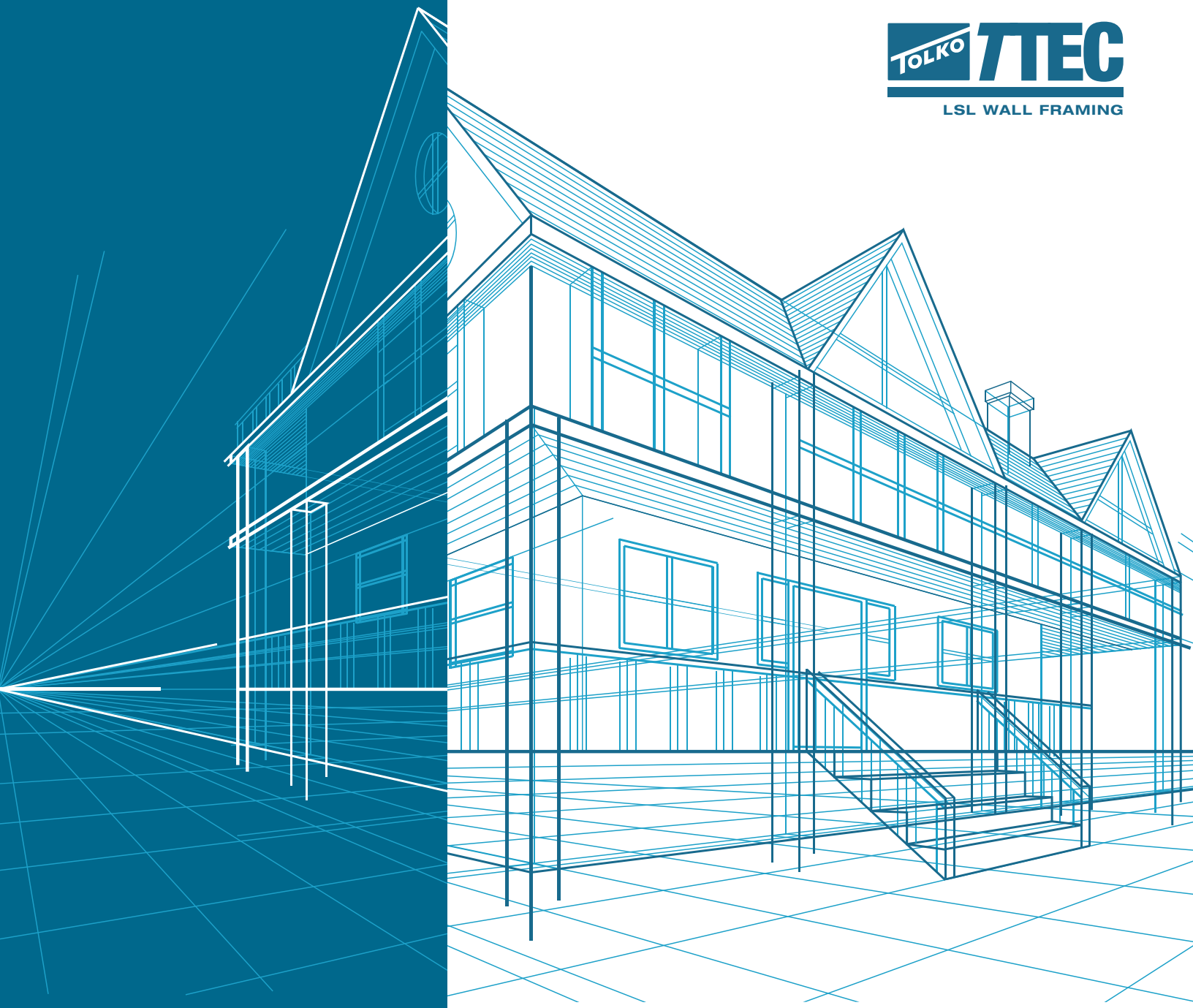
TOLKO

TECHNICAL GUIDE (LSD - CANADA)

T-TEC 1.35E LSL WALL FRAMING

TOLKO T-TEC
LSL WALL FRAMING



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LIMIT STATES DESIGN

Published: July 12, 2019

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TOLKO T-TEC LSL PRODUCTS

Tolko's line of Laminated Strand Lumber (LSL) is manufactured from strands of fibre selected to create a solid, consistent, and uniform alternative to traditional structural and non-structural products such as lumber, plywood, OSB and LVL. There is no warp, no wane, and no rot which means no waste and no need to order extra materials.

CREATING VALUE FROM THE STRANDS

Tolko LSL products are produced at our Athabasca mill in Slave Lake, Alberta. This industry-leading facility has the longest continuous press in North America, ensuring a steady stream of uniform engineered wood products and precise mixtures for product consistency and dimensional accuracy. Our continuous press provides contractors with the confidence that T-TEC LSL will perform as intended at every job.

DELIVERING VALUE WITH CONSISTENCY

Our Athabasca Mill is serviced by a combination of truck and rail providing Tolko with the flexibility to reach customers across Canada and the USA.

ACHIEVING VALUE WITH 1.35 E-RATING

The E-Rating of engineered wood products identifies the modulus of elasticity (MOE) or the tendency of the product to deform along an axis when opposing forces are applied. A greater E-Rating means the product is more resistant to changing with force.

WHY CHOOSE T-TEC LSL?

- ✓ Reduce materials and enhance design
- ✓ Improve recovery
- ✓ Reduce installation time
- ✓ Build quieter floors and straighter walls
- ✓ Protect against fungal decay and insects
- ✓ Earn Green Building credits

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SECTION 1: WALL FRAMING DESIGN AND CONSTRUCTION

1.1) Tolko T-TEC 1.35E LSL: Design Properties (Limit States Design)

TABLE 1: SPECIFIED EDGEWISE BENDING STRENGTHS AND MODULUS OF ELASTICITY[a]

Product/Grade	Modulus of Elasticity, E[d] (psi)	Specified flexural strength, fb[b] (psi)	Specified compression perpendicular to grain, fc⊥ (psi)	Specified shear parallel to grain, fv (psi)
1.35E T-TEC LSL	1.35 X 10^6	3420[c]	1370	580

(a) The tabulated values are specified strengths and modulus of elasticity for normal load duration. All values, except E, are permitted to be adjusted for other load durations as permitted by the code.
The tabulated values are limited to the dry service conditions.

(b) Tabulated flexural stress (fb) may be increased by 4 percent when the member qualifies as a repetitive member as defined in CSA086.

(c) Tabulated value is based on a reference depth of 12 inches. For other depths, when loaded edgewise, fb shall be modified by $(12/d)^{0.125}$, where d = depth in inches. For depths less than 2-1/2 inches, the factor for the 2-1/2-inch depth shall be used.

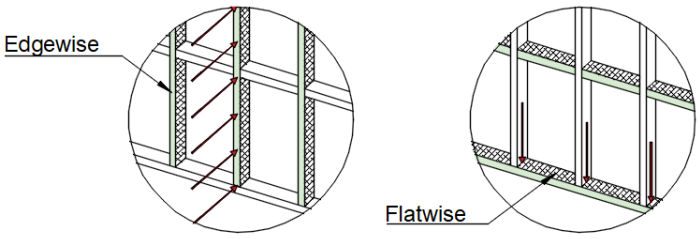
(d) For a simple span member, deflection for a uniform load could be calculated as follows:

(e) $$\delta_T = \frac{270wL^4}{Ebh^3}$$

where:

δ_T = total deflection (in)
w = applied uniform loads (lbf/ft)
L = design span (ft)
E = modulus of elasticity (lbf/in^2)
b = beam width (in)
h = beam depth (in)

FIGURE 1: PRODUCT ORIENTATION



PROPOSITION 65 WARNING

WARNING

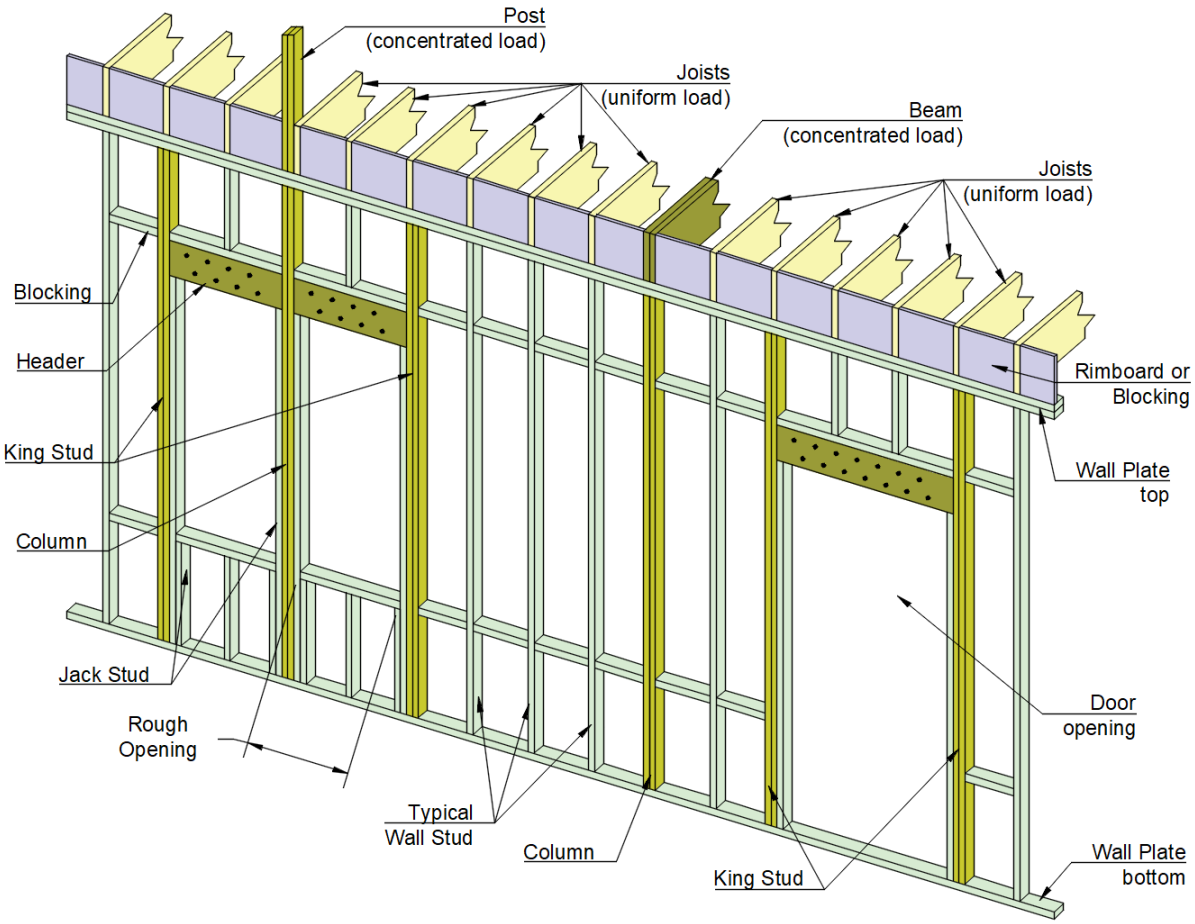
Drilling, sawing, sanding or machining wood products can expose you to wood dust, a substance known to the State of California to cause cancer. Avoid inhailing wood dust or use a dust mask or other safeguards for personal protection. For more information go to www.P65Warnings.ca.gov/wood.

WARNING

This product can expose you to chemicals including methanol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

1.2) Typical Wall Framing

FIGURE 2: WALL FRAMING COMPONENTS



1.3) Exterior Walls Design Wind Pressure

TABLE 2: WALL DESIGN WIND LOAD/PRESSURE (PSF)

Hourly wind pressure, $q_{1/50}$ (kPa)	Wind Load (psf)	
	Open Terrain	Rough (Urban) Terrain
0.4	20	15
0.5	25	20
0.6	30	25
0.7	35	25
0.8	40	30
0.9	45	35
1	50	35

How to use this table:

1. Determine the hourly wind pressure, $q_{1/50}$ (kPa), from NBC 2015 Table C-2.
   Example: Alberta - Calgary $q_{1/50}$ = 0.48 kPa, rounded up to 0.5 kPa
2. Determine the terrain type (open vs. urban)
3. Identify the wind load from Table 2:
   Open Terrain wind load (strength and serviceability) = 25 psf or,
   Urban Terrain wind load (strength and serviceability) = 20 psf

Design Assumptions for the wind loads calculations:

1) Design method: NBC 2015 Components and Cladding
2) Reference mean roof height: 50 ft.
3) Is the building on hills or escarpments? No
4) Max. wall height = 30 ft.
5) Building with large openings.
6) Component end zone.
7) External pressure coefficients: CpCg+ = 1.70; CpCg- = -2.00
8) Internal gust effect factor: Cgi = 0.2
9) Internal pressure coefficients: Cpi+ = 0.7; Cpi- = -0.7
10) Tabulated wind load values have not been adjusted by the importance factor.

Note: Design assumptions shall be checked by the building design professional of record to determine if they are appropriate for the intended application.

1.4) Prescriptive Wall Applications

1.35E Tolko T-TEC LSL shall be permitted for use as wall studs in accordance with the prescriptive requirements of Part 9 of the NBC, and the following requirements:

- Braced wall panels utilizing Tolko LSL studs are subject to the limitations in Clause 9.23.1.1 of Part 9 of the NBC.
- Fasteners for sheathing shall conform to Tables 9.23.3.5 – A and 9.23.3.5 – B of Part 9 of NBC.
- Tolko LSL stud size and spacing shall conform to Table 9.23.10.1 of Part 9 of NBC.
- Tolko LSL stud-braced walls shall be detailed in accordance with Clause 9.23.13 of Part 9 of NBC.
- Free standing columns or unbraced columns in a wall shall not be drilled or notched without the approval of a professional engineer or the manufacturer. Bolts, lag screws, and self-tapping screws shall only be inserted through the face of the column, perpendicular to the face of the strands.
- Built-up columns connections shall be as specified in this guide or as provided by the manufacturer.

1.5) Engineered Stud Wall Applications

1.35E Tolko T-TEC LSL shall be permitted when designed in accordance with Clause 4.3.1 of the NBCC and the following requirements:

- The factored shear resistance values for nailed wood structural panel shear walls using Tolko LSL as the wall studs shall be determined as per CSA086 where the Tolko LSL Studs are considered to be equivalent to sawn lumber studs with a specific gravity of 0.50, when subjected to the nailing restrictions from section 1.6.
- Tolko LSL shall be permitted in engineered wall applications when designed based on net section analysis in accordance with CSA086. The factored resistance for bending, axial compression, and axial tension shall be reduced as specified in Table 5 of APA Product Report® PR-L284C to account for stress concentrations.
- For double-sided walls:
  - Tolko LSL Studs shall be a minimum nominal 2x6 for connections with 10d nails spaced less than 4” o.c. spacing.
  - Stud size and sheathing attachment shall be in accordance with Clause 11.5.3.5. of CSAO86-14.
- The nail diameter for sheathing-to-framing connections in a any wall shall not exceed 0.148”.
- The nail spacing in any cases shall be equal to or greater than 3”.
- The size of the nail heads shall meet the requirements specified in CSA B111.
- Maximum sheathing thickness shall not exceed 5/8”.
- The stud spacing shall not exceed 24” o.c. spacing.
- Built-up columns connections shall be as specified in this guide or as provided by the manufacturer.
- Free standing columns or unbraced columns in a wall shall not be drilled or notched without the approval of a professional engineer or the manufacturer. Bolts, lag screws, and self-tapping screws shall only be inserted through the face of the column, perpendicular to the face of the strands.
- Cutting, notching and boring of Tolko LSL studs shall be permitted in engineered wall applications as shown in Details 15 & 16.

1.6) Wall Sheathing - Nailing Restrictions and Requirements

- For sheathing attached with 10d common nails (0.148” x 3.0”) with a spacing no closer than 6 inches on center, a single Tolko LSL stud shall be permitted for framing at abjointing panel edges. Nails shall be installed at a min. 3/8” from all panel edges.
- For sheathing attached with 8d common nails (0.131” x 2-1/2”) or smaller with a spacing no closer than 4 inches on center, a single Tolko LSL stud shall be permitted for framing at abjointing panel edges. Nails shall be installed at a min. 3/8” from all panel edges.
- For sheathing attached with 8d common nails (0.131” x 2-1/2”) spaced closer than 4 inches on center or 10d common nails (0.148” x 3.0”) spaced closer than 6 inches on center, a double, stich-nailed, LSL stud or single 2-1/2-inch-thick LSL Stud is required at abjointing panel edges. Nails shall be installed at a min. 3/8” from all panel edges and shall be staggered a minimum of ½ inch for each row of nails.
- For Part 9 of NBCC stud wall applications, the double LSL studs shall be stich-nailed together with 2 staggered rows of nails (minimum 0.148” x 3”) spaced 8” in each row.
- For Part 4 of NBCC engineered stud wall applications, the stich nailing of double LSL studs shall be designed to transfer the required lateral shear using an assumed equivalent specific gravity of 0.50.
- Nails into the edge of LSL studs shall not be spaced closer than 3” on center.
- Maximum nail size is 10d common (0.148” x 3”).

1.7) Single Member Header

- Single member header could be used for higher energy efficiency by replacing the wider/multi-ply header with a thinner header, which will provide an increased space for cavity insulation.
- Single 1.35E Tolko T-TEC LSL header shall be framed with a single flat 1-1/2” or 1-3/4” 1.35E Tolko T-TEC LSL member (plate) with the width not less than the wall studs on the top and the bottom of the header and face nailed to the top and bottom of the header with 10d box nails (0.128” x 3”) spaced at 12” o.c. spacing.
- Headers shall be supported on each end with one or more trimmer/jack stud or with approved framing connections.
- Single member header shall be fastened to the adjacent King-Studs as per Table 51 or 56.

1.8) Exterior Wood Framed Walls Bracing Conditions

The exterior wall bracing shall be in accordance with NBCC.

1.9) Wall Top Plate

- Tolko LSL studs shall be caped with a double top plate.
- End joints in top plates shall be offset not less than 24 inches and the end joints shall not occur over studs.
- Wall plates shall not be less than 1-1/2" in thickness and the width shall not be less than the width of the studs.
- The rafters or joists supported by the wall shall be centered over the studs with a tolerance of not more than 3 inches for double plates.
- Omission of the top plate is permitted over a header where the headers are adequately tied to the adjacent wall sections with framing connections.
- If the rafter/joists from above the top plate are offset more than the limits indicated above, the maximum vertical load carried by the top plate shall be checked as per Table 50.
- If the joists/rafters/trusses/studs above the top plate are spaced more than 16" o.c. and the bearing studs below are 24" o.c., such members shall bear within 5" of the studs beneath, with the following exceptions:
  a. The top plates are (2) 1-1/2" x 5.25", or (2) 3" x 3.5" members.
  b. A third top plate is installed.

1.10) Wall Bottom Plate

- Studs shall have full bearing on min. 1-1/2" plate with the width not less than the width of the studs.

1.11) Braced Wall Panel Uplift

- Braced wall panels located at exterior walls that support roof rafters or trusses shall have the framing members connected to resist combined uplift and shear forces in accordance with acceptable engineering practice and in accordance with NBCC.

1.12) Wall Bracing

- Walls shall be braced as per NBCC.

1.13) Deflection Requirements

TABLE 3: WALL MEMBERS DEFLECTION CRITERIA

Building Component	Deflection Criteria
Wall members	L/180 or L/360 or L/600

Notes:

- L/360 is recommended to control damage to masonry veneer due to wind deflection of wood stud walls.
  Reference: User's Guide - NBC 2015 Structural Commentaries (Part 4 of Division B)
- L/360 for plaster or gypsum wall boards if attached to the interior side of the wall.
  Reference: National Building Code of Canada (NBC) Part 9 - Table 9.4.3.1
- L/600 for structural support for glass block walls .
  Reference: User's Guide - NBC 2015 Structural Commentaries (Part 4 of Division B)

1.14) Fire-rated Assemblies

- Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer and approved by the authority having jurisdiction (AHJ), and the following requirements:
  a. The specified strength in compression parallel to grain, fc, shall not exceed 694 psi for Tolko LSL.
  b. When the slenderness ratio, Cc, exceeds 33, the specified strength in compression parallel to grain determined in accordance with Clause 15.3.3.4 of CSAO86-14, shall be multiplied by 0.78 for Tolko LSL.

1.15) Design Limitations

- Tolko LSL shall be designed in accordance with the governing building code using the design properties and installation requirements specified in this technical guide.
- Tolko LSL is limited to dry service conditions, as defined in CSA086, where the average equilibrium moisture content of solid-sawn lumber is 15 percent or less and does not exceed 19 percent at anytime.

SECTION 2: STUD MAX HEIGHT TABLES

TABLE 4: 1.35E TOLKO T-TEC LSL: MAXIMUM STUD HEIGHT (FT): 1-1/2" X 3-1/2"

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Stud o.c. spacing (in)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Stud Height (ft)**							**Maximum Stud Height (ft)**						
12	**310**	**470**	11'-10"	10'-10"	10'-1"	9'-6"	9'-1"	8'-8"	8'-1"	9'-4"	8'-7"	8'-0"	7'-6"	7'-2"	6'-10"	6'-4"
16	**420**	**630**	10'-8"	9'-9"	9'-1"	8'-7"	8'-2"	7'-10"	7'-4"	8'-5"	7'-8"	7'-2"	6'-9"	6'-5"	6'-2"	
19.2	**510**	**770**	10'-0"	9'-2"	8'-7"	8'-1"	7'-8"	7'-4"	6'-10"	7'-11"	7'-3"	6'-9"	6'-4"	6'-1"		
24	**640**	**960**	9'-3"	8'-5"	7'-11"	7'-5"	7'-1"	6'-10"	6'-4"	7'-3"	6'-8"	6'-2"				

Design Assumptions:

1) The vertical dead load shall not exceed the vertical floor/roof live/snow loads.
2) Both factored and unfactored axial loads shall be checked.
3) Buckling length coefficient Ke = 1.0.
4) Axial load eccentricity = 1/6 of depth or 1/6 of width (whichever generates the worst-case scenario).
5) Studs are continuously laterally braced.
6) Full-width wall blocking is installed at max. 8 ft. on center.
7) Specified compression perpendicular to grain for the wall plate = 769 psi.
8) A structural board is assumed to be attached to the exterior and interior sides of the stud.

Stud Design Example:

Input Loads: Axial Snow Load = 300 lbs; Axial Dead Load = 100 lbs; Lateral Wind Load = 30 psf
Stud deflection criteria: L/180

- Determine the actual unfactored axial load = 300 + 100 = 400 lbs
- Determine the actual factored axial load = 1.25*100 + 1.5*300 = 575 lbs
- Scan across the row with a max. unfactored axial load ≥ 400 lbs, a max. factored axial load ≥ 575 lbs, and the 30 psf lateral wind load column that will meet the L/180 deflection criteria.
- The 1-1/2" x 3-1/2" Stud at 16" o.c. spacing will be adequate for a maximum height of 8'-7".
- Calculate the lateral unfactored concentrated reaction for the stud to the plate connections = Lateral wind Load (psf)*Stud o.c. spacing (ft) *Stud Height (ft)/2 = 30*(16/12)*(8'-7"/2) = 172 lbs
- Calculate the lateral factored concentrated reaction for the stud to the plate connections = 1.4*Lateral wind Load (psf)*Stud o.c. spacing (ft) *Stud Height (ft)/2 = 1.4*30*(16/12)*(8'-7"/2) = 241 lbs

FIGURE 3: STUD TRIBUTARY WIDTH AND TRIBUTARY AREA

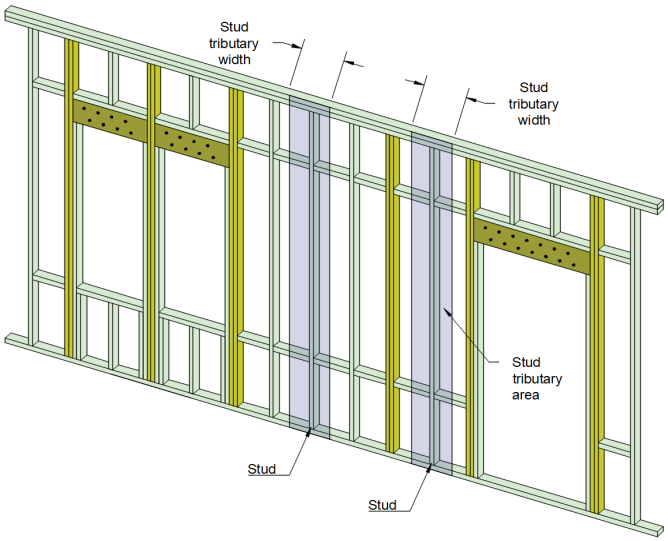


TABLE 5: 1.35E TOLKO T-TEC LSL: MAXIMUM STUD HEIGHT (FT): 1-3/4" X 3-1/2"

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Stud o.c. spacing (in)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Stud Height (ft)**							**Maximum Stud Height (ft)**						
12	**310**	**470**	12'-6"	11'-5"	10'-8"	10'-1"	9'-7"	9'-2"	8'-6"	9'-11"	9'-0"	8'-5"	7'-11"	7'-7"	7'-3"	6'-9"
16	**420**	**630**	11'-4"	10'-4"	9'-7"	9'-1"	8'-8"	8'-3"	7'-8"	8'-11"	8'-2"	7'-7"	7'-2"	6'-10"	6'-6"	6'-1"
19.2	**510**	**770**	10'-7"	9'-8"	9'-0"	8'-6"	8'-1"	7'-9"	7'-3"	8'-4"	7'-8"	7'-1"	6'-9"	6'-5"	6'-1"	
24	**640**	**960**	9'-9"	8'-11"	8'-4"	7'-10"	7'-6"	7'-2"	6'-8"	7'-8"	7'-0"	6'-7"	6'-2"			

Design assumptions same as Table 4.

TABLE 6: 1.35E TOLKO T-TEC LSL: MAXIMUM STUD HEIGHT (FT): 1-1/2" X 5-1/2"

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Stud o.c. spacing (in)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Stud Height (ft)**							**Maximum Stud Height (ft)**						
12	**850**	**1280**	18'-1"	16'-7"	15'-6"	14'-8"	14'-0"	13'-5"	12'-6"	14'-3"	13'-1"	12'-2"	11'-6"	11'-0"	10'-7"	9'-10"
16	**1140**	**1710**	16'-3"	14'-11"	13'-11"	13'-2"	12'-7"	12'-1"	11'-3"	12'-9"	11'-9"	10'-11"	10'-4"	9'-11"	9'-6"	8'-10"
19.2	**1370**	**2050**	15'-2"	13'-11"	13'-0"	12'-4"	11'-9"	11'-4"	10'-7"	11'-10"	10'-11"	10'-3"	9'-8"	9'-3"	8'-10"	8'-3"
24	**1720**	**2580**	13'-11"	12'-10"	12'-0"	11'-4"	10'-10"	10'-2"	9'-2"	10'-10"	10'-0"	9'-4"	8'-11"	8'-6"	8'-2"	

Design assumptions same as Table 4.

TABLE 7: 1.35E TOLKO T-TEC LSL: MAXIMUM STUD HEIGHT (FT): 1-3/4" X 5-1/2"

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Stud o.c. spacing (in)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Stud Height (ft)**							**Maximum Stud Height (ft)**						
12	**850**	**1280**	19'-2"	17'-7"	16'-5"	15'-6"	14'-9"	14'-2"	13'-2"	15'-1"	13'-10"	12'-11"	12'-3"	11'-8"	11'-2"	10'-5"
16	**1140**	**1710**	17'-2"	15'-9"	14'-9"	14'-0"	13'-4"	12'-9"	11'-11"	13'-6"	12'-5"	11'-7"	11'-0"	10'-6"	10'-1"	9'-4"
19.2	**1370**	**2050**	16'-1"	14'-9"	13'-10"	13'-1"	12'-5"	11'-11"	11'-2"	12'-7"	11'-7"	10'-10"	10'-3"	9'-9"	9'-5"	8'-9"
24	**1720**	**2580**	14'-9"	13'-7"	12'-8"	12'-0"	11'-6"	11'-0"	10'-3"	11'-7"	10'-8"	9'-11"	9'-5"	9'-0"	8'-8"	8'-1"

Design assumptions same as Table 4.

TABLE 8: 1.35E TOLKO T-TEC LSL: MAXIMUM STUD HEIGHT (FT): 1-1/2" X 7-1/4"

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Stud o.c. spacing (in)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Stud Height (ft)**							**Maximum Stud Height (ft)**						
12	**850**	**1280**	24'-3"	22'-3"	20'-9"	19'-7"	18'-8"	17'-11"	16'-8"	19'-2"	17'-6"	16'-4"	15'-5"	14'-9"	14'-1"	13'-2"
16	**1140**	**1710**	21'-10"	20'-0"	18'-8"	17'-8"	16'-10"	16'-2"	15'-1"	17'-3"	15'-9"	14'-9"	13'-11"	13'-3"	12'-9"	11'-10"
19.2	**1370**	**2050**	20'-5"	18'-9"	17'-6"	16'-7"	15'-9"	15'-2"	14'-1"	16'-1"	14'-9"	13'-9"	13'-0"	12'-5"	11'-11"	11'-1"
24	**1720**	**2580**	18'-10"	17'-3"	16'-2"	15'-3"	14'-7"	13'-9"	12'-5"	14'-9"	13'-7"	12'-8"	12'-0"	11'-5"	10'-11"	10'-3"

Design assumptions same as Table 4.

TABLE 9: 1.35E TOLKO T-TEC LSL: MAXIMUM STUD HEIGHT (FT): 1-3/4" X 7-1/4"

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Stud o.c. spacing (in)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Stud Height (ft)**							**Maximum Stud Height (ft)**						
12	**850**	**1280**	25'-8"	23'-6"	21'-11"	20'-8"	19'-8"	18'-10"	17'-7"	20'-3"	18'-7"	17'-4"	16'-4"	15'-7"	14'-11"	13'-10"
16	**1140**	**1710**	23'-2"	21'-2"	19'-9"	18'-8"	17'-9"	17'-1"	15'-11"	18'-3"	16'-8"	15'-7"	14'-9"	14'-0"	13'-5"	12'-6"
19.2	**1370**	**2050**	21'-8"	19'-10"	18'-6"	17'-6"	16'-8"	16'-0"	14'-11"	17'-1"	15'-7"	14'-7"	13'-9"	13'-2"	12'-7"	11'-9"
24	**1720**	**2580**	19'-11"	18'-3"	17'-1"	16'-2"	15'-5"	14'-9"	13'-9"	15'-8"	14'-4"	13'-5"	12'-8"	12'-1"	11'-7"	10'-10"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Stud o.c. spacing (in)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Stud Height (ft)**						
12	**850**	**1280**	16'-11"	15'-6"	14'-5"	13'-8"	13'-0"	12'-5"	11'-7"
16	**1140**	**1710**	15'-2"	13'-11"	13'-0"	12'-3"	11'-8"	11'-3"	10'-5"
19.2	**1370**	**2050**	14'-2"	13'-0"	12'-2"	11'-6"	10'-11"	10'-6"	9'-9"
24	**1720**	**2580**	13'-0"	11'-11"	11'-2"	10'-6"	10'-1"	9'-8"	9'-0"

Design assumptions same as Table 4.

TABLE 10: 1.35E TOLKO T-TEC LSL: MAXIMUM STUD HEIGHT (FT): 1-1/2" X 9-1/4"

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Stud o.c. spacing (in)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Stud Height (ft)**							**Maximum Stud Height (ft)**						
12	**850**	**1280**	26'-4"	26'-4"	26'-4"	25'-2"	24'-0"	23'-0"	21'-5"	24'-10"	22'-8"	21'-1"	19'-11"	18'-11"	18'-2"	16'-11"
16	**1140**	**1710**	26'-4"	25'-11"	24'-2"	22'-9"	21'-8"	20'-10"	19'-4"	22'-4"	20'-5"	19'-0"	18'-0"	17'-1"	16'-5"	15'-3"
19.2	**1370**	**2050**	26'-4"	24'-3"	22'-7"	21'-4"	20'-4"	19'-6"	18'-1"	20'-11"	19'-1"	17'-10"	16'-10"	16'-0"	15'-4"	14'-4"
24	**1720**	**2580**	24'-5"	22'-5"	20'-11"	19'-9"	18'-10"	17'-8"	15'-11"	19'-3"	17'-7"	16'-5"	15'-6"	14'-9"	14'-2"	13'-3"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Stud o.c. spacing (in)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Stud Height (ft)**						
12	**850**	**1280**	20'-9"	18'-11"	17'-8"	16'-8"	15'-10"	15'-2"	14'-2"
16	**1140**	**1710**	18'-7"	17'-1"	15'-11"	15'-0"	14'-4"	13'-8"	12'-9"
19.2	**1370**	**2050**	17'-5"	15'-11"	14'-10"	14'-0"	13'-4"	12'-10"	11'-11"
24	**1720**	**2580**	15'-11"	14'-8"	13'-8"	12'-11"	12'-4"	11'-10"	11'-0"

Design assumptions same as Table 4.

TABLE 11: 1.35E TOLKO T-TEC LSL: MAXIMUM STUD HEIGHT (FT): 1-3/4" X 9-1/4"

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Stud o.c. spacing (in)	Max. Unfactored Axial Load (lbs)	Max. Factored Axial Load (lbs)	Maximum Stud Height (ft)							Maximum Stud Height (ft)						
12	**850**	**1280**	30'-0"	30'-0"	28'-2"	26'-7"	25'-4"	24'-3"	22'-7"	26'-2"	23'-11"	22'-3"	21'-0"	20'-0"	19'-2"	17'-10"
16	**1140**	**1710**	29'-11"	27'-4"	25'-6"	24'-1"	22'-11"	21'-11"	20'-5"	23'-8"	21'-7"	20'-2"	19'-0"	18'-1"	17'-4"	16'-2"
19.2	**1370**	**2050**	28'-0"	25'-8"	23'-11"	22'-7"	21'-6"	20'-7"	19'-2"	22'-1"	20'-3"	18'-10"	17'-10"	16'-11"	16'-3"	15'-1"
24	**1720**	**2580**	25'-10"	23'-8"	22'-1"	20'-10"	19'-10"	19'-0"	17'-8"	20'-4"	18'-8"	17'-5"	16'-5"	15'-8"	15'-0"	14'-0"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Stud o.c. spacing (in)	Max. Unfactored Axial Load (lbs)	Max. Factored Axial Load (lbs)	Maximum Stud Height (ft)						
12	**850**	**1280**	21'-11"	20'-0"	18'-8"	17'-7"	16'-9"	16'-1"	14'-11"
16	**1140**	**1710**	19'-9"	18'-0"	16'-10"	15'-11"	15'-1"	14'-6"	13'-6"
19.2	**1370**	**2050**	18'-5"	16'-10"	15'-9"	14'-10"	14'-2"	13'-7"	12'-8"
24	**1720**	**2580**	16'-11"	15'-6"	14'-6"	13'-8"	13'-0"	12'-6"	11'-8"

Design assumptions same as Table 4.

SECTION 3: COLUMNS/KING-STUDS MAX. HEIGHT TABLES

FIGURE 4: COLUMN TRIBUTARY WIDTH AND TRIBUTARY AREA

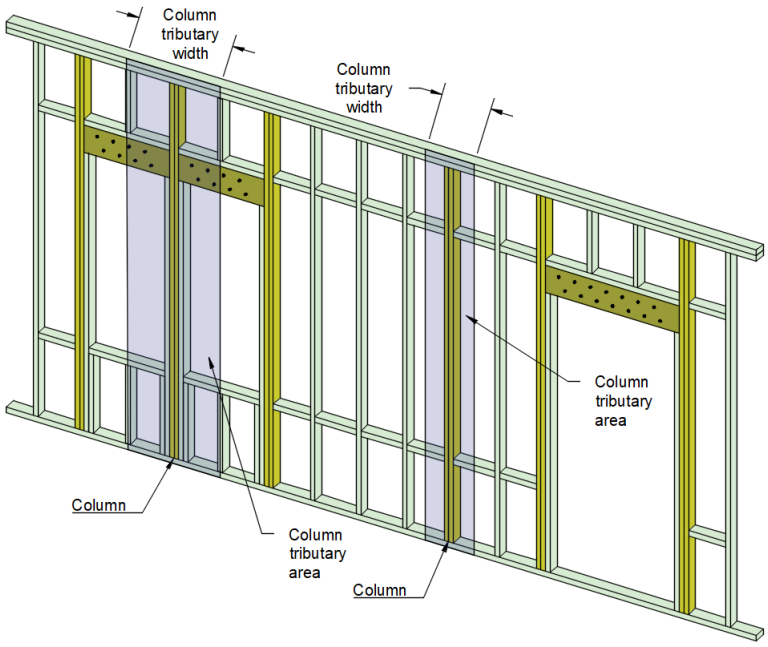


FIGURE 5: KING-STUD TRIBUTARY WIDTH AND TRIBUTARY AREA

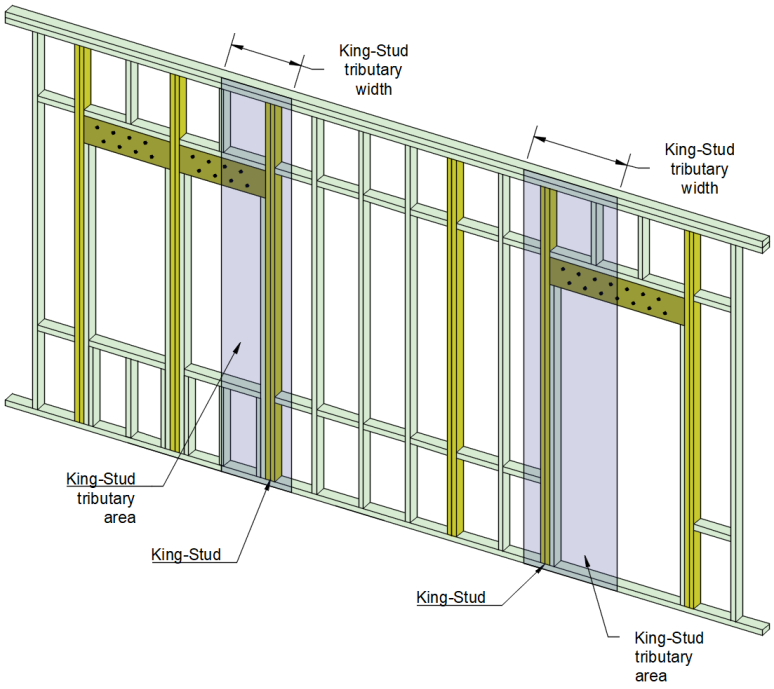


TABLE 12: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-1/2" X 3-1/2" – 2 PLIES

			Deflection Criteria: L/180						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**						
1	**700**	**1015**	14'-7"	13'-5"	12'-6"	11'-10"	11'-3"	10'-10"	10'-1"
1.5	**1000**	**1450**	12'-7"	11'-7"	10'-10"	10'-3"	9'-9"	9'-4"	8'-9"
2	**1400**	**2025**	11'-4"	10'-5"	9'-9"	9'-2"	8'-9"	8'-5"	
2.5	**1700**	**2465**	10'-1"	9'-7"	8'-11"	8'-6"	8'-1"		
3	**2100**	**3040**	9'-0"	8'-9"	8'-4"				

Design Assumptions:

1) The vertical dead load shall not exceed the vertical floor/roof live/snow loads.
2) Buckling length coefficient Ke = 1.0.
3) Axial load eccentricity = 1/6 of depth or 1/6 of width (whichever generates the worst-case scenario).
4) Full-width blocking at max. 8 ft. on center, or max. unbraced length of 8 ft.
5) Specified compression perpendicular to grain for the wall plate = 769 psi.

Column/King-Stud Design Example:

Left tributary width = 12" (1 ft.) (stud at 24" away from the King-Stud on the left side)
Right tributary width = 2 ft. (opening with a total width = 4 ft. on the right side)
Input Loads: Axial Snow Load = 1000 lbs; Axial Dead Load = 500 lbs; Lateral Wind Load = 15 psf
Stud deflection criteria: L/600

- Determine the actual unfactored axial load = 1000 + 500 = 1500 lbs
- Determine the actual factored axial load = 1.25*500 + 1.5*1000 = 2125 lbs
- Determine the total tributary width = 1 ft. + 2 ft. = 3 ft.
- Go to Table 19, which allows the L/600 deflection criteria.
- Scan across the row with a max. unfactored axial load ≥ 1500 lbs, a max. factored axial load ≥ 2125 lbs, with the 15 psf lateral wind load column, and the tributary width of 3 ft.
- The 1-1/2" x 7-1/4" - 3 plies will be adequate for a maximum height of 16'-3".
- Calculate the lateral unfactored concentrated reaction for the stud to the plate connections = Lateral wind Load (psf)*Tributary width (ft) *Column/King-Stud Height (ft)/2 = 15*3*(16'-3"/2) = 366 lbs
- Calculate the lateral factored concentrated reaction for the stud to the plate connections = 1.4*Lateral wind Load (psf)*Tributary width (ft) *Column/King-Stud Height (ft)/2 = 1.4*15*3*(16'-3"/2) = 512 lbs

TABLE 13: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-3/4" X 3-1/2" - 2 PLIES

			Deflection Criteria: L/180						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	Max. Unfactored Axial Load (lbs)	Max. Factored Axial Load (lbs)	Maximum Column/King-Stud Height (ft)						
1	700	1015	14'-7"	14'-2"	13'-3"	12'-6"	11'-11"	11'-5"	10'-8"
1.5	1000	1450	13'-4"	12'-3"	11'-5"	10'-10"	10'-4"	9'-11"	9'-3"
2	1400	2025	12'-0"	11'-0"	10'-4"	9'-9"	9'-3"	8'-11"	8'-4"
2.5	1700	2465	11'-0"	10'-1"	9'-6"	9'-0"	8'-7"	8'-3"	
3	2100	3040	10'-1"	9'-5"	8'-10"	8'-5"	8'-0"		

Design assumptions same as Table 12.

TABLE 14: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-1/2" X 5-1/2" - 2 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	Max. Unfactored Axial Load (lbs)	Max. Factored Axial Load (lbs)	Maximum Column/King-Stud Height (ft)							Maximum Column/King-Stud Height (ft)						
2	1400	2025	18'-2"	16'-4"	14'-11"	13'-11"	13'-0"	12'-3"	11'-1"	14'-6"	13'-3"	12'-5"	11'-8"	11'-2"	10'-8"	9'-11"
2.5	1700	2465	16'-3"	14'-7"	13'-4"	12'-4"	11'-7"	10'-10"	9'-9"	13'-4"	12'-3"	11'-5"	10'-9"	10'-3"	9'-10"	9'-2"
3	2100	3040	14'-9"	13'-3"	12'-1"	11'-2"	10'-5"	9'-9"	8'-9"	12'-6"	11'-5"	10'-8"	10'-1"	9'-7"	9'-3"	8'-7"
3.5	2400	3475	13'-8"	12'-2"	11'-2"	10'-2"	9'-6"	8'-11"	8'-0"	11'-9"	10'-9"	10'-1"	9'-6"	9'-1"	8'-8"	8'-2"
4	2800	4050	12'-8"	11'-4"	10'-3"	9'-5"	8'-8"	8'-2"		11'-2"	10'-3"	9'-7"	9'-1"	8'-8"	8'-3"	

Design assumptions same as Table 12.

TABLE 15: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-1/2" X 5-1/2" – 3 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	Max. Unfactored Axial Load (lbs)	Max. Factored Axial Load (lbs)	Maximum Column/King-Stud Height (ft)							Maximum Column/King-Stud Height (ft)						
2	1400	2025	21'-3"	19'-5"	18'-1"	17'-1"	16'-3"	15'-7"	14'-1"	16'-10"	15'-5"	14'-4"	13'-6"	12'-10"	12'-4"	11'-6"
2.5	1700	2465	19'-8"	18'-0"	16'-9"	15'-9"	14'-9"	13'-10"	12'-6"	15'-6"	14'-2"	13'-3"	12'-6"	11'-11"	11'-5"	10'-7"
3	2100	3040	18'-5"	16'-10"	15'-6"	14'-4"	13'-5"	12'-7"	11'-4"	14'-6"	13'-3"	12'-5"	11'-8"	11'-2"	10'-8"	9'-11"
3.5	2400	3475	17'-4"	15'-8"	14'-4"	13'-3"	12'-4"	11'-7"	10'-4"	13'-8"	12'-7"	11'-8"	11'-1"	10'-6"	10'-1"	9'-5"
4	2800	4050	16'-4"	14'-7"	13'-4"	12'-4"	11'-5"	10'-8"	9'-7"	13'-0"	11'-11"	11'-2"	10'-6"	10'-0"	9'-8"	9'-0"
4.5	3200	4625	15'-5"	13'-9"	12'-6"	11'-6"	10'-8"	10'-0"	9'-0"	12'-6"	11'-5"	10'-8"	10'-1"	9'-7"	9'-3"	8'-7"
5	3500	5065	14'-7"	13'-0"	11'-9"	10'-9"	10'-0"	9'-4"	8'-5"	12'-0"	11'-0"	10'-3"	9'-8"	9'-3"	8'-10"	8'-3"
6	4200	6075	13'-3"	11'-8"	10'-6"	9'-7"	8'-11"	8'-4"		11'-2"	10'-3"	9'-7"	9'-1"	8'-8"	8'-3"	

Design assumptions same as Table 12.

TABLE 16: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-3/4" X 5-1/2" – 2 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	Max. Unfactored Axial Load (lbs)	Max. Factored Axial Load (lbs)	Maximum Column/King-Stud Height (ft)							Maximum Column/King-Stud Height (ft)						
2	1400	2025	19'-5"	17'-9"	16'-7"	15'-8"	14'-11"	14'-3"	13'-4"	15'-4"	14'-1"	13'-1"	12'-4"	11'-9"	11'-3"	10'-6"
2.5	1700	2465	17'-11"	16'-5"	15'-4"	14'-6"	13'-9"	13'-2"	12'-4"	14'-2"	12'-11"	12'-1"	11'-5"	10'-10"	10'-5"	9'-8"
3	2100	3040	16'-9"	15'-4"	14'-4"	13'-7"	12'-11"	12'-5"	11'-4"	13'-3"	12'-1"	11'-4"	10'-8"	10'-2"	9'-9"	9'-1"
3.5	2400	3475	15'-10"	14'-6"	13'-7"	12'-10"	12'-2"	11'-6"	10'-4"	12'-6"	11'-5"	10'-8"	10'-1"	9'-7"	9'-3"	8'-7"
4	2800	4050	15'-1"	13'-10"	12'-11"	12'-0"	11'-3"	10'-7"	9'-6"	11'-10"	10'-10"	10'-2"	9'-7"	9'-2"	8'-9"	8'-2"

Design assumptions same as Table 12.

TABLE 17: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-3/4" X 5-1/2" – 3 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	Maximum Column/King-Stud Height (ft)							Maximum Column/King-Stud Height (ft)						
2	**1400**	**2025**	22'-6"	20'-6"	19'-2"	18'-1"	17'-2"	16'-5"	15'-4"	17'-9"	16'-3"	15'-2"	14'-3"	13'-7"	13'-0"	12'-1"
2.5	**1700**	**2465**	20'-9"	19'-0"	17'-8"	16'-8"	15'-11"	15'-3"	14'-2"	16'-5"	15'-0"	14'-0"	13'-2"	12'-7"	12'-0"	11'-2"
3	**2100**	**3040**	19'-5"	17'-9"	16'-7"	15'-8"	14'-11"	14'-3"	13'-4"	15'-4"	14'-1"	13'-1"	12'-4"	11'-9"	11'-3"	10'-6"
3.5	**2400**	**3475**	18'-5"	16'-10"	15'-8"	14'-10"	14'-1"	13'-6"	12'-7"	14'-6"	13'-3"	12'-5"	11'-8"	11'-2"	10'-8"	9'-11"
4	**2800**	**4050**	17'-6"	16'-0"	15'-0"	14'-2"	13'-6"	12'-11"	12'-0"	13'-10"	12'-8"	11'-10"	11'-2"	10'-7"	10'-2"	9'-6"
4.5	**3200**	**4625**	16'-9"	15'-4"	14'-4"	13'-7"	12'-11"	12'-5"	11'-5"	13'-3"	12'-1"	11'-4"	10'-8"	10'-2"	9'-9"	9'-1"
5	**3500**	**5065**	16'-2"	14'-9"	13'-10"	13'-1"	12'-5"	11'-11"	10'-9"	12'-8"	11'-8"	10'-10"	10'-3"	9'-9"	9'-5"	8'-9"
6	**4200**	**6075**	15'-1"	13'-10"	12'-11"	12'-3"	11'-5"	10'-9"	9'-8"	11'-10"	10'-10"	10'-2"	9'-7"	9'-2"	8'-9"	8'-2"

Design assumptions same as Table 12.

TABLE 18: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-1/2" X 7-1/4" – 2 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	Maximum Column/King-Stud Height (ft)							Maximum Column/King-Stud Height (ft)						
2	**1400**	**2025**	22'-0"	19'-6"	17'-9"	16'-4"	15'-2"	14'-3"	12'-9"	19'-5"	17'-9"	16'-6"	15'-7"	14'-10"	14'-3"	12'-9"
2.5	**1700**	**2465**	19'-8"	17'-5"	15'-9"	14'-6"	13'-6"	12'-7"	11'-4"	17'-11"	16'-5"	15'-3"	14'-5"	13'-6"	12'-7"	11'-4"
3	**2100**	**3040**	17'-11"	15'-10"	14'-4"	13'-1"	12'-2"	11'-5"	10'-2"	16'-9"	15'-4"	14'-4"	13'-1"	12'-2"	11'-5"	10'-2"
3.5	**2400**	**3475**	16'-6"	14'-7"	13'-1"	12'-0"	11'-1"	10'-5"	9'-4"	15'-10"	14'-6"	13'-1"	12'-0"	11'-1"	10'-5"	9'-4"
4	**2800**	**4050**	15'-5"	13'-6"	12'-1"	11'-1"	10'-3"	9'-7"	8'-7"	15'-1"	13'-6"	12'-1"	11'-1"	10'-3"	9'-7"	8'-7"
4.5	**3200**	**4625**	14'-5"	12'-6"	11'-3"	10'-3"	9'-6"	8'-11"	8'-0"	14'-5"	12'-6"	11'-3"	10'-3"	9'-6"	8'-11"	8'-0"
5	**3500**	**5065**	13'-6"	11'-9"	10'-6"	9'-8"	8'-11"	8'-4"		13'-6"	11'-9"	10'-6"	9'-8"	8'-11"	8'-4"	
6	**4200**	**6075**	11'-11"	10'-5"	9'-4"	8'-6"				11'-11"	10'-5"	9'-4"	8'-6"			

Design assumptions same as Table 12.

TABLE 19: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-1/2" X 7-1/4" – 3 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	Maximum Column/King-Stud Height (ft)							Maximum Column/King-Stud Height (ft)						
2	**1400**	**2025**	26'-4"	24'-8"	22'-4"	20'-7"	19'-3"	18'-1"	16'-3"	22'-6"	20'-6"	19'-1"	18'-0"	17'-1"	16'-5"	15'-3"
2.5	**1700**	**2465**	24'-10"	22'-1"	20'-0"	18'-5"	17'-2"	16'-1"	14'-5"	20'-9"	18'-11"	17'-8"	16'-8"	15'-10"	15'-2"	14'-1"
3	**2100**	**3040**	22'-9"	20'-1"	18'-3"	16'-9"	15'-7"	14'-7"	13'-1"	19'-5"	17'-9"	16'-6"	15'-7"	14'-10"	14'-3"	13'-1"
3.5	**2400**	**3475**	21'-0"	18'-7"	16'-10"	15'-5"	14'-3"	13'-5"	12'-0"	18'-5"	16'-10"	15'-8"	14'-9"	14'-1"	13'-5"	12'-0"
4	**2800**	**4050**	19'-8"	17'-5"	15'-8"	14'-4"	13'-3"	12'-5"	11'-2"	17'-6"	16'-0"	14'-11"	14'-1"	13'-3"	12'-5"	11'-2"
4.5	**3200**	**4625**	18'-6"	16'-3"	14'-8"	13'-5"	12'-5"	11'-8"	10'-5"	16'-9"	15'-4"	14'-4"	13'-5"	12'-5"	11'-8"	10'-5"
5	**3500**	**5065**	17'-6"	15'-4"	13'-9"	12'-7"	11'-8"	10'-11"	9'-10"	16'-2"	14'-9"	13'-9"	12'-7"	11'-8"	10'-11"	9'-10"
6	**4200**	**6075**	15'-10"	13'-9"	12'-4"	11'-4"	10'-6"	9'-10"	8'-10"	15'-1"	13'-9"	12'-4"	11'-4"	10'-6"	9'-10"	8'-10"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	Maximum Column/King-Stud Height (ft)						
2	**1400**	**2025**	18'-10"	17'-2"	16'-0"	15'-1"	14'-4"	13'-9"	12'-10"
2.5	**1700**	**2465**	17'-4"	15'-10"	14'-9"	13'-11"	13'-3"	12'-8"	11'-10"
3	**2100**	**3040**	16'-3"	14'-10"	13'-10"	13'-1"	12'-5"	11'-11"	11'-1"
3.5	**2400**	**3475**	15'-4"	14'-0"	13'-1"	12'-4"	11'-9"	11'-3"	10'-6"
4	**2800**	**4050**	14'-7"	13'-4"	12'-5"	11'-9"	11'-2"	10'-9"	10'-0"
4.5	**3200**	**4625**	14'-0"	12'-9"	11'-11"	11'-3"	10'-9"	10'-3"	9'-7"
5	**3500**	**5065**	13'-5"	12'-3"	11'-6"	10'-10"	10'-4"	9'-11"	9'-3"
6	**4200**	**6075**	12'-6"	11'-5"	10'-8"	10'-1"	9'-8"	9'-3"	8'-8"

Design assumptions same as Table 12.

TABLE 20: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-1/2" X 7-1/4" – 4 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**							**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	26'-4"	26'-4"	25'-10"	23'-10"	22'-2"	20'-11"	18'-10"	24'-10"	22'-8"	21'-1"	19'-11"	18'-11"	18'-1"	16'-10"
2.5	**1700**	**2465**	26'-4"	25'-5"	23'-1"	21'-4"	19'-10"	18'-8"	16'-10"	23'-0"	21'-0"	19'-6"	18'-5"	17'-6"	16'-9"	15'-7"
3	**2100**	**3040**	26'-2"	23'-3"	21'-1"	19'-5"	18'-1"	17'-0"	15'-3"	21'-7"	19'-8"	18'-4"	17'-3"	16'-5"	15'-9"	14'-8"
3.5	**2400**	**3475**	24'-3"	21'-6"	19'-6"	18'-0"	16'-9"	15'-8"	14'-0"	20'-5"	18'-7"	17'-4"	16'-4"	15'-7"	14'-11"	13'-10"
4	**2800**	**4050**	22'-9"	20'-1"	18'-3"	16'-9"	15'-7"	14'-7"	13'-1"	19'-5"	17'-9"	16'-6"	15'-7"	14'-10"	14'-3"	13'-1"
4.5	**3200**	**4625**	21'-5"	18'-11"	17'-2"	15'-9"	14'-7"	13'-8"	12'-3"	18'-8"	17'-0"	15'-10"	14'-11"	14'-3"	13'-8"	12'-3"
5	**3500**	**5065**	20'-4"	17'-11"	16'-2"	14'-10"	13'-9"	12'-11"	11'-7"	17'-11"	16'-5"	15'-3"	14'-5"	13'-9"	12'-11"	11'-7"
6	**4200**	**6075**	18'-6"	16'-3"	14'-8"	13'-5"	12'-5"	11'-8"	10'-5"	16'-9"	15'-4"	14'-4"	13'-5"	12'-5"	11'-8"	10'-5"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	20'-10"	19'-0"	17'-8"	16'-8"	15'-11"	15'-2"	14'-2"
2.5	**1700**	**2465**	19'-3"	17'-7"	16'-4"	15'-5"	14'-8"	14'-1"	13'-1"
3	**2100**	**3040**	18'-0"	16'-6"	15'-4"	14'-6"	13'-9"	13'-2"	12'-3"
3.5	**2400**	**3475**	17'-1"	15'-7"	14'-6"	13'-8"	13'-0"	12'-6"	11'-8"
4	**2800**	**4050**	16'-3"	14'-10"	13'-10"	13'-1"	12'-5"	11'-11"	11'-1"
4.5	**3200**	**4625**	15'-7"	14'-3"	13'-3"	12'-6"	11'-11"	11'-5"	10'-8"
5	**3500**	**5065**	14'-11"	13'-8"	12'-9"	12'-0"	11'-6"	11'-0"	10'-3"
6	**4200**	**6075**	14'-0"	12'-9"	11'-11"	11'-3"	10'-9"	10'-3"	9'-7"

Design assumptions same as Table 12.

TABLE 21: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-3/4" X 7-1/4" – 2 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**							**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	22'-6"	22'-6"	21'-11"	20'-3"	18'-11"	17'-10"	16'-1"	20'-6"	18'-9"	17'-6"	16'-6"	15'-8"	15'-0"	14'-0"
2.5	**1700**	**2465**	22'-6"	21'-5"	19'-7"	18'-1"	16'-11"	15'-11"	14'-4"	18'-11"	17'-4"	16'-2"	15'-3"	14'-6"	13'-11"	12'-11"
3	**2100**	**3040**	21'-11"	19'-7"	17'-10"	16'-5"	15'-4"	14'-5"	12'-11"	17'-9"	16'-3"	15'-1"	14'-3"	13'-7"	13'-0"	12'-1"
3.5	**2400**	**3475**	20'-3"	18'-1"	16'-5"	15'-2"	14'-1"	13'-3"	11'-10"	16'-9"	15'-4"	14'-4"	13'-6"	12'-10"	12'-4"	11'-6"
4	**2800**	**4050**	18'-11"	16'-10"	15'-4"	14'-1"	13'-1"	12'-3"	11'-0"	15'-11"	14'-7"	13'-7"	12'-10"	12'-3"	11'-9"	10'-11"
4.5	**3200**	**4625**	17'-9"	15'-10"	14'-4"	13'-2"	12'-2"	11'-5"	10'-3"	15'-3"	14'-0"	13'-1"	12'-4"	11'-9"	11'-3"	10'-3"
5	**3500**	**5065**	16'-10"	14'-11"	13'-6"	12'-4"	11'-5"	10'-9"	9'-7"	14'-8"	13'-5"	12'-7"	11'-10"	11'-4"	10'-9"	9'-7"
6	**4200**	**6075**	15'-3"	13'-5"	12'-0"	11'-0"	10'-2"	9'-7"	8'-7"	13'-8"	12'-7"	11'-9"	11'-0"	10'-2"	9'-7"	8'-7"

Design assumptions same as Table 12.

TABLE 22: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-3/4" X 7-1/4" – 3 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**							**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	29'-11"	27'-4"	25'-5"	24'-0"	22'-10"	21'-10"	20'-4"	23'-9"	21'-8"	20'-2"	19'-0"	18'-1"	17'-4"	16'-1"
2.5	**1700**	**2465**	27'-8"	25'-3"	23'-6"	22'-2"	21'-2"	20'-1"	18'-2"	21'-11"	20'-0"	18'-8"	17'-7"	16'-8"	16'-0"	14'-11"
3	**2100**	**3040**	25'-11"	23'-8"	22'-1"	20'-10"	19'-6"	18'-4"	16'-6"	20'-6"	18'-9"	17'-6"	16'-6"	15'-8"	15'-0"	14'-0"
3.5	**2400**	**3475**	24'-7"	22'-5"	20'-10"	19'-3"	18'-0"	16'-11"	15'-2"	19'-5"	17'-9"	16'-6"	15'-7"	14'-10"	14'-3"	13'-3"
4	**2800**	**4050**	23'-5"	21'-5"	19'-6"	18'-0"	16'-10"	15'-9"	14'-1"	18'-6"	16'-11"	15'-9"	14'-11"	14'-2"	13'-7"	12'-8"
4.5	**3200**	**4625**	22'-6"	20'-2"	18'-4"	16'-11"	15'-9"	14'-9"	13'-3"	17'-9"	16'-3"	15'-1"	14'-3"	13'-7"	13'-0"	12'-1"
5	**3500**	**5065**	21'-6"	19'-2"	17'-5"	16'-0"	14'-10"	13'-11"	12'-6"	17'-1"	15'-7"	14'-7"	13'-9"	13'-1"	12'-6"	11'-8"
6	**4200**	**6075**	19'-7"	17'-5"	15'-9"	14'-5"	13'-4"	12'-6"	11'-3"	15'-11"	14'-7"	13'-7"	12'-10"	12'-3"	11'-9"	10'-11"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	19'-11"	18'-2"	16'-11"	15'-11"	15'-2"	14'-6"	13'-6"
2.5	**1700**	**2465**	18'-4"	16'-9"	15'-7"	14'-9"	14'-0"	13'-5"	12'-6"
3	**2100**	**3040**	17'-2"	15'-8"	14'-8"	13'-10"	13'-2"	12'-7"	11'-8"
3.5	**2400**	**3475**	16'-3"	14'-10"	13'-10"	13'-1"	12'-5"	11'-11"	11'-1"
4	**2800**	**4050**	15'-5"	14'-2"	13'-2"	12'-5"	11'-10"	11'-4"	10'-7"
4.5	**3200**	**4625**	14'-10"	13'-6"	12'-7"	11'-11"	11'-4"	10'-11"	10'-2"
5	**3500**	**5065**	14'-3"	13'-0"	12'-2"	11'-6"	10'-11"	10'-6"	9'-9"
6	**4200**	**6075**	13'-3"	12'-2"	11'-4"	10'-9"	10'-3"	9'-10"	9'-2"

Design assumptions same as Table 12.

TABLE 23: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-3/4" X 7-1/4" – 4 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**							**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	30'-0"	30'-0"	28'-1"	26'-6"	25'-2"	24'-1"	22'-5"	26'-3"	23'-11"	22'-3"	21'-0"	19'-11"	19'-1"	17'-9"
2.5	**1700**	**2465**	30'-0"	27'-11"	26'-0"	24'-6"	23'-4"	22'-4"	20'-9"	24'-3"	22'-2"	20'-7"	19'-5"	18'-6"	17'-8"	16'-5"
3	**2100**	**3040**	28'-9"	26'-3"	24'-5"	23'-0"	21'-11"	21'-0"	19'-2"	22'-9"	20'-9"	19'-4"	18'-3"	17'-4"	16'-7"	15'-5"
3.5	**2400**	**3475**	27'-3"	24'-10"	23'-2"	21'-10"	20'-9"	19'-7"	17'-8"	21'-7"	19'-8"	18'-4"	17'-3"	16'-5"	15'-9"	14'-8"
4	**2800**	**4050**	25'-11"	23'-8"	22'-1"	20'-10"	19'-6"	18'-4"	16'-6"	20'-6"	18'-9"	17'-6"	16'-6"	15'-8"	15'-0"	14'-0"
4.5	**3200**	**4625**	24'-11"	22'-9"	21'-2"	19'-8"	18'-4"	17'-3"	15'-6"	19'-8"	18'-0"	16'-9"	15'-10"	15'-0"	14'-5"	13'-5"
5	**3500**	**5065**	24'-0"	21'-11"	20'-2"	18'-7"	17'-5"	16'-4"	14'-8"	18'-11"	17'-4"	16'-2"	15'-3"	14'-6"	13'-11"	12'-11"
6	**4200**	**6075**	22'-6"	20'-2"	18'-5"	16'-11"	15'-9"	14'-9"	13'-3"	17'-9"	16'-3"	15'-1"	14'-3"	13'-7"	13'-0"	12'-1"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	22'-0"	20'-1"	18'-8"	17'-7"	16'-9"	16'-1"	14'-11"
2.5	**1700**	**2465**	20'-4"	18'-7"	17'-3"	16'-4"	15'-6"	14'-10"	13'-10"
3	**2100**	**3040**	19'-1"	17'-5"	16'-2"	15'-3"	14'-6"	13'-11"	12'-11"
3.5	**2400**	**3475**	18'-0"	16'-6"	15'-4"	14'-6"	13'-9"	13'-2"	12'-3"
4	**2800**	**4050**	17'-2"	15'-8"	14'-8"	13'-10"	13'-2"	12'-7"	11'-8"
4.5	**3200**	**4625**	16'-5"	15'-0"	14'-0"	13'-3"	12'-7"	12'-1"	11'-3"
5	**3500**	**5065**	15'-10"	14'-6"	13'-6"	12'-9"	12'-2"	11'-7"	10'-10"
6	**4200**	**6075**	14'-10"	13'-6"	12'-7"	11'-11"	11'-4"	10'-11"	10'-2"

Design assumptions same as Table 12.

TABLE 24: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-1/2" X 9-1/4" – 2 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	Max. Unfactored Axial Load (lbs)	Max. Factored Axial Load (lbs)	Maximum Column/King-Stud Height (ft)							Maximum Column/King-Stud Height (ft)						
2	1400	2025	22'-6"	22'-5"	20'-3"	18'-7"	17'-2"	16'-1"	14'-5"	22'-6"	22'-5"	20'-3"	18'-7"	17'-2"	16'-1"	14'-5"
2.5	1700	2465	22'-6"	20'-0"	18'-0"	16'-5"	15'-3"	14'-3"	12'-9"	22'-6"	20'-0"	18'-0"	16'-5"	15'-3"	14'-3"	12'-9"
3	2100	3040	20'-9"	18'-2"	16'-3"	14'-11"	13'-9"	12'-11"	11'-7"	20'-9"	18'-2"	16'-3"	14'-11"	13'-9"	12'-11"	11'-7"
3.5	2400	3475	19'-2"	16'-8"	14'-11"	13'-8"	12'-8"	11'-10"	10'-7"	19'-2"	16'-8"	14'-11"	13'-8"	12'-8"	11'-10"	10'-7"
4	2800	4050	17'-9"	15'-5"	13'-10"	12'-8"	11'-9"	11'-0"	9'-10"	17'-9"	15'-5"	13'-10"	12'-8"	11'-9"	11'-0"	9'-10"
4.5	3200	4625	16'-7"	14'-5"	12'-11"	11'-10"	10'-11"	10'-3"	9'-2"	16'-7"	14'-5"	12'-11"	11'-10"	10'-11"	10'-3"	9'-2"
5	3500	5065	15'-7"	13'-6"	12'-2"	11'-1"	10'-3"	9'-7"	8'-7"	15'-7"	13'-6"	12'-2"	11'-1"	10'-3"	9'-7"	8'-7"
6	4200	6075	13'-11"	12'-1"	10'-10"	9'-11"	9'-2"	8'-7"		13'-11"	12'-1"	10'-10"	9'-11"	9'-2"	8'-7"	

Design assumptions same as Table 12.

TABLE 25: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-1/2" X 9-1/4" – 3 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	Max. Unfactored Axial Load (lbs)	Max. Factored Axial Load (lbs)	Maximum Column/King-Stud Height (ft)							Maximum Column/King-Stud Height (ft)						
2	1400	2025	26'-4"	26'-4"	25'-6"	23'-5"	21'-9"	20'-4"	18'-3"	26'-4"	26'-4"	24'-6"	23'-1"	21'-9"	20'-4"	18'-3"
2.5	1700	2465	26'-4"	25'-3"	22'-9"	20'-10"	19'-4"	18'-1"	16'-3"	26'-4"	24'-4"	22'-8"	20'-10"	19'-4"	18'-1"	16'-3"
3	2100	3040	26'-3"	23'-1"	20'-9"	18'-11"	17'-7"	16'-5"	14'-9"	25'-1"	22'-10"	20'-9"	18'-11"	17'-7"	16'-5"	14'-9"
3.5	2400	3475	24'-3"	21'-3"	19'-1"	17'-5"	16'-2"	15'-2"	13'-7"	23'-9"	21'-3"	19'-1"	17'-5"	16'-2"	15'-2"	13'-7"
4	2800	4050	22'-8"	19'-9"	17'-9"	16'-3"	15'-0"	14'-1"	12'-7"	22'-7"	19'-9"	17'-9"	16'-3"	15'-0"	14'-1"	12'-7"
4.5	3200	4625	21'-4"	18'-7"	16'-8"	15'-2"	14'-1"	13'-2"	11'-10"	21'-4"	18'-7"	16'-8"	15'-2"	14'-1"	13'-2"	11'-10"
5	3500	5065	20'-1"	17'-6"	15'-8"	14'-4"	13'-4"	12'-5"	11'-2"	20'-1"	17'-6"	15'-8"	14'-4"	13'-4"	12'-5"	11'-2"
6	4200	6075	18'-2"	15'-9"	14'-2"	12'-11"	12'-0"	11'-3"	10'-1"	18'-2"	15'-9"	14'-2"	12'-11"	12'-0"	11'-3"	10'-1"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	Max. Unfactored Axial Load (lbs)	Max. Factored Axial Load (lbs)	Maximum Column/King-Stud Height (ft)						
2	1400	2025	24'-3"	22'-1"	20'-7"	19'-5"	18'-5"	17'-8"	16'-5"
2.5	1700	2465	22'-5"	20'-5"	19'-0"	17'-11"	17'-1"	16'-4"	15'-2"
3	2100	3040	21'-0"	19'-2"	17'-10"	16'-10"	16'-0"	15'-4"	14'-3"
3.5	2400	3475	19'-10"	18'-1"	16'-11"	15'-11"	15'-2"	14'-6"	13'-6"
4	2800	4050	18'-11"	17'-3"	16'-1"	15'-2"	14'-5"	13'-10"	12'-7"
4.5	3200	4625	18'-1"	16'-7"	15'-5"	14'-7"	13'-10"	13'-2"	11'-10"
5	3500	5065	17'-5"	15'-11"	14'-10"	14'-0"	13'-4"	12'-5"	11'-2"
6	4200	6075	16'-3"	14'-11"	13'-11"	12'-11"	12'-0"	11'-3"	10'-1"

Design assumptions same as Table 12.

TABLE 26: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-1/2" X 9-1/4" – 4 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**							**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	26'-4"	26'-4"	26'-4"	26'-4"	25'-2"	23'-7"	21'-2"	26'-4"	26'-4"	26'-4"	25'-6"	24'-3"	23'-3"	21'-2"
2.5	**1700**	**2465**	26'-4"	26'-4"	26'-4"	24'-2"	22'-6"	21'-1"	18'-10"	26'-4"	26'-4"	25'-1"	23'-7"	22'-6"	21'-1"	18'-10"
3	**2100**	**3040**	26'-4"	26'-4"	24'-0"	22'-1"	20'-5"	19'-2"	17'-2"	26'-4"	25'-3"	23'-6"	22'-1"	20'-5"	19'-2"	17'-2"
3.5	**2400**	**3475**	26'-4"	24'-8"	22'-3"	20'-4"	18'-10"	17'-8"	15'-10"	26'-3"	24'-0"	22'-3"	20'-4"	18'-10"	17'-8"	15'-10"
4	**2800**	**4050**	26'-3"	23'-1"	20'-9"	18'-11"	17'-7"	16'-5"	14'-9"	25'-1"	22'-10"	20'-9"	18'-11"	17'-7"	16'-5"	14'-9"
4.5	**3200**	**4625**	24'-9"	21'-8"	19'-5"	17'-10"	16'-6"	15'-5"	13'-10"	24'-0"	21'-8"	19'-5"	17'-10"	16'-6"	15'-5"	13'-10"
5	**3500**	**5065**	23'-5"	20'-6"	18'-5"	16'-10"	15'-7"	14'-7"	13'-1"	23'-2"	20'-6"	18'-5"	16'-10"	15'-7"	14'-7"	13'-1"
6	**4200**	**6075**	21'-4"	18'-7"	16'-8"	15'-2"	14'-1"	13'-2"	11'-10"	21'-4"	18'-7"	16'-8"	15'-2"	14'-1"	13'-2"	11'-10"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	26'-4"	24'-6"	22'-9"	21'-5"	20'-5"	19'-6"	18'-2"
2.5	**1700**	**2465**	24'-10"	22'-7"	21'-1"	19'-10"	18'-10"	18'-1"	16'-10"
3	**2100**	**3040**	23'-3"	21'-3"	19'-9"	18'-7"	17'-8"	16'-11"	15'-9"
3.5	**2400**	**3475**	22'-0"	20'-1"	18'-8"	17'-8"	16'-9"	16'-1"	14'-11"
4	**2800**	**4050**	21'-0"	19'-2"	17'-10"	16'-10"	16'-0"	15'-4"	14'-3"
4.5	**3200**	**4625**	20'-1"	18'-4"	17'-1"	16'-2"	15'-4"	14'-8"	13'-8"
5	**3500**	**5065**	19'-4"	17'-8"	16'-6"	15'-6"	14'-9"	14'-2"	13'-1"
6	**4200**	**6075**	18'-1"	16'-7"	15'-5"	14'-7"	13'-10"	13'-2"	11'-10"

Design assumptions same as Table 12.

TABLE 27: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-3/4" X 9-1/4" – 2 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**							**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	22'-6"	22'-6"	22'-6"	22'-6"	21'-7"	20'-4"	18'-3"	22'-6"	22'-6"	22'-6"	21'-2"	20'-2"	19'-3"	17'-11"
2.5	**1700**	**2465**	22'-6"	22'-6"	22'-6"	20'-9"	19'-3"	18'-1"	16'-2"	22'-6"	22'-4"	20'-9"	19'-7"	18'-8"	17'-10"	16'-2"
3	**2100**	**3040**	22'-6"	22'-6"	20'-6"	18'-10"	17'-6"	16'-4"	14'-8"	22'-6"	20'-11"	19'-6"	18'-4"	17'-6"	16'-4"	14'-8"
3.5	**2400**	**3475**	22'-6"	20'-11"	18'-11"	17'-4"	16'-1"	15'-0"	13'-6"	21'-8"	19'-10"	18'-5"	17'-4"	16'-1"	15'-0"	13'-6"
4	**2800**	**4050**	22'-2"	19'-6"	17'-7"	16'-1"	14'-11"	13'-11"	12'-6"	20'-8"	18'-10"	17'-7"	16'-1"	14'-11"	13'-11"	12'-6"
4.5	**3200**	**4625**	20'-10"	18'-4"	16'-5"	15'-0"	13'-11"	13'-1"	11'-8"	19'-9"	18'-1"	16'-5"	15'-0"	13'-11"	13'-1"	11'-8"
5	**3500**	**5065**	19'-9"	17'-3"	15'-6"	14'-2"	13'-1"	12'-3"	11'-0"	19'-0"	17'-3"	15'-6"	14'-2"	13'-1"	12'-3"	11'-0"
6	**4200**	**6075**	17'-9"	15'-6"	13'-11"	12'-8"	11'-9"	11'-0"	9'-10"	17'-9"	15'-6"	13'-11"	12'-8"	11'-9"	11'-0"	9'-10"

Design assumptions same as Table 12.

TABLE 28: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-3/4" X 9-1/4" – 3 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**							**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	30'-0"	30'-0"	30'-0"	29'-2"	27'-2"	25'-7"	23'-0"	30'-0"	27'-10"	25'-10"	24'-4"	23'-2"	22'-2"	20'-7"
2.5	**1700**	**2465**	30'-0"	30'-0"	28'-5"	26'-1"	24'-4"	22'-10"	20'-6"	28'-2"	25'-9"	23'-11"	22'-7"	21'-5"	20'-6"	19'-1"
3	**2100**	**3040**	30'-0"	28'-7"	25'-11"	23'-10"	22'-2"	20'-9"	18'-7"	26'-5"	24'-2"	22'-5"	21'-2"	20'-2"	19'-3"	17'-11"
3.5	**2400**	**3475**	30'-0"	26'-6"	23'-11"	22'-0"	20'-5"	19'-2"	17'-2"	25'-1"	22'-10"	21'-3"	20'-1"	19'-1"	18'-3"	17'-0"
4	**2800**	**4050**	28'-1"	24'-9"	22'-5"	20'-6"	19'-0"	17'-10"	15'-11"	23'-11"	21'-10"	20'-4"	19'-2"	18'-3"	17'-5"	15'-11"
4.5	**3200**	**4625**	26'-5"	23'-4"	21'-0"	19'-3"	17'-10"	16'-9"	15'-0"	22'-11"	20'-11"	19'-6"	18'-4"	17'-6"	16'-9"	15'-0"
5	**3500**	**5065**	25'-1"	22'-1"	19'-10"	18'-2"	16'-10"	15'-9"	14'-2"	22'-1"	20'-2"	18'-9"	17'-8"	16'-10"	15'-9"	14'-2"
6	**4200**	**6075**	22'-10"	20'-0"	17'-11"	16'-5"	15'-3"	14'-3"	12'-9"	20'-8"	18'-10"	17'-7"	16'-5"	15'-3"	14'-3"	12'-9"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	25'-7"	23'-4"	21'-9"	20'-6"	19'-6"	18'-8"	17'-4"
2.5	**1700**	**2465**	23'-8"	21'-7"	20'-1"	18'-11"	18'-0"	17'-3"	16'-0"
3	**2100**	**3040**	22'-2"	20'-3"	18'-10"	17'-9"	16'-11"	16'-2"	15'-1"
3.5	**2400**	**3475**	21'-0"	19'-2"	17'-10"	16'-10"	16'-0"	15'-4"	14'-3"
4	**2800**	**4050**	20'-0"	18'-3"	17'-0"	16'-0"	15'-3"	14'-7"	13'-7"
4.5	**3200**	**4625**	19'-2"	17'-6"	16'-4"	15'-5"	14'-8"	14'-0"	13'-1"
5	**3500**	**5065**	18'-5"	16'-10"	15'-8"	14'-10"	14'-1"	13'-6"	12'-7"
6	**4200**	**6075**	17'-3"	15'-9"	14'-8"	13'-10"	13'-2"	12'-8"	11'-9"

Design assumptions same as Table 12.

TABLE 29: 1.35E TOLKO T-TEC LSL: MAXIMUM COLUMN/KING-STUD HEIGHT (FT): 1-3/4" X 9-1/4" – 4 PLIES

			Deflection Criteria: L/180							Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**							**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"	29'-6"	26'-7"	30'-0"	30'-0"	28'-7"	26'-11"	25'-7"	24'-6"	22'-9"
2.5	**1700**	**2465**	30'-0"	30'-0"	30'-0"	30'-0"	28'-1"	26'-5"	23'-9"	30'-0"	28'-5"	26'-5"	24'-11"	23'-8"	22'-8"	21'-1"
3	**2100**	**3040**	30'-0"	30'-0"	29'-11"	27'-6"	25'-8"	24'-1"	21'-8"	29'-3"	26'-8"	24'-10"	23'-5"	22'-3"	21'-4"	19'-10"
3.5	**2400**	**3475**	30'-0"	30'-0"	27'-8"	25'-6"	23'-9"	22'-3"	20'-0"	27'-9"	25'-3"	23'-6"	22'-2"	21'-1"	20'-2"	18'-9"
4	**2800**	**4050**	30'-0"	28'-7"	25'-11"	23'-10"	22'-2"	20'-9"	18'-7"	26'-5"	24'-2"	22'-5"	21'-2"	20'-2"	19'-3"	17'-11"
4.5	**3200**	**4625**	30'-0"	27'-0"	24'-5"	22'-5"	20'-10"	19'-6"	17'-6"	25'-5"	23'-2"	21'-7"	20'-4"	19'-4"	18'-6"	17'-3"
5	**3500**	**5065**	29'-0"	25'-7"	23'-2"	21'-3"	19'-8"	18'-5"	16'-6"	24'-5"	22'-4"	20'-9"	19'-7"	18'-8"	17'-10"	16'-6"
6	**4200**	**6075**	26'-5"	23'-4"	21'-0"	19'-3"	17'-10"	16'-9"	15'-0"	22'-11"	20'-11"	19'-6"	18'-4"	17'-6"	16'-9"	15'-0"

			Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Axial Load (lbs)**	**Max. Factored Axial Load (lbs)**	**Maximum Column/King-Stud Height (ft)**						
2	**1400**	**2025**	28'-4"	25'-10"	24'-0"	22'-7"	21'-6"	20'-7"	19'-2"
2.5	**1700**	**2465**	26'-2"	23'-11"	22'-2"	20'-11"	19'-11"	19'-1"	17'-9"
3	**2100**	**3040**	24'-7"	22'-5"	20'-10"	19'-8"	18'-8"	17'-11"	16'-8"
3.5	**2400**	**3475**	23'-3"	21'-3"	19'-9"	18'-7"	17'-8"	16'-11"	15'-9"
4	**2800**	**4050**	22'-2"	20'-3"	18'-10"	17'-9"	16'-11"	16'-2"	15'-1"
4.5	**3200**	**4625**	21'-3"	19'-5"	18'-1"	17'-0"	16'-2"	15'-6"	14'-5"
5	**3500**	**5065**	20'-6"	18'-8"	17'-5"	16'-5"	15'-7"	14'-11"	13'-11"
6	**4200**	**6075**	19'-2"	17'-6"	16'-4"	15'-5"	14'-8"	14'-0"	13'-1"

Design assumptions same as Table 12.

SECTION 4: HEADERS MAX. ROUGH OPENING TABLES

FIGURE 6: HEADER TRIBUTARY WIDTH AND TRIBUTARY AREA

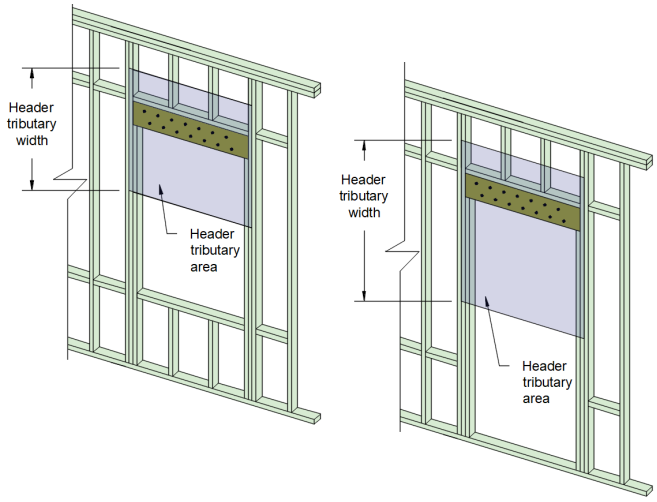


TABLE 30: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-1/2" WIDTH; DEPTHS: 7-1/4", 9-1/4", & 11-1/4" - 1 PLY

			Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	**Header: Max. Rough Opening (ft)**						
3	**100**	**145**	4'-4"	3'-11"	3'-7"	3'-5"	3'-3"		
4	**100**	**145**	3'-11"	3'-6"	3'-3"	3'-1"			
5	**100**	**145**	3'-7"	3'-3"	3'-0"				
6	**100**	**145**	3'-5"	3'-1"	2'-10"				

Design Assumptions:

1) Tabulated values are as per NBC and CSA086.
2) Self-weight was considered in the analysis.
3) The vertical dead load shall not exceed the vertical live/construction/snow load.
4) Load duration factor KD = 1.15 for the combined lateral and vertical loads.
5) If the header is supported by end trimmers, the header must have the width fully supported.
6) Minimum end bearing support = 1.5".
7) Vertical deflection, L/360 or 5/16", whichever is less.

Column/King-Stud Design Example:

6 ft. rough opening, 6 ft. header tributary width, lateral wind load = 25 psf, lateral wind load deflection = L/360

Unfactored vertical dead load = 20 plf; Unfactored vertical live load = 50 plf

Calculate the total unfactored vertical load = Dead Load +Live Load = 20 +50 = 70 plf

Calculate the total factored vertical load = 1.25*Dead Load +1.5*Live Load = 1.25*20+1.5*50 = 100 plf

Scan across the 6 ft. tributary width row and the 25 psf wind load column from the table that meets the L/360 lateral deflection criteria, for the max. unfactored load of 70 plf and the max. factored load of 100 plf.

3 plies: 1-3/4" x 11-1/4" from Table 42 is adequate for a max. rough opening of 6'-3".

- Calculate the lateral factored concentrated reaction for the header to the king-stud/column connections = 1.4*Lateral Wind Load (psf)*Tributary width (ft)*Rough opening (ft)/2 = 1.4*25 psf* (6 ft)* 6 ft/2 = 630 lbs
- Calculate the vertical factored reaction transferred by the header to the trimmer, or to the king-stud/column = (1.25*Dead Load (plf)+1.5*Live Load(plf))*Rough opening (ft)/2 = (1.25*20+1.5*50) * 6 ft/2 = 300 lbs

TABLE 31: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-1/2" WIDTH; DEPTHS: 7-1/4" & 9-1/4" - 2 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	Header: Max. Rough Opening (ft)							Header: Max. Rough Opening (ft)						
3	**165**	**240**	6'-1"	5'-6"	5'-1"	4'-9"	4'-6"	4'-4"	4'-0"	5'-1"	4'-7"	4'-3"	4'-0"	3'-10"	3'-7"	3'-4"
4	**165**	**240**	5'-6"	5'-0"	4'-7"	4'-4"	4'-1"	3'-11"	3'-7"	4'-7"	4'-2"	3'-10"	3'-7"	3'-5"	3'-3"	3'-0"
5	**165**	**240**	5'-1"	4'-7"	4'-3"	4'-0"	3'-10"	3'-7"	3'-4"	4'-3"	3'-10"	3'-7"	3'-4"	3'-2"	3'-0"	
6	**165**	**240**	4'-9"	4'-4"	4'-0"	3'-9"	3'-7"	3'-5"	3'-2"	4'-0"	3'-7"	3'-4"	3'-2"	3'-0"		

Design assumptions same as Table 30.

TABLE 32: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-1/2" WIDTH; DEPTHS: 7-1/4" & 9-1/4" - 3 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	Header: Max. Rough Opening (ft)							Header: Max. Rough Opening (ft)						
3	**195**	**280**	7'-0"	6'-4"	5'-10"	5'-6"	5'-2"	5'-0"	4'-7"	5'-10"	5'-4"	4'-11"	4'-7"	4'-4"	4'-2"	3'-10"
4	**195**	**280**	6'-4"	5'-9"	5'-4"	5'-0"	4'-9"	4'-6"	4'-2"	5'-4"	4'-10"	4'-5"	4'-2"	3'-11"	3'-9"	3'-6"
5	**195**	**280**	5'-10"	5'-4"	4'-11"	4'-7"	4'-4"	4'-2"	3'-10"	4'-11"	4'-5"	4'-1"	3'-10"	3'-8"	3'-6"	3'-3"
6	**195**	**280**	5'-6"	5'-0"	4'-7"	4'-4"	4'-1"	3'-11"	3'-7"	4'-7"	4'-2"	3'-10"	3'-7"	3'-5"	3'-3"	3'-0"

Design assumptions same as Table 30.

TABLE 33: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-1/2" WIDTH; DEPTHS: 7-1/4" & 9-1/4" - 4 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	Header: Max. Rough Opening (ft)							Header: Max. Rough Opening (ft)						
3	**240**	**345**	7'-8"	7'-0"	6'-5"	6'-1"	5'-9"	5'-6"	5'-1"	6'-5"	5'-10"	5'-5"	5'-1"	4'-10"	4'-7"	4'-3"
4	**240**	**345**	7'-0"	6'-4"	5'-10"	5'-6"	5'-2"	5'-0"	4'-7"	5'-10"	5'-4"	4'-11"	4'-7"	4'-4"	4'-2"	3'-10"
5	**240**	**345**	6'-5"	5'-10"	5'-5"	5'-1"	4'-10"	4'-7"	4'-3"	5'-5"	4'-11"	4'-6"	4'-3"	4'-0"	3'-10"	3'-7"
6	**240**	**345**	6'-1"	5'-6"	5'-1"	4'-9"	4'-6"	4'-4"	4'-0"	5'-1"	4'-7"	4'-3"	4'-0"	3'-10"	3'-7"	3'-4"

Design assumptions same as Table 30.

TABLE 34: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-3/4" WIDTH; DEPTHS: 7-1/4", 9-1/4" & 11-1/4" - 1 PLY

			Lateral Wind Deflection Criteria: L/360						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	Header: Max. Rough Opening (ft)						
3	**100**	**145**	5'-0"	4'-7"	4'-3"	4'-0"	3'-9"	3'-7"	3'-4"
4	**100**	**145**	4'-7"	4'-2"	3'-10"	3'-7"	3'-5"	3'-3"	3'-0"
5	**100**	**145**	4'-3"	3'-10"	3'-7"	3'-4"	3'-2"	3'-0"	
6	**100**	**145**	4'-0"	3'-7"	3'-4"	3'-2"	3'-0"		

Design assumptions same as Table 30.

TABLE 35: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-3/4" WIDTH; DEPTHS: 7-1/4" & 9-1/4" - 2 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	Header: Max. Rough Opening (ft)							Header: Max. Rough Opening (ft)						
3	**165**	**240**	7'-1"	6'-5"	5'-11"	5'-7"	5'-4"	5'-1"	4'-8"	5'-11"	5'-5"	5'-0"	4'-8"	4'-5"	4'-3"	3'-11"
4	**165**	**240**	6'-5"	5'-10"	5'-5"	5'-1"	4'-10"	4'-7"	4'-3"	5'-5"	4'-11"	4'-6"	4'-3"	4'-0"	3'-10"	3'-7"
5	**165**	**240**	5'-11"	5'-5"	5'-0"	4'-8"	4'-5"	4'-3"	3'-11"	5'-0"	4'-6"	4'-2"	3'-11"	3'-9"	3'-7"	3'-4"
6	**165**	**240**	5'-7"	5'-1"	4'-8"	4'-5"	4'-2"	4'-0"	3'-8"	4'-8"	4'-3"	3'-11"	3'-8"	3'-6"	3'-4"	3'-1"

Design assumptions same as Table 30.

TABLE 36: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-3/4" WIDTH; DEPTHS: 7-1/4" & 9-1/4" - 3 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	**Header: Max. Rough Opening (ft)**							**Header: Max. Rough Opening (ft)**						
3	**195**	**280**	8'-2"	7'-5"	6'-10"	6'-5"	6'-1"	5'-10"	5'-5"	6'-10"	6'-2"	5'-9"	5'-5"	5'-1"	4'-11"	4'-6"
4	**195**	**280**	7'-5"	6'-8"	6'-2"	5'-10"	5'-6"	5'-3"	4'-11"	6'-2"	5'-7"	5'-2"	4'-11"	4'-8"	4'-5"	4'-1"
5	**195**	**280**	6'-10"	6'-2"	5'-9"	5'-5"	5'-1"	4'-11"	4'-6"	5'-9"	5'-2"	4'-10"	4'-6"	4'-4"	4'-1"	3'-10"
6	**195**	**280**	6'-5"	5'-10"	5'-5"	5'-1"	4'-10"	4'-7"	4'-3"	5'-5"	4'-11"	4'-6"	4'-3"	4'-0"	3'-10"	3'-7"

Design assumptions same as Table 30.

TABLE 37: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-3/4" WIDTH; DEPTHS: 7-1/4" & 9-1/4" - 4 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	**Header: Max. Rough Opening (ft)**							**Header: Max. Rough Opening (ft)**						
3	**240**	**345**	9'-0"	8'-2"	7'-7"	7'-1"	6'-9"	6'-5"	5'-11"	7'-7"	6'-10"	6'-4"	5'-11"	5'-8"	5'-5"	5'-0"
4	**240**	**345**	8'-2"	7'-5"	6'-10"	6'-5"	6'-1"	5'-10"	5'-5"	6'-10"	6'-2"	5'-9"	5'-5"	5'-1"	4'-11"	4'-6"
5	**240**	**345**	7'-7"	6'-10"	6'-4"	5'-11"	5'-8"	5'-5"	5'-0"	6'-4"	5'-9"	5'-4"	5'-0"	4'-9"	4'-6"	4'-2"
6	**240**	**345**	7'-1"	6'-5"	5'-11"	5'-7"	5'-4"	5'-1"	4'-8"	5'-11"	5'-5"	5'-0"	4'-8"	4'-5"	4'-3"	3'-11"

Design assumptions same as Table 30.

TABLE 38: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-1/2" X 11-1/4" - 2 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	**Header: Max. Rough Opening (ft)**							**Header: Max. Rough Opening (ft)**						
3	**165**	**240**	7'-1"	6'-5"	5'-11"	5'-7"	5'-3"	5'-0"	4'-8"	5'-11"	5'-4"	4'-11"	4'-8"	4'-5"	4'-3"	3'-11"
4	**165**	**240**	6'-5"	5'-9"	5'-4"	5'-0"	4'-9"	4'-7"	4'-3"	5'-4"	4'-10"	4'-6"	4'-3"	4'-0"	3'-10"	3'-6"
5	**165**	**240**	5'-11"	5'-4"	4'-11"	4'-8"	4'-5"	4'-3"	3'-11"	4'-11"	4'-6"	4'-2"	3'-11"	3'-8"	3'-6"	3'-3"
6	**165**	**240**	5'-7"	5'-0"	4'-8"	4'-4"	4'-2"	3'-11"	3'-8"	4'-8"	4'-3"	3'-11"	3'-8"	3'-6"	3'-4"	3'-1"

Design assumptions same as Table 30.

TABLE 39: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-1/2" X 11-1/4" - 3 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	**Header: Max. Rough Opening (ft)**							**Header: Max. Rough Opening (ft)**						
3	**195**	**280**	8'-1"	7'-4"	6'-10"	6'-5"	6'-1"	5'-9"	5'-4"	6'-10"	6'-2"	5'-8"	5'-4"	5'-1"	4'-10"	4'-6"
4	**195**	**280**	7'-4"	6'-8"	6'-2"	5'-9"	5'-6"	5'-3"	4'-10"	6'-2"	5'-7"	5'-2"	4'-10"	4'-7"	4'-5"	4'-1"
5	**195**	**280**	6'-10"	6'-2"	5'-8"	5'-4"	5'-1"	4'-10"	4'-6"	5'-8"	5'-2"	4'-9"	4'-6"	4'-3"	4'-1"	3'-9"
6	**195**	**280**	6'-5"	5'-9"	5'-4"	5'-0"	4'-9"	4'-7"	4'-3"	5'-4"	4'-10"	4'-6"	4'-3"	4'-0"	3'-10"	3'-6"

Design assumptions same as Table 30.

TABLE 40: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-1/2" X 11-1/4" - 4 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	**Header: Max. Rough Opening (ft)**							**Header: Max. Rough Opening (ft)**						
3	**240**	**345**	9'-0"	8'-1"	7'-6"	7'-1"	6'-8"	6'-5"	5'-11"	7'-6"	6'-10"	6'-4"	5'-11"	5'-7"	5'-4"	4'-11"
4	**240**	**345**	8'-1"	7'-4"	6'-10"	6'-5"	6'-1"	5'-9"	5'-4"	6'-10"	6'-2"	5'-8"	5'-4"	5'-1"	4'-10"	4'-6"
5	**240**	**345**	7'-6"	6'-10"	6'-4"	5'-11"	5'-7"	5'-4"	4'-11"	6'-4"	5'-8"	5'-3"	4'-11"	4'-8"	4'-6"	4'-2"
6	**240**	**345**	7'-1"	6'-5"	5'-11"	5'-7"	5'-3"	5'-0"	4'-8"	5'-11"	5'-4"	4'-11"	4'-8"	4'-5"	4'-3"	3'-11"

Design assumptions same as Table 30.

TABLE 41: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-3/4" X 11-1/4" - 2 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	**Header: Max. Rough Opening (ft)**							**Header: Max. Rough Opening (ft)**						
3	**165**	**240**	8'-0"	7'-6"	6'-11"	6'-6"	6'-2"	5'-11"	5'-6"	6'-11"	6'-3"	5'-10"	5'-6"	5'-2"	4'-11"	4'-7"
4	**165**	**240**	7'-6"	6'-9"	6'-3"	5'-11"	5'-7"	5'-4"	4'-11"	6'-3"	5'-8"	5'-3"	4'-11"	4'-8"	4'-6"	4'-2"
5	**165**	**240**	6'-11"	6'-3"	5'-10"	5'-6"	5'-2"	4'-11"	4'-7"	5'-10"	5'-3"	4'-10"	4'-7"	4'-4"	4'-2"	3'-10"
6	**165**	**240**	6'-6"	5'-11"	5'-6"	5'-1"	4'-10"	4'-8"	4'-4"	5'-6"	4'-11"	4'-7"	4'-4"	4'-1"	3'-11"	3'-7"

Design assumptions same as Table 30.

TABLE 42: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-3/4" X 11-1/4" - 3 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	**Header: Max. Rough Opening (ft)**							**Header: Max. Rough Opening (ft)**						
3	**195**	**280**	9'-6"	8'-7"	7'-11"	7'-6"	7'-1"	6'-9"	6'-3"	7'-11"	7'-3"	6'-8"	6'-3"	5'-11"	5'-8"	5'-3"
4	**195**	**280**	8'-7"	7'-9"	7'-3"	6'-9"	6'-5"	6'-2"	5'-8"	7'-3"	6'-6"	6'-1"	5'-8"	5'-5"	5'-2"	4'-9"
5	**195**	**280**	7'-11"	7'-3"	6'-8"	6'-3"	5'-11"	5'-8"	5'-3"	6'-8"	6'-1"	5'-7"	5'-3"	5'-0"	4'-9"	4'-5"
6	**195**	**280**	7'-6"	6'-9"	6'-3"	5'-11"	5'-7"	5'-4"	4'-11"	6'-3"	5'-8"	5'-3"	4'-11"	4'-8"	4'-6"	4'-2"

Design assumptions same as Table 30.

TABLE 43: 1.35E TOLKO T-TEC LSL: HEADER - MAX ROUGH OPENING (FT): 1-3/4" X 11-1/4" - 4 PLIES

			Lateral Wind Deflection Criteria: L/360							Lateral Wind Deflection Criteria: L/600						
Unfactored Lateral Wind Load (psf)			15	20	25	30	35	40	50	15	20	25	30	35	40	50
Tributary width (ft)	**Max. Unfactored Vertical Load (plf)**	**Max. Factored Vertical Load (plf)**	**Header: Max. Rough Opening (ft)**							**Header: Max. Rough Opening (ft)**						
3	**240**	**345**	10'-0"	9'-6"	8'-9"	8'-3"	7'-10"	7'-6"	6'-11"	8'-9"	7'-11"	7'-4"	6'-11"	6'-7"	6'-3"	5'-10"
4	**240**	**345**	9'-6"	8'-7"	7'-11"	7'-6"	7'-1"	6'-9"	6'-3"	7'-11"	7'-3"	6'-8"	6'-3"	5'-11"	5'-8"	5'-3"
5	**240**	**345**	8'-9"	7'-11"	7'-4"	6'-11"	6'-7"	6'-3"	5'-10"	7'-4"	6'-8"	6'-2"	5'-10"	5'-6"	5'-3"	4'-11"
6	**240**	**345**	8'-3"	7'-6"	6'-11"	6'-6"	6'-2"	5'-11"	5'-6"	6'-11"	6'-3"	5'-10"	5'-6"	5'-2"	4'-11"	4'-7"

Design assumptions same as Table 30.

SECTION 5: TRIMMERS/JACK-STUDS MAX. VERTICAL LOAD TABLES

TABLE 44: TRIMMER/JACK STUD - MAXIMUM FACTORED VERTICAL LOAD (LBS) - 1-1/2" WIDTH

Trimmer/Jack Stud Height (ft)	1.35E Tolko T-TEC LSL: Trimmer/Jack Stud - Max. Vertical Load (lbs)							
	1-1/2" x 3-1/2"				1-1/2" x 5-1/2"			
	1 ply		2 plies		1 ply		2 plies	
	Factored	Unfactored	Factored	Unfactored	Unfactored	Factored	Unfactored	Factored
6	1,262	870	4,388	3,026	1,865	1,286	6,587	4,543
7			3,226	2,225			4,842	3,339
8			2,469	1,703			3,706	2,556
9			1,950	1,345			2,927	2,019
10			1,578	1,088			2,312	1,594
11			1,244	858			1,818	1,254
12							1,448	998

Trimmer/Jack Stud Height (ft)	1-1/2" x 7-1/4"				1-1/2" x 9-1/4"			
	1 ply		2 plies		1 ply		2 plies	
	Unfactored	Factored	Unfactored	Factored	Unfactored	Factored	Unfactored	Factored
6	2,487	1,715	8,735	6,024	3,055	2,107	10,445	7,204
7			6,659	4,592			8,017	5,529
8			5,098	3,516			6,179	4,262
9			3,934	2,713			4,800	3,310
10			3,068	2,116			3,766	2,598
11			2,427	1,674			2,991	2,063
12			1,939	1,337			2,403	1,657

Design Assumptions:

1) The vertical dead load shall not exceed the live and/or snow loads.
2) Both max. factored and unfactored vertical loads shall be checked.
3) Trimmers must support the full width of the header.
4) Header must be supported by at least a trimmer at each end, unless the vertical load is transferred to the adjacent column/king-stud by proper connections.
5) Tabulated values shall not be increased for load durations KD > 1.0.

How to size a Trimmer/Jack stud:

- Determine the clear height of the Trimmer/Jack Stud
- Scan the cells with the heights higher or equal to the actual trimmer height, and select a size with the factored/unfactored vertical load capacity ≥ factored/unfactored vertical load transferred by the header

Example:

- Header Unfactored Reactions: Dead Load = 750 lbs; Snow Load = 2000 lbs, Trimmer Height = 8ft
- Calculated the unfactored vertical load transferred by the header = Dead Load + Snow Load = 750 + 2000 = 2750 lbs
- Calculate the factored vertical load transferred by the header = 1.25*Dead Load + 1.5*Snow Load = 1.25*750+1.5*2000 = 3938 lbs
- 1-1/2" x 7-1/4" - 2 plies will be adequate.

TABLE 45: TRIMMER/JACK STUD - MAXIMUM FACTORED VERTICAL LOAD (LBS) - 1-3/4" WIDTH

Trimmer/Jack Stud Height (ft)	1.35E Tolko T-TEC LSL: Trimmer/Jack Stud - Max. Vertical Load (lbs)							
	1-3/4" x 3-1/2"				1-3/4" x 5-1/2"			
	1 ply		2 plies		1 ply		2 plies	
	Factored	Unfactored	Factored	Unfactored	Factored	Unfactored	Factored	Unfactored
6	2,117	1,460	5,806	4,004	3,134	2,162	9,858	6,799
7			4,787	3,302			7,686	5,301
8			3,923	2,706			5,882	4,057
9			3,099	2,137			4,651	3,207
10			2,509	1,730			3,766	2,597
11			2,073	1,429			3,112	2,146
12			1,739	1,199			2,545	1,755
13			1,416	976			2,073	1,430
14			1,161	801			1,706	1,177

Trimmer/Jack Stud Height (ft)	1-3/4" x 7-1/4"				1-3/4" x 9-1/4"			
	1 ply		2 plies		1 ply		2 plies	
	Factored	Unfactored	Factored	Unfactored	Factored	Unfactored	Factored	Unfactored
6	4,232	2,919	13,139	9,061	5,213	3,595	15,875	10,948
7			10,497	7,240			12,659	8,730
8			8,127	5,605			10,061	6,939
9			6,424	4,431			8,010	5,524
10			5,203	3,588			6,411	4,421
11			4,200	2,896			5,168	3,564
12			3,401	2,345			4,204	2,899
13			2,784	1,920			3,449	2,378
14			2,298	1,585			2,857	1,970

Design assumptions same as Table 44.

SECTION 6: WALL PLATE MAX. ROUGH OPENING FOR LATERAL WIND LOAD TABLES

TABLE 46: 1.35E TOLKO T-TEC LSL: PLATE - MAX. ROUGH OPENING (FT): 1-1/2" OR 1-3/4" WIDTH; DEPTH 3-1/2" - 1 PLY

	Lateral Wind Deflection Criteria: L/360 or L/600						
Unfactored Lateral Wind Load (psf)	15	20	25	30	35	40	50
Tributary width (ft)	Plate: Max. Rough Opening (ft)						
3	5'-1"	4'-7"	4'-3"	4'-0"	3'-9"	3'-7"	3'-4"
4	4'-7"	4'-2"	3'-10"	3'-7"	3'-5"	3'-3"	3'-0"
5	4'-3"	3'-10"	3'-7"	3'-4"	3'-2"	3'-0"	
6	4'-0"	3'-7"	3'-4"	3'-1"	3'-0"		

Design Assumptions:

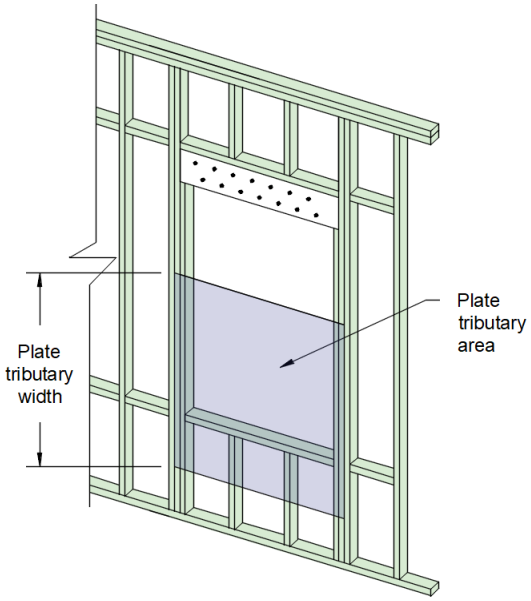
1) Tabulated values are as per NBC and CSA086.
2) Self-weight was considered in the analysis (max. 5 plf dead load)
3) The plate shall not transfer any vertical load other than the self weight.
4) Minimum end bearing support = 1.5". Plate width must be fully supported at the bearing supports.

Plate Design Example:

Wind load = 30 psf, 4 ft. rough opening, 3 ft. plate tributary width

- Scan across the 3 ft. tributary width row and the 30 psf wind load column that has a 4 ft. rough opening.
- 1-ply: 1-1/2" x 3-1/2" will be adequate.
- Calculate the lateral factored reaction transferred from the plate to the king-stud/column = 1.4*Lateral wind Load (psf)*Tributary width(ft)*Rough opening (ft)/2 = 1.4*30 psf*3 ft* 4 ft/2 = 252 lbs
- Calculate the vertical factored reaction transferred by the plate to the trimmer, or to the king-stud/column = 1.25*Self weight (plf)*Rough opening (ft)/2 =1.25* 5 plf * 4 ft/2 = 13 lbs

FIGURE 7: PLATE TRIBUTARY WIDTH AND TRIBUTARY AREA FOR THE LATERAL WIND LOAD



Note: Holes shall not be drilled in wall plates subjected to vertical and lateral wind loads.

TABLE 47: 1.35E TOLKO T-TEC LSL: PLATE - MAX. ROUGH OPENING (FT): 1-1/2" OR 1-3/4" WIDTH; DEPTH 5-1/2" - 1 PLY

	Lateral Wind Deflection Criteria: L/360 or L/600						
Unfactored Lateral Wind Load (psf)	15	20	25	30	35	40	50
Tributary width (ft)	**Plate: Max. Rough Opening (ft)**						
3	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	5'-9"	5'-4"
4	6'-0"	6'-0"	6'-0"	5'-9"	5'-6"	5'-3"	4'-10"
5	6'-0"	6'-0"	5'-8"	5'-4"	5'-1"	4'-10"	4'-6"
6	6'-0"	5'-9"	5'-4"	5'-0"	4'-9"	4'-6"	4'-2"

Design assumptions same as Table 46.

TABLE 48: 1.35E TOLKO T-TEC LSL: PLATE - MAX. ROUGH OPENING (FT): 1-1/2" OR 1-3/4" WIDTH; DEPTH 7-1/4" - 1 PLY

	Lateral Wind Deflection Criteria: L/360 or L/600						
Unfactored Lateral Wind Load (psf)	15	20	25	30	35	40	50
Tributary width (ft)	**Plate: Max. Rough Opening (ft)**						
3	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"
4	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	6'-11"	6'-5"
5	7'-0"	7'-0"	7'-0"	7'-0"	6'-9"	6'-5"	5'-11"
6	7'-0"	7'-0"	7'-0"	6'-8"	6'-4"	6'-0"	5'-7"

Design assumptions same as Table 46.

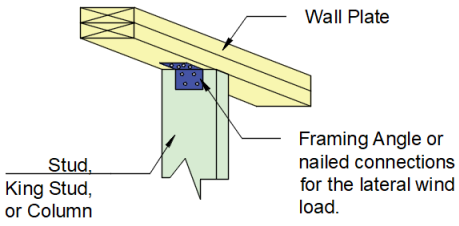
TABLE 49: 1.35E TOLKO T-TEC LSL: PLATE - MAX. ROUGH OPENING (FT): 1-1/2" OR 1-3/4" WIDTH; DEPTH 9-1/4" - 1 PLY

	Lateral Wind Deflection Criteria: L/360 or L/600						
Unfactored Lateral Wind Load (psf)	15	20	25	30	35	40	50
Tributary width (ft)	**Plate: Max. Rough Opening (ft)**						
3	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"
4	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"
5	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"
6	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	6'-8"

Design assumptions same as Table 46.

SECTION 7: WALL DETAILS

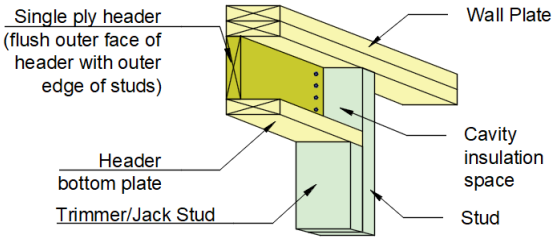
Detail 1. Stud to Wall Plate



Note:

1) Lateral wind load connections as per Table 5555.

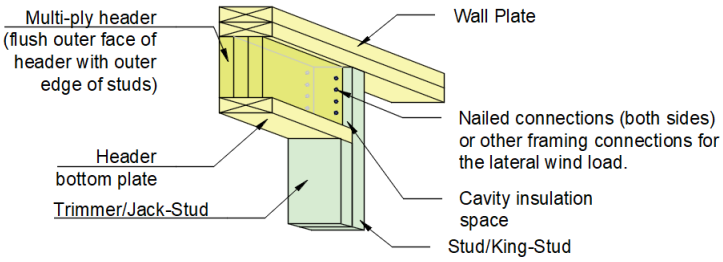
Detail 2. Single Ply Header Supported by Trimmer/Jack-Studs



Notes:

1) Fasten header to the stud/post as per Table 51 and Table 52.
2) Toenail top header to top plates with 8d box nails (0.113" x 2-1/2") at 6 "o.c. spacing.
3) Face nail the header bottom edge through the bottom plate with 8d common nails (0.113" x 2-1/2") at 6" o.c. spacing.

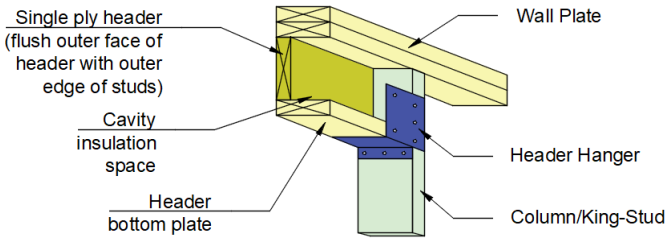
Detail 3. Multi-ply Header Supported by Trimmers/Jack-Studs



Notes:

1) Fasten header to the Stud/King-Stud/Column as per Table 51 and Table 52.
2) Toenail top header to top plates with 8d box nails (0.113" x 2-1/2") at 6 "o.c. spacing.
3) Face nail the header bottom edge through the bottom plate with 8d common nails (0.113" x 2-1/2") at 6" o.c. spacing.
4) Multi-ply header connections as per Table 5454.
5) Vertical load transferred to the trimmer as per Table 44 and Table 45.

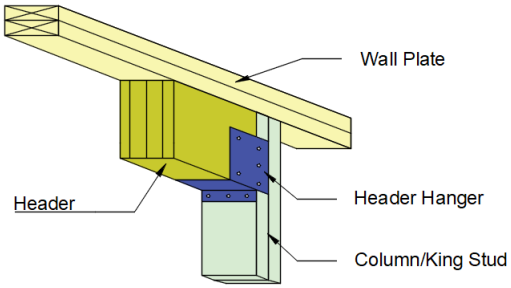
Detail 4. Single Ply Header Supported by Hangers



Notes:

1) Toenail top header to top plates with 8d box nails (0.113" x 2-1/2") at 6 "o.c. spacing.
2) Face nail the header bottom edge through the bottom plate with 8d common nails (0.113" x 2-1/2") at 6" o.c. spacing.
3) Vertical and lateral load capacities as per Table 56.

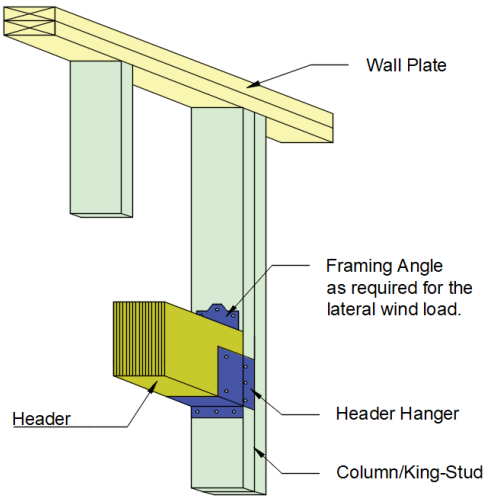
Detail 5. Top Header Supported by Hangers



Notes:

1) Multi-ply header connections as per Table 54.
2) Vertical and lateral load capacities as per Table 56.

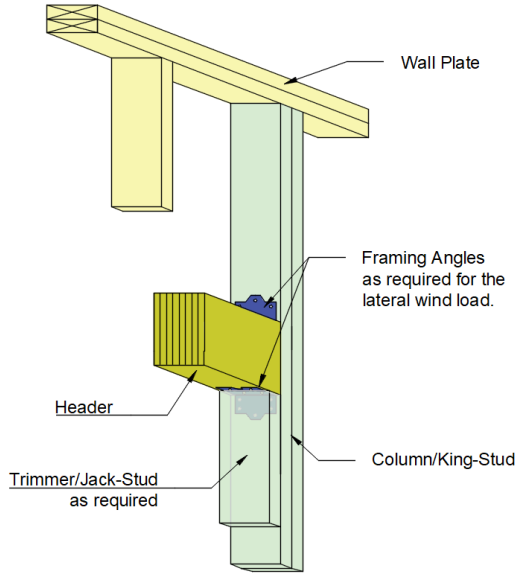
Detail 6. Header with Framing Angle Supported by Hangers



Notes:

1) Multi-ply header connections as per Table 54.
2) Lateral wind load connections as per Table 55 and Table 56.
3) Vertical load capacities as per Table 56.

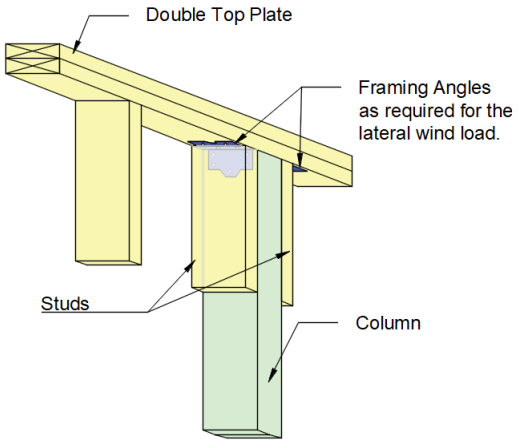
Detail 7. Header with Framing Angles Supported by Trimmers



Notes:

1) Multi-ply header connections as per Table 54.
2) Lateral wind load connections as per Table 55.
3) Vertical load transferred to the trimmer as per Table 44 and Table 45.

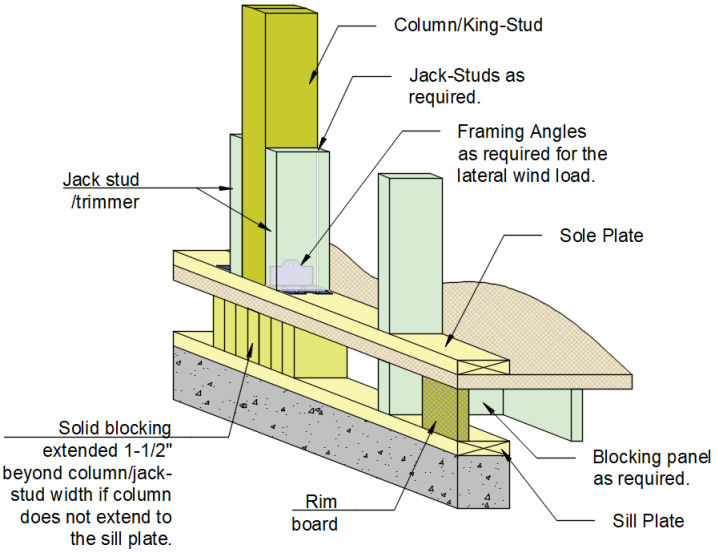
Detail 8. Column/King-Stud to Top Plate



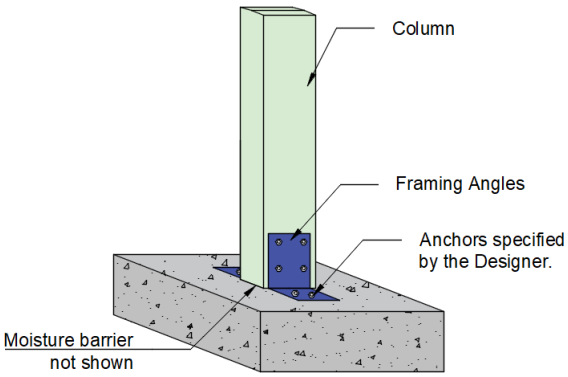
Notes:

1) Lateral wind load connections as per Table 5555 (the studs transfer the lateral wind load).
2) The post transfers the concentrated vertical load.

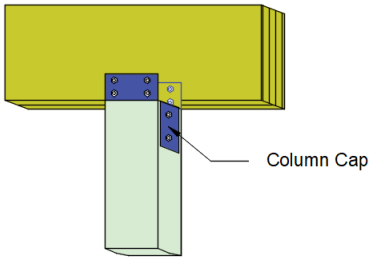
Detail 9. Column/King-Stud to Sill Plate



Detail 10. Column Base



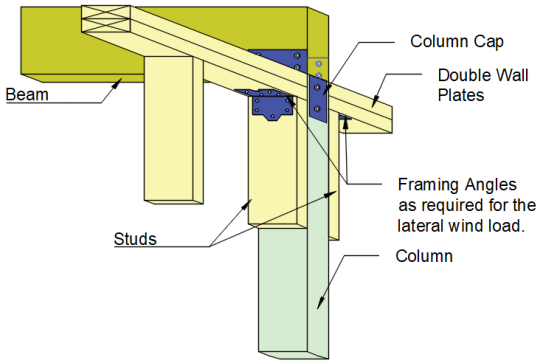
Detail 11. Column Cap



Note:

1) Column cap is used for the vertical load transfer.

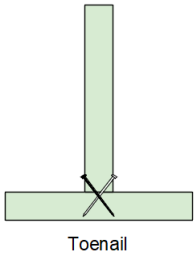
Detail 12. Column to Beam



Notes:

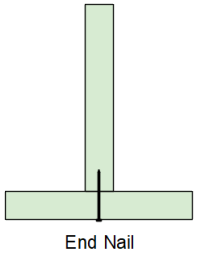
1) Lateral wind load connections as per Table 5555 (the studs transfer the lateral wind load).
2) The post transfers the concentrated vertical load.

Detail 13. Toenail



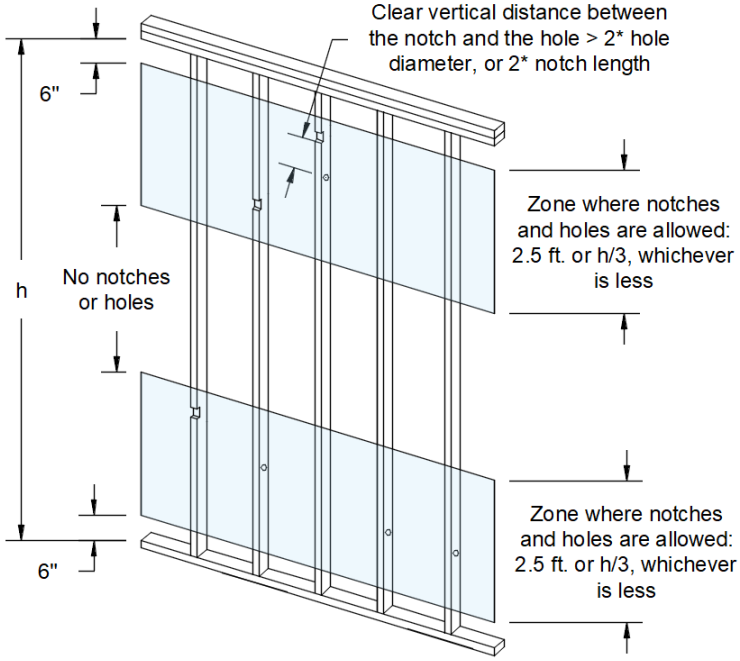
Fasteners capacities as per Table 52.

Detail 14. End Nail

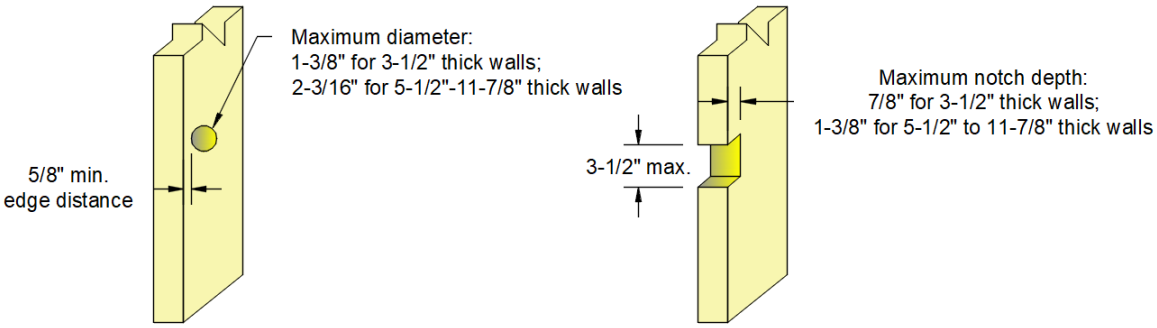


Fasteners capacities as per Table 52.

Detail 15. Allowed Drilling and Notching Zones



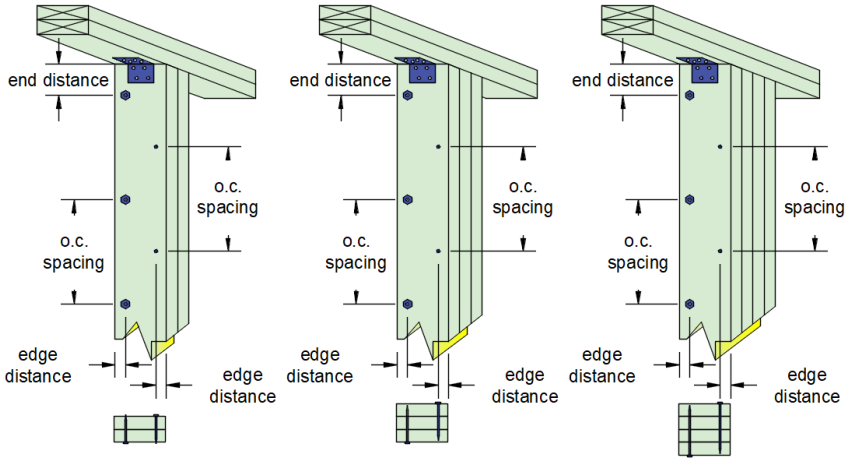
Detail 16. Allowed Drilling and Notching Zones



Note:

1) Column cap is used for the vertical load transfer.

Detail 17. Vertical Members - Multi-ply Connections



Note:

1) Multi-ply member connections as per Table 53.

SECTION 8: WALL TOP PLATE: MAXIMUM OFFSET VERTICAL LOAD

FIGURE 8: OFFSET VERTICAL LOAD

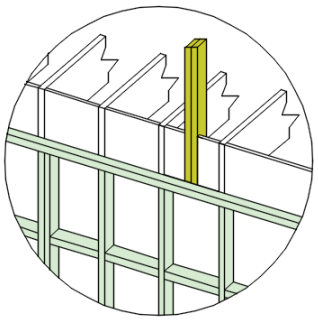


TABLE 50: MAX. CONCENTRATED LOAD (lbs) TRANSFERRED BY THE 1.35E TOLKO T-TEC LSL TOP PLATE

Top Plate Thickness	Plate Width	Max. Unfactored Vertical Load (lbs)	Max. Factored Vertical Load (lbs)
(2) x 1-1/2"	3.5"	1460	1870
	5.5"	2300	2950
	7.25"	3030	3500
	9.25"	3500	3500
(2) x 1-3/4"	3.5"	1752	2190
	5.5"	2752	3440
	7.25"	2800	3500
	9.25"	2800	3500

Design Assumptions:

2) Maximum studs o.c. spacing = 24"
3) Load duration factor K_D = 1.0. Tabulated values shall not be increased for higher load durations.
4) A single concentrated load in between studs is allowed.
5) Both factored and unfactored vertical loads shall be checked.
6) The offset vertical load shall be transferred to the adjacent studs as follows:
   - Left stud: Concentrated Load (lbs)*Distance to the right stud (in)/o.c. spacing (in)
   - Right stud: Concentrated Load (lbs)*Distance to the left stud (in)/o.c. spacing (in)

Example:

Offset Vertical Load: Live Load = 1000 lbs, Dead Load = 300 lbs
Unfactored vertical load = Live Load + Dead Load = 1000 + 300 = 1300 lbs
Factored vertical load = 1.5*Live Load + 1.25*Dead Load = 1.5*1000 + 1.25*300 = 1875 lbs
(2) 1-1/2" x 3-1/2" 1.35E Tolko T-TEC LSL Plates will be adequate
Studs o.c. spacing = 16"
Distance to the right stud = 6"
Distance to the left stud = 10"
Concentrated live load transferred to the left stud = 1000 lbs*6"/16" = 375 lbs
Concentrated dead load transferred to the left stud = 300 lbs*6"/16" = 112.5 lbs
Concentrated live load transferred to the right stud = 1000 lbs*10"/16" = 625 lbs
Concentrated dead load transferred to the right stud = 300 lbs*10"/16" = 187.5 lbs

SECTION 9: WALL FRAMING NAILED CONNECTIONS

TABLE 51: WALL FRAMING NAILED CONNECTIONS

Connection Type	Fastener type	Header thickness (in)	Fastener size	o.c. spacing (in)	Number of fasteners	Orientation
Stud to top or bottom plate	8d box, 8d common nail	-	0.113" x 2-1/2", 0.131" x 2-1/2"	-	4	Toenail
	10d box, 10d common nails		0.128" x 3", 0.148" x 3"		4	
	16d common nail	-	0.162" x 3-1/2"	-	2	End nail
	10d box, 10d common nails		0.128" x 3", 0.148" x 3"		3	
Header to stud/king stud/ column	8d box, 8d common nail	1.5 - 3.5	0.113" x 2-1/2", 0.131" x 2-1/2"	-	4 - one side	Toenail
	10d box, 10d common nails		0.128" x 3", 0.148" x 3"			
	8d common nail	4.5 - 7	0.131" x 2-1/2"	-	4 - both sides	Toenail
	10d box, 10d common nails		0.128" x 3", 0.148" x 3"			
Top plate to top plate	16d common nail	-	0.162" x 3-1/2"	16	-	Face nail
	10d box nail		0.128" x 3"	12		
Top plates, laps at corners and intersections	16d common nail	-	0.162" x 3-1/2"	-	2	Face nail
	10d box nail		0.128" x 3"		3	

Design assumptions:

- The net factored uplift at the top of the wall does not exceed 100 plf.
- If the net factored uplift at the top of the wall exceeds 100 plf, uplift framing connectors shall be installed to provide a continuous load path from the top of the wall to the foundation or to a point where the factored uplift force is 100 plf or less.

TABLE 52: NAIL FACTORED RESISTANCES

Tolko T-TEC LSL - main and side members				
Nail Type	Nail Size (in)	Factored Lateral Resistance (lb)	Toe-nailing Factored Resistance (lb)	End grain Factored Resistance (lb)
8d Box	0.113" x 2-1/2"	114	95	76
8d Common	0.131" x 2-1/2"	149	123	100
10d Box	0.128" x 3"	144	120	96
10d Common	0.148" x 3"	188	156	126
16d Common	0.162" x 3-1/2"	222	184	149

SPF - main and side members				
Nail Type	Nail Size (in)	Factored Lateral Resistance (lb)	Toe-nailing Factored Resistance (lb)	End grain Factored Resistance (lb)
8d Box	0.113" x 2-1/2"	112	93	75
8d Common	0.131" x 2-1/2"	145	121	97
10d Box	0.128" x 3"	140	116	94
10d Common	0.148" x 3"	180	149	120
16d Common	0.162" x 3-1/2"	209	173	140

Notes:

1) Tabulated capacities are for a load duration K_D = 1.0.
2) Tabulated factored resistances are governed by the fastener yeild strength and shall not be increased for a higher K_D.

SECTION 10: MULTI-PLY MEMBER CONNECTIONS

TABLE 53: MULTI-PLY CONNECTIONS FOR STUDS/KING-STUDS/COLUMNS (1.35E TOLKO T-TEC LSL)

Ply thickness (in)	No. of plies	Depth range	Fastener type	No. of rows of fasteners	O.C. spacing	Min. end distance (in)	Min. edge distance (in)	Notes
1.5	2	Depth ≤ 7.25”	10d common nail (0.148” x 3”)	2	6”	2-1/4”	1”	Staggered; adjacent nails driven from opposite side
		9.25” ≤ Depth < 11.875”		3				
		Depth ≥ 14”		4				
	3	5.5” ≤ Depth ≤ 7.25”	SDS1/4x4-1/2, SDW22458, WSWH45, WS45 screws	2	8”	6”	2”	Staggered; adjacent screws driven from opposite side
		9.25” ≤ Depth < 11.875”		2				
		Depth ≥ 14”		3				
	4	5.5” ≤ Depth ≤ 7.25”	1/2” A307 Through Bolts; SDS1/4x6, SDW22600, WSWHS6, WS6 screws	2	8”	6”	2”	Staggered; adjacent screws driven from opposite side
		9.25” ≤ Depth < 11.875”		2				
		Depth ≥ 14”		3				
1.75	2	Depth ≤ 7.25”	16d common nail (0.162” x 3-1/2”)	2	6”	2-1/4”	1”	Staggered; adjacent nails driven from opposite side
		9.25” ≤ Depth < 11.875”		3				
		Depth ≥ 14”		4				
	3	5.5” ≤ Depth ≤ 11.875”	SDW22500, MIFLK005 (F5.0FL), WSWH5, WS5 screws	2	8”	6”	2”	Staggered; adjacent screws driven from opposite side
		Depth ≥ 14”		3				
	4	5.5” ≤ Depth ≤ 11.875”	1/2” A307 Through Bolts; SDW22634, MIFLK634 (F6.7FL), WSWHS634 screws	2	8”	6”	2”	Staggered; adjacent screws driven from opposite side
		Depth ≥ 14”		3				

TABLE 54: MULTI-PLY CONNECTIONS FOR HEADERS (1.35E TOLKO T-TEC LSL)

Depth	Fastener type	No. of rows of fasteners	O.C. spacing	Min. end distance (in)	Min. edge distance (in)
7.25”	1/2” A307 Through Bolts (staggered)	2	6”	2”	2”
9.25”, 11.25”		3			

SECTION 11: FRAMING ANGLES, HEADER HANGERS CONNECTORS

TABLE 55: FRAMING ANGLES – CONNECTORS FOR THE LATERAL WIND LOAD

Framing Angle Type	Framing Angle Width - on the supported member (in)	Framing Angle Width - on the supporting member (in)	Framing Angle Length (in)	Max. Factored Lateral Resistance (lbs)
Simpson Strong-Tie® Connectors				
A21	2	1.5	1.375	260
A23	2	1.5	2.75	715
A33	3	3	1.5	570
A34	1.4375	1.4375	2.5	665
A35 (type 4)	1.4375	1.4375	4.5	955
GA1	1	1	2.75	350
GA2	1	1	3.25	610
ML24Z	2	2	4	765
ML26Z	2	2	6	1360
Mitek® Connectors				
JA1	1.5	1.5	1.25	379
A3	1.4375	1.4375	2.75	873
MP34	1.5	1.4375	2.813	770
MPA1	1.5	1.4375	4.5	1004
ML24-TZ	2	2	4	990
ML26-TZ	2	2	6	1701

Notes:

1) Factored resistances have been increased for wind loading (K_D = 1.15); no further increase allowed.
2) Factored resistances are for a product with a specific gravity of 0.5 for connectors.
3) Connectors are required on both sides to achieve the tabulated loads values. Fasteners quatity and size as per manufacturer's recommendations.
4) Minimum Stud/King-Stud/Column Thickness = 1.5"

TABLE 56: HEADER HANGERS FOR VERTICAL AND LATERAL WIND LOADS

Manufacturer	Hanger Model	Dimensions (in)		Min. Post Size/ Thickness (in)	Fasteners		Max. Factored Vertical Load (lbs)	Max. Factored Lateral Wind Load (lbs)
		W	H		Column/King-Stud	Header		
Simpson Strong-Tie®	HH4	3.5	2.813	1.5	(7) 10d x 1-1/2"	(4) 10d x 1-1/2"	1240	1370
				3	(7) 16d x 2-1/2"	(4) 16d x 2-1/2"	1715	1410
				4.5	(9) 16d	(4) 16d	2205	2140
	HH6	5.5	5.125	1.5	(10) 10d x 1-1/2"	(6) 10d x 1-1/2"	1930	1930
				3	(10) 16d x 2-1/2"	(6) 16d x 2-1/2"	2450	2405
				4.5	(12) 16d	(6) 16d	2940	2405

Notes:

1) Use all specified fasteners.
2) Attachment to 1.5" stud/column will result in two round holes not being filled in the stud and load reductions are as noted in the Table 5656.
3) Lateral wind loads have been increased for a load duration factor K_D = 1.15 with no further increase allowed.
4) Tabulated values are for the 1.35E T-TEC LSL used for the header and also for the post.
5) Nails: 10d x 1 1⁄2" = 0.148" x 1-1⁄2", 16d x 2-1⁄2" = 0.162" x 2-1⁄2", 16d = 0.162" x 3-1/2".

SECTION 12: STORAGE AND HANDLING

INTRODUCTION

Proper storage and handling of engineered wood products (EWP) including T-TEC LSL and Tolko LSL Industrials is required to protect the products during distribution and at the jobsite. APA – The Engineered Wood Association recommends the following storage and handling practices for EWP products. For full details on proper storage and handling, refer to *APA Technical Note: Proper Storage and Handling of I-Joists and LVL, Form E705* available at www.apawood.org.

SAFE HANDLING DURING DISTRIBUTION

1. Bundle wrap can be slippery. Avoid walking on wrapped bundles. Stacks of product may be unstable or slippery, especially when wet. Avoid walking on the material.
2. Follow good forklift safety procedures when handling T-TEC LSL and Tolko LSL Industrials at the yard.
3. Store longest material lowest to the ground.
4. When handling with a crane, pick up the load using a spreader if necessary to minimize handling stresses.
5. Post and follow load limits on storage racks.

STORAGE DURING DISTRIBUTION

1. Keep wrapped to protect from weather.
2. Use stickers to separate bundles.
3. Use stickers every 8 feet and maintain vertical alignment of the stickers.
4. Do not store T-TEC LSL and Tolko LSL Industrials in direct contact with the ground.
5. For optimal moisture protection, keep at least 12 inches up from the ground.
6. To protect from dirt and weather, delay unwrapping the bundles until the time of the installation or cut-up for delivery.
7. Take care to avoid forklift damage. If the ground is unlevel in the storage area, reduce forklift speed to avoid “bouncing” the load.
8. When handling with a crane, pick up the load using a spreader if necessary to minimize handling stresses.
9. Maintain stack height within safe limits.
10. Do not stack other material on top of T-TEC LSL and Tolko LSL Industrials.

PROPER HANDLING AT THE JOBSITE

1. Do not drop the product off the delivery truck. Best practice is to use a forklift or boom.
2. Store on level, well-drained area.
3. Keep on stickers spaced every 8’ and at least every 6” off the ground at the jobsite.
4. Keep material covered to protect from weather.
5. Do not stack other material on top of the product.
6. Never use or try to repair damaged products. If defective material is discovered prior to or during installation, cease installation and contact the supplier.

MOISTURE EFFECTS

T-TEC LSL and Tolko LSL Industrials products are manufactured under carefully controlled conditions that assure they are dry. Moisture content can be affected by humidity, exposure to wetting and drying conditions. While T-TEC LSL and Tolko LSL Industrials products are engineered to withstand normal exposure, excessive exposure to moisture may lead to dimensional change.

If moisture is present, mold, mildew and wood decay fungi may grow on any engineered wood products, thus it is important to properly store T-TEC LSL and Tolko LSL Industrials to control exposure to moisture. Moisture increase is expected under normal construction situations and does not adversely affect the performance of the products if good building practices are followed to minimize exposure and to provide proper conditions for the products to re-equilibrate to dry conditions.

Reference: *APA Technical Note: Proper Storage and Handling of I-Joists and LVL, Form E705* available at www.apawood.org.

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