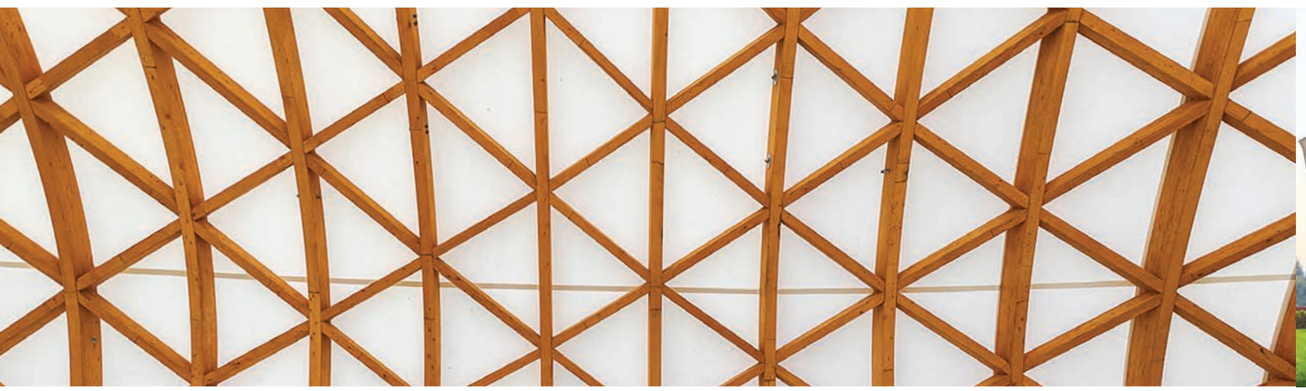
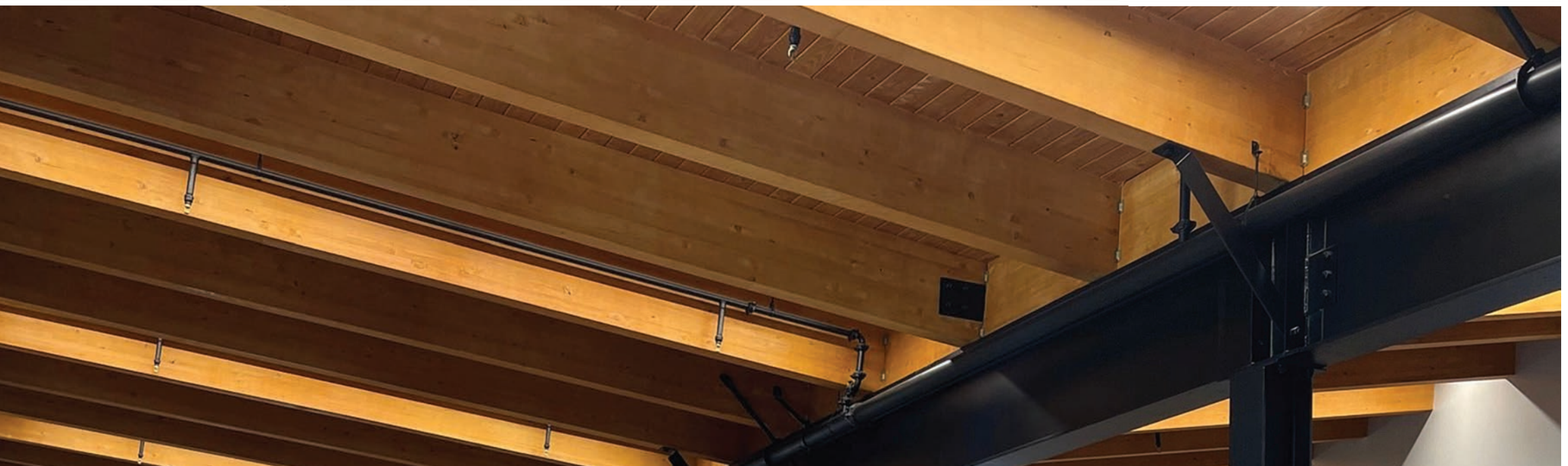
WFP™ ENGINEERED PRODUCTS

Glulam Technical Resource & Product Guide

WFP™ Engineered Products
DEFINING A HIGHER STANDARD™





WFP™ Engineered Products

Experience & Products You Can Trust

The practical, cost-effective, and renewable choice.

WFP™ Engineered Products, Calvert Division brings more than 65 years of experience producing high-quality glued laminated products. Our two manufacturing plants in the Pacific Northwest – Washougal and Vancouver, Washington – produce glulam for both commercial and residential projects around the world.

Our production capabilities provide customers with great flexibility and versatility. Products include straight beams and columns for commercial projects, curved and arched glulam for custom applications, stock beams, high-strength GL3000 beams for engineered floor systems, fabricated beams and glulam trusses, high-quality export beams, turned round columns, and many other custom products. Our glulam experts are one call away for your next project.

As one of the oldest continuous glulam manufacturers in the U.S., we are proud of our long-standing reputation for good service and high quality. As a member of APA – Engineered Wood Systems (APA-EWS), all beams are produced to the highest quality requirements of the American National Standards Institute (ANSI) Standard A190.1. We are also a member of the APA-EWS, JAS certified, and approved by the city of Los Angeles, the city of Seattle, and many others. We have also earned FSC / SmartWood Chain of Custody Certification by the Forest Stewardship Council. Additionally, our yellow cedar glulams are PEFC certified.

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Yellow Cedar Glulam

Grown in mid- and high-elevation forests in coastal British Columbia, yellow cedar is a resilient and slow-growing tree that produces some of **the most beautiful and durable wood on the planet.**

Product	Straight Glulam	Curved & Arched Glulam	Straight Columns	Turned Round Columns
Grade	20F-V12 20F-V13		Combo 69, 70, or 71	
Length	Up to 85'		Up to 85'	Up to 50'
Width/Diameter	Up to 24"		Up to 24" custom sizes may be available	Up to 24"
Depth	Up to 55" custom sizes may be available		Up to 24" custom sizes may be available	Up to 24"

Versatile and Strong

Yellow cedar glulam is a beautiful, naturally durable cost-effective alternative to pressure-treated glulam beams, with products ranging from large, straight beams and columns for commercial projects; curved and arched glulam for custom applications; turned round columns; and many other custom products.

Resistant to Decay, Earthquakes and Fire

Yellow cedar is renowned for its durability. It has a remarkable resistance to decay, allowing it to be left exposed in outdoor applications.

Wood's natural elasticity, strength and lighter weight combined with good seismic design, give mass timber buildings, including those made with yellow cedar, an advantage during an earthquake.

Glulam's fire safety is well established by more than 70 years of in-service use in commercial and residential buildings, combined with extensive testing. In the event of a fire, our glulam products form a naturally protective charring layer while retaining strength.

Manufacturing Information

WFP Engineered Products is certified by APA to make glued structural laminated yellow cedar timbers under the following standards:

- ANSI A190.1 American National Standard for Structural Glued Laminated Timber.
- CSA Standard O122 Structural Glued Laminated Timber.
- CSA Standard O177 Qualification Code for Manufacturers of Structural Glued Laminated Timber.
- Japanese Agricultural Standard for Structural Glulam.

Protection and Delivery:

- Individual packaging, bundle packaging, load packaging.
- Special edge protection and crate packaging available.
- On-site export container loading.

Adhesive:

- WFP uses a waterproof glue designed for exterior use. Urea free. Standard brown adhesive and clear adhesive available.

Knot Filler Patch:

- Poly Patch Part A Fir/ B5 Part B Cream Hardener.
- Synthetic Patch XU-100a fir, U-100D Hardener.

High-quality yellow cedar glue-laminated timber (glulam) for industrial, commercial, and residential projects.

Yellow cedar is prized worldwide for its smooth, rich texture and straight grain. When manufactured into glue-laminated timber (glulam), yellow cedar creates stunning structures where appearance is important and strength and durability are paramount. And because it's wood, you can be assured that it delivers environmental benefits and a lighter carbon footprint, as the only major building material grown naturally.

Cost-Effective Solution

Glulam's favorable strength-to-weight ratio offers cost efficiencies in transportation and installation. Yellow cedar glulam can also reduce costs through off-site prefabrication and lighter foundation requirements.

Yellow cedar is renowned for its durability. It has a remarkable resistance to decay, allowing it to be left exposed in outdoor applications.

YELLOW CEDAR GLULAM STRENGTH TABLE

SALES INQUIRIES
218 "V" Street, Vancouver, WA 98661, USA | T 360.693.0971 | info@westernforest.com | westernforest.com

Combination Symbols	Species Outer/ Core	Bal/ Unbal	Bending About X-X Axis (Loaded Perpendicular to Wide Faces of Laminations)								Bending About Y-Y Axis (Loaded Parallel to Wide Faces of Laminations)						Axially Loaded		Fasteners	
			Extreme Fiber in Bending		Compression Perpendicular to Grain		Shear Parallel to Grain	Modulus of Elasticity			Extreme Fiber in Bending	Compression Perpendicular to Grain	Shear Parallel to Grain	Modulus of Elasticity			Tension Parallel to Grain	Compression Parallel to Grain	Specific Gravity for Fastener Design	
			Bottom of Beam Stressed in Tension (Positive Bending)	Top of Beam Stressed in Tension (Negative Bending)	Tension Face	Compression Face													Top or Bottom Face	Side Face
			F_{bx}^{+} (psi)	F_{bx}^{-} (psi)	$F_{c\ x}$ (psi)		F_{vx} (psi)	$E_{x\ true}$ (10^6 psi)	$E_{x\ app}$ (10^6 psi)	$E_{x\ min}$ (10^6 psi)	F_{by} (psi)	$F_{c\ y}$ (psi)	F_{vy} (psi)	$E_{y\ true}$ (10^6 psi)	$E_{y\ app}$ (10^6 psi)	$E_{y\ min}$ (10^6 psi)	F_t (psi)	F_c (psi)	G	
20F-V12	AC/AC	U	2000	1400	560	560	265	1.6	1.5	0.79	1250	470	230	1.5	1.4	0.74	925	1500	0.46	0.46
20F-V13	AC/AC	B	2000	2000	560	560	265	1.6	1.5	0.79	1250	470	230	1.5	1.4	0.74	950	1550	0.46	0.46
22F-V/AC1	AC/AC	U	2200	1400	560	550	265	1.6	1.5	0.79	1250	470	230	1.5	1.4	0.74	975	1500	0.46	0.46
22F-V/AC2	AC/AC	B	2200	2200	560	550	265	1.7	1.6	0.85	1450	470	230	1.5	1.4	0.74	1050	1600	0.46	0.46

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Douglas-fir Glulam

Found along the southern mainland coast of British Columbia and across Vancouver Island, coastal Douglas-fir is known to reach impressively large heights and produce **the strongest softwood available.**

Product	Straight Glulam	Curved & Arched Glulam	Straight Columns	Turned Round Columns
Grade	24F-V4 24F-V8		Combo 1, 2, 3, or 5	
Length	Up to 85'		Up to 85'	Up to 50'
Width/Diameter	Up to 24"		Up to 24" custom sizes may be available	Up to 24"
Depth	Up to 55" custom sizes may be available		Up to 24" custom sizes may be available	Up to 24"

True Strength, Natural Beauty

With excellent staining qualities and pronounced grain pattern, the use of Douglas-fir is not only beneficial for structural purposes, but also for when visual appeal in key to a project's design. As a finished product, the prominent grain pattern of finished Douglas-fir lends the feeling of warmth and authenticity created by real wood.

Resistant to Decay, Earthquakes and Fire

Douglas-fir is the benchmark for structural wood applications, and widely used in a wide range of construction and architectural projects.

Wood's natural elasticity, strength and lighter weight combined with good seismic design, give mass timber buildings, including those made with Douglas-fir, an advantage during an earthquake.

Glulam's fire safety is well established by more than 70 years of in-service use in commercial and residential buildings, combined with extensive testing. In the event of a fire, our glulam products form a naturally protective charring layer while retaining strength.

Manufacturing Information

WFP Engineered Products is certified by APA to make glued structural laminated Douglas-fir timbers under the following standards:

- ANSI A190.1 American National Standard for Structural Glued Laminated Timber.
- CSA Standard O122 Structural Glued Laminated Timber.
- CSA Standard O177 Qualification Code for Manufacturers of Structural Glued Laminated Timber.
- Japanese Agricultural Standard for Structural Glulam.

Protection and Delivery:

- Individual packaging, bundle packaging, load packaging.
- Special edge protection and crate packaging available.
- On-site export container loading.

Adhesive:

- WFP uses a waterproof glue designed for exterior use. Urea free. Standard brown adhesive and clear adhesive available.

Knot Filler Patch:

- Poly Patch Part A Fir/ B5 Part B Cream Hardener.
- Synthetic Patch XU-100a fir, U-100D Hardener.

High-quality Douglas-fir glue-laminated timber (glulam) for industrial, commercial and residential projects.

Well known for immense strength and durability, glulam products made from Douglas-fir exhibit high strength at a fraction of the weight of alternative materials such as steel or concrete. This makes Douglas-fir and excellent choice for heavy structural applications like glulam beams and roof trusses.

A Cost-Effective Solution

Glulam's favorable strength-to-weight ratio offers cost efficiencies in transportation and installation. Douglas-fir glulam can also reduce costs through off-site prefabrication and lighter foundation requirements.

Douglas-fir is prized for its strength. It has exceptional structural performance and can be used in some of your project's most crucial components.

DOUGLAS FIR GLULAM STRENGTH TABLE

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Combination Symbols	Species Outer/ Core	Bal/ Unbal	Bending About X-X Axis (Loaded Perpendicular to Wide Faces of Laminations)									Bending About Y-Y Axis (Loaded Parallel to Wide Faces of Laminations)						Axially Loaded		Fasteners	
			Extreme Fiber in Bending		Compression Perpendicular to Grain		Shear Parallel to Grain	Modulus of Elasticity				Extreme Fiber in Bending	Compression Perpendicular to Grain	Shear Parallel to Grain	Modulus of Elasticity			Tension Parallel to Grain	Compression Parallel to Grain	Specific Gravity for Fastener Design	
			Bottom of Beam Stressed in Tension (Positive Bending)	Top of Beam Stressed in Tension (Negative Bending)	Tension Face	Compression Face														Top or Bottom Face	Side Face
			F_{bx}^{+} (psi)	F_{bx}^{-} (psi)	$F_{c\ x}$ (psi)		F_{vx} (psi)	$E_{x\ true}$ (10^6 psi)	$E_{x\ app}$ (10^6 psi)	$E_{x\ min}$ (10^6 psi)		F_{by} (psi)	$F_{c\ y}$ (psi)	F_{vy} (psi)	$E_{y\ true}$ (10^6 psi)	$E_{y\ app}$ (10^6 psi)	$E_{y\ min}$ (10^6 psi)	F_t (psi)	F_c (psi)	G	
24F-V4	DF/DF	U	2400	1850	650	650	265	1.9	1.8	0.95		1450	560	230	1.7	1.6	0.85	1100	1650	0.50	0.50
24F-V8	DF/DF	B	2400	2400	650	650	265	1.9	1.8	0.95		1550	560	230	1.7	1.6	0.85	1100	1650	0.50	0.50

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Hem-Fir Glulam

Hem-Fir is a combination of two of British Columbia's most abundant species, Western hemlock and Amabilis fir. Virtually identical in appearance, these two species share many performance characteristics.

Product	Straight Glulam	Curved & Arched Glulam	Straight Columns	Turned Round Columns
Grade	24F-E15 24F-E11			

Dimensions available upon request.

Tailored Solutions

Our manufacturing capabilities can be adapted to your project's needs, and include a range of products such as large, straight beams, and columns for commercial projects, curved and arched glulam for custom applications, turned round columns, and other custom options. Hem-fir glulam stands out as a naturally durable and attractive alternative to building substitutes like concrete or steel.

Resistant to Decay, Earthquakes and Fire

When transformed into an engineered product, hem-fir becomes increasingly durable against wear.

Wood's natural elasticity, strength and lighter weight combined with good seismic design, give mass timber buildings an advantage during an earthquake.

Glulam's fire safety is well established by more than 70 years of in-service use in commercial and residential buildings, combined with extensive testing. In the event of a fire, our glulam products form a naturally protective charring layer while retaining strength.

Manufacturing Information

WFP Engineered Products is certified by APA to make glued structural laminated hem-fir timbers under the following standard:

- ANSI A190.1 American National Standard for Structural Glued Laminated Timber.

Protection and Delivery:

- Individual packaging, bundle packaging, load packaging.
- Special edge protection and crate packaging available.
- On-site export container loading.

Adhesive:

- WFP uses a waterproof glue designed for exterior use. Urea free. Standard brown adhesive and clear adhesive available.

Knot Filler Patch:

- Poly Patch Part A Fir/ B5 Part B Cream Hardener.
- Synthetic Patch XU-100a fir, U-100D Hardener.

High-quality hem-fir glue-laminated timber (glulam) for industrial, commercial and residential projects.

As a readily available species, coastal hem-fir is considered a cost-effective option, while maintaining high strength values. The combination of hem-fir's affordability and high structural performance make it the smart choice for projects where both robust strength and maintaining a budget are essential.

When Budget Matters

With approximately 65% of the forests of British Columbia's South Coast region being composed of hem-fir, a strong supply can support projects that prioritize staying within budget.

Hem-Fir provides the versatility for projects that demand a product with an excellent mix of performance and value.

HEM-FIR GLULAM STRENGTH TABLE

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			Extreme Fiber in Bending		Compression Perpendicular to Grain		Shear Parallel to Grain	Modulus of Elasticity			Extreme Fiber in Bending	Compression Perpendicular to Grain	Shear Parallel to Grain	Modulus of Elasticity			Tension Parallel to Grain	Compression Parallel to Grain	Specific Gravity for Fastener Design	
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			F_{bx}^{+} (psi)	F_{bx}^{-} (psi)	$F_{c\ x}$ (psi)		F_{vx} (psi)	$E_{x\ true}$ (10^6 psi)	$E_{x\ app}$ (10^6 psi)	$E_{x\ min}$ (10^6 psi)	F_{by} (psi)	$F_{c\ y}$ (psi)	F_{vy} (psi)	$E_{y\ true}$ (10^6 psi)	$E_{y\ app}$ (10^6 psi)	$E_{y\ min}$ (10^6 psi)	F_t (psi)	F_c (psi)	G	
24F-E15	HF/HF	U	2400	1600	500	500	215	1.9	1.8	0.95	1200	375	190	1.6	1.5	0.79	975	1500	0.43	0.43
24F-E11	HF/HF	B	2400	2400	500	500	215	1.9	1.8	0.95	1550	375	190	1.6	1.5	0.79	1150	1550	0.43	0.43

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