SPECIFICATION GUIDE

MASS TIMBER FOR THE MASSES

TerraLam® CLT

Product Specifications and Span Tables

STERLING® Structural

STANDARD, REPEATABLE DELIVERY

Sterling Structural provides a sustainable and affordable cross-laminated timber (CLT) option for the North American building construction industry. Our TerraLam® structural product line provides a competitively priced, prefabricated mass timber panel that is compatible with a range of structural systems in wall, floor and roof applications.

Sterling streamlines the design, fabrication and installation process for CLT structural systems by introducing a standardized product line. Offering a palette of standard sizes helps us deliver a highly efficient and cost-competitive system. Using in-house CNC capability, our panels can be prefabricated and customized to meet any project requirements. We are dedicated to providing accessible mass timber options for the construction industry.

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This guide is intended to convey best practices and suggestions for using TerraLam® CLT.

SUSTAINABILITY MEETS AFFORDABILITY

Over the past decade, mass timber has become a growing force in North America due to its ecological, aesthetic and logistical benefits. CLT is one of the most prevalent forms of mass timber used in building construction today. Most of the carbon sequestered in a mass timber building is stored in its floor and roof slabs. Specifying CLT in these applications presents an excellent solution to reducing embodied carbon.

Our TerraLam® CLT product line is a scalable, cost-competitive structural solution. It has the potential to rapidly decarbonize our built environment while maintaining compatibility with other materials in mass timber or hybrid applications. As a domestically produced, renewable resource, TerraLam minimizes emissions associated with traditional construction while supporting regional economies.

MAKING MASS TIMBER ACCESSIBLE

Our company was founded in 1949 and continues to operate according to the Sterling family values to this day. Since we are always innovating and adapting to our customers' needs, we were one of the first companies to begin manufacturing cross-laminated timber and offer the unique benefits of our CLT to the site access market.

Today, Sterling is still America's largest CLT manufacturer with the capacity to produce 1,000 panels a day at our plants in Lufkin, Texas and Phoenix, Illinois. We now bring our exceptional operational capacity and wealth of experience to the building construction market, with PRG 320-certified structural CLT panels available at competitive price points and timelines.

HOW WE DO IT

STANDARDIZED APPROACH

Utilizing a standard format system that optimizes our production capacity, we streamline design, fabrication, customization and installation for cost-competitive CLT structures.

SPEED AND CAPACITY

As the world's largest CLT manufacturer, our high-speed manufacturing and extensive fabrication capabilities provide American-made CLT as an affordable option for buildings in a wide variety of sizes and occupancies.

ROBUST LOGISTICS

Having served industrial markets for over a decade, we're highly experienced in the scaled delivery of CLT across North America. You can feel confident about investing in Sterling CLT solutions for your buildings regardless of location or site constraints.

WHAT WE DO

NOW IS THE TIME FOR TIMBER — AND WE CAN HELP

Design Assist and Coordination

Project Management and Logistics

Machining and Prefabrication

Transparent Pricing and Timelines

Value-Added Complementary Products

Sustainability Support

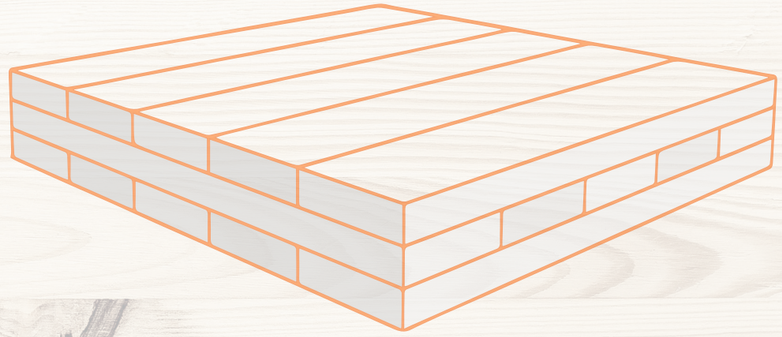
WHY CLT?

Timber buildings are healthier for the environment because wood materials store carbon throughout the life cycle of the building, instead of releasing it into the atmosphere to form carbon dioxide (CO_2). Additionally, building with forest products typically creates fewer emissions during the harvesting/extraction, manufacturing and transportation cycle than other materials used in construction.

Many buildings have been completed using CLT for floors, roofs, and walls with a full mass timber system. However, it is common to use CLT floor and roof panels in combination with engineered wood framed post and beam systems or light-frame wood bearing walls as the vertical supporting structure. Since roughly 75% of the carbon sequestered in a mass timber building is stored in its floor and roof slabs, increasing the adoption of CLT for horizontal plate applications can significantly reduce the construction industry's carbon footprint. This approach provides flexibility for the utilization of a wider range of vertical support materials while making substantial progress in sustainability.

WHY STERLING?

- Accessible price point
- Panel sizes are compatible with various building types
- Faster lead times and robust logistics network
- Domestic sourcing and manufacturing



SUSTAINABLE FORESTRY AND PROCUREMENT

TerraLam® CLT panels are built from Southern pine, a fast-growing and structurally efficient softwood species native to the United States that has been an integral part of American building tradition for centuries. Sterling sources high-quality pine lumber from partners in the southeastern United States who are committed to renewable growing and harvesting practices. Through 100% domestic and responsible sourcing, Sterling supports America's woodland economies and sustainable forest management. TerraLam panels can be SFI certified, upon request. Our long-standing forest supply chain partnerships and strategic plant locations allows lumber to be delivered directly by rail to our manufacturing facilities in Phoenix, Illinois and Lufkin, Texas. Using the rail network to transport large volumes of raw materials and finished CLT panels can reduce the greenhouse gas emissions of the project life cycle and reduce freight costs.

TERRALAM® AT A GLANCE

INTENDED USE

TerraLam CLT is primarily in one-way lateral structural applications for floors and roofs, but also has the capacity for 2-way action to accommodate MEP openings and act as the horizontal lateral wind and seismic diaphragm. TerraLam may also be used in bearing or shear wall assemblies for certain applications, depending on building code and engineering requirements.

The bottom faces of floor and roof panels may be visually exposed as ceiling surfaces as well as side faces of walls, where permitted by code. The panels are capable of providing fire protection and a beautiful, exposed texture that can be used as a finish surface. Exposing the top face as a wear surface is generally not recommended.

Panels are produced as install-ready finished billets in our standard format sizes. From there the project's panels requiring customization are able machined using in-house CNC capability to perform subtractive operations such as shaping, sizing, edge cuts and openings. Machining operations are coordinated with the architect and/or engineer of record through a design review and approval process with our exceptional BIM and Project Management teams.

Partnerships with value-aligned manufacturers allow us to deliver panels with complementary products pre-applied in our production facility under precise factory conditions. These surface treatments, such as self-adhered weather resistive barriers and protective coatings, are available upon request at an added cost and can be instrumental in saving on-site application time and labor.

PRIMARY APPLICATIONS

- Repeatable simple spans
- Scalable and modular designs
- Budget-conscious but user-driven projects
- Replacements for steel decking and precast concrete

MAXIMUM DIMENSIONS

WIDTH: up to 92 in. (2.33 m)

LENGTH: up to 212 in. (5.39 m)

DEPTH: 3-ply, 5-ply, and 7-ply layups from 4 1/8 in. to 9 5/8 in.

Sizes can be customized and prefabricated within above parameters using in-house CNC capability.

TOLERANCES: 1/8" length and width, 1/16" depth

SPECIES

Southern Pine (SP)

Spruce-Pine-Fir South (SPF-S) and Eastern hemlock (EH-T) coming soon. Contact us for more information.

AVAILABLE GRADES

V3 +

(See ICC ESR 5053)

V4+ and EH-T coming soon

CERTIFICATIONS

ANSI PRG-320

DECLARE™ Label

Environmental Product Declaration

SFI Certified Source and Chain of Custody

AVAILABLE APPEARANCE GRADES

Standard Concealed

Standard Visual

MOISTURE CONTENT

12% MC +/- 3%

ADHESIVE

ANSI 405-certified PUR

THERMAL RESISTANCE

R = 1.25/inch

SPAN TABLES

See page 14

TERRALAM® CLT PANEL PROPERTIES

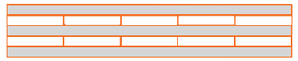
STERLING TERRALAM PRODUCT DIMENSIONS

Product	Length		Width		Thickness
	ft	in	ft	in	in
TL300S14	13.67	164	7.67	92	4.125
TL300S16	15.50	186			
TL300S18	17.67	212			
TL500S14	13.67	164	7.67	92	6.875
TL500S16	15.50	186			
TL500S18	17.67	212			
TL700S14	13.67	164	7.67	92	9.625
TL700S16	15.50	186			
TL700S18	17.67	212			
Tolerance	+/- 1/4"		+/- 1/8"		+/- 1/16"

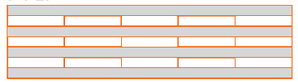
STERLING TERRALAM LAYUPS

3-PLY

5-PLY



7-PLY



PRODUCT CERTIFICATIONS

ANSI PRG 320 - All panels are certified to the PRG 320 performance standard by the International Code Council.

SUSTAINABILITY CERTIFICATIONS

Declare – Sterling TerraLam panels are DECLARE® certified by the International Living Future Institute to be Red List Free™.

Environmental Product Declaration – Our Environmental Product Declaration (EPD) is available for AEC teams to measure their sustainability through whole-building life cycle assessment (LCA). EPDs are third-party verified reports detailing the environmental impacts of products throughout their full life cycle. Life Cycle Assessment support is available upon request.

Sustainable Forestry Initiative – Sterling supports regenerative forestry practices throughout its supply chain. We source 100% of our lumber from U.S. forests and are committed to traceability and accountability through the SFI Certified Source and Chain of Custody programs.

LEED/Living Building Challenge – TerraLam panels are eligible for credits in the Materials Petal of the Living Building Challenge, as well as sourcing and material health areas in LEED. Contact our team to learn how TerraLam can contribute to green building certification programs or otherwise support your sustainable design goals.

TERRALAM CLT APPEARANCE

Sterling manufactures to a single appearance standard that can be used for both exposed and concealed applications. We utilize No. 2 lumber, sort for wane, and have rigorous panel handling requirements for our operations and logistics teams. By standardizing our appearance grade, we are able to use readily available lumber to get you your products faster and at a lower price point. Sterling uses high-grade planers to deliver a smooth final surface that honors the natural characteristics of each species. If you love wood like we do, you'll love TerraLam panels.

FIRE AND ACOUSTIC PERFORMANCE

DESIGN CONSIDERATIONS

FIRE DESIGN OF MASS TIMBER MEMBERS

"For many years, exposed heavy timber framing elements have been permitted in U.S. buildings due to their inherent fire-resistance properties. The predictability of wood's char rate has been well-established for decades and has long been recognized in building codes and standards"

Scott Breneman, PhD, PE, SE
Senior Technical Director, WoodWorks

Richard McLain, PE, SE
Senior Technical Director, WoodWorks

Data and design information regarding fire design of Mass Timber can be found in Fire Design of Mass Timber by Wood Works.

Depending on individual project requirements, TerraLam® may need to be integrated into an assembly with supplemental materials in order to achieve desired acoustic and/or fire performance.

MASS TIMBER ACOUSTIC DESIGN

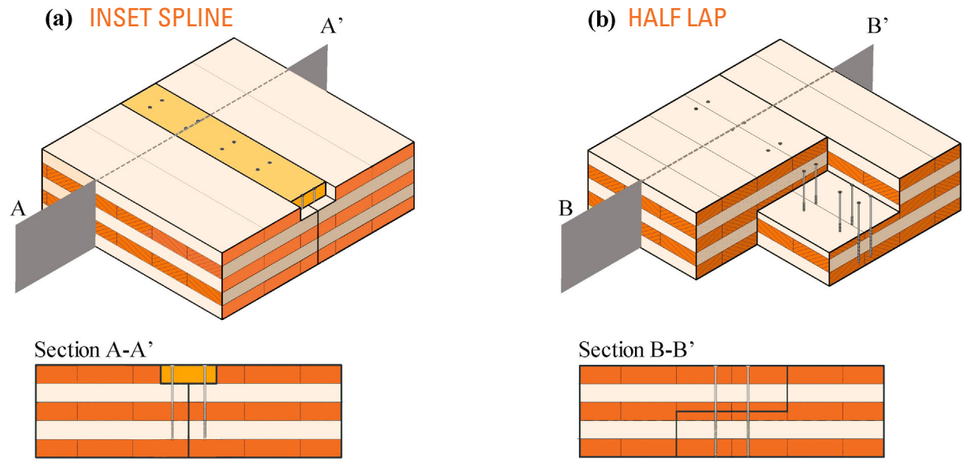
For a complete list of tested acoustic assemblies, please reference the Inventory of Acoustically-Tested Mass Timber Assemblies by Wood Works.

COMPLEMENTARY PRODUCTS AND SERVICES

With every Sterling Structural package, customers are offered a variety of complementary products through our strategic partners. For some projects, factory-application of these products can greatly improve the speed and efficiency on the job site. Sterling works with a variety of supply chain partners including Vaproshield, Sansin, Canfor, Unalam, Simpson Strong-Tie, Rothoblaas and more to deliver the solutions you need for your next mass timber project.

PANEL-TO-PANEL CONNECTIONS

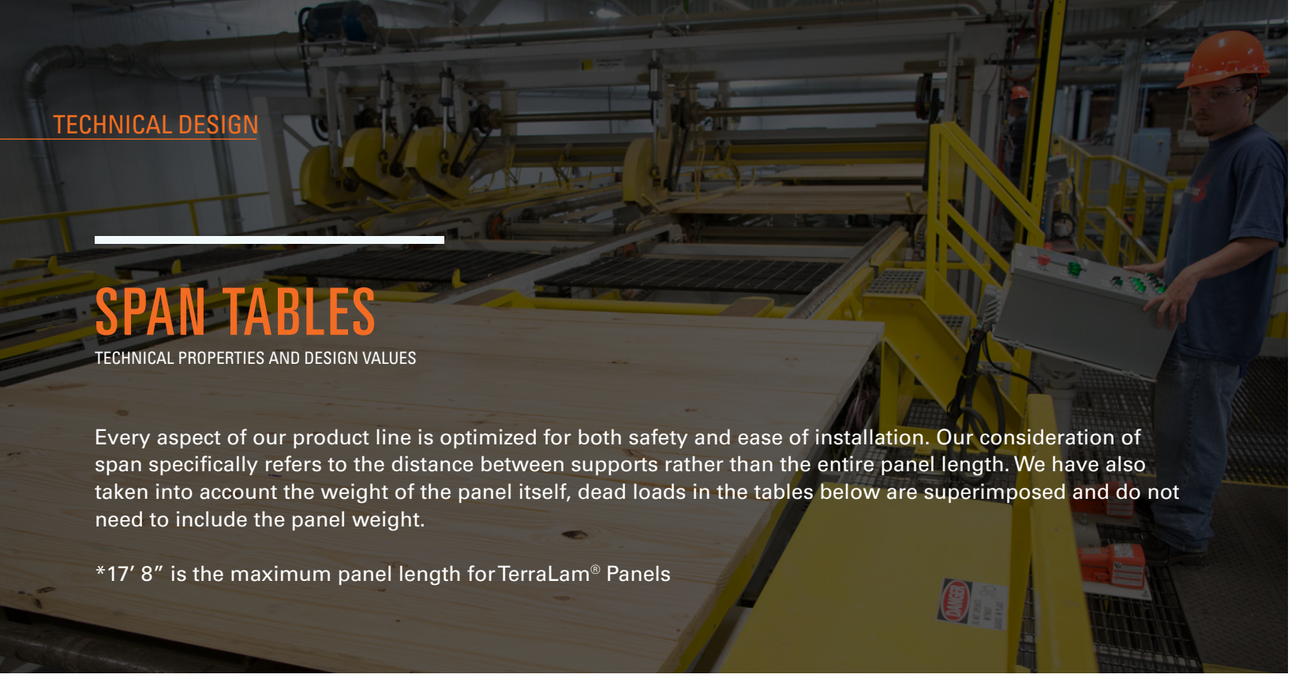
TYPICAL ASSEMBLY DETAILS



RESOURCES FOR DESIGN

Detail images by Loss, Cristiano, et al. "Simple cross-laminated timber shear connections with spatially arranged screws." Engineering Structures, vol. 173, 15 Oct. 2018, pp. 340–356, https://doi.org/10.1016/j.engstruct.2018.07.004.

For a full catalog of downloadable standard assembly and detail drawings, visit WoodWorks: www.woodworks.org/cad-revit/mass-timber



SPAN TABLES

TECHNICAL PROPERTIES AND DESIGN VALUES

Every aspect of our product line is optimized for both safety and ease of installation. Our consideration of span specifically refers to the distance between supports rather than the entire panel length. We have also taken into account the weight of the panel itself, dead loads in the tables below are superimposed and do not need to include the panel weight.

*17′ 8″ is the maximum panel length for TerraLam® Panels

ASD REFERENCE DESIGN VALUES FOR STERLING TERRALAM CLT PANELS

Grade	Layup ID	CLT Thickness (in)	Lamination Thickness in CLT Layup (in)							Major Strength Direction				Minor Strength Direction			
			=	⊥	=	⊥	=	⊥	=	$F_bS_{eff,0}$ (lb-ft/ft)	$EI_{eff,0}$ (10^6 lb-in²/ft)	$GA_{eff,0}$ (10^6 lb-in²/ft)	$V_{s,0}$ (lb/ft)	$F_bS_{eff,90}$ (lb-ft/ft)	$EI_{eff,90}$ (10^6 lb-in²/ft)	$GA_{eff,90}$ (10^6 lb-in²/ft	$V_{s,90}$ (lb/ft)
V3+	TL300S	4.125	1.375	1.375	1.375					2,150	95	0.53	1,820	290	3.6	0.53	605
	TL500S	6.875	1.375	1.375	1.375	1.375	1.375			4,950	363	1.05	3,025	2,525	95	1.05	1,820
	TL700S	9.625	1.375	1.375	1.375	1.375	1.375	1.375	1.375	8,750	900	1.58	4,225	5,825	363	1.58	3,025

Table calculated in accordance with the Shear Analogy Method as defined by PRG 320-2019

LIVE LOAD 40 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
20 PSF																		
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50 PSF																		
60 PSF																		

= Pass
= Fail

LIVE LOAD 50 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
20 PSF																		
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60 PSF																		

LIVE LOAD 60 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
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40 PSF																		
50 PSF																		
60 PSF																		

LIVE LOAD 80 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
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60 PSF																		

LIVE LOAD 100 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
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60 PSF																		

LIVE LOAD 125 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
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50 PSF																		
60 PSF																		

LIVE LOAD 150 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
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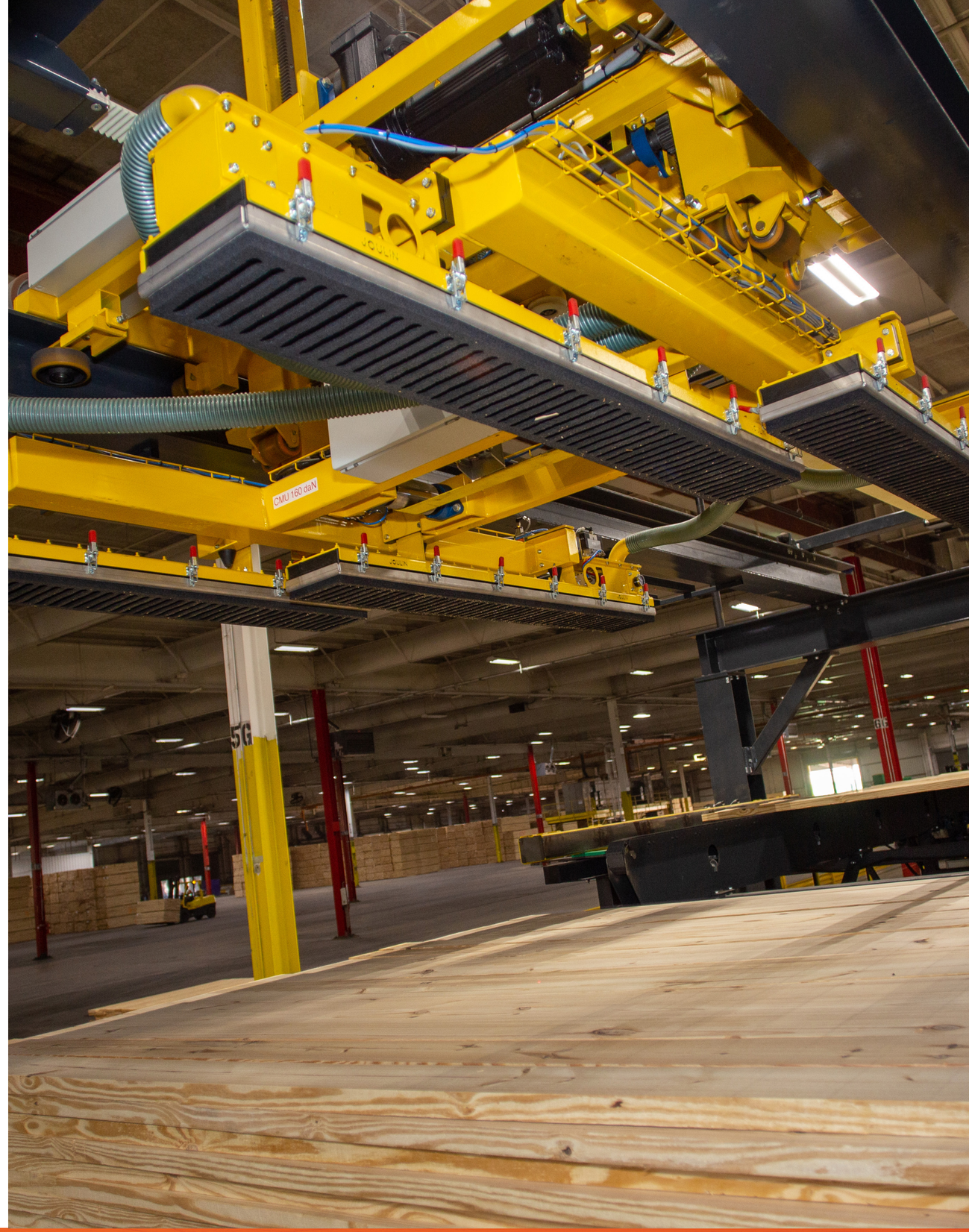
= Pass
= Fail



SPAN TABLES FOR SNOW LOAD

ROOF SNOW LOAD 30 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
10 PSF																		
20 PSF																		
30 PSF																		

ROOF SNOW LOAD 40 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
10 PSF																		
20 PSF																		
30 PSF																		

= Pass
= Fail

Notes:

1. Span tables are based on IBC and NDS code minimum requirements for flexure, shear, and long-term creep.
2. Panels meet minimum vibration checks in accordance with the CLT Handbook, US Edition. Detailed vibration demand and analysis to be completed by a design professional.
3. NDS Factors included in span tables: C_d = 1.0, C_m=1.0, C_t=1.0, C_i=1.0, K_{cr}=2.0.
4. Dead loads are superimposed.
5. Span tables are for guidance purposes only; the final design is the responsibility of the design professional of record.

ROOF SNOW LOAD 50 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
10 PSF																		
20 PSF																		
30 PSF																		

ROOF SNOW LOAD 60 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
10 PSF																		
20 PSF																		
30 PSF																		

ROOF SNOW LOAD 80 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
10 PSF																		
20 PSF																		
30 PSF																		

ROOF SNOW LOAD 100 PSF

Dead Load	MAXIMUM SPAN DISTANCE																	
	8'			10'			12'			14'			16'			17' 8"		
Thickness (in)	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625	3-ply 4.125	5-ply 6.875	7-ply 9.625
10 PSF																		
20 PSF																		
30 PSF																		

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