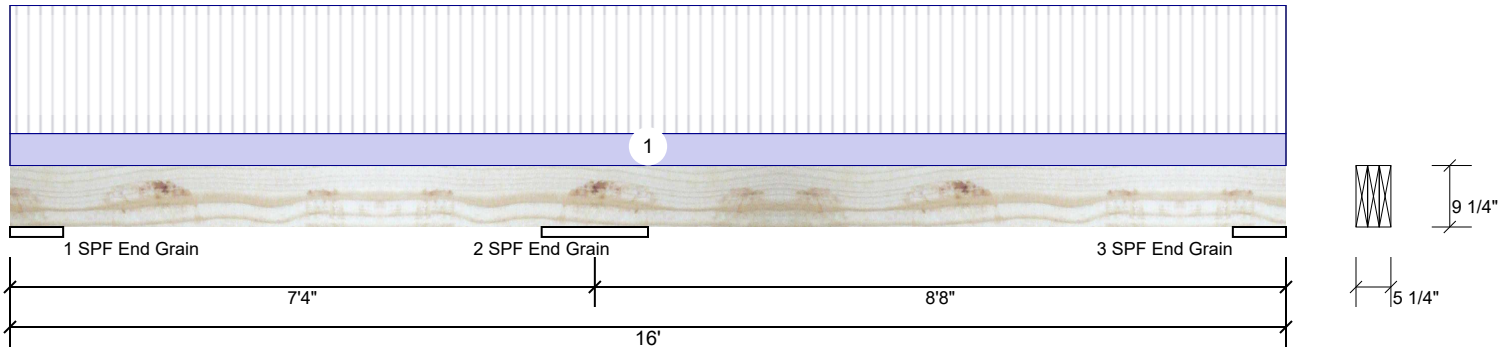
| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 1DB2 Kerto-S LVL 1.750" X 9.250" 3-Ply - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 3 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | Yes |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 2271 | 598 | 0 | 0 | 0 |
| 2 | Vertical | 7018 | 1849 | 0 | 0 | 0 |
| 3 | Vertical | 2903 | 765 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF End Grain | 8.000" | Vert | 9% | 588 / 2733 | 3320 | L_ | D+L |
| 2 - SPF End Grain | 16.000" | Vert | 13% | 1868 / 7091 | 8959 | LL | D+L |
| 3 - SPF End Grain | 8.000" | Vert | 11% | 756 / 3114 | 3870 | _L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Neg Moment | -6743 ft-lb | 7'4" | 19565 ft-lb | 0.345 (34%) | D+L | LL |
| Unbraced | -6743 ft-lb | 7'4" | 7759 ft-lb | 0.869 (87%) | D+L | LL |
| Pos Moment | 5615 ft-lb | 11'11 3/4" | 19565 ft-lb | 0.287 (29%) | D+L | _L |
| Unbraced | 5615 ft-lb | 11'11 3/4" | 7759 ft-lb | 0.724 (72%) | D+L | _L |
| Shear | 3342 lb | 8'9 1/4" | 10360 lb | 0.323 (32%) | D+L | LL |
| LL Defl inch | 0.087 (L/1111) | 11'6 13/16" | 0.202 (L/480) | 0.432 (43%) | L | _L |
| TL Defl inch | 0.105 (L/920) | 11'7 3/16" | 0.403 (L/240) | 0.261 (26%) | D+L | _L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Girders are designed to be supported on the bottom edge only.
3 Multiple plies must be fastened together as per manufacturer's details.
4 Top loads must be supported equally by all plies.
5 Top must be laterally braced at end bearings.
6 Bottom must be laterally braced at end bearings.
7 Lateral slenderness ratio based on single ply width.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | | Top | 190 PLF | 762 PLF | 0 PLF | 0 PLF | 0 PLF | 1FJ1 |
| | Self Weight | | | | 11 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

**Manufacturer Info**

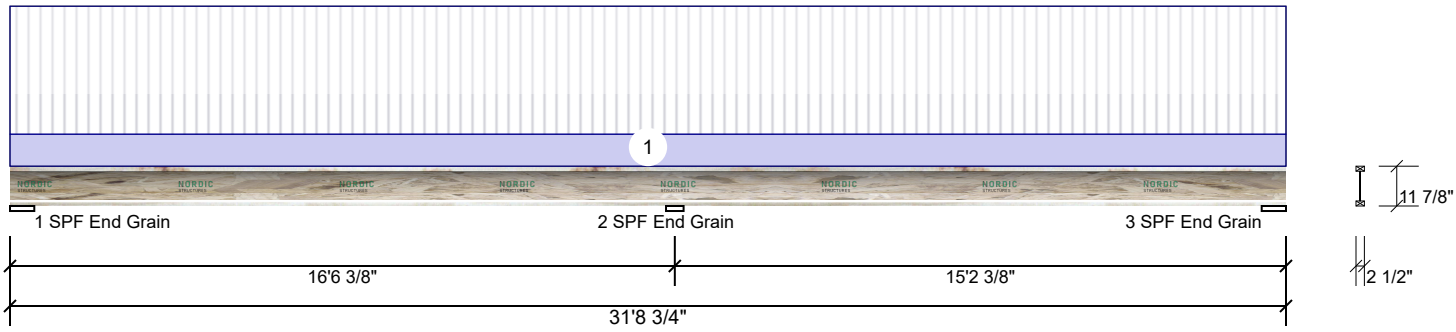
Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 1FJ1 NI-40x 11.875" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Joist | Application: | Floor |
| Spacing: | 19.2" o.c. | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | 3/4 APA Rated Sturd-I-FloorPlywood Nailed and Glued |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 434 | 109 | 0 | 0 | 0 |
| 2 | Vertical | 1215 | 304 | 0 | 0 | 0 |
| 3 | Vertical | 381 | 95 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF End Grain | 7.250" | Vert | 40% | 108 / 482 | 591 | L_ | D+L |
| 2 - SPF End Grain | 5.250" | Vert | 44% | 304 / 1218 | 1522 | LL | D+L |
| 3 - SPF End Grain | 7.250" | Vert | 37% | 95 / 450 | 545 | _L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Neg Moment | -2265 ft-lb | 16'6 3/8" | 3760 ft-lb | 0.602 (60%) | D+L | LL |
| Unbraced | -2265 ft-lb | 16'6 3/8" | 2289 ft-lb | 0.989 (99%) | D+L | LL |
| Pos Moment | 1872 ft-lb | 7'4 9/16" | 3760 ft-lb | 0.498 (50%) | D+L | L_ |
| Shear | 781 lb | 16'6 3/8" | 1480 lb | 0.528 (53%) | D+L | LL |
| LL Defl inch | 0.174 (L/1100) | 8'2" | 0.400 (L/480) | 0.436 (44%) | L | L_ |
| TL Defl inch | 0.207 (L/928) | 8'1 1/16" | 0.799 (L/240) | 0.259 (26%) | D+L | L_ |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Bottom flange must be laterally braced at a maximum of 4'8" o.c.

| ID | Load Type | Location | Trib Width | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-7-3 | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |

**Notes**

It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application and to verify the dimensions and loads.

**Engineered Wood Products**

1. Dry service conditions, unless noted otherwise
2. No treatment with fire-retardant or other strength-reducing chemicals.

**Handling & Installation**

1. Engineered wood products must not be cut or drilled. Damaged products shall not be used.
2. Refer to the latest version of the installation guide for construction details, hole specifications, multiple-member connections, and handling guidelines.
3. Provide lateral support at bearing points to prevent lateral displacement and rotation.
4. For flat roof, provide proper drainage to prevent ponding.
5. Design assumes top flange to be laterally restrained by attached sheathing or as specified in engineering notes.

This design is valid until 11/3/2024

**Manufacturer Info**

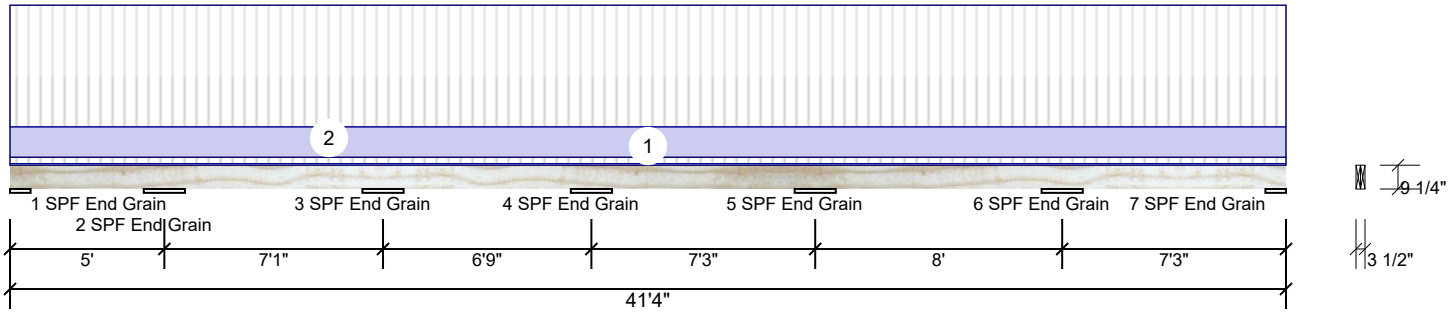
Nordic Structures
1100 Avenue des Canadiens-de-Montréal, Suite 100
Montreal, Québec, Canada H3B 2S2
(866) 871-3418
www.nordic.ca
APA PR-L274C

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 1DB1 Kerto-S LVL 1.750" X 9.250" 2-Ply - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 2 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 1636 | 423 | 0 | 0 | 0 |
| 2 | Vertical | 5125 | 1324 | 0 | 0 | 0 |
| 3 | Vertical | 5667 | 1464 | 0 | 0 | 0 |
| 4 | Vertical | 5465 | 1412 | 0 | 0 | 0 |
| 5 | Vertical | 6196 | 1601 | 0 | 0 | 0 |
| 6 | Vertical | 6557 | 1694 | 0 | 0 | 0 |
| 7 | Vertical | 2504 | 647 | 0 | 0 | 0 |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Neg Moment | -6184 ft-lb | 34'1" | 12542 ft-lb | 0.493 (49%) | D+L | L_L_LL |
| Unbraced | -6184 ft-lb | 34'1" | 6195 ft-lb | 0.998 (100%) | D+L | L_L_LL |
| Pos Moment | 4387 ft-lb | 30' 1/16" | 12542 ft-lb | 0.350 (35%) | D+L | L_L_L_ |
| Unbraced | 4387 ft-lb | 30' 1/16" | 4394 ft-lb | 0.998 (100%) | D+L | L_L_L_ |
| Shear | 3020 lb | 32'7 3/4" | 6907 lb | 0.437 (44%) | D+L | L_L_LL |
| LL Defl inch | 0.106 (L/902) | 30' 11/16" | 0.200 (L/480) | 0.532 (53%) | L | L_L_L_ |
| TL Defl inch | 0.122 (L/789) | 30' 9/16" | 0.400 (L/240) | 0.304 (30%) | D+L | L_L_L_ |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF End Grain | 8.000" | Vert | 11% | 415 / 2213 | 2628 | L_L_L_ | D+L |
| 2 - SPF End Grain | 16.000" | Vert | 15% | 1336 / 5717 | 7054 | LL_L_L | D+L |
| 3 - SPF End Grain | 16.000" | Vert | 17% | 1460 / 6430 | 7891 | _LL_L_ | D+L |
| 4 - SPF End Grain | 16.000" | Vert | 17% | 1411 / 6587 | 7997 | L_LL_L | D+L |
| 5 - SPF End Grain | 16.000" | Vert | 18% | 1596 / 7045 | 8641 | _L_LL_ | D+L |
| 6 - SPF End Grain | 16.000" | Vert | 19% | 1704 / 7045 | 8749 | L_L_LL | D+L |
| 7 - SPF End Grain | 8.000" | Vert | 15% | 642 / 2914 | 3556 | _L_L_L | D+L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Girders are designed to be supported on the bottom edge only.
3 Multiple plies must be fastened together as per manufacturer's details.
4 Top loads must be supported equally by all plies.
5 Top must be laterally braced at a maximum of 17'6 3/16" o.c.
6 Bottom must be laterally braced at a maximum of 12'2" o.c.
7 Lateral slenderness ratio based on single ply width.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | | Top | 10 PLF | 40 PLF | 0 PLF | 0 PLF | 0 PLF | |
| 2 | Uniform | | | Top | 190 PLF | 762 PLF | 0 PLF | 0 PLF | 0 PLF | 1FJ1 |
| | Self Weight | | | | 7 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

**Manufacturer Info**

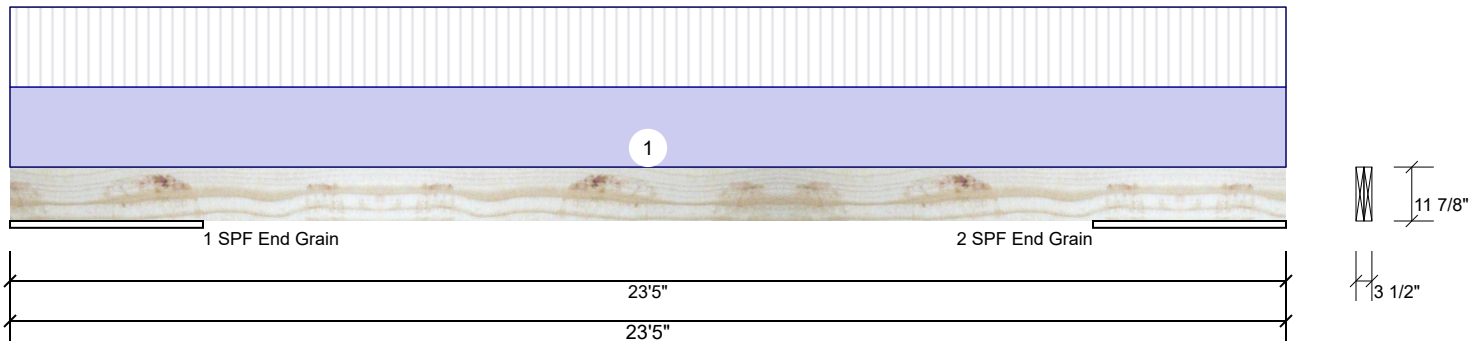
Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# GDH Kerto-S LVL 1.750" X 11.875" 2-Ply - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 2 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 2517 | 2625 | 0 | 0 | 0 |
| 2 | Vertical | 2517 | 2625 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF End Grain | 42.500" | Vert | 4% | 2625 / 2517 | 5143 | L | D+L |
| 2 - SPF End Grain | 42.500" | Vert | 4% | 2625 / 2517 | 5143 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 14872 ft-lb | 11'8 1/2" | 19911 ft-lb | 0.747 (75%) | D+L | L |
| Unbraced | 14872 ft-lb | 11'8 1/2" | 14883 ft-lb | 0.999 (100%) | D+L | L |
| Shear | 3162 lb | 4'6 3/8" | 8867 lb | 0.357 (36%) | D+L | L |
| LL Defl inch | 0.384 (L/515) | 11'8 9/16" | 0.411 (L/480) | 0.932 (93%) | L | L |
| TL Defl inch | 0.784 (L/252) | 11'8 9/16" | 0.823 (L/240) | 0.952 (95%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Girders are designed to be supported on the bottom edge only.
3 Multiple plies must be fastened together as per manufacturer's details.
4 Top loads must be supported equally by all plies.
5 Top must be laterally braced at a maximum of 5'3 5/8" o.c.
6 Bottom must be laterally braced at end bearings.
7 Lateral slenderness ratio based on single ply width.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | | Top | 215 PLF | 215 PLF | 0 PLF | 0 PLF | 0 PLF | |
| | Self Weight | | | | 9 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

**Manufacturer Info**

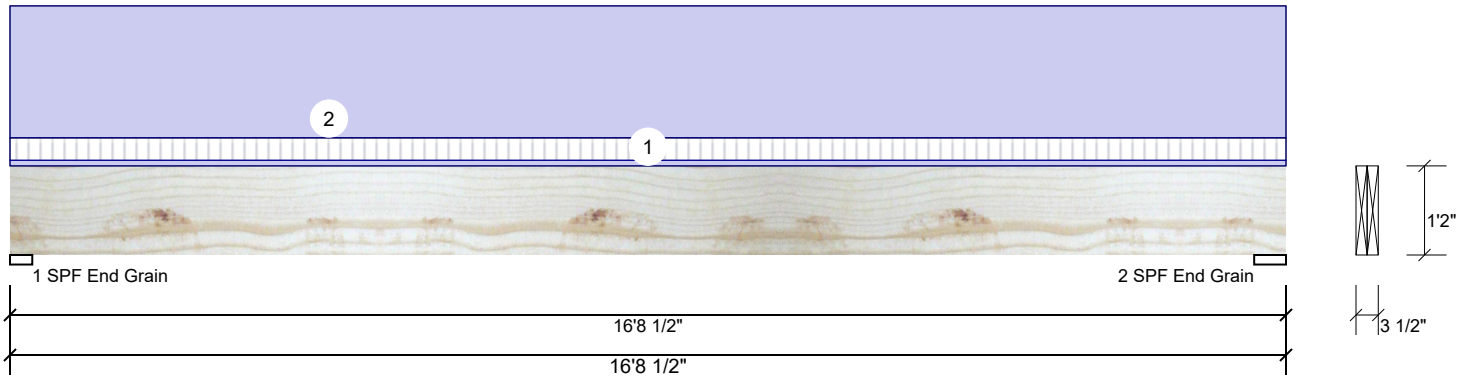
Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FB1 Kerto-S LVL 1.750" X 14.000" 2-Ply - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 2 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 332 | 2113 | 0 | 0 | 0 |
| 2 | Vertical | 337 | 2145 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF End Grain | 3.500" | Vert | 24% | 2113 / 332 | 2445 | L | D+L |
| 2 - SPF End Grain | 5.000" | Vert | 17% | 2145 / 337 | 2482 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 9584 ft-lb | 8'3 1/2" | 26999 ft-lb | 0.355 (35%) | D+L | L |
| Unbraced | 9584 ft-lb | 8'3 1/2" | 9597 ft-lb | 0.999 (100%) | D+L | L |
| Shear | 2028 lb | 1'5 1/2" | 10453 lb | 0.194 (19%) | D+L | L |
| LL Defl inch | 0.041 (L/4711) | 8'3 9/16" | 0.403 (L/480) | 0.102 (10%) | L | L |
| TL Defl inch | 0.303 (L/639) | 8'3 9/16" | 0.806 (L/240) | 0.376 (38%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Girders are designed to be supported on the bottom edge only.
3 Multiple plies must be fastened together as per manufacturer's details.
4 Top loads must be supported equally by all plies.
5 Top must be laterally braced at a maximum of 11'6 11/16" o.c.
6 Bottom must be laterally braced at end bearings.
7 Lateral slenderness ratio based on single ply width.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-0-0 | Top | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |
| 2 | Uniform | | | Top | 234 PLF | 0 PLF | 0 PLF | 0 PLF | 0 PLF | WALL |
| | Self Weight | | | | 11 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

**Manufacturer Info**

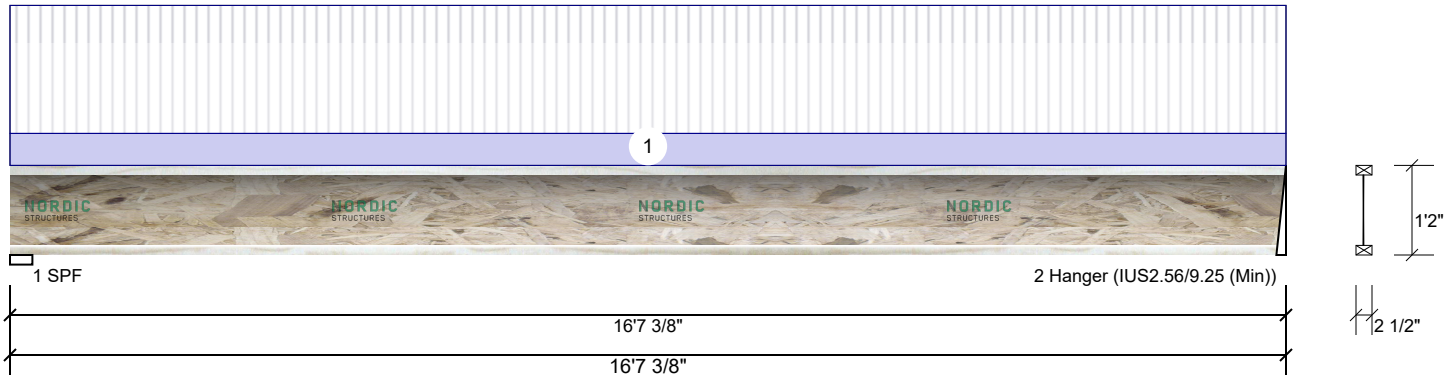
Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FJ5 NI-40x 14.000" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Joist | Application: | Floor |
| Spacing: | 19.2" o.c. | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 534 | 134 | 0 | 0 | 0 |
| 2 | Vertical | 529 | 132 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF | 3.500" | Vert | 45% | 134 / 534 | 668 | L | D+L |
| 2 - Hanger | 1.500" | Vert | 47% | 132 / 529 | 661 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 2637 ft-lb | 8'4 3/16" | 4530 ft-lb | 0.582 (58%) | D+L | L |
| Unbraced | 2637 ft-lb | 8'4 3/16" | 2639 ft-lb | 1.000 (100%) | D+L | L |
| Shear | 650 lb | 2 3/4" | 1730 lb | 0.375 (38%) | D+L | L |
| LL Defl inch | 0.213 (L/914) | 8'4 1/4" | 0.406 (L/480) | 0.525 (53%) | L | L |
| TL Defl inch | 0.267 (L/731) | 8'4 1/4" | 0.812 (L/240) | 0.328 (33%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Fill all hanger nailing holes.
3 Top flange must be laterally braced at a maximum of 4'10" o.c.
4 Bottom flange must be laterally braced at bearings.

| ID | Load Type | Location | Trib Width | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-7-3 | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |

**Notes**

It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application and to verify the dimensions and loads.

**Engineered Wood Products**

1. Dry service conditions, unless noted otherwise
2. No treatment with fire-retardant or other strength-reducing chemicals.

**Handling & Installation**

1. Engineered wood products must not be cut or drilled. Damaged products shall not be used.
2. Refer to the latest version of the installation guide for construction details, hole specifications, multiple-member connections, and handling guidelines.
3. Provide lateral support at bearing points to prevent lateral displacement and rotation.
4. For flat roof, provide proper drainage to prevent ponding.
5. Design assumes top flange to be laterally restrained by attached sheathing or as specified in engineering notes.

This design is valid until 11/3/2024

**Manufacturer Info**

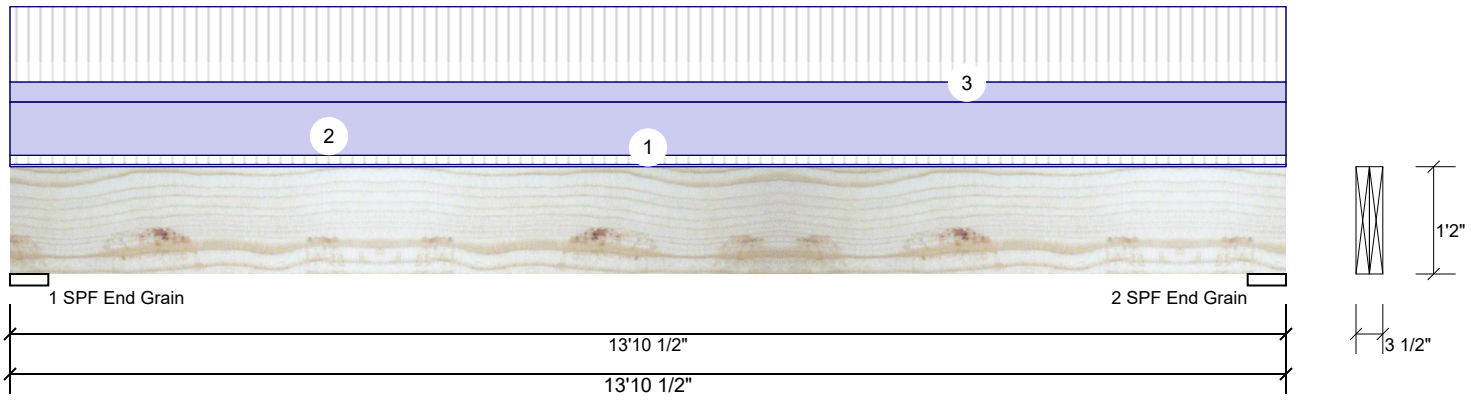
Nordic Structures
1100 Avenue des Canadiens-de-Montréal, Suite 100
Montreal, Québec, Canada H3B 2S2
(866) 871-3418
www.nordic.ca
APA PR-L274C

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FB2 Kerto-S LVL 1.750" X 14.000" 2-Ply - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 2 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 2567 | 2372 | 0 | 0 | 0 |
| 2 | Vertical | 2567 | 2372 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF End Grain | 5.000" | Vert | 34% | 2372 / 2567 | 4939 | L | D+L |
| 2 - SPF End Grain | 5.000" | Vert | 34% | 2372 / 2567 | 4939 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 15427 ft-lb | 6'11 1/4" | 26999 ft-lb | 0.571 (57%) | D+L | L |
| Unbraced | 15427 ft-lb | 6'11 1/4" | 15443 ft-lb | 0.999 (100%) | D+L | L |
| Shear | 4311 lb | 1'7" | 10453 lb | 0.412 (41%) | D+L | L |
| LL Defl inch | 0.175 (L/902) | 6'11 1/4" | 0.329 (L/480) | 0.532 (53%) | L | L |
| TL Defl inch | 0.337 (L/469) | 6'11 1/4" | 0.658 (L/240) | 0.512 (51%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Girders are designed to be supported on the bottom edge only.
3 Multiple plies must be fastened together as per manufacturer's details.
4 Top loads must be supported equally by all plies.
5 Top must be laterally braced at a maximum of 6'6 1/16" o.c.
6 Bottom must be laterally braced at end bearings.
7 Lateral slenderness ratio based on single ply width.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-0-0 | Top | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |
| 2 | Uniform | | | Top | 234 PLF | 0 PLF | 0 PLF | 0 PLF | 0 PLF | WALL |
| 3 | Uniform | | | Near Face | 87 PLF | 330 PLF | 0 PLF | 0 PLF | 0 PLF | 2FJ5 |
| | Self Weight | | | | 11 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

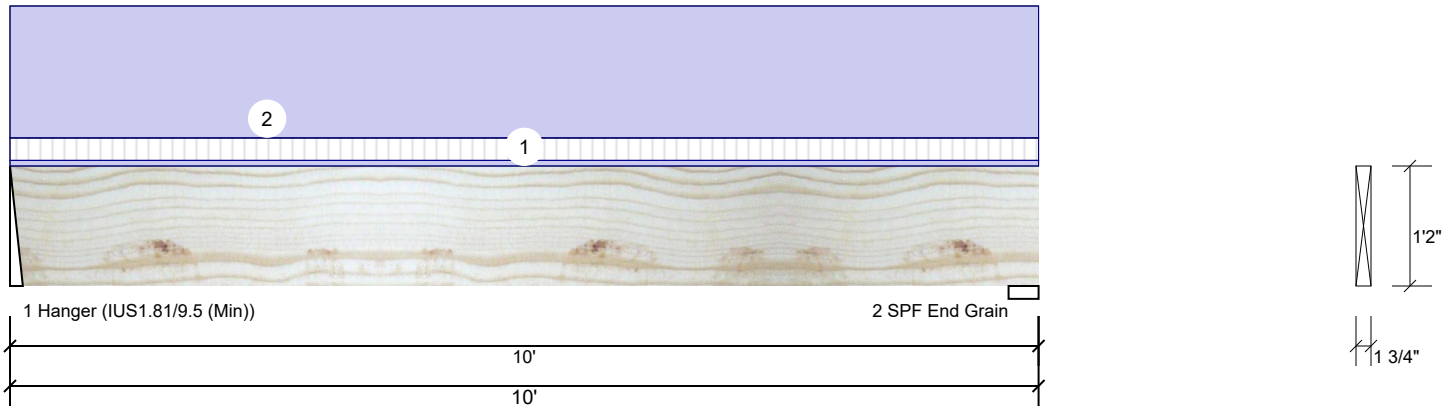
**Manufacturer Info**

Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

# 2FB3 Kerto-S LVL 1.750" X 14.000" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 1 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 198 | 1237 | 0 | 0 | 0 |
| 2 | Vertical | 202 | 1258 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - Hanger | 1.500" | Vert | 39% | 1237 / 198 | 1435 | L | D+L |
| 2 - SPF End Grain | 3.500" | Vert | 28% | 1258 / 202 | 1459 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 3352 ft-lb | 4'11 1/2" | 13500 ft-lb | 0.248 (25%) | D+L | L |
| Unbraced | 3352 ft-lb | 4'11 1/2" | 5549 ft-lb | 0.604 (60%) | D+L | L |
| Shear | 1044 lb | 1'4 1/2" | 5227 lb | 0.200 (20%) | D+L | L |
| LL Defl inch | 0.012 (L/9764) | 4'11 1/2" | 0.241 (L/480) | 0.049 (5%) | L | L |
| TL Defl inch | 0.086 (L/1349) | 4'11 1/2" | 0.481 (L/240) | 0.178 (18%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Fill all hanger nailing holes.
3 Girders are designed to be supported on the bottom edge only.
4 Top must be laterally braced at end bearings.
5 Bottom must be laterally braced at end bearings.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-0-0 | Top | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |
| 2 | Uniform | | | Top | 234 PLF | 0 PLF | 0 PLF | 0 PLF | 0 PLF | WALL |
| | Self Weight | | | | 5 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

**Manufacturer Info**

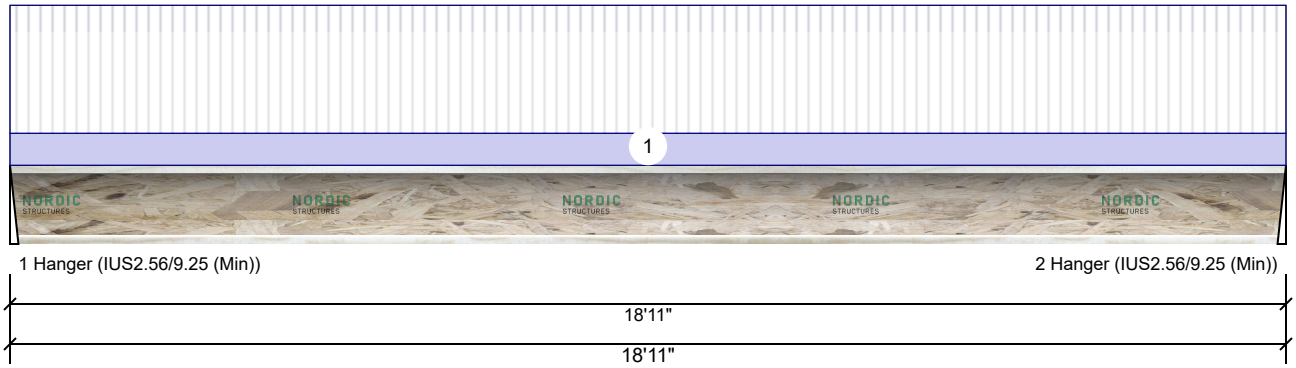
Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FJ4 NI-40x 14.000" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Joist | Application: | Floor |
| Spacing: | 19.2" o.c. | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 605 | 151 | 0 | 0 | 0 |
| 2 | Vertical | 605 | 151 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - Hanger | 1.500" | Vert | 54% | 151 / 605 | 757 | L | D+L |
| 2 - Hanger | 1.500" | Vert | 54% | 151 / 605 | 757 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 3469 ft-lb | 9'5 1/2" | 4530 ft-lb | 0.766 (77%) | D+L | L |
| Unbraced | 3469 ft-lb | 9'5 1/2" | 3483 ft-lb | 0.996 (100%) | D+L | L |
| Shear | 745 lb | 1 3/4" | 1730 lb | 0.431 (43%) | D+L | L |
| LL Defl inch | 0.357 (L/625) | 9'5 9/16" | 0.466 (L/480) | 0.768 (77%) | L | L |
| TL Defl inch | 0.447 (L/500) | 9'5 9/16" | 0.931 (L/240) | 0.480 (48%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Fill all hanger nailing holes.
3 Top flange must be laterally braced at a maximum of 3'8" o.c.
4 Bottom flange must be laterally braced at bearings.

| ID | Load Type | Location | Trib Width | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-7-3 | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |

**Notes**

It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application and to verify the dimensions and loads.

**Engineered Wood Products**

1. Dry service conditions, unless noted otherwise
2. No treatment with fire-retardant or other strength-reducing chemicals.

**Handling & Installation**

1. Engineered wood products must not be cut or drilled. Damaged products shall not be used.
2. Refer to the latest version of the installation guide for construction details, hole specifications, multiple-member connections, and handling guidelines.
3. Provide lateral support at bearing points to prevent lateral displacement and rotation.
4. For flat roof, provide proper drainage to prevent ponding.
5. Design assumes top flange to be laterally restrained by attached sheathing or as specified in engineering notes.

This design is valid until 11/3/2024

**Manufacturer Info**

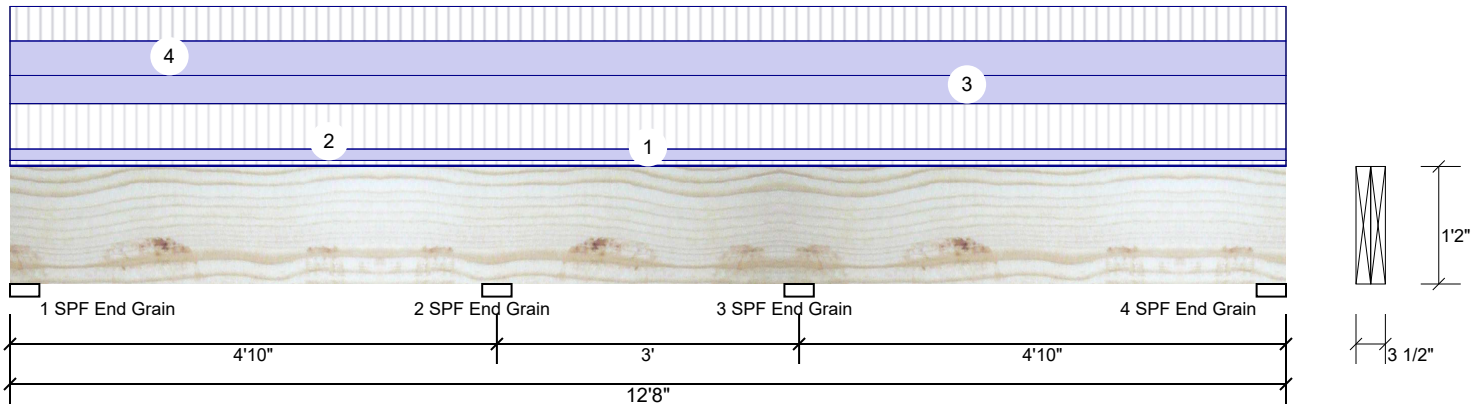
Nordic Structures
1100 Avenue des Canadiens-de-Montréal, Suite 100
Montreal, Québec, Canada H3B 2S2
(866) 871-3418
www.nordic.ca
APA PR-L274C

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FB4 Kerto-S LVL 1.750" X 14.000" 2-Ply - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 2 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 1558 | 1407 | 0 | 0 | 0 |
| 2 | Vertical | 2907 | 2626 | 0 | 0 | 0 |
| 3 | Vertical | 2907 | 2626 | 0 | 0 | 0 |
| 4 | Vertical | 1558 | 1407 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF End Grain | 3.500" | Vert | 29% | 1375 / 1579 | 2955 | L_L | D+L |
| 2 - SPF End Grain | 3.500" | Vert | 54% | 2658 / 3463 | 6121 | LL_ | D+L |
| 3 - SPF End Grain | 3.500" | Vert | 54% | 2658 / 3463 | 6121 | _LL | D+L |
| 4 - SPF End Grain | 3.500" | Vert | 29% | 1375 / 1579 | 2955 | L_L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Neg Moment | -2528 ft-lb | 4'10" | 26999 ft-lb | 0.094 (9%) | D+L | LL_ |
| Unbraced | -2528 ft-lb | 4'10" | 9178 ft-lb | 0.275 (28%) | D+L | LL_ |
| Pos Moment | 2611 ft-lb | 10'5 9/16" | 26999 ft-lb | 0.097 (10%) | D+L | L_L |
| Unbraced | 2611 ft-lb | 10'5 9/16" | 9178 ft-lb | 0.285 (28%) | D+L | L_L |
| Shear | 2441 lb | 9'1 3/4" | 10453 lb | 0.234 (23%) | D+L | _LL |
| LL Defl inch | 0.008 (L/7132) | 2'5 13/16" | 0.115 (L/480) | 0.067 (7%) | L | L__ |
| TL Defl inch | 0.014 (L/3838) | 10'2 5/16" | 0.230 (L/240) | 0.063 (6%) | D+L | __L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Girders are designed to be supported on the bottom edge only.
3 Multiple plies must be fastened together as per manufacturer's details.
4 Top loads must be supported equally by all plies.
5 Top must be laterally braced at end bearings.
6 Bottom must be laterally braced at end bearings.
7 Lateral slenderness ratio based on single ply width.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-0-0 | Top | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |
| 2 | Uniform | | | Near Face | 95 PLF | 378 PLF | 0 PLF | 0 PLF | 0 PLF | 2FJ4 |
| 3 | Uniform | | | Top | 234 PLF | 0 PLF | 0 PLF | 0 PLF | 0 PLF | WALL |
| 4 | Uniform | | | Top | 287 PLF | 287 PLF | 0 PLF | 0 PLF | 0 PLF | B1 |
| | Self Weight | | | | 11 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

**Manufacturer Info**

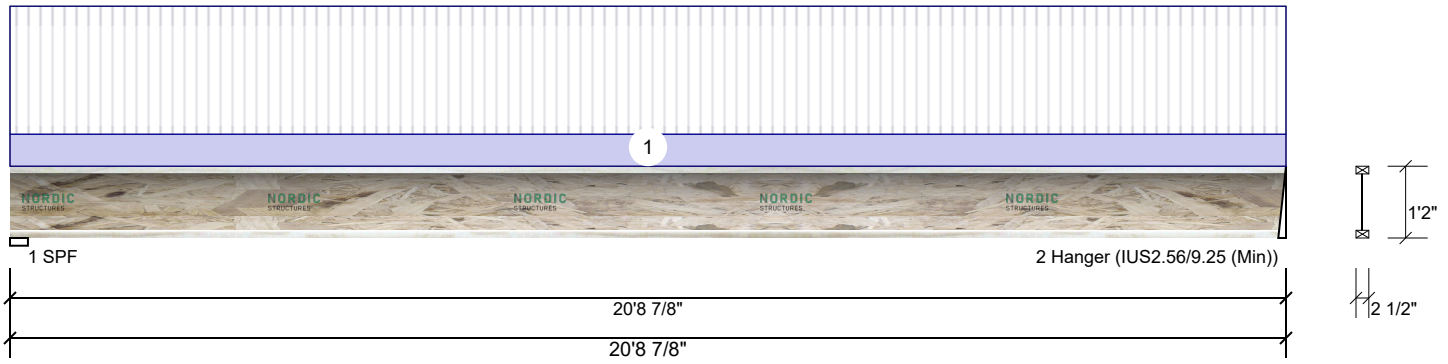
Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FJ3 NI-40x 14.000" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Joist | Application: | Floor |
| Spacing: | 19.2" o.c. | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 666 | 167 | 0 | 0 | 0 |
| 2 | Vertical | 661 | 165 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF | 3.500" | Vert | 56% | 167 / 666 | 833 | L | D+L |
| 2 - Hanger | 1.500" | Vert | 59% | 165 / 661 | 826 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 4147 ft-lb | 10'4 15/16" | 4530 ft-lb | 0.915 (92%) | D+L | L |
| Unbraced | 4147 ft-lb | 10'4 15/16" | 4159 ft-lb | 0.997 (100%) | D+L | L |
| Shear | 815 lb | 2 3/4" | 1730 lb | 0.471 (47%) | D+L | L |
| LL Defl inch | 0.502 (L/486) | 10'5" | 0.509 (L/480) | 0.987 (99%) | L | L |
| TL Defl inch | 0.628 (L/389) | 10'5" | 1.018 (L/240) | 0.617 (62%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Fill all hanger nailing holes.
3 Top flange must be laterally braced at a maximum of 2'5" o.c.
4 Bottom flange must be laterally braced at bearings.

| ID | Load Type | Location | Trib Width | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-7-3 | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |

**Notes**

It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application and to verify the dimensions and loads.

**Engineered Wood Products**

1. Dry service conditions, unless noted otherwise
2. No treatment with fire-retardant or other strength-reducing chemicals.

**Handling & Installation**

1. Engineered wood products must not be cut or drilled. Damaged products shall not be used.
2. Refer to the latest version of the installation guide for construction details, hole specifications, multiple-member connections, and handling guidelines.
3. Provide lateral support at bearing points to prevent lateral displacement and rotation.
4. For flat roof, provide proper drainage to prevent ponding.
5. Design assumes top flange to be laterally restrained by attached sheathing or as specified in engineering notes.

This design is valid until 11/3/2024

**Manufacturer Info**

Nordic Structures
1100 Avenue des Canadiens-de-Montréal, Suite 100
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(866) 871-3418
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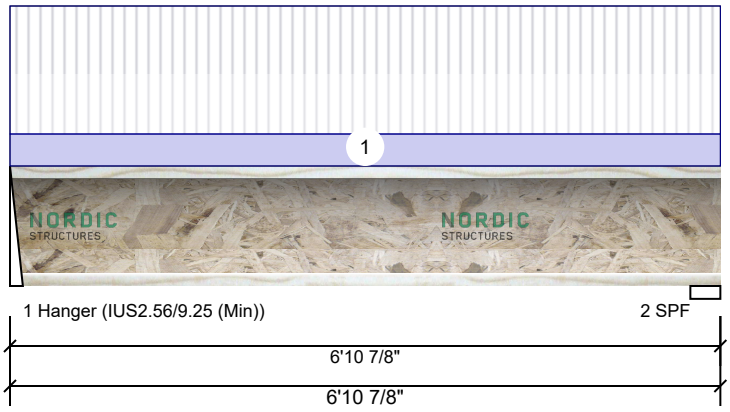
APA PR-L274C

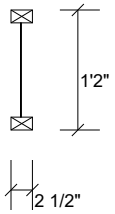
Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FJ7 NI-40x 14.000" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Joist | Application: | Floor |
| Spacing: | 19.2" o.c. | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 218 | 55 | 0 | 0 | 0 |
| 2 | Vertical | 224 | 56 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - Hanger | 1.500" | Vert | 20% | 55 / 218 | 273 | L | D+L |
| 2 - SPF | 3.500" | Vert | 19% | 56 / 224 | 280 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 427 ft-lb | 3'4 15/16" | 4530 ft-lb | 0.094 (9%) | D+L | L |
| Unbraced | 427 ft-lb | 3'4 15/16" | 1638 ft-lb | 0.260 (26%) | D+L | L |
| Shear | 261 lb | 1 3/4" | 1730 lb | 0.151 (15%) | D+L | L |
| LL Defl inch | 0.009 (L/8380) | 3'4 15/16" | 0.163 (L/480) | 0.057 (6%) | L | L |
| TL Defl inch | 0.012 (L/6704) | 3'4 15/16" | 0.327 (L/240) | 0.036 (4%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Fill all hanger nailing holes.
3 Top flange must be laterally braced at bearings.
4 Bottom flange must be laterally braced at bearings.

| ID | Load Type | Location | Trib Width | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-7-3 | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |

**Notes**

It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application and to verify the dimensions and loads.

**Engineered Wood Products**

1. Dry service conditions, unless noted otherwise
2. No treatment with fire-retardant or other strength-reducing chemicals.

**Handling & Installation**

1. Engineered wood products must not be cut or drilled. Damaged products shall not be used.
2. Refer to the latest version of the installation guide for construction details, hole specifications, multiple-member connections, and handling guidelines.
3. Provide lateral support at bearing points to prevent lateral displacement and rotation.
4. For flat roof, provide proper drainage to prevent ponding.
5. Design assumes top flange to be laterally restrained by attached sheathing or as specified in engineering notes.

This design is valid until 11/3/2024

**Manufacturer Info**

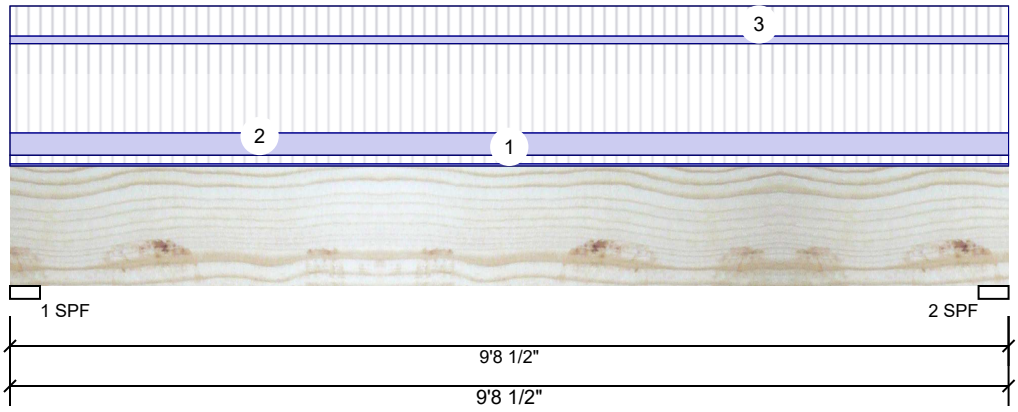
Nordic Structures
1100 Avenue des Canadiens-de-Montréal, Suite 100
Montreal, Québec, Canada H3B 2S2
(866) 871-3418
www.nordic.ca
APA PR-L274C

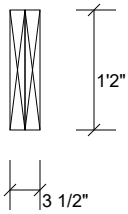
Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FB5 Kerto-S LVL 1.750" X 14.000" 2-Ply - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 2 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 2874 | 771 | 0 | 0 | 0 |
| 2 | Vertical | 2874 | 771 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF | 3.500" | Vert | 70% | 771 / 2874 | 3645 | L | D+L |
| 2 - SPF | 3.500" | Vert | 70% | 771 / 2874 | 3645 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 8031 ft-lb | 4'10 1/4" | 26999 ft-lb | 0.297 (30%) | D+L | L |
| Unbraced | 8031 ft-lb | 4'10 1/4" | 11443 ft-lb | 0.702 (70%) | D+L | L |
| Shear | 3368 lb | 8'3" | 10453 lb | 0.322 (32%) | D+L | L |
| LL Defl inch | 0.076 (L/1464) | 4'10 1/4" | 0.231 (L/480) | 0.328 (33%) | L | L |
| TL Defl inch | 0.096 (L/1154) | 4'10 1/4" | 0.462 (L/240) | 0.208 (21%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Girders are designed to be supported on the bottom edge only.
3 Multiple plies must be fastened together as per manufacturer's details.
4 Top loads must be supported equally by all plies.
5 Top must be laterally braced at end bearings.
6 Bottom must be laterally braced at end bearings.
7 Lateral slenderness ratio based on single ply width.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-0-0 | Top | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |
| 2 | Uniform | | | Near Face | 103 PLF | 413 PLF | 0 PLF | 0 PLF | 0 PLF | 2FJ3 |
| 3 | Uniform | | | Far Face | 35 PLF | 139 PLF | 0 PLF | 0 PLF | 0 PLF | 2FJ7 |
| | Self Weight | | | | 11 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

**Manufacturer Info**

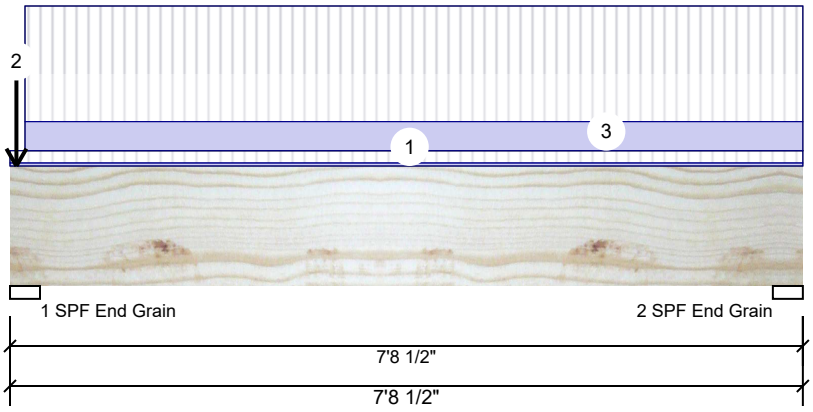
Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

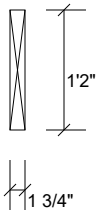
Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FB6 Kerto-S LVL 1.750" X 14.000" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 1 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 1556 | 1847 | 0 | 0 | 0 |
| 2 | Vertical | 1611 | 426 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF End Grain | 3.500" | Vert | 66% | 1847 / 1556 | 3403 | L | D+L |
| 2 - SPF End Grain | 3.500" | Vert | 40% | 426 / 1611 | 2037 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 3472 ft-lb | 3'10 1/4" | 13500 ft-lb | 0.257 (26%) | D+L | L |
| Unbraced | 3472 ft-lb | 3'10 1/4" | 7008 ft-lb | 0.495 (50%) | D+L | L |
| Shear | 1824 lb | 1'5 1/2" | 5227 lb | 0.349 (35%) | D+L | L |
| LL Defl inch | 0.045 (L/1917) | 3'10 5/16" | 0.181 (L/480) | 0.250 (25%) | L | L |
| TL Defl inch | 0.057 (L/1516) | 3'10 5/16" | 0.362 (L/240) | 0.158 (16%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Girders are designed to be supported on the bottom edge only.
3 Top must be laterally braced at end bearings.
4 Bottom must be laterally braced at end bearings.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-0-0 | Top | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |
| 2 | Point | 0-0-12 | | Far Face | 1435 lb | 0 lb | 0 lb | 0 lb | 0 lb | 3FB3 |
| 3 | Part. Uniform | 0-1-12 to 7-8-8 | | Far Face | 95 PLF | 378 PLF | 0 PLF | 0 PLF | 0 PLF | 2FJ4 |
| | Self Weight | | | | 5 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

**Manufacturer Info**

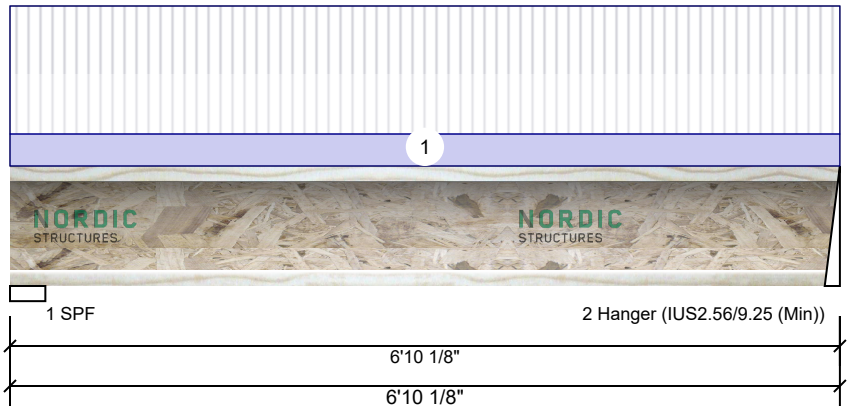
Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

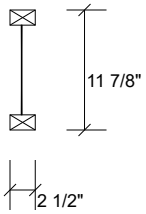
Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FJ8 NI-40x 11.875" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Joist | Application: | Floor |
| Spacing: | 16" o.c. | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 186 | 46 | 0 | 0 | 0 |
| 2 | Vertical | 179 | 45 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF | 3.500" | Vert | 16% | 46 / 186 | 232 | L | D+L |
| 2 - Hanger | 1.500" | Vert | 17% | 45 / 179 | 224 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 353 ft-lb | 3'5 13/16" | 3760 ft-lb | 0.094 (9%) | D+L | L |
| Unbraced | 353 ft-lb | 3'5 13/16" | 1367 ft-lb | 0.258 (26%) | D+L | L |
| Shear | 217 lb | 6'8 7/8" | 1480 lb | 0.147 (15%) | D+L | L |
| LL Defl inch | 0.010 (L/7659) | 3'5 13/16" | 0.163 (L/480) | 0.063 (6%) | L | L |
| TL Defl inch | 0.013 (L/6127) | 3'5 13/16" | 0.326 (L/240) | 0.039 (4%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Fill all hanger nailing holes.
3 Top flange must be laterally braced at bearings.
4 Bottom flange must be laterally braced at bearings.

| ID | Load Type | Location | Trib Width | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-4-0 | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |

**Notes**

It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application and to verify the dimensions and loads.

**Engineered Wood Products**

1. Dry service conditions, unless noted otherwise
2. No treatment with fire-retardant or other strength-reducing chemicals.

**Handling & Installation**

1. Engineered wood products must not be cut or drilled. Damaged products shall not be used.
2. Refer to the latest version of the installation guide for construction details, hole specifications, multiple-member connections, and handling guidelines.
3. Provide lateral support at bearing points to prevent lateral displacement and rotation.
4. For flat roof, provide proper drainage to prevent ponding.
5. Design assumes top flange to be laterally restrained by attached sheathing or as specified in engineering notes.

This design is valid until 11/3/2024

**Manufacturer Info**

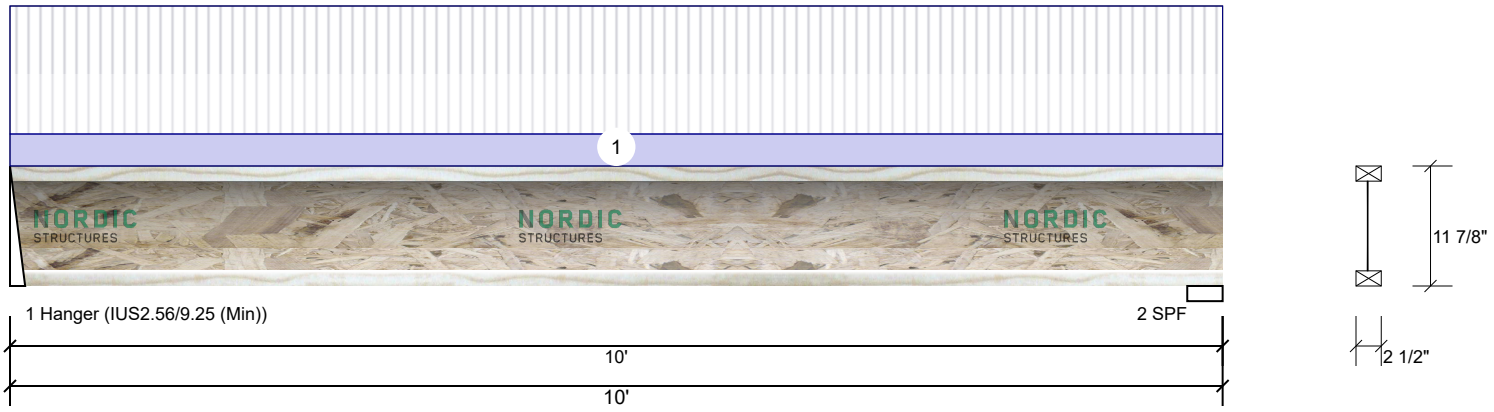
Nordic Structures
1100 Avenue des Canadiens-de-Montréal, Suite 100
Montreal, Québec, Canada H3B 2S2
(866) 871-3418
www.nordic.ca
APA PR-L274C

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FJ2 NI-40x 11.875" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Joist | Application: | Floor |
| Spacing: | 16" o.c. | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 263 | 66 | 0 | 0 | 0 |
| 2 | Vertical | 270 | 68 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - Hanger | 1.500" | Vert | 25% | 66 / 263 | 329 | L | D+L |
| 2 - SPF | 3.500" | Vert | 24% | 68 / 270 | 338 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 779 ft-lb | 4'11 1/4" | 3760 ft-lb | 0.207 (21%) | D+L | L |
| Unbraced | 779 ft-lb | 4'11 1/4" | 779 ft-lb | 1.000 (100%) | D+L | L |
| Shear | 322 lb | 1 1/4" | 1480 lb | 0.218 (22%) | D+L | L |
| LL Defl inch | 0.038 (L/3059) | 4'11 1/4" | 0.242 (L/480) | 0.157 (16%) | L | L |
| TL Defl inch | 0.047 (L/2447) | 4'11 1/4" | 0.483 (L/240) | 0.098 (10%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Fill all hanger nailing holes.
3 Top flange must be laterally braced at a maximum of 8'10" o.c.
4 Bottom flange must be laterally braced at bearings.

| ID | Load Type | Location | Trib Width | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-4-0 | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |

**Notes**

It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application and to verify the dimensions and loads.

**Engineered Wood Products**

1. Dry service conditions, unless noted otherwise
2. No treatment with fire-retardant or other strength-reducing chemicals.

**Handling & Installation**

1. Engineered wood products must not be cut or drilled. Damaged products shall not be used.
2. Refer to the latest version of the installation guide for construction details, hole specifications, multiple-member connections, and handling guidelines.
3. Provide lateral support at bearing points to prevent lateral displacement and rotation.
4. For flat roof, provide proper drainage to prevent ponding.
5. Design assumes top flange to be laterally restrained by attached sheathing or as specified in engineering notes.

This design is valid until 11/3/2024

**Manufacturer Info**

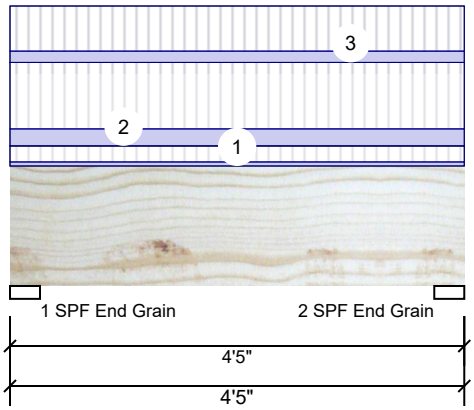
Nordic Structures
1100 Avenue des Canadiens-de-Montréal, Suite 100
Montreal, Québec, Canada H3B 2S2
(866) 871-3418
www.nordic.ca
APA PR-L274C

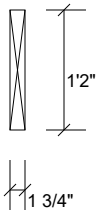
Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787

| | | | |
|---|---|---|---|
| Client: | Great South Builders | Date: | 4/24/2023 |
| Project: | 2L-2937/ 2 Story | Input by: | |
| Address: | | Job Name: | J0423-1835 Beams |
| | | Project #: | J0423-1835 Beams |

# 2FB7 Kerto-S LVL 1.750" X 14.000" - PASSED

Level: Level




## Member Information

| | | | |
|---|---|---|---|
| Type: | Girder | Application: | Floor |
| Plies: | 1 | Design Method: | ASD |
| Moisture Condition: | Dry | Building Code: | IBC/IRC 2015 |
| Deflection LL: | 480 | Load Sharing: | No |
| Deflection TL: | 240 | Deck: | Not Checked |
| Importance: | Normal - II | | |
| Temperature: | Temp <= 100°F | | |

## Reactions UNPATTERNED lb (Uplift)

| Brg | Direction | Live | Dead | Snow | Wind | Const |
|---|---|---|---|---|---|---|
| 1 | Vertical | 700 | 189 | 0 | 0 | 0 |
| 2 | Vertical | 700 | 189 | 0 | 0 | 0 |

## Bearings

| Bearing | Length | Dir. | Cap. | React D/L lb | Total | Ld. Case | Ld. Comb. |
|---|---|---|---|---|---|---|---|
| 1 - SPF End Grain | 3.500" | Vert | 17% | 189 / 700 | 889 | L | D+L |
| 2 - SPF End Grain | 3.500" | Vert | 17% | 189 / 700 | 889 | L | D+L |

## Analysis Results

| Analysis | Actual | Location | Allowed | Capacity | Comb. | Case |
|---|---|---|---|---|---|---|
| Moment | 788 ft-lb | 2'2 1/2" | 13500 ft-lb | 0.058 (6%) | D+L | L |
| Unbraced | 788 ft-lb | 2'2 1/2" | 11156 ft-lb | 0.071 (7%) | D+L | L |
| Shear | 713 lb | 1'5 1/2" | 5227 lb | 0.136 (14%) | D+L | L |
| LL Defl inch | 0.005 (L/9301) | 2'2 9/16" | 0.099 (L/480) | 0.052 (5%) | L | L |
| TL Defl inch | 0.006 (L/7326) | 2'2 9/16" | 0.198 (L/240) | 0.033 (3%) | D+L | L |

## Design Notes

1 Provide support to prevent lateral movement and rotation at the end bearings. Lateral support may also be required at the interior bearings by the building code.
2 Girders are designed to be supported on the bottom edge only.
3 Top must be laterally braced at end bearings.
4 Bottom must be laterally braced at end bearings.

| ID | Load Type | Location | Trib Width | Side | Dead 0.9 | Live 1 | Snow 1.15 | Wind 1.6 | Const. 1.25 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Uniform | | 1-0-0 | Top | 10 PSF | 40 PSF | 0 PSF | 0 PSF | 0 PSF | |
| 2 | Uniform | | | Far Face | 42 PLF | 165 PLF | 0 PLF | 0 PLF | 0 PLF | 2FJ2 |
| 3 | Uniform | | | Near Face | 28 PLF | 112 PLF | 0 PLF | 0 PLF | 0 PLF | 2FJ8 |
| | Self Weight | | | | 5 PLF | | | | | |

**Notes**

Calculated Structured Designs is responsible only of the structural adequacy of this component based on the design criteria and loadings shown. It is the responsibility of the customer and/or the contractor to ensure the component suitability of the intended application, and to verify the dimensions and loads.

**Lumber**

1. Dry service conditions, unless noted otherwise
2. LVL not to be treated with fire retardant or corrosive chemicals

**Handling & Installation**

1. LVL beams must not be cut or drilled
2. Refer to manufacturer's product information regarding installation requirements, multi-ply fastening details, beam strength values, and code approvals
3. Damaged Beams must not be used
4. Design assumes top edge is laterally restrained
5. Provide lateral support at bearing points to avoid lateral displacement and rotation
6. For flat roofs provide proper drainage to prevent ponding

This design is valid until 11/3/2024

**Manufacturer Info**

Metsä Wood
301 Merritt 7 Building, 2nd Floor
Norwalk, CT 06851
(800) 622-5850
www.metsawood.com/us

Comtech
Reilly Road Industrial Park P.O. Box 40408, NC
USA
28309
910-864-8787