

# NORDIC

DETAILS  
NORDIC LAM+ NORDIC X-LAM

NS-DS2 

ENGLISH

VERSION

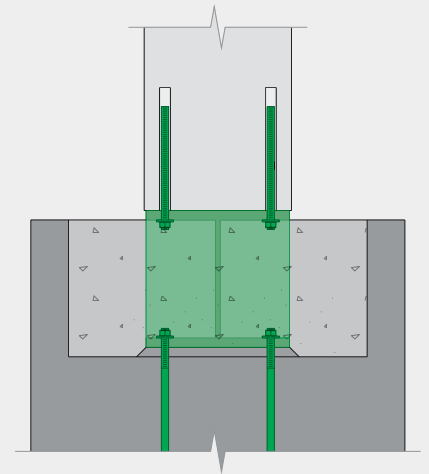
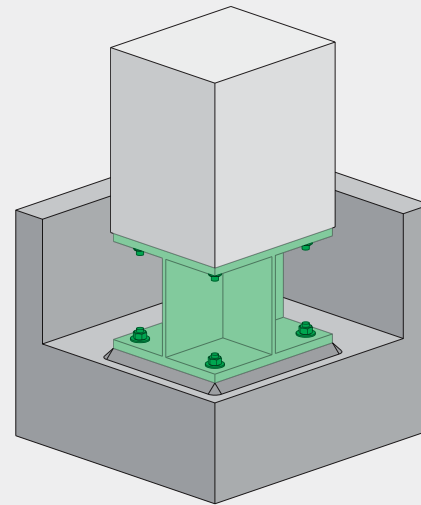
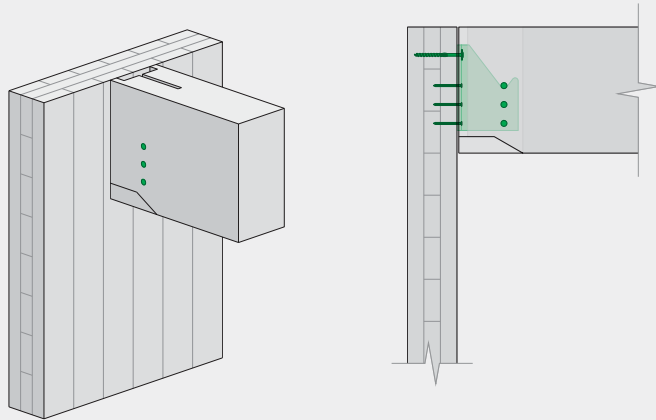
2022-04-21

Mass Timber Construction

## STRUCTURAL DETAILS

 NORDIC  
LAM+

 NORDIC  
X-LAM



NORDIC  
STRUCTURES

## ABOUT NORDIC

# NORDIC STRUCTURES

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.

**514-871-8526**

1 866 817-3418

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### HEAD OFFICE

**Nordic Structures**

100-1100 Canadiens-de-Montréal Avenue

Montréal, Québec H3B 2S2

[www.nordic.ca](http://www.nordic.ca)

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### GENERAL INFORMATION

[info@nordic.ca](mailto:info@nordic.ca)

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### TECHNICAL SUPPORT

[arch@nordic.ca](mailto:arch@nordic.ca)

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- vi Nordic Lam+ (glulam)

## STRUCTURE

## MECHANICAL, ELECTRICAL, AND PLUMBING

1

2

## GENERAL NOTES

### 1.0 General

- 1.1 This document supersedes all previous versions. For the latest version, consult [nordic.ca](http://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](http://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 086-14, 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

Category	Title	Drawing	Date	Page
Structure, GL-CLT	Continuous Floor Slab on Beam	NS-DS2001	2022-02-01	1.1
Structure, GL-CLT	Single Floor Slab on Beam	NS-DS2002	2022-02-01	1.2
Structure, GL-CLT	Face-mount Hanger	NS-DS2003	2022-02-01	1.3
Structure, GL-CLT	Face-mount Hanger with Concealed Flanges	NS-DS2067	2022-02-01	1.4
Structure, GL-CLT	Knife Plate	NS-DS2004	2022-02-01	1.5
Structure, GL-CLT	Knife Plate with Cap	NS-DS2005	2022-02-01	1.6
Structure, GL-CLT	Screwed Beam to Column	NS-DS2006	2022-02-01	1.7
Structure, GL-CLT	Beam to Column with Knife Plate	NS-DS2007	2022-02-01	1.8
Structure, GL-CLT	Pocket for Beam	NS-DS2008	2022-02-01	1.9
Structure, GL-CLT	Through Pocket for Beam	NS-DS2009	2022-02-01	1.10
Structure, Wall-Foundation	Wall to Sill Plate, Screws	NS-DS2010	2022-02-01	1.11
Structure, Wall-Foundation	Wall to Sill Plate, Nailed Steel Plate	NS-DS2011	2022-02-01	1.12
Structure, Wall-Foundation	Wall to Sill Plate, Holdown	NS-DS2012	2022-02-01	1.13
Structure, Wall-Foundation	Wall to Sill Plate, Steel Angle	NS-DS2013	2022-02-01	1.14
Structure, Wall-Foundation	Wall to Foundation, Holdown	NS-DS2014	2022-02-01	1.15
Structure, Wall-Foundation	Wall to Foundation, Nailed Steel Angle	NS-DS2015	2022-02-01	1.16
Structure, Wall-Foundation	Wall to Foundation, Screwed Steel Angle	NS-DS2016	2022-02-01	1.17
Structure, Wall-Foundation	Wall to Foundation, Nailed Steel Angle and Steel C Shape	NS-DS2068	2022-02-01	1.18
Structure, Wall-Foundation	Wall to Foundation, Nailed C Shape	NS-DS2017	2022-02-01	1.19
Structure, Floor/Roof-Wall	Ledger	NS-DS2018	2022-02-01	1.20
Structure, Floor/Roof-Wall	Steel Angle	NS-DS2019	2022-02-01	1.21
Structure, Floor/Roof-Wall	Screwed Floor/Roof Slab to Wall	NS-DS2020	2022-02-01	1.22
Structure, Floor/Roof-Wall	Screwed Wall to Continuous Floor Slab to Wall	NS-DS2021	2022-02-01	1.23
Structure, Floor/Roof-Wall	Screwed Wall to Single Floor Slab to Wall	NS-DS2022	2022-02-01	1.24
Structure, Floor/Roof-Wall	Wall to Floor Slab with Steel Square to Wall	NS-DS2023	2022-02-01	1.25
Structure, Floor/Roof-Wall	Wall to Floor Slab with Steel Square to Notched Wall	NS-DS2024	2022-02-01	1.26
Structure, Floor/Roof-Wall	Sloped Roof Slab to Wall	NS-DS2025	2022-02-01	1.27
Structure, Lintel	CLT Lintel	NS-DS2026	2022-02-01	1.28
Structure, Lintel	Glulam Lintel	NS-DS2027	2022-02-01	1.29
Structure, Panel-Panel	Butt Joint, One Row of Nails	NS-DS2029	2022-04-21	1.30
Structure, Panel-Panel	Butt Joint, Two Rows of Nails	NS-DS2030	2022-04-21	1.31
Structure, Panel-Panel	Butt Joint, 45° Screws	NS-DS2069	2022-02-01	1.32
Structure, Panel-Panel	Half-lap Joint	NS-DS2031	2022-02-01	1.33
Structure, Wall-Wall	Corner Joint with 90° Screws	NS-DS2032	2022-02-01	1.34
Structure, Wall-Wall	Notched Corner Joint with 90° Screws	NS-DS2033	2022-02-01	1.35
Structure, Wall-Wall	Corner Joint with 45° Screws	NS-DS2034	2022-02-01	1.36
Structure, Wall-Wall	T-joint with 90° Screws	NS-DS2035	2022-02-01	1.37
Structure, Wall-Wall	T-joint with 45° Screws	NS-DS2036	2022-02-01	1.38
Structure, Base Plate	Base Plate with Steel Square	NS-DS2037	2022-02-01	1.39
Structure, Base Plate	Base Plate with Knife Plate and Four Mechanical Anchors	NS-DS2038	2022-02-01	1.40

## LIST OF DETAILS (CONTINUED)

### Structure (continued)

Category	Title	Drawing	Date	Page
Structure, Base Plate	Base Plate with Knife Plate and Four Hidden Mechanical Anchors	NS-DS2039	2022-02-01	1.41
Structure, Base Plate	Two-storey Base Plate with Knife Plate	NS-DS2040	2022-02-01	1.42
Structure, Base Plate	Two-storey Base Plate with Glued-in Rod	NS-DS2041	2022-02-01	1.43
Structure, Base Plate	Two-storey Base Plate with Glued-in Rod and Pocket	NS-DS2042	2022-02-01	1.44
Structure, Base Plate	Two-storey Base Plate with Glued-in Rod and Half-height Pocket	NS-DS2070	2022-02-01	1.45
Structure, Beam-Column	Double Member Beam with Spacing	NS-DS2043	2022-02-01	1.46
Structure, Beam-Column	Double Member Beam Without Spacing	NS-DS2044	2022-02-01	1.47
Structure, Beam-Column	Knife Plate with Shear Key	NS-DS2045	2022-02-01	1.48
Structure, Beam-Column	Knife Plate with Shear Key and Bearing Plate	NS-DS2046	2022-02-01	1.49
Structure, Beam-Column	Single Beam, Bridle Joint	NS-DS2047	2022-02-01	1.50
Structure, Beam-Column	Continuous Beam, Bridle Joint	NS-DS2048	2022-02-01	1.51
Structure, Beam-Column	Half-lap Joint	NS-DS2049	2022-02-01	1.52
Structure, Beam-Column	Face-mount Hanger	NS-DS2050	2022-02-01	1.53
Structure, Beam-Column	Face-mount Hanger with Concealed Flanges	NS-DS2051	2022-02-01	1.54
Structure, Beam-Column	Beam on Cleat	NS-DS2053	2022-02-01	1.55
Structure, Girt-Column	Knife Plate	NS-DS2055	2022-02-01	1.56
Structure, Girt-Column	Steel Plates	NS-DS2056	2022-02-01	1.57
Structure, Girt-Column	45° Screws	NS-DS2057	2022-02-01	1.58
Structure, Joist-Beam	Nailed Face-mount Hanger	NS-DS2058	2022-02-01	1.59
Structure, Joist-Beam	Nailed Face-mount Hanger with Concealed Flanges	NS-DS2059	2022-02-01	1.60
Structure, Joist-Beam	Bolted Face-mount Hanger	NS-DS2060	2022-02-01	1.61
Structure, Joist-Beam	Knife Plate with Saddle	NS-DS2061	2022-02-01	1.62
Structure, Joist-Beam	Knife Plate	NS-DS2062	2022-02-01	1.63
Structure, Joist-Beam	45° Screws – Option 1	NS-DS2063	2022-02-01	1.64
Structure, Joist-Beam	45° Screws – Option 2	NS-DS2064	2022-02-01	1.65
Structure, Joist-Beam	Joist on Beam with 45° Screws and Glued-in Rod	NS-DS2065	2022-02-01	1.66
Structure, Hybrid	Decking to Steel Beam	NS-DS2066	2022-02-01	1.67

### Mechanical, electrical, and plumbing

Category	Title	Drawing	Date	Page
Mechanical, Electrical, and Plumbing	Vertical, Double-member Beam	NS-DS2501	2022-02-01	2.1
Mechanical, Electrical, and Plumbing	Horizontal, Pre-machined Opening	NS-DS2502	2022-02-01	2.2
Mechanical, Electrical, and Plumbing	Horizontal, Electrical Box with 38 mm x 64 mm Wood Studs	NS-DS2503	2022-02-01	2.3
Mechanical, Electrical, and Plumbing	Horizontal, Raised Floor	NS-DS2504	2022-02-01	2.4
Mechanical, Electrical, and Plumbing	Horizontal, Suspended Ceiling	NS-DS2505	2022-02-01	2.5
Mechanical, Electrical, and Plumbing	Horizontal, Joist on Beam	NS-DS2506	2022-02-01	2.6
Mechanical, Electrical, and Plumbing	Horizontal, Bevelled Beam	NS-DS2507	2022-02-01	2.7
Mechanical, Electrical, and Plumbing	Multi-residential Unit Diagram – Option 1	NS-DS2508	2022-02-01	2.8
Mechanical, Electrical, and Plumbing	Multi-residential Unit Diagram – Option 2	NS-DS2509	2022-02-01	2.9

CLT



## 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

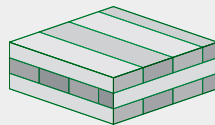
89-3s, 105-3s,  
143-5s, 175-5s,  
197-7s, 213-7l, 245-7s, 245-7l  
and 267-9l

#### Maximum sizes

2.70 × 19.5 m (106-1/4 in. × 64 ft)

#### Stress grade

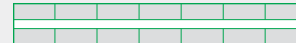
E1 (L 1950Fb and T No. 3/Stud)



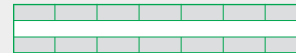
### NORDIC X-LAM LAYUP COMBINATIONS

#### 3 LAYERS

##### 89-3s

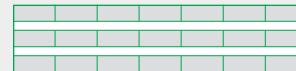


##### 105-3s

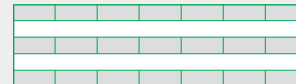


#### 5 LAYERS

##### 143-5s

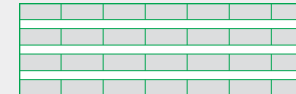


##### 175-5s

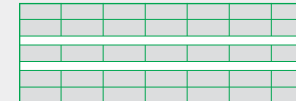


#### 7 LAYERS

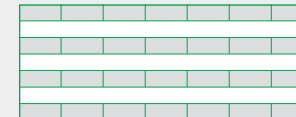
##### 197-7s



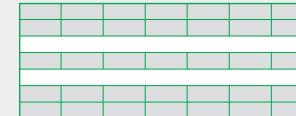
##### 213-7l



##### 245-7s

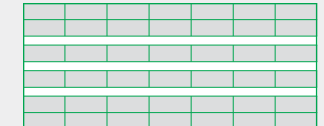


##### 245-7l



#### 9 LAYERS

##### 267-9l



## GLULAM



### 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\***

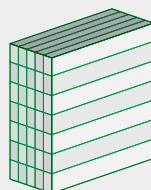
From 67 to 2435 mm  
(2-5/8 to 95-7/8 in.)

**Lengths\***

Up to 24.4 m (80 ft)

**Stress grade**

24F-ES/NPG



\* 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**

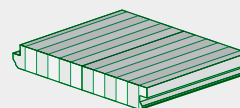
203, 305 and 406 mm  
(8, 12 and 16 in.)

**Lengths**

Up to 18.9 m (62 ft)

**Stress grades**

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



\* Larger sizes available upon request



# NORDIC

DETAILS  
NORDIC LAM+ NORDIC X-LAM

NS-DS2 

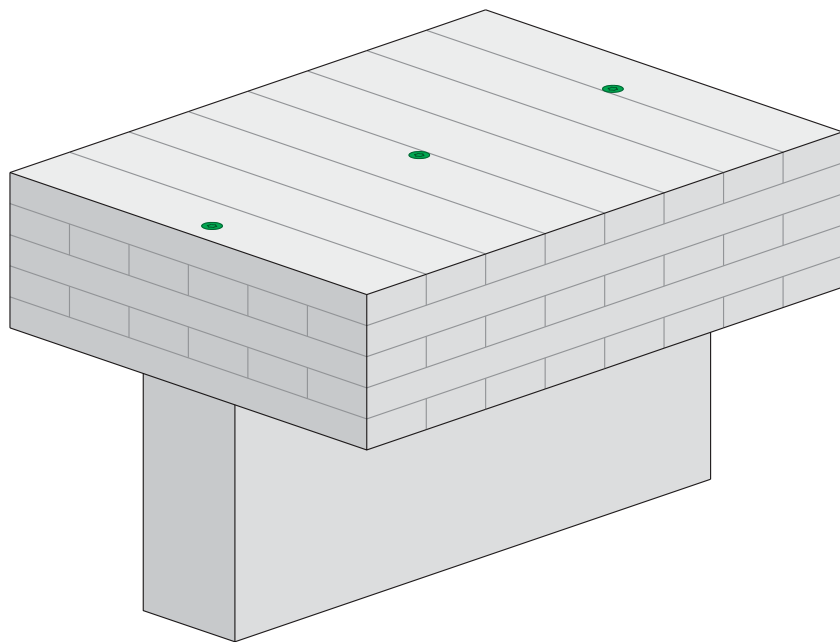
ENGLISH

VERSION  
2022-02-01

## STRUCTURE

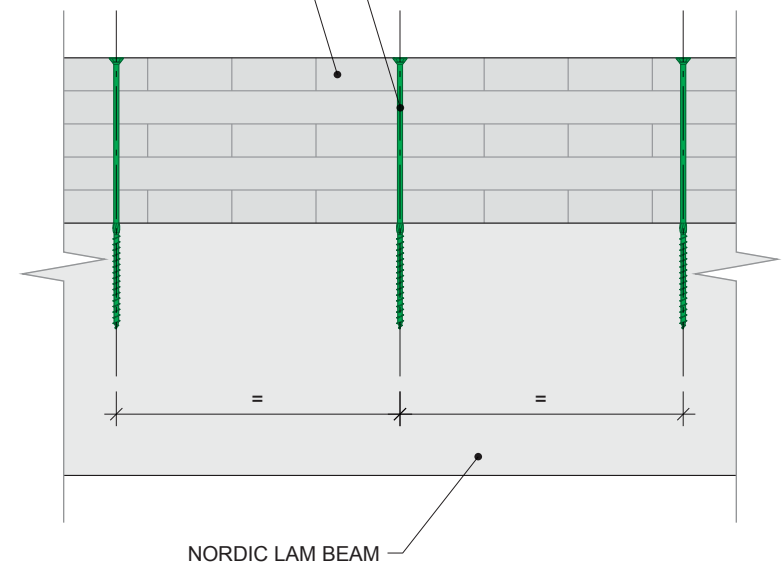
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**NORDIC**  
STRUCTURES

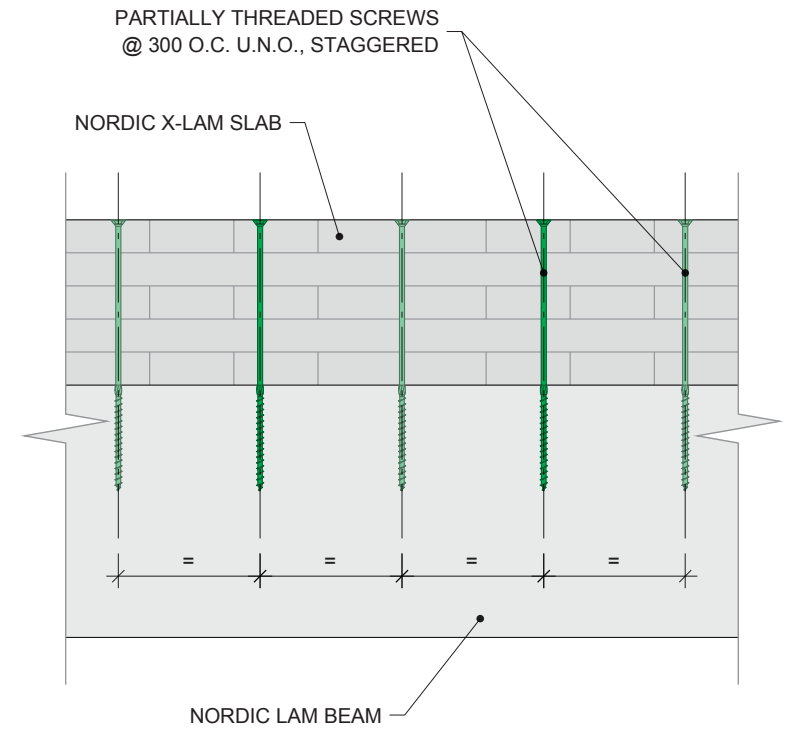
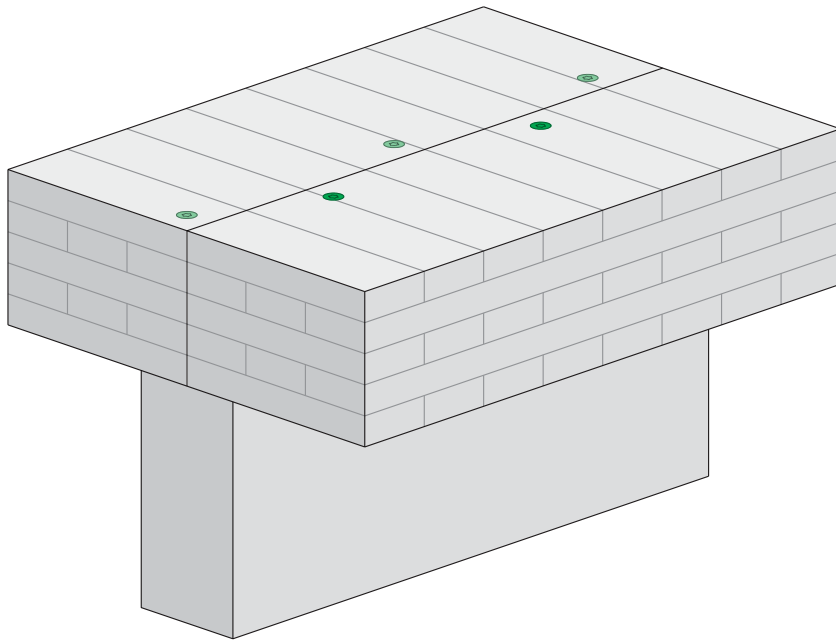


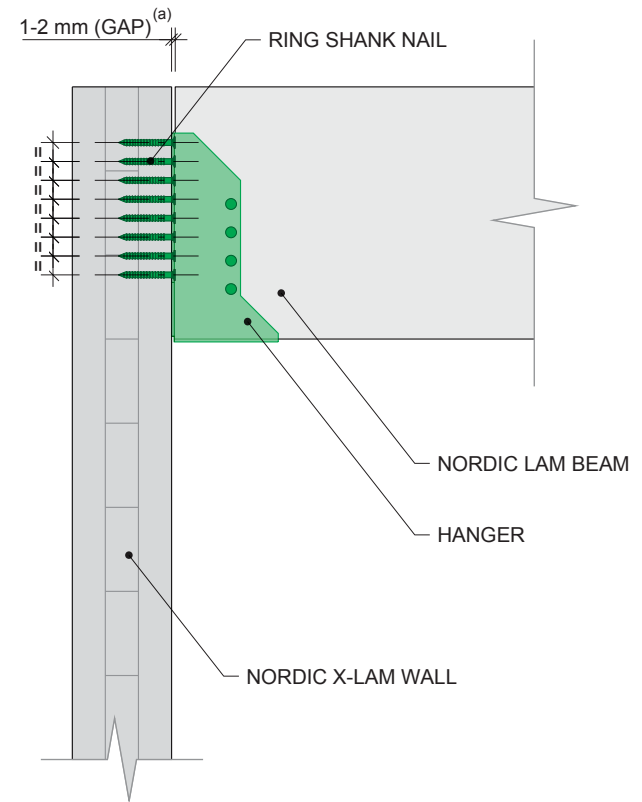
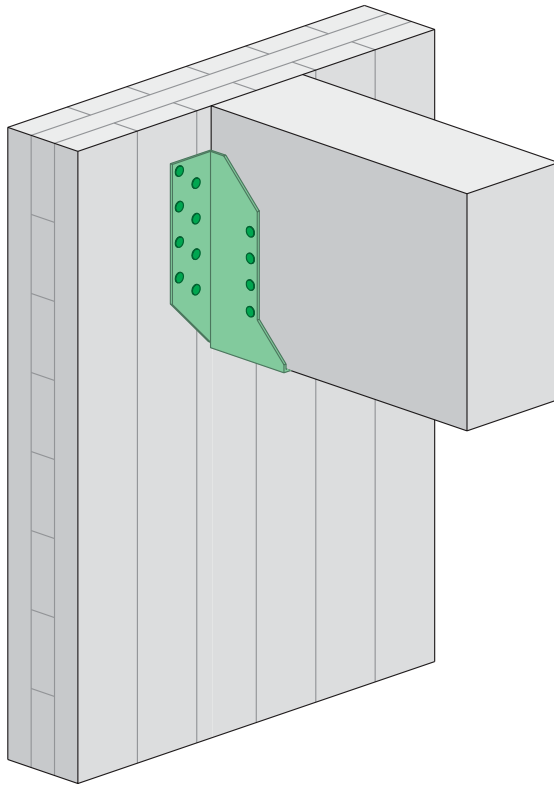
PARTIALLY THREADED SCREW  
@ 300 O.C. U.N.O.

NORDIC X-LAM SLAB

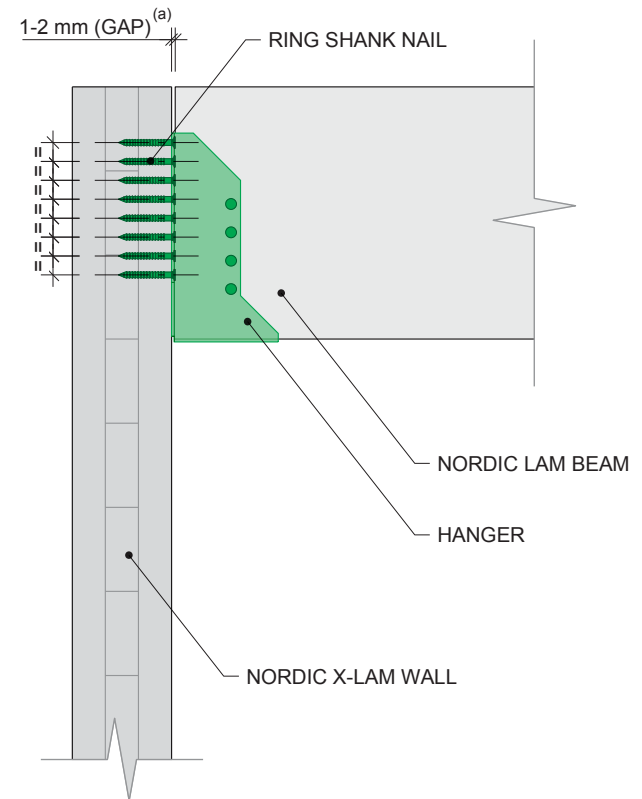
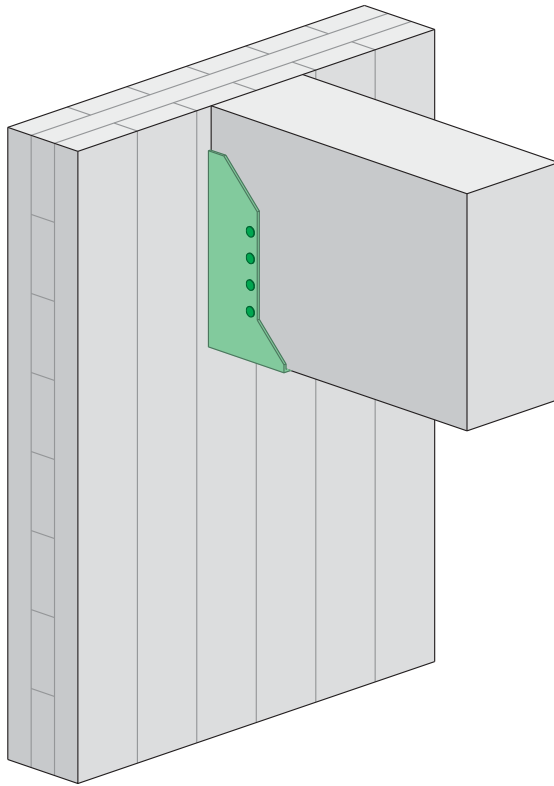


NORDIC LAM BEAM

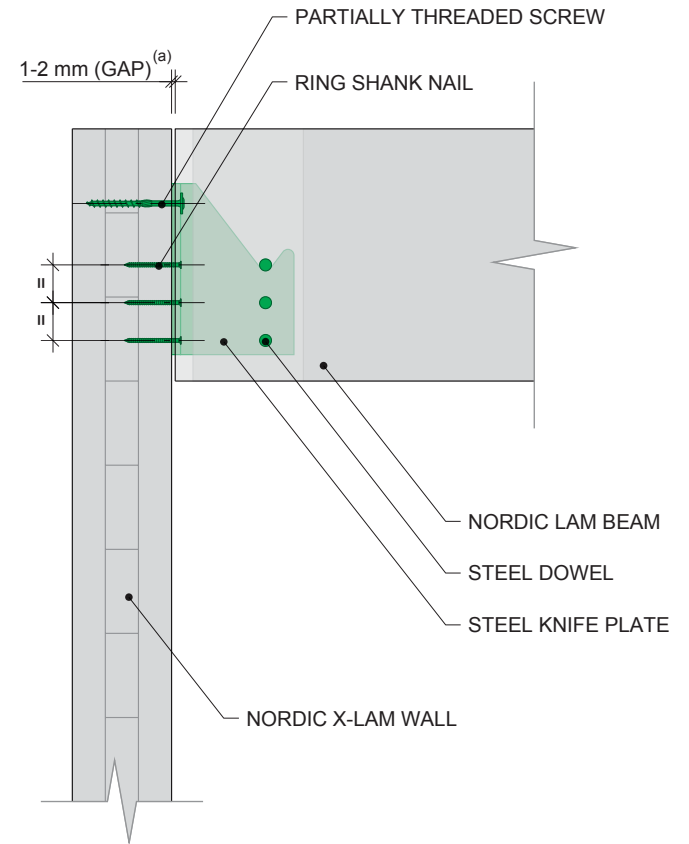
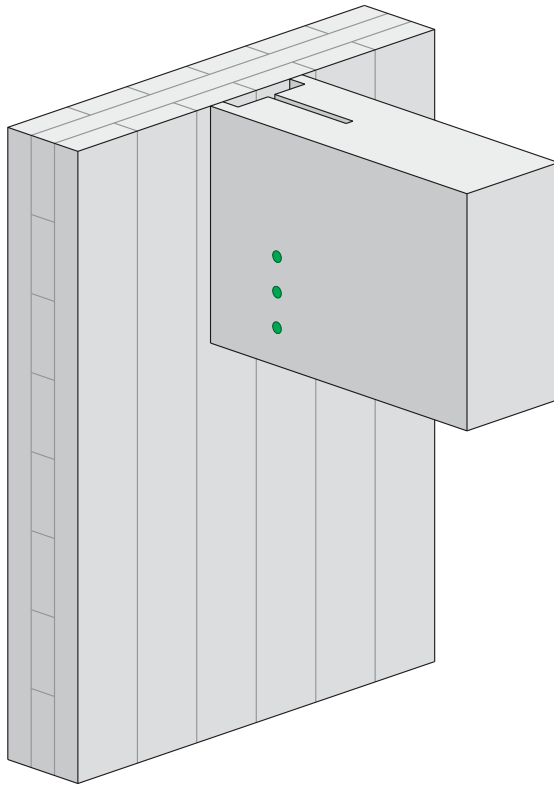




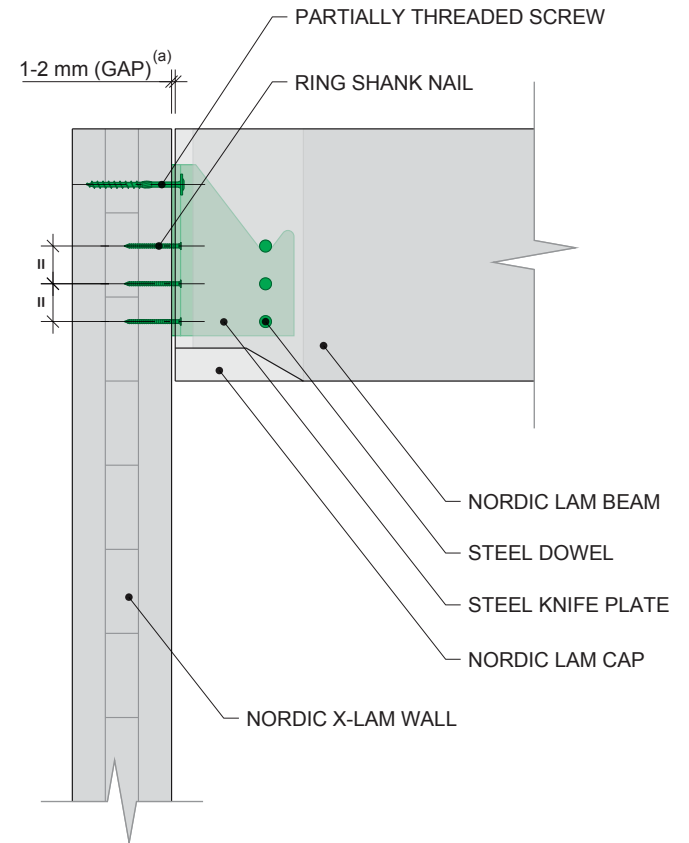
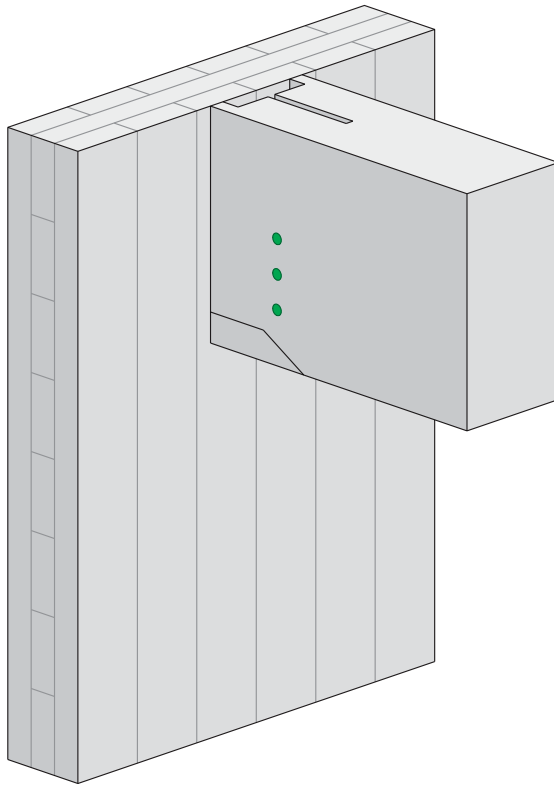
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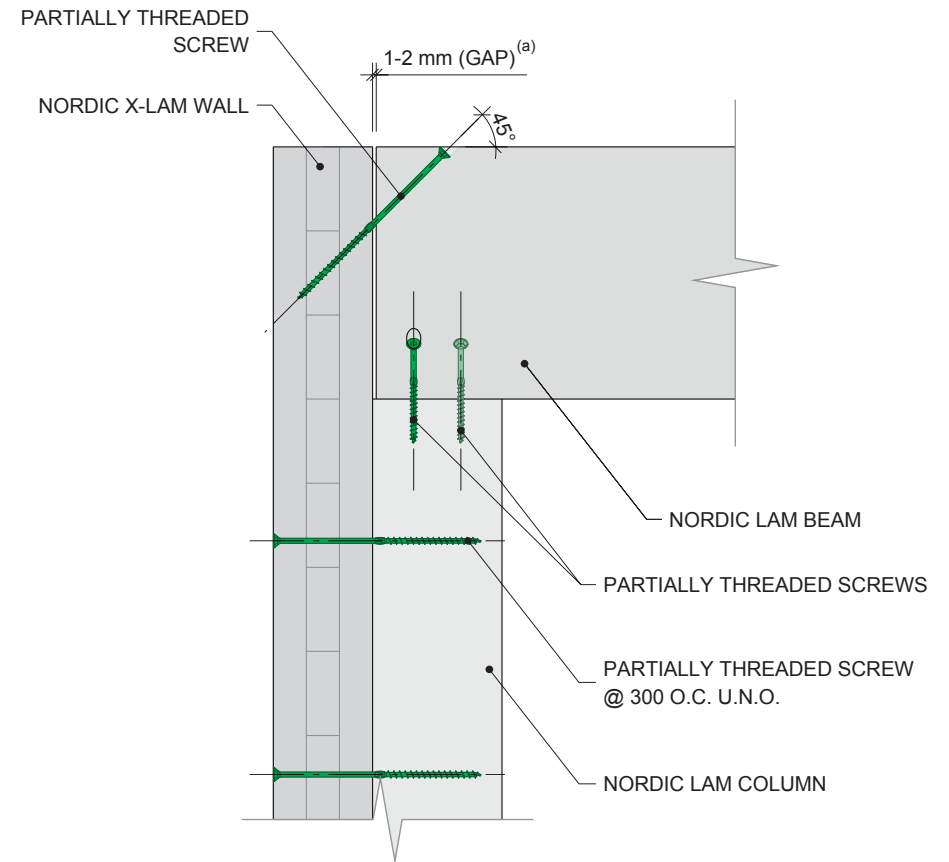
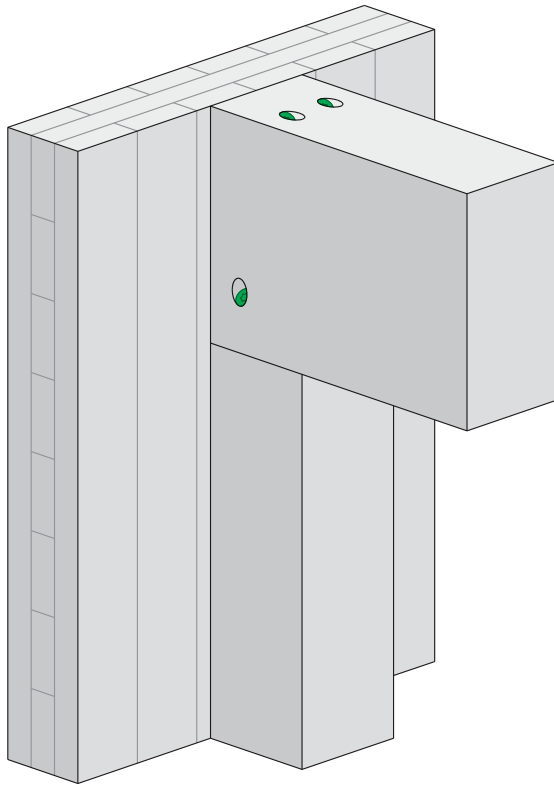
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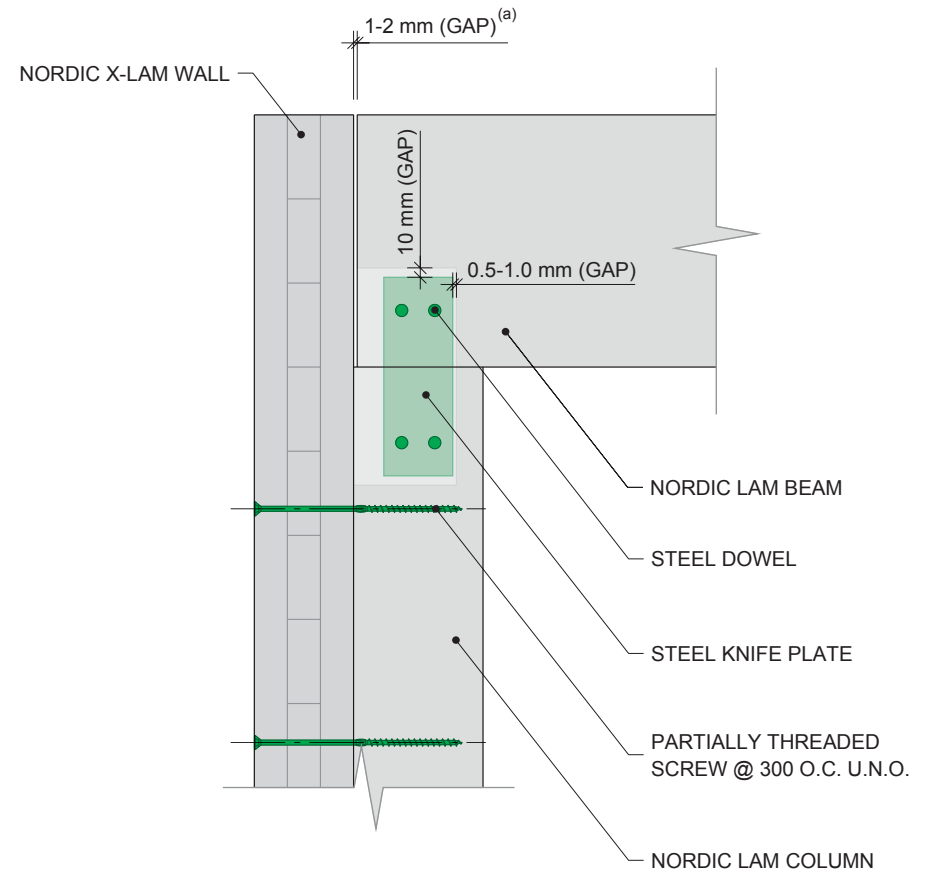
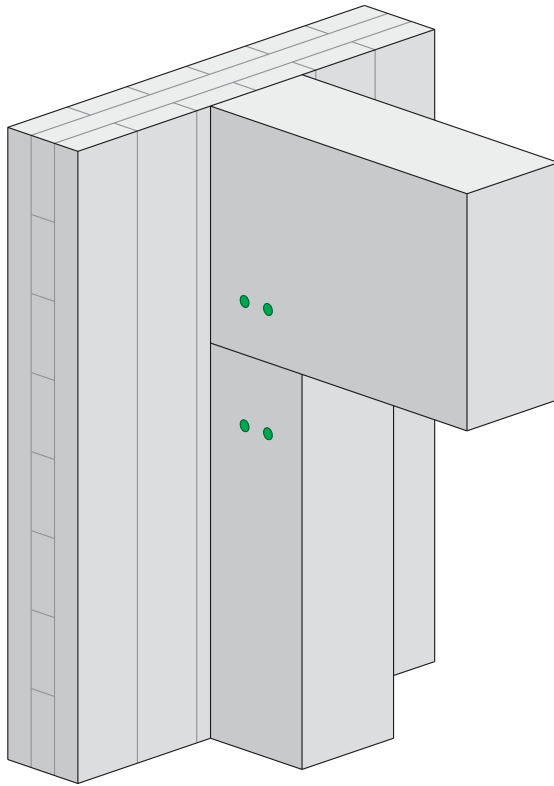


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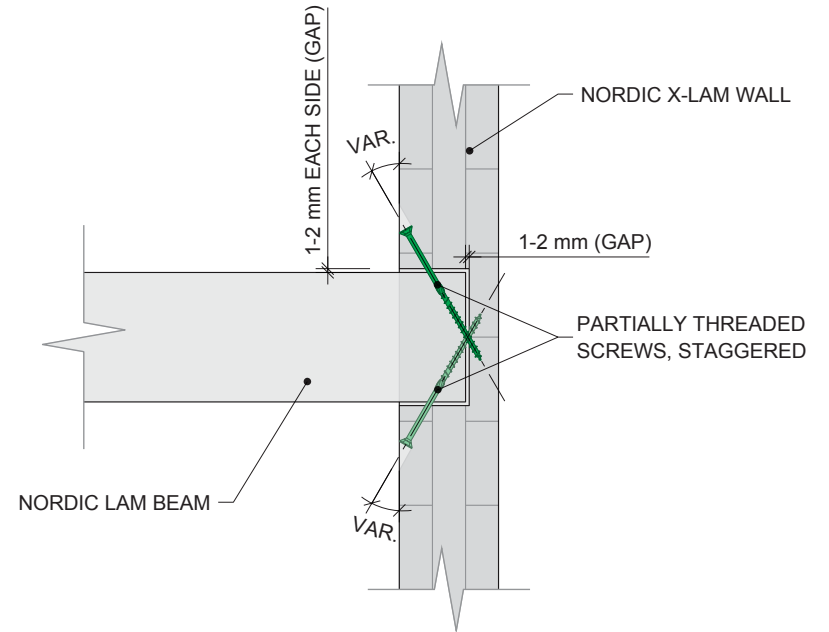
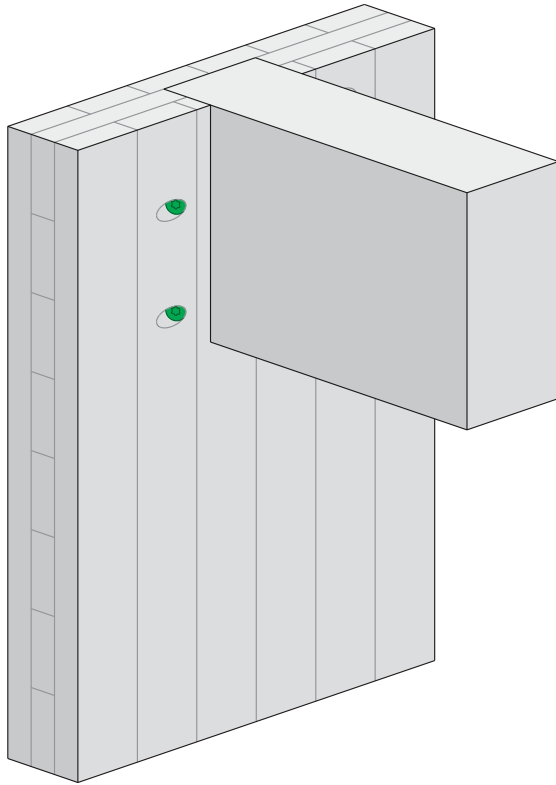


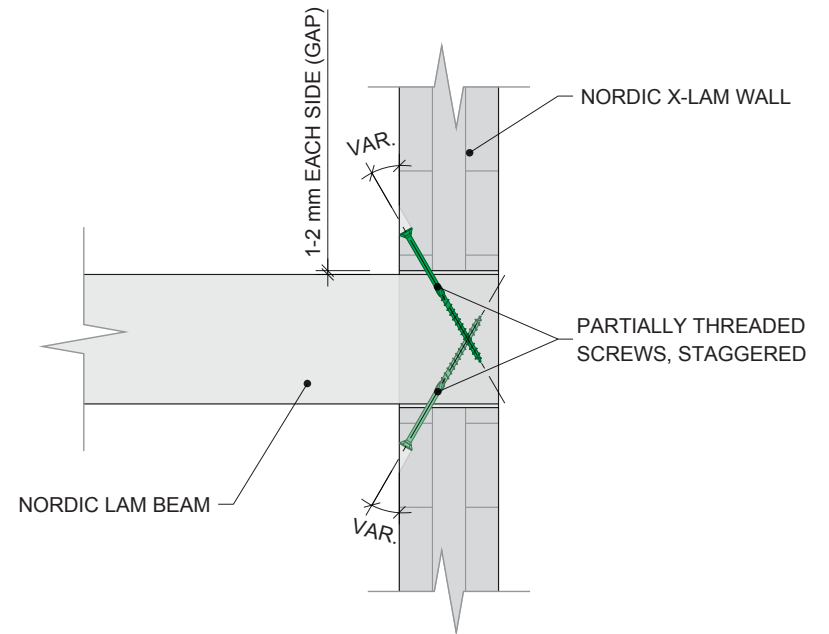
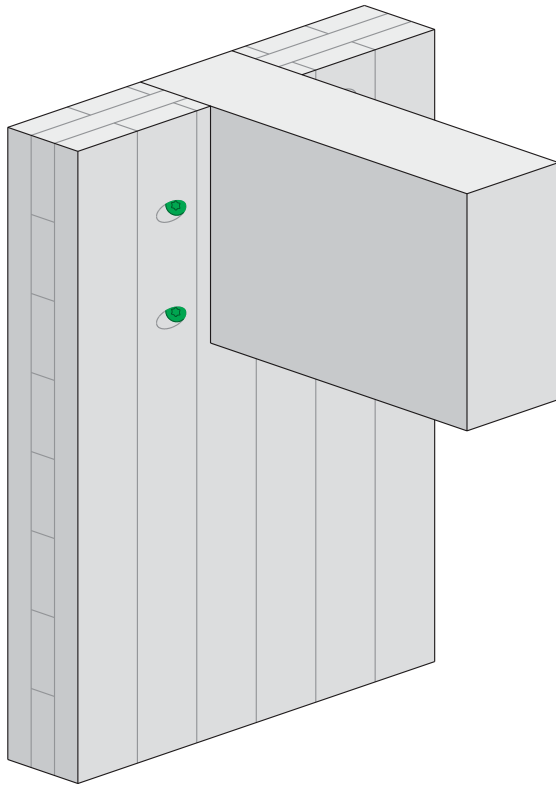
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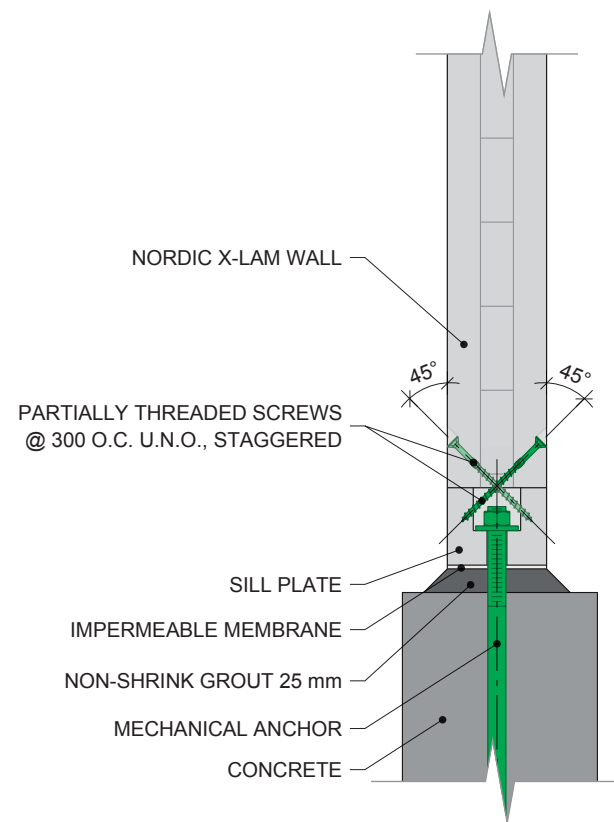
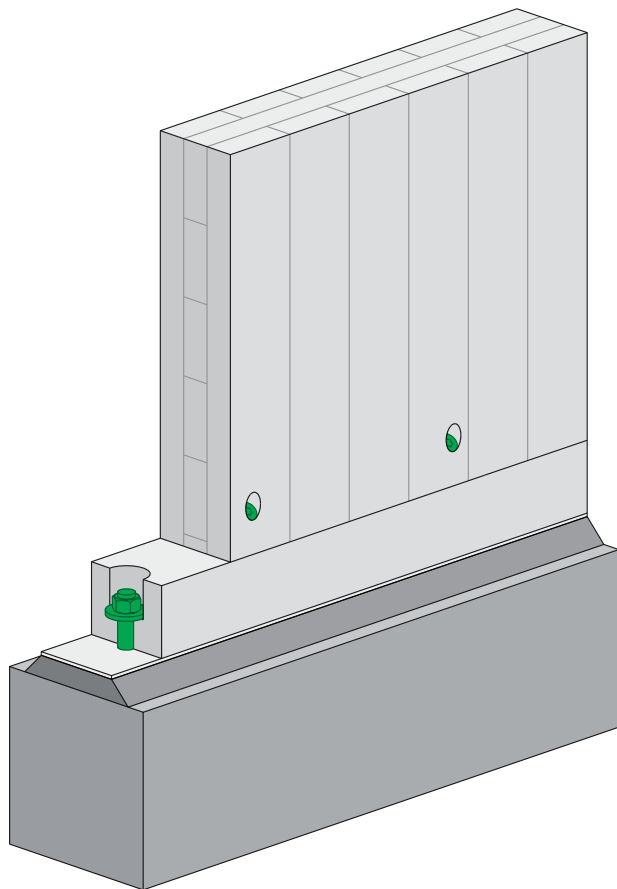


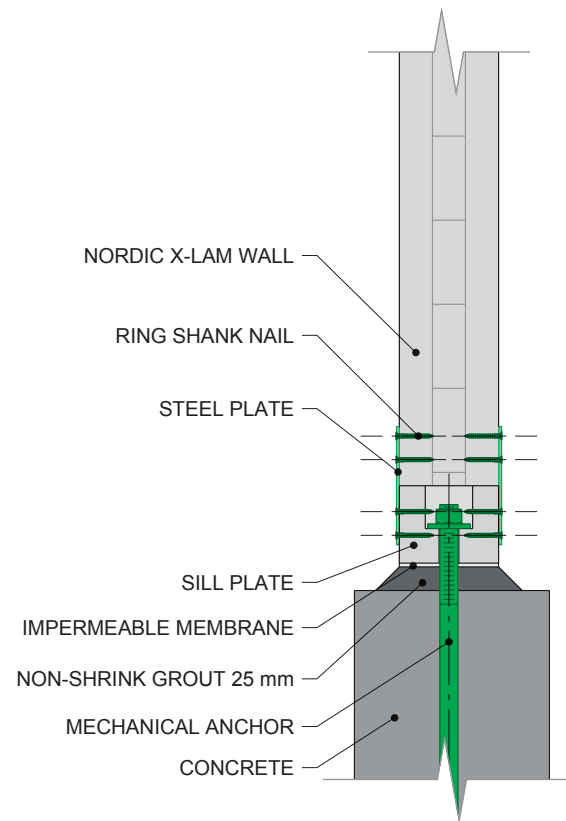
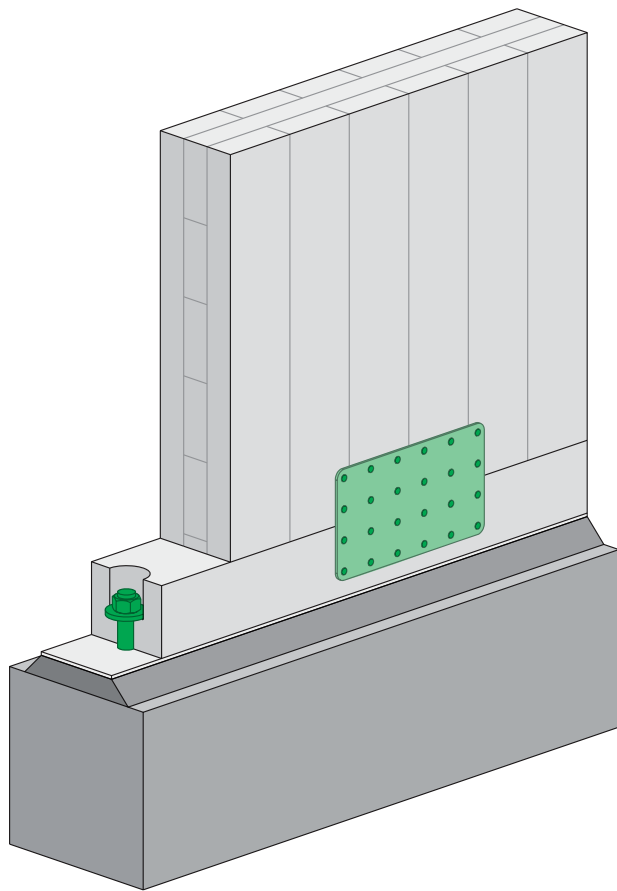


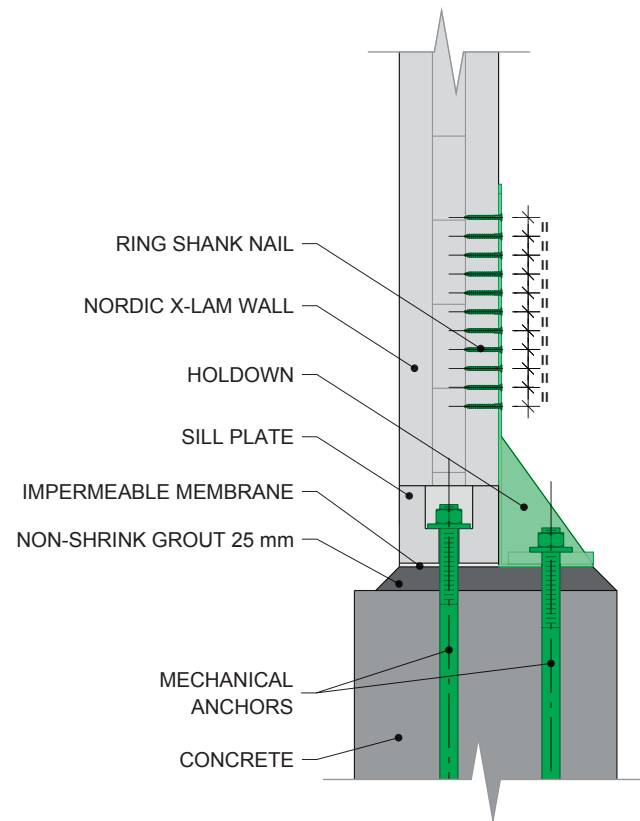
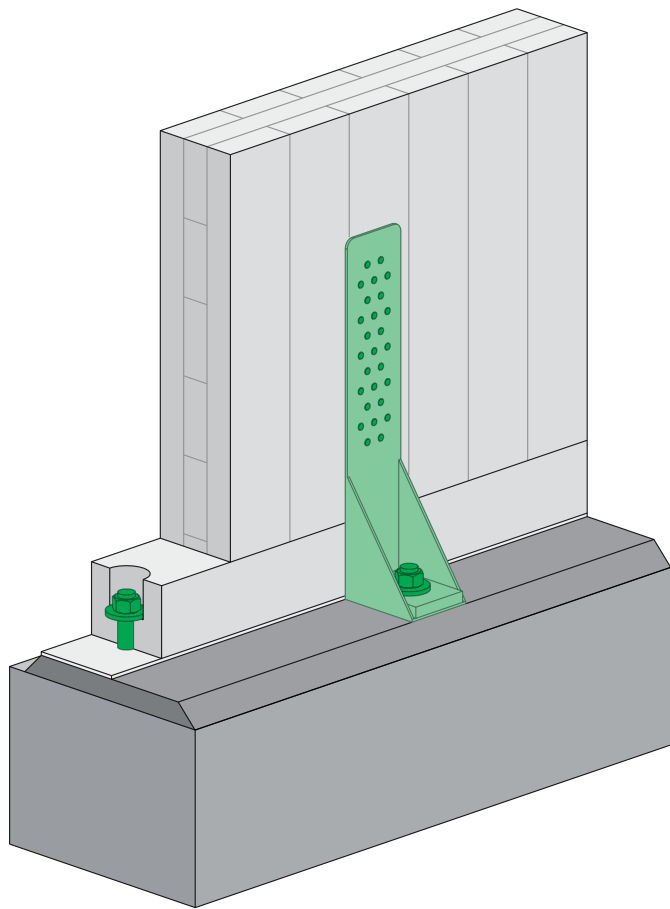
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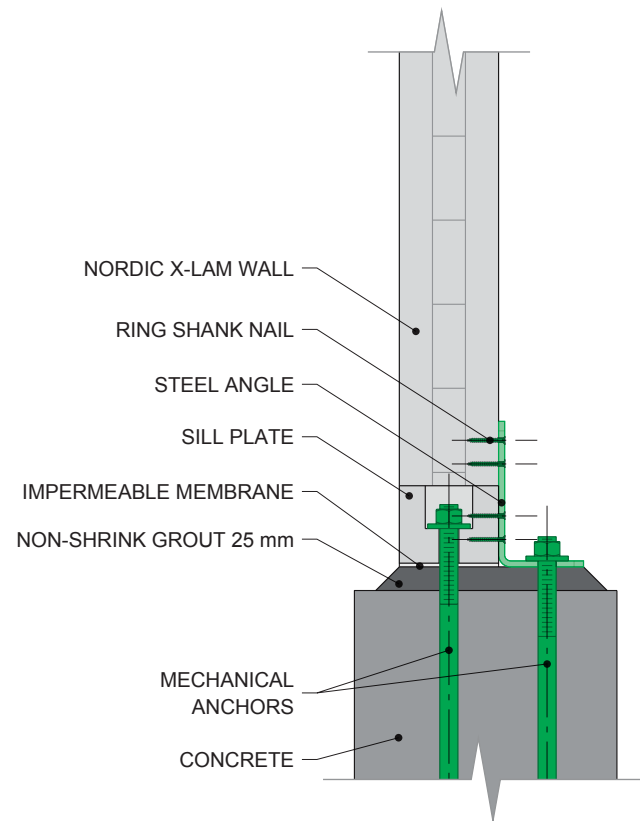
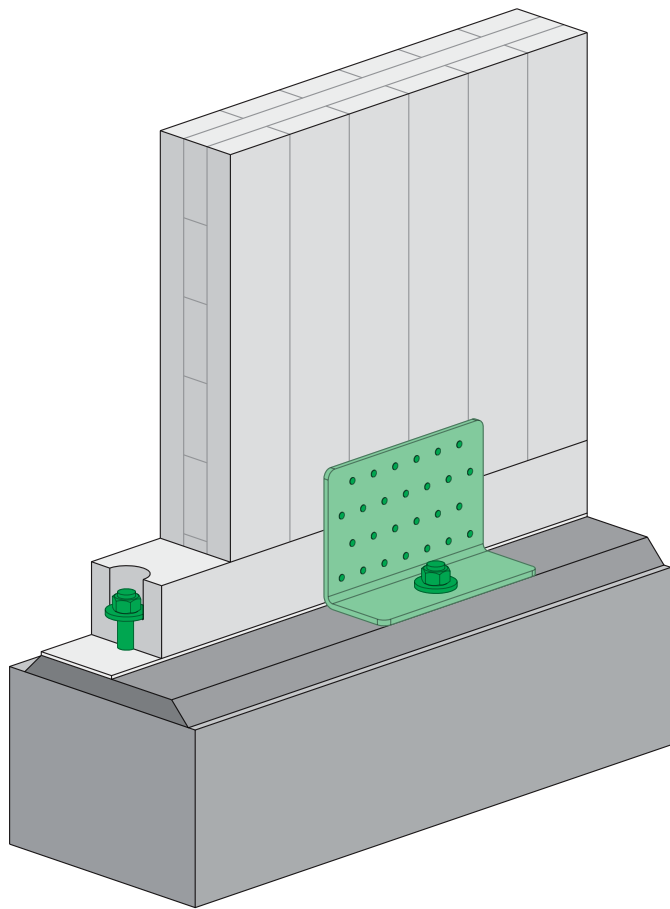


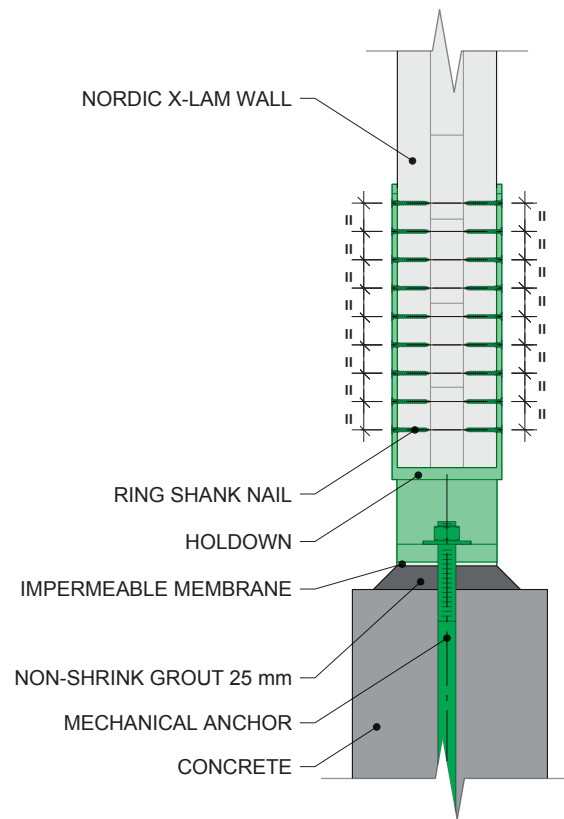
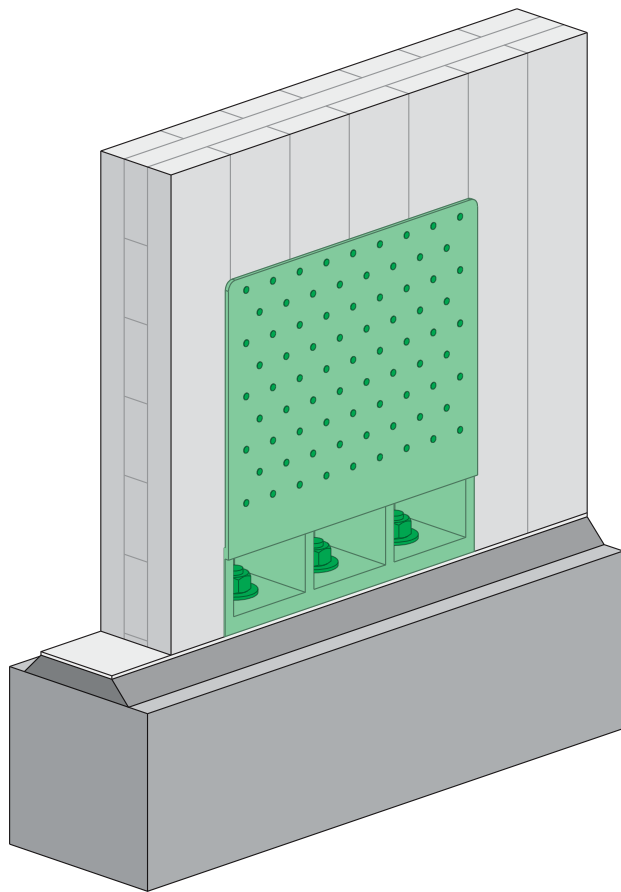




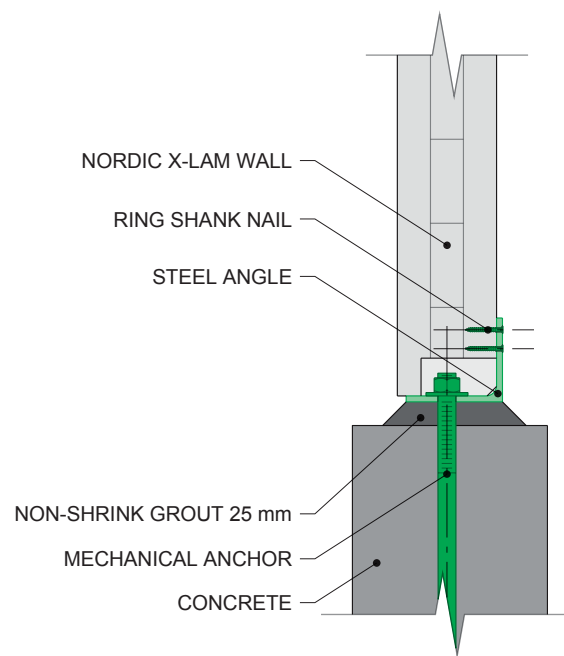
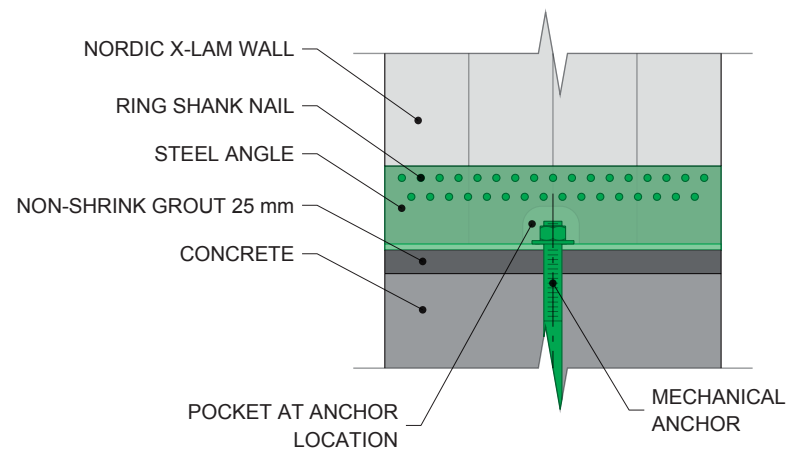
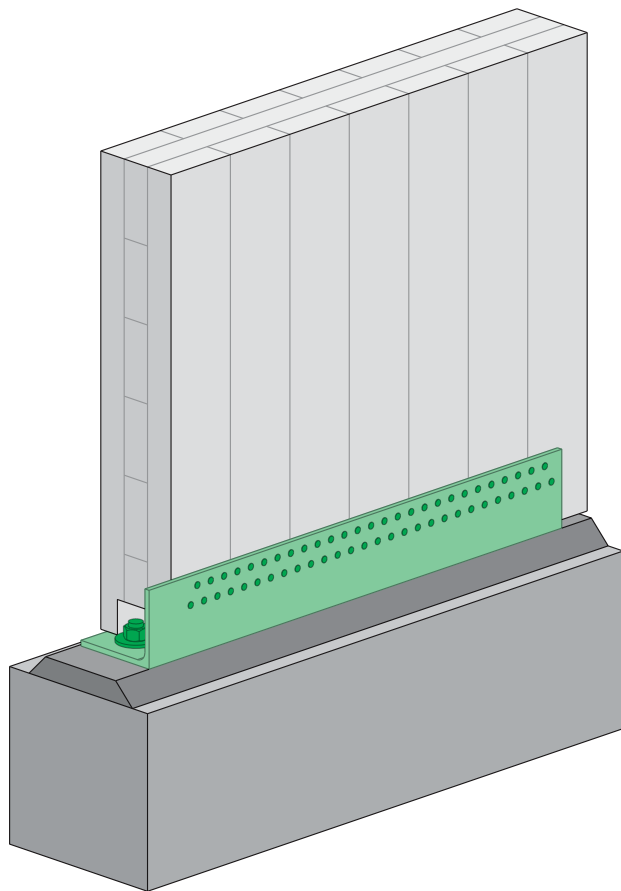


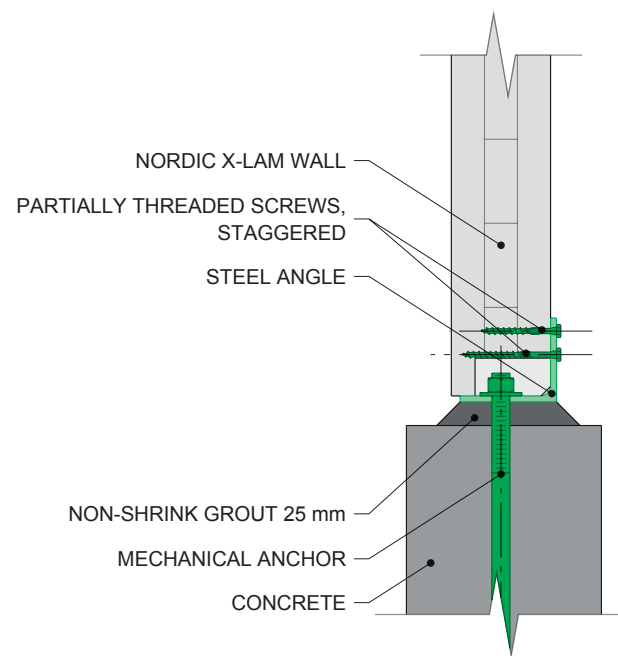
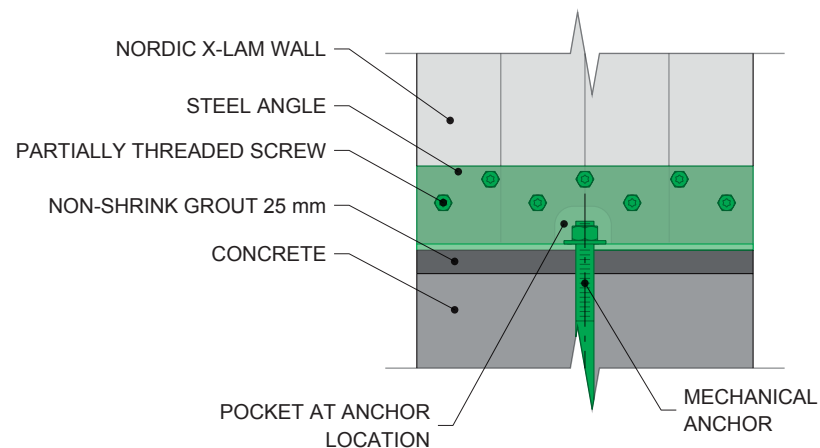
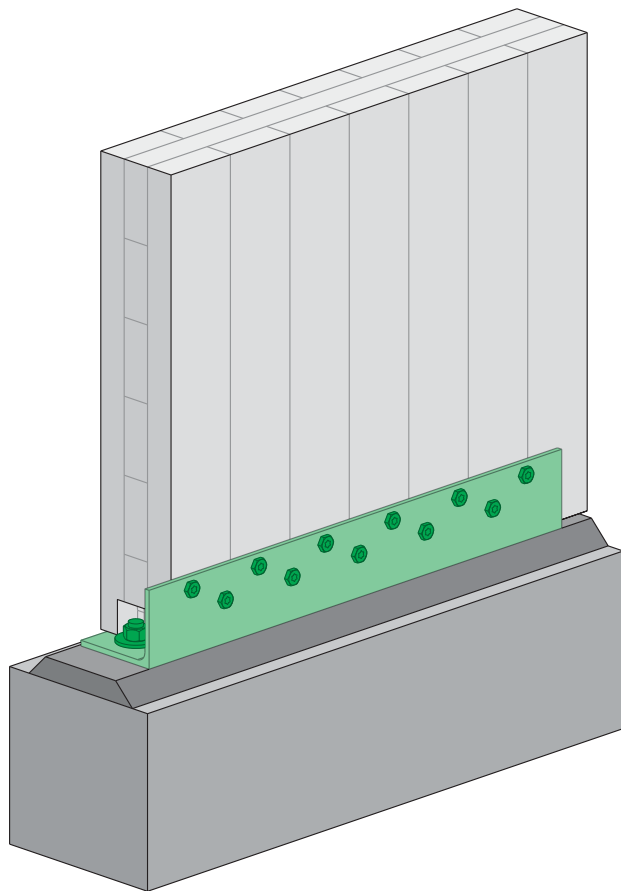






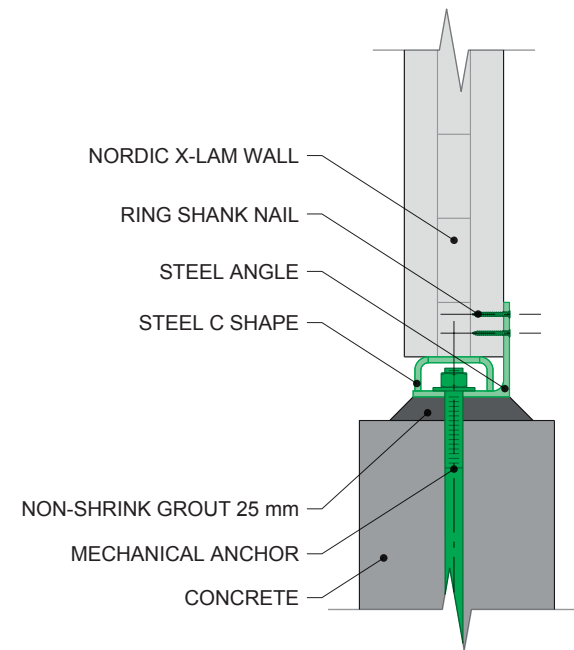
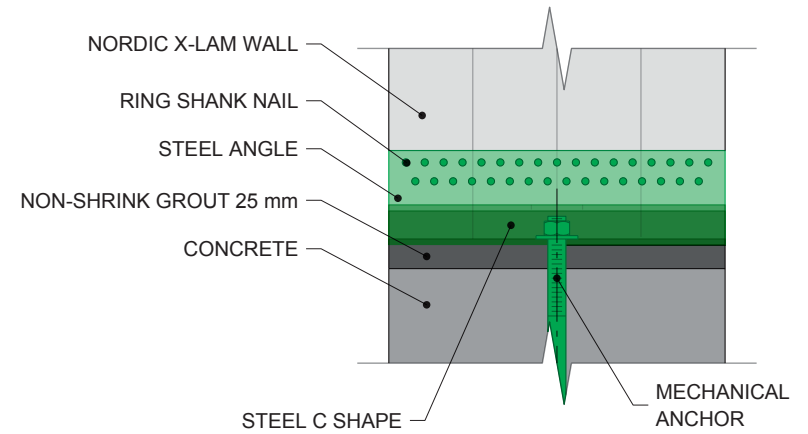
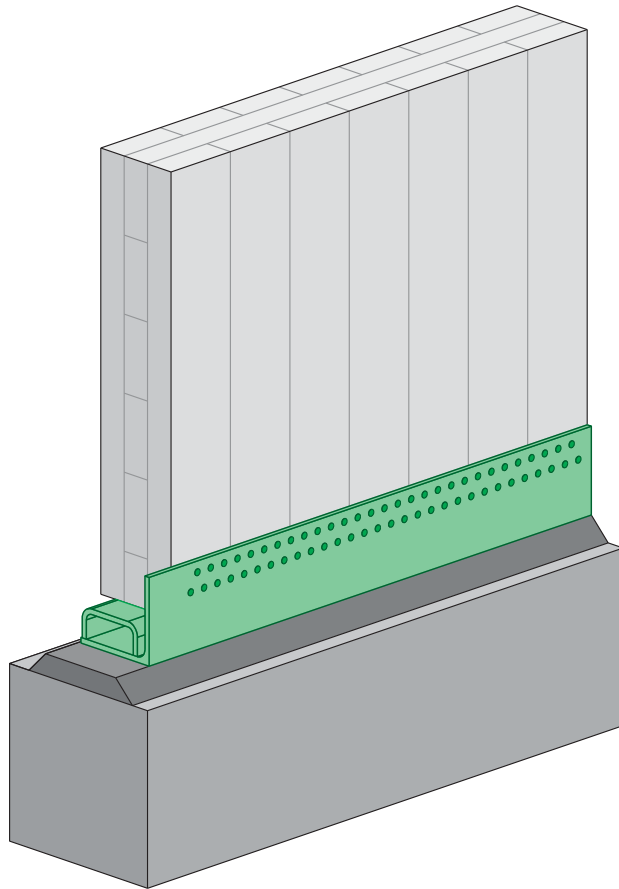


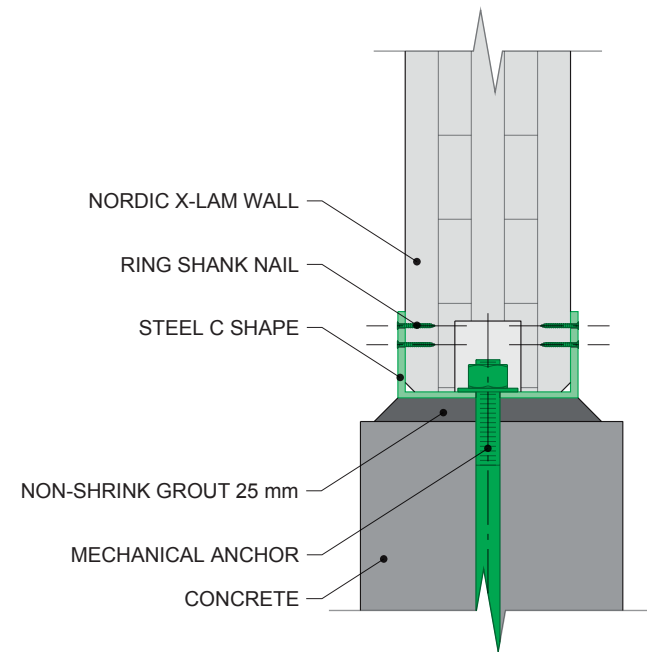
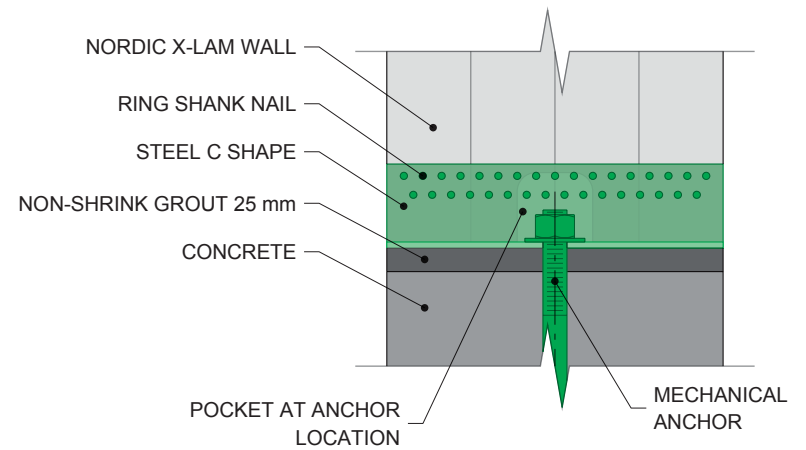
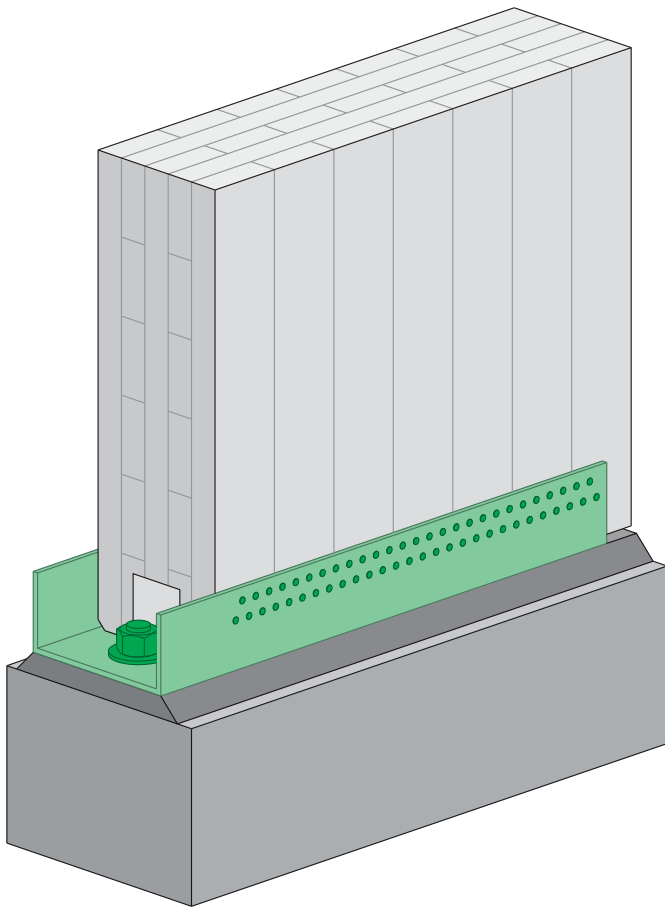




**Note:**

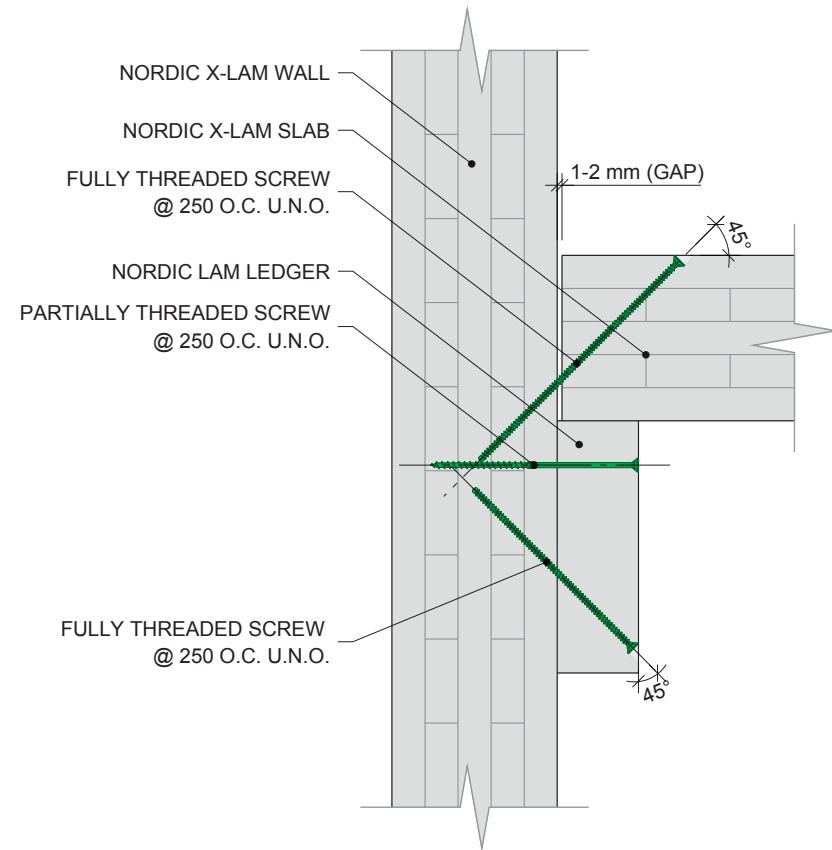
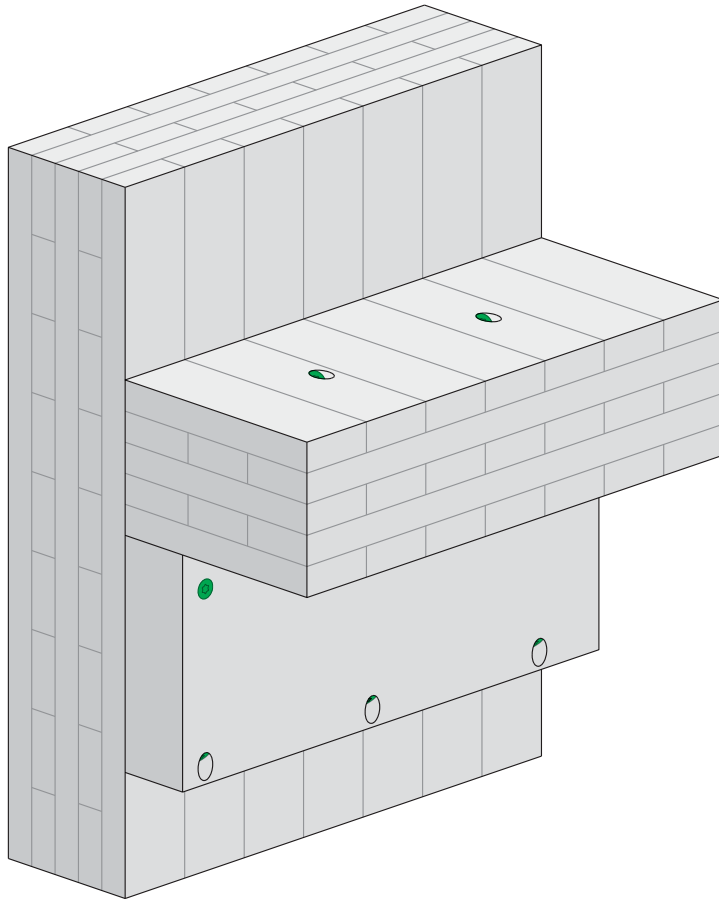
1. This assembly detail offers a resistance to forces acting perpendicularly to the foundation wall.

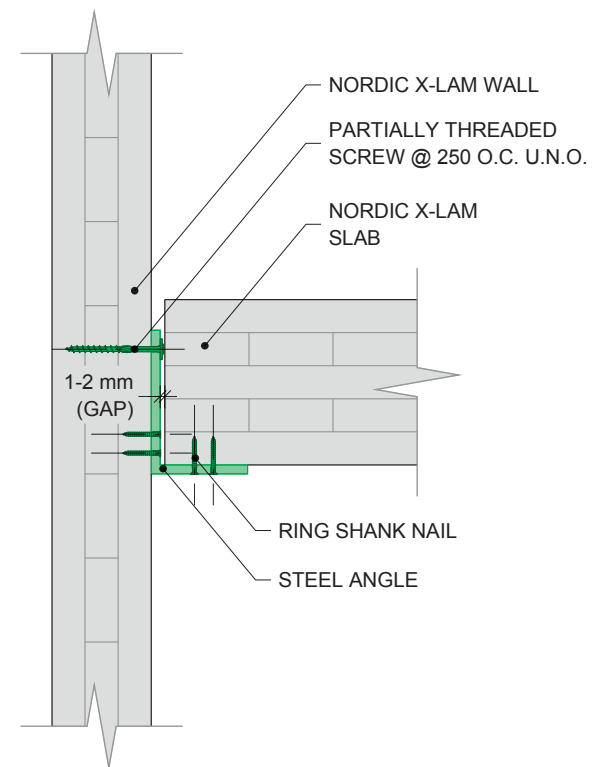
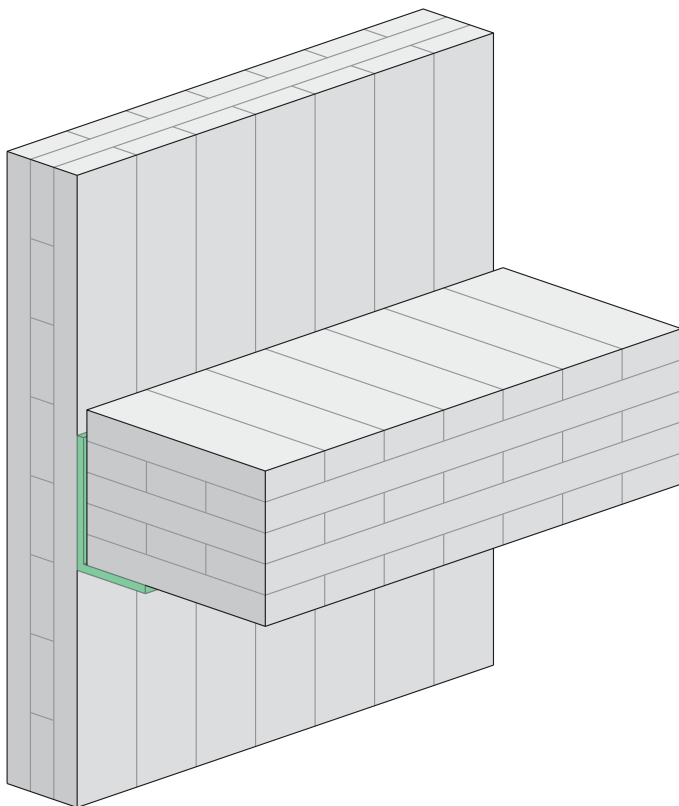


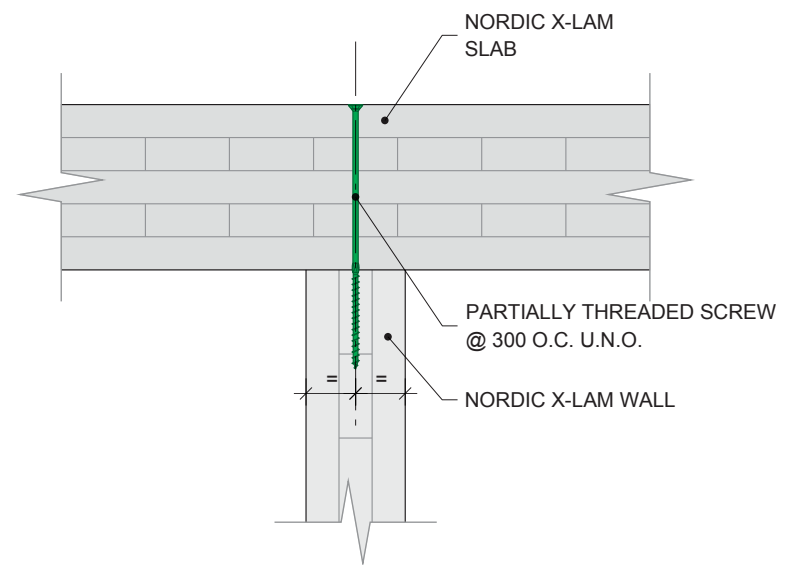
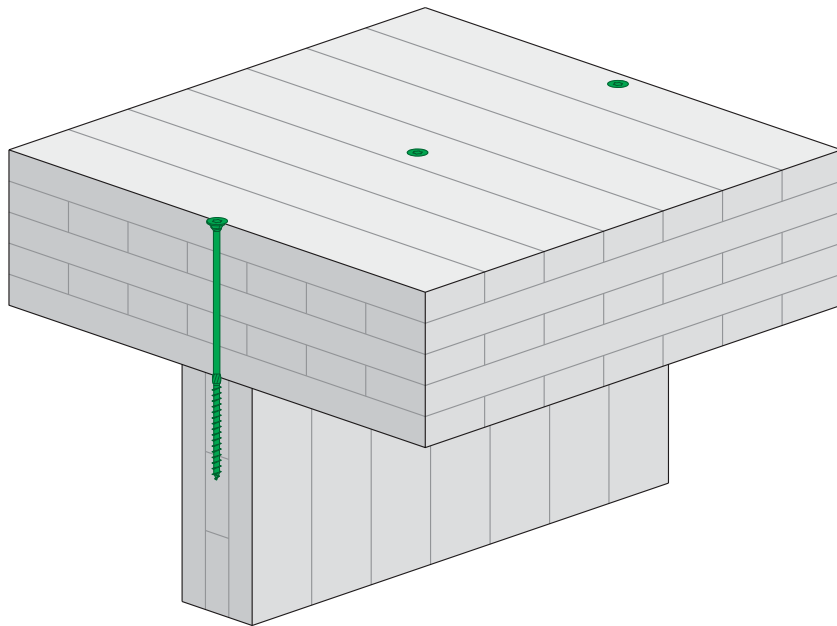


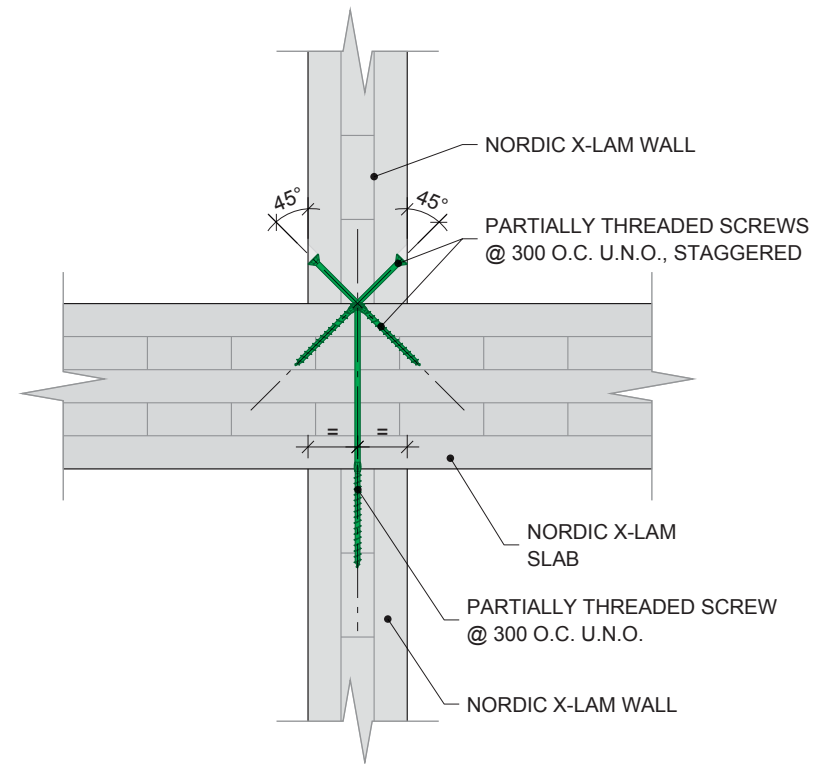
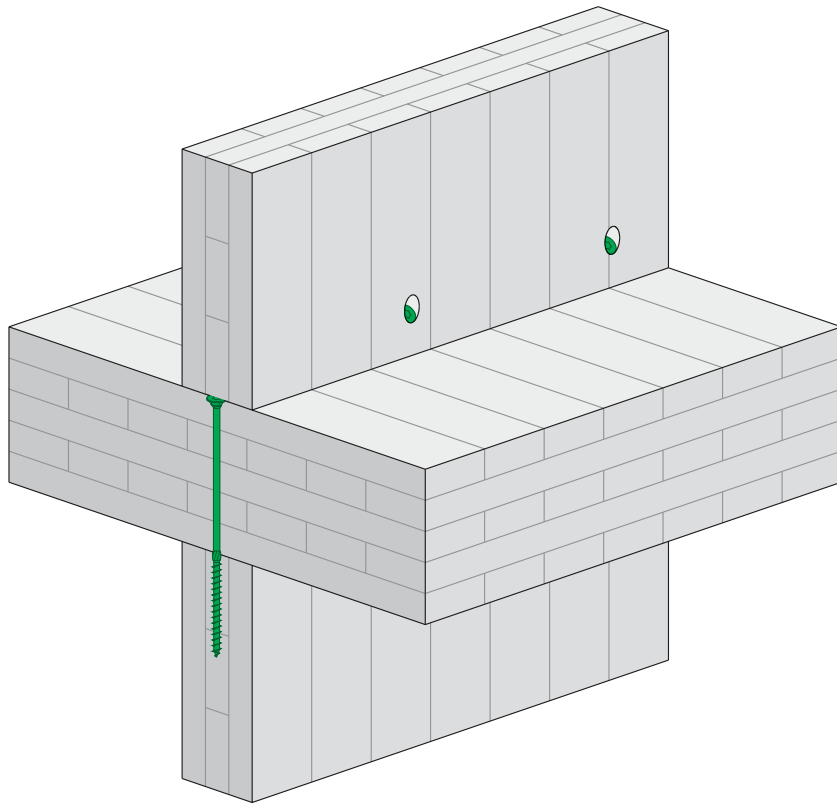
**Note:**

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.

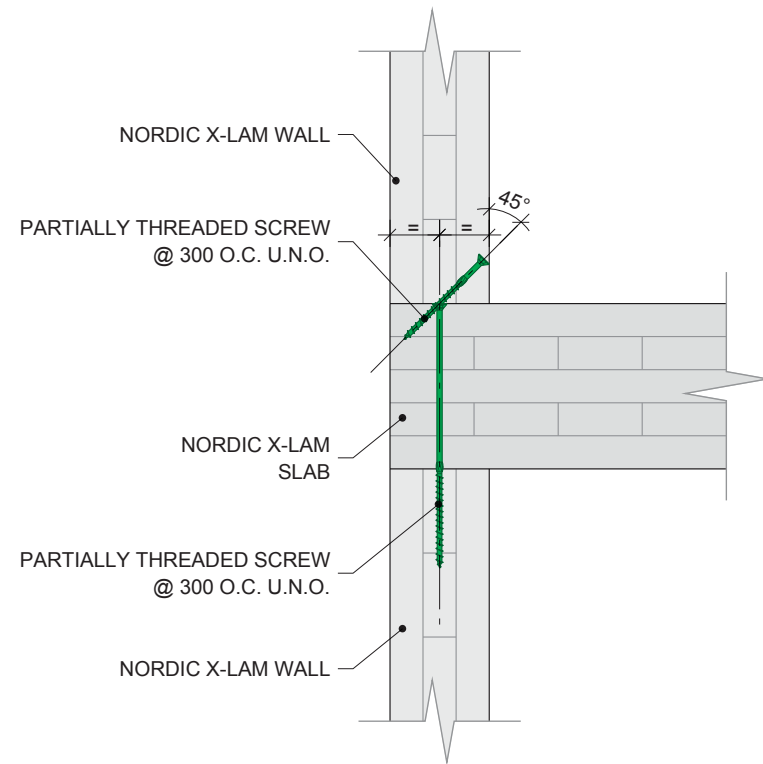
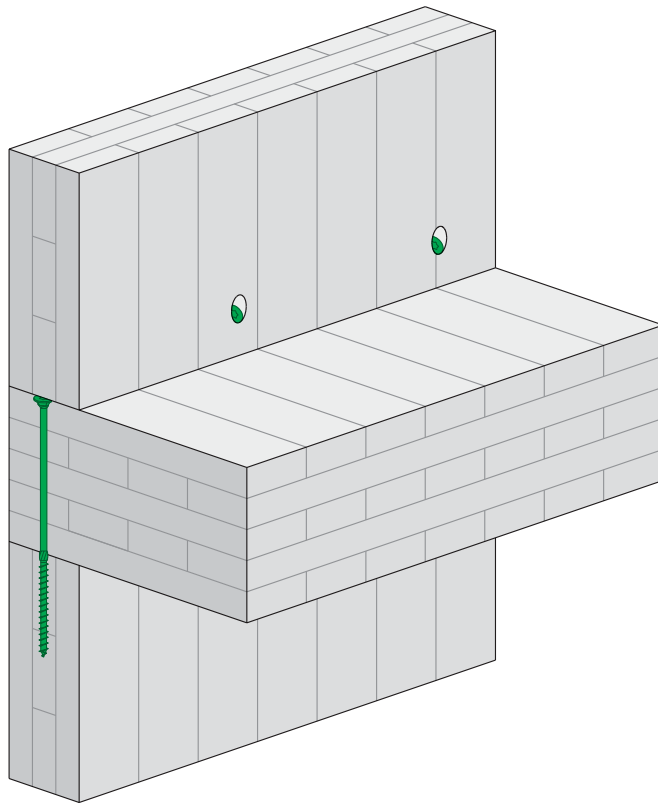


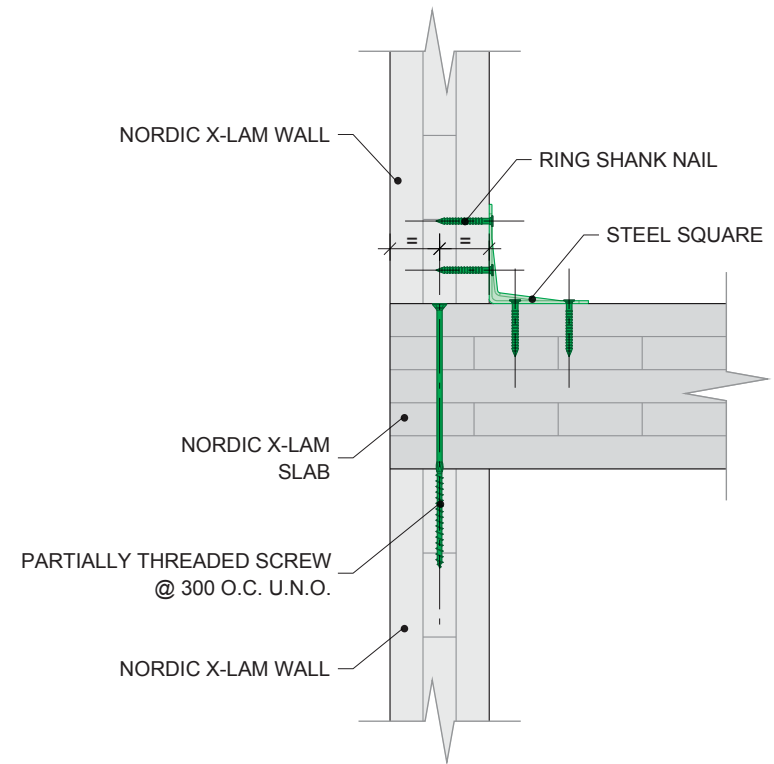
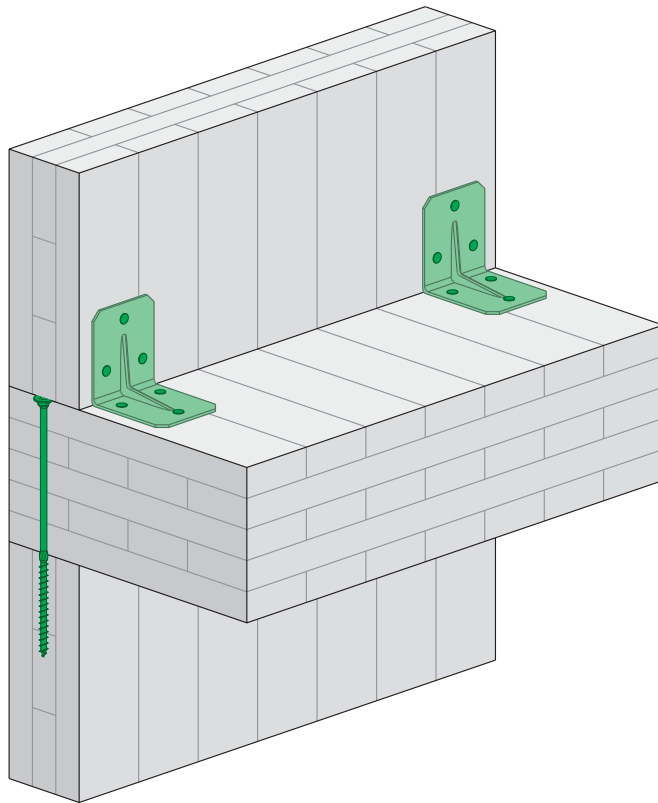


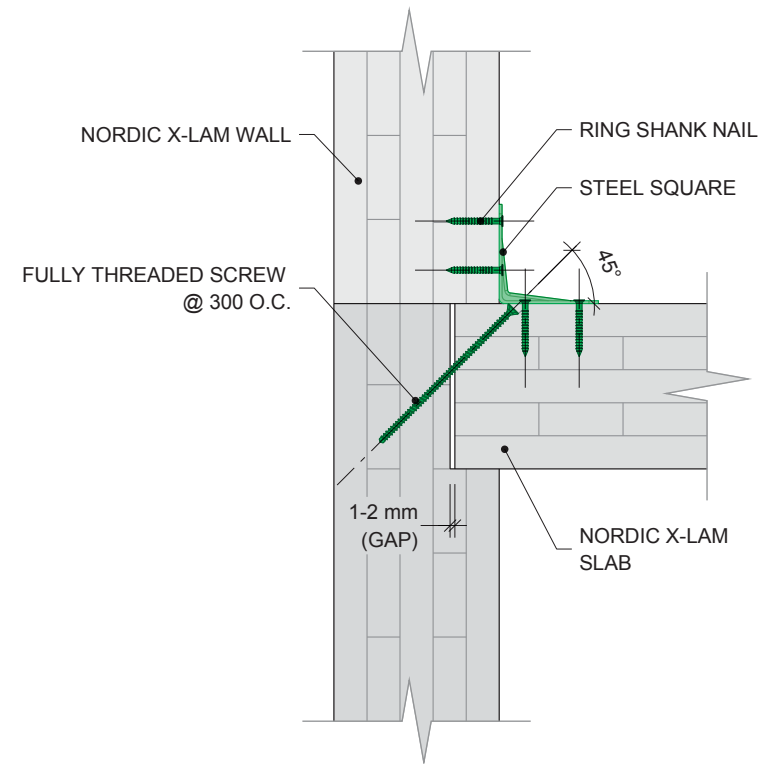
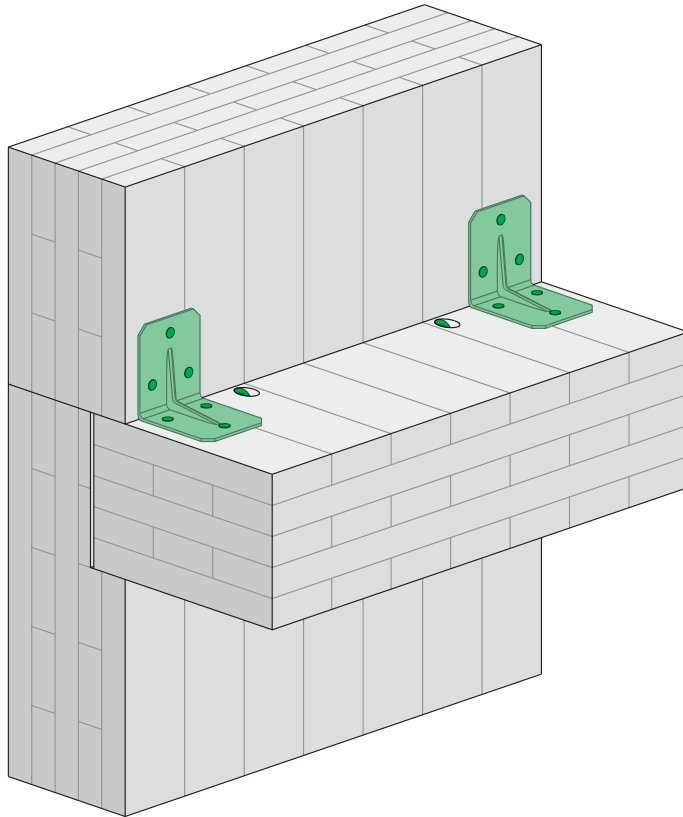


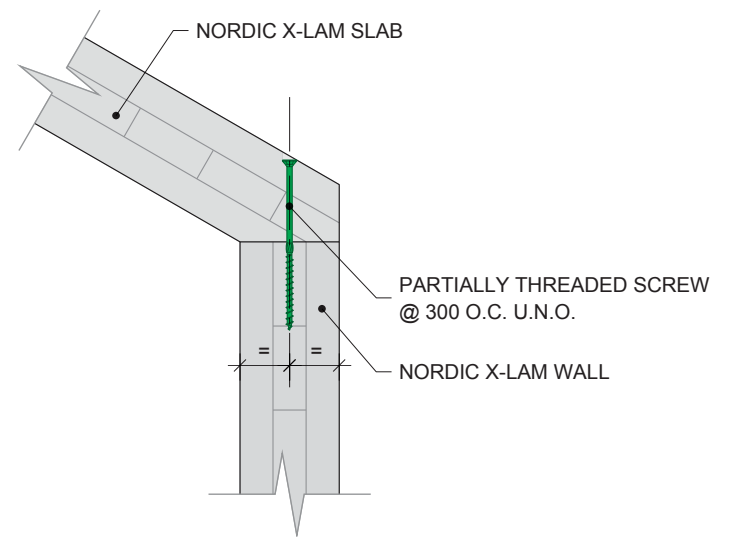
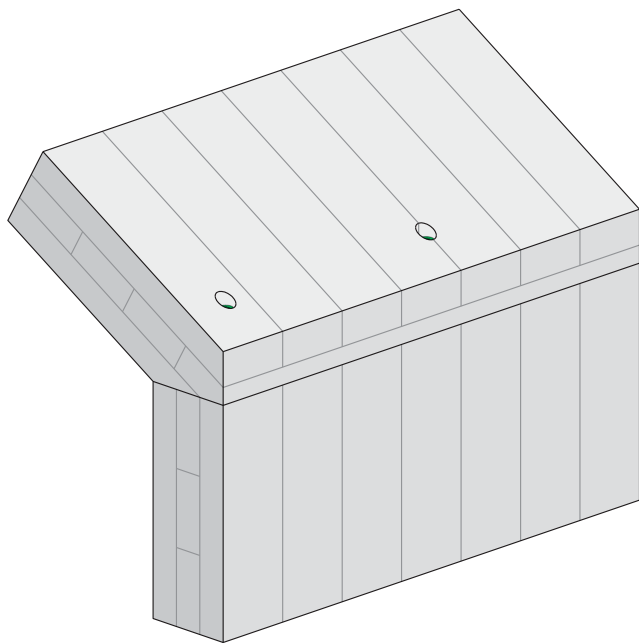


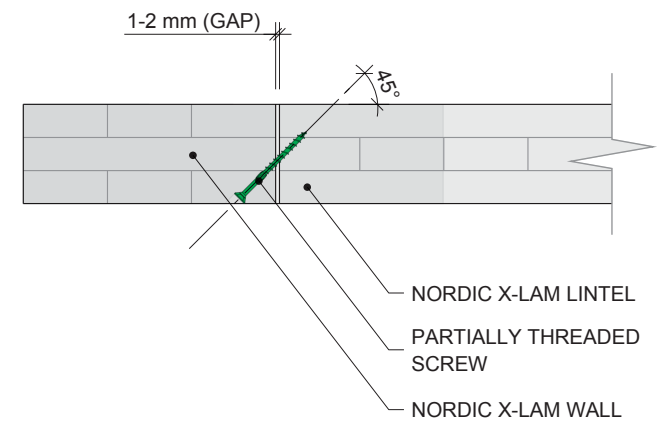
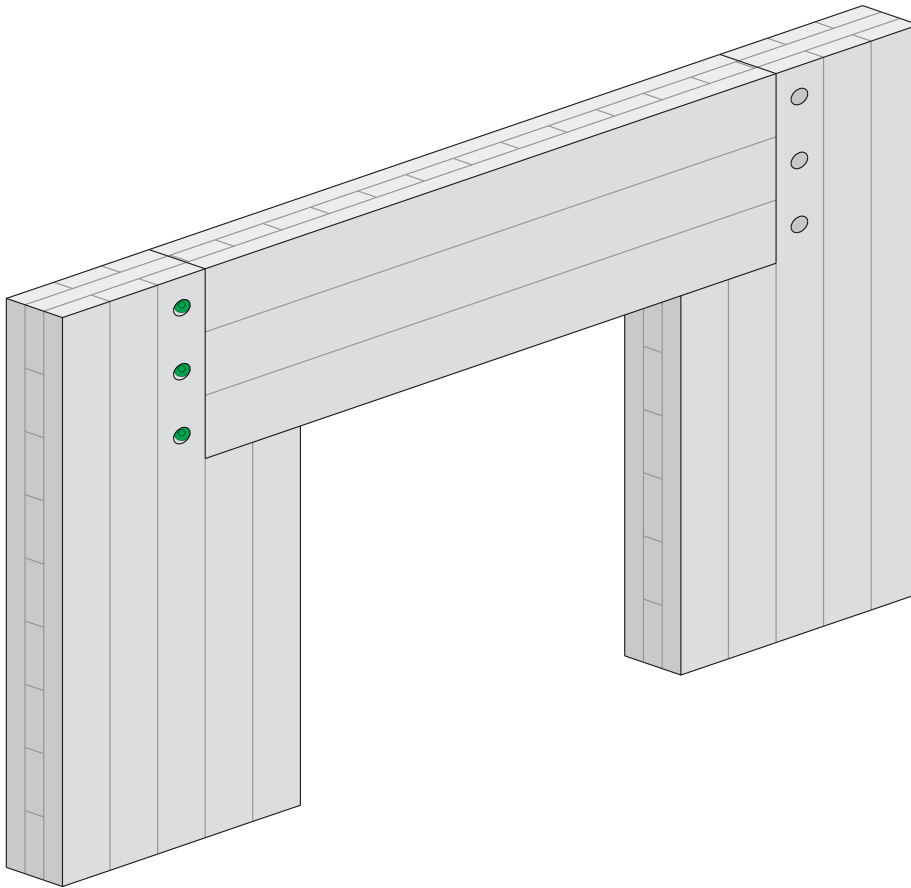


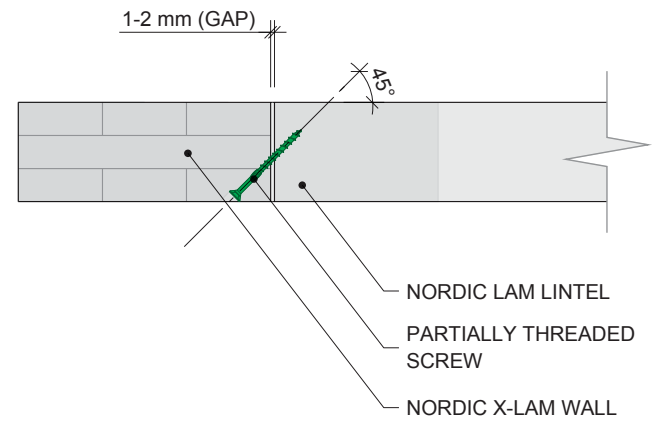
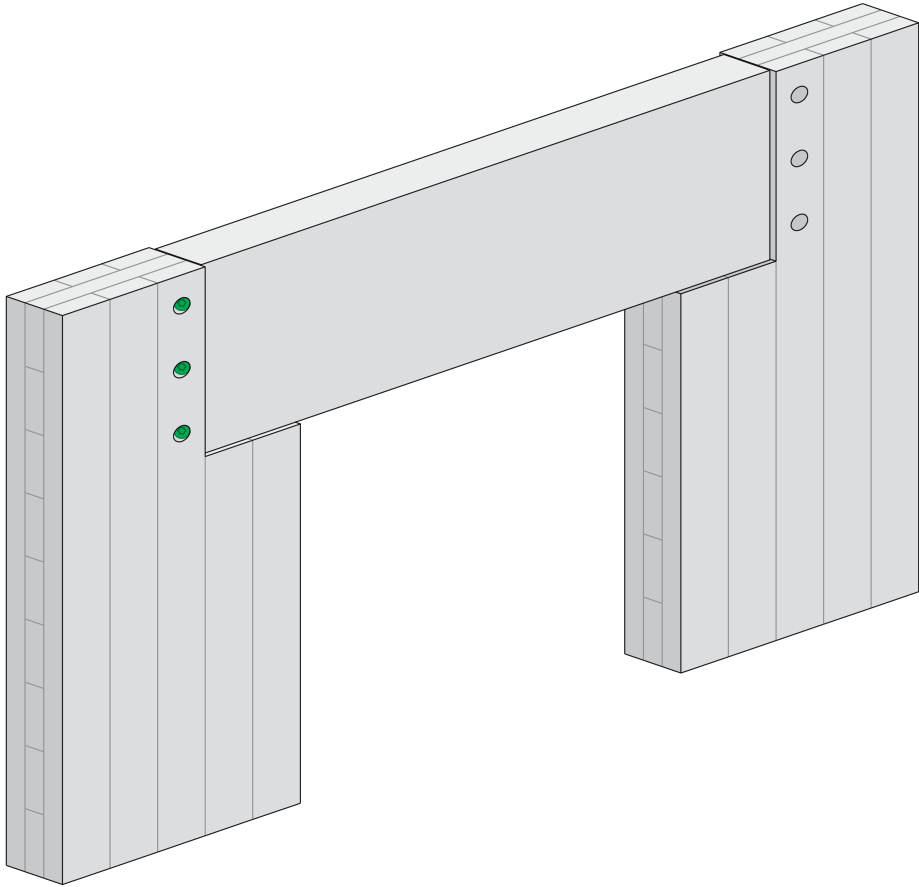


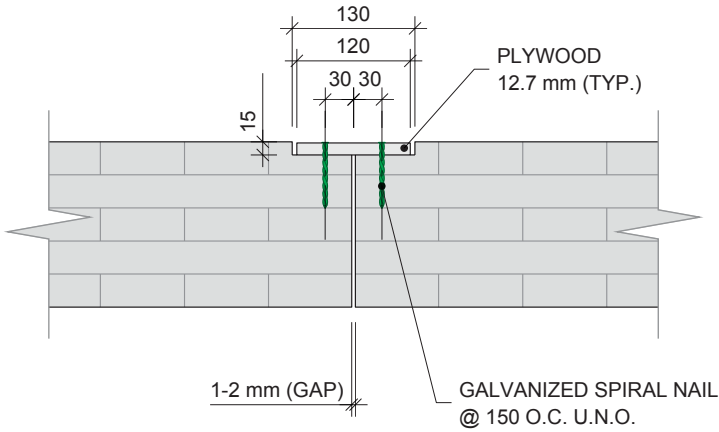
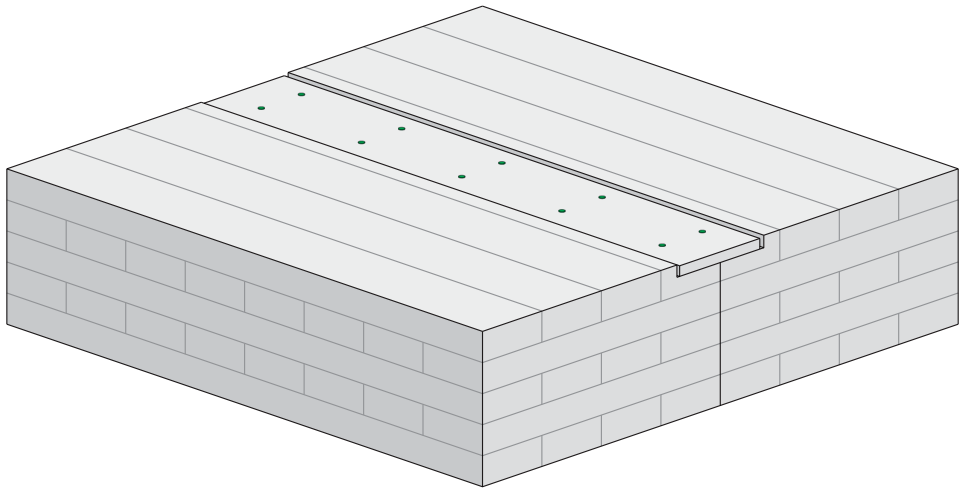


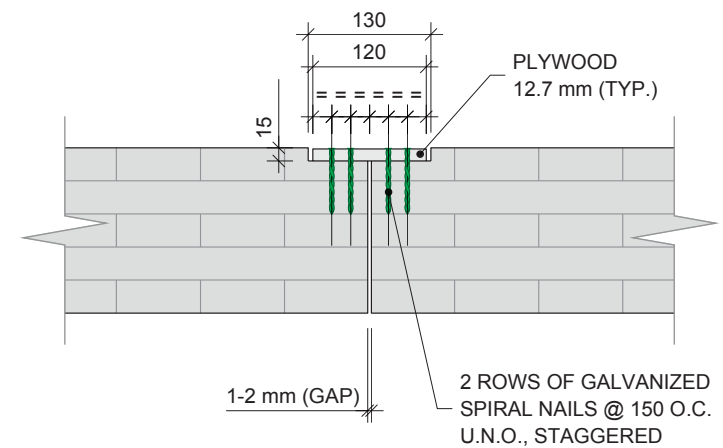
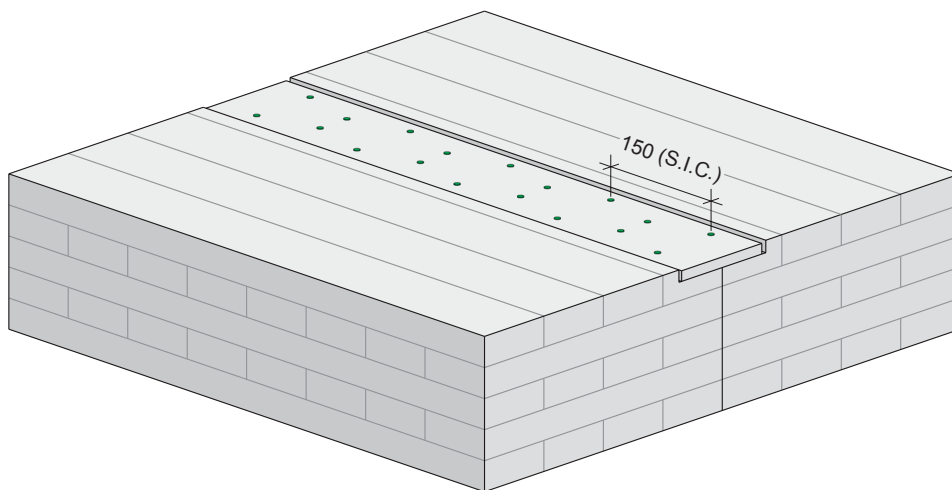




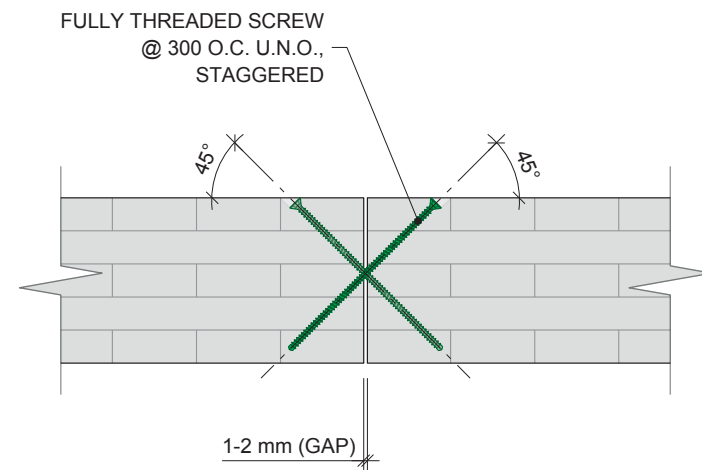
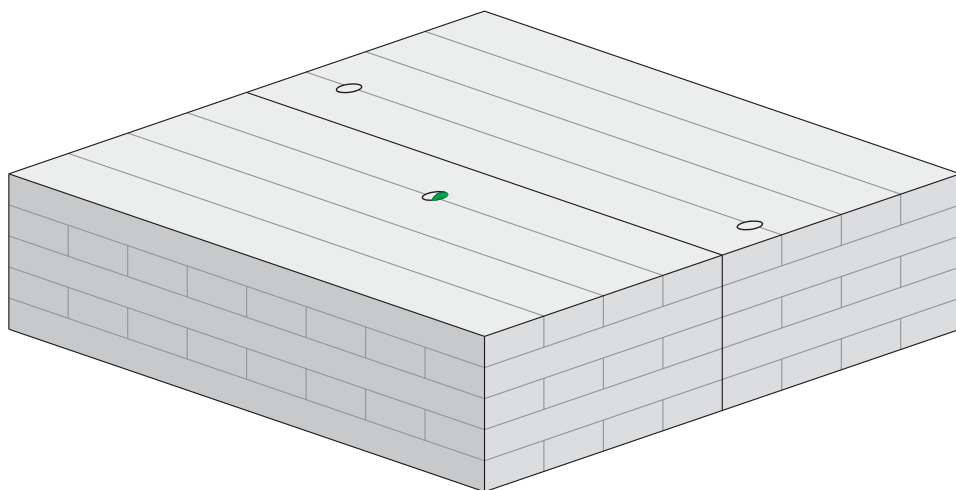


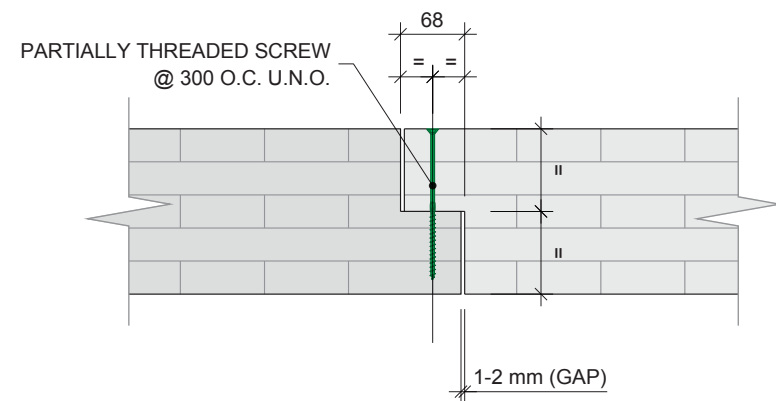
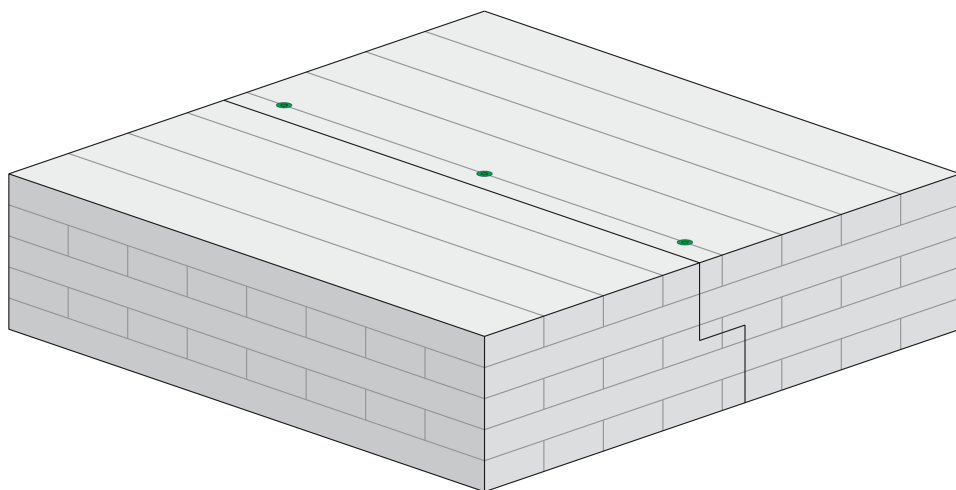


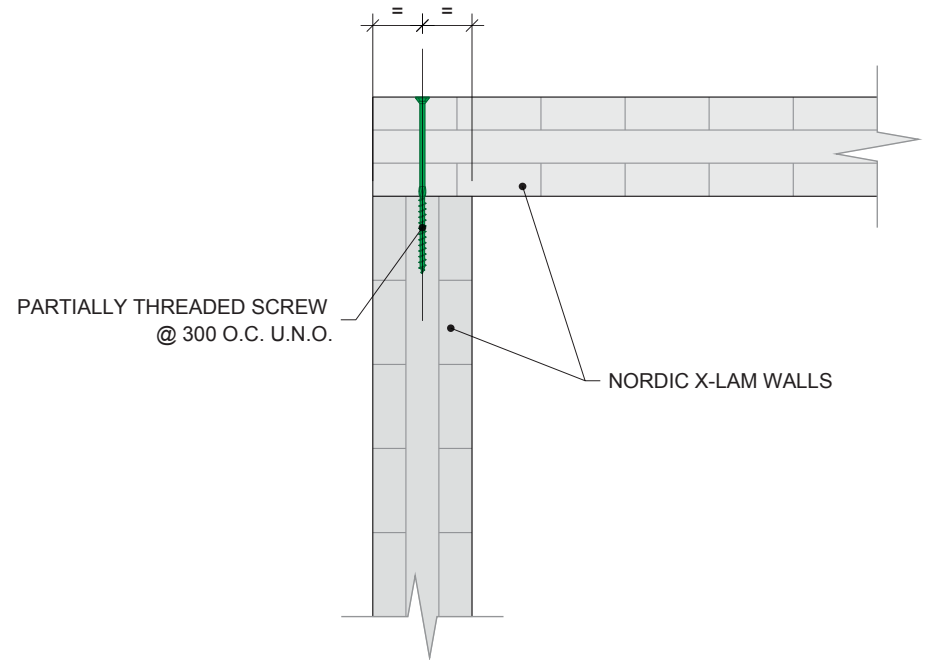
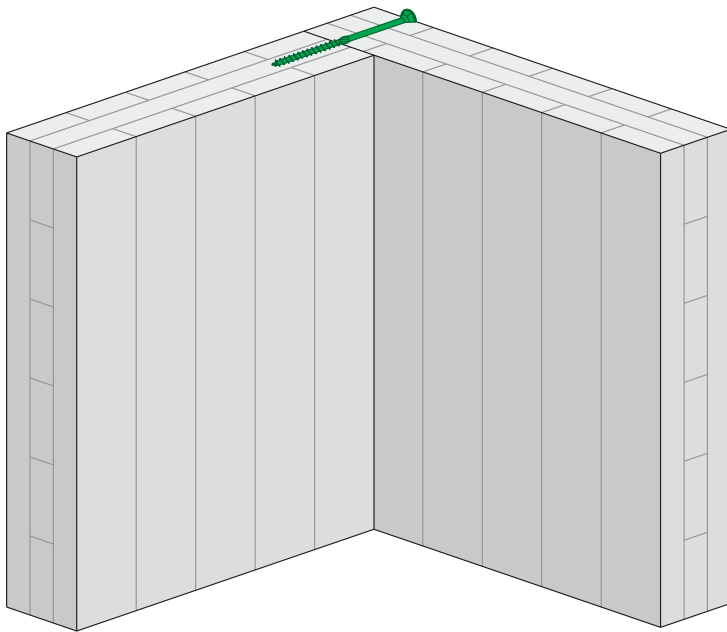


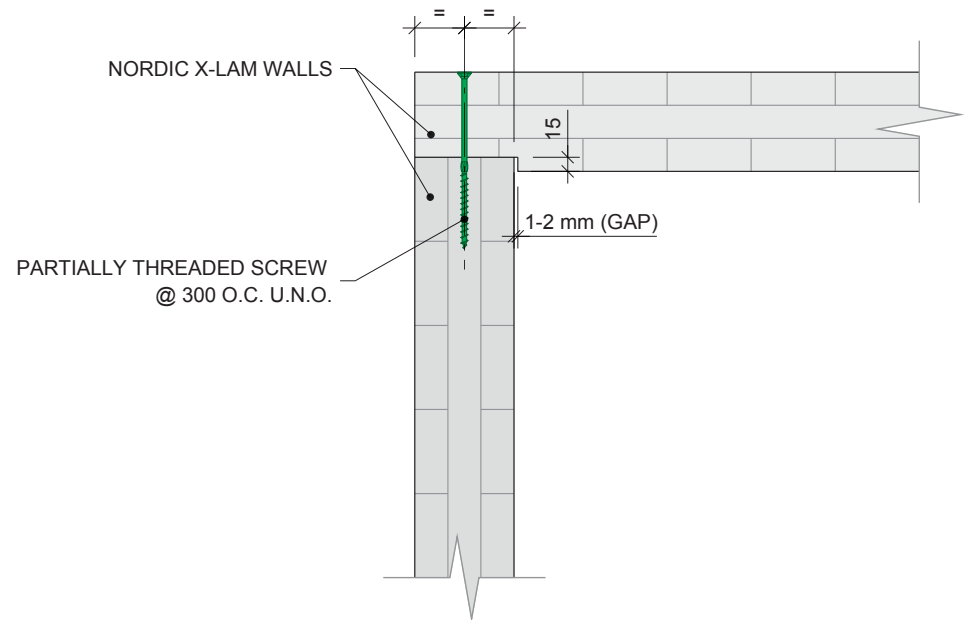
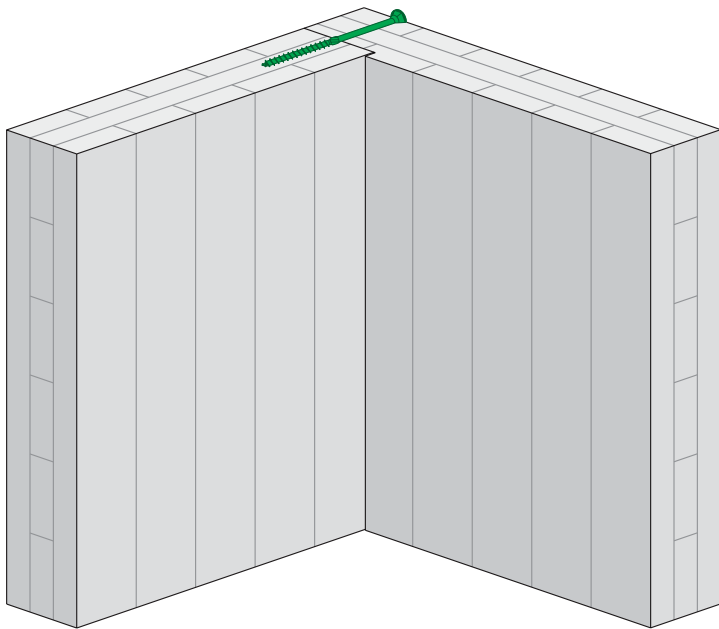


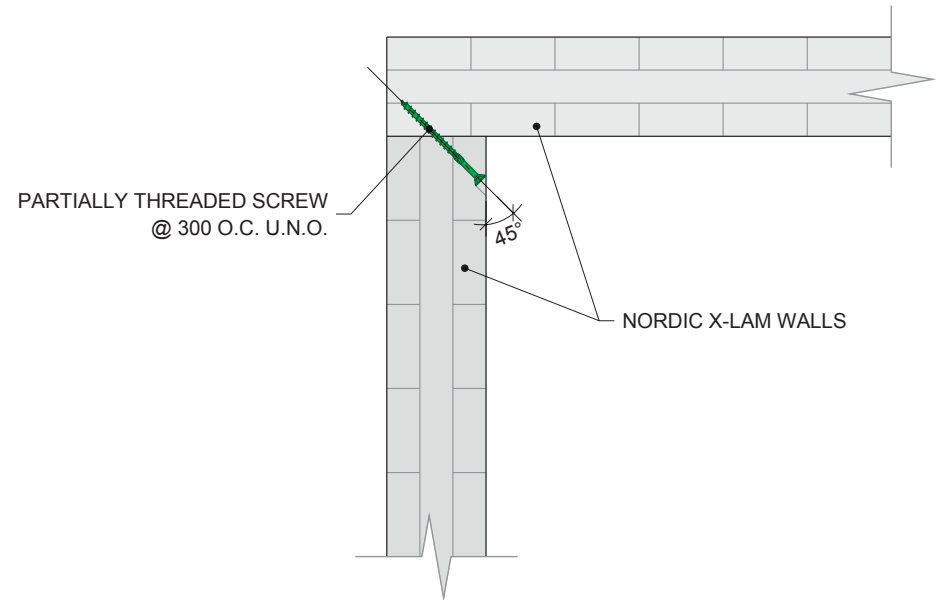
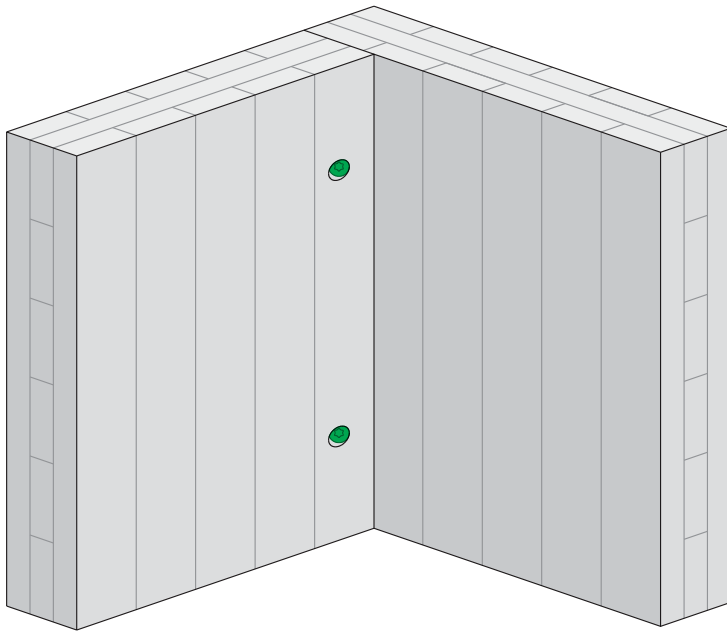


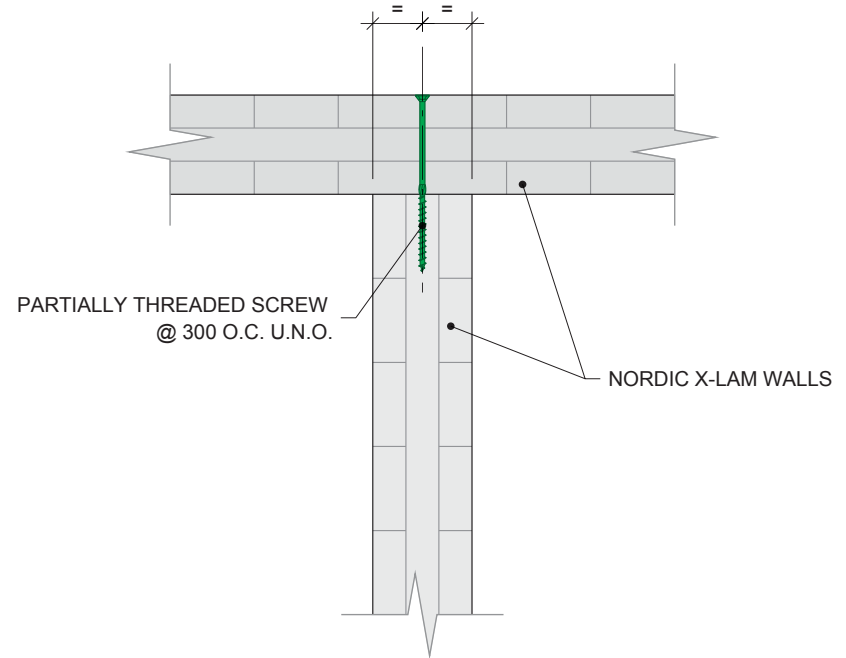
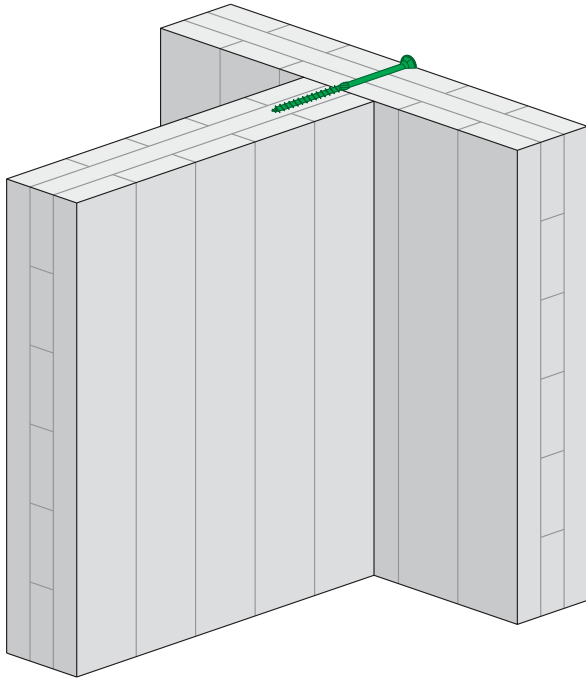


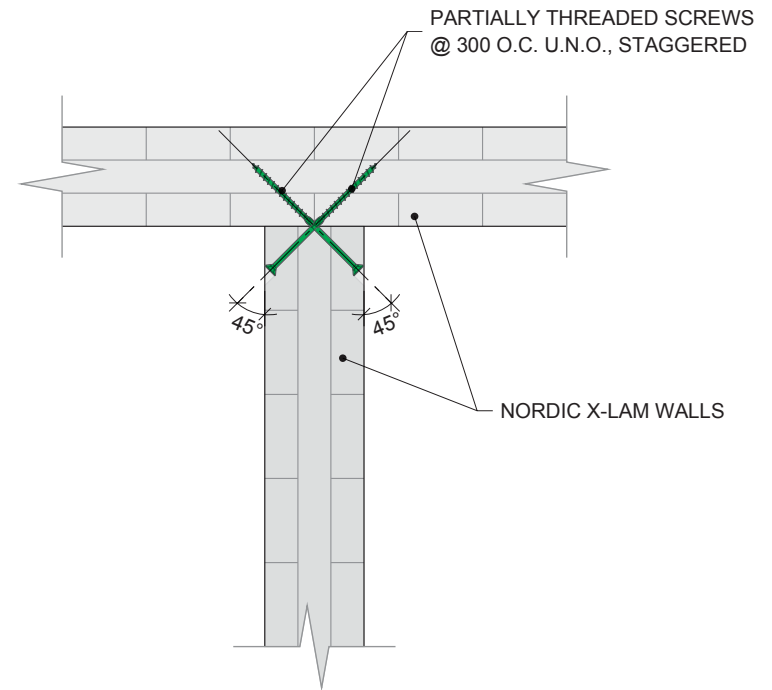
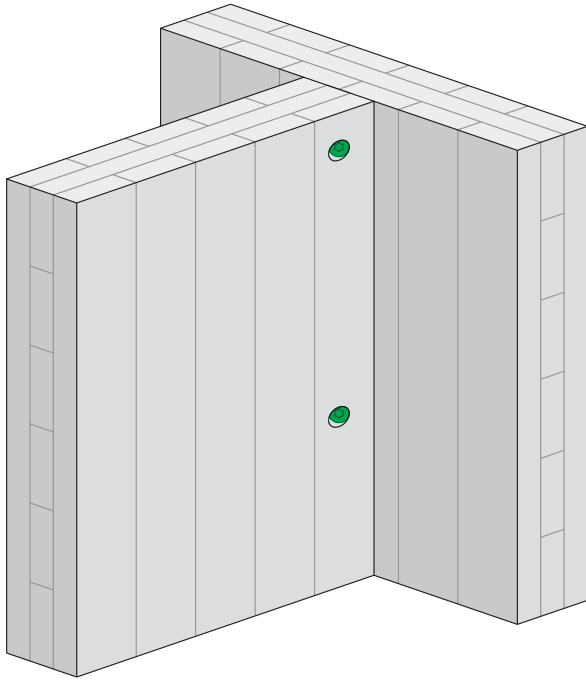


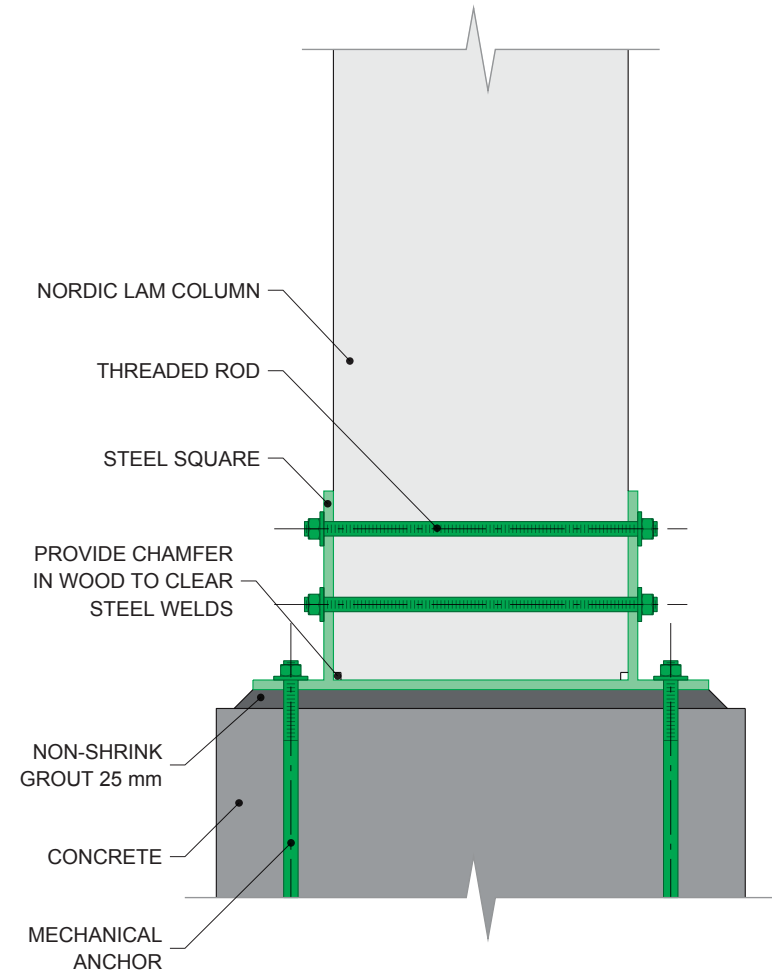
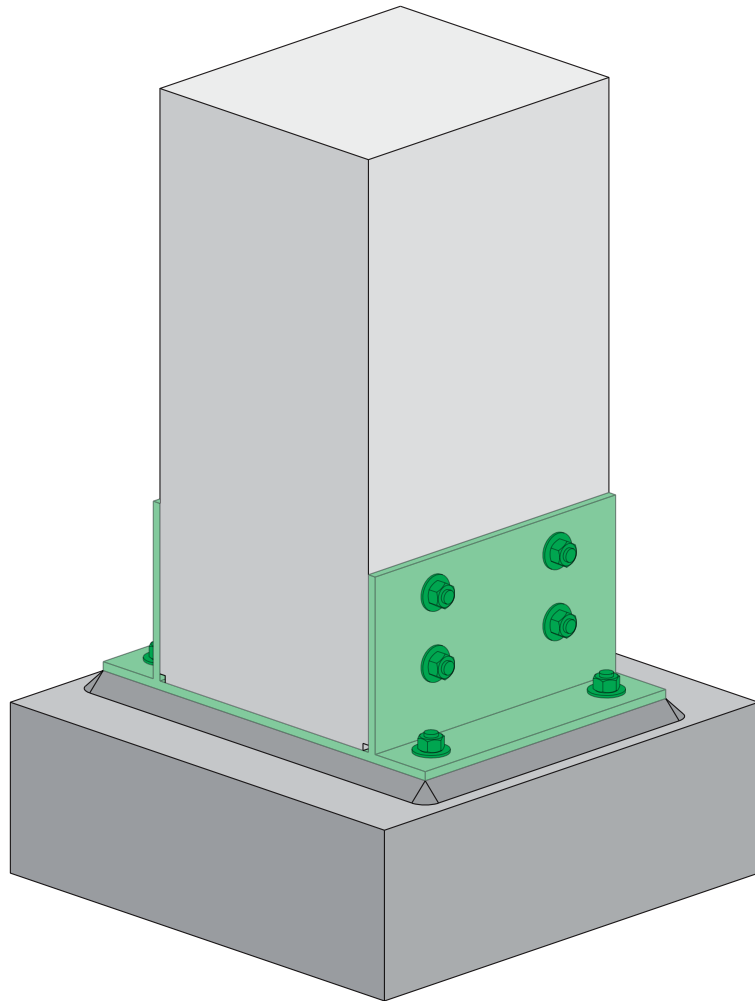




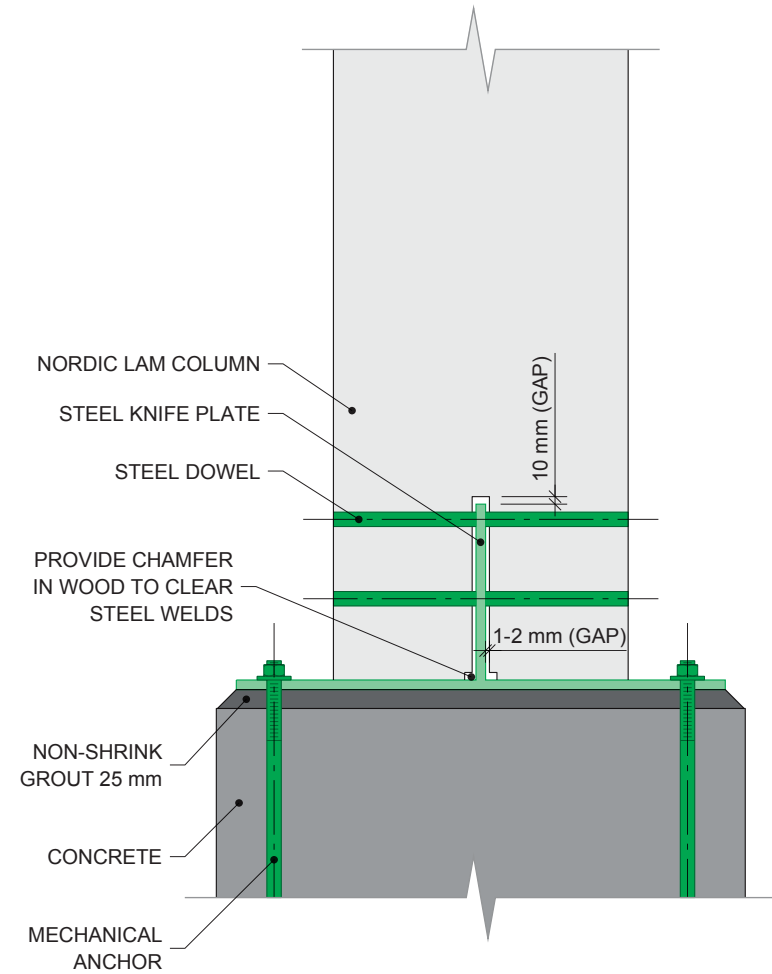
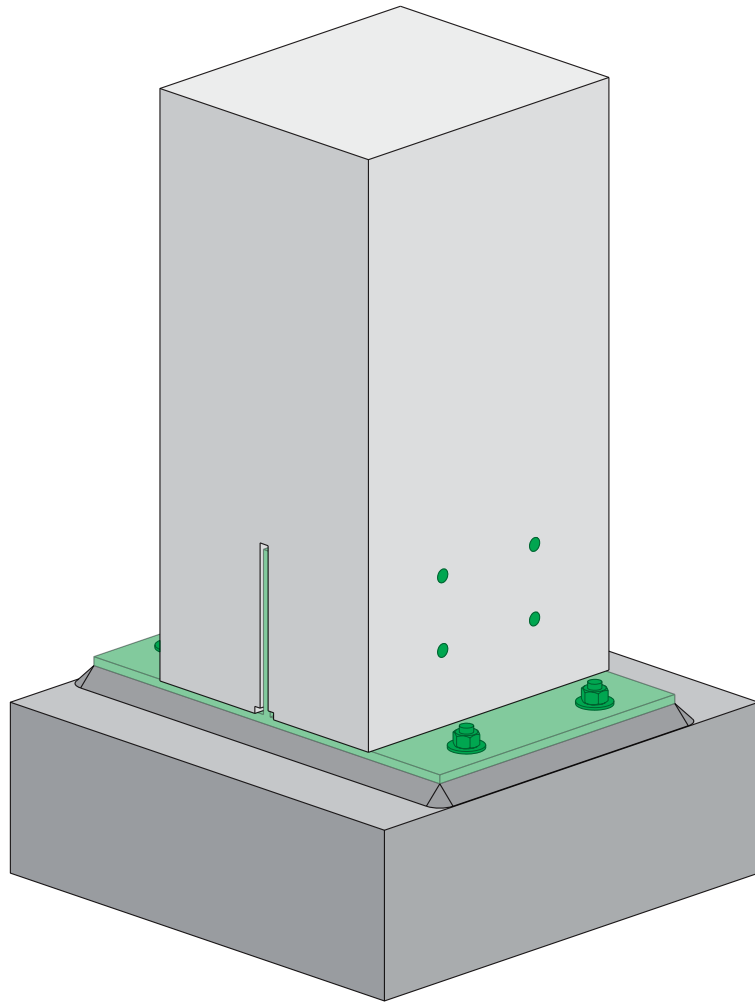


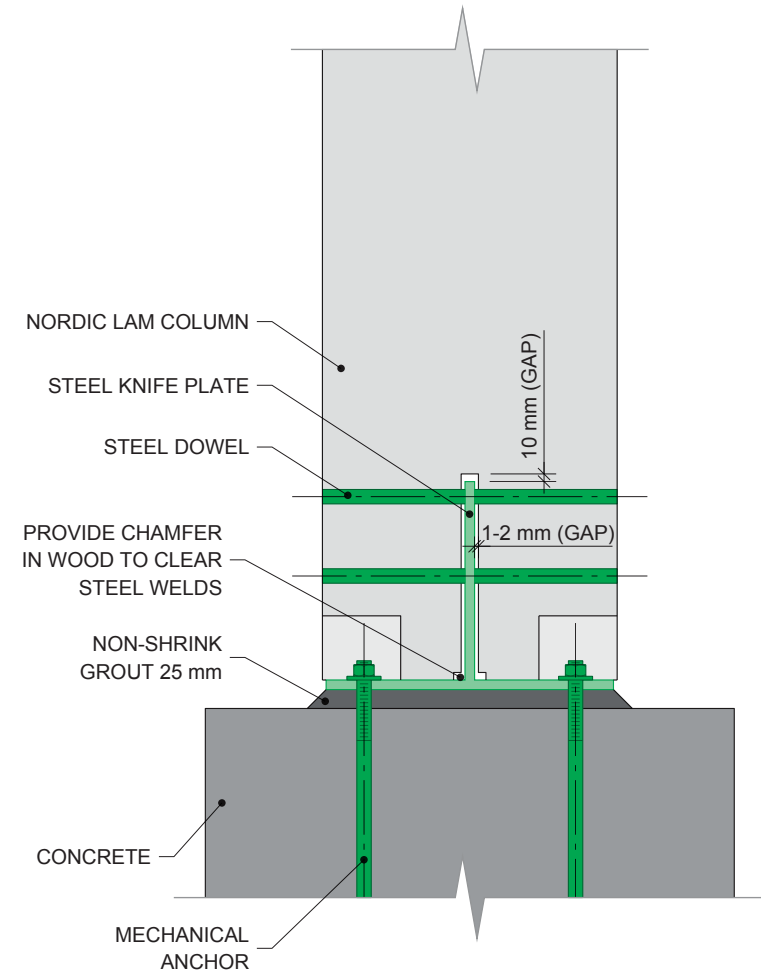
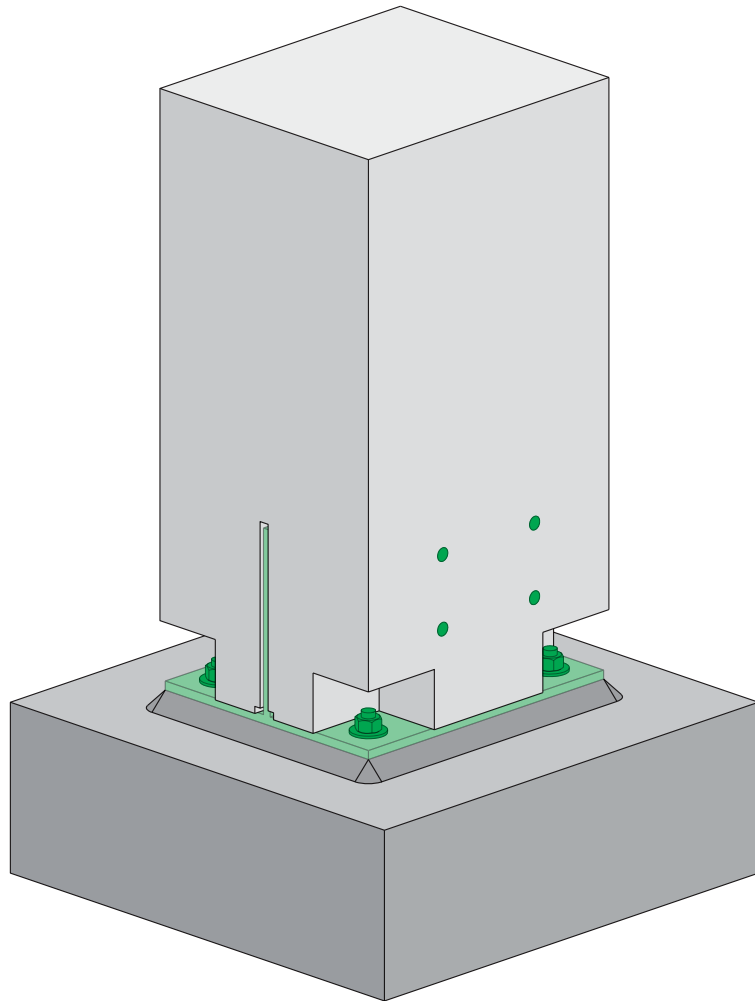


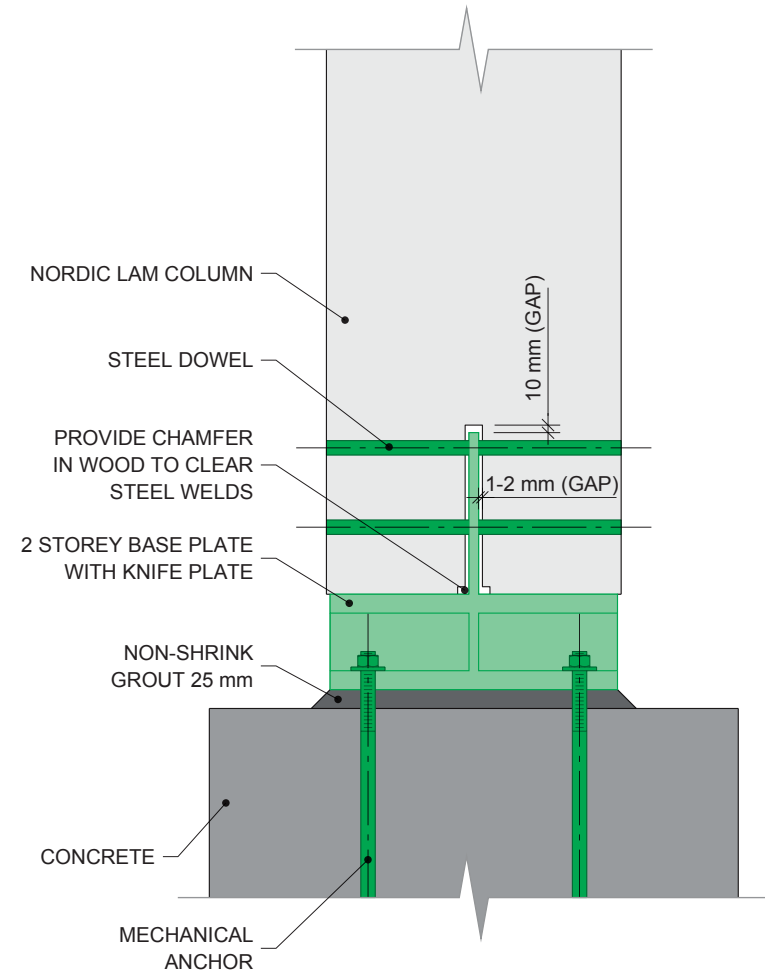
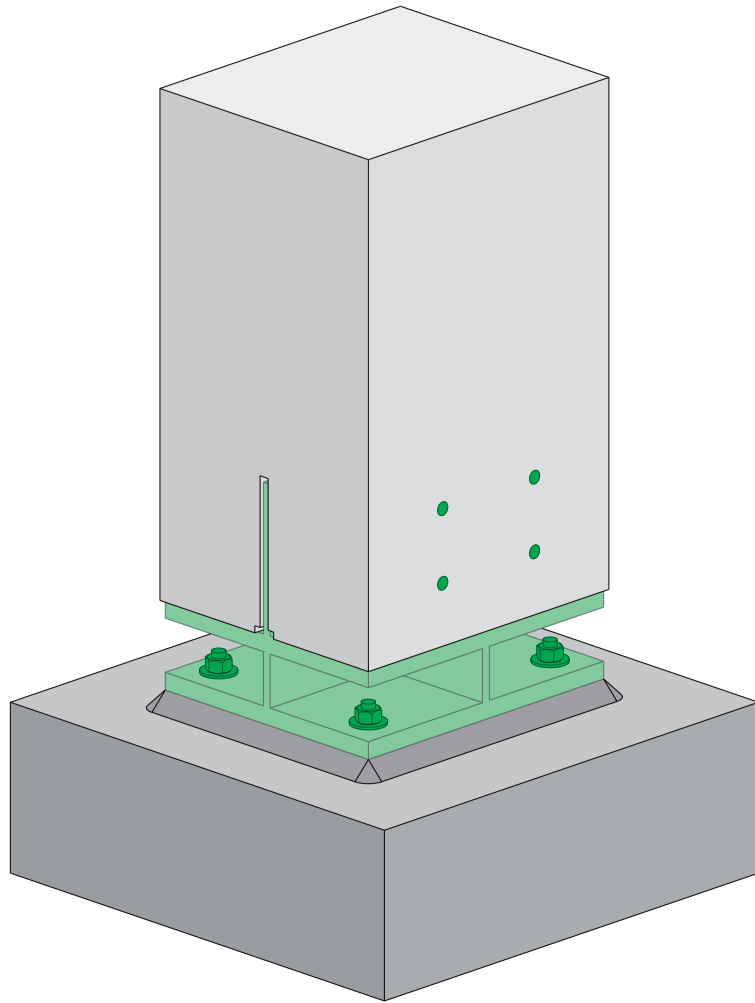


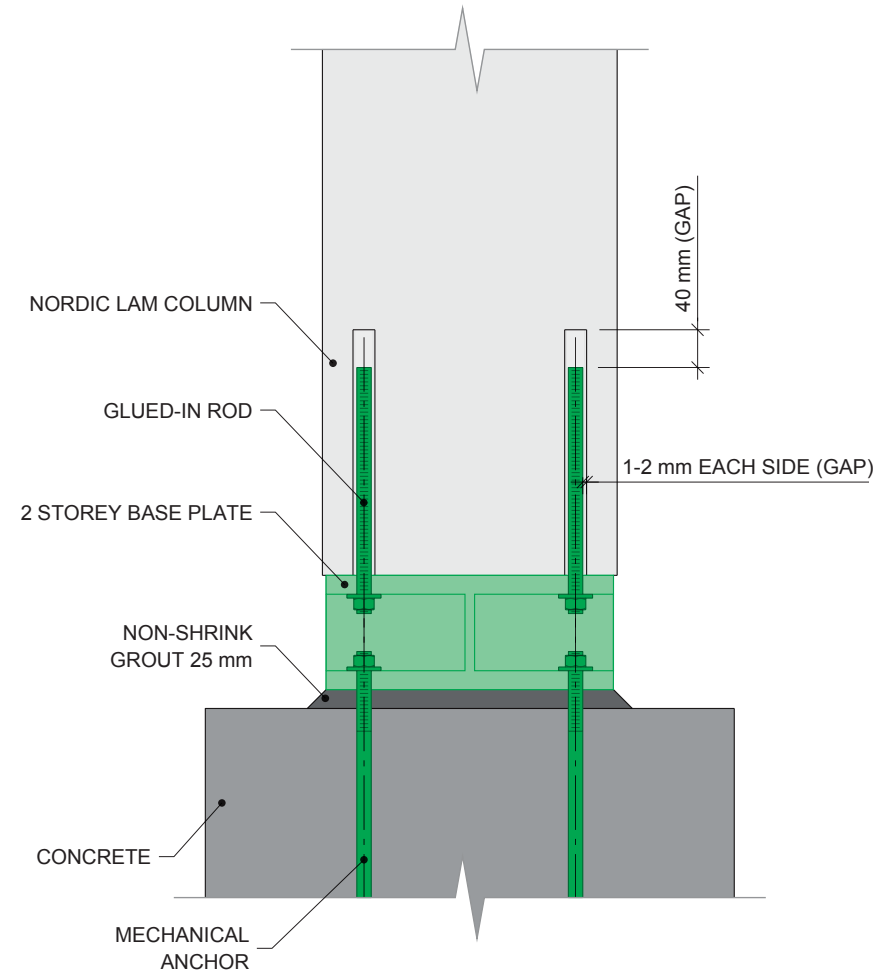
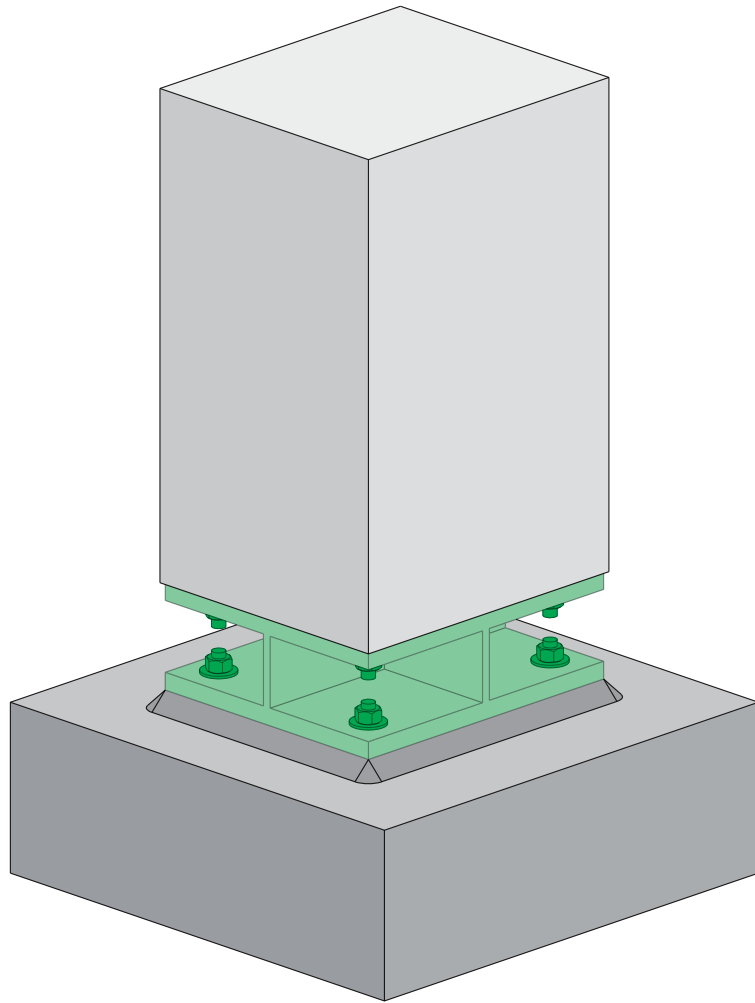


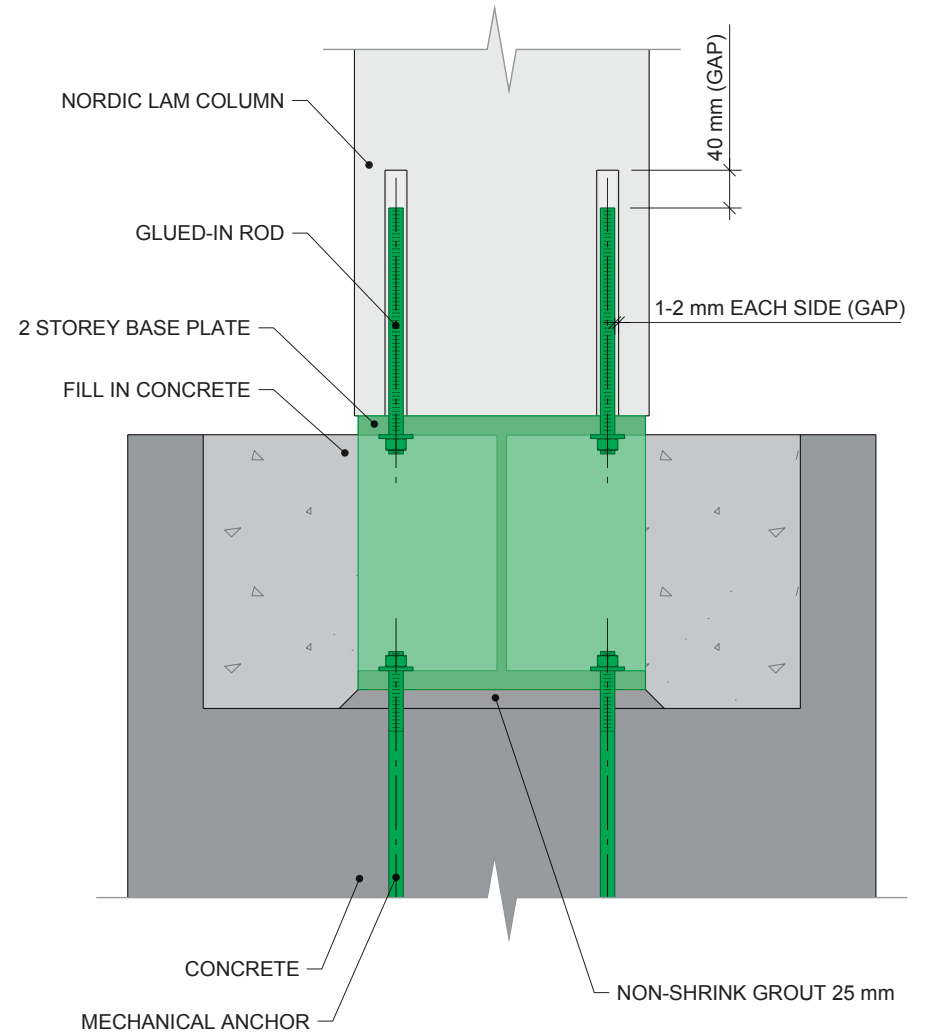
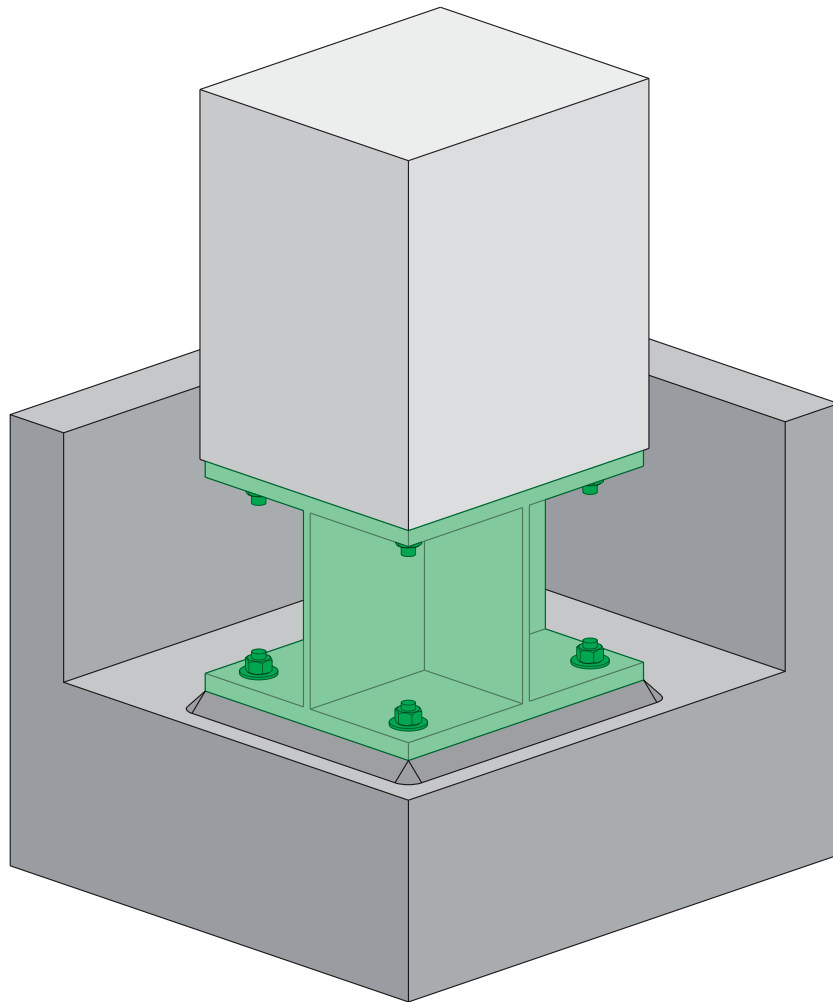


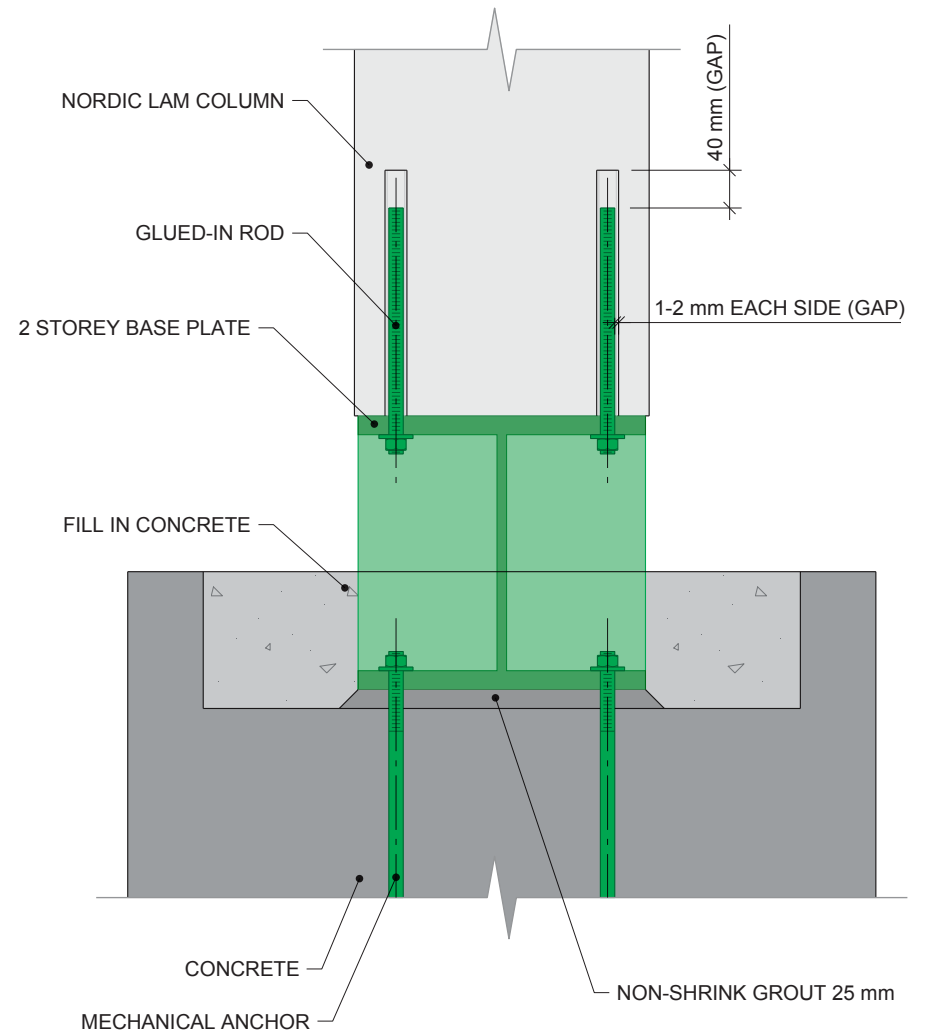
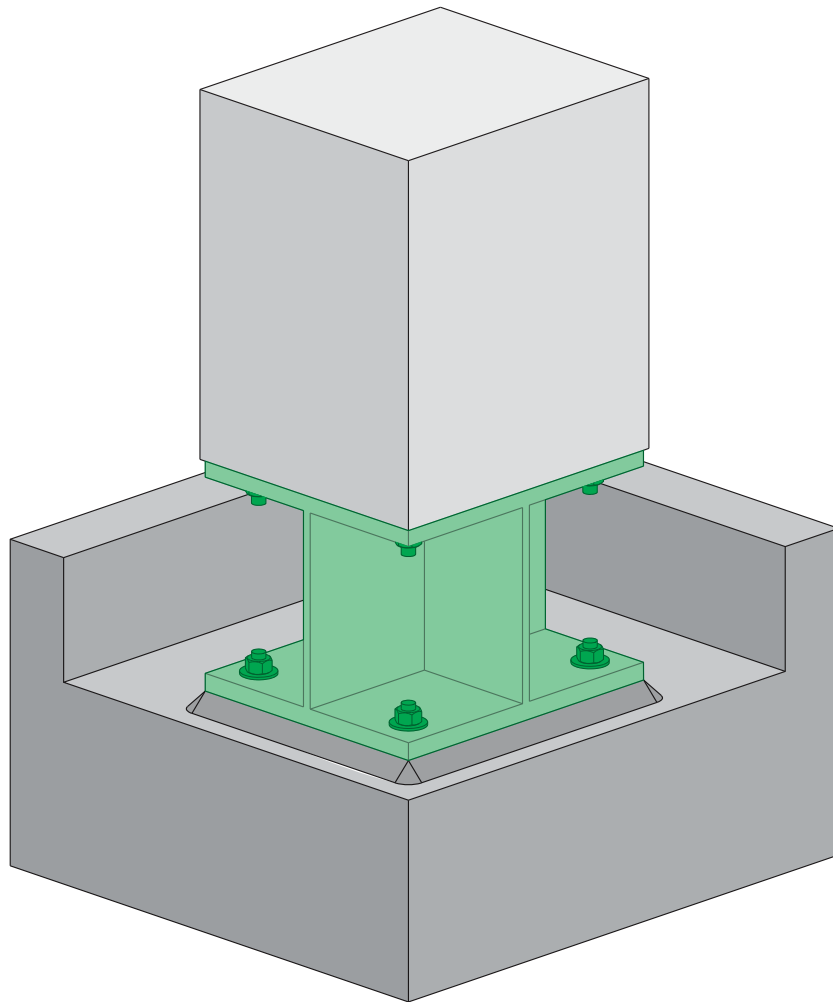


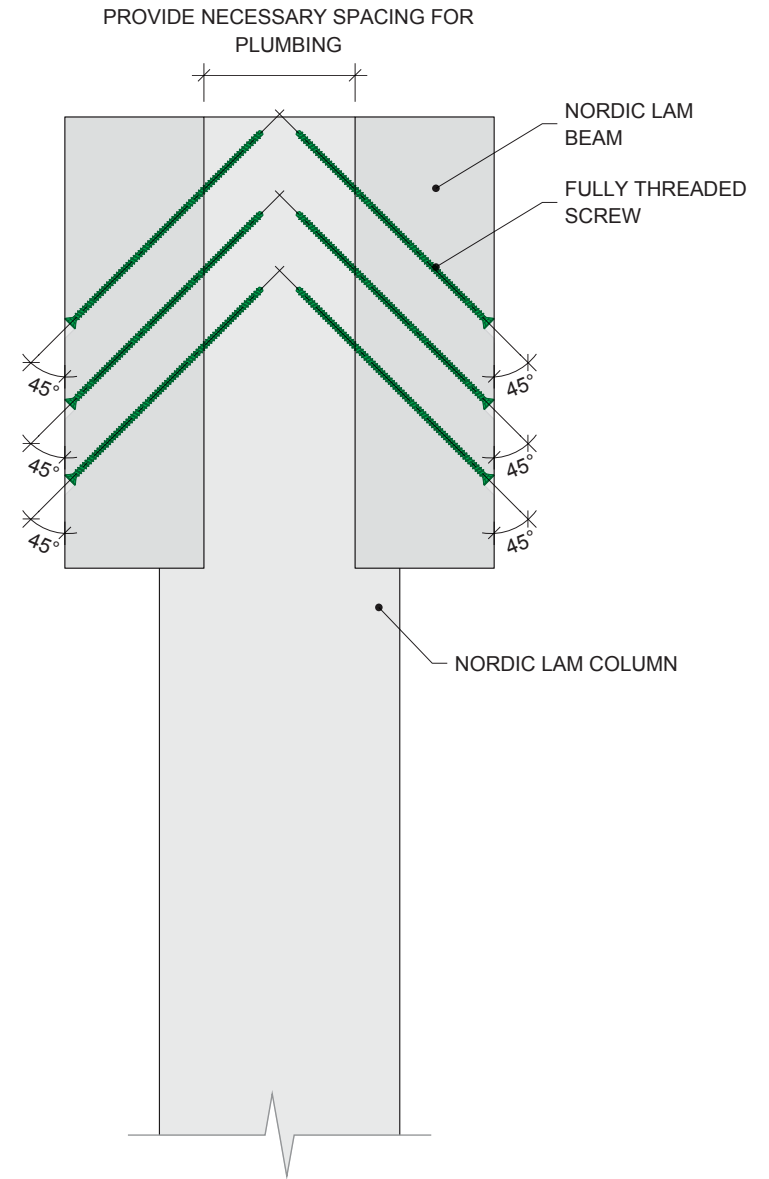
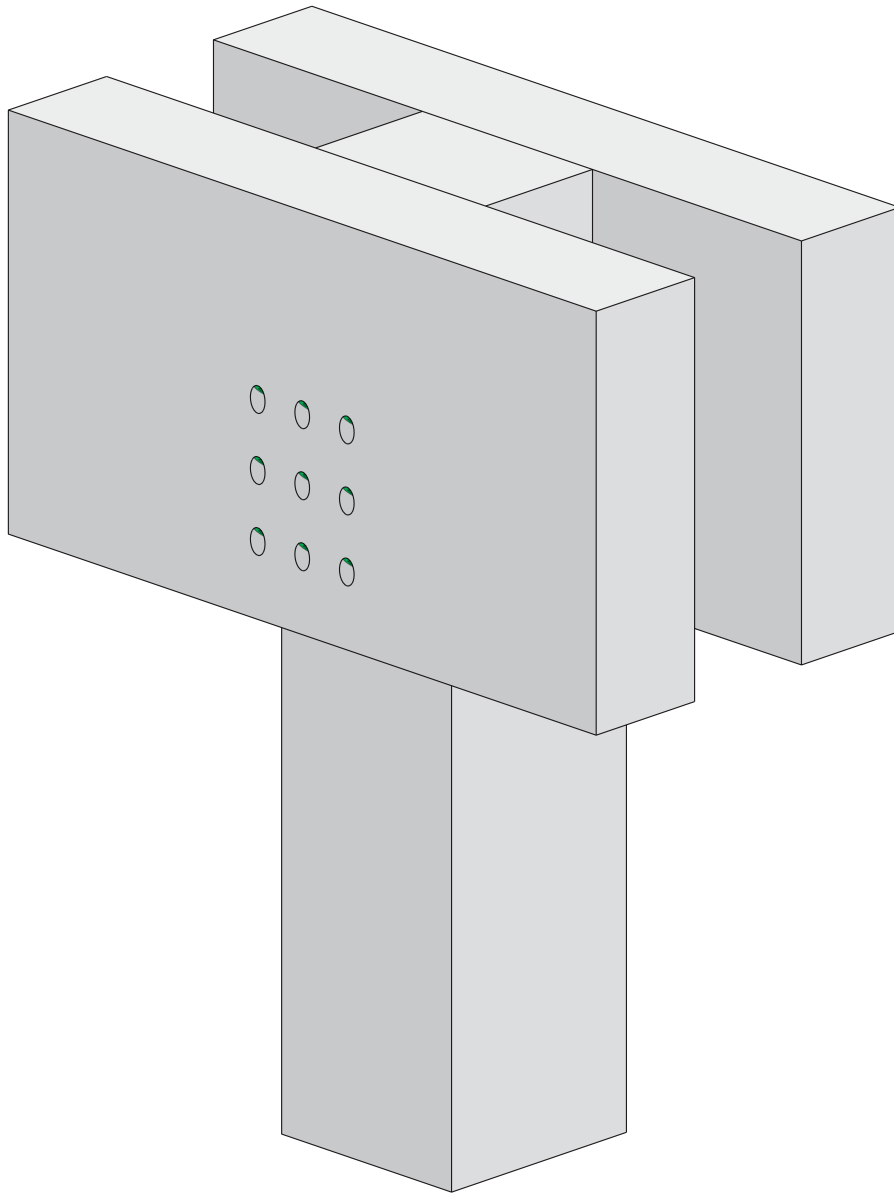


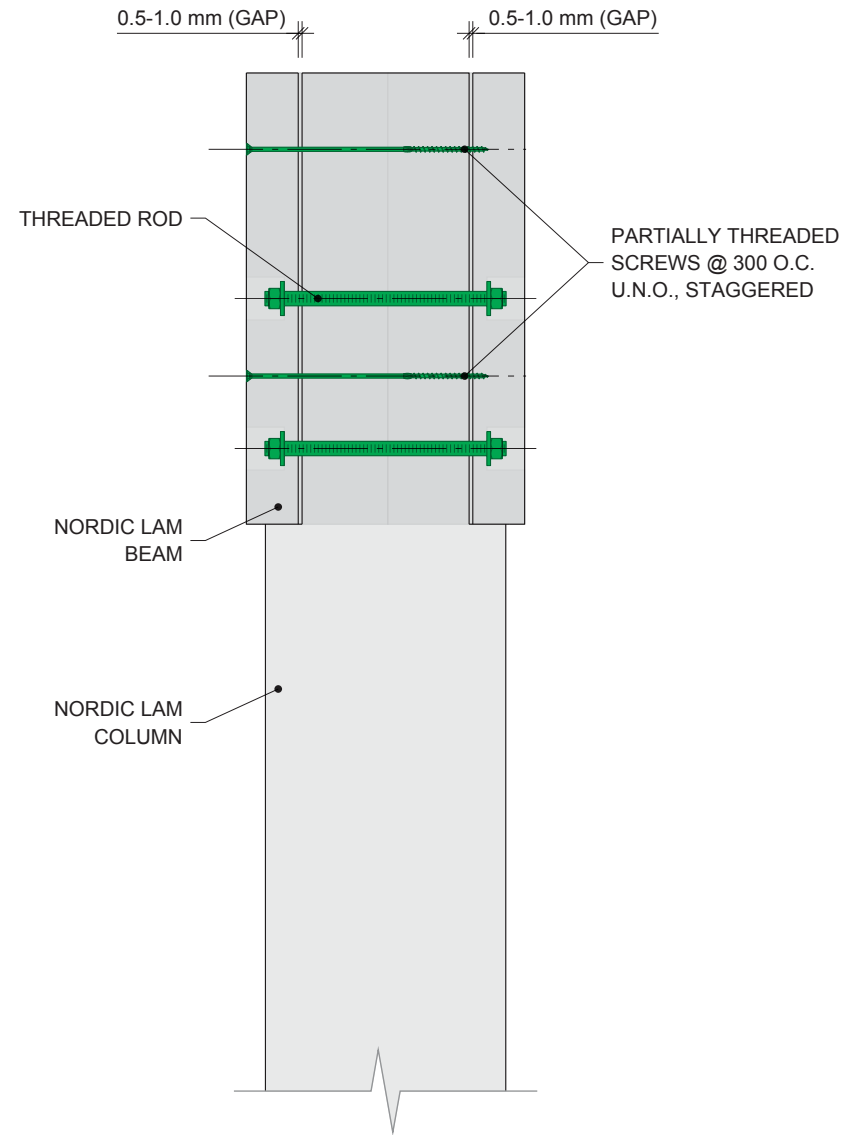
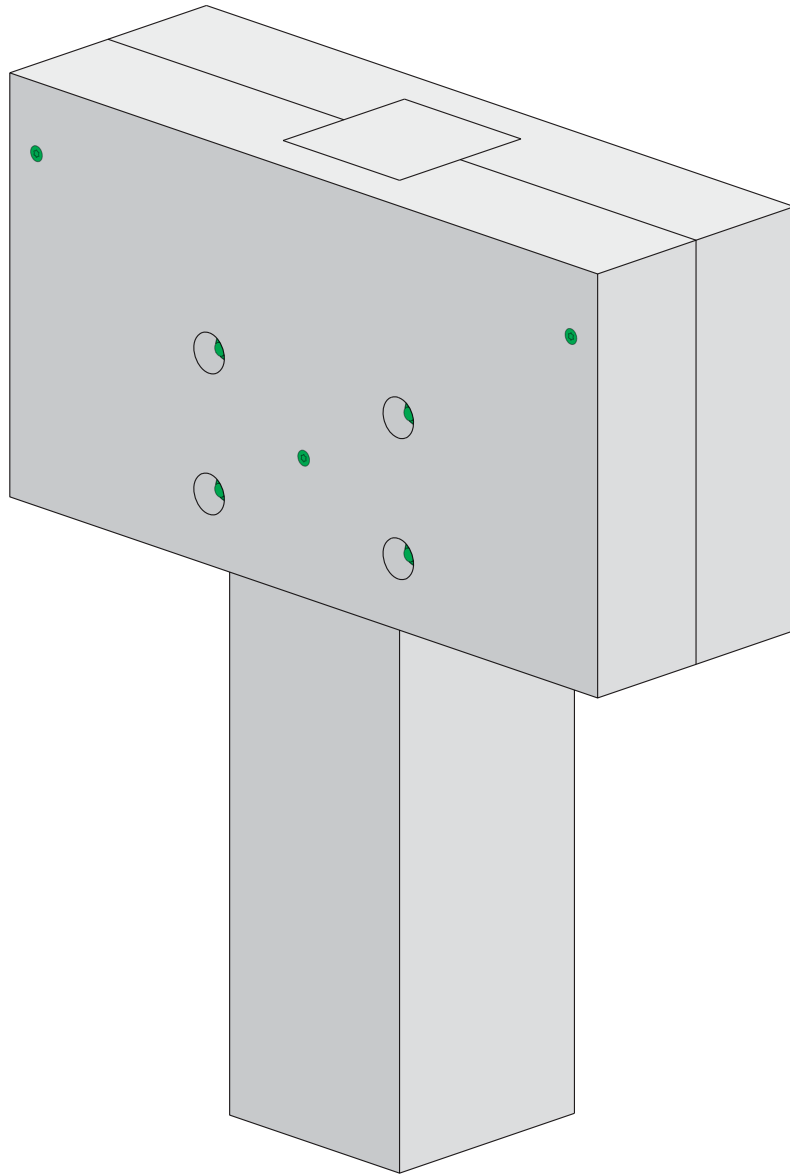




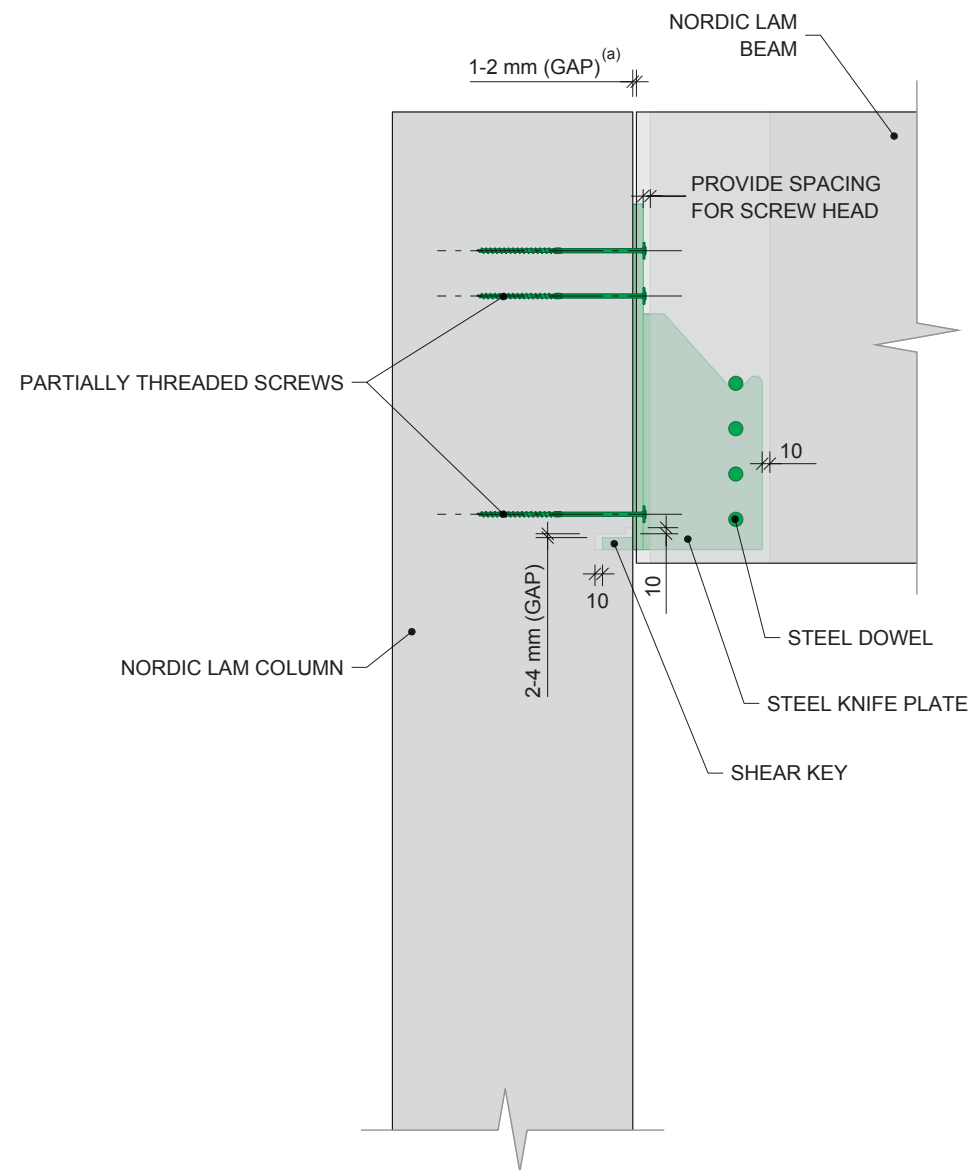
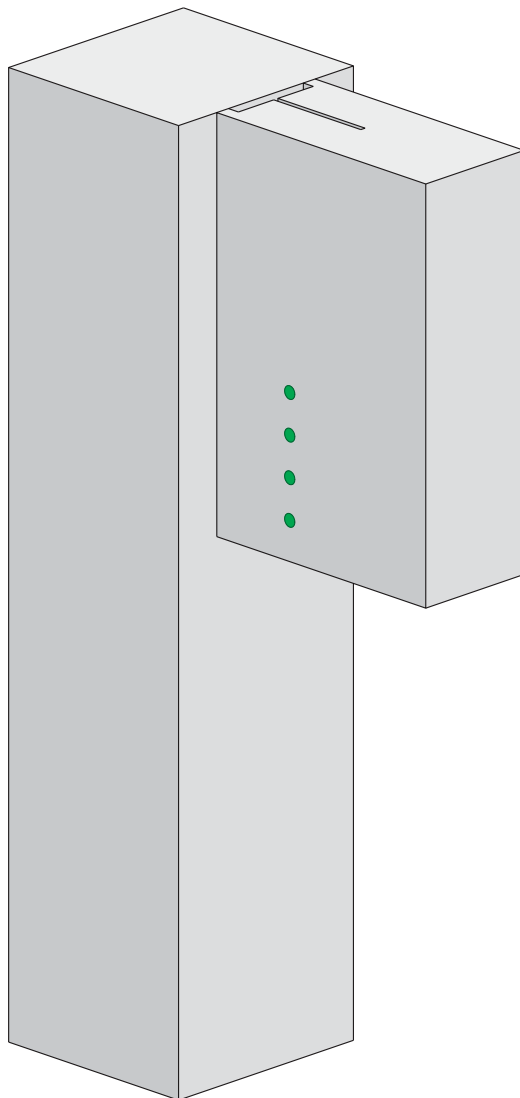




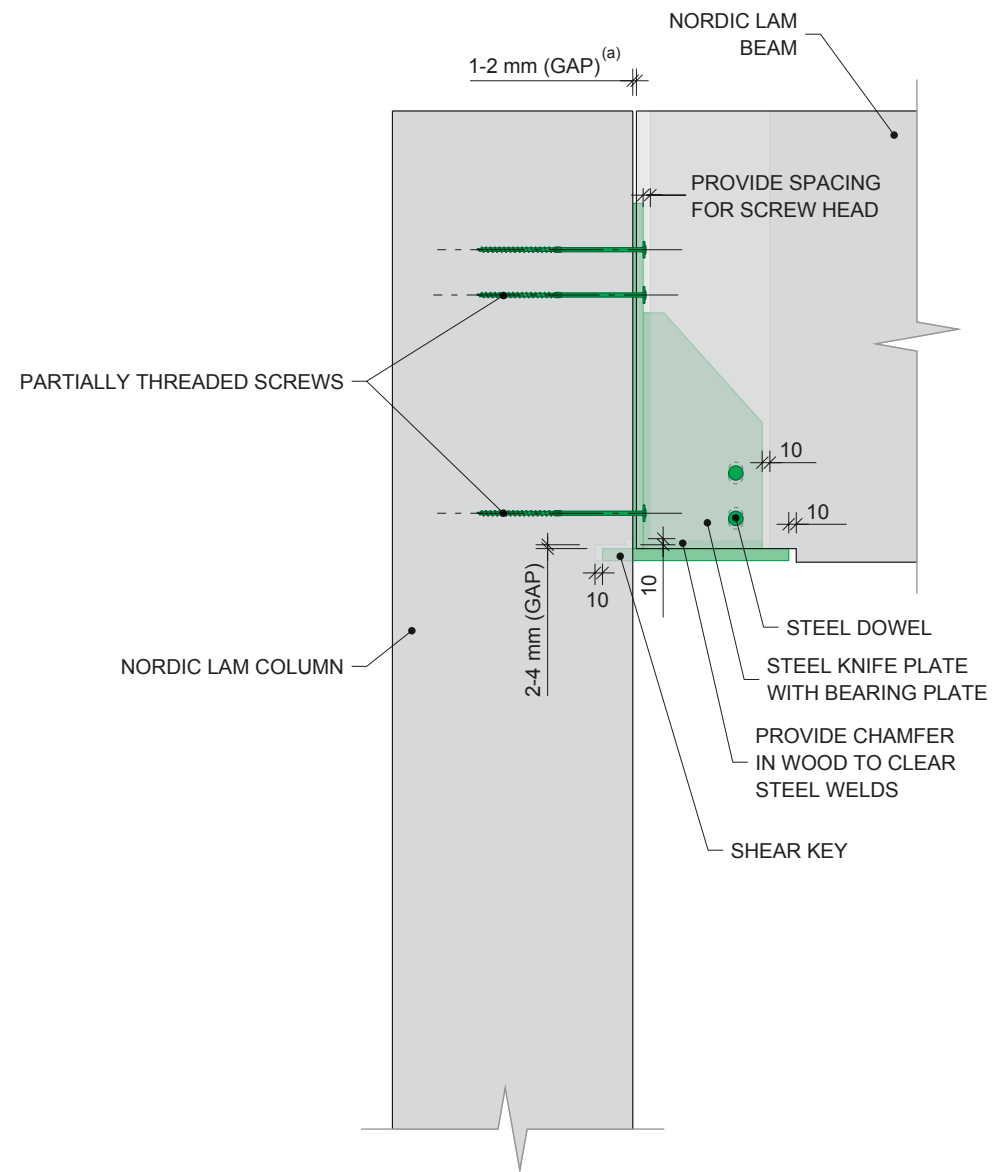
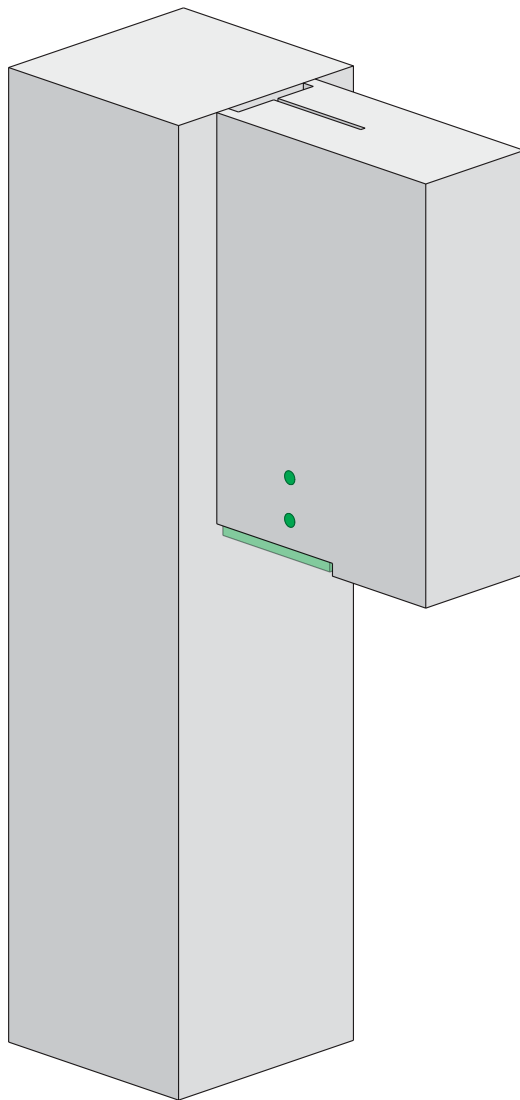




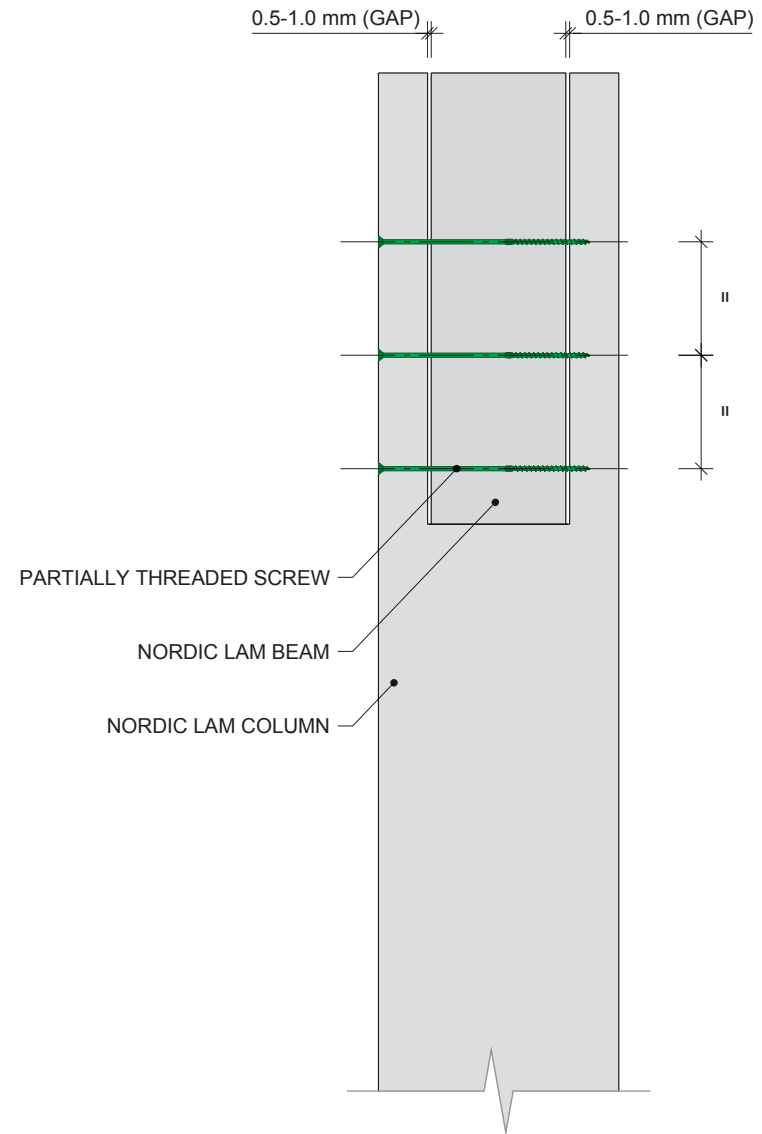
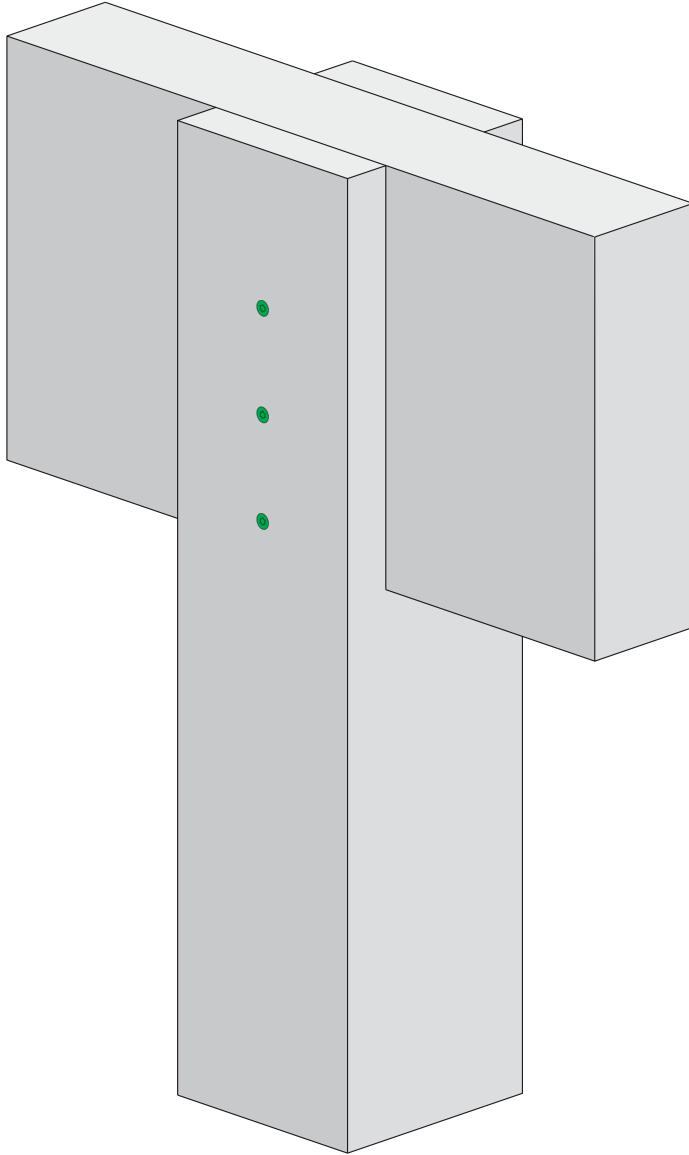


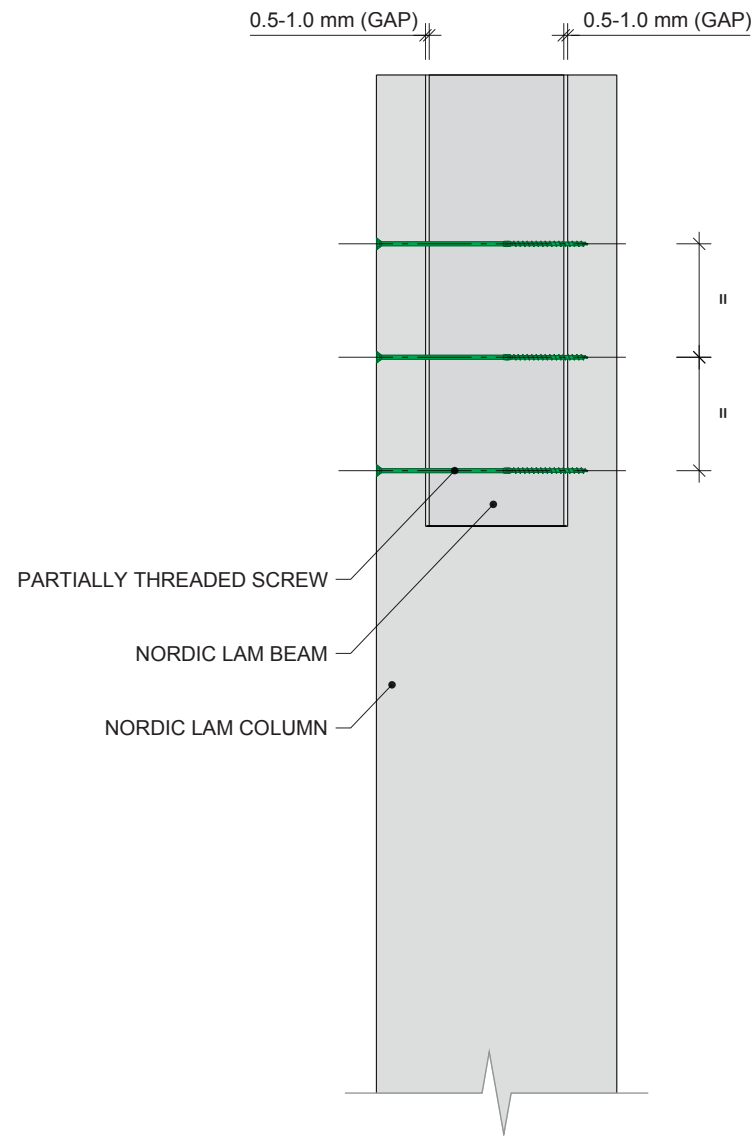
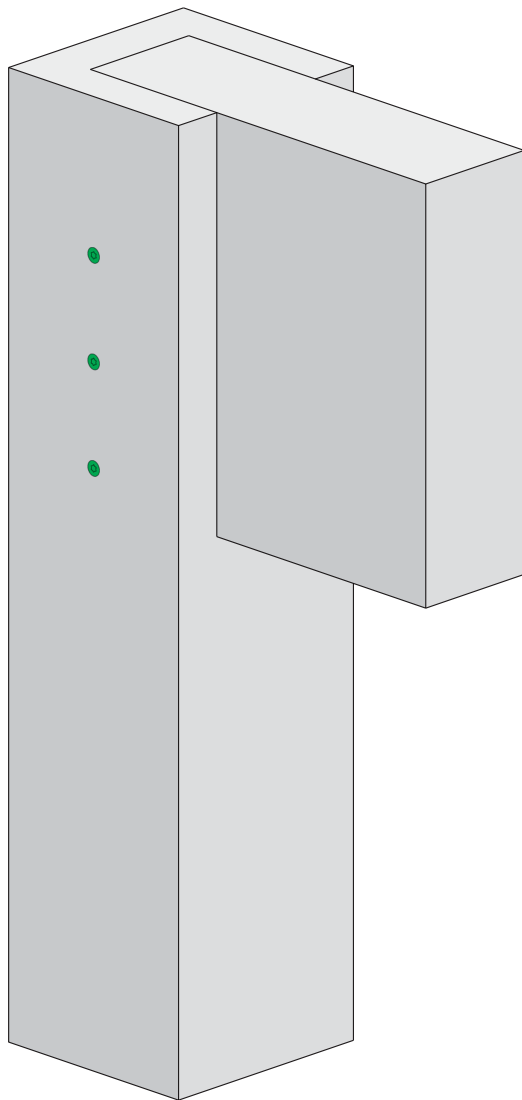


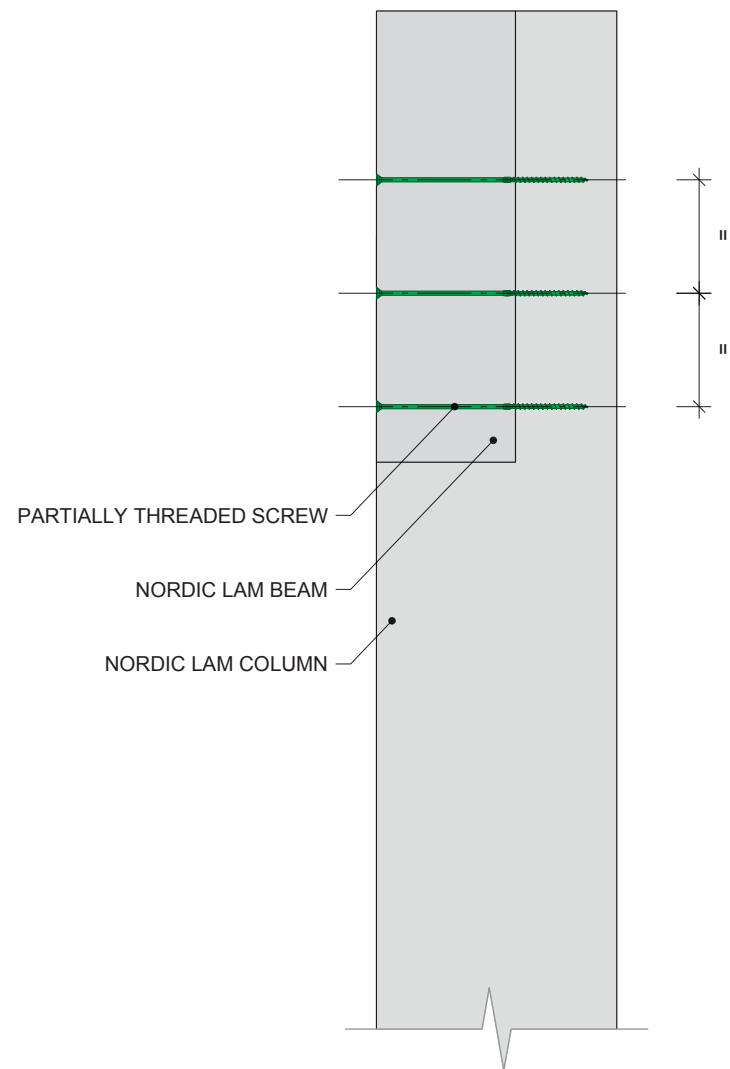
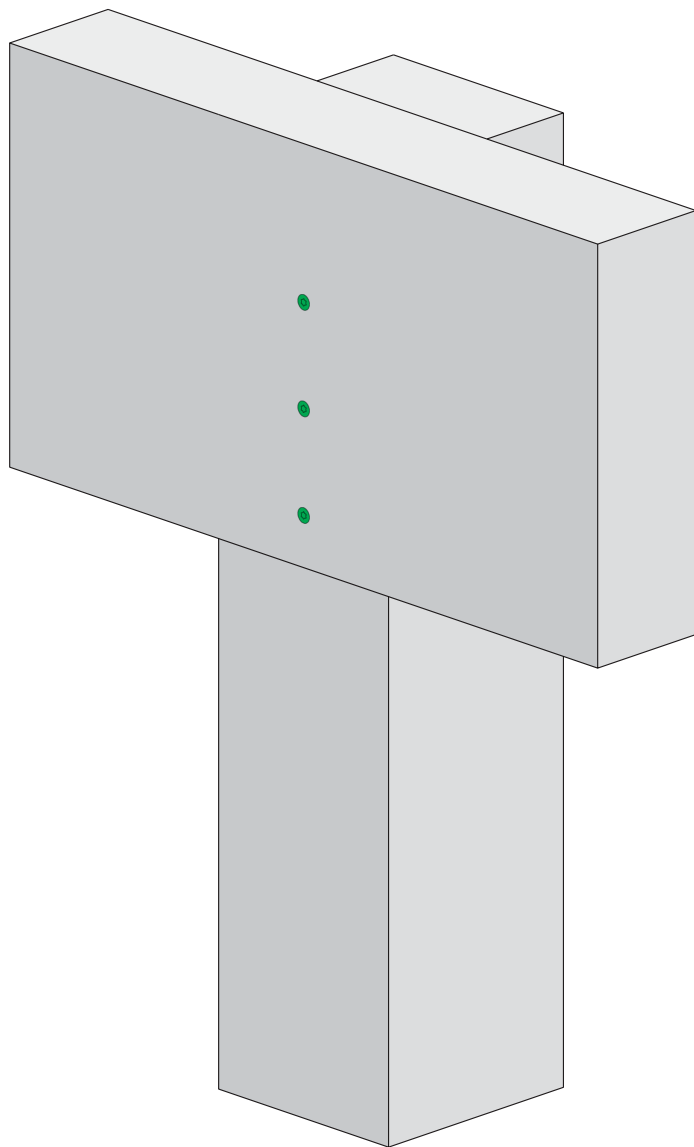
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.

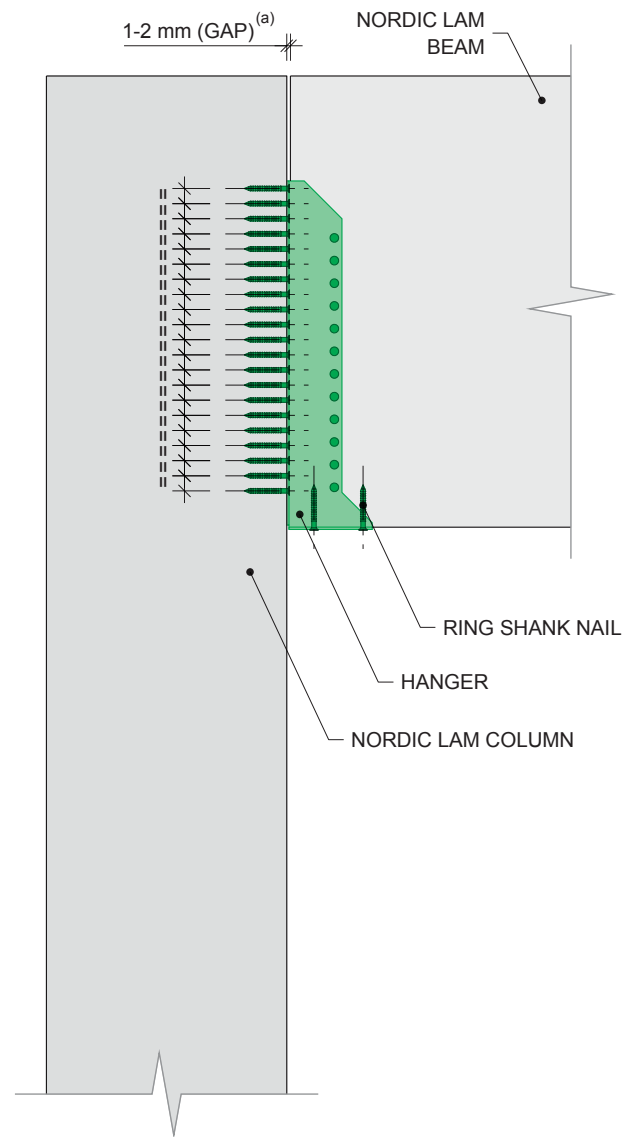
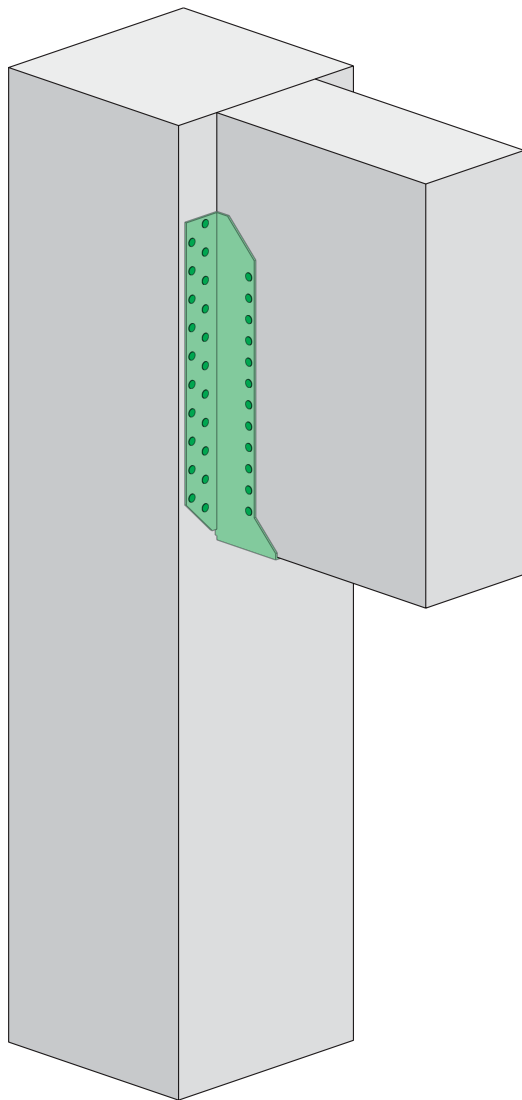


a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.

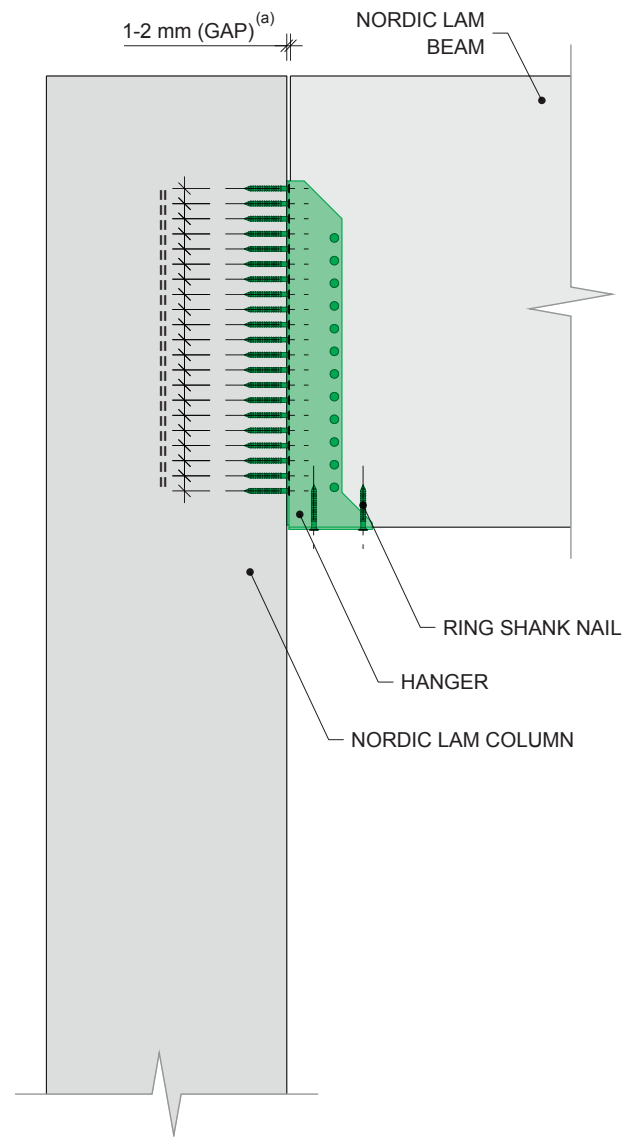
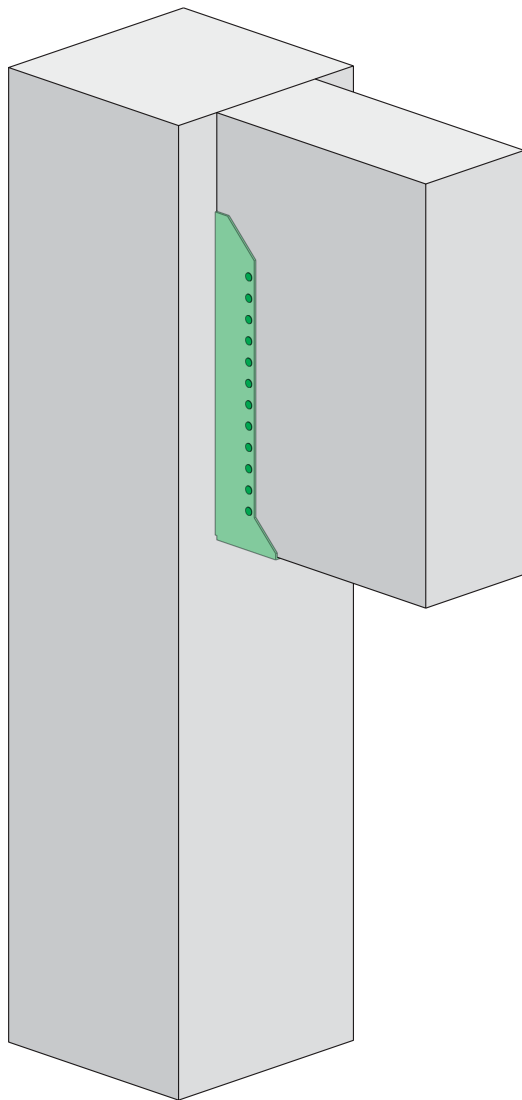




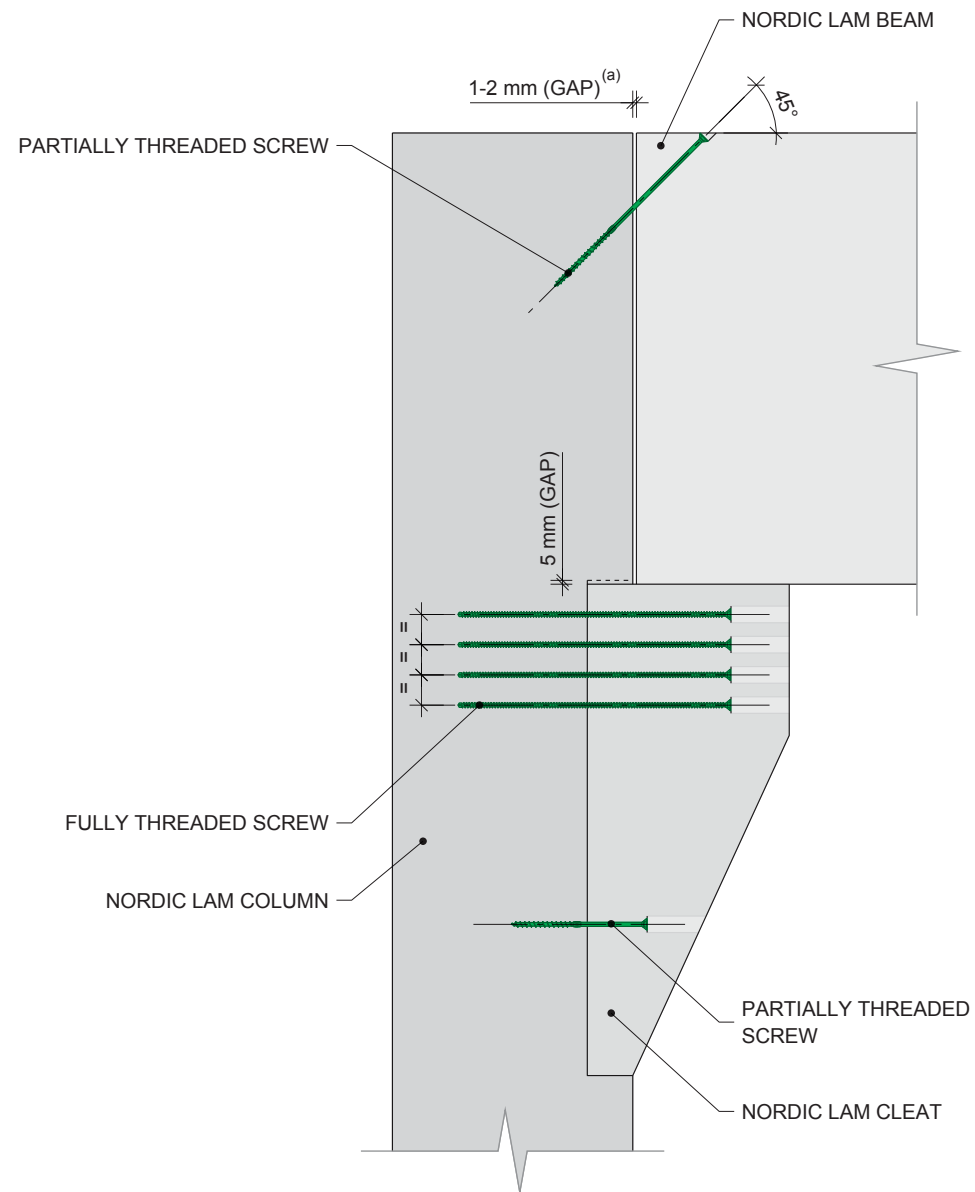
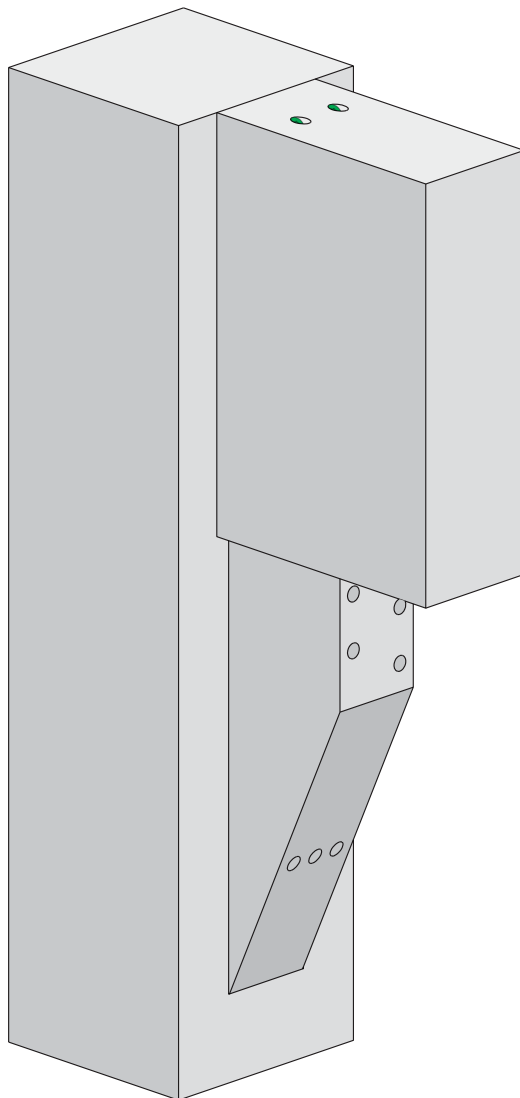




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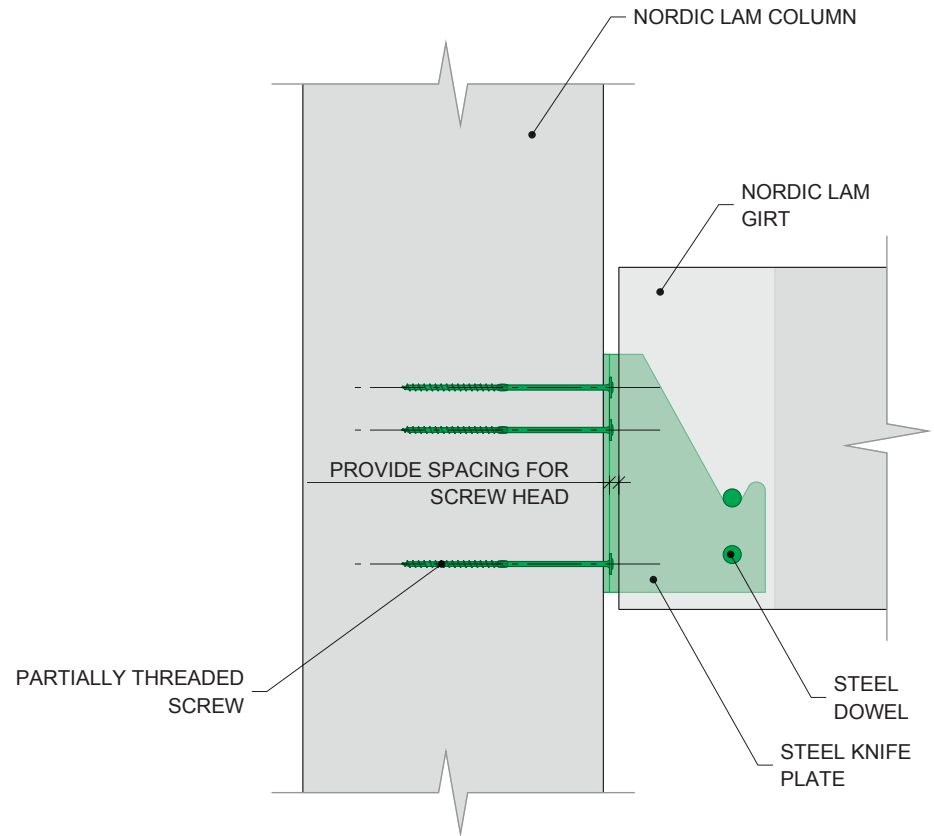
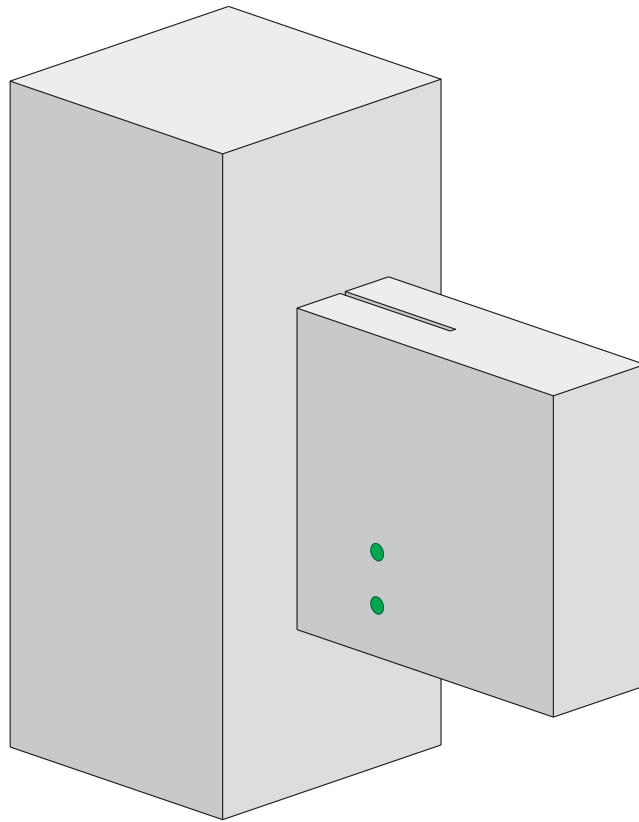


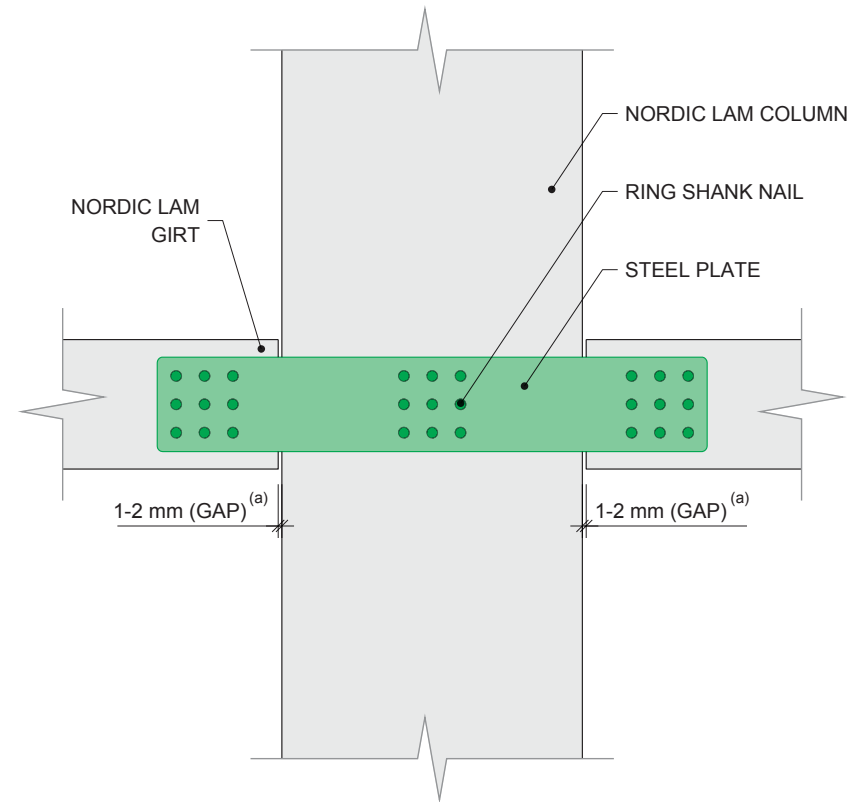
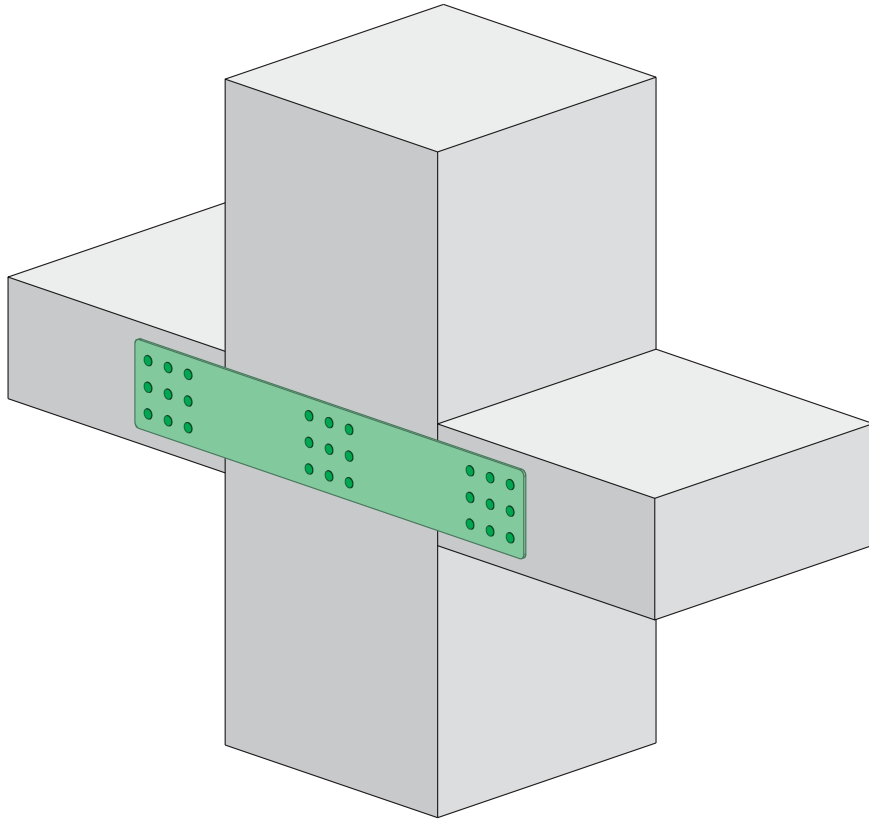
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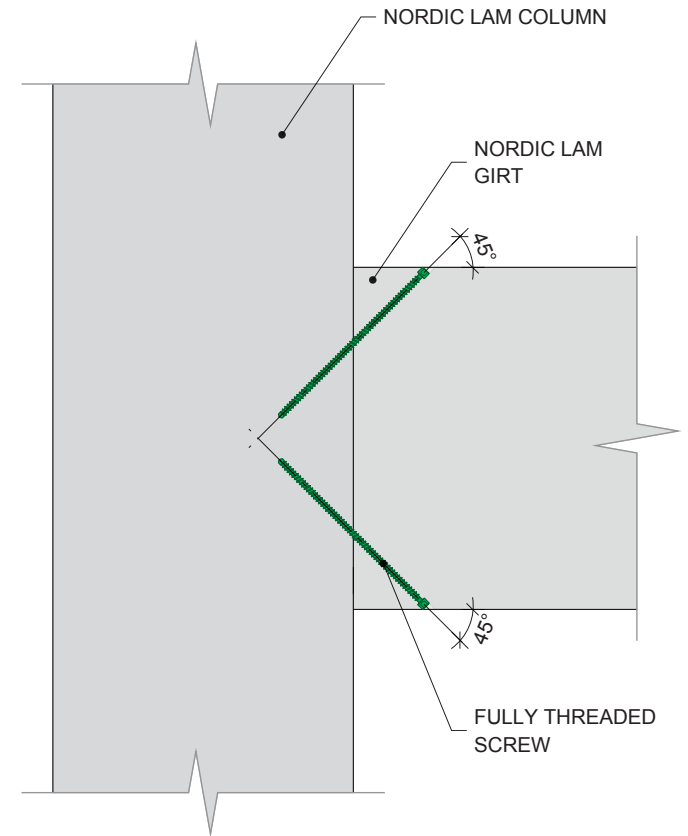
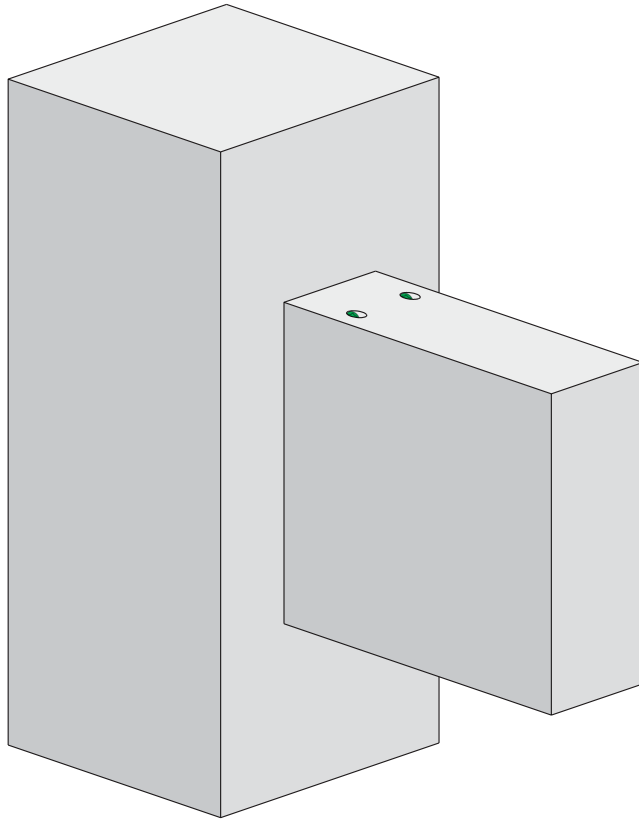
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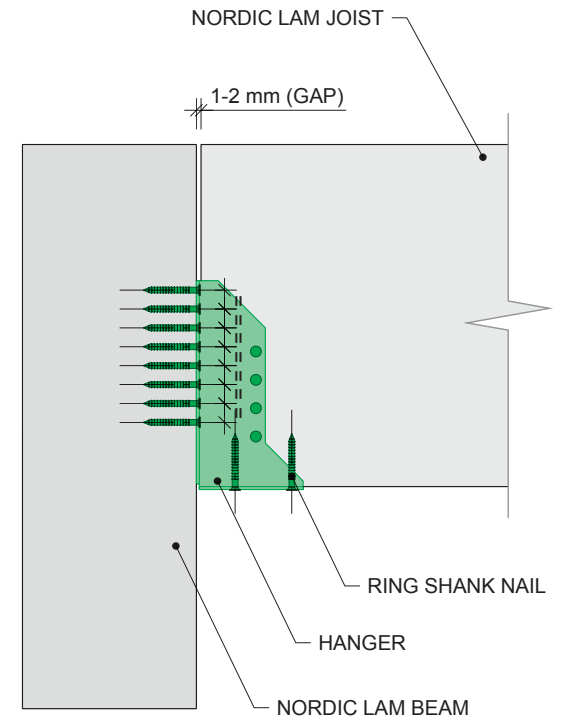
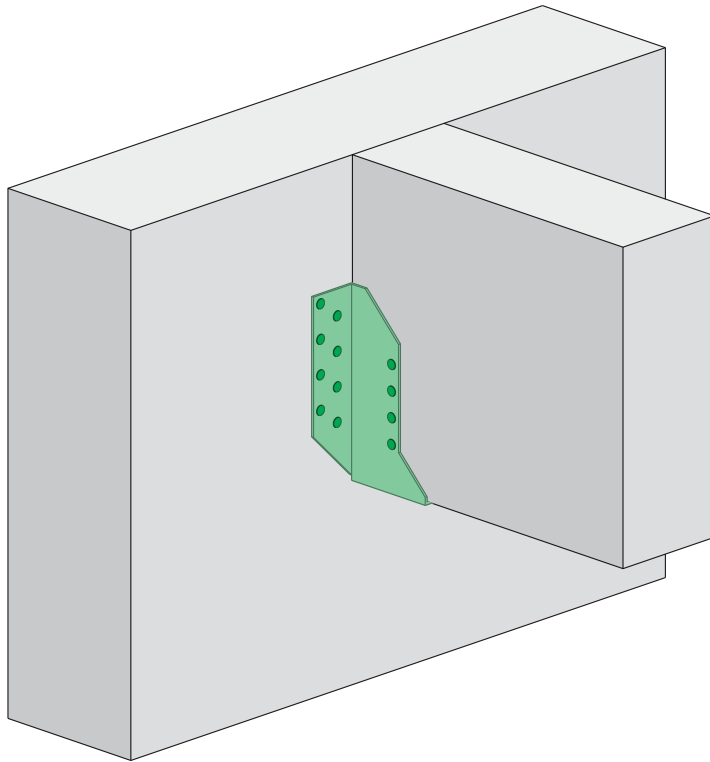


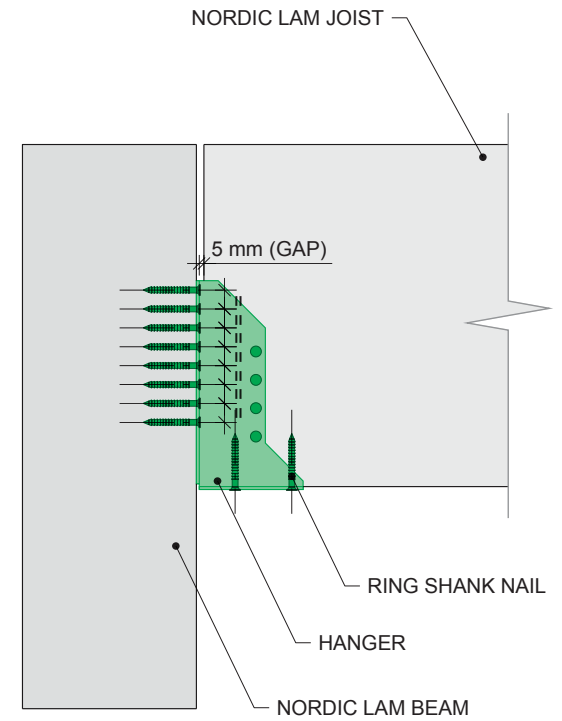
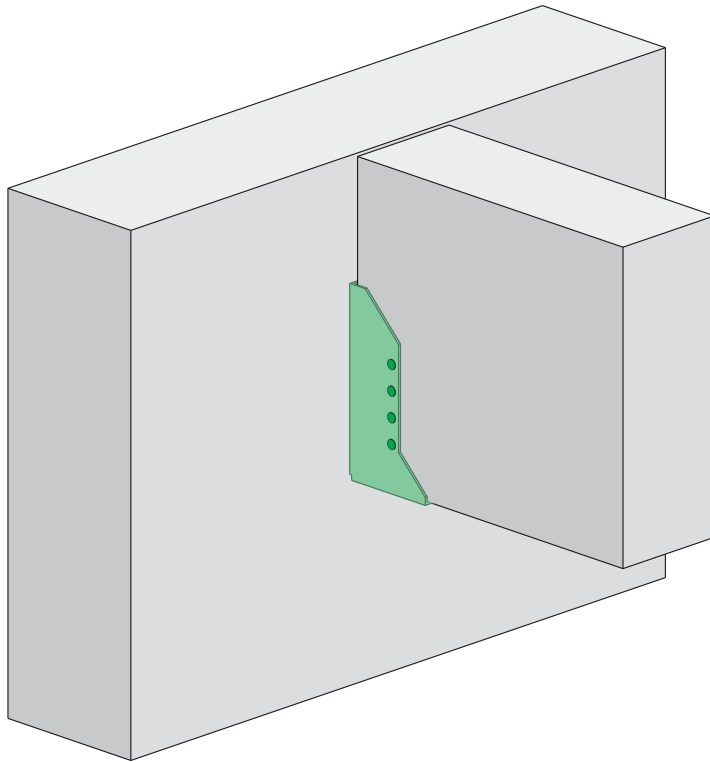


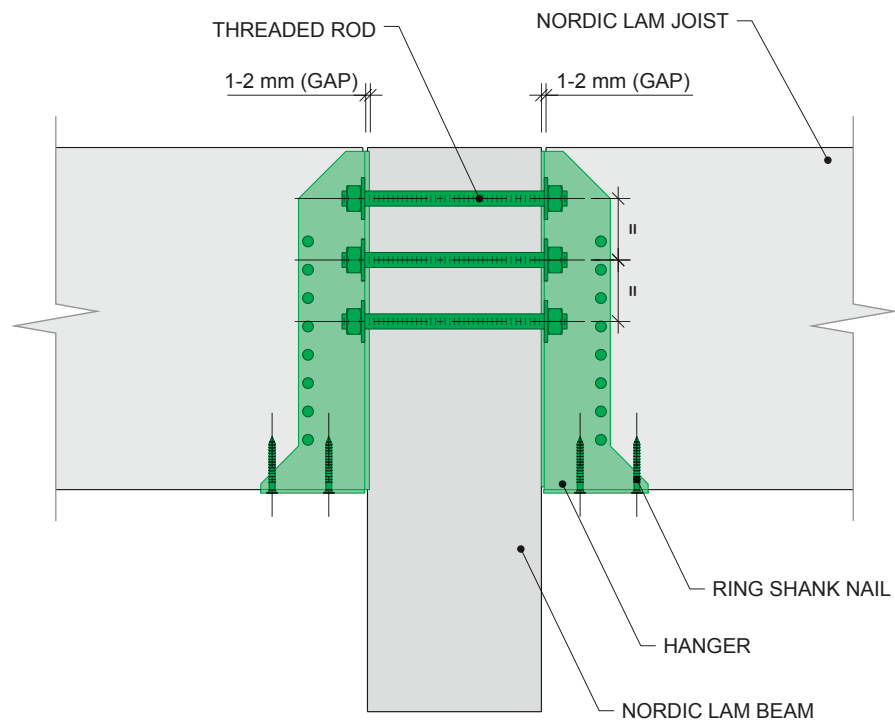
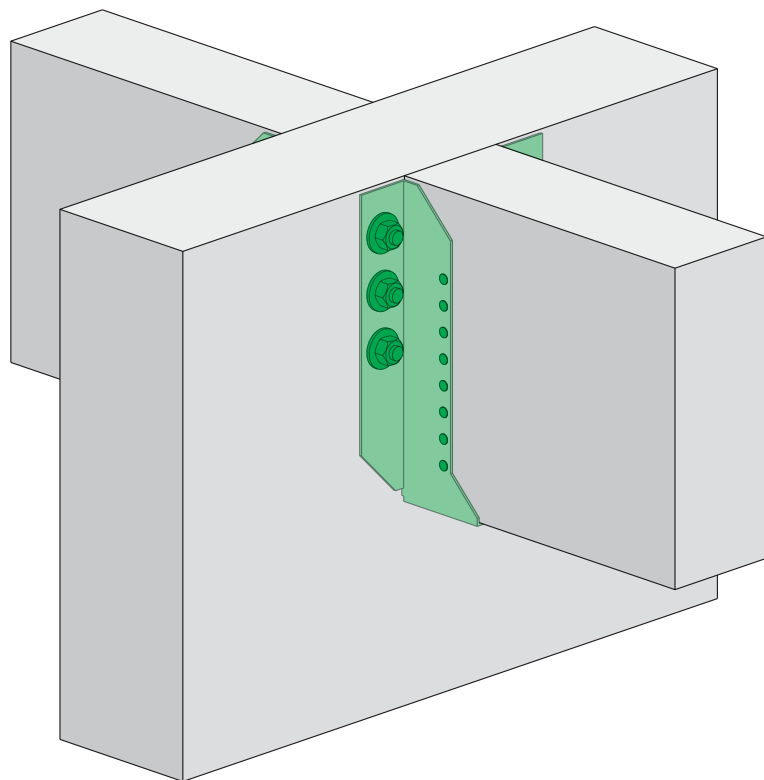


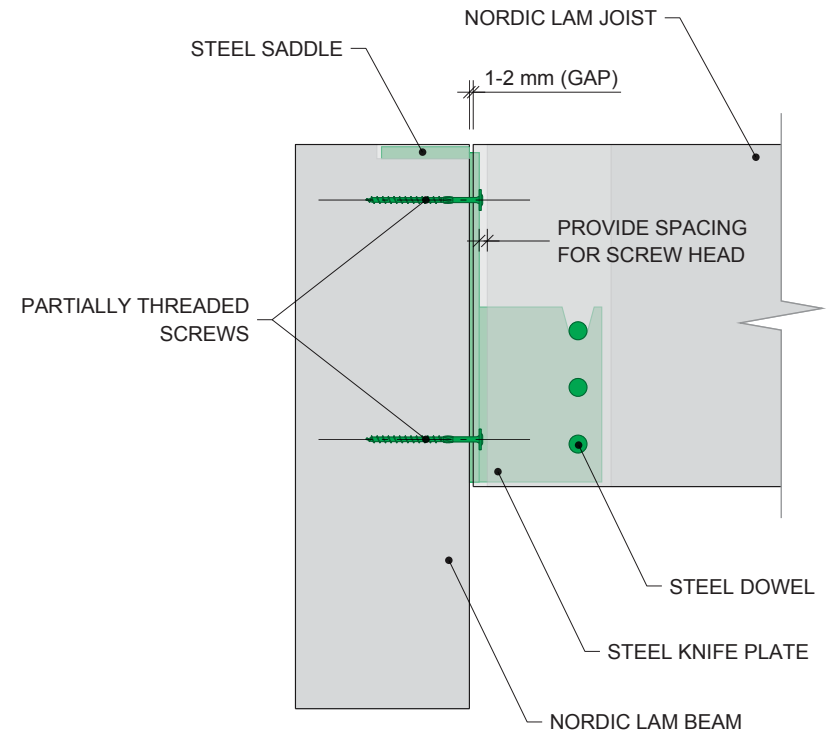
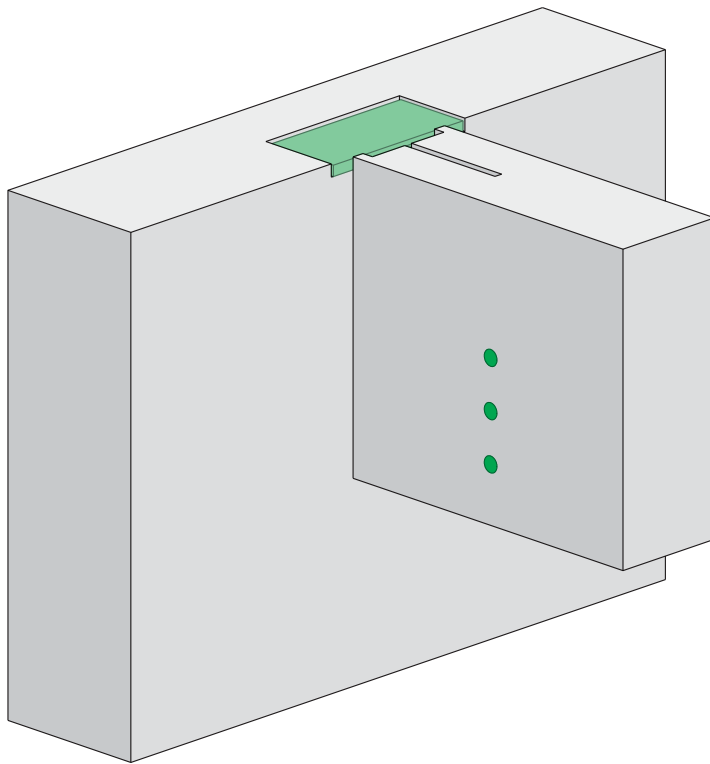
a) The 1-2 mm gap may not be required depending on the detail on the other side of the beam.

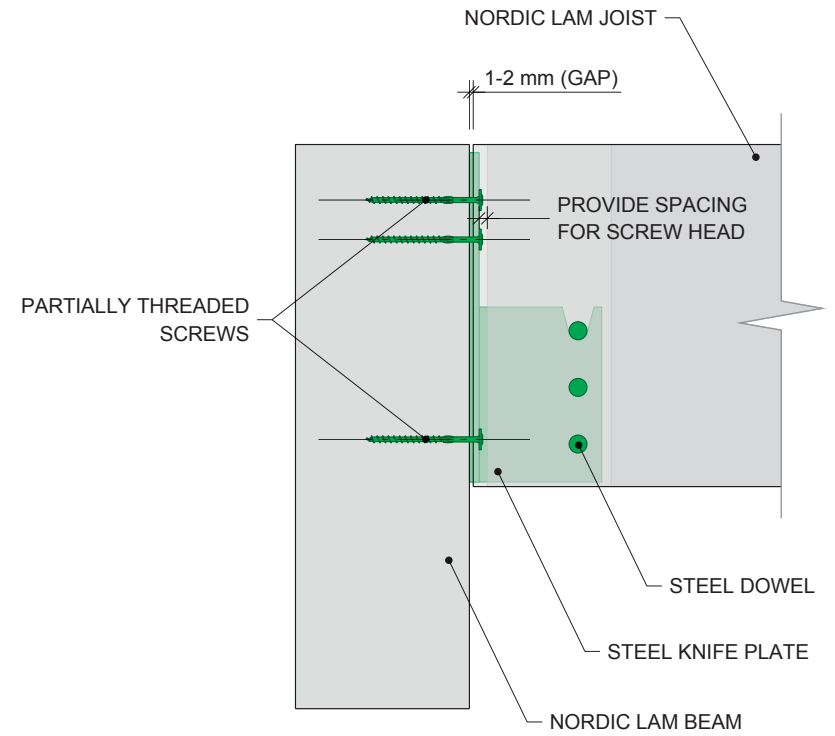
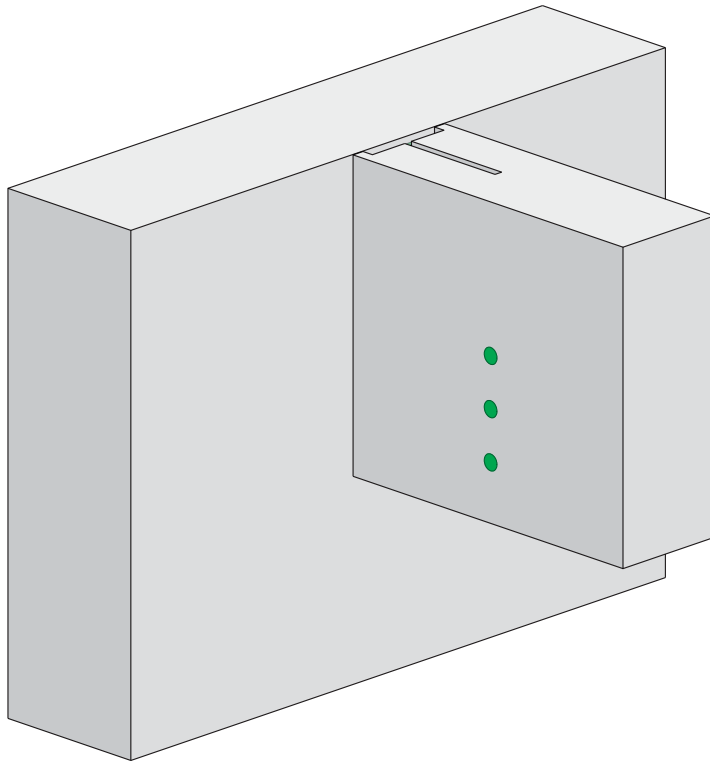




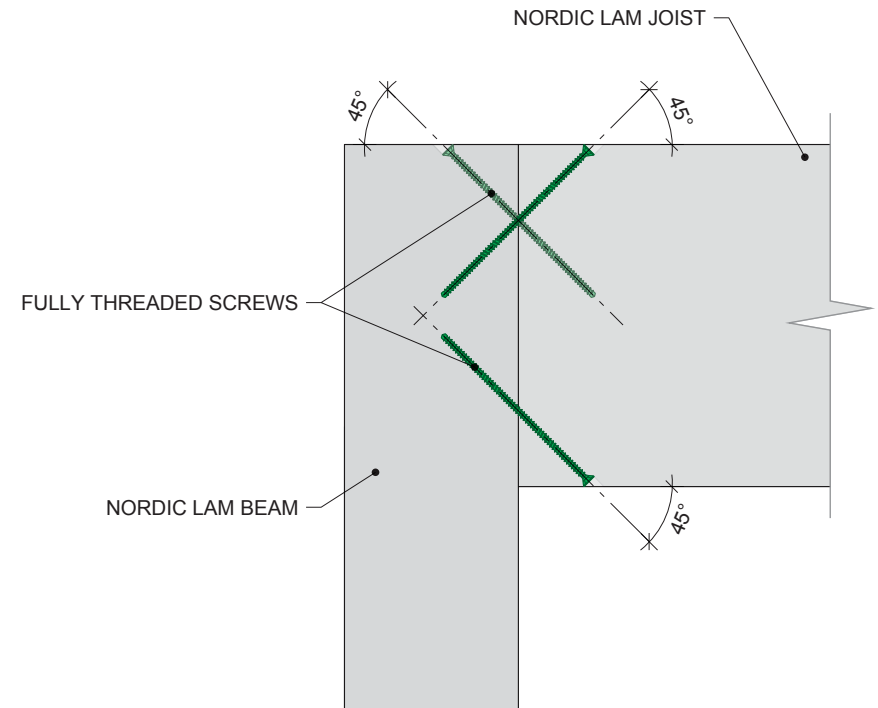
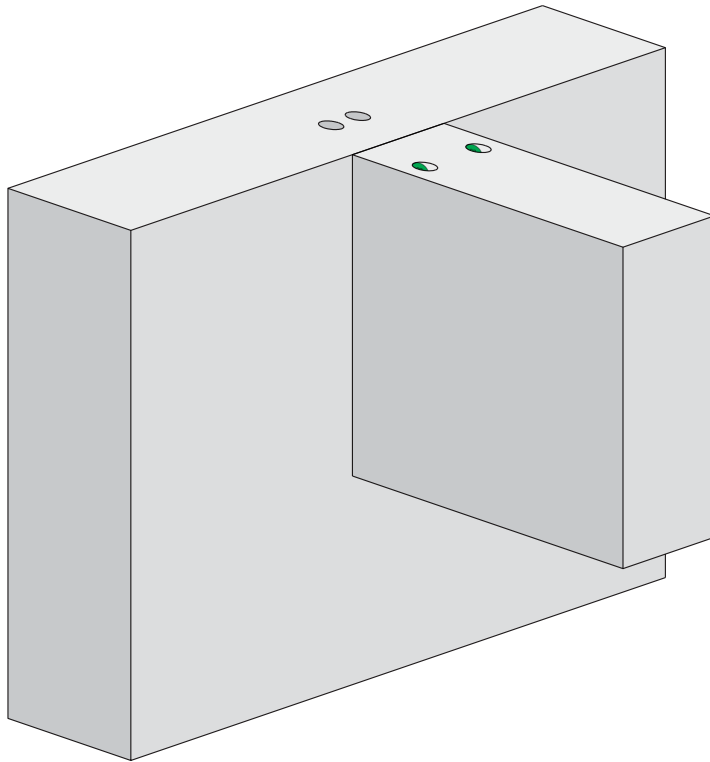


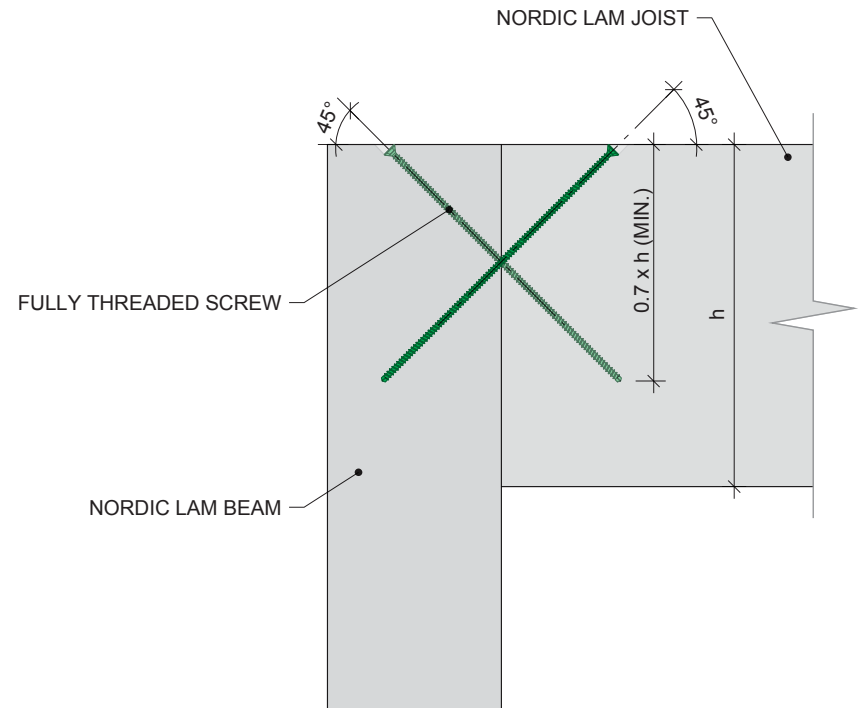
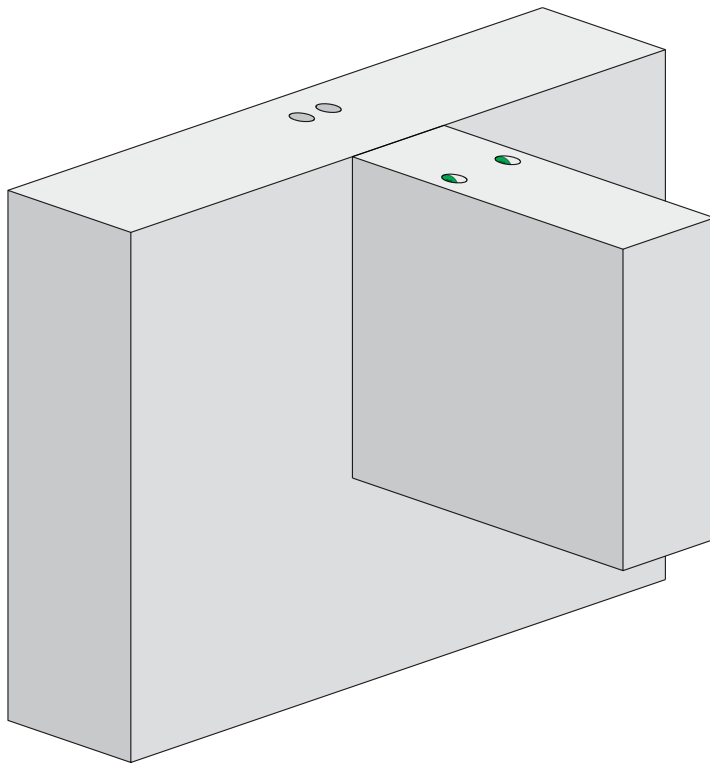


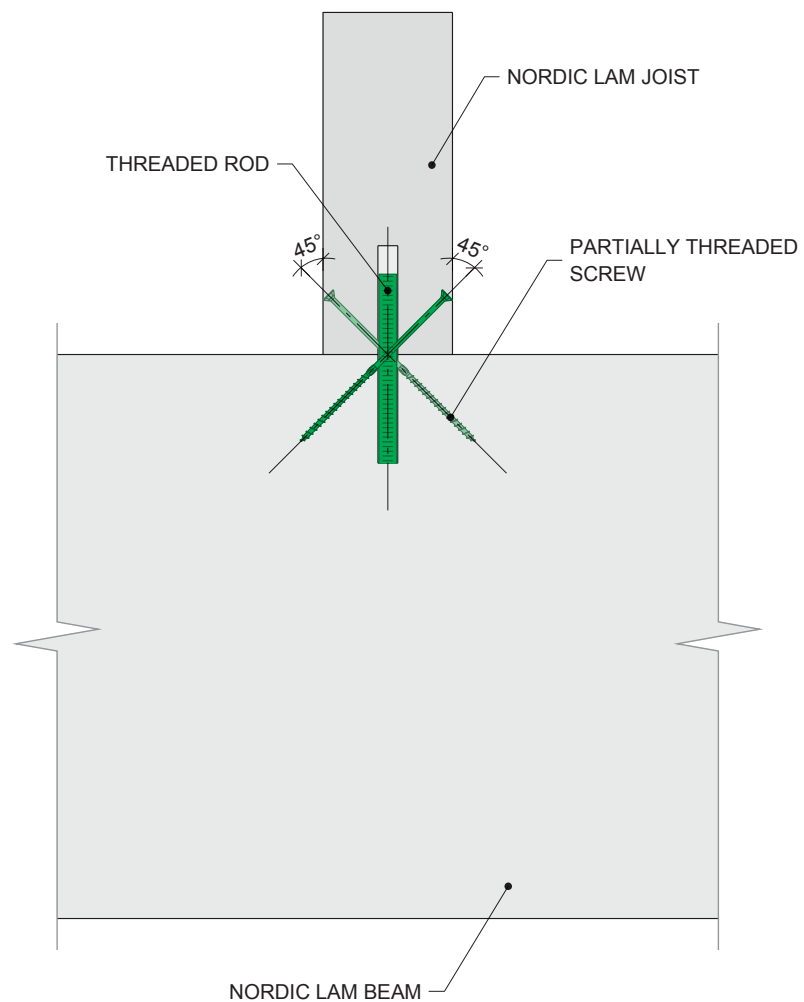
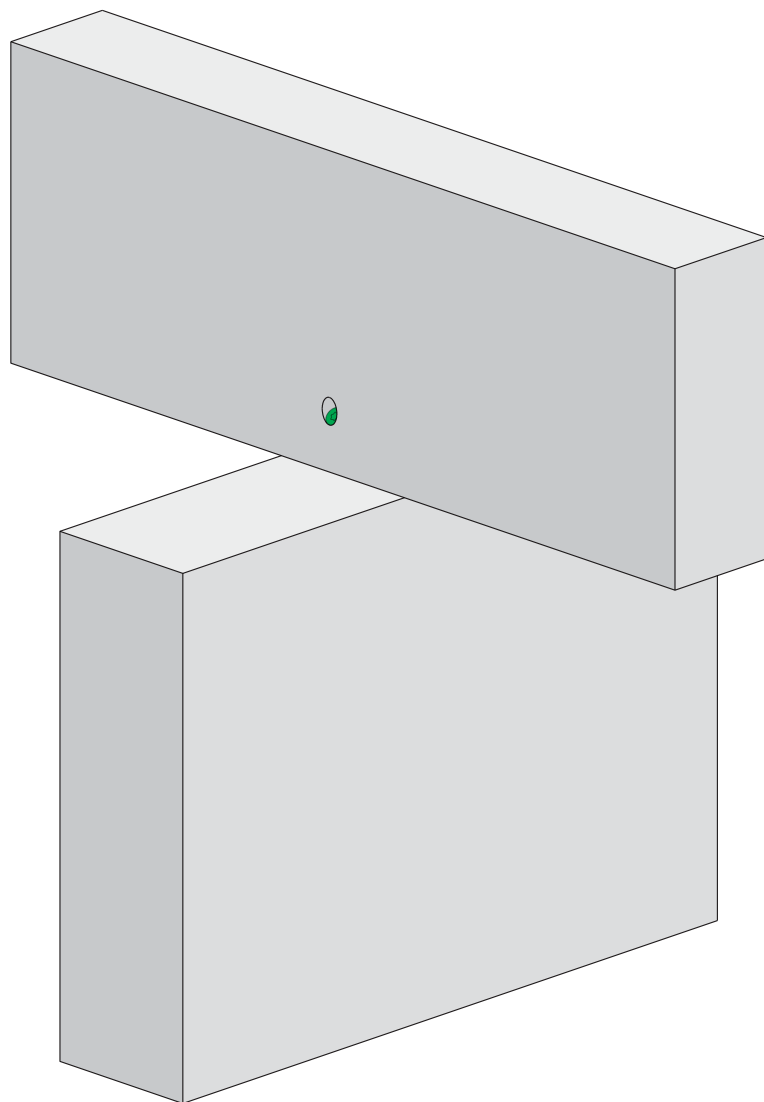


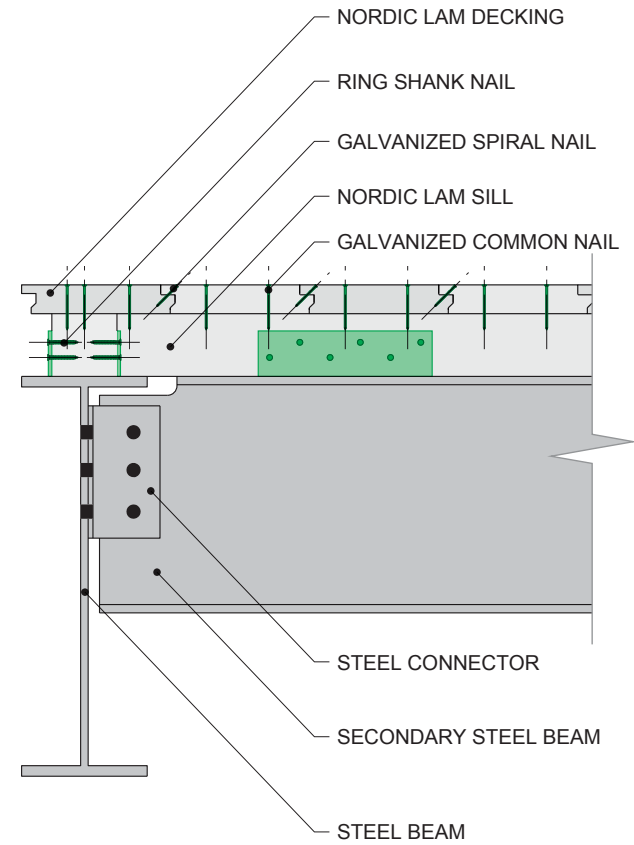
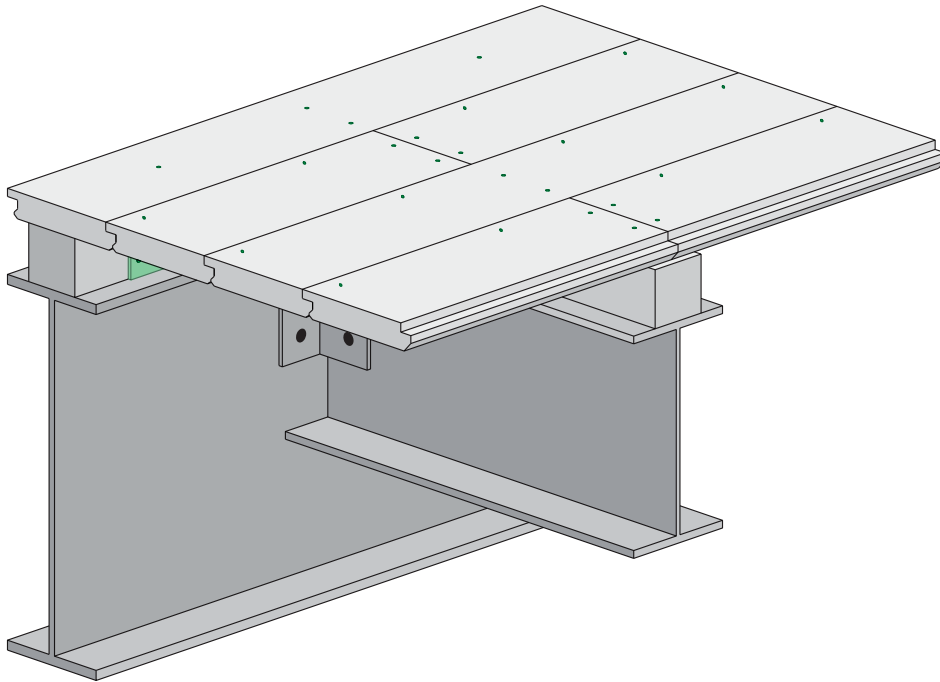












**Note:**

1. For assembly details refer to technical note D-R00.

# NORDIC

DETAILS  
NORDIC LAM+ NORDIC X-LAM

NS-DS2 

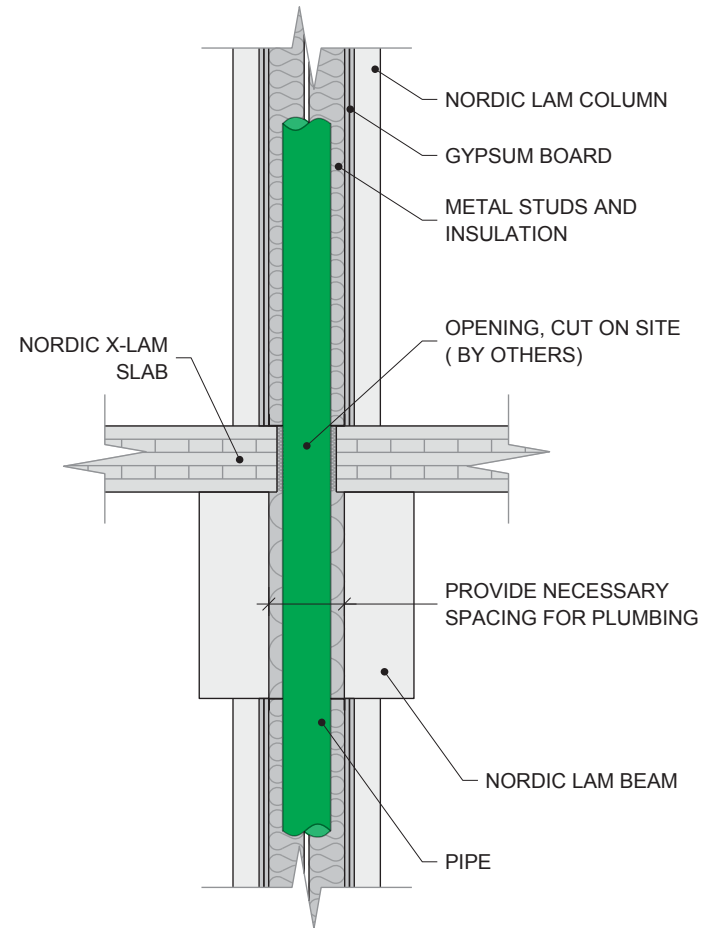
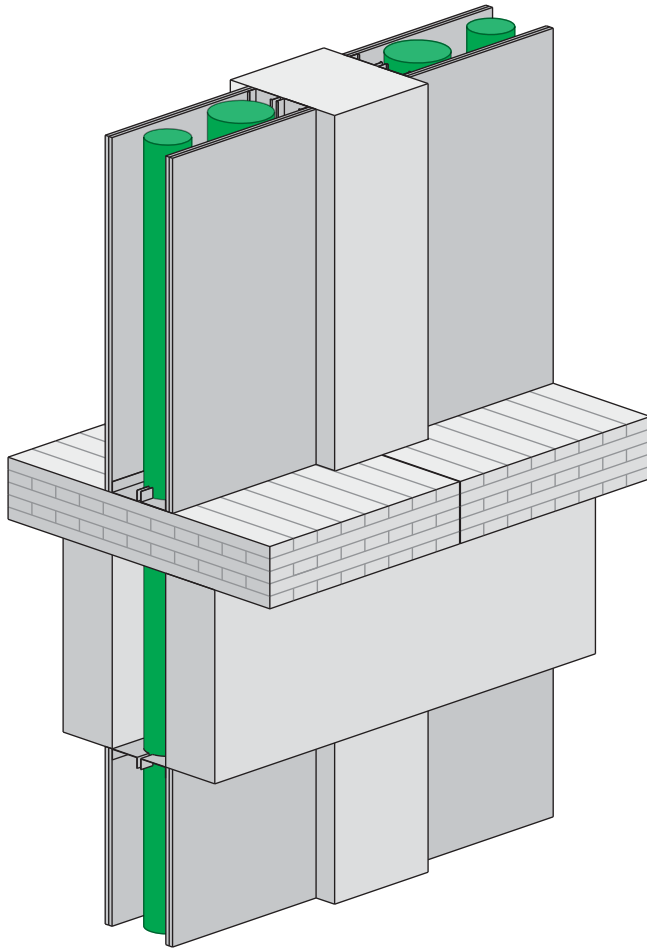
ENGLISH

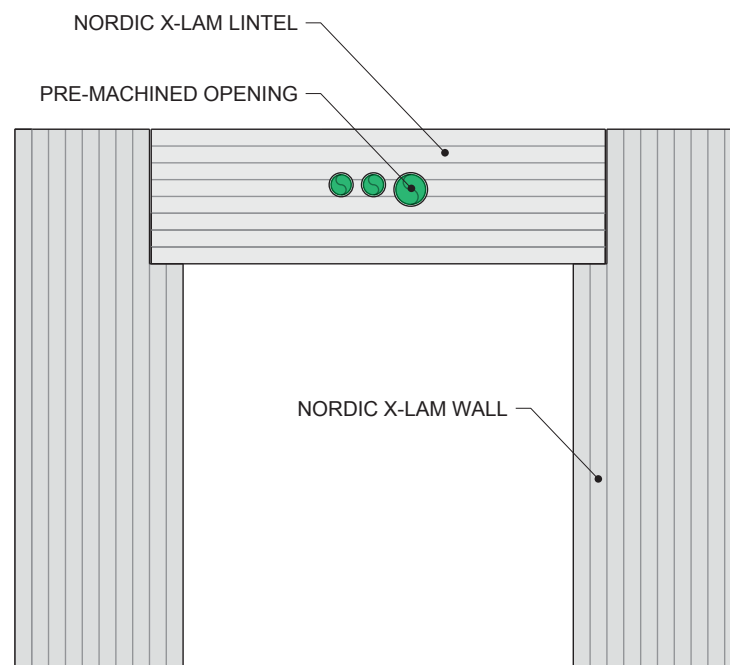
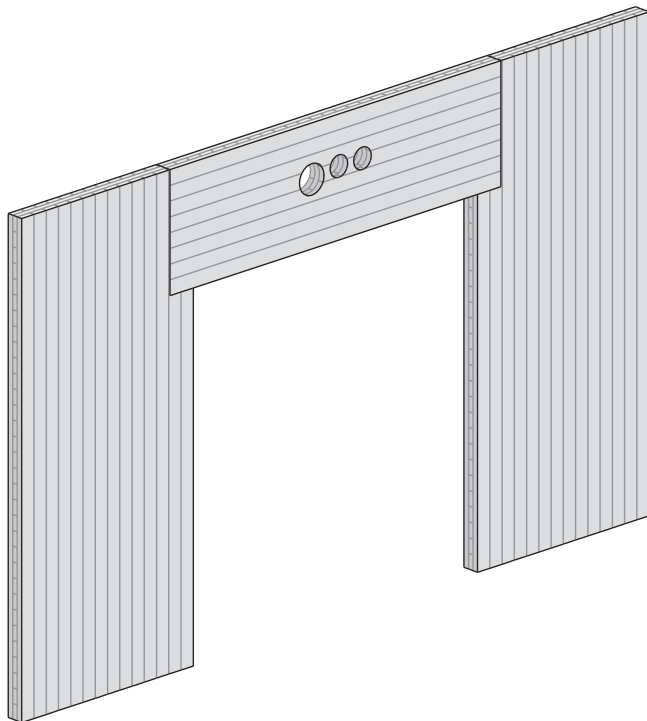
VERSION  
2022-02-01

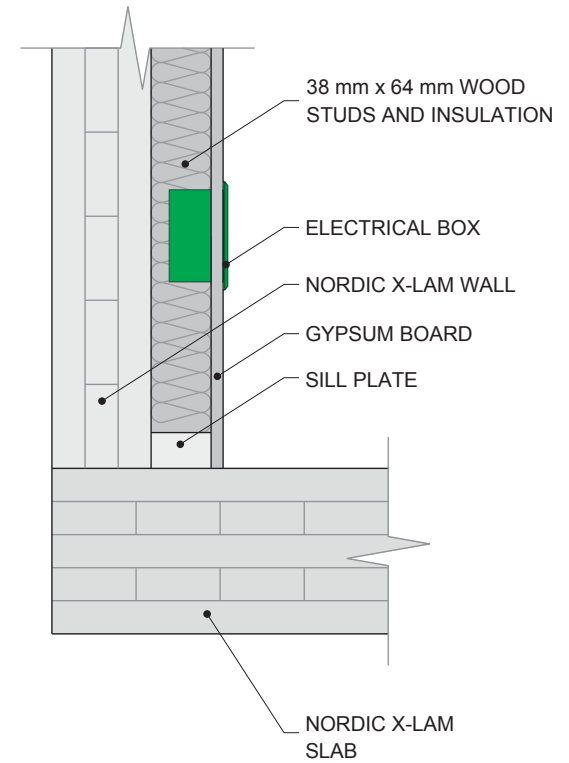
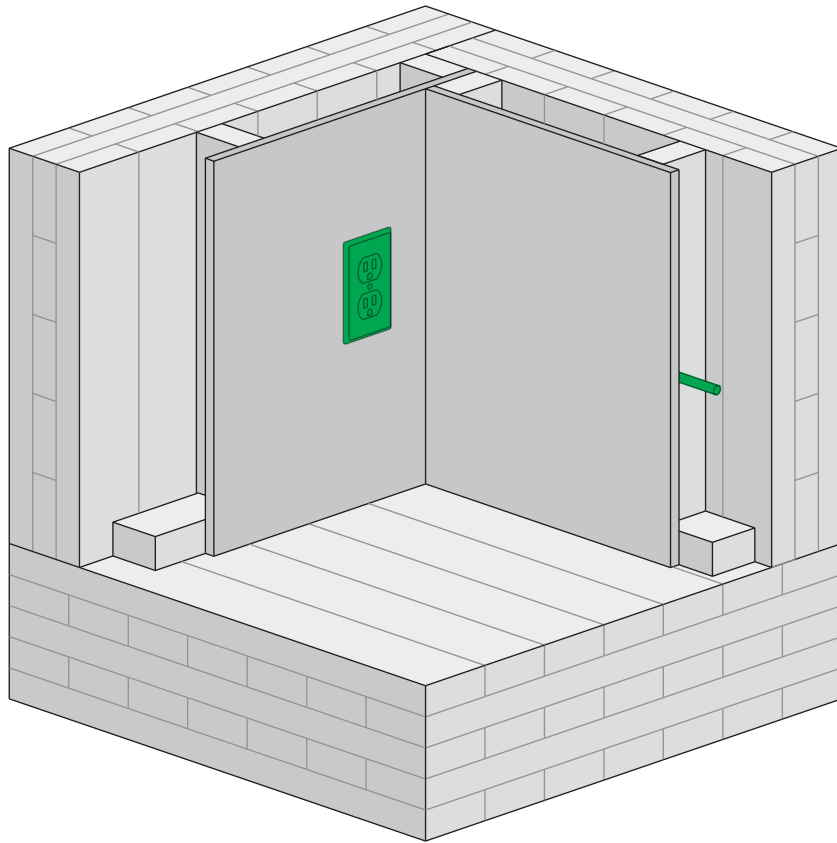
MECHANICAL, ELECTRICAL,  
AND PLUMBING

2

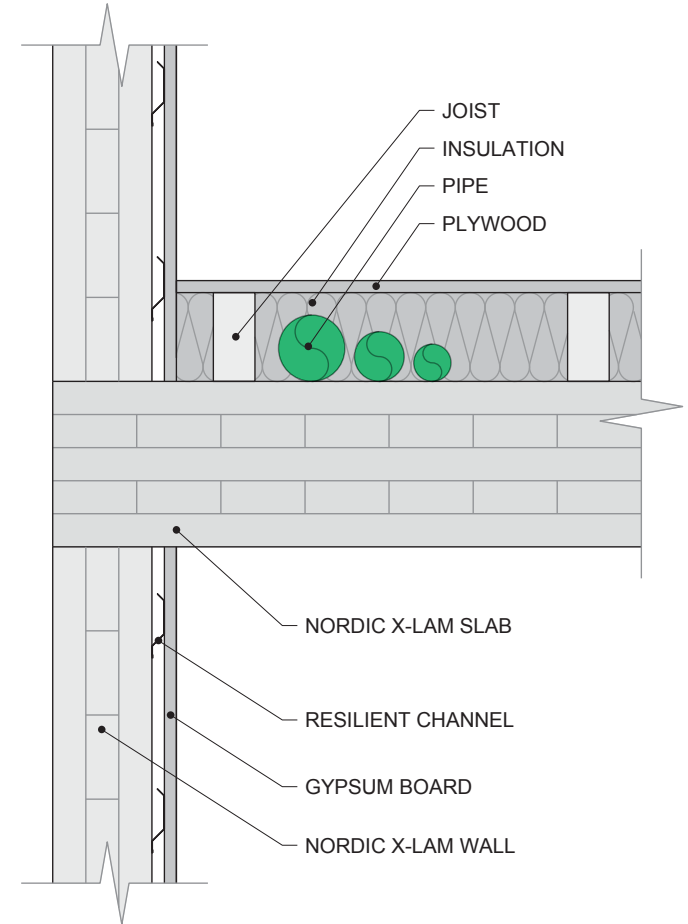
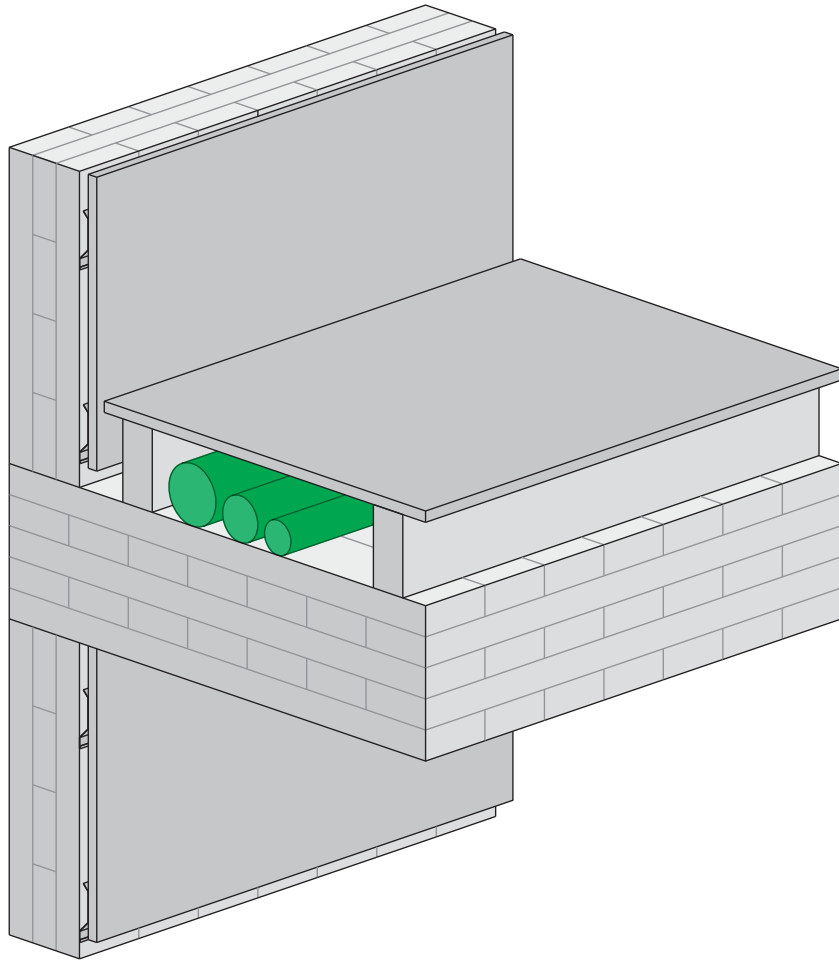
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STRUCTURES

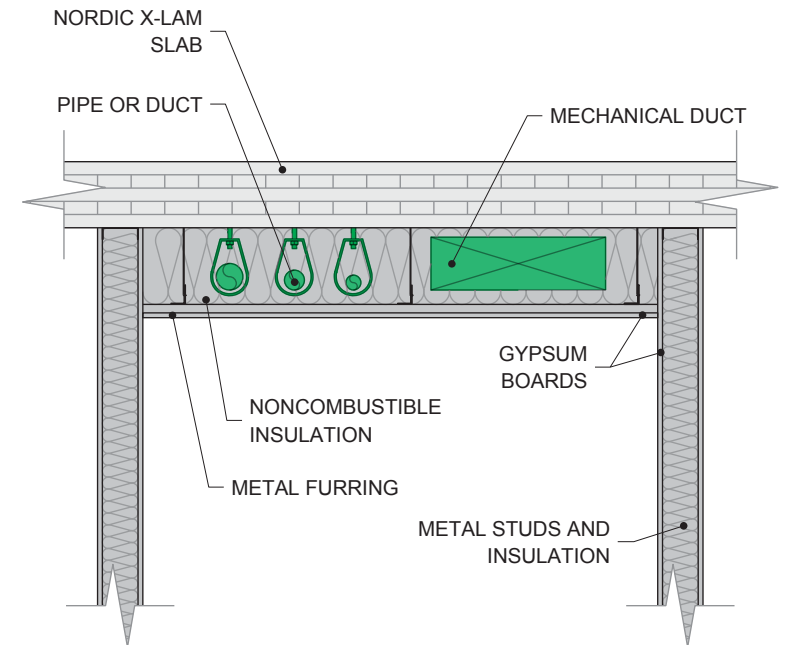
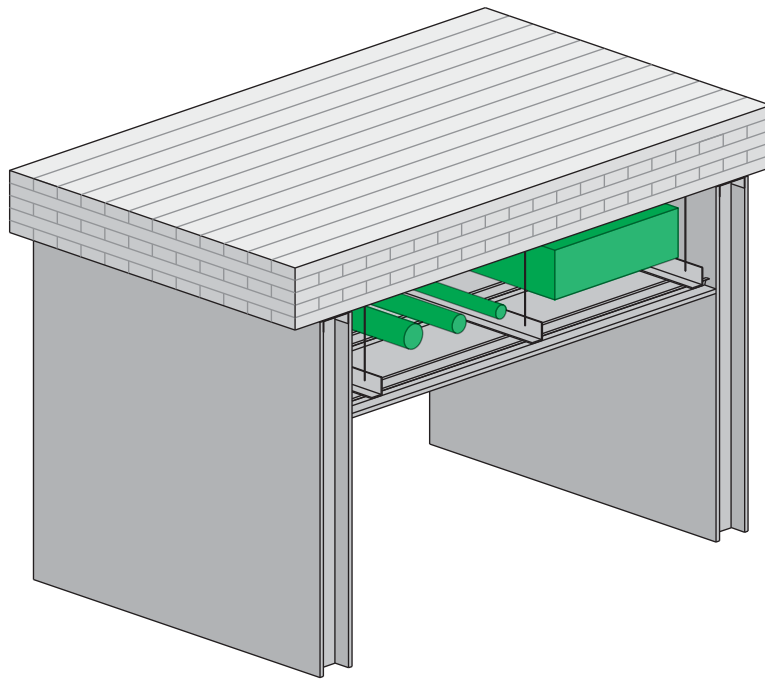


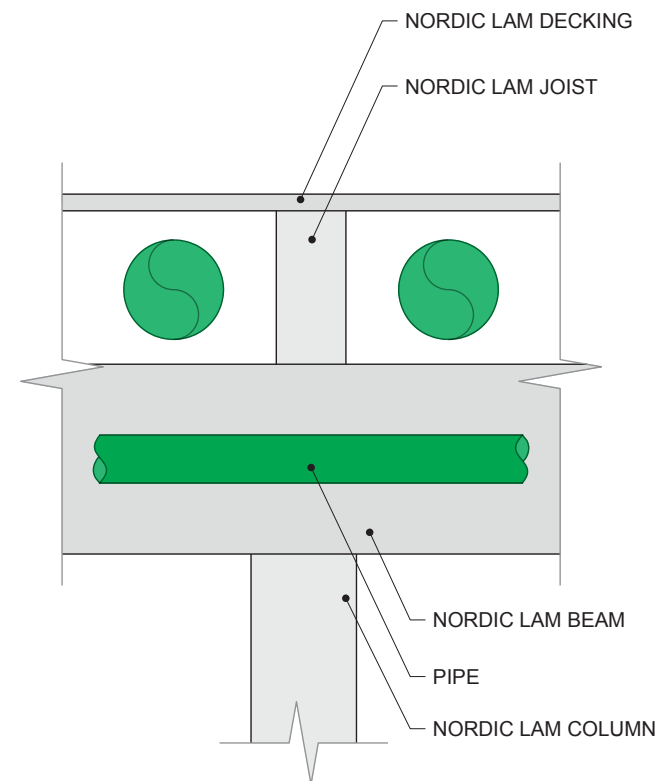
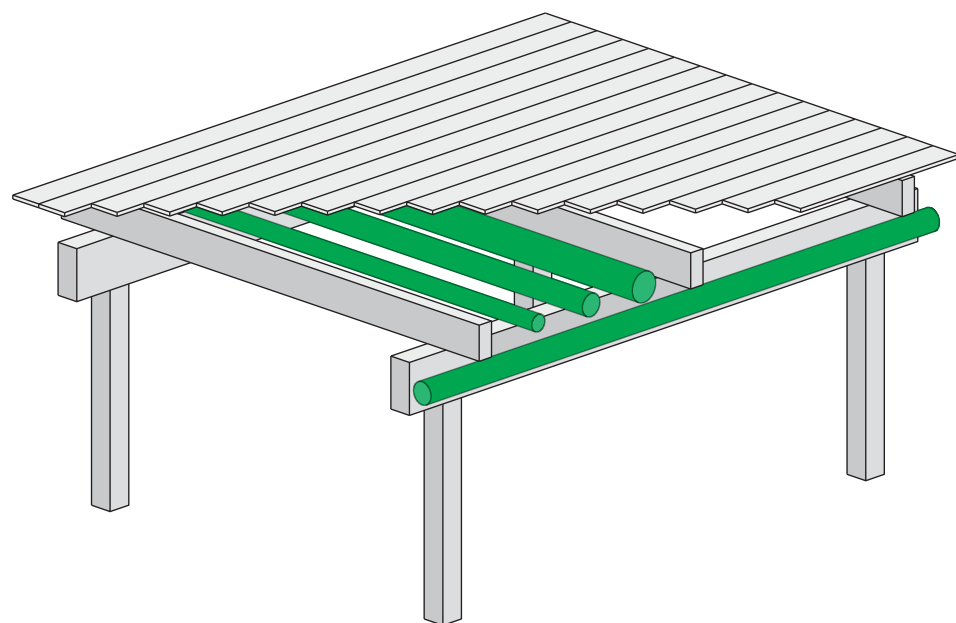


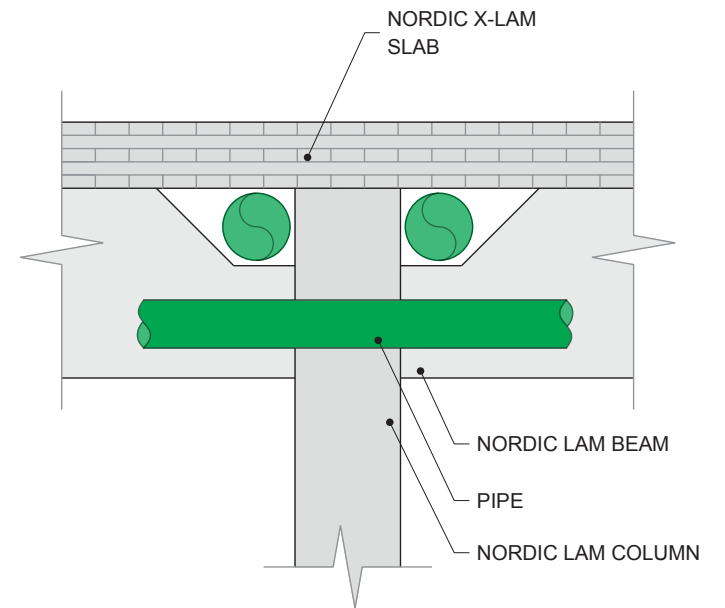
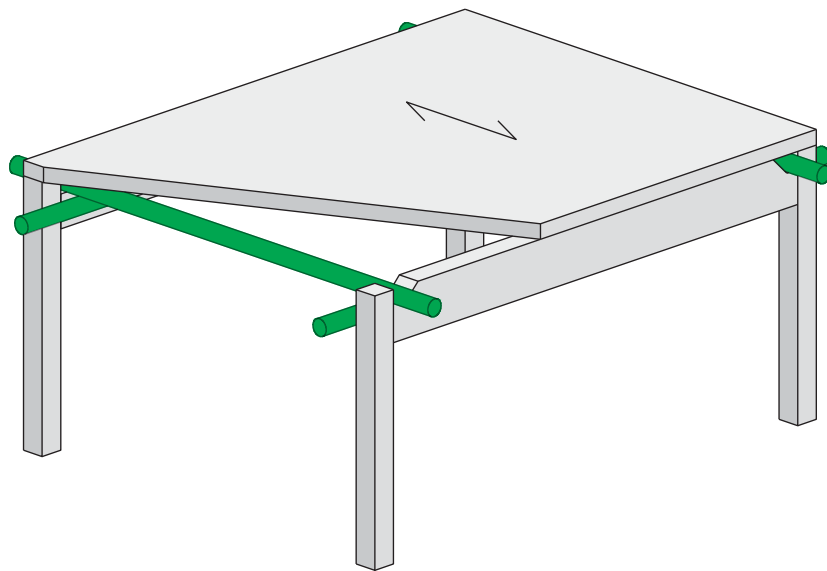


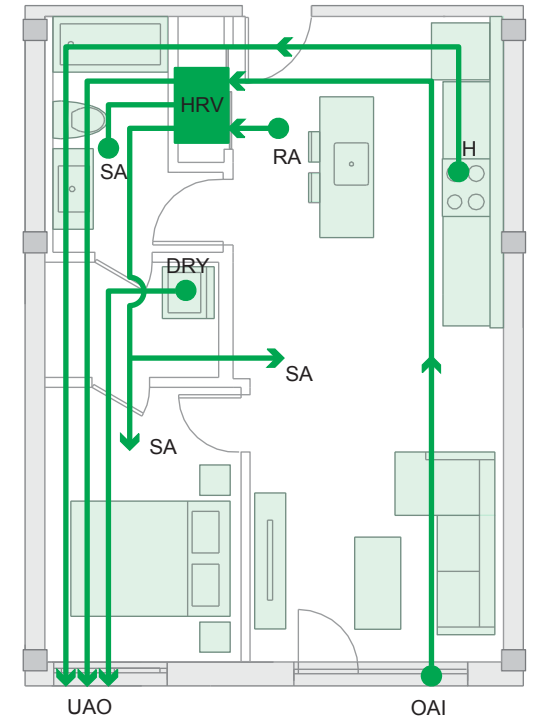
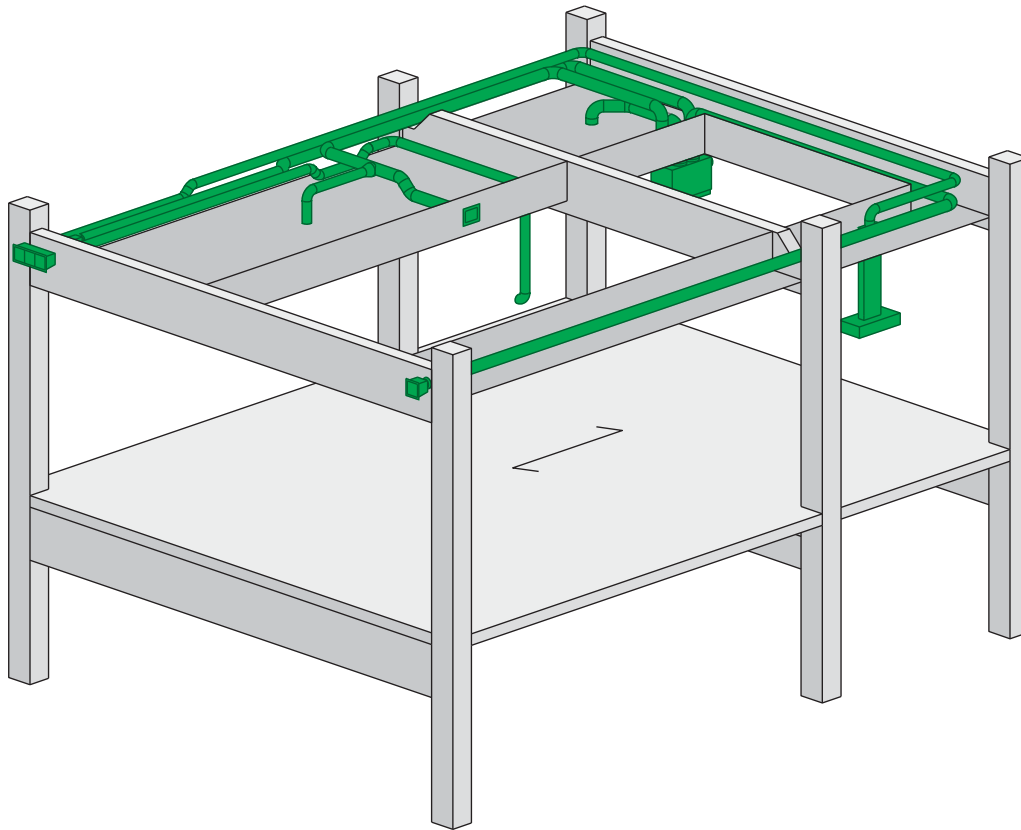






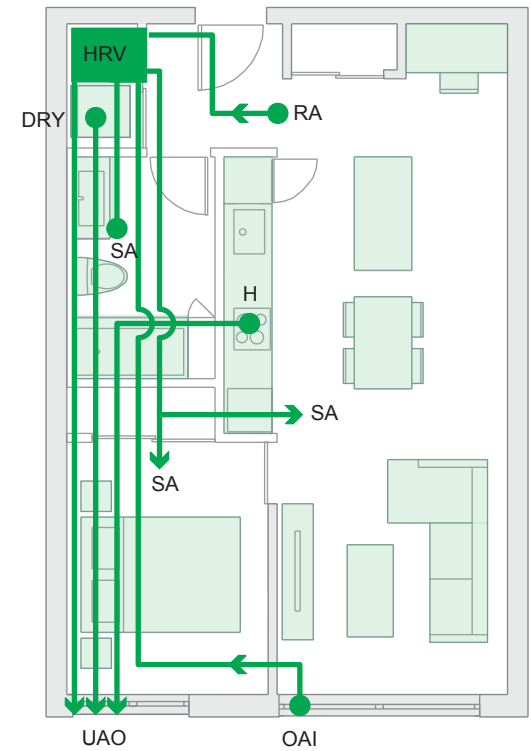
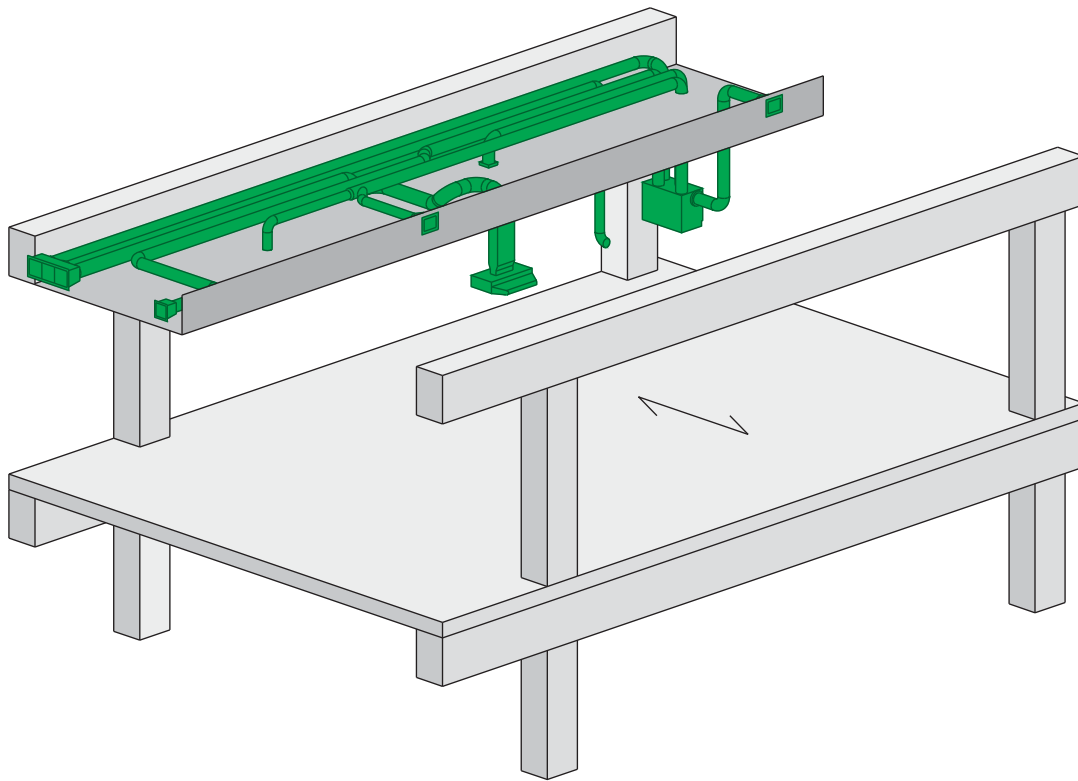






#### Legend

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



#### Legend

SA	Supply Air
H	Hood
OAI	Outdoor Air Intake
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