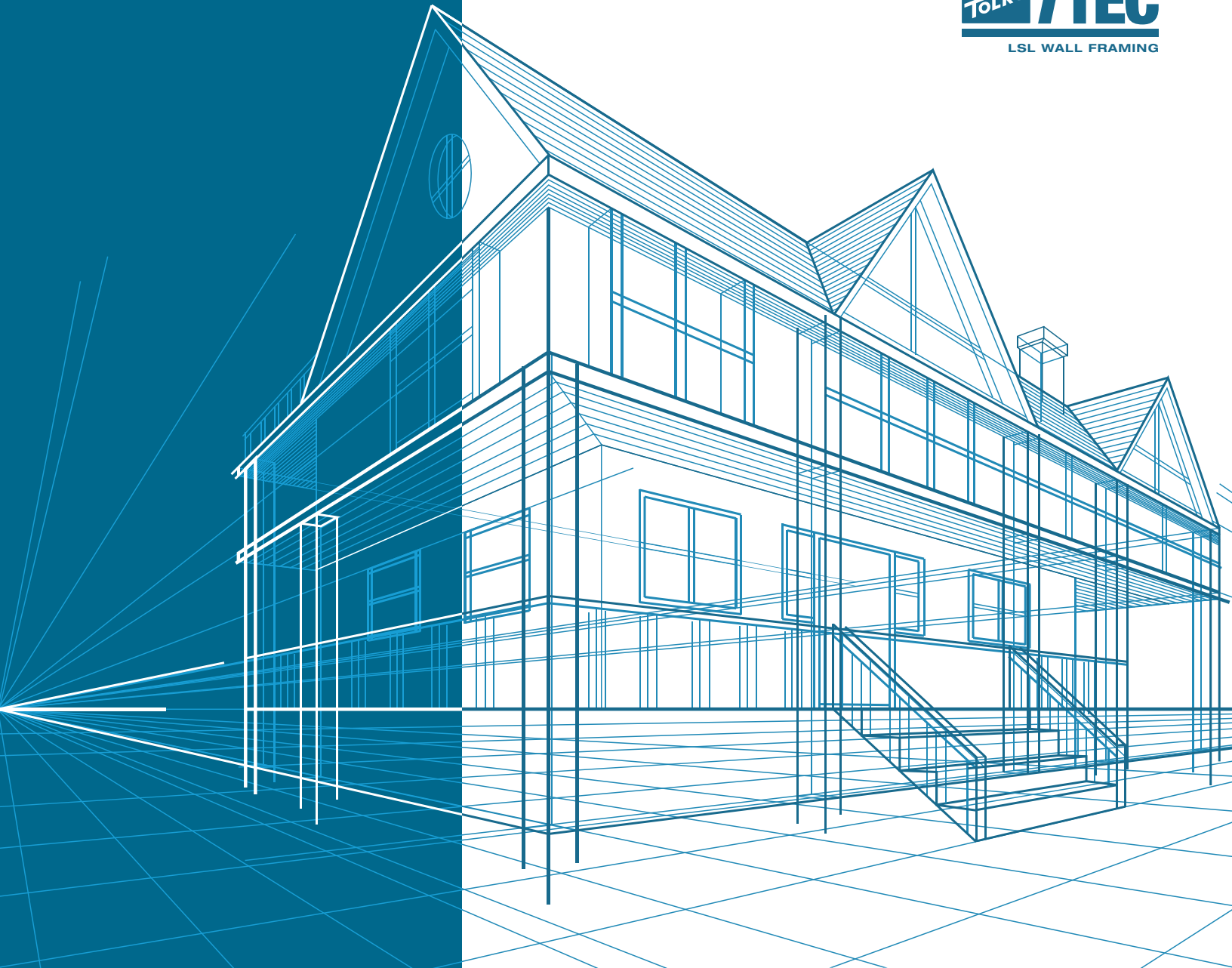


TOLKO

TECHNICAL GUIDE | ASD - USA

T-TEC 1.35E & 1.55E LSL WALL FRAMING



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ALLOWABLE STRESS DESIGN

Published: Aug. 7, 2020

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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 1.35/1.55 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 LSL: Design Properties (Allowable Stress Design)

TABLE 1: TOLKO T-TEC LSL DESIGN PROPERTIES (ALLOWABLE STRESS DESIGN) ^{(a), (b)}

Property	Product Orientation	Product Grade	
		1.35E LSL	1.55E LSL
Bending, $F_b^{(c)}$ (psi)	Edgewise	1,850 ^(d)	2,360 ^(d)
	Flatwise	2,060	2,620
Modulus of elasticity, $E^{(a)}$ (psi)	Edgewise	1,350,000	1,550,000
	Flatwise	1,350,000	1,550,000
Compression perpendicular to grain, $F_{c\perp}^{(f)}$ (psi)	Edgewise	750	900
	Flatwise	690	775
Longitudinal shear, F_v (psi)	Edgewise	330	525
	Flatwise	115	155
Compression parallel to grain, $F_{c\parallel}$ (psi)		1,650	2,175
Tension parallel to grain, F_t (psi)		1,300 ^(e)	1,750 ^(e)

- (a) Tabulated values are design values for normal load duration. All values, except E and $F_{c\perp}$, are permitted to be adjusted for other load durations as permitted by the code. The design stresses are limited to conditions in which the average equivalent moisture content of sawn lumber does not exceed 16 percent.
- (b) Allowable stresses for edgewise orientation refer to loads applied parallel to the wide face of the strands (the edge of the member). Flatwise refers to loads applied perpendicular to the wide face of the strands (the face of the member).
- (c) Tabulated flexural stress (F_b) may be increased by 4 percent when the member qualifies as a repetitive member as defined in NDS.
- (d) Tabulated value is based on a reference depth of 12 inches. For other depths, when loaded edgewise, F_b shall be modified by $(12/d)^{0.125}$, where d = depth in inches.
- (e) Tabulated value for LSL is based on a reference length of 3 feet. For other lengths, the allowable tensile stress shall be modified by $(3/L)^{1/16}$, where L = length in feet. For lengths less than 3 feet, use the allowable tension stress from Table 1 unadjusted.
- (f) When designing with the tabulated compression perpendicular to grain $F_{c\perp}$, the bearing area factor C_b stipulated in Section 3.10.4 of the NDS shall be permitted to be applied.
- (g) For a simple-span member, deflection for a uniform load could be calculated as follows:

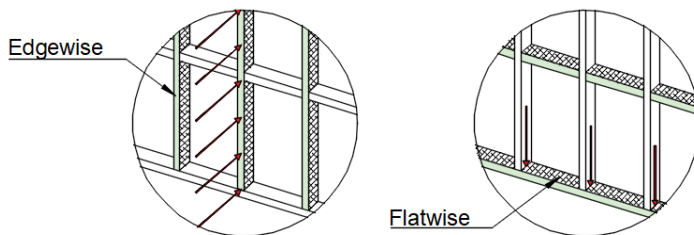
$$\delta_T = \frac{270wL^4}{Ebh^3}$$

where:

δ_T = total deflection (in)
 w = applied uniform loads (lbf/ft)
 L = design span (ft)

E = modulus of elasticity (lbf/in²)
 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 inhaling wood dust or use a dust mask or other safeguards for personal protection. For more information go to www.P65Warnings.ca.gov/wood.

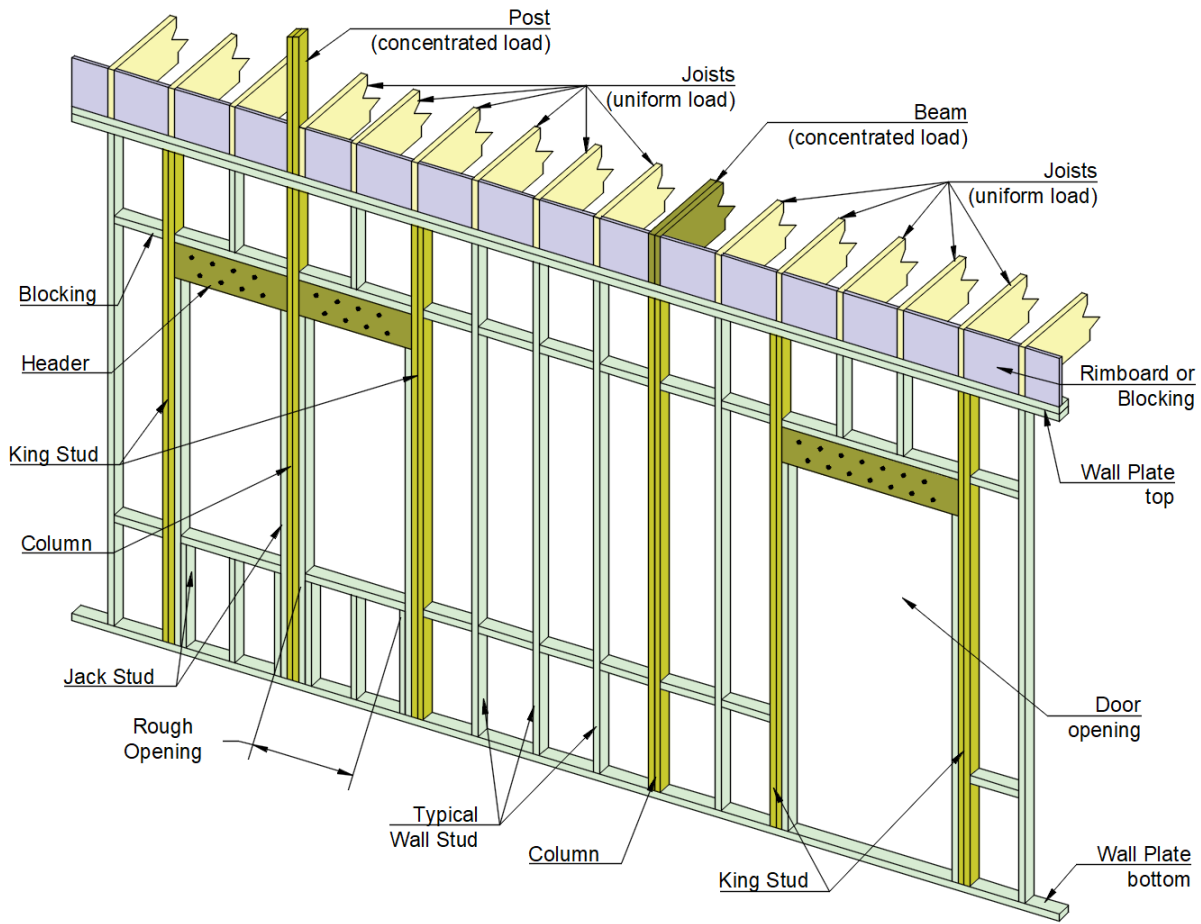


WARNING

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



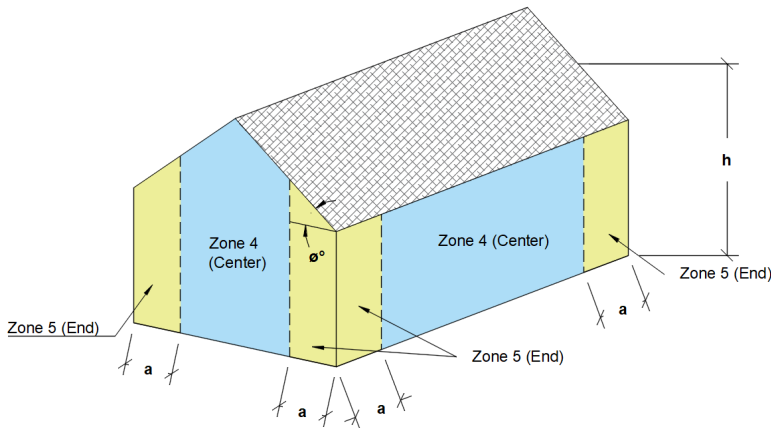
1.3) Exterior Walls Design Wind Pressure

TABLE 2: EFFECTIVE WIND AREA, A (ft²)

Stud, King-Stud, Column Height (ft)	Effective Wind Area, A (ft ²)
8	21
9	27
10	33
11	40
12	48
13	56
14	65
15	75
16	85
17	96
≥ 18	100

Notes:

- 1) The effective wind area is used to determine the external pressure coefficients and shall not be confused with the generic load tributary area, which is used to determine the amount of load applied to an individual member.
- 2) The effective wind area is the span length multiplied by the tributary width, or the span length²/3, whichever is greater.

FIGURE 3: WALL WIND ZONES**Notations:**

a (ft) = 10% for least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft.

Exception: For buildings with $\theta = 0^\circ$ to 7° and a least horizontal dimension greater than 300 ft, dimension "a" shall be limited to a maximum of $0.8h$.

h (ft) = Mean roof height, except that eave height shall be used for $\theta \leq 10^\circ$
 θ = Roof slope in degrees

TABLE 3: WALL DESIGN WIND PRESSURE (psf) - LOW-RISE BUILDING ENCLOSED

Exposure Category	Wall Zone	Effective Wind Area (ft²)	Ultimate Design Wind Speed, V _{ult} (mph)								
			2015 and 2018 IRC/IBC (ASCE 7-10 and ASCE 7-16: W)								
			110	115	120	130	140	150	160	170	180
B	Zone 4 (Center)	≤ 10	24.2	26.4	28.8	33.8	39.2	45.0	51.2	57.8	64.8
		50	21.9	23.9	26.0	30.5	35.4	40.7	46.3	52.2	58.5
		A ≥ 100	20.9	22.8	24.8	29.1	33.8	38.8	44.1	49.8	55.9
	Zone 5 (End)	≤ 10	31.8	34.7	37.8	44.4	51.4	59.1	67.2	75.9	85.0
		50	25.2	27.5	30.0	35.2	40.8	46.9	53.3	60.2	67.5
		A ≥ 100	23.2	25.3	27.6	32.4	37.6	43.1	49.1	55.4	62.1
C	Zone 4 (Center)	≤ 10	33.6	36.8	40.0	47.0	54.5	62.5	71.2	80.3	90.1
		50	30.4	33.2	36.2	42.4	49.2	56.5	64.3	72.6	81.4
		A ≥ 100	29.0	31.7	34.5	40.5	47.0	53.9	61.3	69.3	77.6
	Zone 5 (End)	≤ 10	44.1	48.2	52.5	61.7	71.5	82.1	93.4	105.4	118.2
		50	35.0	38.3	41.7	48.9	56.7	65.1	74.1	83.7	93.8
		A ≥ 100	32.2	35.2	38.4	45.0	52.2	59.9	68.2	77.0	86.3
D	Zone 4 (Center)	≤ 10	39.7	43.4	47.2	55.4	64.3	73.8	84.0	94.8	106.3
		50	35.9	39.2	42.7	50.1	58.1	66.7	75.9	85.7	96.1
		A ≥ 100	34.2	37.4	40.7	47.8	55.4	63.6	72.4	81.7	91.6
	Zone 5 (End)	≤ 10	52.1	57.0	62.0	72.8	84.4	96.9	110.2	124.5	139.5
		50	41.3	45.2	49.2	57.8	67.0	76.9	87.5	98.8	110.7
		A ≥ 100	38.1	41.6	45.3	53.1	61.6	70.8	80.5	90.9	101.9

Design Assumptions:

- 1) Tabulated design wind pressures are for a low-rise building, enclosed, with a mean roof height $h \leq 33$ ft, risk/occupancy category II, topographic factor of 1.0, and importance factor of 1.0.
- 2) The design wind pressures are based on ASCE7-10 & ASCE7-16, Chapter 30, Part 1 for Components and Cladding (C & C).
- 3) The effective wind area is the span length multiplied by the tributary width, or the span length²/3, whichever is greater.
- 4) For effective wind areas between those given above, the design wind pressure may be interpolated; otherwise, the wind pressure associated with the lower effective area shall be used.

Example:

Wall Zone 4 (Center), Exposure Category B, 8 ft. Stud @ 16" o.c. spacing

IRC/IBC 2015 Building Code

Basic Wind Speed, $V = 115$ (mph)

Stud, 8 ft., effective wind area, $A = 21$ ft² from Table 2

- the wind pressure corresponding to the lower wind effective area (10 ft²) from Table 3 = 26.4 psf, or

- by interpolation, the wind pressure = $26.4 - [(21-10)(26.4-23.9)/(50-10)] = 25.7$ psf

- 5) Tabulated wind pressures of this table are not reduced by 0.6 since the load combinations include the 0.6 factor for the wind load.

Exposure B: Urban and suburban areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Exposure B shall be assumed unless the site meets the definition of another type exposure.

Exposure C: Open terrain with scattered obstructions having heights generally less than 30 feet.

Exposure D: Flat, unobstructed areas exposed to wind.

Building Enclosed: A building that has the total area of openings in each wall, that receives positive external pressure, less than or equal to 4 sq. ft. or 1% of the area of that wall, whichever is smaller.

Building Partially Enclosed: A building that complies with both of the following conditions:

- (a) The total area of openings in a wall that receives positive external pressure exceeds the sum of the areas of openings in the balance of the building envelope (walls and roof) by more than 10%.
- (b) The total area of openings in a wall that receives positive external pressure exceeds 4 ft² or 1% of the area of the wall, whichever is smaller, and the percentage of openings in the balance of the building envelope does not exceed 20%.

TABLE 4: WALL DESIGN WIND PRESSURE (psf) - LOW-RISE BUILDING PARTIALLY-ENCLOSED

Exposure Category	Wall Zone	Effective wind area (ft ²)	Ultimate Design Wind Speed, V _{ult} (mph)								
			2015 and 2018 IRC/IBC (ASCE 7-10 and ASCE 7-16: W)								
			110	115	120	130	140	150	160	170	180
B	Zone 4 (Center)	≤ 10	31.2	34.1	37.1	43.6	50.5	58.0	66.0	74.5	83.5
		50	28.9	31.5	34.3	40.3	46.7	53.7	61.1	68.9	77.3
		A ≥ 100	27.9	30.4	33.1	38.9	45.1	51.8	58.9	66.5	74.6
	Zone 5 (End)	≤ 10	38.8	42.4	46.1	54.1	62.8	72.1	82.0	92.6	103.8
		50	32.2	35.2	38.3	45.0	52.2	59.9	68.1	76.9	86.2
		A ≥ 100	30.2	33.0	35.9	42.2	48.9	56.1	63.9	72.1	80.8
C	Zone 4 (Center)	≤ 10	43.4	47.4	51.6	60.6	70.2	80.6	91.7	103.6	116.1
		50	40.1	43.8	47.7	56.0	65.0	74.6	84.9	95.8	107.4
		A ≥ 100	38.7	42.3	46.1	54.1	62.7	72.0	81.9	92.5	103.7
	Zone 5 (End)	≤ 10	53.9	58.9	64.1	75.2	87.3	100.2	114.0	128.7	144.2
		50	44.8	48.9	53.3	62.5	72.5	83.2	94.7	106.9	119.8
		A ≥ 100	42.0	45.9	49.9	58.6	68.0	78.0	88.8	100.2	112.4
D	Zone 4 (Center)	≤ 10	51.2	55.9	60.9	71.5	82.9	95.2	108.3	122.2	137.0
		50	47.3	51.8	56.3	66.1	76.7	88.0	100.2	113.1	126.8
		A ≥ 100	45.7	49.9	54.4	63.8	74.0	85.0	96.7	109.1	122.4
	Zone 5 (End)	≤ 10	63.6	69.5	75.7	88.8	103.0	118.2	134.5	151.9	170.3
		50	52.8	57.7	62.9	73.8	85.6	98.2	111.8	126.2	141.4
		A ≥ 100	49.5	54.1	58.9	69.2	80.2	92.1	104.8	118.3	132.6

Design Assumptions:

- 1) Tabulated design wind pressures are for a low-rise building, partially-enclosed, with a mean roof height $h \leq 33$ ft, risk/occupancy category II, topographic factor of 1.0, and importance factor of 1.0.
- 2) The design wind pressures are based on ASCE7-10 & ASCE7-16, Chapter 30, Part 1 for Components and Cladding (C & C).
- 3) The effective wind area is the span length multiplied by the tributary width, or the span length²/3, whichever is greater.
- 4) For effective wind areas between those given above, the design wind pressure may be interpolated; otherwise, the wind pressure associated with the lower effective area shall be used.

Example:

Wall Zone 4 (Center), Exposure Category B, 8 ft. Stud @ 16" o.c. spacing

IRC/IBC 2015 Building Code

Basic Wind Speed, V = 115 (mph)

Stud, 8 ft., effective wind area, A = 21 ft² from Table 2- the wind pressure corresponding to the lower wind effective area (10 ft²) from Table 4 = 34.1 psf, or- by interpolation, the wind pressure = $34.1 - [(21-10) \times (34.1-31.5)] / (50-10) = 33.4$ psf

- 5) Tabulated wind pressures of this table are not reduced by 0.6 since the load combinations include the 0.6 factor for the wind load.

Exposure B: Urban and suburban areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Exposure B shall be assumed unless the site meets the definition of another type exposure.

Exposure C: Open terrain with scattered obstructions having heights generally less than 30 feet.

Exposure D: Flat, unobstructed areas exposed to wind.

Building Enclosed: A building that has the total area of openings in each wall, that receives positive external pressure, less than or equal to 4 sq. ft. or 1% of the area of that wall, whichever is smaller.

Building Partially Enclosed: A building that complies with both of the following conditions:

- (a) The total area of openings in a wall that receives positive external pressure exceeds the sum of the areas of openings in the balance of the building envelope (walls and roof) by more than 10%.
- (b) The total area of openings in a wall that receives positive external pressure exceeds 4 ft² or 1% of the area of the wall, whichever is smaller, and the percentage of openings in the balance of the building envelope does not exceed 20%.

TABLE 5: WIND SPEED CONVERSION (V_{ULT}, V_{ASD})

V _{ult} (mph)	110	115	120	130	140	150	160	170	180
V _{asd} (mph)	85	89	93	101	108	116	124	132	139

Note:

- 1) Where reference documents are based on the nominal design wind speed, V_{asd} (e.g. 2009 IRC/IBC, ASCE7-05), the nominal design wind speed, V_{asd}, could be converted to the ultimate design wind speeds, V_{ult}, as shown above.

1.4) Prescriptive Wall Applications

- 1.35E & 1.55E Tolko T-TEC LSL could be used for prescriptive stud wall applications in conventional construction in accordance with Section 2308.5 of the 2018 and 2015 IBC, Section 2308.9 of the 2012 and 2009 IBC, and Section R602.6 of the 2018 through 2009 IRC.
- Cutting, notching and boring of Tolko LSL used as studs in conventional construction is permitted in accordance with Section 2308.5 of the 2018 and 2015 IBC, Section 2308.9 of the 2012 and 2009 IBC, and Section R602.6 of the 2018 through 2009 IRC.
- 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 Wall Applications

- 1.35E & 1.55E Tolko T-TEC LSL is permitted in engineered wall applications when designed in accordance with the National Design Specification for Wood Construction (NDS) and the governing building code.
- 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.
- Cutting, notching and boring of Tolko LSL studs shall be permitted in engineered wall applications as shown in Detail 15 and Detail 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 adjoining 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 adjoining 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, stitch-nailed, LSL stud or single 2-1/2-inch-thick LSL Stud is required at adjoining panel edges. Nails shall be installed at a min. 3/8" from all panel edges and shall be staggered a minimum of 1/2 inch for each row of nails.

- For stud wall applications in accordance with IRC and the conventional light-frame construction provisions of the IBC [Section 2308, Table 2304.10.1 (2018 & 2015 IBC), and Table 2304.9.1 (2012 & 2009 IBC)], double LSL studs shall be stitch-nailed together with 2 staggered rows of nails (minimum 0.120" x 2-7/8") spaced 8" in each row. For engineered stud wall applications, the stitch nailing of double LSL studs shall be designed to transfer the required lateral shear using an assumed equivalent specific gravity of 0.50.
- 10d common nails (0.148" x 3") shall not be spaced closer than 3" on center, and 8d common nails (0.131" x 2-1/2") shall not be spaced closer than 2" 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 & 1.55E Tolko T-TEC LSL header shall be framed with a single flat 1-1/2" or 1-3/4" 1.35E & 1.55E 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 34.

1.8) Exterior Wood Framed Walls Bracing Conditions

- The exterior wall bracing shall be in accordance with IRC 2018 – R602.10.

1.9) Wall Top Plate

- Tolko LSL studs shall be capped 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 no more than 3 inches for double plates.
- As per IRC 2018 R602.3.2, a single top plate can be used as an alternative to a double plate if the rafter/joists from above are centered over the studs below with a tolerance of no more than 1 inch.

- 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 32.
- According to IRC 2018 R602.3.3, 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:
 - The top plates are (2) 1-1/2" x 5.25", or (2) 3" x 3.5" members
 - 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 in accordance with one of the following provisions (as per IRC 2018):
- Fastening in accordance with IRC 2018 Table R602.3(1) where:
 - The ultimate design wind speed, Vult, does not exceed 115 mph, the wind exposure category is B, the roof pitch is 5:12, and the roof span is 32 feet or less.
 - The net uplift at the top of the wall does not exceed 100 plf.
- Where the net uplift at the top of the wall exceeds 100 plf, uplift framing connectors shall be installed.
- The wall sheathing and the fasteners designed to resist combined uplift and shear forces in accordance with acceptable engineering practice.

1.12) Wall Bracing

- Walls shall be braced as per IRC 2018 R602.10.

1.13) Wood Structural Panel Sheathing for Lateral Wind Pressure

TABLE 6: WOOD STRUCTURAL PANEL SHEATHING USED TO RESIST WIND PRESSURE

Minimum Nail		Min. Wood Structural Panel Span Rating	Min. Nominal Panel Thickness (in)	Max. Wall Stud Spacing (in)	Panel Nail o.c. spacing (in)		Maximum Allowable Stress Design Wind Speed, Vasd, (mph)			Maximum Ultimate Stress Design Wind Speed, Vult, (mph)		
Size	Penetration (inches)				Edge	Field	Wind Exposure Category			Wind Exposure Category		
6d common nail (0.113" x 2.0")	1.5	24/0	3/8	16	6	12	B	C	D	B	C	D
		24/16	7/16	16	6	12	B	C	D	B	C	D
8d common nail (0.131 x 2.5")	1.75	24/16	7/16	16	6	12	B	C	D	B	C	D
						6	B	C	D	B	C	D
				24	6	12	B	C	D	B	C	D
						6	B	C	D	B	C	D

Reference: IBC 2018 - Table 2304.6.1

Design Assumptions:

- Enclosed building with a mean roof height not greater than 30 ft. and a topographic factor of 1.0.
- Table is based on wind pressure acting toward and away from the building surfaces.
- Panel strength axis shall be parallel or perpendicular to supports.
- Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with the panel strength axis perpendicular to supports.
- Wood structural panels with span ratings of wall-16 or wall-24 shall be permitted as an alternative to panels with a 24/0 span rating.
- Plywood siding rated 16 on center, or 24 on center, shall be permitted as an alternative to panels with a 24/16 span rating.
- Wall-16 and plywood siding 16 on center shall be used with studs spaced not more than 16 inches on center.

Notes:

- When the sheathing is exposed to moisture during construction, there is a potential risk that the panel may buckle between studs. Therefore, builders shall pay attention to the moisture management of the wood structural panels on the jobsite.
- Additional information on preventing wall sheathing from buckling is provided in APA Technical Note: Minimize Buckling of Wood Structural Panels, Form X480.

1.14) Deflection Requirements

TABLE 7: MINIMUM DEFLECTION CRITERIA

Member type	Maximum Deflection
Exterior walls - wind loads with plaster or stucco finish	H/360
Exterior walls - wind loads with other brittle finishes	H/240
Exterior walls with interior gypsum board finish	H/180
Exterior walls - wind loads with flexible finishes	H/120
Lintels supporting masonry veneer walls ^(a)	L/600

(a) IRC 2015/2018 Table R301.7 & R703.8.2

1.15) Fire-rated Assemblies

- When used as wall studs, Tolko LSL is permitted to be used as a direct replacement for solid-sawn lumber of No.2 or lower grades, having the same dimensions, in any fire-resistance-rated wall assemblies listed in Table 721.1(2) of the 2018, 2015 and 2012 IBC or Table 720.1(2) of the 2009 IBC. A minimum of 2.5 lb/ft³ mineral wool insulation shall be placed in the stud cavity.

1.16) 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 where the equivalent moisture content of sawn lumber is less than 16 percent.

SECTION 2: STUD LOAD TABLES

TABLE 8: STUDS - MAXIMUM ALLOWABLE LATERAL WIND AND VERTICAL LOAD (1-1/2" WIDTH) - 3.5" & 5.5" THICK WALLS - 1.35E

Wall Height (ft)	1.35E Tolko T-TEC LSL									
	1-1/2" x 3-1/2"				1-1/2" x 5-1/2"					
	Vertical load (lbs) Defl. Ratio (L/_) Lateral Design Wind Load (plf)				Vertical load (lbs) Defl. Ratio (L/_) Lateral Design Wind Load (plf)					
	25	35	45	50	25	35	45	50	65	80
8	2780 (L/714)	2575 (L/510)	2375 (L/397)	2275 (L/357)	4380 (L/2646)	4380 (L/1890)	4380 (L/1470)	4380 (L/1323)	4380 (L/1017)	4380 (L/827)
9	2205 (L/505)	1990 (L/361)	1780 (L/280)	1675 (L/252)	4380 (L/1889)	4380 (L/1349)	4380 (L/1049)	4380 (L/944)	4380 (L/726)	4380 (L/590)
10	1755 (L/370)	1530 (L/264)	1310 (L/205)	1200 (L/185)	4380 (L/1393)	4380 (L/995)	4380 (L/774)	4380 (L/696)	4380 (L/536)	4380 (L/435)
11	1395 (L/279)	1165 (L/199)	940 (L/155)	825 (L/139)	4380 (L/1056)	4380 (L/754)	4380 (L/587)	4380 (L/528)	4180 (L/406)	3735 (L/330)
12	1105 (L/215)	870 (L/154)			4380 (L/819)	4320 (L/585)	4000 (L/455)	3840 (L/409)	3370 (L/315)	2900 (L/256)
13	870 (L/170)				4000 (L/647)	3665 (L/462)	3335 (L/359)	3170 (L/323)	2670 (L/249)	2175 (L/202)
14					3455 (L/521)	3105 (L/372)	2760 (L/289)	2590 (L/260)	2075 (L/200)	
15					2980 (L/425)	2620 (L/303)	2265 (L/236)	2090 (L/212)		
16					2570 (L/351)	2205 (L/250)	1840 (L/195)			
17					2215 (L/293)	1840 (L/209)				
18					1905 (L/247)					

Design Assumptions:

- Tabulated values are as per NDS and IBC/IRC 2015 & 2018, where the first value represents the maximum allowable vertical load in lbs, and the second value is the deflection ratio (L/x) for the horizontal design wind load.
- The vertical load dead load shall not exceed the vertical live/construction/snow load.
- Buckling length coefficient $K_e = 0.85$ (for serviceability, $K_e = 1.0$).
- Load duration factor $C_D = 1.6$
- Axial load eccentricity = 1/6 of the wall thickness (calculations as per NDS 15.4.1 for combined bending and eccentric axial compression loads).
- Lateral wind deflection limited to max. 1".
- Full-width blocking at max. 8 ft. on center.
- Compression perpendicular to grain for the wall plate = 425 psi
- A gypsum wall board is assumed to be attached to the interior side of the stud.

Stud Design Example:

Enclosed Building, Wall Zone 5 (End), Exposure Category B, 8 ft. Stud @ 16 " o.c. spacing

IRC/IBC 2015 Building Code, Lateral wind deflection criteria = L/360

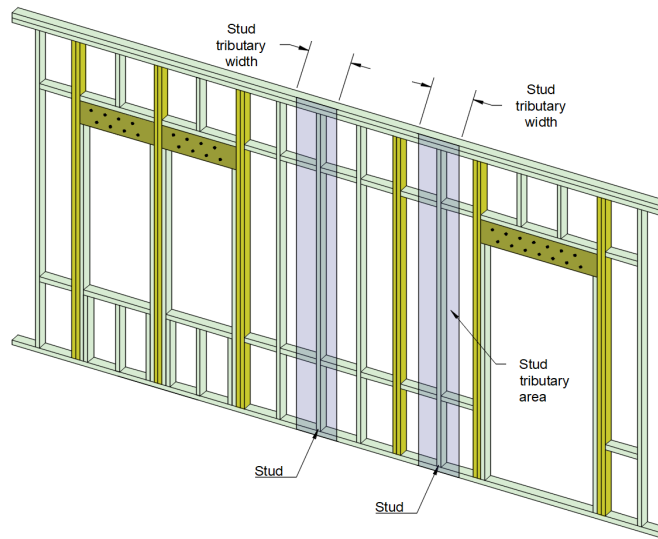
Basic Wind Speed, $V = 115$ (mph), Actual vertical load = 3000 plf

- Determine the effective wind area for the 8 ft. stud from Table 2, $A = 21 \text{ ft}^2$
- Determine the design wind load from Table 3 = 34.7 psf
- Calculate the design wind load in plf = $34.7 \times (16/12) = 46.3 \text{ plf}$ -50 plf
- Calculate the vertical load in lbs = $3000 \times (16/12) = 4000 \text{ lbs}$
- Scan across the 8 ft. row and the 50 plf lateral wind load columns that will meet the 4000 lbs axial load and deflection ratio of L/360.
- The 1-1/2" x 5-1/2" Stud will be adequate
- Calculate the lateral concentrated reaction for the stud to the plate connections = Lateral wind Load (plf) * Stud Height (ft) / 2 = 50 plf * 8 ft / 2 = 200 lbs

TABLE 9: STUDS - MAXIMUM ALLOWABLE LATERAL WIND AND VERTICAL LOAD (1-1/2" WIDTH) - 3.5" & 5.5" THICK WALLS - 1.55E LSL

Wall Height (ft)	1.55E Tolko T-TEC LSL									
	1-1/2" x 3-1/2"				1-1/2" x 5-1/2"					
	Vertical load (lbs) Defl. Ratio (L/_) Lateral Design Wind Load (plf)				Vertical load (lbs) Defl. Ratio (L/_) Lateral Design Wind Load (plf)					
	25	35	45	50	25	35	45	50	65	80
8	2785 (L/820)	2785 (L/586)	2785 (L/456)	2785 (L/410)	4380 (L/3038)	4380 (L/2170)	4380 (L/1688)	4380 (L/1519)	4380 (L/1168)	4380 (L/949)
9	2730 (L/580)	2525 (L/414)	2325 (L/322)	2230 (L/290)	4380 (L/2169)	4380 (L/1549)	4380 (L/1205)	4380 (L/1084)	4380 (L/834)	4380 (L/677)
10	2195 (L/425)	1985 (L/303)	1780 (L/236)	1680 (L/212)	4380 (L/1600)	4380 (L/1143)	4380 (L/889)	4380 (L/800)	4380 (L/615)	4380 (L/500)
11	1775 (L/320)	1560 (L/229)	1350 (L/178)	1245 (L/160)	4380 (L/1213)	4380 (L/866)	4380 (L/673)	4380 (L/606)	4380 (L/466)	4380 (L/379)
12	1435 (L/247)	1215 (L/176)			4380 (L/940)	4380 (L/672)	4380 (L/522)	4380 (L/470)	4380 (L/361)	4060 (L/294)
13	1160 (L/195)				4380 (L/743)	4380 (L/531)	4300 (L/413)	4145 (L/371)	3685 (L/286)	3225 (L/232)
14					4285 (L/598)	3950 (L/427)	3625 (L/332)	3465 (L/299)	2990 (L/230)	2515 (L/186)
15					3725 (L/488)	3385 (L/348)	3050 (L/271)	2890 (L/244)	2400 (L/187)	
16					3240 (L/403)	2895 (L/288)	2555 (L/224)	2390 (L/201)		
17					2825 (L/336)	2475 (L/240)				
18					2465 (L/284)					

See design assumptions from Table 8

FIGURE 4: STUD TRIBUTARY WIDTH AND TRIBUTARY AREA**TABLE 10: STUDS - MAXIMUM ALLOWABLE LATERAL WIND AND VERTICAL LOAD (1-1/2" WIDTH) - 7.25 & 9.25" THICK WALLS - 1.35E LSL**

Wall Height (ft)	1.35E Tolko T-TEC LSL											
	1-1/2" x 7-1/4"						1-1/2" x 9-1/4"					
	Vertical load (lbs) Defl. Ratio (L/_)						Vertical load (lbs) Defl. Ratio (L/_)					
	Lateral Design Wind Load (plf)						Lateral Design Wind Load (plf)					
	25	35	45	50	65	80	25	35	45	50	65	80
8	5775 (L/5733)	5775 (L/4095)	5775 (L/3185)	5775 (L/2866)	5775 (L/2205)	5775 (L/1791)	7370 (L/11026)	7370 (L/7876)	7370 (L/6125)	7370 (L/5513)	7370 (L/4240)	7370 (L/3445)
9	5775 (L/4137)	5775 (L/2955)	5775 (L/2298)	5775 (L/2068)	5775 (L/1591)	5775 (L/1293)	7370 (L/8069)	7370 (L/5763)	7370 (L/4483)	7370 (L/4034)	7370 (L/3103)	7370 (L/2521)
10	5775 (L/3076)	5775 (L/2197)	5775 (L/1709)	5775 (L/1538)	5775 (L/1183)	5775 (L/961)	7370 (L/6064)	7370 (L/4332)	7370 (L/3369)	7370 (L/3032)	7370 (L/2332)	7370 (L/1895)
11	5775 (L/2346)	5775 (L/1676)	5775 (L/1303)	5775 (L/1173)	5775 (L/902)	5775 (L/733)	7370 (L/4663)	7370 (L/3331)	7370 (L/2590)	7370 (L/2331)	7370 (L/1793)	7370 (L/1457)
12	5775 (L/1828)	5775 (L/1305)	5775 (L/1015)	5775 (L/914)	5775 (L/703)	5775 (L/571)	7370 (L/3657)	7370 (L/2612)	7370 (L/2031)	7370 (L/1828)	7370 (L/1406)	7370 (L/1142)
13	5775 (L/1451)	5775 (L/1036)	5775 (L/806)	5775 (L/725)	5775 (L/558)	5775 (L/453)	7370 (L/2917)	7370 (L/2084)	7370 (L/1621)	7370 (L/1458)	7370 (L/1122)	7370 (L/911)
14	5775 (L/1170)	5775 (L/835)	5775 (L/650)	5775 (L/585)	5775 (L/450)	5230 (L/365)	7370 (L/2363)	7370 (L/1687)	7370 (L/1312)	7370 (L/1181)	7370 (L/908)	7370 (L/738)
15	5775 (L/957)	5775 (L/683)	5775 (L/531)	5570 (L/478)	4955 (L/368)	4335 (L/299)	7370 (L/1939)	7370 (L/1385)	7370 (L/1077)	7370 (L/969)	7370 (L/745)	7370 (L/606)
16	5775 (L/792)	5470 (L/566)	5035 (L/440)	4820 (L/396)	4180 (L/304)	3535 (L/247)	7370 (L/1610)	7370 (L/1150)	7370 (L/894)	7370 (L/805)	7370 (L/619)	7370 (L/503)
17	5275 (L/663)	4825 (L/473)	4380 (L/368)	4155 (L/331)	3490 (L/255)	2815 (L/207)	7370 (L/1351)	7370 (L/965)	7370 (L/750)	7370 (L/675)	7370 (L/519)	7150 (L/422)
18	4715 (L/560)	4250 (L/400)	3790 (L/311)	3560 (L/280)			7370 (L/1144)	7370 (L/817)	7370 (L/635)	7370 (L/572)	6970 (L/440)	6180 (L/357)
19	4215 (L/478)	3735 (L/341)	3265 (L/265)	3030 (L/239)			7370 (L/977)	7370 (L/698)	7205 (L/543)	6935 (L/488)	6115 (L/375)	5295 (L/305)
20	3765 (L/410)	3275 (L/293)					7370 (L/841)	7030 (L/601)	6465 (L/467)	6180 (L/420)	5335 (L/323)	4480 (L/262)
21	3360 (L/355)	2865 (L/254)					6955 (L/729)	6370 (L/520)	5785 (L/405)	5495 (L/364)	4620 (L/280)	
22	3000 (L/309)						6365 (L/636)	5760 (L/454)	5165 (L/353)	4860 (L/318)		
23							5825 (L/558)	5205 (L/398)	4590 (L/310)	4285 (L/279)		
24							5330 (L/492)	4695 (L/351)				
25							4870 (L/436)	4225 (L/311)				
26							4455 (L/388)					
27							4070 (L/347)					

See Design Assumptions from Table 8

TABLE 11: STUDS - MAXIMUM ALLOWABLE LATERAL WIND AND VERTICAL LOAD (1-1/2" WIDTH) - 7.25 & 9.25" THICK WALLS - 1.55E LSL

Wall Height (ft)	1.55E Tolko T-TEC LSL											
	1-1/2" x 7-1/4"						1-1/2" x 9-1/4"					
	Vertical load (lbs) Defl. Ratio (L/_) Lateral Design Wind Load (plf)						Vertical load (lbs) Defl. Ratio (L/_) Lateral Design Wind Load (plf)					
	25	35	45	50	65	80	25	35	45	50	65	80
8	5775 (L/6583)	5775 (L/4702)	5775 (L/3657)	5775 (L/3291)	5775 (L/2532)	5775 (L/2057)	7370 (L/12660)	7370 (L/9042)	7370 (L/7033)	7370 (L/6330)	7370 (L/4869)	7370 (L/3956)
9	5775 (L/4750)	5775 (L/3393)	5775 (L/2639)	5775 (L/2375)	5775 (L/1827)	5775 (L/1484)	7370 (L/9265)	7370 (L/6617)	7370 (L/5147)	7370 (L/4632)	7370 (L/3563)	7370 (L/2895)
10	5775 (L/3532)	5775 (L/2523)	5775 (L/1962)	5775 (L/1766)	5775 (L/1358)	5775 (L/1103)	7370 (L/6963)	7370 (L/4973)	7370 (L/3868)	7370 (L/3481)	7370 (L/2678)	7370 (L/2176)
11	5775 (L/2694)	5775 (L/1924)	5775 (L/1496)	5775 (L/1347)	5775 (L/1036)	5775 (L/841)	7370 (L/5354)	7370 (L/3824)	7370 (L/2974)	7370 (L/2677)	7370 (L/2059)	7370 (L/1673)
12	5775 (L/2099)	5775 (L/1499)	5775 (L/1166)	5775 (L/1049)	5775 (L/807)	5775 (L/655)	7370 (L/4199)	7370 (L/2999)	7370 (L/2332)	7370 (L/2099)	7370 (L/1615)	7370 (L/1312)
13	5775 (L/1666)	5775 (L/1190)	5775 (L/925)	5775 (L/833)	5775 (L/640)	5775 (L/520)	7370 (L/3350)	7370 (L/2392)	7370 (L/1861)	7370 (L/1675)	7370 (L/1288)	7370 (L/1046)
14	5775 (L/1343)	5775 (L/959)	5775 (L/746)	5775 (L/671)	5775 (L/516)	5775 (L/419)	7370 (L/2713)	7370 (L/1937)	7370 (L/1507)	7370 (L/1356)	7370 (L/1043)	7370 (L/847)
15	5775 (L/1098)	5775 (L/784)	5775 (L/610)	5775 (L/549)	5775 (L/422)	5775 (L/343)	7370 (L/2226)	7370 (L/1590)	7370 (L/1236)	7370 (L/1113)	7370 (L/856)	7370 (L/695)
16	5775 (L/909)	5775 (L/649)	5775 (L/505)	5775 (L/454)	5625 (L/349)	5025 (L/284)	7370 (L/1848)	7370 (L/1320)	7370 (L/1027)	7370 (L/924)	7370 (L/711)	7370 (L/577)
17	5775 (L/761)	5775 (L/544)	5655 (L/423)	5445 (L/380)	4820 (L/292)	4200 (L/238)	7370 (L/1551)	7370 (L/1108)	7370 (L/861)	7370 (L/775)	7370 (L/596)	7370 (L/484)
18	5775 (L/643)	5395 (L/459)	4965 (L/357)	4750 (L/321)	4110 (L/247)		7370 (L/1313)	7370 (L/938)	7370 (L/729)	7370 (L/656)	7370 (L/505)	7370 (L/410)
19	5245 (L/548)	4795 (L/392)	4350 (L/304)	4130 (L/274)			7370 (L/1122)	7370 (L/801)	7370 (L/623)	7370 (L/561)	7370 (L/431)	7370 (L/350)
20	4720 (L/471)	4255 (L/337)	3810 (L/262)				7370 (L/966)	7370 (L/690)	7370 (L/536)	7370 (L/483)	7170 (L/371)	6370 (L/301)
21	4245 (L/408)	3780 (L/291)					7370 (L/837)	7370 (L/598)	7370 (L/465)	7165 (L/418)	6340 (L/322)	5520 (L/261)
22	3820 (L/355)						7370 (L/730)	7280 (L/521)	6710 (L/405)	6425 (L/365)	5585 (L/280)	
23	3440 (L/311)						7220 (L/640)	6625 (L/457)	6045 (L/356)	5755 (L/320)		
24							6630 (L/565)	6030 (L/403)	5435 (L/314)			
25							6095 (L/501)	5480 (L/358)				
26							5605 (L/446)	4985 (L/318)				
27							5155 (L/399)					

See design assumptions from Table 8

TABLE 12: STUDS - MAXIMUM ALLOWABLE LATERAL WIND AND VERTICAL LOAD (1-3/4" WIDTH) - 3.5" & 5.5" THICK WALLS - 1.35E

Wall Height (ft)	1.35E Tolko T-TEC LSL									
	1-3/4" x 3-1/2"				1-3/4" x 5-1/2"					
	Vertical load (lbs) Defl. Ratio (L/_) Lateral Design Wind Load (plf)				Vertical load (lbs) Defl. Ratio (L/_) Lateral Design Wind Load (plf)					
	25	35	45	50	25	35	45	50	65	80
8	3160 (L/834)	3125 (L/595)	2925 (L/463)	2825 (L/417)	4965 (L/3087)	4965 (L/2205)	4965 (L/1715)	4965 (L/1543)	4965 (L/1187)	4965 (L/964)
9	2670 (L/589)	2455 (L/421)	2240 (L/327)	2135 (L/294)	4965 (L/2204)	4965 (L/1574)	4965 (L/1224)	4965 (L/1102)	4965 (L/847)	4965 (L/688)
10	2145 (L/432)	1920 (L/308)	1700 (L/240)	1590 (L/216)	4965 (L/1626)	4965 (L/1161)	4965 (L/903)	4965 (L/813)	4965 (L/625)	4965 (L/508)
11	1725 (L/325)	1495 (L/232)	1270 (L/181)	1155 (L/162)	4965 (L/1232)	4965 (L/880)	4965 (L/684)	4965 (L/616)	4965 (L/474)	4795 (L/385)
12	1390 (L/251)	1155 (L/179)			4965 (L/956)	4965 (L/682)	4935 (L/531)	4775 (L/478)	4305 (L/367)	3840 (L/298)
13	1120 (L/198)				4835 (L/755)	4495 (L/539)	4165 (L/419)	4000 (L/377)	3510 (L/290)	3015 (L/236)
14					4195 (L/607)	3845 (L/434)	3500 (L/337)	3330 (L/303)	2820 (L/233)	2310 (L/189)
15					3645 (L/495)	3285 (L/354)	2930 (L/275)	2755 (L/247)	2230 (L/190)	
16					3170 (L/409)	2800 (L/292)	2440 (L/227)	2260 (L/204)		
17					2760 (L/342)	2380 (L/244)				
18					2400 (L/289)					
19					2085 (L/246)					

See Design Assumptions from Table 8

TABLE 13: STUDS - MAXIMUM ALLOWABLE LATERAL WIND AND VERTICAL LOAD (1-3/4" WIDTH) - 7.25" & 9.25" THICK WALLS - 1.35E

Wall Height (ft)	1.35E Tolko T-TEC LSL											
	1-3/4" x 7-1/4"						1-3/4" x 9-1/4"					
	Vertical load (lbs) Defl. Ratio (L/_)						Vertical load (lbs) Defl. Ratio (L/_)					
	Lateral Design Wind Load (plf)						Lateral Design Wind Load (plf)					
	25	35	45	50	65	80	25	35	45	50	65	80
8	6545 (L/6689)	6545 (L/4778)	6545 (L/3716)	6545 (L/3344)	6545 (L/2572)	6545 (L/2090)	8350 (L/12864)	8350 (L/9188)	8350 (L/7146)	8350 (L/6432)	8350 (L/4947)	8350 (L/4020)
9	6545 (L/4827)	6545 (L/3448)	6545 (L/2681)	6545 (L/2413)	6545 (L/1856)	6545 (L/1508)	8350 (L/9414)	8350 (L/6724)	8350 (L/5230)	8350 (L/4707)	8350 (L/3620)	8350 (L/2942)
10	6545 (L/3589)	6545 (L/2564)	6545 (L/1994)	6545 (L/1794)	6545 (L/1380)	6545 (L/1121)	8350 (L/7075)	8350 (L/5054)	8350 (L/3930)	8350 (L/3537)	8350 (L/2721)	8350 (L/2211)
11	6545 (L/2737)	6545 (L/1955)	6545 (L/1520)	6545 (L/1368)	6545 (L/1052)	6545 (L/855)	8350 (L/5440)	8350 (L/3886)	8350 (L/3022)	8350 (L/2720)	8350 (L/2092)	8350 (L/1700)
12	6545 (L/2133)	6545 (L/1523)	6545 (L/1185)	6545 (L/1066)	6545 (L/820)	6545 (L/666)	8350 (L/4266)	8350 (L/3047)	8350 (L/2370)	8350 (L/2133)	8350 (L/1641)	8350 (L/1333)
13	6545 (L/1692)	6545 (L/1209)	6545 (L/940)	6545 (L/846)	6545 (L/651)	6545 (L/529)	8350 (L/3404)	8350 (L/2431)	8350 (L/1891)	8350 (L/1702)	8350 (L/1309)	8350 (L/1063)
14	6545 (L/1365)	6545 (L/975)	6545 (L/758)	6545 (L/682)	6545 (L/525)	6545 (L/426)	8350 (L/2756)	8350 (L/1969)	8350 (L/1531)	8350 (L/1378)	8350 (L/1060)	8350 (L/861)
15	6545 (L/1116)	6545 (L/797)	6545 (L/620)	6545 (L/558)	6325 (L/429)	5715 (L/348)	8350 (L/2262)	8350 (L/1616)	8350 (L/1256)	8350 (L/1131)	8350 (L/870)	8350 (L/707)
16	6545 (L/924)	6545 (L/660)	6280 (L/513)	6065 (L/462)	5435 (L/355)	4805 (L/288)	8350 (L/1878)	8350 (L/1341)	8350 (L/1043)	8350 (L/939)	8350 (L/722)	8350 (L/587)
17	6410 (L/773)	5960 (L/552)	5515 (L/429)	5295 (L/386)	4645 (L/297)	3985 (L/241)	8350 (L/1576)	8350 (L/1125)	8350 (L/875)	8350 (L/788)	8350 (L/606)	8350 (L/492)
18	5755 (L/654)	5290 (L/467)	4840 (L/363)	4610 (L/327)	3935 (L/251)		8350 (L/1335)	8350 (L/953)	8350 (L/741)	8350 (L/667)	8350 (L/513)	8245 (L/417)
19	5170 (L/557)	4695 (L/398)	4225 (L/309)	3995 (L/278)			8350 (L/1140)	8350 (L/814)	8350 (L/633)	8350 (L/570)	8015 (L/438)	7225 (L/356)
20	4645 (L/479)	4160 (L/342)	3685 (L/266)				8350 (L/981)	8350 (L/701)	8205 (L/545)	7930 (L/490)	7110 (L/377)	6300 (L/306)
21	4180 (L/415)	3685 (L/296)					8350 (L/850)	7975 (L/607)	7410 (L/472)	7130 (L/425)	6290 (L/327)	5445 (L/265)
22	3755 (L/361)						7855 (L/742)	7265 (L/530)	6685 (L/412)	6395 (L/371)	5530 (L/285)	
23	3380 (L/317)						7220 (L/651)	6615 (L/465)	6020 (L/361)	5725 (L/325)		
24							6640 (L/574)	6020 (L/410)	5410 (L/319)			
25							6100 (L/509)	5470 (L/363)				
26							5610 (L/453)	4970 (L/324)				
27							5155 (L/405)					
28							4745 (L/364)					

See Design Assumptions from Table 8

SECTION 3: COLUMNS/KING-STUDS LOAD TABLES

TABLE 14: COLUMNS/KING-STUDS - MAXIMUM ALLOWABLE LATERAL WIND LOAD (plf)/VERTICAL LOAD (lbs) - 1-1/2" THICKNESS - 1.35E LSL

Deflection Ratio	Wall Height (ft)	Max. Lateral Deflection (in)	1.35E Tolko T-TEC LSL: 1-1/2" thickness								
			3-1/2" Wall Thickness 1-1/2" x 3-1/2"	5-1/2" Wall Thickness 1-1/2" x 5-1/2"	7-1/4" Wall Thickness 1-1/2" x 7-1/4"				9-1/4" Wall Thickness 1-1/2" x 9-1/4"		
			2-ply	2-ply	3-ply	2-ply	3-ply	4-ply	2-ply	3-ply	4-ply
L/180	8	0.53	197/1450	300/3415	300/10515	300/5595	300/13865	300/18485	300/7610	300/17690	300/20000
	10	0.67	102/1720	257/1795	300/6470	300/3505	300/12090	300/18485	300/5795	300/16875	300/20000
	12	0.80	59/1725	178/1600	267/3000	235/2480	300/7310	300/15465	300/3045	300/12590	300/20000
	14	0.93	37/1495	131/1405	196/2480	172/2300	259/4300	300/8965	220/2895	300/7365	300/16880
	16	1.00		90/1695	136/2830	132/2115	198/3825	264/5180	168/2745	253/5050	300/10145
	18	1.00		56/2265	85/3550	104/1930	156/3360	209/4470	133/2590	200/4635	267/6400
	20	1.00		37/2440	55/3695	84/1750	127/2915	169/3890	108/2435	162/4260	216/5770
	22	1.00		25/2375	38/3585	58/2540	87/4090	116/5455	89/2270	134/3900	178/5200
	24	1.00			27/3380	41/2975	61/4595	82/6125	75/2115	112/3525	150/4700
	26	1.00				29/3140	44/4730	59/6310	61/2220	92/3605	123/4810
L/240	8	0.40	148/2175	300/3415	300/10515	300/5595	300/13865	300/18485	300/7610	300/17690	300/20000
	10	0.50	76/2235	257/1795	300/6470	300/3505	300/12090	300/18485	300/5795	300/16875	300/20000
	12	0.60	44/2115	170/1870	255/3555	235/2480	300/7310	300/15465	300/3045	300/12590	300/20000
	14	0.70	28/1760	107/2320	161/4240	172/2300	259/4300	300/8965	220/2895	300/7365	300/16880
	16	0.80		72/2515	108/4235	132/2115	198/3825	264/5180	168/2745	253/5050	300/10145
	18	0.90		51/2555	76/4010	104/1930	156/3360	209/4470	133/2590	200/4635	267/6400
	20	1.00		37/2440	55/3695	84/1750	127/2915	169/3890	108/2435	162/4260	216/5770
	22	1.00		25/2375	38/3585	58/2540	87/4090	116/5455	89/2270	134/3900	178/5200
	24	1.00			27/3380	41/2975	61/4595	82/6125	75/2115	112/3525	150/4700
	26	1.00				29/3140	44/4730	59/6310	61/2220	92/3605	123/4810
L/360	8	0.27	98/2830	300/3415	300/10515	300/5595	300/13865	300/18485	300/7610	300/17690	300/20000
	10	0.33	51/2745	194/3155	291/6735	300/3505	300/12090	300/18485	300/5795	300/16875	300/20000
	12	0.40	29/2515	113/3475	170/7135	235/2480	300/7310	300/15465	300/3045	300/12590	300/20000
	14	0.47		71/3580	107/6795	162/2725	244/5215	300/8965	220/2895	300/7365	300/16880
	16	0.53		48/3540	72/6055	109/3255	164/6185	219/8465	168/2745	253/5050	300/10145
	18	0.60		34/3410	51/5350	77/3540	116/6505	154/8675	133/2590	200/4635	267/6400
	20	0.67			37/4725	56/3675	84/6350	113/8465	108/2435	162/4260	216/5770
	22	0.73			28/4180	42/3705	64/6035	85/8045	87/2410	131/4145	175/5530
	24	0.80				32/3655	49/5660	65/7545	67/2865	101/4850	135/6470
	26	0.87				25/3495	38/5260	51/7015	53/3150	80/5210	107/6950
L/600	8	0.16	59/3325	223/4290	300/10515	300/5595	300/13865	300/18485	300/7610	300/17690	300/20000
	10	0.20	30/3160	116/4530	174/10265	261/4265	300/12090	300/18485	300/5795	300/16875	300/20000
	12	0.24		68/4590	102/9830	153/4775	230/10295	300/15465	300/3045	300/12590	300/20000
	14	0.28		43/4520	64/8805	97/5045	146/10590	195/15350	199/3790	299/7415	300/16880
	16	0.32		29/4355	43/7515	65/5160	98/10465	131/14430	135/4485	202/8820	270/12530
	18	0.36			30/6450	46/5165	69/9910	92/13210	95/4915	143/9595	191/13565
	20	0.40				33/5090	50/8995	67/11995	69/5190	104/9945	139/13700
	22	0.44				25/4940	38/8130	51/10840	52/5325	79/10025	105/13385
	24	0.48					29/7350	39/9805	40/5380	61/9625	81/12835
	26	0.52						31/8875	32/5365	48/9140	64/12185
L/600	28	0.56							25/5295	38/8620	51/11490
	30	0.60								31/8095	41/10795

Design Assumptions:

- 1) Tabulated values are as per NDS and IBC/IRC 2015 & 2018, where the first value represents the maximum lateral wind load in plf, and the second value is the maximum vertical load in lbs.
- 2) The vertical dead load shall not exceed the vertical live/construction/snow load.
- 3) Buckling length coefficient $K_e = 0.85$ (for serviceability, $K_e = 1.0$).
- 4) Load duration factor $C_D = 1.6$
- 5) Axial load eccentricity = 1/6 of the wall thickness (calculations as per NDS 15.4.1 for combined bending and eccentric axial compression loads).
- 6) Lateral wind deflection limited to max. 1".
- 7) Full-width blocking at max. 8 ft. on center, or a max. unbraced length of 8 ft.
- 8) Compression perpendicular to grain for the wall plate = 425 psi

Column Design Example:

Enclosed building, Wall Zone 4 (Center), Exposure Category B, 20 ft. Column, Unbraced length = 8 ft. or less, Tributary width = 6 ft.

IRC/IBC 2015 Building Code, Lateral wind deflection criteria = L/360

Basic Wind Speed, $V = 115$ (mph), Actual vertical load = 4000 lbs

- Determine the effective wind area for the 20 ft. Column from Table 2, $A = 100$ ft²
- Determine the design wind load from Table 3 = 22.8 psf
- Calculate the design wind load in plf = $22.8 \times (6) = 136.8$ plf -140 plf
- The vertical load in lbs = 4000 lbs
- Scan across the 20 ft. row in the L/360 section and find a cell with the lateral wind load and the vertical concentrated load equal or higher than 140/4000.
- 3 plies - 1-1/2" x 9-1/4" Column will be adequate
- Calculate the lateral concentrated reaction for the column to the plate connections = Lateral wind Load (plf) * Column Height (ft) / 2 = $140 \text{ plf} \times 20 \text{ ft} / 2 = 1400$ lbs

TABLE 15: COLUMNS - MAXIMUM ALLOWABLE LATERAL WIND LOAD (PLF)/VERTICAL LOAD (LBS) - 1-1/2" THICKNESS - 1.55E LSL

Deflection Ratio	Wall Height (ft)	Max. Lateral Deflection (in)	1.55E Tolko T-TEC LSL: 1-1/2" thickness								
			3-1/2" Wall Thickness 1-1/2" x 3-1/2"	5-1/2" Wall Thickness 1-1/2" x 5-1/2"		7-1/4" Wall Thickness 1-1/2" x 7-1/4"			9-1/4" Wall Thickness 1-1/2" x 9-1/4"		
			2-ply	2-ply	3-ply	2-ply	3-ply	4-ply	2-ply	3-ply	4-ply
L/180	8	0.53	227/1900	300/4550	300/10515	300/6940	300/13865	300/18485	300/9210	300/17690	300/20000
	10	0.67	117/2145	295/2215	300/9115	300/4975	300/13865	300/18485	300/7455	300/17690	300/20000
	12	0.80	68/2110	205/1980	300/4060	270/2945	300/10570	300/18485	300/4945	300/16500	300/20000
	14	0.93	42/1800	150/1745	226/3070	198/2735	297/5135	300/13385	253/3400	300/11245	300/20000
	16	1.00	27/1575	104/2050	156/3400	152/2515	228/4565	300/6470	194/3225	291/5930	300/15485
	18	1.00		65/2680	97/4185	120/2295	180/3990	240/5325	153/3045	229/5460	300/8200
	20	1.00		42/2860	64/4315	97/2085	145/3450	194/4605	124/2860	186/5025	248/6810
	22	1.00		29/2770	43/4175	66/2975	100/4780	133/6375	102/2665	153/4590	205/6120
	24	1.00			31/3925	47/3460	70/5340	94/7125	86/2485	129/4130	172/5505
	26	1.00				34/3645	51/5485	68/7315	70/2600	106/4225	141/5630
	28	1.00				25/3595	38/5410	51/7215	52/3450	79/5500	105/7335
30	1.00					29/5220	38/6960	40/3985	60/6175	80/8235	
L/240	8	0.40	170/2670	300/4550	300/10515	300/6940	300/13865	300/18485	300/9210	300/17690	300/20000
	10	0.50	87/2705	295/2215	300/9115	300/4975	300/13865	300/18485	300/7455	300/17690	300/20000
	12	0.60	51/2535	195/2280	293/4350	270/2945	300/10570	300/18485	300/4945	300/16500	300/20000
	14	0.70	32/2090	123/2770	185/5045	198/2735	297/5135	300/13385	253/3400	300/11245	300/20000
	16	0.80		83/2975	124/5000	152/2515	228/4565	300/6470	194/3225	291/5930	300/15485
	18	0.90		58/3005	88/4695	120/2295	180/3990	240/5325	153/3045	229/5460	300/8200
	20	1.00		42/2860	64/4315	97/2085	145/3450	194/4605	124/2860	186/5025	248/6810
	22	1.00		29/2770	43/4175	66/2975	100/4780	133/6375	102/2665	153/4590	205/6120
	24	1.00			31/3925	47/3460	70/5340	94/7125	86/2485	129/4130	172/5505
	26	1.00				34/3645	51/5485	68/7315	70/2600	106/4225	141/5630
	28	1.00				25/3595	38/5410	51/7215	52/3450	79/5500	105/7335
30	1.00					29/5220	38/6960	40/3985	60/6175	80/8235	
L/360	8	0.27	113/3380	300/4550	300/10515	300/6940	300/13865	300/18485	300/9210	300/17690	300/20000
	10	0.33	58/3260	223/3735	300/9115	300/4975	300/13865	300/18485	300/7455	300/17690	300/20000
	12	0.40	34/2975	130/4080	195/8440	270/2945	300/10570	300/18485	300/4945	300/16500	300/20000
	14	0.47		82/4190	123/7950	186/3220	280/6180	300/13385	253/3400	300/11245	300/20000
	16	0.53		55/4135	83/7060	126/3810	189/7265	252/9915	194/3225	291/5930	300/15485
	18	0.60		39/3975	58/6225	88/4130	133/7585	177/10115	153/3045	229/5460	300/8200
	20	0.67		28/3640	42/5480	65/4275	97/7380	130/9845	124/2860	186/5025	248/6810
	22	0.73			32/4840	48/4305	73/7000	97/9335	101/2825	151/4870	202/6490
	24	0.80				37/4245	56/6550	75/8735	78/3330	117/5650	156/7535
	26	0.87				29/4050	44/6090	59/8120	61/3665	92/6050	123/8065
	28	0.93					35/5640	47/7525	49/3870	74/6190	98/8255
30	1.00					29/5220	38/6960	40/3985	60/6175	80/8235	
L/600	8	0.16	68/3920	257/5015	300/10515	300/6940	300/13865	300/18485	300/9210	300/17690	300/20000
	10	0.20	35/3720	133/5285	200/10515	299/4975	300/13865	300/18485	300/7455	300/17690	300/20000
	12	0.24		78/5340	117/10515	176/5555	264/12065	300/18485	300/4945	300/16500	300/20000
	14	0.28		49/5255	74/10230	112/5860	168/12375	224/18005	228/4425	300/11245	300/20000
	16	0.32		33/5060	49/8720	75/5990	113/12200	151/16745	155/5210	232/10300	300/15485
	18	0.36			35/7475	53/5990	80/11480	106/15310	109/5705	164/11185	219/15805
	20	0.40			25/6450	39/5895	58/10400	78/13865	80/6005	120/11565	160/15875
	22	0.44				29/5715	44/9395	58/12530	60/6170	90/11610	121/15480
	24	0.48					34/8490	45/11325	46/6225	70/11130	93/14840
	26	0.52					26/7685	35/10250	36/6205	55/10555	73/14075
	28	0.56						28/9290	29/6120	44/9955	59/13270
30	0.60								36/9340	48/12450	

See Design Assumptions from Table 14

FIGURE 5: COLUMN TRIBUTARY WIDTH AND TRIBUTARY AREA

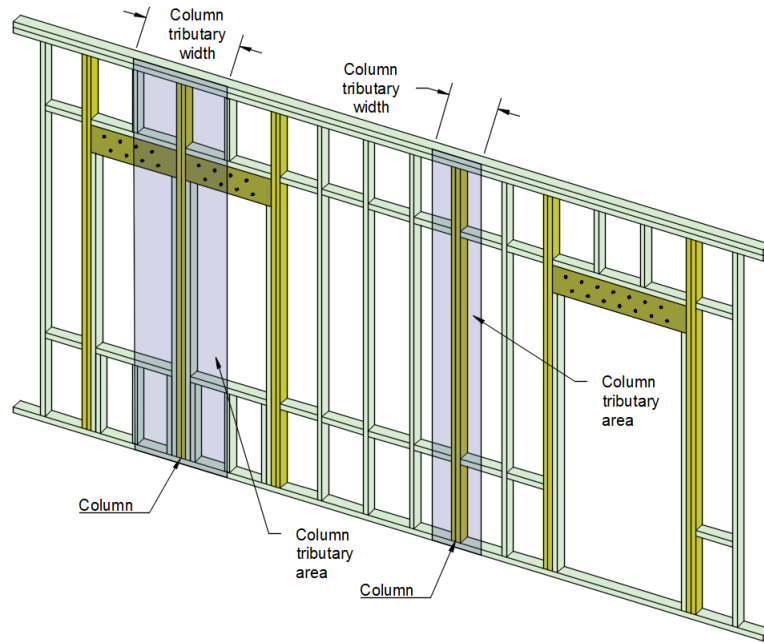


FIGURE 6: KING-STUD TRIBUTARY WIDTH AND TRIBUTARY AREA

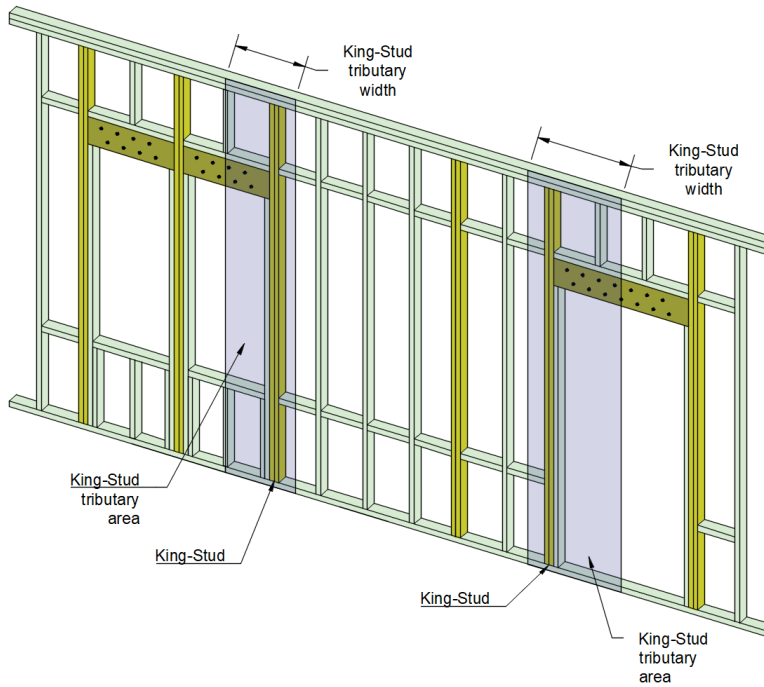


TABLE 16: COLUMNS/KING-STUDS - MAXIMUM ALLOWABLE LATERAL WIND LOAD (plf)/VERTICAL LOAD (lbs) - 1-3/4" THICKNESS - 1.35E LSL

Deflection Ratio	Wall Height (ft)	Max. Lateral Deflection (in)	1.35E Tolko T-TEC LSL: 1-3/4" thickness								
			3-1/2" Wall Thickness 1-3/4" x 3-1/2"	5-1/2" Wall Thickness 1-3/4" x 5-1/2"		7-1/4" Wall Thickness 1-3/4" x 7-1/4"			9-1/4" Wall Thickness 1-3/4" x 9-1/4"		
			2-plys	2-plys	3-plys	2-plys	3-plys	4-plys	2-plys	3-plys	4-plys
L/180	8	0.53	230/2240	300/6625	300/12270	300/10050	300/16175	300/20000	300/13200	300/20000	300/20000
	10	0.67	119/2450	300/4075	300/12270	300/8050	300/16175	300/20000	300/11455	300/20000	300/20000
	12	0.80	69/2180	265/1840	300/7230	300/5280	300/16175	300/20000	300/9085	300/20000	300/20000
	14	0.93	43/1840	167/2630	251/4465	274/2690	300/10690	300/19890	300/5940	300/18940	300/20000
	16	1.00	27/1605	105/3250	158/5095	210/2395	300/5145	300/12810	268/3595	300/13215	300/20000
	18	1.00		66/3495	99/5340	150/3065	225/5095	300/6875	212/3330	300/7210	300/17825
	20	1.00		43/3390	65/5155	99/4205	148/6655	198/8875	171/3060	257/5190	300/10835
	22	1.00		29/3170	44/4810	67/4725	101/7160	135/9550	139/2980	209/4890	279/6520
	24	1.00			31/4415	48/4735	72/7160	96/9550	99/4465	148/7175	198/9570
	26	1.00				34/4580	52/6915	69/9220	72/5335	108/8290	144/11055
L/240	8	0.40	173/3195	300/6625	300/12270	300/10050	300/16175	300/20000	300/13200	300/20000	300/20000
	10	0.50	89/3115	300/4075	300/12270	300/8050	300/16175	300/20000	300/11455	300/20000	300/20000
	12	0.60	51/2610	198/3910	298/7300	300/5280	300/16175	300/20000	300/9085	300/20000	300/20000
	14	0.70	32/2135	125/4160	188/7040	274/2690	300/10690	300/19890	300/5940	300/18940	300/20000
	16	0.80		84/4145	126/6440	192/3345	288/5860	300/12810	268/3595	300/13215	300/20000
	18	0.90		59/3795	89/5780	135/3920	203/6545	271/8725	212/3330	300/7210	300/17825
	20	1.00		43/3390	65/5155	99/4205	148/6655	198/8875	171/3060	257/5190	300/10835
	22	1.00		29/3170	44/4810	67/4725	101/7160	135/9550	139/2980	209/4890	279/6520
	24	1.00			31/4415	48/4735	72/7160	96/9550	99/4465	148/7175	198/9570
	26	1.00				34/4580	52/6915	69/9220	72/5335	108/8290	144/11055
L/360	8	0.27	115/4100	300/6625	300/12270	300/10050	300/16175	300/20000	300/13200	300/20000	300/20000
	10	0.33	59/3790	226/5550	300/12270	300/8050	300/16175	300/20000	300/11455	300/20000	300/20000
	12	0.40	34/3060	132/5710	198/10960	298/5315	300/16175	300/20000	300/9085	300/20000	300/20000
	14	0.47		83/5605	125/9535	189/5970	284/11435	300/19890	300/5940	300/18940	300/20000
	16	0.53		56/5320	84/8230	128/6260	192/11465	256/15295	262/3915	300/13215	300/20000
	18	0.60		39/4695	59/7110	90/6310	135/10715	180/14285	185/5000	278/8915	300/17825
	20	0.67		29/4080	43/6175	66/6210	99/9850	132/13135	136/5650	204/9955	272/13290
	22	0.73			32/5395	49/5945	74/8975	99/11970	102/6025	153/10185	205/13585
	24	0.80			25/4745	38/5410	57/8160	76/10880	79/6210	118/10050	158/13405
	26	0.87				30/4920	45/7420	60/9895	62/6250	93/9725	125/12965
L/600	8	0.16	69/4810	261/7065	300/12270	300/10050	300/16175	300/20000	300/13200	300/20000	300/20000
	10	0.20	35/4350	136/7200	204/12270	300/8050	300/16175	300/20000	300/11455	300/20000	300/20000
	12	0.24		79/7080	119/12270	179/8355	268/16175	300/20000	300/9085	300/20000	300/20000
	14	0.28		50/6755	75/11550	113/8465	170/16175	227/20000	232/8340	300/18940	300/20000
	16	0.32		33/6290	50/9700	76/8380	115/15755	153/20000	157/8825	236/17170	300/20000
	18	0.36			35/8225	54/8140	81/13970	108/18625	111/9065	167/17235	222/20000
	20	0.40			26/7040	39/7790	59/12380	79/16510	81/9120	122/16805	163/20000
	22	0.44				29/7300	44/11000	59/14665	61/9045	92/15660	123/20000
	24	0.48					34/9800	46/13065	47/8855	71/14510	95/19350
	26	0.52					27/8770	36/11695	37/8595	56/13405	75/17875
	28	0.56						29/10510	30/8220	45/12360	60/16480
	30	0.60								36/11405	48/15210

See Design Assumptions from Table 14

SECTION 4: HEADERS LOAD TABLES

TABLE 17: HEADERS - MAXIMUM ALLOWABLE LATERAL WIND LOAD (PLF)/VERTICAL LOAD (PLF) [LATERAL WIND LOAD DEFLECTION = L/360 - 1-1/2" THICKNESS] - 1.35E LSL

Thickness	1.35E Tolko T-TEC LSL - 1-1/2"											
Depth	7-1/4"				9-1/4"				11-1/4"			
# Plies	1	2	3	4	1	2	3	4	1	2	3	4
Rough Opening (ft)	1.35E Tolko T-TEC: Header Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)											
3	145/575	500/1155	500/1730	500/2310	190/575	500/1150	500/1730	500/2305	230/575	500/1150	500/1725	500/2300
4	65/435	300/870	500/1310	500/1745	80/435	380/870	500/1305	500/1740	100/435	465/870	500/1305	500/1740
5	30/350	155/700	500/1050	500/1400	40/350	200/700	500/1050	500/1400	50/345	245/695	500/1045	500/1395
6		90/540	305/740	500/1015	25/290	115/580	390/875	500/1165	30/290	145/580	475/870	500/1165
7		55/365	195/505	450/620		75/480	250/660	500/850		90/495	305/745	500/995
8		40/255	130/355	305/440		50/330	170/460	390/570		60/405	205/555	475/690
9		25/185	90/260	220/320		35/240	120/330	280/410		40/290	145/400	340/500
10			65/190	160/240		25/175	85/245	205/305		30/210	105/295	250/370
11			50/145	120/185			65/185	155/230			80/225	190/280
12			40/110	95/140			50/145	120/180			60/170	145/215

Design Assumptions:

- 1) Tabulated values are as per IBC/IRC 2015 & 2018, where the first value represents the maximum allowable lateral wind load (plf), and the second value is the maximum vertical load (plf).
- 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 $C_D = 1.6$ for the combined lateral and vertical load.
- 5) Load duration factor $C_D = 1.0$ for the vertical load only.
- 6) Vertical deflection, $L/360$ or $5/16"$, whichever is less.
- 7) Maximum lateral deflection = $L/360$.
- 8) If the header is supported by end trimmers, the header must have the width fully supported.
- 9) Minimum end bearing support = $1.5"$.
- 10) Header's depth is parallel to the face of the wall.

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

Header Design Example:

Enclosed Building, Wall Zone 4 (Center), Exposure Category B, 6 ft. rough opening, 10 ft. header tributary width
If the header is in both Zones 4 & 5, select the most restrictive zone, which is Zone 5.
IRC/IBC 2015 Building Code, Lateral wind deflection criteria = $L/360$
Basic Wind Speed, $V = 115$ (mph), Actual vertical load = 800 plf

Determine the effective wind area, A , for the header = $\max(6 \times 10, 6 \times 6/3) = \max(60, 12) = 60$ psf

Determine the design wind load from Table 3 = 23.9 psf

- the wind pressure corresponding to the lower wind effective area (50 ft²) from Table 3 = 23.9 psf, or
- by interpolation, the wind pressure = $23.9 - [(60-50) \times (23.9-22.8)/(100-50)] = 23.68$ psf

Calculate the design wind load in plf = 23.9 psf $\times$ 10 ft. = 239 plf -240 plf

Scan across the 6 ft. rough opening row and the column that meets the 240/800 plf for the lateral/vertical loads.

4 plies: 1-1/2" $\times$ 7-1/4", or 3 plies: 1-1/2" $\times$ 9-1/4" will be adequate.

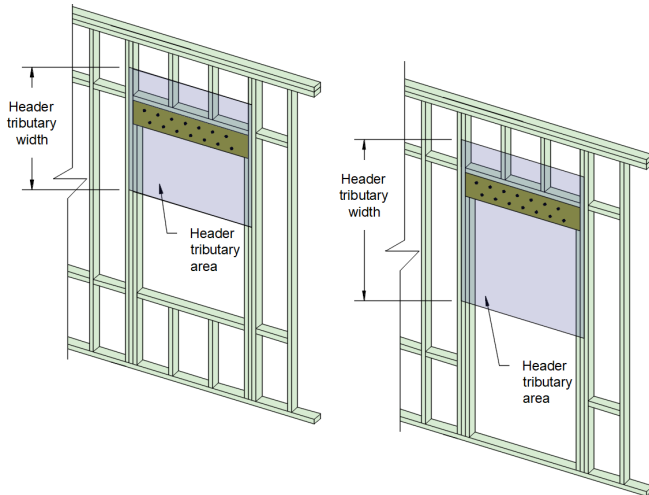
Calculate the lateral concentrated reaction for the header to the king-stud/column connections = Lateral wind Load (plf) $\times$ Rough opening (ft)/2 = 240 plf $\times$ 6 ft/2 = 720 lbs

Calculate the vertical reaction transferred by the header to the trimmer, or to the king-stud/column = Vertical load (plf) $\times$ Rough opening (ft)/2 = 800 plf $\times$ 6 ft/2 = 2400 lbs

TABLE 18: HEADERS - MAXIMUM ALLOWABLE LATERAL WIND LOAD (PLF)/VERTICAL LOAD (PLF) [LATERAL WIND LOAD DEFLECTION = L/360 - 1-1/2" THICKNESS] - 1.55E LSL

Thickness	1.55E Tolko T-TEC LSL - 1-1/2"											
Depth	7-1/4"				9-1/4"				11-1/4"			
# Plies	1	2	3	4	1	2	3	4	1	2	3	4
Rough opening (ft)	1.55E Tolko T-TEC: Header Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)											
3	170/575	500/1155	500/1730	500/2310	215/575	500/1150	500/1730	500/2305	265/575	500/1150	500/1725	500/2300
4	70/435	340/870	500/1310	500/1745	95/435	435/870	500/1305	500/1740	115/435	500/870	500/1305	500/1740
5	35/350	180/700	500/1050	500/1400	45/350	230/700	500/1050	500/1400	60/345	280/695	500/1045	500/1395
6		105/585	350/810	500/1145	25/290	135/580	445/875	500/1165	35/290	165/580	500/870	500/1165
7		65/390	225/540	500/675		85/500	285/690	500/925		105/495	350/745	500/995
8		45/270	150/375	350/465		55/345	195/475	450/595		70/415	235/575	500/735
9		30/190	105/270	250/340		40/245	135/340	320/430		50/295	165/415	390/515
10			75/200	185/250		30/180	100/250	235/315		35/215	120/305	285/380
11			60/150	140/190			75/190	180/240		25/165	90/230	215/290
12			45/115	105/145			55/145	135/185			70/175	170/225

See Design Assumptions from Table 17

FIGURE 7: HEADER TRIBUTARY WIDTH AND TRIBUTARY AREA**TABLE 19: HEADERS - MAXIMUM ALLOWABLE LATERAL WIND LOAD (plf)/VERTICAL LOAD (plf) [LATERAL WIND LOAD DEFLECTION = L/360 - 1-3/4" THICKNESS] - 1.35E LSL**

Thickness	1.35E Tolko T-TEC LSL -1-3/4"											
Depth	7-1/4"				9-1/4"				11-1/4"			
# Plies	1	2	3	4	1	2	3	4	1	2	3	4
Rough Opening (ft)	1.35E Tolko T-TEC: Header Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)											
3	235/670	500/1345	500/2020	500/2695	300/670	500/1345	500/2020	500/2690	365/670	500/1340	500/2015	500/2685
4	100/505	465/1015	500/1525	500/2035	130/505	500/1015	500/1525	500/2035	155/505	500/1015	500/1520	500/2030
5	50/405	245/815	500/1225	500/1635	65/405	315/815	500/1225	500/1630	80/405	385/815	500/1220	500/1630
6	30/340	145/680	475/970	500/1365	40/340	185/680	500/1020	500/1360	45/340	225/680	500/1020	500/1360
7		90/505	305/695	500/955	25/290	120/585	390/875	500/1170	30/290	145/580	475/870	500/1165
8		60/370	205/510	480/625		80/495	265/685	500/900		95/505	325/760	500/1015
9		45/275	145/380	340/470		55/360	190/500	435/620		65/445	230/610	500/770
10		30/205	105/290	250/360		40/270	140/375	320/465		50/330	170/455	395/565
11			80/225	190/280		30/205	105/285	245/355		35/250	125/350	300/435
12			60/175	150/220			80/225	190/280		25/195	95/270	230/340

See Design Assumptions from Table 17

Note: Holes shall not be drilled in headers subjected to vertical and lateral wind loads.**TABLE 20: HEADERS - MAXIMUM ALLOWABLE LATERAL WIND LOAD (plf)/VERTICAL LOAD (plf) [LATERAL WIND LOAD DEFLECTION = L/600 - 1-1/2" THICKNESS] - 1.35E LSL**

Thickness	1.35E Tolko T-TEC LSL -1-1/2"											
Depth	7-1/4"				9-1/4"				11-1/4"			
# Plies	1	2	3	4	1	2	3	4	1	2	3	4
Rough Opening (ft)	1.35E Tolko T-TEC: Header Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)											
3	85/575	400/1155	500/1730	500/2310	110/575	500/1150	500/1730	500/2305	135/575	500/1150	500/1725	500/2300
4	35/435	180/870	500/1310	500/1745	45/435	225/870	500/1305	500/1740	60/435	275/870	500/1305	500/1740
5		95/700	305/1050	500/1400	25/350	120/700	390/1050	500/1400	30/345	145/695	475/1045	500/1395
6		55/585	180/845	415/1065		70/580	230/875	500/1165		85/580	285/870	500/1165
7		35/400	115/570	270/720		45/500	150/740	345/940		55/495	180/745	420/995
8			80/400	185/505		30/360	100/510	235/650		35/435	120/620	285/790
9			55/285	130/365			70/365	165/465		25/310	85/445	205/565
10			40/210	95/270			50/270	120/345			60/325	150/415
11			30/160	70/205			40/200	90/260			45/245	110/315
12				55/155			30/155	70/200			35/190	85/240

See Design Assumptions from Table 17

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

TABLE 21: HEADERS - MAXIMUM ALLOWABLE LATERAL WIND LOAD (PLF)/VERTICAL LOAD (PLF) [LATERAL WIND LOAD DEFLECTION = L/600 - 1-1/2" THICKNESS] - 1.55E LSL

Thickness	1.55E Tolko T-TEC LSL - 1-1/2"											
Depth	7-1/4"				9-1/4"				11-1/4"			
# Plies	1	2	3	4	1	2	3	4	1	2	3	4
Rough opening (ft)	1.55E Tolko T-TEC: Header Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)											
3	100/575	460/1155	500/1730	500/2310	130/575	500/1150	500/1730	500/2305	160/575	500/1150	500/1725	500/2300
4	40/435	205/870	500/1310	500/1745	55/435	260/870	500/1305	500/1740	65/435	320/870	500/1305	500/1740
5		105/700	350/1050	500/1400	25/350	135/700	450/1050	500/1400	35/345	165/695	500/1045	500/1395
6		60/585	210/875	475/1155		80/580	265/875	500/1165		95/580	325/870	500/1165
7		40/420	135/600	310/765		50/500	170/750	395/975		60/495	210/745	480/995
8		25/290	90/415	210/530		35/370	115/525	270/670		40/435	140/635	330/810
9			65/295	150/380		25/260	80/375	190/480		30/315	100/455	235/580
10			45/215	110/280			60/275	140/355			70/330	170/425
11			35/165	80/210			45/205	105/265			55/250	130/320
12			25/125	65/160			35/160	80/205			40/190	100/245

See Design Assumptions from Table 17

TABLE 22: HEADERS - MAXIMUM ALLOWABLE LATERAL WIND LOAD (plf)/VERTICAL LOAD (plf) [LATERAL WIND LOAD DEFLECTION = L/600 - 1-3/4" THICKNESS] - 1.35E LSL

Thickness	1.35E Tolko T-TEC LSL - 1-3/4"											
Depth	7-1/4"				9-1/4"				11-1/4"			
# Plies	1	2	3	4	1	2	3	4	1	2	3	4
Rough Opening (ft)	1.35E Tolko T-TEC: Header Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)											
3	140/670	500/1345	500/2020	500/2695	180/670	500/1345	500/2020	500/2690	215/670	500/1340	500/2015	500/2685
4	60/505	280/1015	500/1525	500/2035	75/505	355/1015	500/1525	500/2035	95/505	435/1015	500/1520	500/2030
5	30/405	145/815	475/1225	500/1635	40/405	190/815	500/1225	500/1630	50/405	230/815	500/1220	500/1630
6		85/680	285/1025	500/1365		110/680	360/1020	500/1360	25/340	135/680	440/1020	500/1360
7		55/555	180/795	415/1005		70/585	235/875	500/1170		85/580	285/870	500/1165
8		35/400	125/575	285/730		45/510	160/765	365/975		55/505	195/760	445/1015
9		25/300	85/425	205/540		30/395	110/560	260/710		40/450	135/675	320/865
10			65/320	150/410		25/290	80/415	190/530		30/355	100/505	235/645
11			45/245	115/315			60/315	145/405			75/385	180/490
12			35/180	90/240			45/245	110/315			55/295	135/380

See Design Assumptions from Table 17

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

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

TABLE 23: TRIMMER/JACK STUD - MAXIMUM VERTICAL LOAD (lbs) - 1-1/2" WIDTH - 1.35E LSL

Trimmer/Jack Stud Height (ft.)	1.35E Tolko T-TEC LSL: Trimmer/Jack Stud - Maximum Vertical Load (lbs)							
	1-1/2" x 3-1/2"		1-1/2" x 5-1/2"		1-1/2" x 7-1/4"		1-1/2" x 9-1/4"	
	1 ply	2 plies	1 ply	2 plies	1 ply	2 plies	1 ply	2 plies
6	700	3275	1055	4920	1455	6790	1850	8675
7		2730		4105		5665		7230
8		2325		3495		4825		6155
9		2020		3030		4180		5335
10		1765		2650		3670		4685
11		1520		2280		3150		4025
12		1310		1970		2720		3475

Design Assumptions:

- 1) Tabulated values are for Trimmers/Jack Studs transferring vertical loads only.
- 2) Trimmers must support the full width of the header/plate.
- 3) Tabulated values shall not be increased for load durations $C_o > 1.0$.

How to size a Trimmer/Jack Stud:

- 1) Determine the clear height of the Trimmer/Jack Stud
- 2) Scan the cells with the heights higher or equal to the actual trimmer height, and select a size with the vertical load capacity $\geq$ reaction/vertical load transferred by the header/plate.

Example:

Header Reaction (lbs) = 1000 lbs
 Trimmer height = 5 ft.
 1-1/2" x 5-1/2" - 1 ply will be adequate.

TABLE 24: TRIMMER/JACK STUD - MAXIMUM VERTICAL LOAD (LBS) - 1-1/2" WIDTH - 1.55E LSL

Trimmer/Jack Stud Height (ft.)	1.55E Tolko T-TEC LSL: Trimmer/Jack Stud - Maximum Vertical Load (lbs)							
	1-1/2" x 3-1/2"		1-1/2" x 5-1/2"		1-1/2" x 7-1/4"		1-1/2" x 9-1/4"	
	1 ply	2 plies	1 ply	2 plies	1 ply	2 plies	1 ply	2 plies
6	805	3760	1205	5650	1665	7800	2135	9960
7		3135		4705		6500		8305
8		2670		4015		5545		7075
9		2320		3475		4800		6130
10		2030		3050		4215		5375
11		1770		2660		3680		4705
12		1530		2295		3175		4055

See Design Assumptions from Table 23

TABLE 25: TRIMMER/JACK STUD - MAXIMUM VERTICAL LOAD (lbs) - 1-3/4" WIDTH - 1.35E LSL

Trimmer/Jack Stud Height (ft.)	1.35E Tolko T-TEC LSL: Trimmer/Jack Stud - Maximum Vertical Load (lbs)							
	1-3/4" x 3-1/2"		1-3/4" x 5-1/2"		1-3/4" x 7-1/4"		1-3/4" x 9-1/4"	
	1 ply	2 plies	1 ply	2 plies	1 ply	2 plies	1 ply	2 plies
6	990	4570	1490	6855	2060	9475	2630	12090
7	815	3820	1220	5740	1695	7930	2170	10110
8		3265		4910		6770		8645
9		2840		4260		5890		7510
10		2495		3750		5175		6610
11		2220		3330		4610		5880
12		1980		2970		4110		5240
13		1735		2600		3595		4595
14		1525		2295		3175		4050

See Design Assumptions from Table 23

SECTION 6: WALL PLATE MAX. LATERAL WIND LOAD TABLES

TABLE 26: PLATES - MAXIMUM ALLOWABLE LATERAL WIND LOAD (plf)/VERTICAL LOAD (plf) [LATERAL WIND LOAD DEFLECTION = L/360 - 1-1/2" THICKNESS] - 1.35E LSL

Thickness	1-1/2"			
Depth	3-1/2"	5-1/2"	7-1/4"	9-1/4"
# Plies	1	1	1	1
Rough opening (ft)	1.35E Tolko T-TEC: Plate Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)			
3	255/50	255/140	255/185	255/235
4	160/20	190/60	190/75	190/100
5	85/15	155/30	155/35	155/50
6	50/10	130/15	130/20	130/25
7	30/5	110/5	110/10	110/15

Design Assumptions:

- 1) Tabulated values are as per IBC/IRC 2015 & 2018, where the first value represents the maximum allowable lateral wind load (plf), and the second value is the maximum vertical load (plf).
- 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 CD = 1.0. Tabulated values shall not be increased for a higher load duration.
- 5) Vertical deflection, L/360 or 5/16", whichever is less.
- 6) The plate must be supported by end trimmers if the plate transfers a vertical load in addition to the lateral load.
- 7) Minimum end bearing support = 1.5". Plate width must be fully supported at the bearing supports.
- 8) Plate's depth is perpendicular on the face of the wall.

Plate Design Example:

Enclosed Building, Wall Zone 4 (Center), Exposure Category B, 6 ft. rough opening, 2 ft. plate tributary width

If the plate is in both Zones 4 & 5, select the most restrictive zone, which is Zone 5.

IRC/IBC 2015 Building Code, Lateral wind deflection criteria = L/360

Basic Wind Speed, V = 115 (mph), Actual vertical load = 15 plf (it could be just the self-weight if there are no other uniform vertical loads transferred).

Determine the effective wind area, A, for the plate = max (6'2, 6'6/3) = max (12,12) = 12 psf

Determine the design wind load from Table 3 = 26.4 psf

- the wind pressure corresponding to the lower wind effective area (10 ft2) from Table 3 = 26.4 psf, or
- by interpolation, the wind pressure = 26.4 - [(12-10)x(26.4-23.9)/(50-10)] = 26.3 psf

Calculate the design wind load in plf = 26.4 psf * 2 ft. = 52.8 plf -53 plf

Scan across the 6 ft. rough opening row and the column that meets the 53/15 plf for the lateral/vertical loads.

1-ply: 1-3/4" x 3-1/2" will be adequate.

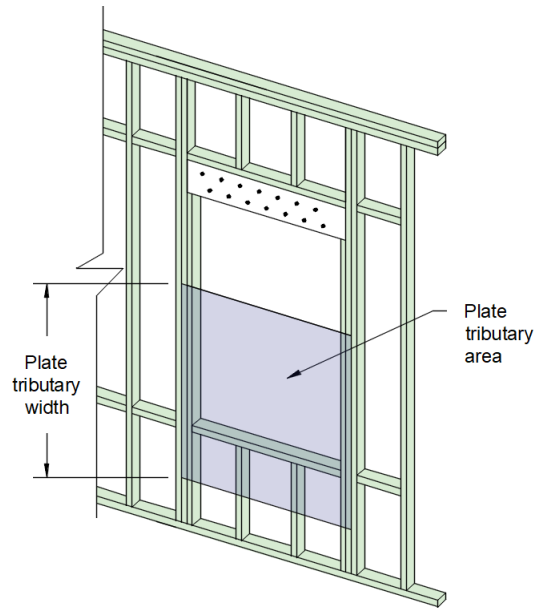
Calculate the lateral concentrated reaction for the plate to the king-stud/column connections = Lateral wind Load (plf)*Rough opening (ft)/2 = 53 plf* 6 ft/2 = 159 lbs

Calculate the vertical reaction transferred by the plate to the trimmer, or to the king-stud/column = Vertical load (plf)*Rough opening (ft)/2 = 15 plf * 6 ft/2 = 45 lbs

TABLE 27: PLATES - MAXIMUM ALLOWABLE LATERAL WIND LOAD (PLF)/VERTICAL LOAD (PLF) [LATERAL WIND LOAD DEFLECTION = L/360 - 1-1/2" THICKNESS] - 1.55E LSL

Thickness	1-1/2"			
Depth	3-1/2"	5-1/2"	7-1/4"	9-1/4"
# Plies	1	1	1	1
Rough opening (ft)	1.55E Tolko T-TEC: Plate Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)			
3	255/90	255/160	255/210	255/270
4	185/35	190/65	190/90	190/115
5	95/20	155/30	155/45	155/55
6	55/10	130/15	130/25	130/30
7	35/5	110/10	110/15	110/15

See Design Assumptions from Table 26

FIGURE 8: 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 28: PLATES - MAXIMUM ALLOWABLE LATERAL WIND LOAD (plf)/VERTICAL LOAD (plf) [LATERAL WIND LOAD DEFLECTION = L/360 - 1-3/4" THICKNESS] - 1.35E LSL

Thickness	1-3/4"			
Depth	3-1/2"	5-1/2"	7-1/4"	9-1/4"
# Plies	1	1	1	1
Rough opening (ft)	1.35E Tolko T-TEC: Plate Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)			
3	255/90	255/220	255/290	255/375
4	185/30	190/95	190/125	190/160
5	100/25	155/45	155/60	155/80
6	55/15	130/25	130/35	130/45
7	35/10	110/15	110/20	110/25

See Design Assumptions from Table 26

TABLE 29: PLATES - MAXIMUM ALLOWABLE LATERAL WIND LOAD (plf)/VERTICAL LOAD (plf) [LATERAL WIND LOAD DEFLECTION = L/600 - 1-1/2" THICKNESS] - 1.35E LSL

Thickness	1-1/2"			
Depth	3-1/2"	5-1/2"	7-1/4"	9-1/4"
# Plies	1	1	1	1
Rough opening (ft)	1.35E Tolko T-TEC: Plate Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)			
3	210/65	255/140	255/185	255/235
4	95/35	190/60	190/75	190/100
5	50/15	155/30	155/35	155/50
6	30/10	110/15	130/20	130/25
7		70/5	110/10	110/15

See Design Assumptions from Table 26

TABLE 30: PLATES - MAXIMUM ALLOWABLE LATERAL WIND LOAD (PLF)/VERTICAL LOAD (PLF) [LATERAL WIND LOAD DEFLECTION = L/600 - 1-1/2" THICKNESS] - 1.55E LSL

Thickness	1-1/2"			
Depth	3-1/2"	5-1/2"	7-1/4"	9-1/4"
# Plies	1	1	1	1
Rough opening (ft)	1.55E Tolko T-TEC: Plate Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)			
3	240/95	255/160	255/210	255/270
4	110/40	190/65	190/90	190/115
5	55/20	155/30	155/45	155/55
6	30/10	125/15	130/25	130/30
7		80/10	110/15	110/15

See Design Assumptions from Table 26

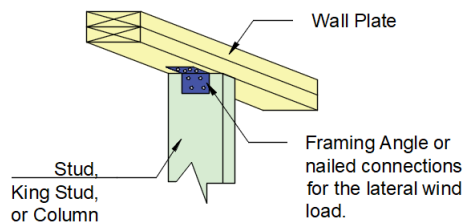
TABLE 31: PLATES - MAXIMUM ALLOWABLE LATERAL WIND LOAD (plf)/VERTICAL LOAD (plf) [LATERAL WIND LOAD DEFLECTION = L/600 - 1-3/4" THICKNESS] - 1.35E LSL

Thickness	1-3/4"			
Depth	3-1/2"	5-1/2"	7-1/4"	9-1/4"
# Plies	1	1	1	1
Rough opening (ft)	1.35E Tolko T-TEC: Plate Maximum Allowable Lateral Wind Load (PLF)/Vertical Load (PLF)			
3	245/90	255/220	255/290	255/375
4	110/60	190/95	190/125	190/160
5	60/30	155/45	155/60	155/80
6	35/15	130/25	130/35	130/45
7		80/15	110/20	110/25

See Design Assumptions from Table 26

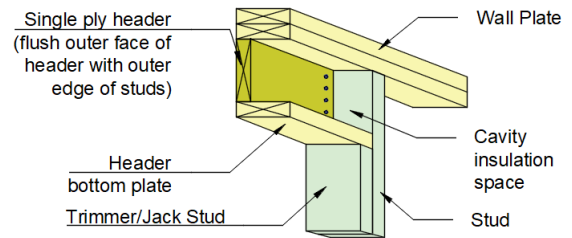
SECTION 7: WALL DETAILS

Detail 1. Stud to Wall Plate

**Note:**

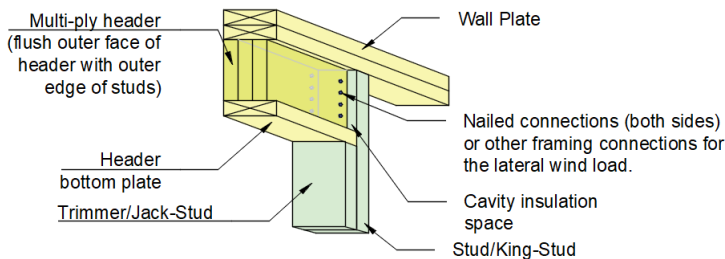
- 1) Lateral wind load connections as per Table 38.

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

**Notes:**

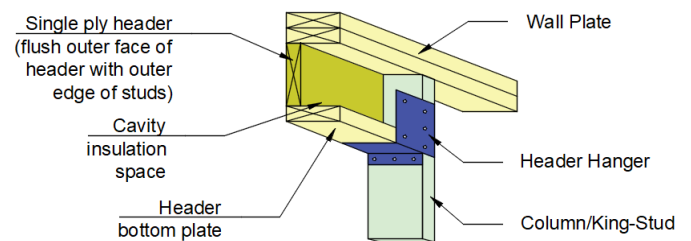
- 1) Fasten header to the stud/post as per Table 34 and Table 35.
- 2) Toenail top header to top plates with 8d box nails (0.113" x 2-1/2") at 6" o.c. spacing.
- 3) Face nail the header bottom edge through the bottom plate with 8d common nails (0.113" x 2-1/2") at 6" o.c. spacing.

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

**Notes:**

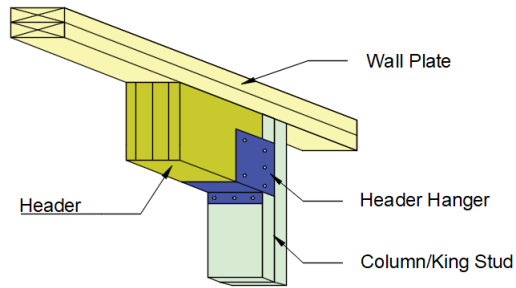
- 1) Fasten header to the Stud/King-Stud/Column as per Table 34 & Table 35.
- 2) Toenail top header to top plates with 8d box nails (0.113" x 2-1/2") at 6" o.c. spacing.
- 3) Face nail the header bottom edge through the bottom plate with 8d common nails (0.113" x 2-1/2") at 6" o.c. spacing.
- 4) Multi-ply header connections as per Table 37.
- 5) Vertical load transferred to the trimmer as per Table 23 - Table 25.

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 39.

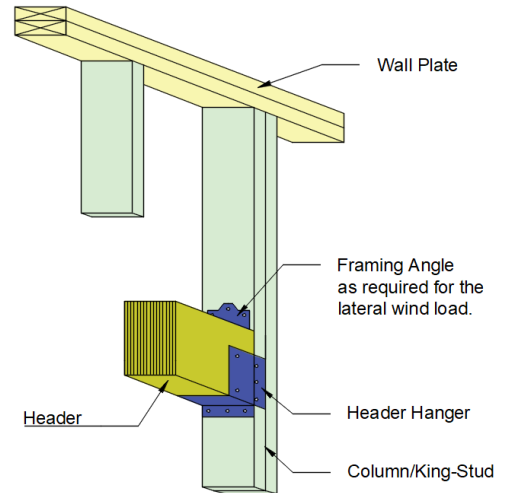
Detail 5. Top Header Supported by Hangers



Notes:

- 1) Multi-ply header connections as per Table 37.
- 2) Vertical and lateral load capacities as per Table 39.

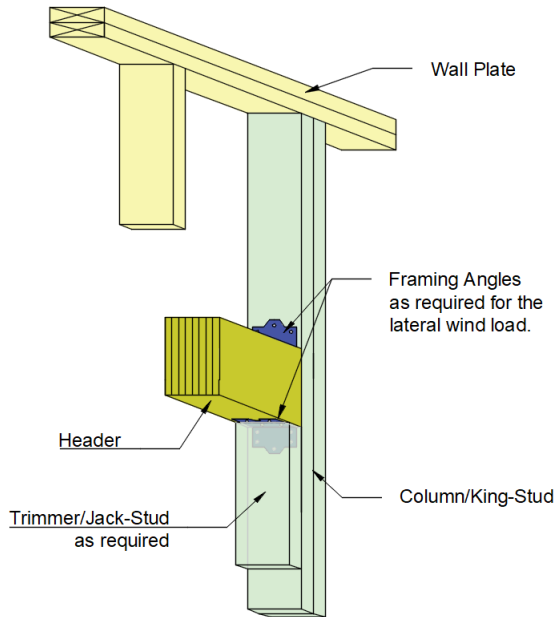
Detail 6. Header with Framing Angle Supported by Hangers



Notes:

- 1) Multi-ply header connections as per Table 37.
- 2) Lateral wind load connections as per Table 38 & Table 39.
- 3) Vertical load capacities as per Table 39.

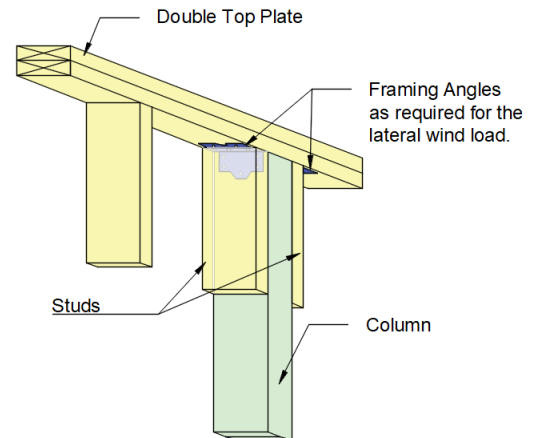
Detail 7. Header with Framing Angles Supported by Trimmers



Notes:

- 1) Multi-ply header connections as per Table 37.
- 2) Lateral wind load connections as per Table 38.
- 3) Vertical load transferred to the trimmer as per Table 23 - Table 25.

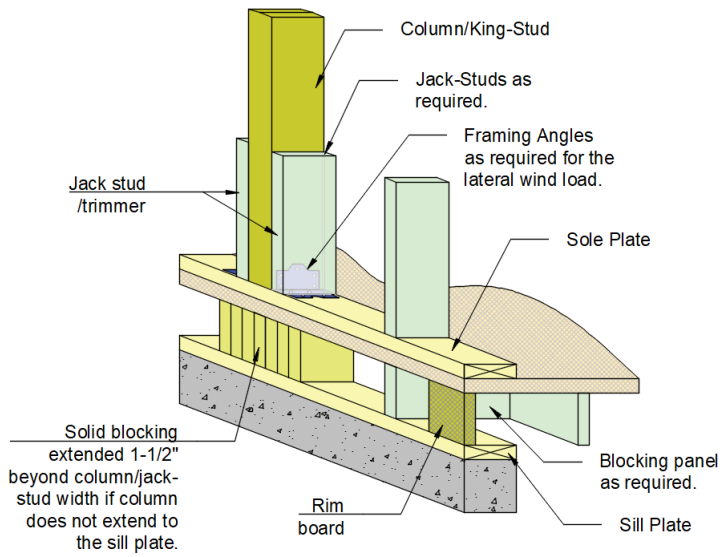
Detail 8. Column/King-Stud to Top Plate



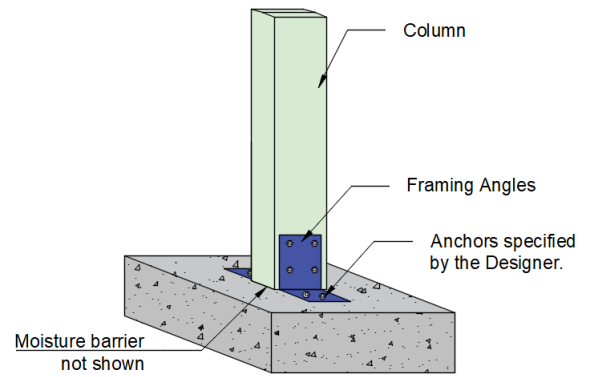
Notes:

- 1) Lateral wind load connections as per Table 38 (the studs transfer the lateral wind load).
- 2) The post transfers the concentrated vertical load.

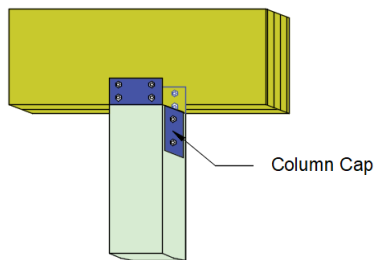
Detail 9. Column/King-Stud to Sill Plate



Detail 10. Column Base



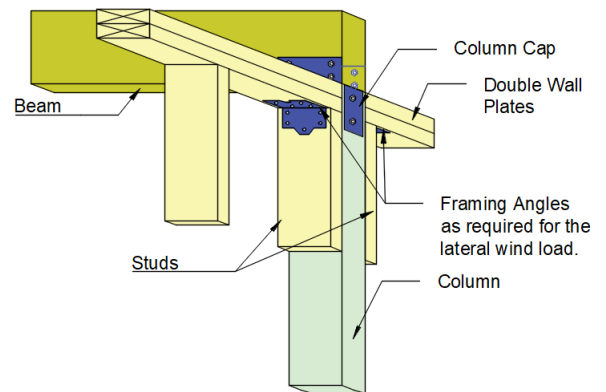
Detail 11. Column Cap



Note:

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

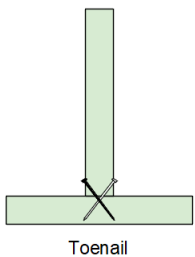
Detail 12. Column to Beam



Notes:

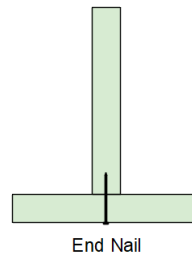
- 1) Lateral wind load connections as per Table 38 (the studs transfer the lateral wind load).
- 2) The post transfers the concentrated vertical load.

Detail 13. Toenail

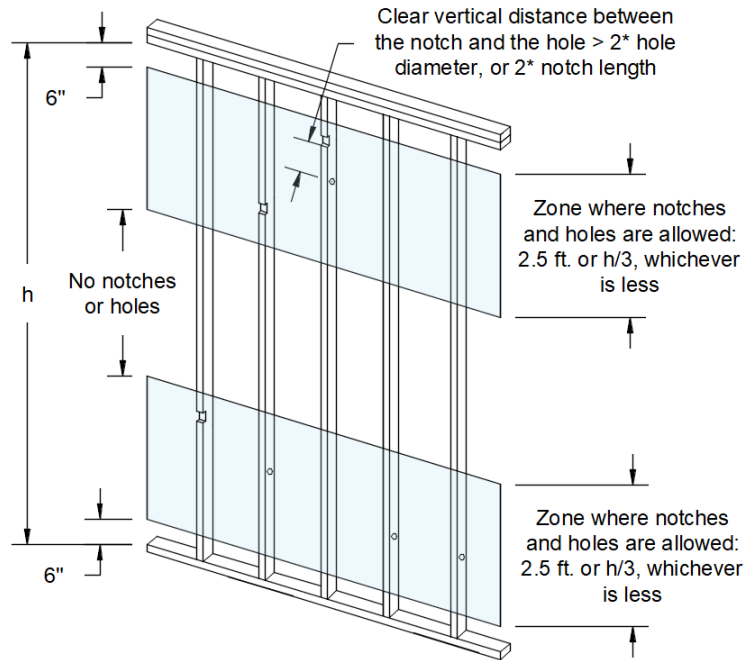
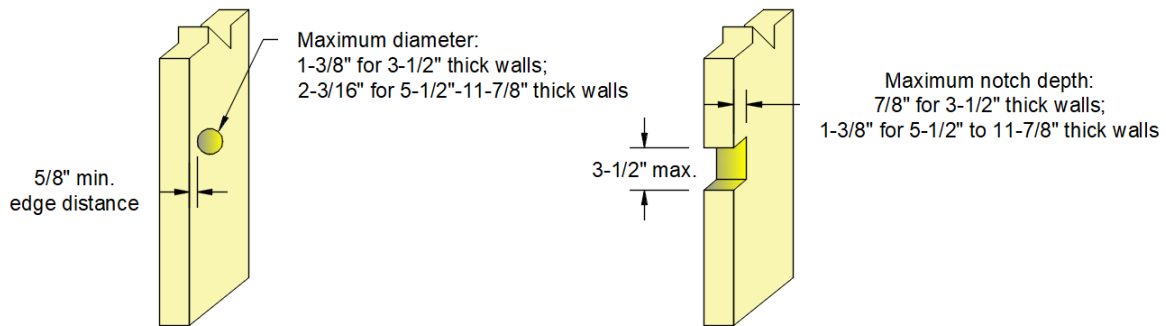


Fasteners capacities as per Table 35.

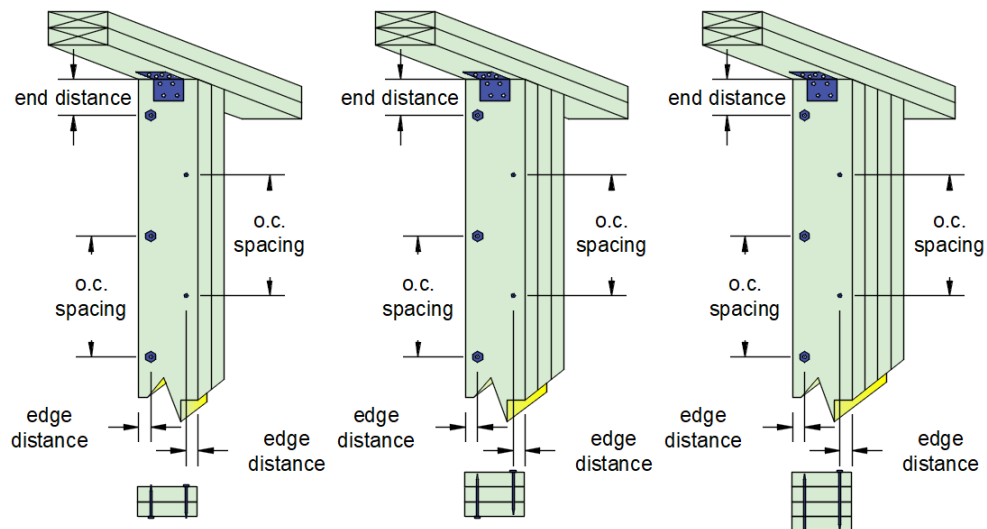
Detail 14. End Nail



Fasteners capacities as per Table 35.

Detail 15. Allowed Drilling and Notching Zones**Detail 16. Allowed Holes and Notches Dimensions****Note:**

- 1) Notches are only allowed on the narrow face.

Detail 17. Vertical Members - Multi-ply Connections**Note:**

- 1) Multi-ply member connections as per Table 36.

SECTION 8: WALL TOP PLATE: MAXIMUM OFFSET VERTICAL LOAD

FIGURE 9: OFFSET VERTICAL LOAD

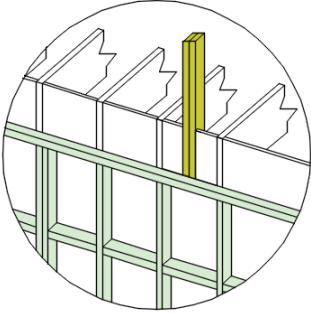


TABLE 32: MAX. CONCENTRATED LOAD (lbs) TRANSFERRED BY THE 1.35E TOLKO T-TEC LSL TOP PLATE

Top Plate Thickness	Plate Width	Max. Vertical Load (lbs)
(2) x 1-1/2"	3.5"	1170
	5.5"	1840
	7.25"	2400
	9.25"	2410
(2) x 1-3/4"	3.5"	1360
	5.5"	2140
	7.25"	2400
	9.25"	2410
(1) x 1-1/2"	3.5"	400
	5.5"	630
	7.25"	830
	9.25"	1060
(1) x 1-3/4"	3.5"	550
	5.5"	860
	7.25"	1140
	9.25"	1450

Design Assumptions:

- Maximum studs o.c. spacing = 24"
- Load duration factor $C_D = 1.0$. Tabulated values shall not be increased for higher load durations.
- A single concentrated load in between studs is allowed.
- 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 = 1000 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 load transferred to the left stud = $1000 \text{ lbs} \times 6" / 16" = 375 \text{ lbs}$

Concentrated load transferred to the right stud = $1000 \text{ lbs} \times 10" / 16" = 625 \text{ lbs}$

TABLE 33: MAX. OFFSET LOAD TRANSFERRED BY THE 1.55E TOLKO T-TEC LSL TOP PLATE

Top Plate Thickness	Plate Width	Max. Vertical Load (lbs)
(2) x 1-1/2"	3.5"	1570
	5.5"	2480
	7.25"	2710
	9.25"	2710
(1) x 1-1/2"	3.5"	510
	5.5"	810
	7.25"	1060
	9.25"	1360

See Design Assumptions from Table 32

SECTION 9: WALL FRAMING NAILED CONNECTIONS

TABLE 34: WALL FRAMING NAILED CONNECTIONS

Connection Type	Fastener type	Header thickness (in)	Fastener size	O.C. Spacing (in)	No. 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	4.5 - 7	0.128" x 3", 0.148" x 3"	-	4 - both sides	Toenail
	8d common nail		0.131" x 2-1/2"			
	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	

Reference: IRC 2018 (International Residential Code) - Table R602.3(1)

Design assumptions:

- The ultimate design wind speed shall not exceed 115 mph, the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet or less
- The net uplift at the top of the wall does not exceed 100 plf, where the net uplift is determined as per IRC - R802.11.
- If the net 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 uplift force is 100 plf or less.

TABLE 35: NAIL CAPACITIES

Tolko T-TEC LSL - main and side members				
Nail type	Size	Lateral capacity (lb)	Toe-Nail capacity (lb)	End-Nail capacity (lb)
8d box	0.113" x 2-1/2"	72	60	48
8d common	0.131" x 2-1/2"	97	81	65
10d box	0.128" x 3"	93	77	62
10d common	0.148" x 3"	118	98	79
16d common	0.162" x 3-1/2"	141	117	94

SPF - main or side member				
Nail type	Size	Lateral capacity (lb)	Toe-Nail capacity (lb)	End-Nail capacity (lb)
8d box	0.113" x 2-1/2"	61	51	41
8d common	0.131" x 2-1/2"	74	61	50
10d box	0.128" x 3"	79	66	53
10d common	0.148" x 3"	100	83	67
16d common	0.162" x 3-1/2"	120	100	80

Note:

- 1) Tabulated capacities are for a load duration $C_D = 1.0$.

SECTION 10: MULTI-PLY MEMBER CONNECTIONS

TABLE 36: MULTI-PLY CONNECTIONS FOR STUDS/KING-STUDS/COLUMNS (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 $\leq 7.25"$	10d common nail (0.148" x 3")	2	6"	2-1/4"	1"	Staggered; adjacent nails driven from opposite side
		9.25" $\leq$ Depth $< 11.875"$		3				
		Depth $\geq 14"$		4				
	3	5.5" $\leq$ Depth $\leq 7.25"$	SDS1/4x4-1/2, SDW22458, WSWH45, WS45 screws	2	8"	6"	2"	Staggered; adjacent screws driven from opposite side
		9.25" $\leq$ Depth $< 11.875"$		2				
		Depth $\geq 14"$		3				
	4	5.5" $\leq$ Depth $\leq 7.25"$	1/2" A307 Through Bolts; SDS1/4x6, SDW22600, WSWHS6, WS6 screws	2	8"	6"	2"	Staggered; adjacent screws driven from opposite side
		9.25" $\leq$ Depth $< 11.875"$		2				
		Depth $\geq 14"$		3				
1.75	2	Depth $\leq 7.25"$	16d common nail (0.162" x 3-1/2")	2	6"	2-1/4"	1"	Staggered; adjacent nails driven from opposite side
		9.25" $\leq$ Depth $< 11.875"$		3				
		Depth $\geq 14"$		4				
	3	5.5" $\leq$ Depth $\leq 11.875"$	SDW22500, MIFLK005 (F5.0FL), WSWH5, WS5 screws	2	8"	6"	2"	Staggered; adjacent screws driven from opposite side
		Depth $\geq 14"$		3				
	4	5.5" $\leq$ Depth $\leq 11.875"$	1/2" A307 Through Bolts; SDW22634, MIFLK634 (F6.7FL), WSWHS634 screws	2	8"	6"	2"	Staggered; adjacent screws driven from opposite side
		Depth $\geq 14"$		3				

TABLE 37: MULTI-PLY CONNECTIONS FOR HEADERS (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 38: 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. Lateral Wind Capacity (lbs)
Simpson Strong-Tie® Connectors				
A21	2	1.5	1.375	129
A23	2	1.5	2.75	460
A33	3	3	1.5	292
A34	1.438	1.438	2.5	400
A35	1.438	1.438	4.5	560
GA1	1	1	2.75	300
GA2	1	1	3.25	475
ML24Z	2	2	4	450
ML26Z	2	2	6	935
Mitek® Connectors				
JA1	1.5	1.5	1.25	195
A3	1.438	1.438	2.75	520
MP34	1.5	1.438	2.813	440
MPA1	1.5	1.438	4.5	515
ML24-TZ	2	2	4	655
ML26-TZ	2	2	6	1090

Notes:

- 1) Allowable loads have been increased for wind loading ($C_o = 1.6$); no further increase allowed.
- 2) Connectors are required on both sides to achieve the tabulated loads values. Fasteners quantity and size shall be as per manufacturer's recommendations.
- 3) Minimum Stud/King-Stud/Column Thickness = 1.5"

TABLE 39: HEADER HANGERS FOR VERTICAL AND LATERAL WIND LOADS

Manufacturer	Hanger Model	Dimensions (in)		Min. Post Size/ Thickness (in)	Fasteners		Max. Vertical Load (lbs)	Max. 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"	731	538
				3	(7) 16d x 2-1/2"	(4) 16d x 2-1/2"	864	830
				4.5	(9) 16d	(4) 16d	1114	830
	HH6	5.5	5.125	1.5	(10) 10d x 1-1/2"	(6) 10d x 1-1/2"	1045	834
				3	(10) 16d x 2-1/2"	(6) 16d x 2-1/2"	1238	1380
				4.5	(12) 16d	(6) 16d	1484	1380
Mitek®	HH44	3.563	6.25	4.5	(9) 16d	(4) 16d	1140	1195
	HH66	5.5	5.25	4.5	(12) 16d	(6) 16d	1518	1195

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 39.
- 3) Lateral wind loads have been increased for a load duration factor $C_o = 1.6$ with no further increase allowed.
- 4) Vertical loads are for a load duration factor $C_o = 1.0$ and it can be increased by a higher load duration factor as per manufacturer's recommendations.
- 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.

CSD SOFTWARE

Calculated Structured Designs Inc. (CSD®) is a software development company providing solutions for the engineered wood, engineering, design, and building industries for all of North America and Australia.

Building with the most recent cutting edge development tools, CSD® offers solutions for our industry leading designers, drafters, engineers, and builders.

Website: csdsoftware.com/csd/software/

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- Multiple input styles for quick and easy drawing
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- Robust graphics tools allow custom detailing in the model

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- Analyze anytime for quick results and guidance
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- Create Flexible and detailed plot layouts
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ACCESS THE CSD SOFTWARE

Tolko offers authorized customers access to engineered wood design software by CSD. This software includes:



isPlan®

A 3D layout and design solution that allows users to model an entire structure with 2D and 3D views. isPlan® develops and transfers gravity loads through the structure and designs the structural members.



isDesign®

A single member sizing solution that allows users to size floor and roof joists, beams and posts by inputting span and load information. Innovative tools allow selection of the most cost effective solution.



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The first stand alone wall design application that allows users to model a tall wall and run gravity and wind analysis for all the components of the wall.

To become a Tolko authorized user, please contact your Tolko EWP sales representative at:

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