Mass Timber Construction
STRUCTURAL DETAILS
Nordic Structures is the leading innovator in mass timber construction. 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.
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vi Nordic Lam+ (glulam)

STRUCTURE

MECHANICAL, ELECTRICAL, AND PLUMBING
1.0 General

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

1.2 The information contained in this document is provided for information purposes only. This information should not be used for any application without examination and verification of its accuracy, suitability and applicability by a licensed engineer, architect or other professional. Nordic Structures does not guarantee that the information is suitable for any general or particular use, and assumes no responsibility for the use, application of and/or reference to the information.

1.3 All dimensions are in inches (in.), unless otherwise noted.

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

2.0 Design of connections

2.1 The design of connections, including fire resistance if required, shall be in accordance with the National Design Specification (NDS) for Wood Construction 2015.

2.2 The design of connections should include considerations for structural and service performance, such as resistance, minimum distances, dimensional changes, durability, erection and fire safety, among others, as well as taking into account architectural requirements.

2.3 The connections shown in this document are provided for information purposes only, and conceptually. Note that many possibilities and variants are possible.
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### Mechanical, electrical, and plumbing

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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:
  - 2.70 × 19.5 m (106-1/4 in. × 64 ft)

- Stress grade:
  - E1 (L 1950Fb and T No. 3/Stud)
NORDIC LAM+
GLUED-LAMINATED TIMBER

Nordic Lam+ glued-laminated timber of architectural appearance classification 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

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
Continuous Floor Slab on Beam

NORDIC LAM BEAM

PARTIALLY THREADED SCREW @ 12 in. O.C. U.N.O.

NORDIC X-LAM SLAB
PARTIALLY THREADED SCREWS @ 12 in. O.C. U.N.O., STAGGERED

NORDIC X-LAM SLAB

NORDIC LAM BEAM

NORDIC LAM BEAM

NORDIC LAM SLAB

NORDIC X-LAM SLAB

PARTIALLY THREADED SCREWS @ 12 in. O.C. U.N.O., STAGGERED
a) The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
a) The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
a) The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
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a) The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
Title: Pocket for Beam

Category: Structure, GL-CLT

DATE: 2020-02-01

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NORDIC LAM+ BEAM
NORDIC X-LAM WALL

TITLE
Through Pocket for Beam

CATEGORY
Structure, GL-CLT
Wall to Sill Plate, Holdown

NORDEIC X-LAM WALL
HOLDOWN
SILL PLATE
IMPERMEABLE MEMBRANE
NON-SHRINK GROUT 1 in.
MECHANICAL ANCHORS
CONCRETE
NORDIC X-LAM WALL
RING SHANK NAIL
HOLDDOWN
IMPERMEABLE MEMBRANE
NON-SHRINK GROUT 1 in.
MECHANICAL ANCHOR
CONCRETE

Wall to Foundation, Holdown
Structure, Wall-Foundation
NS-DS2014-US
2020-02-01
1.15
Note:
1. This assembly detail offers a resistance to forces acting perpendicularly to the foundation wall.
Note:
1. For an exterior wall on foundation, careful consideration should be given to waterproofing and drainage at the junction between wall and steel C shape.
NORDIC X-LAM WALL
NORDIC X-LAM SLAB
FULLY THREADED SCREW @ 10 in. O.C. U.N.O.
NORDIC LAM LEDGER
PARTIALLY THREADED SCREW @ 10 in. O.C. U.N.O.

FULLY THREADED SCREW @ 10 in. O.C. U.N.O.

1/8 in. (GAP)
Screwed Floor/Roof Slab to Wall

Category: Structure, Floor/Roof-Wall

Drawing: NS-DS2020-US

Date: 2020-02-01

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Screwed Wall to Continuous Floor Slab to Wall

NORDIC X-LAM WALL

PARTIALLY Threads SCREWS
@ 12 in. O.C. U.N.O., STAGGERED

PARTIALLY Threads SCREW
@ 12 in. O.C. U.N.O.

NORDIC X-LAM WALL

NORDIC X-LAM SLAB
Wall to Floor Slab with Steel Square to Wall

Structure, Floor/Roof-Wall
Title: Wall to Floor Slab with Steel Square to Notched Wall

Category: Structure, Floor/Roof-Wall

Drawing: NS-DS2024-US

Date: 2020-02-01

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Sloped Roof Slab to Wall

Category: Structure, Floor/Roof-Wall

Drawing: NS-DS2025-US

Scale: -

Date: 2020-02-01

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NORDIC LAM+
NORDIC X-LAM

PARTIALLY THREADED SCREW
NORDIC X-LAM WALL

1/8 in. (GAP)

TILE
CATEGORY
DATE
SCALE
PAGE

CLT Lintel
Structure, Lintel

NS-DS2026-US
- 2020-02-01 1.28
Butt Joint, One row of Nails

GALVANIZED SPIRAL NAIL @ 6 in. O.C. U.N.O.

PLYWOOD 1/2 in. (TYP.)

1/16 in. (GAP)
Butt Joint, Two Rows of Nails

2 ROWS OF GALVANIZED SPIRAL NAILS @ 6 in. O.C. U.N.O., STAGGERED

PLYWOOD 1/2 in. (TYP.)

1/16 in. (GAP)
FULLY THREADED SCREW
@ 12 in. O.C. U.N.O.,
STAGGERED

45°
1/16 in. (GAP)

Butt Joint, 45° Screws

Title: Butt Joint, 45° Screws
Category: Structure, Panel-Panel
Drawing: NS-DS2069-US
Date: 2020-02-01
Page: 1.32
PARTIALLY THREADED SCREW
@ 12 in. O.C. U.N.O.

Half-Lap Joint
Structure, Panel-Panel
PARTIALLY THREADED SCREW @ 12 in. O.C. U.N.O.

NORDIC X-LAM WALLS
TITLE
Notched Corner Joint with 90° Screws

CATEGORY
Structure, Wall-Wall

DRAWING
NS-DS2033-US

SCALE
-  

DATE
2020-02-01

PAGE
1.35
PARTIALLY THREADED SCREW
@ 12 in. O.C. U.N.O.

NORDIC X-LAM WALLS

45°
PARTIALLY THREADED SCREW @ 12 in. O.C. U.N.O.

NORDIC X-LAM WALLS
PARTIALLY THREADED SCREWS
@ 12 in. O.C. U.N.O., STAGGERED

NORDIC X-LAM WALLS

T-Joint with 45° Screws
Structure, Wall-Wall

NS-DS2036-US

SCALE
- 
DATE
2020-02-01
PAGE
1.38
Base Plate with Steel Square

- NON-SHRINK GROUT 1 in.
- PROVIDE CHAMFER IN WOOD TO CLEAR STEEL WELDS
- MECHANICAL ANCHOR
- CONCRETE
- STEEL SQUARE
- THREAD CODED ROD
- NORDIC LAM COLUMN

Structure, Base Plate
Base Plate with Knife Plate and Four Mechanical Anchors

- Mechanical Anchor
- Concrete
- 1 in. Non-Shrink Grout
- Provide Chamfer in Wood to Clear Steel Welds
- Steel Knife Plate
- Steel Dowel
- Steel Lam Column

Title: Base Plate with Knife Plate and Four Mechanical Anchors
Category: Structure, Base Plate
Drawing: NS-DS2038-US
Scale: -
Date: 2020-02-01
Page: 1.40
Base Plate with Knife Plate and Four Hidden Mechanical Anchors

NORDIC LAM+  
NORDIC X-LAM

PROVIDE CHAMFER IN WOOD TO CLEAR STEEL WELDS

NON-SHRINK GROUT 1 in.

CONCRETE

STEEL KNIIFE PLATE

STEEL DOWEL

3/8 in. (GAP)

1/8 in. (GAP)

MECHANICAL ANCHOR

NORDIC LAM COLUMN

CATEGORIES

TITLE

DRAWING

NS-DS2039-US

2020-02-01

1.41

SCALE

DATE

PAGES

Structure, Base Plate
Two-storey Base Plate with Knife Plate

- PROVIDE CHAMFER IN WOOD TO CLEAR STEEL WELDS
- 2 STOREY BASE PLATE WITH KNIFE PLATE
- NON-SHRINK GROUT 1 in.
- CONCRETE
- MECHANICAL ANCHOR
- STEEL DOWEL
- STEEL WELD
- 3/8 in. (GAP)

Title: Two-storey Base Plate with Knife Plate
Category: Structure, Base Plate
Drawing: NS-DS2040-US
Date: 2020-02-01
Two-storey Base Plate with Glued-in Rod

Category: Base Plate

Date: 2020-02-01

Page: 1/16 in. EACH SIDE (GAP)
1-5/8 in. (GAP)

Drawing: NS-DS2041-US
Two-storey Base Plate with Glued-in Rod and Pocket

Structure, Base Plate

NS-DS2042-US

2020-02-01
Two-storey Base Plate with Glued-in Rod and Half-height Pocket

Nordic LAM+ Nordic X-LAM

Title: Two-storey Base Plate with Glued-in Rod and Half-height Pocket
Category: Structure, Base Plate
Drawing: NS-DS2070-US

NORDIC LAM COLUMN
GLUED-IN ROD
2 STOREY BASE PLATE
FILL IN CONCRETE
CONCRETE
MECHANICAL ANCHOR
NON-SHRINK GROUT 1 in.

1/16 in. EACH SIDE (GAP)
1-5/8 in. (GAP)
PROVIDE NECESSARY SPACING FOR PLUMBING

NORDIC LAM BEAM
FULLY THREADED SCREW

NORDIC LAM COLUMN

Double Member Beam with Spacing
Structure, Beam-Column

2020-02-01
Double Member Beam Without Spacing

PARTIALLY threaded screws @ 12 in. O.C.
U.N.O., staggered

NORDIC LAM COLUMN

NORDIC LAM BEAM

1/16 in. (GAP)

1/16 in. (GAP)

THREADED ROD

NORDIC LAM+
NORDIC X-LAM
a) The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
Title: Single Beam, Bridle Joint

Category: Structure, Beam-Column

Drawing: NS-DS2047-US

Scale: -

Date: 2020-02-01

Page: 1.50
a) The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
a) The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
a) The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
(a) The 1/8 in. gap may not be required depending on the detail on the other side of the beam.
45° Screws

NORDIC LAM COLUMN

NORDIC LAM GIRT

FULLY THREADED SCREW

TITLE
45° Screws

CATEGORY
Structure, Girt-Column

DRAWING
NS-DS2057-US

SCALE
-

DATE
2020-02-01

PAGE
1.58
Nailed Face-mount Hanger

Structure, Joist-Beam

NS-DS2

NS-DS2058-US

2020-02-01
Nailed Face-mount Hanger with Concealed Flanges

NORDIC LAM BEAM

RING SHANK NAIL

1/4 in. (GAP)

HANGER

NORDIC LAM JOIST

Structure, Joist-Beam
Knife Plate with Saddle

- Steel Knife Plate
- Steel Dowel
- Steel Saddle
- Partially Threaded Screws
- Provide Spacing for Screw Head
- Nordic Lam Joist
- 1/8 in. (GAP)

Partially Threaded Screws

Title: Knife Plate with Saddle
Category: Structure, Joist-Beam

Drawing: NS-DS2061-US
Scale: -
Date: 2020-02-01
Page: 1.62
NORDIC LAM BEAM

STEEL DOWEL

STEEL KNIFE PLATE

PARTIALLY THREADED SCREWS

PROVIDE SPACING FOR SCREW HEAD

1/8 in. (GAP)

NORDIC LAM JOIST

NORDIC LAM JOIST

Structure, Joist-Beam

2020-02-01
Joist on Beam with 45° Screws and Glued-In Rod

NORDIC LAM BEAM

NORDIC LAM JOIST

PARTIALLY THREADED SCREW

THREADED ROD

NORDIC LAM JOIST

NORDIC LAM BEAM
Note:
1. For assembly details refer to technical note D-R00.
MECHANICAL, ELECTRICAL, AND PLUMBING
NORDIC LAM COLUMN
GYPSUM BOARD
METAL STUDS AND INSULATION
OPENING, CUT ON SITE
( BY OTHERS)
PROVIDE NECESSARY SPACING FOR PLUMBING
NORDIC X-LAM SLAB
NORDIC LAM BEAM
PIPE

TIT LE
Vertical, Double-Member Beam

CAT EGO R Y
Mechanical, Electrical, and Plumbing

DRA W I NG
NS-DS2501-US

S C AL E
-

D AT E
2020-02-01

P AG E
2.1
TITLE: Horizontal, Electrical Box with 2 in. x 3 in. Wood Studs

CATEGORY: Mechanical, Electrical, and Plumbing

DRAWING: NS-DS2503-US

SCALE: -

DATE: 2020-02-01

PAGE: 2.3
NS-DS2507-US
NORDIC X-LAM
SLAB
NORDIC LAM COLUMN
PIPE
NORDIC LAM BEAM

TITLE
Horizontal, Bevelled Beam

CATEGORY
Mechanical, Electrical, and Plumbing

DATE
2020-02-01

PAGE
2.7
Multi-Residential Unit Diagram, Option 1

Legend
- SA  Supply Air
- H  Hood
- OAI  Outdoor Air Intake
- RA  Return Air
- UAO  Used Air Outlet
- SEC  Dryer
- HRV  Heat Recovery Ventilator