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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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 millimetres (mm), 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 CSA O86-14, Engineering design in wood.

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.
# LIST OF DETAILS

## Structure

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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, 245-7s, 245-7l, 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 X-LAM LAYUP COMBINATIONS

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<td>245-7s</td>
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<td>175-5s</td>
<td>245-7l</td>
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**CLT**

NORDIC X-LAM
CROSS-LAMINATED TIMBER

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**NORDIC LAM+**

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**NORDIC X-LAM**

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**NS-DS2**

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**DETAILS**

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**nordic.ca**

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**NORDIC STRUCTURES**

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**V**
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

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

* Larger sizes available upon request

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
TITLE
Continuous Floor Slab on Beam

CATEGORY
Structure, GL-CLT

DRAWING
NS-DS2001-CA-en

SCALE
-

DATE
2022-02-01

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PARTIALLY THREADED SCREWS @ 300 O.C. U.N.O., STAGGERED

NORDIC X-LAM SLAB

NORDIC LAM BEAM

NORDIC LAM+

NORDIC X-LAM

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NS-DS2

2022-02-01

NS-DS2002-CA-en

Structure, GL-CLT

- 2022-02-01 1.2
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
PART IALLY THREADED SCREW
RING SHANK NAIL

1-2 mm (GAP)

NORDIC LAM BEAM
STEEL DOWEL
STEEL KNIFE PLATE
NORDIC X-LAM WALL

a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
PARTIALLY THREADED SCREW

NORDIC X-LAM WALL

1-2 mm (GAP)

PARTIALLY THREADED SCREWS

NORDIC LAM COLUMN

PARTIALLY THREADED SCREW
@ 300 O.C. U.N.O.

a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
Beam to Column with Knife Plate

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**NS-DS**

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**DETAILS**

**nordic.ca**

**1.8**

**2022-02-01**

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**TITLE**

Beam to Column with Knife Plate

**CATEGORY**

Structure, GL-CLT

**DRAWING**

NS-DS2007-CA-en

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-  

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2022-02-01

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(a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
Pocket for Beam

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NORDIC LAM BEAM
PARTIALLY THREADED SCREWS, STAGGERED
NORDIC X-LAM WALL
1-2 mm EACH SIDE (GAP)

Nordic Structures
NS-DS2
DETAILS
NORDIC LAM+
NORDIC X-LAM

TITLE
Through Pocket for Beam
C A T E G O R Y
Structure, GL-CLT
DRAWING
NS-DS2009-CA-en

CATEGORY
SCALE
DATE
P A R T I A L L Y T H R E A D E D S C R E W S , S T A G G E R E D
1-2 mm EACH SIDE (GAP)
NORDIC LAM BEAM
NORDIC X-LAM WALL

- 1.10
2022-02-01
PARTIALLY THREADED SCREWS @ 300 O.C. U.N.O., STAGGERED

**Title:** Wall to Sill Plate, Screws

**Category:** Structure, Wall-Foundation

**Drawing:** NS-DS2010-CA-en

**Date:** 2022-02-01

**Page:** 1.11
Wall to Sill Plate, Nailed Steel Plate

**Categories:**
- Structure, Wall-Foundation

**Materials:**
- Nordic X-Lam Wall
- Ring Shank Nail
- Steel Plate
- Sill Plate
- Impermeable Membrane
- Non-Shrink Grout 25 mm
- Mechanical Anchor
- Concrete
Wall to Sill Plate, Steel Angle

- Nordic X-Lam Wall
- Ring Shank Nail
- Steel Angle
- Sill Plate
- Impermeable Membrane
- Non-Shrink Grout 25 mm

Mechanical Anchors

Concrete
Wall to Foundation, Nailed Steel Angle

NORDIC X-LAM WALL
RING SHANK NAIL
STEEL ANGLE
NON-SHRINK GROUT 25 mm
CONCRETE

POCKET AT ANCHOR LOCATION
MECHANICAL ANCHOR

NORDIC X-LAM WALL
RING SHANK NAIL
STEEL ANGLE
NON-SHRINK GROUT 25 mm
MECHANICAL ANCHOR
CONCRETE
Note:
1. This assembly detail offers a resistance to forces acting perpendicular to the foundation wall.

**Title:** Wall to Foundation, Screwed Steel Angle

**Category:** Structure, Wall-Foundation

**Drawing:** NS-DS2016-CA-en

**Scale:** -

**Date:** 2022-02-01

**Page:** 1.17
NORDIC X-LAM WALL
RING SHANK NAIL
STEEL ANGLE
NON-SHRINK GROUT 25 mm
CONCRETE

STEEL C SHAPE
MECHANICAL ANCHOR

NORDIC X-LAM WALL
RING SHANK NAIL
STEEL ANGLE
STEEL C SHAPE
NON-SHRINK GROUT 25 mm
MECHANICAL ANCHOR
CONCRETE

NORDIC X-LAM WALL
RING SHANK NAIL
STEEL ANGLE
STEEL C SHAPE
NON-SHRINK GROUT 25 mm
MECHANICAL ANCHOR
CONCRETE
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 STRUCTURES

TITLE: Steel Angle
CATEGORY: Structure, Floor/Roof-Wall
DRAWING: NS-DS2019-CA-en
TIT L E
C A T EGO R Y DAT E EGAPELACS
S c r ew ed  F loor/ Roo f  S l ab t o W all
-llaW-fooR/roolF ... RAWING
N ORDI C  X -L A M 
SLAB
N ORDI C  X -L A M WAL L
PAR TIA L LY T H R EADE D  SCRE W
@  300 O.C. U.N.O.
Screwed Wall to Single Floor Slab to Wall

**Category:** Structure, Floor/Roof-Wall

**Drawing:** NS-DS2022-CA-en

**Scale:** -

**Date:** 2022-02-01

**Page:** 1.24
Wall to Floor Slab with Steel Square to Notched Wall

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Structure, Floor/Roof-Wall</th>
</tr>
</thead>
</table>

NORDIC X-LAM WALL

RING SHANK NAIL

STEEL SQUARE

FULLY THREADED SCREW @ 300 O.C.

1-2 mm (GAP)

NORDIC X-LAM SLAB
1-2 mm (GAP)

NORDIC X-LAM LINTEL
PARTIALLY THREADED SCREW
NORDIC X-LAM WALL
Butt Joint, One Row of Nails

Structure, Panel-Panel
**Butt Joint, Two Rows of Nails**

**Category:** Structure, Panel-Panel

**Drawing Information:**
- **Title:** NS-DS2030-CA-en
- **Date:** 2022-04-21
- **Page:** 1.31

**Details:**
- Plywood 12.7 mm (Typ.)
- 2 rows of galvanized spiral nails @ 150 O.C.
- U.N.O., staggered

**Measurements:**
- 150 (S.I.C.)
- 130
- 120
- 15
- 1-2 mm (GAP)
FULLY THREADED SCREW @ 300 O.C. U.N.O., STAGGERED

1-2 mm (GAP)
PARTIALLY THREADED SCREW @ 300 O.C. U.N.O.

1-2 mm (GAP)
Corner Joint with 90° Screws

NORDIC X-LAM WALLS

PARTIALLY THREADED SCREW @ 300 O.C. U.N.O.
Notched Corner Joint with 90° Screws

- Category: Structure, Wall-Wall
- Drawing: NS-DS2033-CA-en
- Date: 2022-02-01
- Scale: -
- Page: 1.35
Corner Joint with 45° Screws

PARTIALLY THREADED SCREW @ 300 O.C. U.N.O.
T-joint with 90° Screws

PARTIALLY THREADED SCREW @ 300 O.C. U.N.O.

NORDIC X-LAM WALLS
T-joint with 45° Screws

Structure, Wall-Wall
Base Plate with Steel Square

Structure, Base Plate

DRAWING

NS-DS2037-CA-en
Base Plate with Knife Plate and Four Mechanical Anchors

- NORDIC LAM COLUMN
- STEEL KNIFE PLATE
- STEEL DOWEL
- PROVIDE CHAMFER IN WOOD TO CLEAR STEEL WELDS
- 1-2 mm (GAP)
- 10 mm (GAP)
- NON-SHRINK GROUT 25 mm
- CONCRETE
- MECHANICAL ANCHOR

Structure, Base Plate

NS-DS2038-CA-en

2022-02-01
1.40
**TITLE**
Base Plate with Knife Plate and Four Hidden Mechanical Anchors

**DRAWING**
NS-DS2039-CA-en

**CATEGORY**
Structure, Base Plate

**SCALE**
-

**DATE**
2022-02-01

**PAGE**
1.41
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 25 mm
- CONCRETE
Two-storey Base Plate with Glued-in Rod

- **Title**: Two-storey Base Plate with Glued-in Rod
- **Category**: Structure, Base Plate
- **Drawing**: NS-DS2041-CA-en
- **Date**: 2022-02-01
- **Page**: 1.43
Two-storey Base Plate with Glued-in Rod and Pocket

**CATEGORY:** Structure, Base Plate

**DRAWING:** NS-DS2042-CA-en

**SCALE:** -

**DATE:** 2022-02-01

**PAGE:** 1.44
Two-storey Base Plate with Glued-in Rod and Half-height Pocket

- NORDIC LAM COLUMN
- GLUED-IN ROD
- 2 STOREY BASE PLATE
- FILL IN CONCRETE
- CONCRETE
- MECHANICAL ANCHOR
- NON-SHRINK GROUT 25 mm

1-2 mm EACH SIDE (GAP)
40 mm (GAP)
Double Member Beam with Spacing

Structure, Beam-Column
Double Member Beam Without Spacing

PARTIALLY THREADED SCREWS @ 300 O.C. U.N.O., STAGGERED

0.5-1.0 mm (GAP)

THREADED ROD

NORDIC LAM BEAM

NORDIC LAM COLUMN

0.5-1.0 mm (GAP)
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
Knife Plate with Shear Key and Bearing Plate

NORDIC LAM COLUMN

STEEL DOWEL
STEEL KNIFE PLATE WITH BEARING PLATE
PROVIDE CHAMFER IN WOOD TO CLEAR STEEL WELDS

SHEAR KEY

PARTIALLY THREADED SCREWS

1-2 mm (GAP) (a)

2-4 mm (GAP)

10

NORDIC LAM BEAM

PROVIDE SPACING FOR SCREW HEAD

a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
PARTIALLY THREADED SCREW
PROVIDE SPACING FOR SCREW HEAD
STEEL DOWEL
STEEL KNIFE PLATE
NORDIC LAM COLUMN
NORDIC LAM GIRT

TITLE: Knife Plate
CATEGORY: Structure, Girt-Column
DRAWING: NS-DS2055-CA-en

SCALE: -
DATE: 2022-02-01
PAGE: 1.56
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.
Knife Plate with Saddle

NORDIC LAM BEAM

NORDIC LAM JOIST

STEEL SADDLE

1-2 mm (GAP)

PROVIDE SPACING FOR SCREW HEAD

PARTIALLY THREADED SCREWS

STEEL DOWEL

STEEL KNIFE PLATE

NORDIC LAM PLATE
Knife Plate

PROVIDE SPACING FOR SCREW HEAD

NORDIC LAM JOIST

STEEL DOWEL

STEEL KNIFE PLATE

NORDIC LAM BEAM

PARTIALLY THREADED SCREWS

1-2 mm (GAP)
Joist on Beam with 45° Screws and Glued-in Rod

TITLE
Joist on Beam with 45° Screws and Glued-in Rod

CATEGORY
Structure, Joist-Beam

DRAWING
NS-DS2065-CA-en

SCALE
-

DATE
2022-02-01

PAGE
1.66
Note:
1. For assembly details refer to technical note D-R00.
MECHANICAL, ELECTRICAL, AND PLUMBING
PROVIDE NECESSARY SPACING FOR PLUMBING

NORDIC X-LAM SLAB

OPENING, CUT ON SITE (BY OTHERS)

METAL STUDS AND INSULATION

GYPSUM BOARD

NORDIC LAM COLUMNS

PIPE

NORDIC LAM BEAM
TITLE  
Horizontal, Pre-machined Opening

CATEGORY  
Mechanical, Electrical, and Plumbing

DRAWING  
NS-DS2502-CA-en

SCALE  
-

DATE  
2022-02-01

PAGE  
2.2
TITLE
Horizontal, Electrical Box with 38 mm x 64 mm Wood Studs

CATEGORY
Mechanical, Electrical, and Plumbing

DRAWING
NS-DS2503-CA-en

SCALE
-

DATE
2022-02-01

PAGE
2.3
NORDIC X-LAM SLAB
RESILIENT CHANNEL
GYPSUM BOARD
NORDIC X-LAM WALL
JOIST
INSULATION
PIPE
PLYWOOD

TITLE
Horizontal, Raised Floor

CATEGORY
Mechanical, Electrical, and Plumbing

DRAWING
NS-DS2504-CA-en

SCALE
-

DATE
2022-02-01

PAGE
2.4
Title: Horizontal, Joist on Beam

Category: Mechanical, Electrical, and Plumbing

Drawing: NS-DS2506-CA-en

Date: 2022-02-01

Page: 2.6
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

Title:
Multi-residential Unit Diagram – Option 1

Category:
Mechanical, Electrical, and Plumbing

Drawing:
NS-DS2508-CA-en

Scale:
-

Date:
2022-02-01

Page:
2.8
Legend
SA  Supply Air
H   Hood
OAI  Outdoor Air Intake
RA   Return Air
UAO  Used Air Outlet
SEC  Dryer
HRV  Heat Recovery Ventilator

Multi-residential Unit Diagram – Option 2