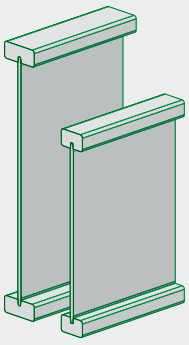
NI-90

2×4 2400f MSR, 7/16 in. web
Depths
11-7/8, 14 and 16 in.



NI-80x — COMMERCIAL SERIES

2×4 2100f MSR, 7/16 in. web
Depths
18, 20, 22 and 24 in.



NS-GT4

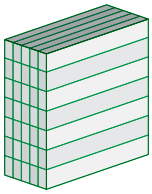
NORDIC LAM

NORDIC LAM
GLUED-LAMINATED TIMBER

Nordic Lam glued-laminated timber of industrial appearance grade consists of small wood laminations bonded together in parallel using structural adhesives.

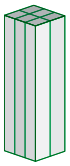
BEAMS AND HEADERS

Widths
1-3/4, 3-1/2, 5-1/2 and 7 in.
Depths
9-1/2, 11-7/8, 14, 16, 18, 20, 22 and 24 in.
Lengths*
Up to 48 ft
Stress grade
24F-1.9E



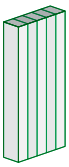
COLUMNS

Widths
3-1/2, 5-1/2 and 7 in.
Depths
3-1/2, 5-1/2 and 7 in.
Lengths*
Up to 48 ft
Stress grade
ES12



STUDS

Widths
1-1/2 and 1-3/4 in.
Depths
5-1/2 and 7-1/4 in.
Lengths*
Up to 48 ft
Stress grade
ES11



* Larger sizes available upon request

MASS TIMBER CONSTRUCTION

Products custom-manufactured
and machined for major projects

NS-GT5

NORDIC LAM+

NORDIC LAM+ GLUED-LAMINATED TIMBER

Nordic Lam+ glued-laminated timber of architectural appearance grade consists of small wood laminations bonded together in parallel using structural adhesives.

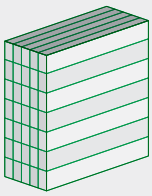
BEAMS AND COLUMNS

Widths*
38, 86, 137, 184, 215, 241, 292, 346, 395, 448, 502, 552 and 603 mm
(1-1/2, 3-3/8, 5-3/8, 7-1/4, 8-1/2, 9-1/2, 11-1/2, 13-5/8, 15-1/2, 17-5/8, 19-3/4, 21-3/4 and 23-3/4 in.)

Depths*
From 67 to 2435 mm
(2-5/8 to 95-7/8 in.)

Lengths*
Up to 24.4 m (80 ft)

Stress grade
24F-ES/NPG



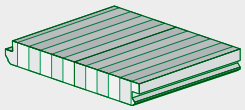
DECKING

Thicknesses*
38, 44, 54 and 89 mm
(1-1/2, 1-3/4, 2-1/8 and 3-1/2 in.)

Widths
203, 305 and 406 mm
(8, 12 and 16 in.)

Lengths
Up to 18.9 m (62 ft)

Stress grades
ES11, except 89 mm thickness in 20F-ES/CPG



* Larger sizes available upon request

NS-GT6

NORDIC X-LAM

NORDIC X-LAM CROSS-LAMINATED TIMBER

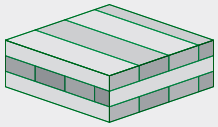
Nordic X-Lam cross-laminated timber is made of at least three orthogonal layers of graded sawn lumber that are laminated by gluing with structural adhesives.

SLABS AND PANELS

Layup combinations
89-3s, 105-3s,
143-5s, 175-5s,
197-7s, 213-7l, 244-7s, 244-7l
and 267-9l

Maximum sizes
2.565 x 19.5 m (101 in. x 64 ft)

Stress grade
E1 (L 1950Fb and T No. 3/Stud)



NORDIC

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NORDIC LAM

NS-GT4

ENGLISH

VERSION
2026-05-01

NORDIC LAM 1

NORDIC
STRUCTURES

NORDIC LAM

NORDIC LAM GLUED-LAMINATED TIMBER

Nordic Lam glued-laminated timber of industrial appearance classification consists of small wood laminations bonded together in parallel using structural adhesives

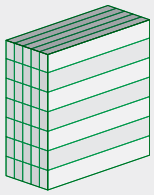
BEAMS AND HEADERS

Widths
1-3/4, 3-1/2, 5-1/2 and 7 in.

Depths
9-1/2, 11-7/8, 14, 16, 18, 20, 22 and 24 in.

Lengths*
Up to 48 ft

Stress grade
24F-1.9E



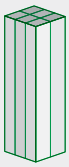
COLUMNS

Widths
3-1/2, 5-1/2 and 7 in.

Depths
3-1/2, 5-1/2 and 7 in.

Lengths*
Up to 48 ft

Stress grade
ES12



Check availability of products with your local distributor.

STUDS

Widths
1-1/2 and 1-3/4 in.

Depths
5-1/2 and 7-1/4 in.

Lengths*
Up to 48 ft

Stress grade
ES11

* Larger sizes available upon request

Nordic Lam – Specification Guide

Specifications

Glued-laminated timber (glulam) products may be used in dry service conditions, such as in most covered structures, where the average equilibrium moisture content of solid wood over a year is 15% or less and does not exceed 19%, as well as wet service conditions when accounted for in the design.

Additional considerations for wet use include, but are not limited to, service condition factors for the resistance, dimensional changes, architectural details, wood protection and maintenance.

Master format 06 18 00

REFERENCE STANDARD

.1 CSA O122-[16], Structural Glued Laminated Timber.
.2 CSA O177-[06 (R2015)], Qualification Code for Manufacturers of Structural Glued-Laminated Timber.

ACTION AND INFORMATION SUBMITTALS

.1 Submit the product report published by a certification agency accredited by the Standards Council of Canada at completion of fabrication.

MATERIALS

.1 Laminating stock: Spruce-Pine-Fir, [FSC certified]
.2 Sealer: Penetrating type, clear, non-yellowing liquid (Sansin KP-12UVW)
.3 Preservative: [Specify as required]
.4 Fire retardant: [Specify as required]

FABRICATION

.1 Stress grade: [24F-E/ES1M1 (beams and headers)] [and/or] [ES12/NPG (columns)] [and/or] [ES11/NPG (studs)]
.2 Service grade: [Interior] [Exterior]
.3 Appearance grade: [Industrial]
.4 Fire resistance: [Specify as required]

ERECTION

.1 Erect glued-laminated timber members in accordance with erection drawings issued for construction.

For the detailed specification guide: https://www.nordic.ca/en/documentation/technical-documents

Nordic Lam – Certifications

Product Certifications

Nordic Lam glued-laminated timber (glulam) products, certified by APA – The Engineered Wood Association (apawood.org), are manufactured in accordance with the principles of the applicable standards and with the specifications indicated below:

- CSA O122, Structural Glued Laminated Timber.
- CSA O177, Qualification Code for Manufacturers of Structural Glued-Laminated Timber.
- APA Product Report PR-L294C

APA is a not-for-profit trade association and is accredited by the Standards Council of Canada (SCC) to operate a production certification system based on ISO/IEC 17065. APA is also accredited by the ANSI National Accreditation Board (ANAB) as an inspection agency under ISO/IEC 17020 and as a testing laboratory under ISO/IEC 17025.

The CSA O122 standard is recognized in the National Building Code (NBC) and is required for using the design provisions specified in CSA O86, Engineering design in wood.

Green Certifications

Wood – efficient and ecological

Overview of environmental certifications:

- Green Verification Report APA GR-L294
- Low Formaldehyde Emissions Products APA PR-E740
- Environmental Product Declaration (EPD), Nordic Lam
- Health Product Declaration (HPD), Nordic Lam
- Declare (ILFI), Nordic Lam
- USDA Certified Biobased Product, Product 92%
- Cradle to Cradle Certified, Nordic Lam
- FSC-certified products available

Note: For independently verified LEED (Leadership in Energy and Environmental Design) points, refer to APA GR-L294.

See nordic.ca for details.

Nordic Lam – Transparency Brief

The Nordic Lam business-to-business environmental product declaration (EPD) is based on a cradle-to-gate life cycle analysis (LCA). The delivery of the product to the customer, its use and eventual end-of-life processing are excluded from the EPD.

Forest Operations

The assessment of the life cycle impacts of Nordic wood product begins with its origin in managed forests and the energy use and emissions caused by its extraction. Forest management and reforestation that occurs after extraction are also included.

Nordic is committed to sustainable forestry as defined in the Forest Stewardship Council (FSC) forest management certification. Nordic's wood fiber sources fall into the following category:

- Certified sources of wood fiber come from FSC certified forests.

Glulam Production

The glued-laminated timber (glulam) production phase begins with the transportation of logs to the finished product. These processes consume fossil fuel (63.0%), electricity drawn from regional grids (25.3%), internally generated biomass (10.7%) and nuclear (1.1%).

Environmental Impacts

Atmosphere		
	Global warming potential	100.38 kg CO_2 eq.
	Ozone depletion potential	1.39E-06 kg CFC-11 eq.
	Photochemical ozone creation potential	30.99 kg O_3 eq.
Water		
	Acidification potential	1.01 kg SO_2 eq.
	Eutrophication potential	0.08 kg N eq.
Earth		
	Depletion of abiotic resources (elements)	5.16 kg
	Depletion of abiotic resources (fossil fuels)	1423.32 MJ

Material Content

Component – for 1 m^3 of Nordic Lam	**Mass (kg)**	**Mass (%)**
Wood (on oven dry basis); renewable	406 kg	99.9 %
Resins (polyurethane and isocyanate)	0.43 kg	0.1 %
Total	406.43 kg	100 %

Carbon Balance

Impact Category – for 1 m^3 of Nordic Lam	**Carbon (kg of CO_2 eq.)**
Forest carbon uptake	-741.36 kg of CO_2 eq.
Life cycle greenhouse gas emissions	100.38 kg of CO_2 eq.
Unaccounted biogenic carbon emissions	26.70 kg of CO_2 eq.
Net global warming potential	-614.27 kg of CO_2 eq.

See nordic.ca for details.

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NS-GT4

ENGLISH

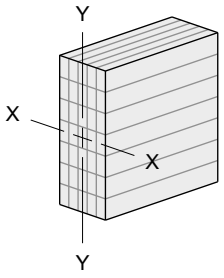
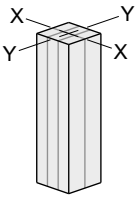
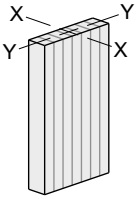
VERSION
2026-05-01

STRUCTURE 2

NORDIC
STRUCTURES

Nordic Lam – Design Properties

Nordic Lam – Design Properties

Application	Beams and headers [g]	Columns [h]	Studs [h]
Axonometry			
Appearance grade	Industrial	Industrial	Industrial
Stress grade	24F-1.9E	ES12	ES11
Layup combination	24F-E/ES1M1	ES12/NPG	ES11/NPG
Bending about X-X axis			
Bending moment, f_{bx} [a]	4,453 psi	4,453 psi	2,495 psi
Longitudinal shear, f_{vx} [b]	319 psi	363 psi	319 psi
Compression perpendicular to grain, f_{cpx} [c]	1,088 psi	1,088 psi	841 psi
Shear-free modulus of elasticity, E_x	1,900,000 psi	1,900,000 psi	1,600,000 psi
Apparent modulus of elasticity, $E_{x,app}$ [d]	1,800,000 psi	1,800,000 psi	1,500,000 psi
Bending about Y-Y axis			
Bending moment, f_{by} [a]			
4 or more laminations	2,045 psi	4,453 psi	3,249 psi
3 laminations	n.a.	4,453 psi	2,959 psi
Longitudinal shear, f_{vy} [b]	218 psi	363 psi	218 psi
Compression perpendicular to grain, f_{cpy} [c]	551 psi	1,088 psi	841 psi
Shear-free modulus of elasticity, E_y	1,600,000 psi	1,900,000 psi	1,600,000 psi
Apparent modulus of elasticity, $E_{y,app}$ [d]	1,500,000 psi	1,800,000 psi	1,500,000 psi
Axially loaded			
Compression parallel to grain, f_c			
4 or more laminations	2,393 psi	4,786 psi	3,234 psi
3 laminations	n.a.	3,539 psi	2,814 psi
Tension parallel to grain, f_t	1,944 psi	2,959 psi	1,813 psi
Tension perpendicular to grain, f_{tp}	74 psi	74 psi	74 psi
Modulus of elasticity, E_a	1,600,000 psi	1,900,000 psi	1,600,000 psi
Mean relative density, G [e]	0.42 -	0.47 -	0.42 -
Density (for member weight), ρ [f]	35 pcf	35 pcf	35 pcf

a) The size factor for bending, K_{Zbg}, shall be calculated in accordance with Clause 7.5.6.5.1 of CSA O86:19, where the beam width, b, is taken as the full member width or, for built-up members, the maximum individual ply width.

b) The specified fracture shear strength at a notch, f_f, shall be calculated as per Clause 7.5.7.5.2 of CSA O86:19, where the effective lamination width, b_{eff}, is taken as the full member width or, for built-up members, the maximum individual ply width.

c) The size factor for bearing, K_{Zcp}, shall be calculated as per Clause 6.5.6.4 of CSA O86:19, where the width and the depth are respectively the full member width and the thickness of lamination.

d) The apparent modulus of elasticity values include a 5% shear deflection. For column stability calculations, E_{05} shall be determined by multiplying the tabulated apparent modulus of elasticity by 0.87.

e) Mean relative density values, G, for dowel-type fastener design in accordance with CSA O86.

f) Density values, ρ, for a moisture content of 12%.

g) Nordic Lam beams and headers are symmetrical throughout the depth of the member (balanced layups).

h) Nordic Lam columns and studs are symmetrical throughout the depth and the width of the member (single-grade layups).

Notes:

1. The tabulated values are for dry service conditions and standard-term duration of load.
2. The tabulated values are applicable to members consisting of 4 or more laminations, unless otherwise noted.
3. Design of glulam members shall be in accordance with CSA O86:19. It should be noted that Clause 7.5.3 is not applicable.

Beams and Headers – Standard Dimensions and Design Properties

Beams and Headers – Depths (in.)

Width (in.)			
1-3/4	3-1/2	5-1/2	7
9-1/2	9-1/2	9-1/2	9-1/2
11-7/8	11-7/8	11-7/8	11-7/8
14	14	14	14
16	16	16	16
18	18	18	18

Note:

1. Maximum length is 48 feet. Larger sizes are available upon request; please contact Nordic Structures.

Beams and Headers – Design Properties

Bending about X-X axis

Width (in.)	Depth (in.)	M_r [(a)] (lbf-ft)	V_r (lbf)	E_sI (10^6 lbf-in.^{2})	Weight (lbf/ft)
1-3/4	9-1/2	8,791	3,183	225	4.0
	11-7/8	13,735	3,979	439	5.0
	14	19,091	4,691	720	5.9
	16	24,935	5,361	1,074	6.8
	18	31,558	6,031	1,530	7.6
2-ply 1-3/4 or 3-1/2	9-1/2	17,581	6,366	450	8.1
	11-7/8	27,470	7,957	878	10.1
	14	38,182	9,381	1,439	11.9
	16	49,870	10,721	2,149	13.6
	18	63,116	12,061	3,059	15.3
3-ply 1-3/4 [(b)]	9-1/2	29,009	10,503	675	12.1
	11-7/8	45,326	13,129	1,318	15.1
	14	63,000	15,479	2,159	17.8
	16	82,285	17,690	3,223	20.4
	18	104,142	19,901	4,589	22.9
5-1/2	9-1/2	27,627	10,003	707	12.7
	11-7/8	43,168	12,504	1,380	15.9
	14	60,000	14,742	2,262	18.7
	16	78,367	16,848	3,376	21.4
	18	99,183	18,954	4,807	24.0
4-ply 1-3/4 [(b)]	9-1/2	38,678	14,005	899	16.1
	11-7/8	60,435	17,506	1,757	20.2
	14	83,999	20,638	2,879	23.8
	16	109,714	23,587	4,297	27.2
	18	138,856	26,535	6,118	30.6
7	9-1/2	35,162	12,731	899	16.1
	11-7/8	54,941	15,914	1,757	20.2
	14	76,363	18,762	2,879	23.8
	16	99,740	21,442	4,297	27.2
	18	126,233	24,123	6,118	30.6

a) The factored bending moment resistance, M_r, is based on a member laterally supported at points of bearing and along all compression edges, and shall be adjusted by the size factor, K_{Zbg}, in accordance with Clause 7.5.6.5.1 of CSA O86:19.

b) The factored bending moment resistance, M_r, and factored shear resistance, V_r, include a system factor, K_H, of 1.1.

Note:

1. The tabulated values are based on dry service conditions and standard-term duration of load.

Beams and Headers – Maximum Uniform Loads

Beams and Headers – Maximum Uniform Loads

Width	Depth	Criteria	Span (ft) [a]												
(in.)	(in.)		6	8	10	12	14	16	18	20	22	24	26	28	30
		Live load, L/360 (plf)	1,544	651	333	193	122	81	57	42	-	-	-	-	-
		Total load, L/240 (plf)	2,311	973	496	285	178	118	82	58	-	-	-	-	-
	9-1/2	Factored load (plf)	1,948	1,094	698	483	354	270	212	171	-	-	-	-	-
		End bearing (in.)	3.4	2.6	2.1	1.7	1.5	1.5	1.5	1.5	-	-	-	-	-
		Intermediate bearing (in.)	8.4	6.3	5.1	4.2	3.6	3.2	3.0	3.0	-	-	-	-	-
		Live load, L/360 (plf)	3,015	1,272	651	377	237	159	112	81	61	47	37	-	-
		Total load, L/240 (plf)	4,517	1,903	972	560	351	233	162	117	87	66	51	-	-
	11-7/8	Factored load (plf)	2,544	1,711	1,093	757	554	423	333	268	221	184	156	-	-
		End bearing (in.)	4.4	4.0	3.2	2.7	2.3	2.0	1.8	1.6	1.5	1.5	1.5	-	-
		Intermediate bearing (in.)	11.0	9.9	7.9	6.6	5.7	5.0	4.4	4.0	3.6	3.3	3.1	-	-
		Live load, L/360 (plf)	4,940	2,084	1,067	618	389	261	183	133	100	77	61	49	40
		Total load, L/240 (plf)	7,405	3,120	1,595	920	577	385	269	194	144	110	85	67	53
1-3/4	14	Factored load (plf)	2,912	2,071	1,520	1,053	772	589	464	374	308	258	218	187	162
		End bearing (in.)	5.1	4.8	4.4	3.7	3.2	2.8	2.5	2.2	2.0	1.9	1.7	1.6	1.5
		Intermediate bearing (in.)	12.6	11.9	11.0	9.1	7.8	6.9	6.1	5.5	5.0	4.6	4.2	3.9	3.7
		Live load, L/360 (plf)	7,374	3,111	1,593	922	580	389	273	199	150	115	91	73	59
		Total load, L/240 (plf)	11,055	4,660	2,383	1,376	864	577	403	292	218	166	129	102	82
	16	Factored load (plf)	3,248	2,311	1,774	1,377	1,009	771	607	490	404	338	287	246	213
		End bearing (in.)	5.6	5.3	5.1	4.8	4.1	3.6	3.2	2.9	2.6	2.4	2.2	2.1	1.9
		Intermediate bearing (in.)	14.0	13.3	12.8	11.9	10.2	8.9	8.0	7.2	6.5	6.0	5.5	5.1	4.8
		Live load, L/360 (plf)	10,500	4,430	2,268	1,313	827	554	389	284	213	164	129	103	84
		Total load, L/240 (plf)	15,742	6,637	3,394	1,961	1,232	823	576	418	312	238	186	147	118
	18	Factored load (plf)	3,577	2,545	1,954	1,574	1,279	977	770	622	512	429	364	312	271
		End bearing (in.)	6.2	5.9	5.7	5.5	5.2	4.6	4.1	3.7	3.3	3.1	2.8	2.6	2.5
		Intermediate bearing (in.)	15.4	14.6	14.1	13.6	12.9	11.3	10.1	9.1	8.2	7.6	7.0	6.5	6.1

a) Span is measured centre to centre of supports.

Notes:

1. Tabulated values are maximum uniform loads that can be applied to the beam in addition to its self-weight, along with required bearing lengths for corresponding factored loads. Selected beam shall satisfy all criteria.
2. Table is based on dry service conditions, standard-term duration of load, and the most restrictive of simple or multiple spans.
3. Beam shall be laterally supported at points of bearing and along all compression edges.
4. Tabulated factored loads account for factored bending moment and shear resistances.
5. Table assumes deflection limits of L/360 under live load and L/240 under total load. For deflection limit of L/480 under live load, multiply live load values by 0.75.

Beams and Headers – Maximum Uniform Loads

Width (in.)	Depth (in.)	Criteria	Span (ft) [a] 6	8	10	12	14	16	18	20	22	24	26	28	30
2-ply 1-3/4 or 3-1/2	9-1/2	Live load, L/360 (plf)	3,087	1,302	667	386	243	163	114	83	63	48	38	30	-
		Total load, L/240 (plf)	4,623	1,946	992	571	356	236	163	117	86	64	49	37	-
		Factored load (plf)	3,739	2,188	1,396	967	707	539	424	342	280	234	198	169	-
		End bearing (in.)	3.3	2.6	2.1	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	-
		Intermediate bearing (in.)	8.1	6.3	5.1	4.2	3.6	3.2	3.0	3.0	3.0	3.0	3.0	3.0	-
	11-7/8	Live load, L/360 (plf)	6,030	2,544	1,302	754	475	318	223	163	122	94	74	59	48
		Total load, L/240 (plf)	9,035	3,806	1,944	1,120	702	467	325	234	173	131	101	79	62
		Factored load (plf)	4,490	3,194	2,185	1,514	1,109	846	666	537	441	369	312	268	232
		End bearing (in.)	3.9	3.7	3.2	2.7	2.3	2.0	1.8	1.6	1.5	1.5	1.5	1.5	1.5
		Intermediate bearing (in.)	9.7	9.2	7.9	6.6	5.7	5.0	4.4	4.0	3.6	3.3	3.1	3.0	3.0
	14	Live load, L/360 (plf)	9,881	4,168	2,134	1,235	778	521	366	267	200	154	121	97	79
		Total load, L/240 (plf)	14,809	6,241	3,189	1,841	1,155	770	537	388	289	220	170	134	107
		Factored load (plf)	5,138	3,655	2,805	2,106	1,544	1,178	928	749	616	515	437	375	325
		End bearing (in.)	4.5	4.2	4.1	3.7	3.2	2.8	2.5	2.2	2.0	1.9	1.7	1.6	1.5
		Intermediate bearing (in.)	11.1	10.5	10.1	9.1	7.8	6.9	6.1	5.5	5.0	4.6	4.2	3.9	3.7
	16	Live load, L/360 (plf)	14,749	6,222	3,186	1,844	1,161	778	546	398	299	230	181	145	118
		Total load, L/240 (plf)	22,110	9,320	4,765	2,752	1,728	1,153	806	584	435	332	258	204	163
		Factored load (plf)	5,732	4,077	3,130	2,521	2,018	1,541	1,214	980	807	676	573	492	426
		End bearing (in.)	5.0	4.7	4.5	4.4	4.1	3.6	3.2	2.9	2.6	2.4	2.2	2.1	1.9
		Intermediate bearing (in.)	12.4	11.7	11.3	10.9	10.2	8.9	8.0	7.2	6.5	6.0	5.5	5.1	4.8
	18	Live load, L/360 (plf)	21,000	8,859	4,536	2,625	1,653	1,107	778	567	426	328	258	207	168
		Total load, L/240 (plf)	31,485	13,274	6,789	3,922	2,464	1,646	1,151	835	624	477	372	295	237
		Factored load (plf)	6,313	4,491	3,447	2,776	2,311	1,953	1,539	1,243	1,024	857	728	625	542
		End bearing (in.)	5.5	5.2	5.0	4.8	4.7	4.6	4.1	3.7	3.3	3.1	2.8	2.6	2.5
		Intermediate bearing (in.)	13.6	12.9	12.4	12.0	11.7	11.3	10.1	9.1	8.2	7.6	7.0	6.5	6.1

a) Span is measured centre to centre of supports.

Notes:

1. Tabulated values are maximum uniform loads that can be applied to the beam in addition to its self-weight, along with required bearing lengths for corresponding factored loads. Selected beam shall satisfy all criteria.
2. Table is based on dry service conditions, standard-term duration of load, and the most restrictive of simple or multiple spans.
3. Beam shall be laterally supported at points of bearing and along all compression edges.
4. Tabulated factored loads account for factored bending moment and shear resistances.
5. Table assumes deflection limits of L/360 under live load and L/240 under total load. For deflection limit of L/480 under live load, multiply live load values by 0.75.

Beams and Headers – Maximum Uniform Loads

Width (in.)	Depth (in.)	Criteria	Span (ft) [a]												
			6	8	10	12	14	16	18	20	22	24	26	28	30
3-ply 1-3/4	9-1/2	Live load, L/360 (plf)	4,631	1,954	1,000	579	365	244	172	125	94	72	57	46	37
		Total load, L/240 (plf)	6,934	2,918	1,488	856	535	354	245	175	129	96	73	56	43
		Factored load (plf)	5,736	3,611	2,306	1,596	1,169	891	701	565	464	388	328	281	243
		End bearing (in.)	3.3	2.8	2.3	1.9	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		Intermediate bearing (in.)	8.3	7.0	5.6	4.7	4.0	3.5	3.1	3.0	3.0	3.0	3.0	3.0	3.0
	11-7/8	Live load, L/360 (plf)	9,045	3,816	1,954	1,131	712	477	335	244	183	141	111	89	72
		Total load, L/240 (plf)	13,552	5,708	2,915	1,681	1,053	700	487	351	260	197	152	118	93
		Factored load (plf)	6,887	4,899	3,607	2,499	1,831	1,398	1,100	888	730	611	517	444	384
		End bearing (in.)	4.0	3.8	3.5	2.9	2.5	2.2	2.0	1.8	1.6	1.5	1.5	1.5	1.5
		Intermediate bearing (in.)	9.9	9.4	8.7	7.2	6.2	5.4	4.8	4.4	4.0	3.6	3.4	3.1	3.0
	14	Live load, L/360 (plf)	14,821	6,253	3,201	1,853	1,167	782	549	400	301	232	182	146	119
		Total load, L/240 (plf)	22,214	9,361	4,784	2,761	1,732	1,154	806	582	433	330	255	201	160
		Factored load (plf)	7,882	5,607	4,304	3,466	2,549	1,946	1,533	1,238	1,019	853	723	621	538
		End bearing (in.)	4.6	4.3	4.2	4.0	3.5	3.0	2.7	2.4	2.2	2.0	1.9	1.8	1.6
		Intermediate bearing (in.)	11.3	10.8	10.3	10.0	8.6	7.5	6.7	6.0	5.5	5.0	4.7	4.3	4.0
	16	Live load, L/360 (plf)	22,123	9,333	4,779	2,765	1,741	1,167	819	597	449	346	272	218	177
		Total load, L/240 (plf)	33,165	13,980	7,148	4,128	2,592	1,730	1,209	876	653	498	387	306	245
		Factored load (plf)	8,793	6,255	4,801	3,867	3,219	2,546	2,006	1,620	1,335	1,117	948	814	706
		End bearing (in.)	5.1	4.8	4.6	4.5	4.4	4.0	3.5	3.2	2.9	2.7	2.5	2.3	2.1
		Intermediate bearing (in.)	12.6	12.0	11.5	11.2	10.9	9.8	8.8	7.9	7.2	6.6	6.1	5.6	5.3
	18	Live load, L/360 (plf)	31,500	13,289	6,804	3,938	2,480	1,661	1,167	851	639	492	387	310	252
		Total load, L/240 (plf)	47,227	19,911	10,183	5,883	3,696	2,469	1,727	1,253	936	715	558	442	355
		Factored load (plf)	9,684	6,889	5,287	4,258	3,545	3,024	2,543	2,054	1,693	1,418	1,204	1,034	897
		End bearing (in.)	5.6	5.3	5.1	4.9	4.8	4.7	4.5	4.0	3.7	3.4	3.1	2.9	2.7
		Intermediate bearing (in.)	13.9	13.2	12.7	12.3	12.0	11.7	11.1	10.0	9.1	8.3	7.7	7.1	6.7

a) Span is measured centre to centre of supports.

Notes:

1. Tabulated values are maximum uniform loads that can be applied to the beam in addition to its self-weight, along with required bearing lengths for corresponding factored loads. Selected beam shall satisfy all criteria.
2. Table is based on dry service conditions, standard-term duration of load, and the most restrictive of simple or multiple spans.
3. Beam shall be laterally supported at points of bearing and along all compression edges.
4. Tabulated factored loads account for factored bending moment and shear resistances.
5. Table assumes deflection limits of L/360 under live load and L/240 under total load. For deflection limit of L/480 under live load, multiply live load values by 0.75.

Beams and Headers – Maximum Uniform Loads

Width	Depth	Criteria	Span (ft) [a]												
(in.)	(in.)		6	8	10	12	14	16	18	20	22	24	26	28	30
		Live load, L/360 (plf)	4,851	2,047	1,048	606	382	256	180	131	98	76	60	48	39
		Total load, L/240 (plf)	7,264	3,057	1,559	897	560	371	257	184	135	101	77	59	46
	9-1/2	Factored load (plf)	5,416	3,438	2,194	1,519	1,112	847	666	537	441	368	311	266	230
		End bearing (in.)	3.0	2.6	2.1	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		Intermediate bearing (in.)	7.5	6.3	5.1	4.2	3.6	3.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0
		Live load, L/360 (plf)	9,475	3,997	2,047	1,184	746	500	351	256	192	148	116	93	76
		Total load, L/240 (plf)	14,197	5,980	3,054	1,761	1,103	734	511	368	272	206	159	124	98
	11-7/8	Factored load (plf)	6,503	4,625	3,434	2,378	1,742	1,329	1,046	844	694	580	491	421	364
		End bearing (in.)	3.6	3.4	3.2	2.7	2.3	2.0	1.8	1.6	1.5	1.5	1.5	1.5	1.5
		Intermediate bearing (in.)	8.9	8.5	7.9	6.6	5.7	5.0	4.4	4.0	3.6	3.3	3.1	3.0	3.0
		Live load, L/360 (plf)	15,527	6,550	3,354	1,941	1,222	819	575	419	315	243	191	153	124
		Total load, L/240 (plf)	23,271	9,807	5,012	2,893	1,815	1,209	844	610	454	345	268	210	168
5-1/2	14	Factored load (plf)	7,442	5,293	4,062	3,271	2,426	1,852	1,458	1,177	968	810	687	589	510
		End bearing (in.)	4.1	3.9	3.8	3.6	3.2	2.8	2.5	2.2	2.0	1.9	1.7	1.6	1.5
		Intermediate bearing (in.)	10.2	9.7	9.3	9.0	7.8	6.9	6.1	5.5	5.0	4.6	4.2	3.9	3.7
		Live load, L/360 (plf)	23,177	9,778	5,006	2,897	1,824	1,222	858	626	470	362	285	228	185
		Total load, L/240 (plf)	34,744	14,645	7,488	4,324	2,715	1,812	1,266	917	684	522	406	321	257
	16	Factored load (plf)	8,302	5,905	4,532	3,649	3,038	2,422	1,908	1,541	1,269	1,062	901	773	670
		End bearing (in.)	4.6	4.4	4.2	4.1	3.9	3.6	3.2	2.9	2.6	2.4	2.2	2.1	1.9
		Intermediate bearing (in.)	11.4	10.8	10.4	10.1	9.8	8.9	8.0	7.2	6.5	6.0	5.5	5.1	4.8
		Live load, L/360 (plf)	33,000	13,922	7,128	4,125	2,598	1,740	1,222	891	669	516	406	325	264
		Total load, L/240 (plf)	49,476	20,859	10,668	6,163	3,872	2,586	1,809	1,312	980	749	584	463	372
	18	Factored load (plf)	9,143	6,503	4,990	4,019	3,345	2,853	2,419	1,954	1,609	1,347	1,144	982	852
		End bearing (in.)	5.0	4.8	4.6	4.5	4.3	4.2	4.1	3.7	3.3	3.1	2.8	2.6	2.5
		Intermediate bearing (in.)	12.5	11.9	11.5	11.1	10.8	10.5	10.1	9.1	8.2	7.6	7.0	6.5	6.1

a) Span is measured centre to centre of supports.

Notes:

1. Tabulated values are maximum uniform loads that can be applied to the beam in addition to its self-weight, along with required bearing lengths for corresponding factored loads. Selected beam shall satisfy all criteria.
2. Table is based on dry service conditions, standard-term duration of load, and the most restrictive of simple or multiple spans.
3. Beam shall be laterally supported at points of bearing and along all compression edges.
4. Tabulated factored loads account for factored bending moment and shear resistances.
5. Table assumes deflection limits of L/360 under live load and L/240 under total load. For deflection limit of L/480 under live load, multiply live load values by 0.75.

Beams and Headers – Maximum Uniform Loads

Width (in.)	Depth (in.)	Criteria	Span (ft) [a]												
			6	8	10	12	14	16	18	20	22	24	26	28	30
4-ply 1-3/4	9-1/2	Live load, L/360 (plf)	6,175	2,605	1,334	772	486	326	229	167	125	96	76	61	49
		Total load, L/240 (plf)	9,246	3,891	1,984	1,142	713	472	327	234	172	129	98	75	58
		Factored load (plf)	7,261	4,815	3,074	2,129	1,559	1,188	935	753	619	517	438	374	324
		End bearing (in.)	3.2	2.8	2.3	1.9	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		Intermediate bearing (in.)	7.8	7.0	5.6	4.7	4.0	3.5	3.1	3.0	3.0	3.0	3.0	3.0	3.0
	11-7/8	Live load, L/360 (plf)	12,060	5,088	2,605	1,507	949	636	447	326	245	188	148	119	96
		Total load, L/240 (plf)	18,069	7,611	3,887	2,241	1,404	934	650	468	347	262	202	158	125
		Factored load (plf)	8,718	6,201	4,760	3,332	2,441	1,863	1,467	1,183	974	814	690	591	512
		End bearing (in.)	3.8	3.6	3.5	2.9	2.5	2.2	2.0	1.8	1.6	1.5	1.5	1.5	1.5
		Intermediate bearing (in.)	9.4	8.9	8.6	7.2	6.2	5.4	4.8	4.4	4.0	3.6	3.4	3.1	3.0
	14	Live load, L/360 (plf)	19,761	8,337	4,268	2,470	1,556	1,042	732	534	401	309	243	194	158
		Total load, L/240 (plf)	29,618	12,481	6,379	3,681	2,310	1,539	1,074	777	577	439	340	268	213
		Factored load (plf)	9,977	7,097	5,447	4,387	3,399	2,595	2,044	1,650	1,359	1,137	964	827	717
		End bearing (in.)	4.3	4.1	4.0	3.8	3.5	3.0	2.7	2.4	2.2	2.0	1.9	1.8	1.6
		Intermediate bearing (in.)	10.8	10.2	9.8	9.5	8.6	7.5	6.7	6.0	5.5	5.0	4.7	4.3	4.0
	16	Live load, L/360 (plf)	29,498	12,444	6,372	3,687	2,322	1,556	1,093	796	598	461	363	290	236
		Total load, L/240 (plf)	44,220	18,639	9,530	5,504	3,456	2,306	1,612	1,167	870	664	517	408	327
		Factored load (plf)	11,131	7,917	6,077	4,894	4,074	3,395	2,675	2,160	1,779	1,490	1,264	1,085	941
		End bearing (in.)	4.8	4.6	4.4	4.3	4.2	4.0	3.5	3.2	2.9	2.7	2.5	2.3	2.1
		Intermediate bearing (in.)	12.0	11.4	11.0	10.6	10.3	9.8	8.8	7.9	7.2	6.6	6.1	5.6	5.3
	18	Live load, L/360 (plf)	42,000	17,719	9,072	5,250	3,306	2,215	1,556	1,134	852	656	516	413	336
		Total load, L/240 (plf)	62,969	26,548	13,577	7,844	4,929	3,292	2,303	1,670	1,247	954	744	589	473
		Factored load (plf)	12,259	8,719	6,692	5,389	4,486	3,827	3,325	2,739	2,257	1,890	1,605	1,379	1,196
		End bearing (in.)	5.3	5.1	4.9	4.7	4.6	4.5	4.4	4.0	3.7	3.4	3.1	2.9	2.7
		Intermediate bearing (in.)	13.2	12.6	12.1	11.7	11.4	11.1	10.9	10.0	9.1	8.3	7.7	7.1	6.7

a) Span is measured centre to centre of supports.

Notes:

1. Tabulated values are maximum uniform loads that can be applied to the beam in addition to its self-weight, along with required bearing lengths for corresponding factored loads. Selected beam shall satisfy all criteria.
2. Table is based on dry service conditions, standard-term duration of load, and the most restrictive of simple or multiple spans.
3. Beam shall be laterally supported at points of bearing and along all compression edges.
4. Tabulated factored loads account for factored bending moment and shear resistances.
5. Table assumes deflection limits of L/360 under live load and L/240 under total load. For deflection limit of L/480 under live load, multiply live load values by 0.75.

Beams and Headers – Maximum Uniform Loads

Width (in.)	Depth (in.)	Criteria	Span (ft) [a] 6	8	10	12	14	16	18	20	22	24	26	28	30
7	9-1/2	Live load, L/360 (plf)	6,175	2,605	1,334	772	486	326	229	167	125	96	76	61	49
		Total load, L/240 (plf)	9,246	3,891	1,984	1,142	713	472	327	234	172	129	98	75	58
		Factored load (plf)	6,599	4,375	2,793	1,933	1,415	1,079	848	683	561	468	396	339	292
		End bearing (in.)	2.9	2.6	2.1	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		Intermediate bearing (in.)	7.1	6.3	5.1	4.2	3.6	3.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	11-7/8	Live load, L/360 (plf)	12,060	5,088	2,605	1,507	949	636	447	326	245	188	148	119	96
		Total load, L/240 (plf)	18,069	7,611	3,887	2,241	1,404	934	650	468	347	262	202	158	125
		Factored load (plf)	7,923	5,635	4,325	3,027	2,217	1,692	1,331	1,074	883	738	625	535	463
		End bearing (in.)	3.5	3.3	3.2	2.7	2.3	2.0	1.8	1.6	1.5	1.5	1.5	1.5	1.5
		Intermediate bearing (in.)	8.6	8.1	7.8	6.6	5.7	5.0	4.4	4.0	3.6	3.3	3.1	3.0	3.0
	14	Live load, L/360 (plf)	19,761	8,337	4,268	2,470	1,556	1,042	732	534	401	309	243	194	158
		Total load, L/240 (plf)	29,618	12,481	6,379	3,681	2,310	1,539	1,074	777	577	439	340	268	213
		Factored load (plf)	9,068	6,449	4,949	3,985	3,087	2,357	1,856	1,497	1,232	1,031	874	749	649
		End bearing (in.)	3.9	3.7	3.6	3.5	3.2	2.8	2.5	2.2	2.0	1.9	1.7	1.6	1.5
		Intermediate bearing (in.)	9.8	9.3	8.9	8.6	7.8	6.9	6.1	5.5	5.0	4.6	4.2	3.9	3.7
	16	Live load, L/360 (plf)	29,498	12,444	6,372	3,687	2,322	1,556	1,093	796	598	461	363	290	236
		Total load, L/240 (plf)	44,220	18,639	9,530	5,504	3,456	2,306	1,612	1,167	870	664	517	408	327
		Factored load (plf)	10,116	7,194	5,521	4,446	3,701	3,083	2,429	1,961	1,615	1,351	1,146	984	853
		End bearing (in.)	4.4	4.2	4.0	3.9	3.8	3.6	3.2	2.9	2.6	2.4	2.2	2.1	1.9
		Intermediate bearing (in.)	10.9	10.4	10.0	9.6	9.4	8.9	8.0	7.2	6.5	6.0	5.5	5.1	4.8
	18	Live load, L/360 (plf)	42,000	17,719	9,072	5,250	3,306	2,215	1,556	1,134	852	656	516	413	336
		Total load, L/240 (plf)	62,969	26,548	13,577	7,844	4,929	3,292	2,303	1,670	1,247	954	744	589	473
		Factored load (plf)	11,141	7,923	6,080	4,896	4,075	3,475	3,020	2,486	2,048	1,715	1,456	1,250	1,080
		End bearing (in.)	4.8	4.6	4.4	4.3	4.2	4.1	4.0	3.7	3.3	3.1	2.8	2.6	2.4
		Intermediate bearing (in.)	12.0	11.4	11.0	10.6	10.3	10.1	9.9	9.1	8.2	7.6	7.0	6.5	6.0

a) Span is measured centre to centre of supports.

Notes:

1. Tabulated values are maximum uniform loads that can be applied to the beam in addition to its self-weight, along with required bearing lengths for corresponding factored loads. Selected beam shall satisfy all criteria.
2. Table is based on dry service conditions, standard-term duration of load, and the most restrictive of simple or multiple spans.
3. Beam shall be laterally supported at points of bearing and along all compression edges.
4. Tabulated factored loads account for factored bending moment and shear resistances.
5. Table assumes deflection limits of L/360 under live load and L/240 under total load. For deflection limit of L/480 under live load, multiply live load values by 0.75.

Beams and Headers – Bearing Length Requirements

Beams and Headers – Bearing Length Requirements (in.)

Factored reaction (lbf)	Beam width (in.)					
	1-3/4	2-ply 1-3/4 or 3-1/2	3-ply 1-3/4	5-1/2	4-ply 1-3/4	7
1,500	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
3,000	1-3/4	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
4,500	2-3/4	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
6,000	3-1/2	1-3/4	1-1/2	1-1/2	1-1/2	1-1/2
7,500	4-1/2	2-1/4	1-1/2	1-1/2	1-1/2	1-1/2
9,000	5-1/4	2-3/4	1-3/4	1-3/4	1-1/2	1-1/2
10,500	6	3	2	2	1-1/2	1-1/2
12,000	7	3-1/2	2-1/2	2-1/4	1-3/4	1-3/4
13,500	7-3/4	4	2-3/4	2-1/2	2	2
15,000	8-3/4	4-1/2	3	2-3/4	2-1/4	2-1/4
16,500	9-1/2	4-3/4	3-1/4	3	2-1/2	2-1/2
18,000	10-1/2	5-1/4	3-1/2	3-1/2	2-3/4	2-3/4
19,500	-	5-3/4	3-3/4	3-3/4	3	3
21,000	-	6	4	4	3	3
22,500	-	6-1/2	4-1/2	4-1/4	3-1/4	3-1/4
24,000	-	7	4-3/4	4-1/2	3-1/2	3-1/2
25,500	-	7-1/2	5	4-3/4	3-3/4	3-3/4
27,000	-	7-3/4	5-1/4	5	4	4
28,500	-	8-1/4	5-1/2	5-1/4	4-1/4	4-1/4
30,000	-	8-3/4	5-3/4	5-1/2	4-1/2	4-1/2
31,500	-	9	6	5-3/4	4-1/2	4-1/2
33,000	-	9-1/2	6-1/2	6	4-3/4	4-3/4
34,500	-	10	6-3/4	6-1/2	5	5
36,000	-	10-1/2	7	6-3/4	5-1/4	5-1/4
37,500	-	10-3/4	7-1/4	7	5-1/2	5-1/2
39,000	-	-	7-1/2	7-1/4	5-3/4	5-3/4
40,500	-	-	7-3/4	7-1/2	6	6
42,000	-	-	8	7-3/4	6	6
43,500	-	-	8-1/2	8	6-1/4	6-1/4
45,000	-	-	8-3/4	8-1/4	6-1/2	6-1/2

Notes:

1. Minimum bearing length shall be 1-1/2 inch for end bearings and 3 inches for intermediate bearings.
2. Table is based on uniform loads, dry service conditions, and standard-term duration of load.
3. Bearing across the full width of the beam is required.
4. Verification of the factored compressive resistance perpendicular to grain of the support member must be carried out separately.

Beams and Headers – Multiple Member Connections

Top-loaded Beams

2-ply 1-3/4" or 3-ply 1-3/4"

- For beam depths less than 14 inches: minimum of 2 rows 3-1/2-inch common nails (0.162 x 3-1/2") at 12 inches o.c.
- For beam depths from 14 to 18 inches: minimum of 3 rows 3-1/2-inch common nails (0.162 x 3-1/2") at 12 inches o.c.
- An additional row is required when nail size is smaller than specified above (minimum 0.148 x 3")

4-ply 1-3/4"

- Minimum of 2 rows 1/2-inch diameter bolts or 1/4 x 6-inch screws at 24 inches o.c.

2-ply 3-1/2"

- Minimum of 2 rows 1/2-inch diameter bolts or 1/4 x 6-inch screws at 24 inches o.c., staggered

Side-loaded Beams

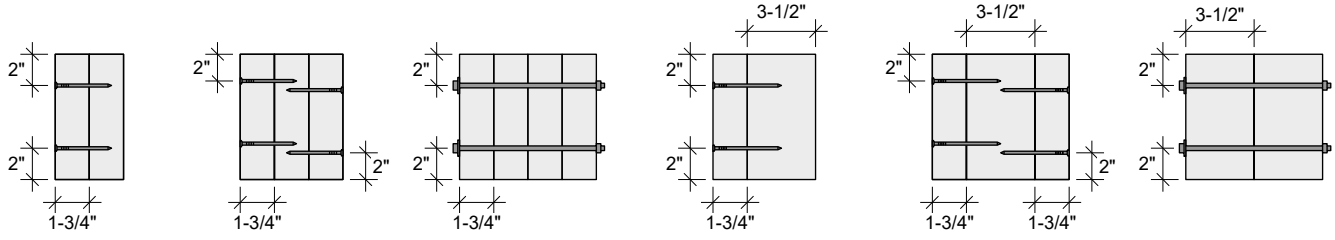
Maximum factored uniform loads (plf) applied to either outside member

Fastener	Spacing	Rows	2-ply 1-3/4"	3-ply 1-3/4"	4-ply 1-3/4" [e]	1-3/4" + 3-1/2"	1-3/4" + 3-1/2" + 1-3/4"	2-ply 3-1/2"
			Nails or screws one side or through bolts	Nails or screws both sides or through bolts	Screws one or both sides or through bolts	Nails or screws one side or through bolts	Nails or screws both sides or through bolts	Screws one or both sides or through bolts
3-1/2" Common nails (0.162 x 3-1/2") [a, b]	12"	2	805	605	-	605	535	-
		3	1,205	905	-	905	805	-
	6"	2	1,610	1,205	-	1,205	1,075	-
		3	2,415	1,810	-	1,810	1,610	-
1/2" Through bolts (ASTM A307) [c, d]	24"	2	655	490	435	735	655	1,310
	12"	2	1,310	985	875	1,475	1,310	2,620
	6"	2	2,620	1,965	1,745	2,950	2,620	5,240
Simpson Strong-Tie screws	Refer to Simpson Strong-Tie's literature							
MiTek screws	Refer to MiTek's literature							

a) Multiply tabulated maximum factored uniform loads by 0.83 for 3-inch common nails (0.148 x 3").
b) Minimum end distance for nails is 3 inches.
c) Bolt holes are recommended to be not more than 1/32 inch greater than the diameter of the bolts. Standard cut washers are required between the wood and the bolt head and between the wood and the nut.
d) Minimum end distance for bolts is 6 inches.
e) 4-ply beams are recommended to be used only when loads are applied to both sides, or if the beam is not fully loaded. The lesser load should be at least 25% of the higher load on the opposite side.

Notes:

1. Table is based on uniform loads, dry service conditions, and standard-term duration of load.
2. Verify adequacy of beam in maximum uniform load tables or design software.
3. Stagger all fasteners installed from opposite side.



Columns – Selection Tables

Columns – Factored Compressive Resistance Parallel to Grain

Maximum factored axial loads (lbf)

Effective length (ft)	Width = 3-1/2"			Width = 5-1/2"		Width = 7"
	Depth			Depth		Depth
	3-1/2"	5-1/2"	7"	5-1/2"	7"	7"
6	17,720	31,345	39,895	65,565	83,445	111,195
7	14,915	25,590	32,565	61,785	78,485	106,715
8	12,345	20,835	26,520	57,335	72,240	101,705
9	10,185	16,990	21,625	51,875	65,325	96,195
10	8,400	13,900	17,690	45,515	57,395	90,270
11	6,940	11,405	14,510	39,870	50,335	84,065
12	5,750	9,390	11,935	34,920	44,130	77,015
13	4,780	7,765	9,860	30,610	38,705	69,670
14	3,990	6,450	8,185	26,860	33,985	62,945
15	-	-	-	23,605	29,880	56,840
16	-	-	-	20,770	26,305	51,325
17	-	-	-	18,305	23,190	46,365
18	-	-	-	16,155	20,475	41,905
19	-	-	-	14,275	18,100	37,895
20	-	-	-	12,640	16,030	34,295
21	-	-	-	11,210	14,220	31,060
22	-	-	-	9,960	12,640	28,155
23	-	-	-	-	-	25,540
24	-	-	-	-	-	23,185

Notes:

1. Final design shall include a complete analysis including verification of the factored bearing resistance.
2. The tabulated values are the maximum factored axial loads that can be applied to the column in addition to its own weight.
3. Table is based on dry service conditions, standard-term duration of load, and axial load eccentricity of 1/6 of the column width or depth, whichever governs.
4. The verification of resistance to combined bending and axial load considers the more critical of the unamplified moment at the top of the column and the amplified moment at the middle of the column.

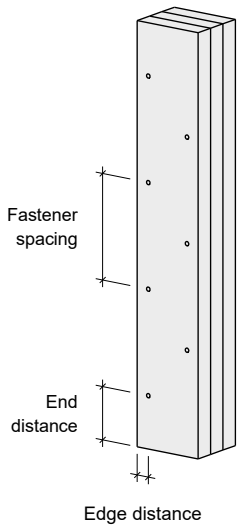
Studs – Multiple Member Connections

Built-up Columns – Fastener Pattern

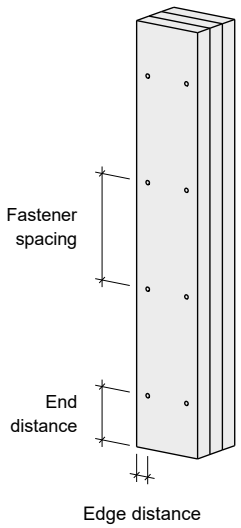
Plies			Fastener	Number of rows	Maximum fastener spacing	Minimum edge distance	Minimum end distance
Width (in.)	Depth (in.)	Number			(in.)	(in.)	(in.)
1-1/2	5-1/2	2	3" Common nails (0.148 x 3")	2	9	1-3/8	1-7/8
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
		3	4-1/2" Common nails (0.207 x 4-1/2")	2	9	1-3/8	2-1/2
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
		4	6" Common nails (0.263 x 6")	2	9	1-3/8	3-1/4
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
	7-1/4	2	3" Common nails (0.148 x 3")	2	9	2-1/4	1-7/8
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
		3	4-1/2" Common nails (0.207 x 4-1/2")	2	9	2-1/4	2-1/2
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
		4	6" Common nails (0.263 x 6")	2	9	2-1/4	3-1/4
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
1-3/4	5-1/2	2	3-1/2" Common nails (0.162 x 3-1/2")	2	9	1-3/8	2
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
		3	5" Common nails (0.225 x 5")	2	9	1-3/8	2-3/4
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
		4	1/2" Through bolts (ASTM A307)	2	9	3/4	2-1/2
	7-1/4	2	3-1/2" Common nails (0.162 x 3-1/2")	2	9	2-1/4	2
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
		3	5" Common nails (0.225 x 5")	2	9	2-1/4	2-3/4
			1/2" Through bolts (ASTM A307)			3/4	2-1/2
		4	1/2" Through bolts (ASTM A307)	2	9	3/4	2-1/2

Notes:

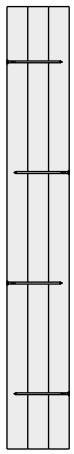
1. Individual studs assumed to be continuous over the full height of the built-up column.
2. Bolt holes are recommended to be not more than 1/32 inch greater than the diameter of the bolts. Standard cut washers are required between the wood and the bolt head and between the wood and the nut.
3. Install one row staggered, or two rows parallel in vertical direction.
4. Nails shall be driven alternately from either face along the member's length.



One row staggered



Two rows parallel



Nails driven alternately from either face

Hangers – Simpson Strong-Tie

Hangers – Simpson Strong-Tie

Face mount

Width	Depth	Hanger		Fasteners		Uplift [b]	Factored resistance [c]
		Model	B [a]	Header	Joist		
(in.)	(in.)		(in.)			(lbf)	(lbf)
1-3/4	9-1/2	HU9	2-1/2	24-16d	10-10d x 1-1/2"	2,265	4,660
		HUS1.81/10	3	30-16d	10-16d	4,010	5,200
	11-7/8	HU11	2-1/2	30-16d	10-10d x 1-1/2"	2,265	4,660
		HUS1.81/10	3	30-16d	10-16d	4,010	5,200
	14	HU14	2-1/2	36-16d	14-10d x 1-1/2"	2,695	5,450
		HUS1.81/10	3	30-16d	10-16d	4,010	5,200
	16	IUS1.81/16	2	14-10d	-	175	1,935
		MIU1.81/16	2-1/2	24-16d	2-10d x 1-1/2"	375	2,690
2-ply 1-3/4 or 3-1/2	9-1/2	HU410	2-1/2	18-16d	10-10d	2,450	4,690
		HGUS410	4	46-16d	16-16d	4,855	10,270
	11-7/8	HU412	2-1/2	22-16d	10-10d	2,450	4,690
		HGUS412	4	56-16d	20-16d	5,425	10,645
	14	HU416	2-1/2	26-16d	12-10d	2,695	5,780
		HGUS414	4	66-16d	22-16d	7,195	11,645
	16	HU416	2-1/2	26-16d	12-10d	2,695	5,780
		HGUS414	4	66-16d	22-16d	7,195	11,645
	18	HU416	2-1/2	26-16d	12-10d	2,695	5,780
		HGUS414	4	66-16d	12-16d	7,195	11,645
3-ply 1-3/4 or 5-1/2	9-1/2	HU610	2-1/2	16-16d	8-16d	2,280	4,690
		HGUS5.50/10	4	46-16d	16-16d	4,855	10,400
	11-7/8	HU612	2-1/2	22-16d	8-16d	2,280	4,690
		HGUS5.50/12	4	56-16d	20-16d	5,425	10,645
	14	HU614	2-1/2	24-16d	12-16d	3,420	6,185
		HGUS5.50/14	4	66-16d	22-16d	7,195	11,645
	16	HU616	2-1/2	26-16d	12-16d	3,420	6,185
		HGUS5.50/14	4	66-16d	22-16d	7,195	11,645
	18	HU616	2-1/2	26-16d	12-16d	3,420	6,185
		HGUS5.50/14	4	66-16d	22-16d	7,195	11,645
4-ply 1-3/4 or 7	9-1/2	HU410-2	2-1/2	18-16d	8-16d	2,280	4,690
		HGUS7.25/10	4	46-16d	16-16d	4,855	11,190
	11-7/8	HU412-2	2-1/2	22-16d	8-16d	2,280	4,690
		HGUS7.25/12	4	56-16d	20-16d	5,425	11,435
	14	HU414-2	2-1/2	26-16d	12-16d	3,420	6,185
		HGUS7.25/14	4	66-16d	22-16d	7,195	12,920
	16	HU414-2	2-1/2	26-16d	12-16d	3,420	6,185
		HGUS7.25/14	4	66-16d	22-16d	7,195	12,920
	18	HU414-2	2-1/2	26-16d	12-16d	3,420	6,185
		HGUS7.25/14	4	66-16d	22-16d	7,195	12,920

a) Dimension B represents the depth of the hanger.

b) Uplift values are based on Nordic Lam headers, upward loads and short-term duration of load.

c) Factored resistances are based on Nordic Lam headers, downward loads and standard-term duration of load.

Notes:

1. Fill all round and triangular holes.
2. Leave 1/16 inch clearance between the end of the supported joist and the header or hanger.
3. To verify hanger suitability for a specific application and for additional information, refer to Simpson Strong-Tie's literature.

Hangers – Simpson Strong-Tie

Top mount

Width	Depth	Hanger		Fasteners		Uplift [b]	Factored resistance [c]
		Model	B [a]	Header	Joist		
(in.)	(in.)		(in.)			(lbf)	(lbf)
1-3/4	9-1/2	MIT9.5	2-1/2	8-16d	2-10d x 1-1/2"	265	2,420
		BA1.81/9.5	3	16-16d	8-10d x 1-1/2"	1,235	4,030
	11-7/8	MIT11.88	2-1/2	8-16d	2-10d x 1-1/2"	265	2,420
		BA1.81/11.88	3	16-16d	8-10d x 1-1/2"	1,235	4,030
	14	MIT1.81/14	2-1/2	8-16d	2-10d x 1-1/2"	265	2,420
		BA1.81/14	3	16-16d	8-10d x 1-1/2"	1,235	4,030
	16	MIT1.81/16	2-1/2	8-16d	2-10d x 1-1/2"	265	2,420
		BA1.81/16	3	16-16d	8-10d x 1-1/2"	1,235	4,030
2-ply 1-3/4 or 3-1/2	9-1/2	MIT49.5	2-1/2	8-16d	2-10d x 1-1/2"	265	2,420
		BA3.56/9.5	3	16-16d	8-10d x 1-1/2"	1,235	4,030
	11-7/8	BA3.56/11.88	3	16-16d	8-10d x 1-1/2"	1,235	4,030
		HB3.56/11.88	3-1/2	22-16d	10-16d x 1-1/2"	2,525	5,945
	14	BA3.56/14	3	16-16d	8-10d x 1-1/2"	1,235	4,030
		SCL3.62/14	4	6-16d	6-16d	1,530	6,775
	16	BA3.56/16	3	16-16d	8-10d x 1-1/2"	1,235	4,030
		SCL3.62/16	4	6-16d	6-16d	1,530	6,775
	18	HB3.56/18	3-1/2	22-16d	10-16d	2,525	5,945
		HGLTV3.518	6	18-16d	6-16d	1,525	9,830
3-ply 1-3/4 or 5-1/2	9-1/2	HB5.50/9.5	3-1/2	22-16d	10-16d	2,525	5,945
		SCL5.37/9.5	4	6-16d	6-16d	1,530	6,775
	11-7/8	HB5.50/11.88	3-1/2	22-16d	10-16d	2,525	5,945
		SCL5.37/11.88	5	12-16d	12-16d	2,310	11,490
	14	HB5.50/14	3-1/2	22-16d	10-16d	2,525	5,945
		SCL5.37/14	5	12-16d	12-16d	2,310	11,490
	16	HB5.50/16	3-1/2	22-16d	10-16d	2,525	5,945
		SCL5.37/16	6	10-16d	12-16d	3,055	13,025
	18	HB5.50/18	3-1/2	22-16d	10-16d	2,525	5,945
		SCL5.37/18	'5	12-16d	12-16d	2310	11,490
4-ply 1-3/4 or 7	9-1/2	HB7.12/9.5	3-1/2	22-16d	10-16d	2,525	5,945
		SCL7.25/9.5	4	6-16d	6-16d	1,530	6,775
	11-7/8	HB7.12/11.88	3-1/2	22-16d	10-16d	2,525	5,945
		SCL7.25/11.88	5	12-16d	12-16d	2,310	11,490
	14	HGLTV7.12 H=14	6	18-16d	6-16d	1,525	9,830
		SCL7.25/14	5	12-16d	12-16d	2,310	11,490
	16	HGLTV7.12 H=16	6	18-16d	6-16d	1,525	9,830
		SCL7.25/16	6	10-16d	12-16d	3,055	13,025
	18	HGLTV7.12 H=18	6	18-16d	6-16d	1,525	9,830
		SCL7.25/18	6	10-16d	12-16d	3,055	13,025

a) Dimension B represents the depth of the hanger.

b) Uplift values are based on Nordic Lam headers, upward loads and short-term duration of load.

c) Factored resistances are based on Nordic Lam headers, downward loads and standard-term duration of load.

Notes:

1. Fill all round and triangular holes.
2. Leave 1/16 inch clearance between the end of the supported joist and the header or hanger.
3. To verify hanger suitability for a specific application and for additional information, refer to Simpson Strong-Tie's literature.

Hangers – MiTek

Hangers – MiTek

Face mount

Width	Depth	Hanger		Fasteners		Uplift [b]	Factored resistance [c]
		Model	B [a]	Header	Joist		
(in.)	(in.)		(in.)			(lbf)	(lbf)
1-3/4	9-1/2	HD17925	2-1/2	24-16d	10-10d x 1-1/2"	3,270	4,710
		HUS179	3	30-16d	10-16d	7,455	8,070
	11-7/8	HD17112	2-1/2	30-16d	12-10d x 1-1/2"	3,270	6,535
		HUS179	3	30-16d	10-16d	7,455	8,070
	14	HD1714	2-1/2	36-16d	14-10d x 1-1/2"	3,270	6,535
		HUS179	3	30-16d	10-16d	7,455	8,070
	16	IHF1716	2-1/2	30-16d	2-10d x 1-1/2"	585	4,280
		HD1714	2-1/2	36-16d	14-10d x 1-1/2"	3,270	6,535
2-ply 1-3/4 or 3-1/2	9-1/2	HD410	2-1/2	20-16d	10-10d	3,640	4,625
		THDH410	4	46-16d	12-16d	7,345	9,725
	11-7/8	HD412	2-1/2	24-16d	12-10d	3,640	6,965
		THDH412	4	56-16d	14-16d	8,775	12,265
	14	HD414	2-1/2	26-16d	12-10d	3,640	6,965
		THDH414	4	66-16d	16-16d	8,905	15,320
	16	HD416	2-1/2	30-16d	14-10d	3,640	6,660
		THDH414	4	66-16d	16-16d	8,905	15,320
	18	HD416	2-1/2	30-16d	14-10d	3,640	6,660
		HD418	2-1/2	28-16d	8-10d	3,515	6,965
3-ply 1-3/4 or 5-1/2	9-1/2	HD5210	2-1/2	20-16d	10-16d	3,640	4,625
		THDH610	4	46-16d	16-16d	8,775	9,725
	11-7/8	HD5212	2-1/2	24-16d	12-16d	3,640	4,625
		THDH612	4	56-16d	20-16d	8,775	11,750
	14	HD5214	2-1/2	26-16d	12-16d	3,640	6,430
		THDH614	4	66-16d	22-16d	8,905	15,320
	16	HD5216	2-1/2	30-16d	14-16d	3,640	6,535
		THDH614	4	66-16d	22-16d	8,905	15,320
	18	HD5216	2-1/2	30-16d	14-16d	3,640	6,535
		THDH614	4	66-16d	22-16d	8,905	15,320
4-ply 1-3/4 or 7	9-1/2	HD7100	2-1/2	18-16d	8-16d	3,480	4,180
		THDH7210	4	46-16d	12-16d	7,345	9,725
	11-7/8	HD7120	2-1/2	22-16d	8-16d	3,515	4,710
		THDH7212	4	56-16d	14-16d	8,775	9,725
	14	HD7140	2-1/2	26-16d	12-16d	3,640	6,430
		THDH7214	4	66-16d	16-16d	8,905	15,320
	16	HD7140	2-1/2	26-16d	12-16d	3,640	6,430
		THDH7214	4	66-16d	16-16d	8,905	15,320
	18	HD7140	2-1/2	26-16d	12-16d	3,640	6,430
		THDH7214	4	66-16d	16-16d	8,905	15,320

a) Dimension B represents the depth of the hanger.

b) Uplift values are based on Nordic Lam headers, upward loads and short-term duration of load.

c) Factored resistances are based on Nordic Lam headers, downward loads and standard-term duration of load.

Notes:

1. For HUS and THDH models, drive joist nails into header at 30° to 45°.
2. Fill all round and diamond holes.
3. Leave 1/16 inch clearance between the end of the supported joist and the header or hanger.
4. To verify hanger suitability for a specific application and for additional information, refer to MiTek's literature.

Hangers – MiTek

Top mount

Width	Depth	Hanger		Fasteners		Uplift [b]	Factored resistance [c]
		Model	B [a]	Header	Joist		
(in.)	(in.)		(in.)			(lbf)	(lbf)
1-3/4	9-1/2	BPH1795	2-3/8	10-16d	4-10d x 1-1/2"	990	4,160
		PHXU1795	3-1/4	8-16d	6-10d x 1-1/2"	1,645	6,075
	11-7/8	BPH17118	2-3/8	10-16d	4-10d x 1-1/2"	990	4,160
		PHXU17118	3-1/4	8-16d	6-10d x 1-1/2"	1,645	6,075
	14	BPH1714	2-3/8	10-16d	4-10d x 1-1/2"	990	4,160
		PHXU1714	3-1/4	8-16d	6-10d x 1-1/2"	1,645	6,075
	16	BPH1716	2-3/8	10-16d	4-10d x 1-1/2"	990	4,160
		PHM1716	2-1/2	2-16d	2-10d x 1-1/2"	-	4,450
2-ply 1-3/4 or 3-1/2	9-1/2	HBPH3595	3-1/2	22-16d	10-16d	4,810	8,640
		HLBH3595	6	15-NA16D-RS	6-16d	1,840	9,310
	11-7/8	HBPH35118	3-1/2	22-16d	10-16d	4,810	8,640
		HLBH35118	6	15-NA16D-RS	6-16d	1,840	9,310
	14	HBPH3514	3-1/2	22-16d	10-16d	4,810	8,640
		HLBH3514	6	15-NA16D-RS	6-16d	1,840	9,310
	16	HBPH3516	3-1/2	22-16d	10-16d	4,810	8,640
		HLBH3516	6	15-NA16D-RS	6-16d	1,840	9,310
	18	HBPH3518	3-1/2	22-16d	10-16d	4,810	8,640
		HLBH3518	6	15-NA16D-RS	6-16d	1,840	9,310
3-ply 1-3/4 or 5-1/2	9-1/2	HBPH5595	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH5595	6	15-NA16D-RS	6-16d	2,355	9,310
	11-7/8	HBPH55118	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH55118	6	15-NA16D-RS	6-16d	2,355	9,310
	14	HBPH5514	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH5514	6	15-NA16D-RS	6-16d	2,355	9,310
	16	HBPH5516	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH5516	6	15-NA16D-RS	6-16d	2,355	9,310
	18	HBPH5518	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH5518	6	15-NA16D-RS	6-16d	2,355	9,310
4-ply 1-3/4 or 7	9-1/2	HBPH7195	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH7195	6	15-NA16D-RS	6-16d	2,355	9,310
	11-7/8	HBPH71118	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH71118	6	15-NA16D-RS	6-16d	2,355	9,310
	14	HBPH7114	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH7114	6	15-NA16D-RS	6-16d	2,355	9,310
	16	HBPH7116	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH7116	6	15-NA16D-RS	6-16d	2,355	9,310
	18	HBPH7118	3-1/2	22-16d	10-16d	4,890	8,635
		HLBH7118	6	15-NA16D-RS	6-16d	2,355	9,310

a) Dimension B represents the depth of the hanger.

b) Uplift values are based on Nordic Lam headers, upward loads and short-term duration of load.

c) Factored resistances are based on Nordic Lam headers, downward loads and standard-term duration of load.

Notes:

1. Fill all round holes.
2. Leave 1/16 inch clearance between the end of the supported joist and the header or hanger.
3. To verify hanger suitability for a specific application and for additional information, refer to MiTek's literature.

NORDIC

TECHNICAL GUIDE
NORDIC LAM

NS-GT4

ENGLISH

VERSION
2026-05-01

CONSTRUCTION DETAILS 3

NORDIC STRUCTURES

GENERAL NOTES

1.0 General

1.1 This document supersedes all previous versions. For the latest version, consult nordic.ca or contact Nordic Structures.

1.2 While this guide emphasizes residential construction, much of the basic design information can be used for other construction applications. Review by a design professional is required for applications beyond the scope of this document.

1.3 For more information, consult nordic.ca or contact Nordic Structures.

2.0 Structure

2.1 All nails shown in the details are assumed to be common nails unless otherwise noted. Nails shall have a diameter not less than 0.128 inch for 2-1/2-inch nails, or 0.144 inch for 3-inch nails. Individual components not shown to scale for clarity.

2.2 For APA Rim Board Plus specifications, see ANSI/APA PRR 410, Standard for Performance-rated Engineered Wood Rim Boards.

2.3 Provide adequate bearing length and bearing across the full width to support Nordic Lam beam. Refer to Chapter 2 for bearing length requirements, and consult local building code for specific requirements.

2.4 Heavy concentrated loads such as heating/cooling units, crane rails or main framing members suspended from the bottom of beams induce tension perpendicular to grain and may cause splitting. Except for light loads such as hung ceilings (including 2x-framing), sprinkler systems, lighting appliances, etc., always suspend concentrated loads from the beam top, unless designed otherwise by a qualified engineer.

3.0 Fire Resistance

3.1 Numerous fire-rated assemblies incorporate I-joists and wood structural panels. These floor-ceiling and roof-ceiling assemblies, recognized as fire-rated constructions by building codes, are illustrated in the APA Product Report PR-S274, Fire-Rated Assemblies.

3.2 A rim board can also serve as a fire barrier when it is installed in a continuous assembly on top of a wall, parallel or perpendicular to the joists. Fire-resistant rim board assemblies are shown in the APA Data File: APA Rim Board in Fire-Rated Assemblies, Form D350.

3.3 In some designs, sprinkler systems are used with Nordic Lam beams. There are a variety of sprinkler attachments that incorporate fasteners permitted by the National Fire Protection Association (NFPA), design load assumptions published by the NFPA, and published design fastener capacities. These sprinkler attachments are illustrated in details 6 of Nordic Lam Construction Details (NS-DC4).

FOR ALL
construction details →DC4

installation guide →GI41

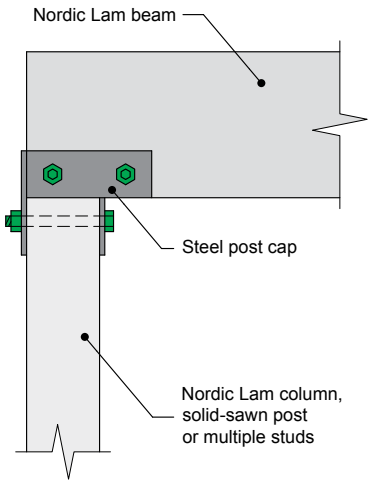
Floor Framing Details

Glulam floor beams can be installed within the floor cavity if a concealed application is desired. Most distributors stock inventory glulam in I-joist-compatible depths for use with I-joist-framing systems but glulam can also be used in most standard lumber-framing systems with minimal furring. Glulam columns are stocked in standard sizes, making them easy to conceal in any wall framing. A glulam beam can also be installed below the floor framing and then covered, therefore making it concealed. It can also be partially concealed in the floor joist cavity or left completely exposed below the floor framing.

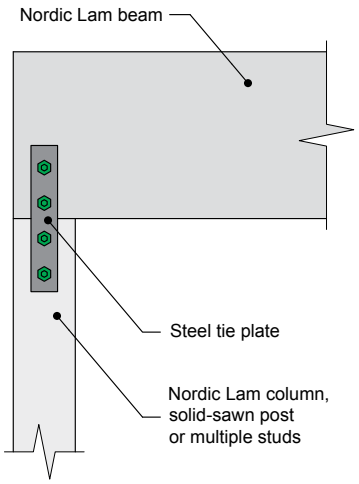
If Nordic Lam beams or columns are left exposed to add an aesthetic value, it needs to be checked, prepared and sanded before installation since its aesthetic aspect is not of primary concern.

Details 1a through 1q illustrate a variety of simple floor-framing details including glulam beams and columns.

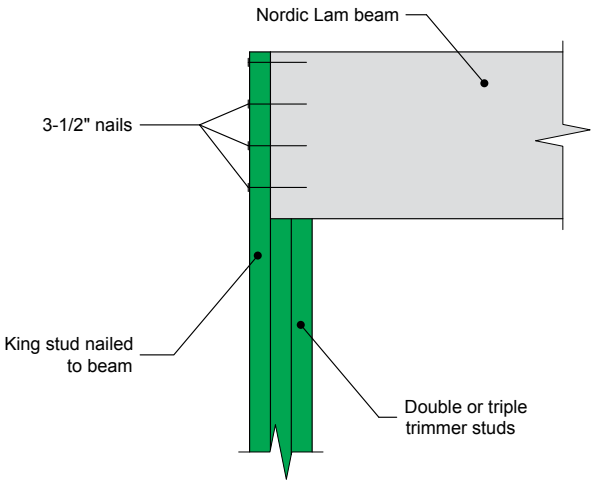
1a



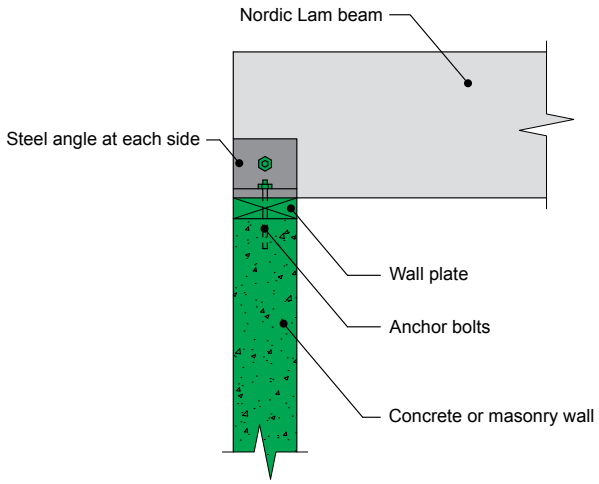
1b



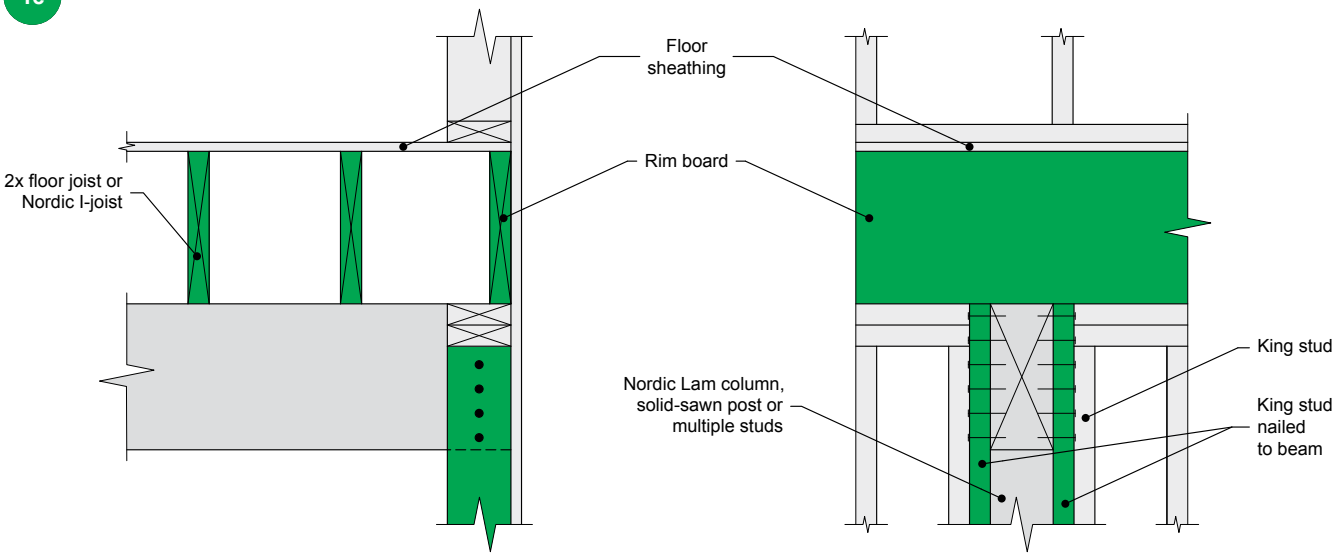
1c



1d



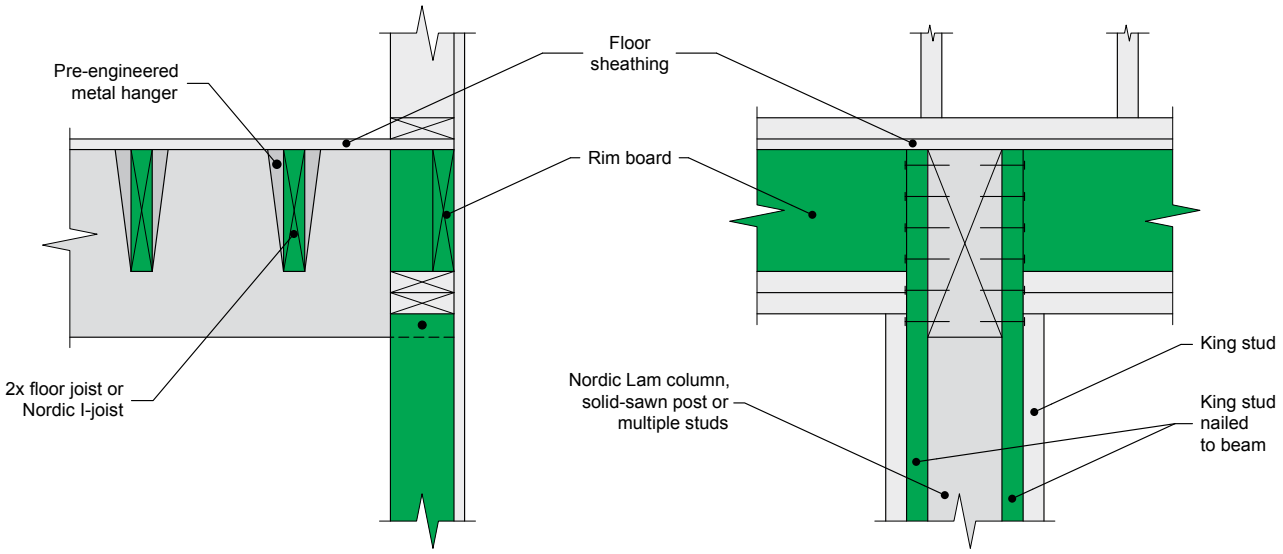
1e



Section Through Floor Joists

Section Through Nordic Lam Beam

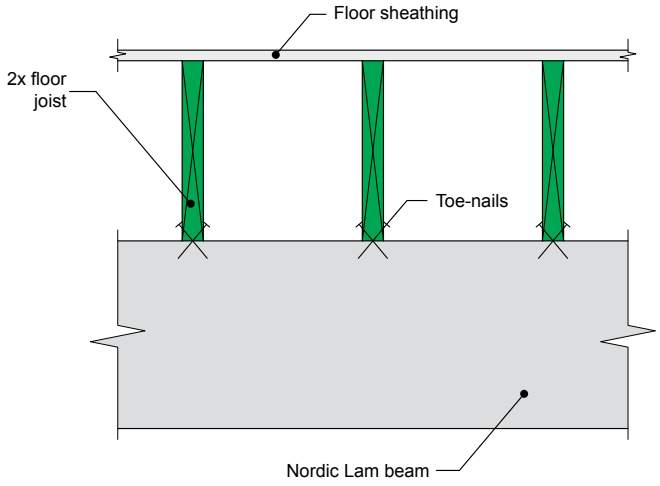
1f



Section Through Floor Joists

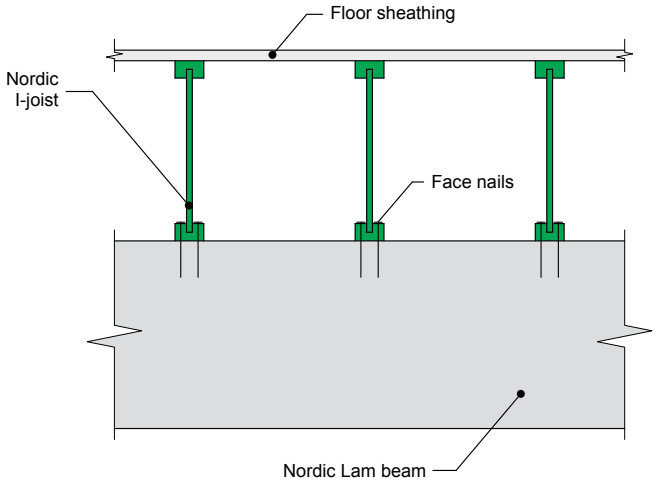
Section Through Nordic Lam Beam

1g



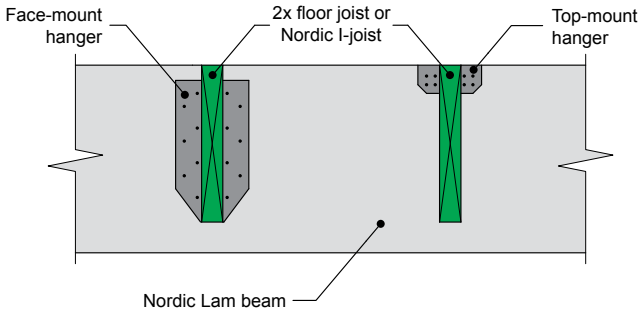
Note:
1. Blocking required between joists at bearing for lateral support, not shown for clarity.

1h



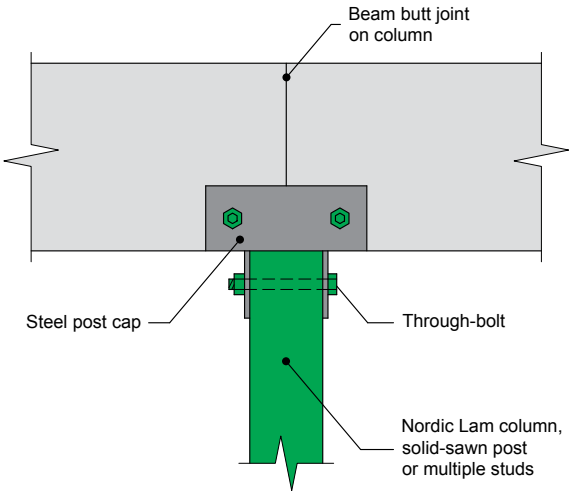
Note:
1. Blocking required between joists at bearing for lateral support, not shown for clarity.

1j



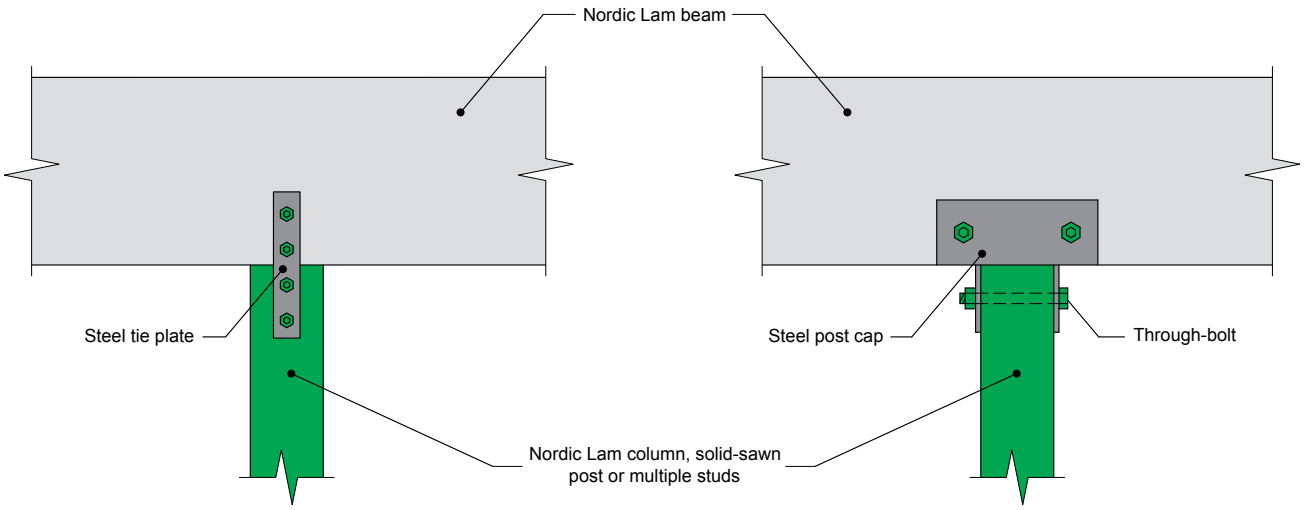
Note:
1. Hangers installed per manufacturer's recommendations.

1k

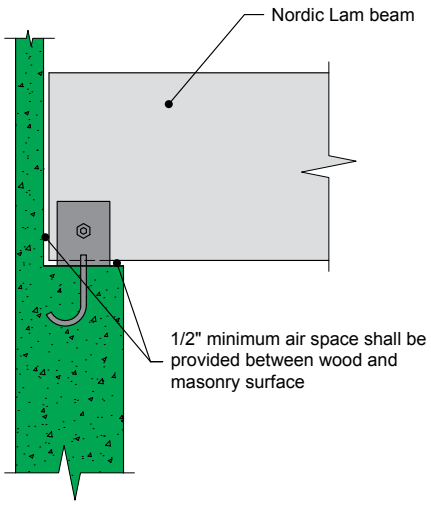


Note:
1. See detail 1m for similar details with continuous floor beam over intermediate wood supports.

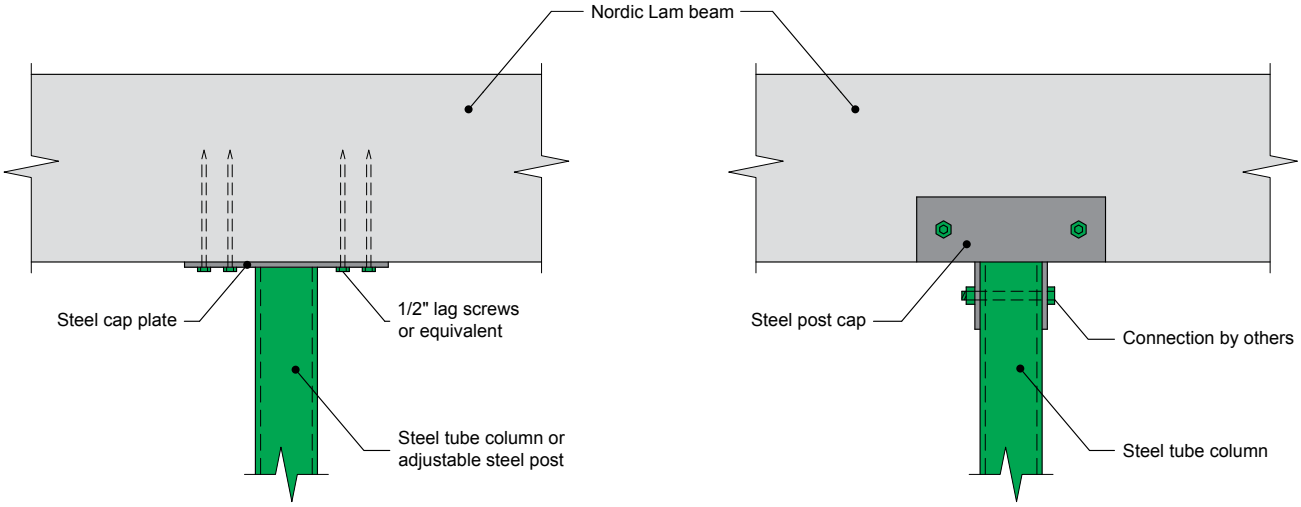
1m


Nordic Lam beam
Steel tie plate
Steel post cap
Through-bolt
Nordic Lam column, solid-sawn post or multiple studs

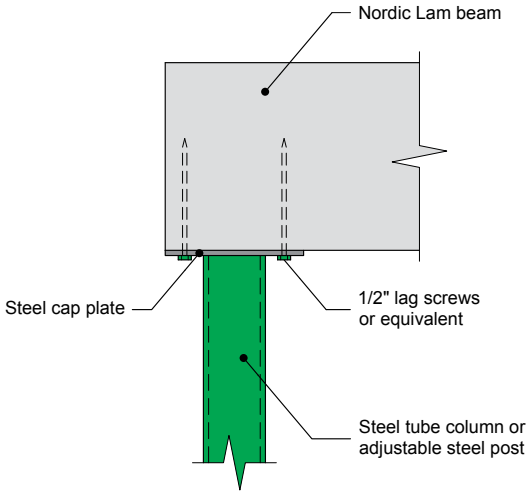
1n


Nordic Lam beam
1/2" minimum air space shall be provided between wood and masonry surface

1p


Nordic Lam beam
Steel cap plate
1/2" lag screws
or equivalent
Steel tube column or
adjustable steel post
Nordic Lam beam
Steel post cap
Connection by others
Steel tube column

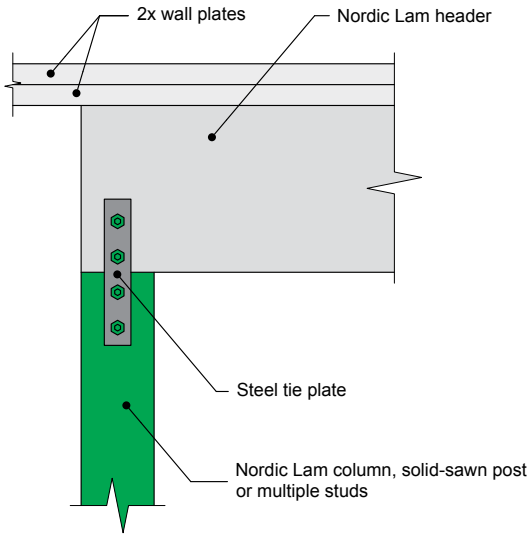
1q


Nordic Lam beam
Steel cap plate
1/2" lag screws
or equivalent
Steel tube column or
adjustable steel post

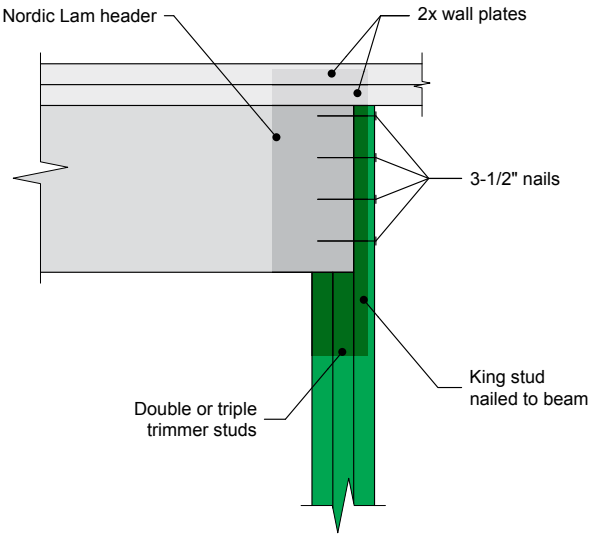
Header Framing Details

Nordic Lam beams have no camber which makes it easy to connect them with other wood frame components. They also offer long spans that are suitable for use as garage door lintels. Details 2a to 2e illustrate some of the many simple connections details that can be used with glulam in residential garage door framing.

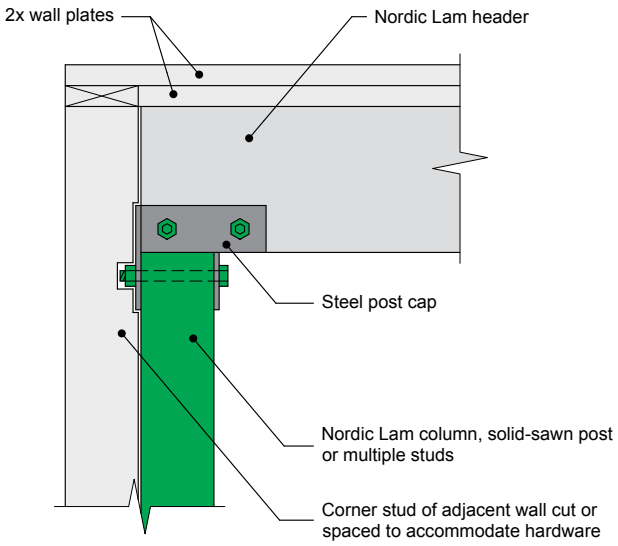
2a



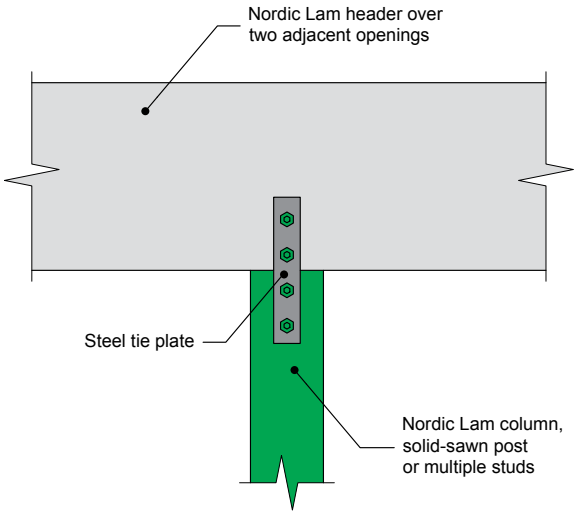
2b



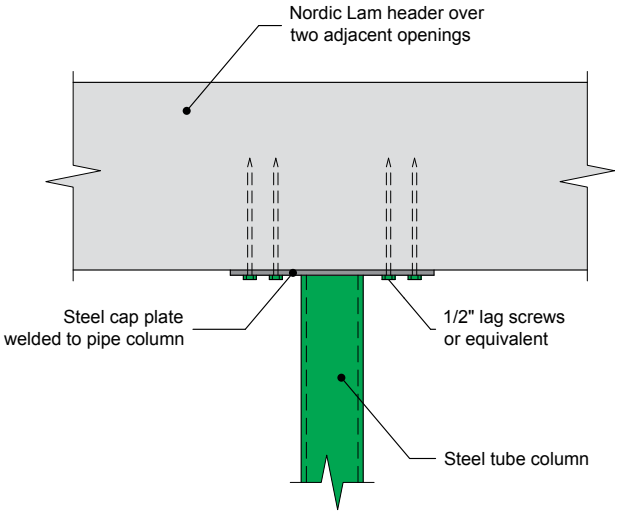
2c


2x wall plates
Nordic Lam header
Steel post cap
Nordic Lam column, solid-sawn post or multiple studs
Corner stud of adjacent wall cut or spaced to accommodate hardware

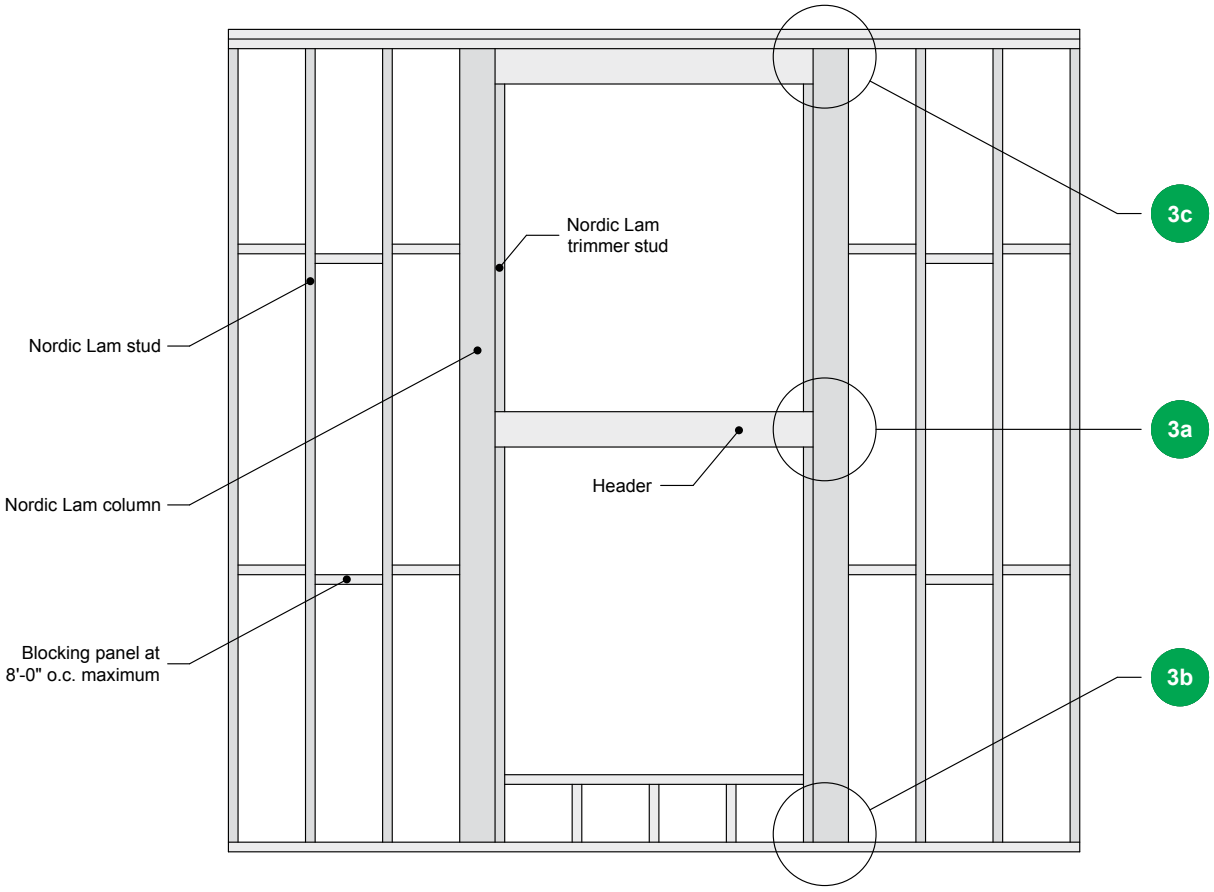
2d


Nordic Lam header over two adjacent openings
Steel tie plate
Nordic Lam column, solid-sawn post or multiple studs

2e


Nordic Lam header over two adjacent openings
Steel cap plate welded to pipe column
1/2" lag screws or equivalent
Steel tube column

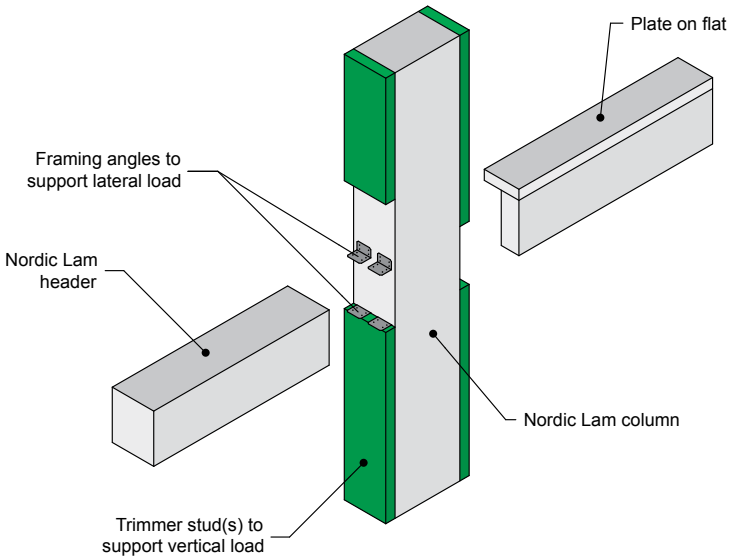
Wall and Column Framing Details



3

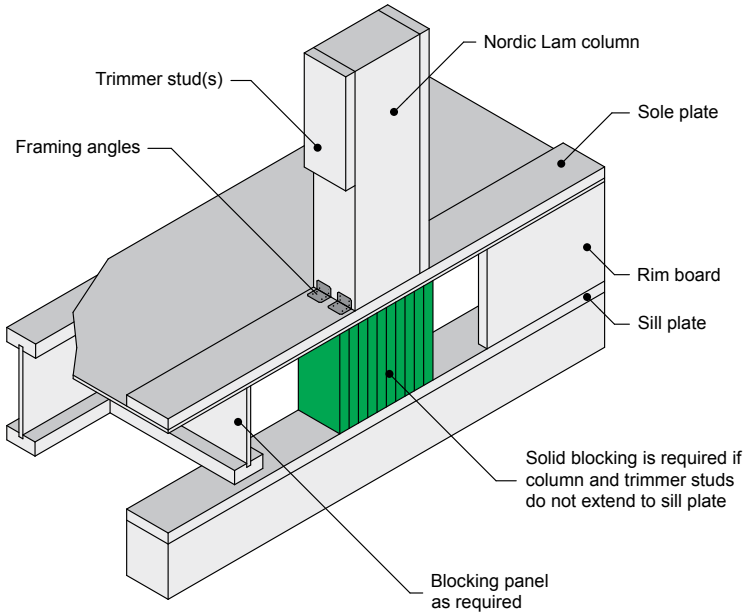
Note:
1. All additional blocking, trimmers, plates, etc. not specified should be the same as the typical stud material.

3a

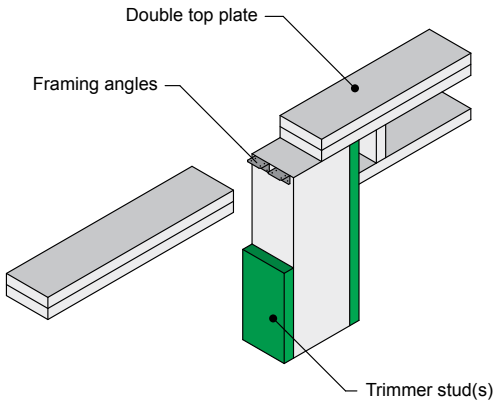


Note:
1. Plate width must equal wall thickness to provide lateral bracing. (Plate not required if header width equals the wall thickness.)

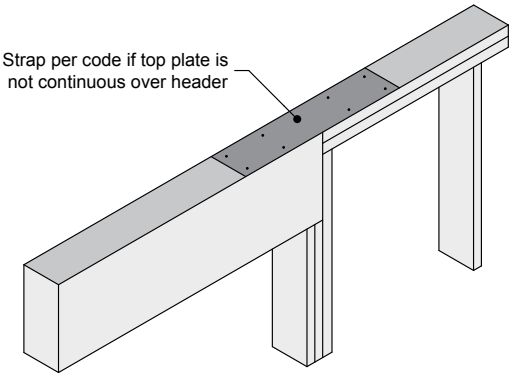
3b



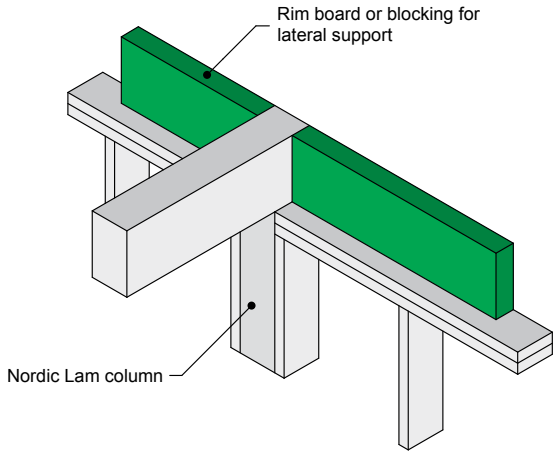
3c


Double top plate
Framing angles
Trimmer stud(s)

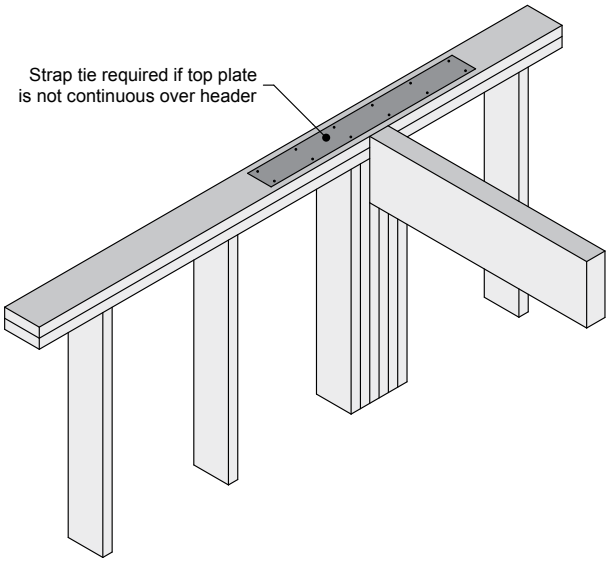
3d


Strap per code if top plate is
not continuous over header

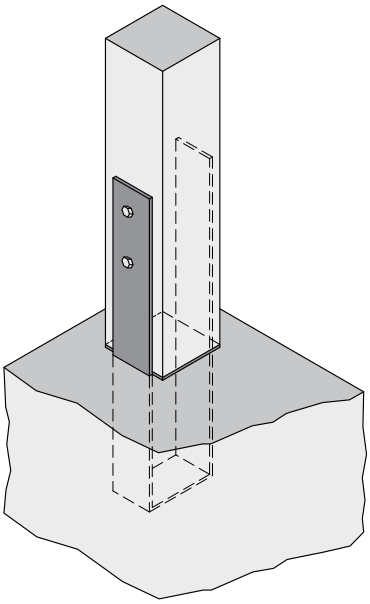
3e


Rim board or blocking for
lateral support
Nordic Lam column

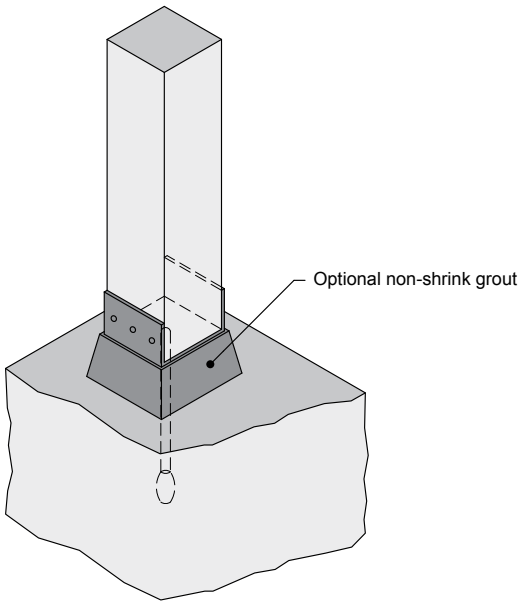
3f


Strap tie required if top plate
is not continuous over header

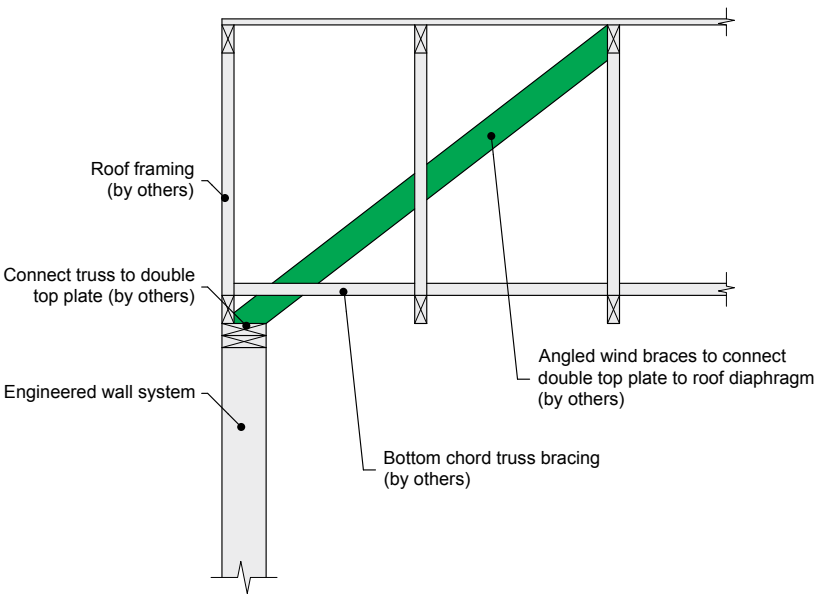
3g



3h

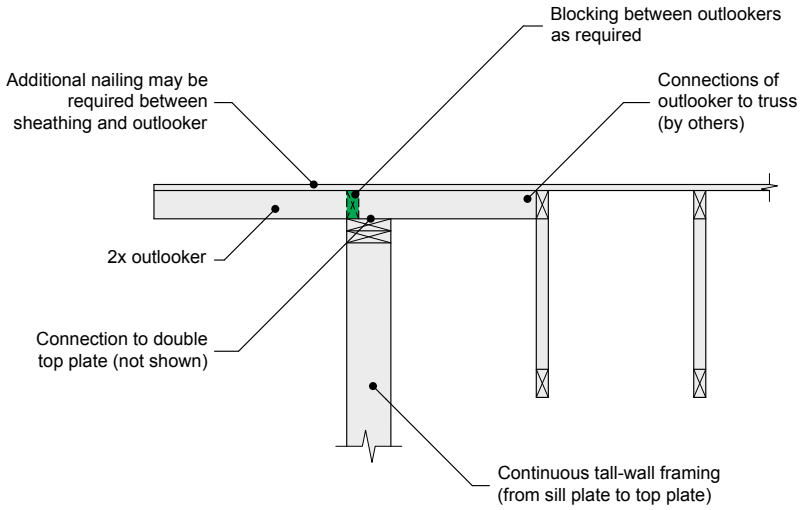


3j



Note:
1. Wall bracing is necessary if double top plate is not attached directly to the roof/floor diaphragm.

3k



Note:
1. Connection of double top plate to outlooker must be designed to transfer lateral load to roof.

Holes in Beams and Studs

Horizontal Holes

Horizontal holes in glued laminated timbers are limited in size and location to maintain the structural integrity of the beam. Detail 4 shows the zones of a uniformly loaded, simply supported beam where the field drilling of holes may be considered. These non-critical zones are located in portions of the beam stressed to less than 50 % of specified bending strength and less than 50 % of specified shear strength. For beams, of more complex loading or other than simple spans, similar diagrams may be developed.

Field-drilled horizontal holes should be used for access only and should not be used as attachment points for brackets or other load bearing hardware unless specifically designed as such by the engineer or designer of record.

These field drilled horizontal holes should meet the following guidelines:

1. Hole size: The hole diameter should not exceed 1-1/2 inch or 1/10 the beam depth, whichever is smaller.
2. Hole location: The hole should have a minimum clear distance, as measured from the edge of the hole to the nearest edge of the beam, of four hole diameters to the top or bottom face of the beam and eight hole diameters from the end of the beam. Note that the horizontal hole should not be drilled in the moment-critical zone, as defined in detail 4, unless approved by an engineer or architect qualified in engineered timber design.
3. Hole spacing: The minimum clear spacing between adjacent holes, as measured between the nearest edge of the holes, should be eight hole diameters based on the largest diameter of any adjacent hole in the beam.
4. Number of holes: The maximum number of holes should not exceed one hole per five feet of beam length. The hole spacing limitation, as given above, should be satisfied separately.

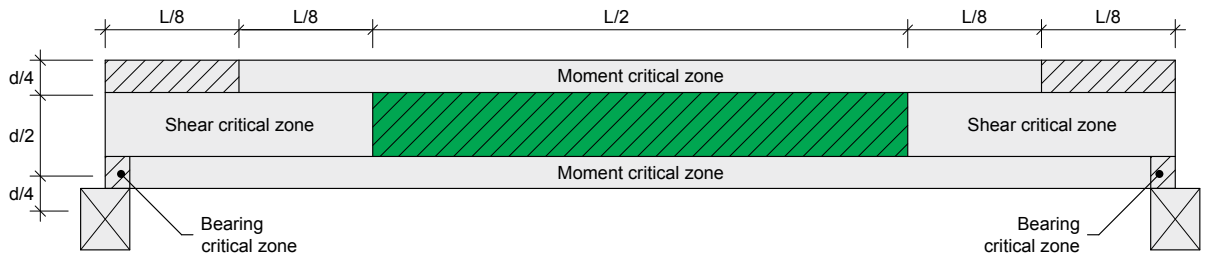
For glulam members that have been oversized or for glulam joists, the guidelines given above may be relaxed based on an engineering analysis. Regardless of the hole location, holes drilled horizontally through a member should be positioned and sized with the understanding that the beam will deflect over a period of time under in-service loading conditions. This deflection could cause distress to supported equipment or piping unless properly considered.

For any horizontal hole of a large diameter or for additional information relative to horizontal holes, see APA technical note: Effect of Large Diameter Horizontal Holes on the Bending and Shear Properties of Structural Glued Laminated Timber, V700.

Vertical Holes

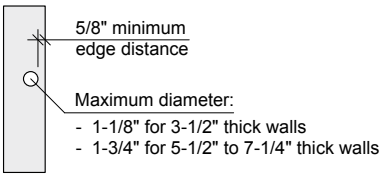
Whenever possible, avoid drilling vertical holes through glulam beams since they can cause a reduction in the resistance at that location directly proportional to the ratio of 1-1/2 times the diameter of the hole to the width of the beam. Use a drill guide to ensure a true alignment of the hole through the depth of the beam. For more information, see APA technical note: Field Notching and Drilling of Glued Laminated Timber Beams, S560.

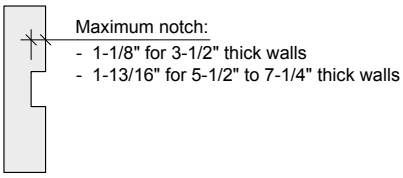
4

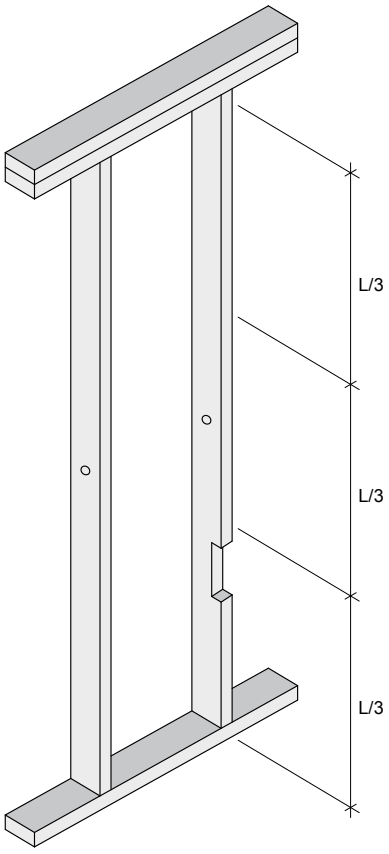


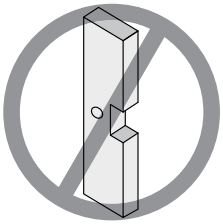
Zones where horizontal holes are permitted for passage of wires, conduit, etc.

5





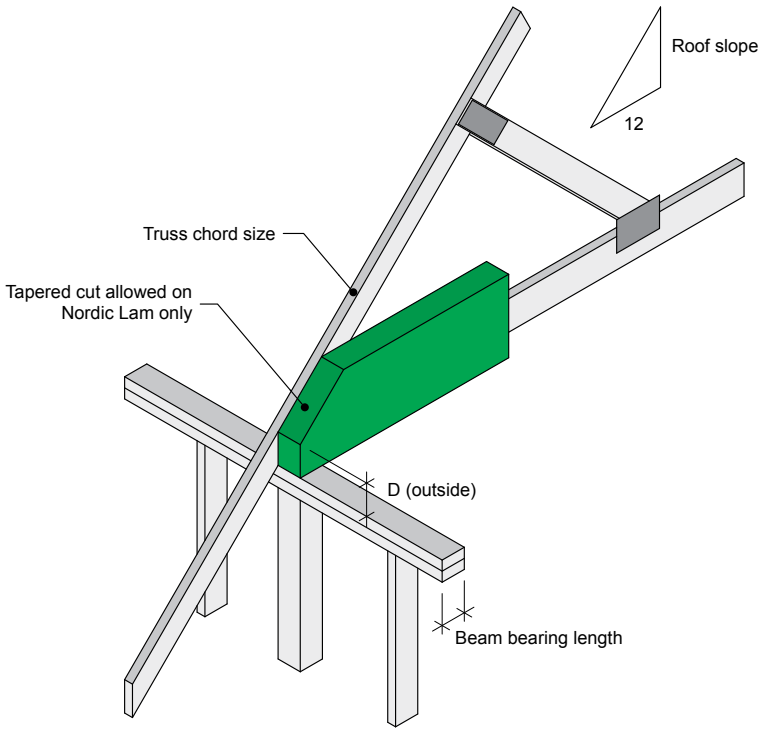




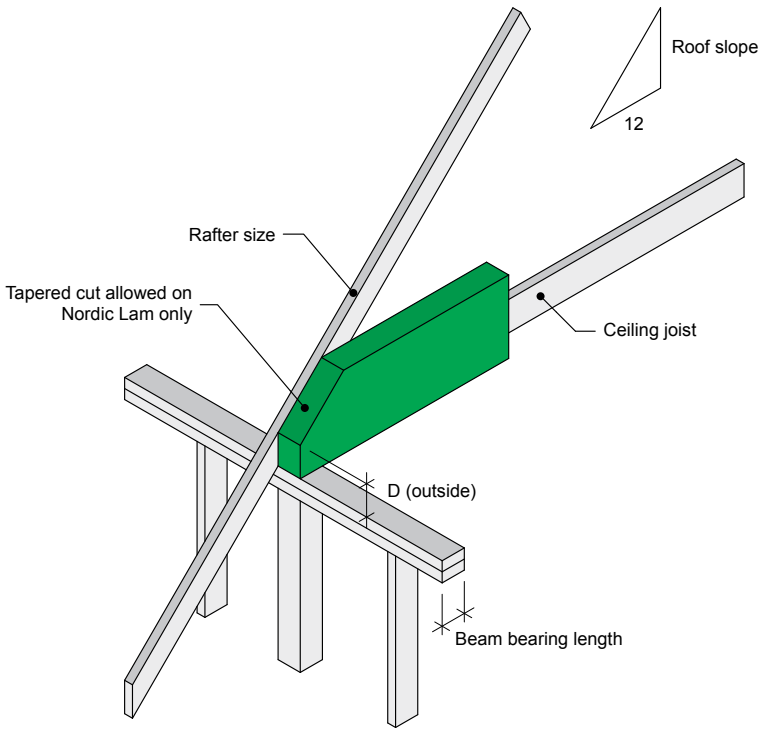
Notes:
1. One hole may be cut anywhere along the length of the stud or column but must be no closer than 5/8 inch from the edge.
2. One notch may be cut anywhere except the middle 1/3 of the length of the stud or column.
3. Bored holes shall not be located in the same section as a cut or notch in stud.

Roof Framing Details

8a



8b


Roof slope
12
Rafter size
Tapered cut allowed on
Nordic Lam only
Ceiling joist
D (outside)
Beam bearing length

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TECHNICAL GUIDE
NORDIC LAM

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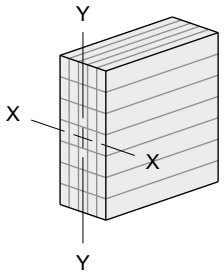
COMMERCIAL APPLICATIONS 4

NORDIC
STRUCTURES

Nordic Lam – Design Properties

Nordic Lam – Design Properties

Application	Beams and headers [g]
Axonometry	
Appearance grade	Industrial
Stress grade	24F-1.9E
Layup combination	24F-E/ES1M1
Bending about X-X axis	
Bending moment, f_{bx} [a]	4,453 psi
Longitudinal shear, f_{vx} [b]	319 psi
Compression perpendicular to grain, f_{cpx} [c]	1,088 psi
Shear-free modulus of elasticity, E_x	1,900,000 psi
Apparent modulus of elasticity, $E_{x,app}$ [d]	1,800,000 psi
Bending about Y-Y axis	
Bending moment, f_{by} [a]	
4 or more laminations	2,045 psi
3 laminations	n.a.
Longitudinal shear, f_{vy} [b]	218 psi
Compression perpendicular to grain, f_{cpy} [c]	551 psi
Shear-free modulus of elasticity, E_y	1,600,000 psi
Apparent modulus of elasticity, $E_{y,app}$ [d]	1,500,000 psi
Axially loaded	
Compression parallel to grain, f_c	
4 or more laminations	2,393 psi
3 laminations	n.a.
Tension parallel to grain, f_t	1,944 psi
Tension perpendicular to grain, f_{tp}	74 psi
Modulus of elasticity, E_a	1,600,000 psi
Mean relative density, G [e]	0.42 -
Density (for member weight), ρ [f]	35 pcf

a) The size factor for bending, K_{Zbg}, shall be calculated as per Clause 7.5.6.5.1 of CSA O86:19, where the beam width, b, is taken as the full member width.

b) The specified fracture shear strength at a notch, f_f, shall be calculated as per Clause 7.5.7.5.2 of CSA O86:19, where the effective lamination width, b_{eff}, is taken as the full member width.

c) The size factor for bearing, K_{Zcp}, shall be calculated as per Clause 6.5.6.4 of CSA O86:19, where the width and the depth are respectively the full member width and the thickness of lamination.

d) The apparent modulus of elasticity values include a 5% shear deflection. For column stability calculations, E_{05} shall be determined by multiplying the tabulated apparent modulus of elasticity by 0.87.

e) Mean relative density values, G, for dowel-type fastener design in accordance with CSA O86.

f) Density values, ρ, for a moisture content of 12%.

g) Nordic Lam beams and headers are symmetrical throughout the depth of the member (balanced layups).

Notes:

1. The tabulated values are for dry service conditions and standard-term duration of load.
2. The tabulated values are applicable to members consisting of 4 or more laminations, unless otherwise noted.
3. Design of glulam members shall be in accordance with CSA O86:19. It should be noted that Clause 7.5.3 is not applicable.

Beams and Headers – Maximum Uniform Loads

Beams and Headers – Maximum Uniform Loads

Width (in.)	Depth (in.)	Criteria	Span (ft) [a] 6	8	10	12	14	16	18	20	22	24	26	28	30
3-1/2	18	Live load, L/360 (plf)	21,000	8,859	4,536	2,625	1,653	1,107	778	567	426	328	258	207	168
		Total load, L/240 (plf)	31,485	13,274	6,789	3,922	2,464	1,646	1,151	835	624	477	372	295	237
		Factored load (plf)	6,313	4,491	3,447	2,776	2,311	1,953	1,539	1,243	1,024	857	728	625	542
		End bearing (in.)	5.5	5.2	5.0	4.8	4.7	4.6	4.1	3.7	3.3	3.1	2.8	2.6	2.5
		Intermediate bearing (in.)	13.6	12.9	12.4	12.0	11.7	11.3	10.1	9.1	8.2	7.6	7.0	6.5	6.1
	20	Live load, L/360 (plf)	28,807	12,153	6,222	3,601	2,268	1,519	1,067	778	584	450	354	283	230
		Total load, L/240 (plf)	43,193	18,212	9,316	5,384	3,384	2,262	1,583	1,150	860	658	514	408	329
		Factored load (plf)	6,883	4,895	3,757	3,026	2,519	2,149	1,867	1,537	1,267	1,061	901	774	671
		End bearing (in.)	6.0	5.7	5.4	5.3	5.1	5.0	4.9	4.5	4.1	3.8	3.5	3.2	3.0
		Intermediate bearing (in.)	14.8	14.1	13.5	13.1	12.7	12.4	12.2	11.2	10.2	9.3	8.6	8.0	7.5
	22	Live load, L/360 (plf)	38,342	16,175	8,282	4,793	3,018	2,022	1,420	1,035	778	599	471	377	307
		Total load, L/240 (plf)	57,494	24,244	12,404	7,170	4,508	3,014	2,111	1,534	1,148	880	688	547	441
		Factored load (plf)	7,442	5,293	4,062	3,271	2,723	2,323	2,018	1,780	1,535	1,286	1,092	939	815
		End bearing (in.)	6.4	6.1	5.9	5.7	5.5	5.4	5.3	5.2	4.9	4.5	4.2	3.9	3.6
		Intermediate bearing (in.)	16.0	15.2	14.6	14.2	13.8	13.4	13.2	12.9	12.3	11.3	10.4	9.7	9.0
	24	Live load, L/360 (plf)	49,778	21,000	10,752	6,222	3,918	2,625	1,844	1,344	1,010	778	612	490	398
		Total load, L/240 (plf)	74,646	31,480	16,108	9,313	5,857	3,917	2,745	1,996	1,494	1,146	897	714	577
		Factored load (plf)	7,992	5,684	4,362	3,513	2,924	2,494	2,167	1,911	1,705	1,533	1,302	1,119	972
		End bearing (in.)	6.9	6.6	6.3	6.1	5.9	5.8	5.7	5.6	5.5	5.4	5.0	4.6	4.3
		Intermediate bearing (in.)	17.2	16.4	15.7	15.2	14.8	14.4	14.1	13.9	13.6	13.4	12.4	11.5	10.7

a) Span is measured centre to centre of supports.

Notes:

1. Tabulated values are maximum uniform loads that can be applied to the beam in addition to its self-weight, along with required bearing lengths for corresponding factored loads. Selected beam shall satisfy all criteria.
2. Table is based on dry service conditions, standard-term duration of load, and the most restrictive of simple or multiple spans.
3. Beam shall be laterally supported at points of bearing and along all compression edges.
4. Tabulated factored loads account for factored bending moment and shear resistances.
5. Table assumes deflection limits of L/360 under live load and L/240 under total load. For deflection limit of L/480 under live load, multiply live load values by 0.75.

Beams and Headers – Maximum Uniform Loads

Width	Depth	Criteria	Span (ft) [a]												
(in.)	(in.)		6	8	10	12	14	16	18	20	22	24	26	28	30
5-1/2	18	Live load, L/360 (plf)	33,000	13,922	7,128	4,125	2,598	1,740	1,222	891	669	516	406	325	264
		Total load, L/240 (plf)	49,476	20,859	10,668	6,163	3,872	2,586	1,809	1,312	980	749	584	463	372
		Factored load (plf)	9,143	6,503	4,990	4,019	3,345	2,853	2,419	1,954	1,609	1,347	1,144	982	852
		End bearing (in.)	5.0	4.8	4.6	4.5	4.3	4.2	4.1	3.7	3.3	3.1	2.8	2.6	2.5
		Intermediate bearing (in.)	12.5	11.9	11.5	11.1	10.8	10.5	10.1	9.1	8.2	7.6	7.0	6.5	6.1
	20	Live load, L/360 (plf)	45,267	19,097	9,778	5,658	3,563	2,387	1,677	1,222	918	707	556	445	362
		Total load, L/240 (plf)	67,874	28,619	14,640	8,461	5,318	3,554	2,488	1,807	1,351	1,034	808	641	516
		Factored load (plf)	9,968	7,089	5,440	4,381	3,647	3,110	2,702	2,382	1,991	1,667	1,416	1,216	1,055
		End bearing (in.)	5.5	5.2	5.0	4.9	4.7	4.6	4.5	4.4	4.1	3.8	3.5	3.2	3.0
		Intermediate bearing (in.)	13.7	13.0	12.5	12.1	11.8	11.5	11.2	11.0	10.2	9.3	8.6	8.0	7.5
	22	Live load, L/360 (plf)	60,251	25,418	13,014	7,531	4,743	3,177	2,232	1,627	1,222	941	740	593	482
		Total load, L/240 (plf)	90,347	38,098	19,492	11,268	7,085	4,737	3,318	2,411	1,804	1,383	1,081	860	694
		Factored load (plf)	10,777	7,665	5,882	4,736	3,942	3,362	2,921	2,575	2,298	2,021	1,717	1,475	1,280
		End bearing (in.)	5.9	5.6	5.4	5.3	5.1	5.0	4.9	4.8	4.7	4.5	4.2	3.9	3.6
		Intermediate bearing (in.)	14.8	14.0	13.5	13.1	12.7	12.4	12.1	11.9	11.7	11.3	10.4	9.7	9.0
	24	Live load, L/360 (plf)	78,222	33,000	16,896	9,778	6,157	4,125	2,897	2,112	1,587	1,222	961	770	626
		Total load, L/240 (plf)	117,301	49,468	25,312	14,635	9,204	6,155	4,314	3,136	2,348	1,801	1,410	1,122	907
		Factored load (plf)	11,574	8,231	6,316	5,086	4,233	3,610	3,137	2,765	2,467	2,222	2,018	1,758	1,515
		End bearing (in.)	6.4	6.1	5.8	5.6	5.5	5.4	5.2	5.1	5.1	5.0	4.9	4.6	4.3
		Intermediate bearing (in.)	15.9	15.1	14.5	14.0	13.6	13.3	13.0	12.8	12.6	12.4	12.2	11.5	10.6

a) Span is measured centre to centre of supports.

Notes:

1. Tabulated values are maximum uniform loads that can be applied to the beam in addition to its self-weight, along with required bearing lengths for corresponding factored loads. Selected beam shall satisfy all criteria.
2. Table is based on dry service conditions, standard-term duration of load, and the most restrictive of simple or multiple spans.
3. Beam shall be laterally supported at points of bearing and along all compression edges.
4. Tabulated factored loads account for factored bending moment and shear resistances.
5. Table assumes deflection limits of L/360 under live load and L/240 under total load. For deflection limit of L/480 under live load, multiply live load values by 0.75.

Beams and Headers – Maximum Uniform Loads

Width (in.)	Depth (in.)	Criteria	Span (ft) [a] 6	8	10	12	14	16	18	20	22	24	26	28	30
7	18	Live load, L/360 (plf)	42,000	17,719	9,072	5,250	3,306	2,215	1,556	1,134	852	656	516	413	336
		Total load, L/240 (plf)	62,969	26,548	13,577	7,844	4,929	3,292	2,303	1,670	1,247	954	744	589	473
		Factored load (plf)	11,141	7,923	6,080	4,896	4,075	3,475	3,020	2,486	2,048	1,715	1,456	1,250	1,080
		End bearing (in.)	4.8	4.6	4.4	4.3	4.2	4.1	4.0	3.7	3.3	3.1	2.8	2.6	2.4
		Intermediate bearing (in.)	12.0	11.4	11.0	10.6	10.3	10.1	9.9	9.1	8.2	7.6	7.0	6.5	6.0
	20	Live load, L/360 (plf)	57,613	24,306	12,444	7,202	4,535	3,038	2,134	1,556	1,169	900	708	567	461
		Total load, L/240 (plf)	86,386	36,424	18,633	10,768	6,769	4,523	3,167	2,299	1,719	1,316	1,028	816	657
		Factored load (plf)	12,146	8,637	6,628	5,337	4,442	3,788	3,291	2,901	2,533	2,122	1,802	1,537	1,324
		End bearing (in.)	5.3	5.0	4.8	4.7	4.5	4.4	4.3	4.3	4.1	3.8	3.5	3.2	3.0
		Intermediate bearing (in.)	13.1	12.4	12.0	11.6	11.3	11.0	10.8	10.6	10.2	9.3	8.6	7.9	7.4
	22	Live load, L/360 (plf)	76,683	32,351	16,564	9,585	6,036	4,044	2,840	2,070	1,556	1,198	942	755	613
		Total load, L/240 (plf)	114,987	48,489	24,808	14,341	9,017	6,028	4,223	3,068	2,296	1,760	1,376	1,094	883
		Factored load (plf)	13,132	9,339	7,166	5,770	4,802	4,095	3,558	3,137	2,798	2,520	2,165	1,847	1,591
		End bearing (in.)	5.7	5.4	5.2	5.0	4.9	4.8	4.7	4.6	4.5	4.4	4.2	3.8	3.6
		Intermediate bearing (in.)	14.2	13.4	12.9	12.5	12.2	11.9	11.6	11.4	11.2	11.0	10.3	9.5	8.8
	24	Live load, L/360 (plf)	99,556	42,000	21,504	12,444	7,837	5,250	3,687	2,688	2,020	1,556	1,223	980	796
		Total load, L/240 (plf)	149,293	62,959	32,215	18,626	11,714	7,834	5,490	3,991	2,988	2,293	1,794	1,429	1,154
		Factored load (plf)	14,103	10,028	7,695	6,196	5,157	4,398	3,820	3,368	3,004	2,706	2,457	2,183	1,881
		End bearing (in.)	6.1	5.8	5.6	5.4	5.3	5.1	5.0	4.9	4.8	4.8	4.7	4.5	4.2
		Intermediate bearing (in.)	15.2	14.4	13.9	13.4	13.1	12.8	12.5	12.3	12.0	11.9	11.7	11.2	10.4

a) Span is measured centre to centre of supports.

Notes:

1. Tabulated values are maximum uniform loads that can be applied to the beam in addition to its self-weight, along with required bearing lengths for corresponding factored loads. Selected beam shall satisfy all criteria.
2. Table is based on dry service conditions, standard-term duration of load, and the most restrictive of simple or multiple spans.
3. Beam shall be laterally supported at points of bearing and along all compression edges.
4. Tabulated factored loads account for factored bending moment and shear resistances.
5. Table assumes deflection limits of L/360 under live load and L/240 under total load. For deflection limit of L/480 under live load, multiply live load values by 0.75.

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VERSION
2026-05-01

ADDITIONAL INFORMATION 5

NORDIC
STRUCTURES

Storage and Handling Guidelines

Water-resistant wrapping is used to protect products from exposure, moisture, dirt and scratches during transit from the manufacturing plant and should be left on the products during all storage stages. Because sunlight can discolor glulam products, it is recommended to leave the wrapping as long as possible before they are to be used. If are to stay apparent in a project and it would be necessary to remove only portions of the wrapping during the erection sequence, it is rather preferable to remove all of the wrapping to avoid discoloration due to exposure to the sun.

Glulam products must be stored properly and handled with care to assure optimal performance. Sealants on the ends of beams help guard against moisture penetration and checking. A coat of sealant should be applied to the ends of any beams trimmed or otherwise cut in the field. Surface sealant, which can be applied to top, bottom, and sides of beams, resist dirt and moisture and help control checking and grain raising. Use a penetrating sealant if beams will be stained or given a natural finish.

Glulam beams are commonly loaded and unloaded with a fork lift. For greater stability, the sides of the beams, rather than the bottom faces, should rest on the forks. If a crane with slings is used to load and unload beams, provide adequate blocking between the cable and the member. Use wooded cleats or blocking to protect corners. Only non-marring fabric slings should be used to lift glulam products.

When loading beams on trucks and transporting them, stack them on lumber blocking or skids. Beams can rest on their sides or bottom faces. Secure the load with straps to keep it from shifting. Protect beam corners with “softeners” when strapping down the load.

In the distribution yard and on the jobsite, a well-drained covered site is recommended. Keep glulam members off the ground with lumber blocking, skids or rack systems. Beams should remain wrapped to protect them from moisture, dirt, sunlight, and scratches. At the jobsite, use similar storage provisions when possible.

Software

Nordic Sizer

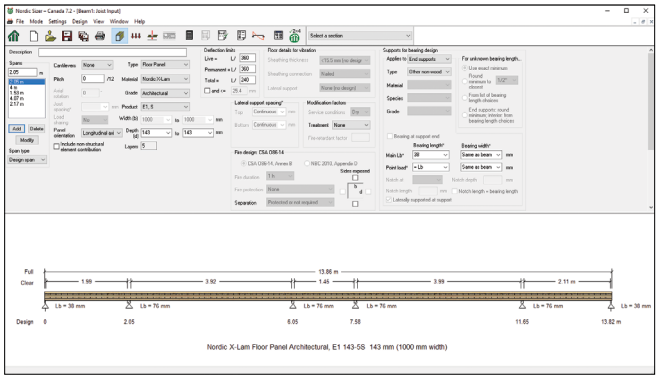
Nordic Sizer is a software program built to design individual structural elements (joists, beams, columns, studs, slabs, and panels) using the full range of Nordic engineered wood products.

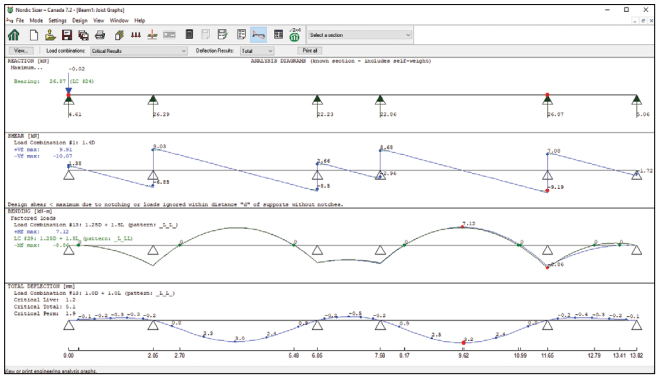
Nordic Sizer software application analyzes and designs members for specified loads in accordance with CSA O86 (Canada) or NDS (United States) standard, and automatically checks load cases and load combinations in accordance with NBC (Canada) or IBC (United States). Features include floor vibration checks and fire resistance calculations.

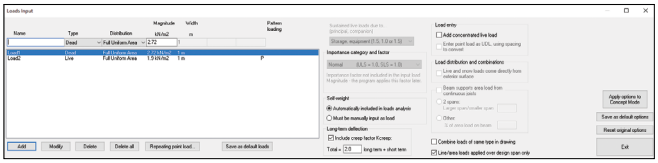
For more information: http://woodworks-software.com

DOWNLOAD & INSTALL
Download, install, and fill in the form to receive a keycode by email within the next business day.For assistance, please contact the technical support at 514-871-8526, ext. 2 or tech@nordic.ca.

WOODWORKS SOFTWARE TUTORIALS
Canadian Training Videos and User Guide
(https://cwc.ca/sizer-can-version/)







NORDIC STRUCTURES

COMPANY	PROJECT
Aug. 12, 2020 15:47	Beam1

Design Check Calculation Sheet
Nordic Sizer – Canada 7.2

Loads:

Load	Type	Distribution	Pat-tern	Location [m] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full Area	No			2.72(1.00m)		kN/m2
Load2	Live	Full Area	Yes			1.90(1.00m)		kN/m2
Self-weight	Dead	Full UDL	No			0.72		kN/m

Maximum Reactions (kN), Bearing Resistances (kN) and Bearing Lengths (mm) :

13.86 m
0 2.05 6.05 7.58 11.65 13.82 m

Unfactored:							
Dead	1.54	12.59	9.22	9.56	12.87		1.79
Live	1.79	7.04	7.14	7.28	7.19		1.88
Factored:							
Uplift	0.02						
Total	4.61	26.29	22.23	22.86	26.87		5.06
Bearing:							
Capacity							
Beam	161.54	282.46	305.35	304.13	282.38		161.54
Des ratio							
Beam	0.03	0.08	0.06	0.07	0.08		0.03
Load case	#24	#14	#25	#16	#29		#24
Length	38*	76	76	76	76		38*
Min req'd	38*	76*	76*	76*	76*		38*
KB	1.00	1.00	1.00	1.00	1.00		1.00
KB min	1.00	1.00	1.00	1.00	1.00		1.00
KD	1.00	0.87	0.94	0.94	0.87		1.00

*Minimum bearing length for panels is 38 mm for exterior supports and 76 mm for intermediate supports

Nordic X-Lam Floor Panel Architectural, E1 143-5S 143 mm (1000 mm width)
Supports: All - Non-wood
Total length: 13.858 m; Clear span: 2, 3.9, 1.5, 4, 2.1 m; Volume = 1.982 m^3; Panel orientation: Longitudinal axis
This section PASSES the design code check.

Limit States Design using CSA O86-14:

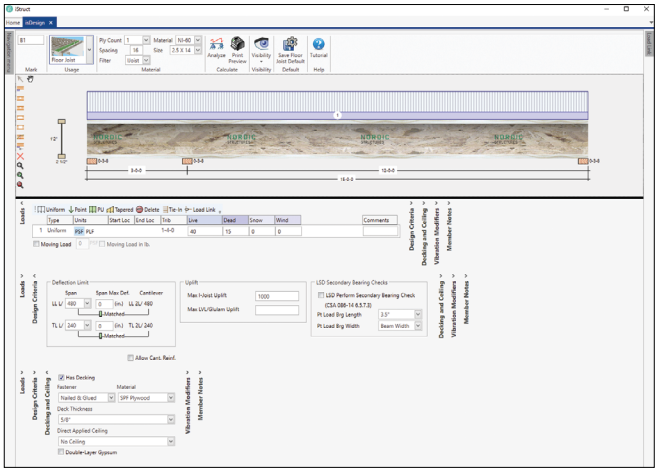
Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	Vf @d = 9.19	Vr = 27.95	kN	Vf/Vr = 0.33
Moment(+)	Mf = 7.12	Mr = 58.05	kN-m	Mf/Mr = 0.12
Moment(-)	Mf = 8.86	Mr = 56.95	kN-m	Mf/Mr = 0.16
Perm. Defl'n	1.9 = < L/999	11.3 = L/360	mm	0.17
Live Defl'n	1.2 = < L/999	11.3 = L/360	mm	0.11
Total Defl'n	5.1 = L/798	17.0 = L/240	mm	0.30
Vibration	Lmax = 4.070	Lv = 5.186	m	Lmax/Lv = 0.78

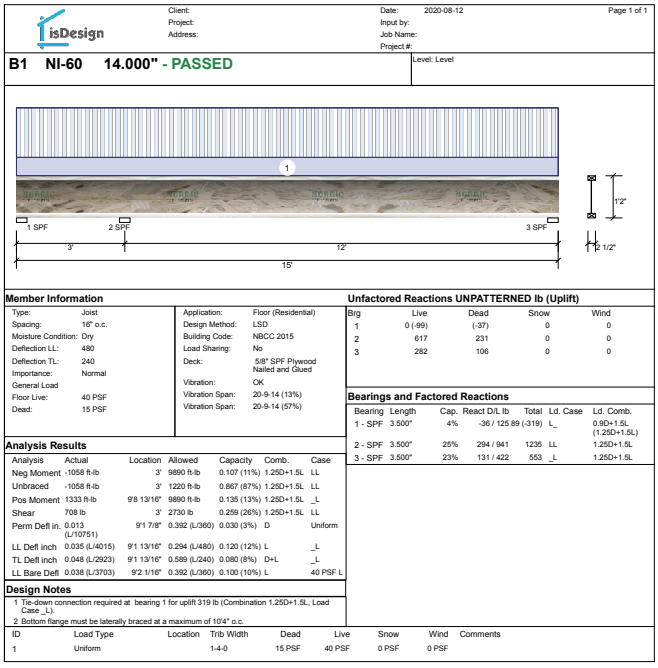
CSD – iStruct™

iStruct™ is a state-of-the-art enterprise solution for layout, design, and structural analysis that combines layout/drafting, single member design, reporting, and an incredible real time 3D experience. It supports a selection of products, including I-joists, SCL lumber, solid sawn lumber, walls, rim board, hangers, and more.

isDesign™ is a single member sizing solution that allows users to size floor and roof joists, beams, and posts by inputting span and load information. Innovative tools allow selection of the most cost-effective solution.

isPlan™ is a 3D layout and design solution that allows users to model an entire structure with 2D and 3D views. isPlan™ develops and transfers gravity loads through the entire structure and designs the structural members. Robust import and export of pdf, dxf, and dwg files combined with intuitive modeling and design tools ensure efficient and cost-effective designs.





isDesign

Client:
Project:
Address:

Date: 2020-08-12
Input by:
Job Name:
Project #:

Page 1 of 1

B1 NI-60 14.000" - PASSED

Level: Level

1 SPF 2 SPF 3 SPF
3' 12' 15'
1'2"
2 1/2"

Member Information

Type:	Joist
Spacing:	16" o.c.
Moisture Condition:	Dry
Deflection LL:	480
Deflection TL:	240
Importance:	Normal
General Load	
Floor Live:	40 PSF
Dead:	15 PSF

Application:	Floor (Residential)
Design Method:	LSD
Building Code:	NBCC 2015
Load Sharing:	No
Deck:	5/8" SPF Plywood Nailed and Glued
Vibration:	OK
Vibration Span:	20-9-14 (13%)
Vibration Span:	20-9-14 (57%)

Unfactored Reactions UNPATTERNED lb (Uplift)

Brg	Live	Dead	Snow	Wind
1	0 (-99)	(-37)	0	0
2	617	231	0	0
3	282	106	0	0

Bearings and Factored Reactions

Bearing	Length	Cap.	React D/L lb	Total	Ld. Case	Ld. Comb.
1 - SPF	3.500"	4%	-36 / 125	89 (-319)	L_	0.9D+1.5L (1.25D+1.5L)
2 - SPF	3.500"	25%	294 / 941	1235	LL	1.25D+1.5L
3 - SPF	3.500"	23%	131 / 422	553	_L	1.25D+1.5L

Analysis Results

Analysis	Actual	Location	Allowed	Capacity	Comb.	Case
Neg Moment	-1058 ft-lb	3'	9890 ft-lb	0.107 (11%)	1.25D+1.5L	LL
Unbraced	-1058 ft-lb	3'	1220 ft-lb	0.867 (87%)	1.25D+1.5L	LL
Pos Moment	1333 ft-lb	9'8 13/16"	9890 ft-lb	0.135 (13%)	1.25D+1.5L	_L
Shear	708 lb	3'	2730 lb	0.259 (26%)	1.25D+1.5L	LL
Perm Defl in.	0.013 (L/10751)	9'1 7/8"	0.392 (L/360)	0.030 (3%)	D	Uniform
LL Defl inch	0.035 (L/4015)	9'1 13/16"	0.294 (L/480)	0.120 (12%)	L	_L
TL Defl inch	0.048 (L/2923)	9'1 13/16"	0.589 (L/240)	0.080 (8%)	D+L	_L
LL Bare Defl	0.038 (L/3703)	9'2 1/16"	0.392 (L/360)	0.100 (10%)	L	40 PSF L

Design Notes

1 Tie-down connection required at bearing 1 for uplift 319 lb (Combination 1.25D+1.5L, Load Case _L).
2 Bottom flange must be laterally braced at a maximum of 10'4" o.c.

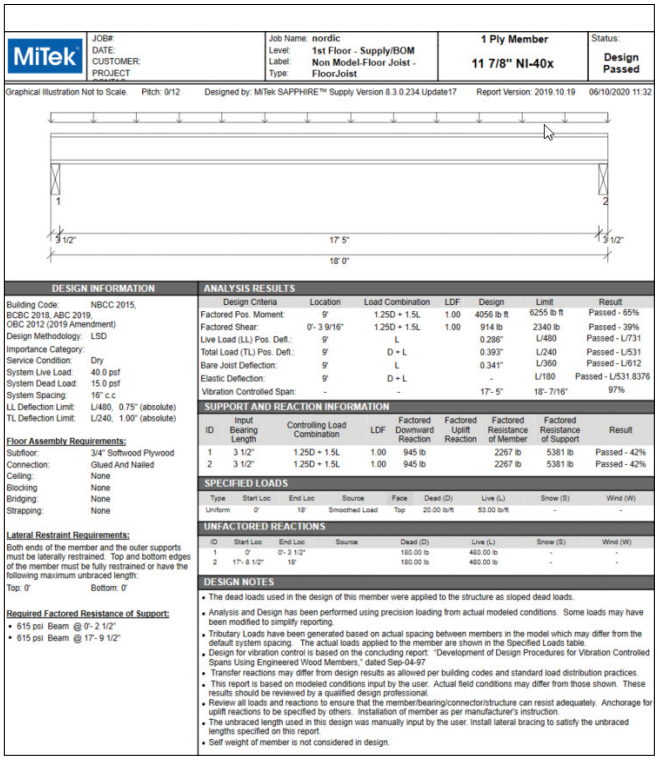
ID	Load Type	Location	Trib Width	Dead	Live	Snow	Wind	Comments
1	Uniform		1-4-0	15 PSF	40 PSF	0 PSF	0 PSF	

MiTek SAPPHIRE

MiTek – SAPPHIRE™ Structure

Built exclusively for component manufacturers, this software delivers the most powerful structural modeling, editing, and estimating functionality available anywhere.

The Formula Builder feature enables designers to create or store customized formulas, group formulas into sets, scheme and apply to jobs or individual objects. Create estimates by applying formulas to modeled objects. For options management, you can create and customize plan options directly from within a job file. You can include all member types in your options, from accessories to walls, and utilize option customization, such as special junction considerations for site-specific creation



MiTek

JOB#:
DATE:
CUSTOMER:
PROJECT

Job Name: nordic
Level: 1st Floor - Supply/BOM
Label: Non Model-Floor Joist -
Type: FloorJoist

1 Ply Member
11 7/8" NI-40x

Status: Design Passed

Graphical Illustration Not to Scale. Pitch: 0/12 Designed by: MiTek SAPPHIRE™ Supply Version 8.3.0.234.Update17 Report Version: 2019.10.19 06/10/2020 11:32

1 2
3 1/2" 17' 5" 3 1/2"
18' 0"

DESIGN INFORMATION

Building Code: NBCC 2015, BCBC 2018, ABC 2019, OBC 2012 (2019 Amendment)
Design Methodology: LSD
Importance Category:
Service Condition: Dry
System Live Load: 40.0 psf
System Dead Load: 15.0 psf
System Spacing: 16" c.c
LL Deflection Limit: L/480, 0.75" (absolute)
TL Deflection Limit: L/240, 1.00" (absolute)

Floor Assembly Requirements:
Subfloor: 3/4" Softwood Plywood
Connection: Glued And Nailed
Ceiling: None
Blocking: None
Bridging: None
Strapping: None

Lateral Restraint Requirements:
Both ends of the member and the outer supports must be laterally restrained. Top and bottom edges of the member must be fully restrained or have the following maximum unbraced length:
Top: 0' Bottom: 0'

Required Factored Resistance of Support:
- 615 psi Beam @ 0'- 2 1/2"
- 615 psi Beam @ 17'- 9 1/2"

ANALYSIS RESULTS

Design Criteria	Location	Load Combination	LDF	Design	Limit	Result
Factored Pos. Moment:	9'	1.25D + 1.5L	1.00	4056 lb ft	6255 lb ft	Passed - 65%
Factored Shear:	0'- 3 9/16"	1.25D + 1.5L	1.00	914 lb	2340 lb	Passed - 39%
Live Load (LL) Pos. Defl.:	9'	L		0.286"	L/480	Passed - L/731
Total Load (TL) Pos. Defl.:	9'	D + L		0.393"	L/240	Passed - L/531
Bare Joist Deflection:	9'	L		0.341"	L/360	Passed - L/612
Elastic Deflection:	9'	D + L		-	L/180	Passed - L/531.8376
Vibration Controlled Span:	-	-		17'- 5"	18'- 7/16"	97%

SUPPORT AND REACTION INFORMATION

ID	Input Bearing Length	Controlling Load Combination	LDF	Factored Downward Reaction	Factored Uplift Reaction	Factored Resistance of Member	Factored Resistance of Support	Result
1	3 1/2"	1.25D + 1.5L	1.00	945 lb		2267 lb	5381 lb	Passed - 42%
2	3 1/2"	1.25D + 1.5L	1.00	945 lb		2267 lb	5381 lb	Passed - 42%

SPECIFIED LOADS

Type	Start Loc	End Loc	Source	Face	Dead (D)	Live (L)	Snow (S)	Wind (W)
Uniform	0'	18'	Smoothed Load	Top	20.00 lb/ft	53.00 lb/ft	-	-

UNFACTORED REACTIONS

ID	Start Loc	End Loc	Source	Dead (D)	Live (L)	Snow (S)	Wind (W)
1	0'	0'- 3 1/2"		180.00 lb	480.00 lb	-	-
2	17'- 8 1/2"	18'		180.00 lb	480.00 lb	-	-

DESIGN NOTES

- The dead loads used in the design of this member were applied to the structure as sloped dead loads.
- Analysis and Design has been performed using precision loading from actual modeled conditions. Some loads may have been modified to simplify reporting.
- Tributary Loads have been generated based on actual spacing between members in the model which may differ from the default system spacing. The actual loads applied to the member are shown in the Specified Loads table.
- Design for vibration control is based on the concluding report: "Development of Design Procedures for Vibration Controlled Spans Using Engineered Wood Members," dated Sep-04-97
- Transfer reactions may differ from design results as allowed per building codes and standard load distribution practices.
- This report is based on modeled conditions input by the user. Actual field conditions may differ from those shown. These results should be reviewed by a qualified design professional.
- Review all loads and reactions to ensure that the member/bearing/connector/structure can resist adequately. Anchorage for uplift reactions to be specified by others. Installation of member as per manufacturer's instruction.
- The unbraced length used in this design was manually input by the user. Install lateral bracing to satisfy the unbraced lengths specified on this report.
- Self weight of member is not considered in design.

Conversion Factors

Conversion Factors

Item	Imperial to metric			Metric to imperial		
Length	1 in.	=	25.4 mm	1 mm	=	0.0393701 in.
		=	0.0254 m	1 m	=	39.3701 in.
	1 ft	=	0.3048 m		=	3.28084 ft
	1 yd	=	0.9144 m		=	1.09361 yd
	1 mile	=	1.60934 km	1 km	=	0.621371 mile
Length / time	1 ft/s	=	0.3048 m/s	1 m/s	=	3.28084 ft/s
	1 mph	=	1.60934 km/h	1 km/h	=	0.621371 mph
Area	1 in.²	=	645.16 mm²	1 mm²	=	0.001550 in.²
	1 ft²	=	0.0929030 m²	1 m²	=	10.7639 ft²
	1 acre	=	0.404686 ha	1 ha	=	2.47105 acres
	1 mi²	=	2.58999 km²	1 km²	=	0.386102 mi²
Volume	1 in.³	=	16 387.1 mm³	1 mm³	=	0.0000610237 in.³
	1 ft³	=	0.0283168 m³	1 m³	=	35.3147 ft³
	1 yd³	=	0.764555 m³		=	1.30795 yd³
	1 fl oz (US)	=	29.5735 mL	1 mL	=	0.0338141 fl oz (US)
	1 gal (US)	=	3.78541 L	1 L	=	0.264172 gal (US)
Mass	1 oz	=	28.3495 g	1 g	=	0.0352740 oz
	1 lb	=	0.453592 kg	1 kg	=	2.20462 lb
	1 short ton (2000 lb)	=	0.907185 tons	1 ton	=	1.10231 short tons
Mass / volume	1 lb/ft³	=	16.0185 kg/m³	1 kg/m³	=	0.0624280 lbf/ft³
Force	1 lbf	=	4.44822 N	1 N	=	0.224809 lbf
Stress	1 lbf/in.² (psi)	=	0.00689476 N/mm² (MPa)	1 N/mm² (MPa)	=	145.038 lbf/in.² (psi)
Loading	1 lbf/ft² (psf)	=	0.0478803 kN/m² (kPa)	1 kN/m² (kPa)	=	20.8854 lbf/ft² (psf)
	1 lbf/ft (plf)	=	0.0145939 kN/m	1 kN/m	=	68.5218 lbf/ft (plf)
Bending moment	1 lbf-ft	=	0.00135582 kN-m	1 kN-m	=	737.561 lbf-ft
Temperature	1 °F	=	(°F - 32) / 1.8 °C	1 °C	=	32 + 1.8 (°C) °F

Notes:

1. 9.80665 N = 1.0 kg x 9.80665 m/s²
2. 1.0 Pa = 1.0 N/m²

+ construction details →**DC4**

+ installation guide →**GI41**

+ product warranty →**NS-DI002**

nordic.ca