


APA

How to Specify Engineered Wood



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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

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Webinar Attendee Survey




Warren Hamrick <https://www.apawood.org/specify-engineered-wood-survey>

APA

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Course Description

This program will present the properties and applications of engineered wood products like wood structural panels, glulam, structural composite lumber, and mass timber timber. The webinar will cover proper specification in accordance with the International Building Code. New technologies, streamlined design options and sustainability issues will be addressed, as well the constructability benefits of engineered wood products.



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Learning Objectives

- Identify the basic types of engineered wood products and their properties.
- Understand the material characteristics of various types of engineered wood products commonly available for use as panels and beams.
- Recognize the aspects of engineered wood products that contribute to constructability.
- Understand the proper design and specification of WSP, SCL, CLT, and glulam beams.



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What are Engineered Wood Products

Engineered Wood

Any wood-based building material that has been improved physically by a man-made process.



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What Are Engineered Wood Products?

Panel Products

- **WSP – Wood Structural Panels**
 - Plywood
 - OSB – Oriented Strand Board
- **Siding**
- **Specialty Panels**
 - Radiant Barrier
 - Formwork
 - Industrial Panels
 - Overlaid Panels
 - APA OSB used as fire rated sheathing



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What Are Engineered Wood Products?

Framing Products

- **I-Joists**
- **SCL – Structural Composite Lumber**
 - PSL – Parallel Strand Lumber
 - LVL – Laminated Veneer Lumber
 - LSL – Laminated Strand Lumber
 - OSL – Oriented Strand Lumber
- **Glulam – Glued Laminated Timber**



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What Are Engineered Wood Products?

Framing Product... or Panel Product



- **CLT – Cross-Laminated Timber**



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Advantages of EWP

- ✓ Sustainable
- ✓ Predictable
- ✓ Performance
- ✓ Less Waste





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Panel Products

Plywood & OSB

Alternating Layer Direction
Moisture-Resistant Adhesive
Wet and Dry Structural Performance Tests
Available in Exterior and Structural I Grade



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Manufacturing Standards



PS 1: Voluntary Product Standard
PRESCRIPTIVE Standard (revised 2020)



PS 2: Voluntary Product Standard
PERFORMANCE Standard (revised 2019)





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Panel Products

Siding and Specialty Panels

- Siding
- Specialty Panels
 - Radiant Barrier
 - APA Plyform®
 - Industrial Panels
 - Overlaid Panels



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Framing Products

Framing Products

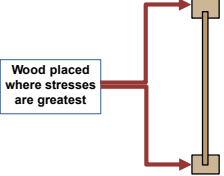
- I-Joists
- SCL – Structural Composite Lumber
 - LVL – Laminated Veneer Lumber
 - LSL – Laminated Strand Lumber
 - OSL – Oriented Strand Lumber
 - PSL – Parallel Strand Lumber
- Glulam – Glued Laminated Timber



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I-Joist Advantages

Engineered design = More efficient



Wood placed where stresses are greatest

- 46% less than lumber at 16" vs. I-joist at 19.2"
- 36% less when both are at 16"



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Rim Board

TYPICAL RIM BOARD TRADEMARKS



Various EW products used as a rim board and typical thickness:

- Glulam (typ. 3-1/2")
- LSL (typ. 1-1/8", 1-1/4", 1-1/2", 1-3/4", 3-1/2")
- LVL (typ. 1-1/4", 1-1/2", 1-3/4", 3-1/2")
- OSB (typ. 1", 1-1/8")
- OSL (typ. 1-1/4", 1-3/4")

Use 100% EWP in the floor system. Do not use a mix of sawn lumber with EWP because shrinkage and dimensional differences can be problematic.



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Engineered Floor Systems

Engineered design = Better systems

Flatter surfaces, stronger, quieter floors, fewer problems

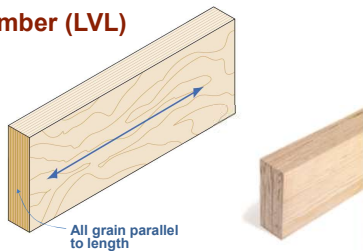


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Structural Composite Lumber

Laminated Veneer Lumber (LVL)

- Common uses
 - Beams
 - Headers
 - Rafters
 - Scaffold planking



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Structural Composite Lumber

Laminated Strand Lumber (LSL)

- Flaked strand length-to-thickness ratio is around 150
- Common uses: studs and headers

Oriented Strand Lumber (OSL)

- Flaked strand length-to-thickness ratio is around 75
- Common uses: studs

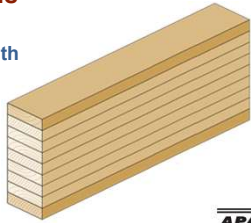


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Glued Laminated Timbers (Glulam)

Dimension lumber laminations

- Wood laminations bonded together
- Wood grain runs parallel to the length
- May or may not be homogeneous
- Common uses: beams, headers and columns

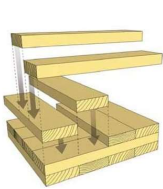


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CLT

Cross-Laminated Timber (CLT)

- Applications: long span walls, floors, roofs



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CLT Panels



Source: Green Building Advisor

TYPICAL CLT TRADEMARK

	1. Grade qualified in accordance with ANSI/APA PRG 320.
1 - V2 6 7/8"	2. Product thickness.
3 - MLE 000 ANS/APA PRG 320-2019	3. APA mill number.
	4. Referenced product standard.



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Code Recognized

Proprietary vs Non-Proprietary

- | | |
|---|--|
| <ul style="list-style-type: none"> ▪ Lab Tested ▪ ES Reports ▪ I-Joists ▪ Structural Composite Lumber (SCL) | <ul style="list-style-type: none"> ▪ Lab Tested ▪ Code Design Values ▪ Plywood ▪ Oriented Strand Board ▪ Glulam ▪ Cross-Laminated Timber (CLT) |
|---|--|

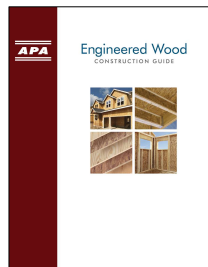


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APA Specification Resources

APA Engineered Wood Construction Guide, Form E30

- Free PDF download
- Nominal cost for hard copy
- The single “go to” document for all engineered wood products
- www.apawood.org



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Panel Specifications

- Refer to APA Engineered Wood Construction Guide, Form E30
- OSB
- Plywood
- Concrete Formwork
- Exposure 1 vs Exterior explained

Panel Specification Guide¹
C1[®] DIVISION 3—CONCRETE FORMWORK

A. Materials

1. Forms—Plywood concrete forms shall be specify appropriate grade!²
 APA HYPO-BOND CLASS E3C;
 APA HIGH DENSITY OVERLAY CONCRETE FORM HYPO-BOND CLASS E3E;
 APA MEDIUM DENSITY OVERLAY CONCRETE FORM HYPO-BOND CLASS E3F;
 Use approved Enduses sufficient to support concrete at temperature and rate-poured! second brace and shore forms to prevent displacement and to enable support construction loads.

C1[®] DIVISION 6—WOOD AND PLASTICS

A. General Provisions

1. Identification Requirements—Each panel shall be identified with the appropriate trademark of APA, and shall meet the requirements of the International Building Code (IBC), International Residential Code (IRC), International Energy Conservation Code (IECC) or applicable code.


2. All panels which have any edge or surface exposed long term to the weather shall be classed Exterior.^{3,4}

3. Panel Performance Category, grade and Group number or span rating shall be at least equal to that shown on the drawings! Application shall be in accordance with recommendations of APA.

B. Roof Sheathing

1. Panel and sheathing shall be specify appropriate grade!
 APA RATED SHEATHING EXP 1;
 APA RATED SHEATHING EXP 2;
 APA RATED SHEATHING EXP 3;
 APA STRUCTURAL RATED SHEATHING EXP 1, or
 APA STRUCTURAL RATED SHEATHING EXP 2;
 Sheathing exposed long term to weather shall be classed Exterior.⁵

1. Panel with the long dimension or strength axis of the panel across supports must always overlap, and will not conform to one piece or more spans. For pitched roofs, where structural surface is side with solid resistant covering, or if OSB panels are used. Where solid resistant sheath when raftering and construction of form and shore from the underside must meet all other construction, the applicable code.



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Panel Specifications


7. FLOOR SHEATHING IS 3/4" TONGUE AND GROOVE C40 PLYWOOD (48/24 RATING) OR OSB, GLUED AND NAILLED WITH 10d SCREWS 2-1/2" IN LENGTH AT 12" O.C. AT SUPPORTED EDGES, AND 10d SCREWS 2-1/2" IN LENGTH @ 8" O.C. @ INTERMEDIATE SUPPORTS. SHEATHING SHALL BE CONTINUOUS OVER TWO SPANS WITH FACE GRAIN PERPENDICULAR TO THE SUPPORTS.

8. WALL SHEATHING SHALL MEET SHEAR WALL SCHEDULE FOR REQUIREMENTS OF SHEAR WALLS

- AT INTERIOR WALLS PROVIDE 3/8" x 3/8" WALLBOARD (SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS) EXPOSED SIDE OF STUDS. NAIL WITH 5d COOLER NAILS AT 7" O.C. @ COOLER WALLS FOR 8' WALLBOARD AT ALL SUPPORTS. PROVIDE SOLID 2x BLOCKING AT ALL SHEAR RIDGES. BLOCKING IS NOT REQUIRED AT NON-LOAD BEARING PARTITIONS.
- AT EXTERIOR WALLS SHEATH THE INTERIOR FACE OF WALLS WITH 5/8" CYPRUS WALLBOARD AS NOTED ABOVE FOR INTERIOR WALLS. SHEATH THE EXTERIOR FACE OF WALLS WITH 7/16" CDX PLYWOOD (OR 7/16" OSB), NAIL WITH #6 RING SHANK NAILS AT 8" O.C. AT ALL EDGE SUPPORTS AND #4 RING SHANK NAILS AT 8" O.C. @ ALL INTERMEDIATE SUPPORTS. PROVIDE SOLID DOUBLE 2x BLOCKING AT ALL SHEET EDGES.
- ROOF SHEATHING SHALL BE 1/2" CDX PLYWOOD OR OSB (48/24 RATING), NAILED PER ROOF SHEATHING FASTENING SCHEDULE. PROVIDE ONE PLYWOOD SHEET PER SPAN BETWEEN SHEET EDGES. PROVIDE SOLID 2x BLOCKING BETWEEN SUPPORTS AT ALL HIPS, RIDGES, VALLEYS, AND CHANGES IN ROOF SLOPE. PLYWOOD SHEATHING SHALL BE CONTINUOUS OVER TWO SPANS WITH FACE GRAIN PERPENDICULAR TO THE SUPPORTS. ALL ROOF SHEATHING SHALL BE RATED FOR EXPOSURE-1

FYI:

- ✓ Instead of OSB or Plywood consider **"Wood Structural Panel"**
- ✓ Use the wording **"Panel Performance Category"** rather than exact panel thickness (for example 3/4")
- ✓ Just say "NO" to "CDX". Instead use **"rated sheathing"**



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APA Performance Panels

When specifying panels, designate grade, span rating, bond classification, dimensions (thickness, width x length), edge, APA trademark.

Out of Date Specifications


- 1/2" CDX - C & D veneers, with exterior glue (when panels were made with interior & exterior glue)

Previous Specifications

- 15/32" APA Rated Sheathing, 32/16, Exposure 1


New Terminology www.apawood.org/apa-trademark

- 15/32 Performance Category, APA Rated Sheathing, 32/16, Exposure 1, nominal 4'x8' (either T&G for tongue and groove or square edge)



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Bond Classification




RATED SHEATHING
24/16
SIZED FOR SPACING
EXPOSURE 1
THICKNESS 0.418 IN.
000
PS 2-18 SHEATHING
PRP-108 HUD-UM-40
7/16 CATEGORY

OR

Bond
Classification



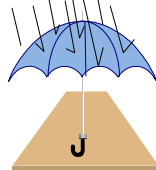
RATED SHEATHING
STRUCTURAL I
48/24
SIZED FOR SPACING
EXTERIOR
THICKNESS 0.703 IN.
000
PS 1-19 C-C PRP-108
23/32 CATEGORY



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Bond Classification

EXPOSURE 1

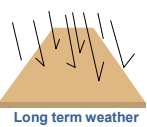


J


Exposure due to
active construction

OR

EXTERIOR




Long term weather
exposure



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Panel Specifications



Consider adding to specs.:

- 1/8" gap all panel edges
- Fasteners 3/8" from panel edges
- Wet weather installation

Refer to APA Publications:
X501 – Questions on Panel...Moisture...
D481 – TN Minimizing Buckling of WSP



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Glulam Specifications

- Refer to:
 - APA Engineered Wood Construction Guide, Form E30
 - ANSI A190.1-2022: Product Standard for Structural Glued Laminated Timber

Glulam Specification Guide

The following is a guide to interpreting symbols for which glulam has been tested for use for load-carrying members under the various, systems or grades to be used. Symbols are listed in accordance with the following specifications. Where a reference to a specification is made, such as "see specification 10.1", it refers to the specification listed in the table of contents.

A. General

1. Product grade and member class shall be indicated on all drawings and in accordance with the following specifications. Where a reference to a specification is made, such as "see specification 10.1", it refers to the specification listed in the table of contents.
2. Approved design drawings, shop drawings and details shall be furnished by the manufacturer and shall be stamped with the manufacturer's name and address. The manufacturer's name shall be stamped on all drawings and details.
3. The manufacturer's name shall be stamped on all drawings and details. The manufacturer's name shall be stamped on all drawings and details.

B. Manufacture

Materials, methods and quality assurance shall be in accordance with the following specifications and shall be stamped on all drawings and details.

1. **End Use Application**—The end use application shall be stamped on all drawings and details.
2. **Design Values**—The design values shall be stamped on all drawings and details.

C. Appearance

Appearance shall be in accordance with the following specifications and shall be stamped on all drawings and details.

1. **Grading**—The grading shall be stamped on all drawings and details.
2. **Appearance**—The appearance shall be stamped on all drawings and details.

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Glulam Specifications

Glulam Beam Combination Symbols

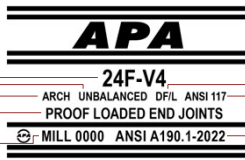
1. Allowable Design Stress
2. Appearance Classification
3. Grading = Visual (V) or Mechanical (E)
4. Assigned combination number of lumber used to assign the design stresses
 - Shear, Modulus of Elasticity, etc.
5. Wood Species: Commonly DF or SP

Common Beam Combinations:

- 24F-V4/DF or 24F-V6/DF – $F_{bx} = 2,400$ psi, or Combination 2/DF – $F_{bx} = 1,700$ psi
- 24F-V3/SP or 24F-V5/SP – $F_{bx} = 2,400$ psi, or Combination 47/SP – $F_{bx} = 1,400$ psi
- High strength 30F-E1/SP or 30F-E2/SP – $F_{bx} = 3,000$ psi

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Glulam Specifications




24F-V4
ARCH UNBALANCED DFIL ANSI 117
PROOF LOADED END JOINTS
MILL 0000 ANSI A190.1-2022

1. Combination symbol
2. Unbalanced layup
3. The species or species group of lumber used
4. Designation of appearance classification
5. Applicable design and manufacturing specification
6. Indicates the member has the required laminations proof loaded
7. Mill number
8. Identification of ANSI A190.1, *Standard for Wood Products – Structural Glued Laminated Timber*.

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SCL Specifications

- Refer to:
 - APA Form E30
 - Proprietary manufacturer published specifications
- SCL Includes:
 - LVL
 - LSL
 - OSL
 - PSL



3100F-2.0E
0000
APA PRI-XXX CCNC XXXXX-4
ICC ES ESR-XXXX ASTM D5484

1. Qualified SCL grade (generally represented by design values).
2. APA mill number.
3. Product evaluation report.
4. Technical specification for SCL.

Structural Composite Lumber (SCL) Specification Guide

A. General

1. SCL shall be furnished and installed as shown on the approved building plans and in accordance with the specifications of the SCL manufacturer.
2. The contractor shall use approved hardware and connections as specified in the plans.


B. Manufacture

1. **Materials, Manufacture and Quality Assurance**—Product quality shall conform to the manufacturer's approved quality manual, with quality assurance inspection services provided by APA in accordance with building code requirements and the applicable APA Product Report or code evaluation report.
2. **Trademark**—SCL shall be marked with the APA trademark, indicating conformance with the manufacturer's APA Product Report or code evaluation report.
3. **Job Site Shipment**—SCL shall be protected from direct exposure to weather prior to installation.
4. **Protection for Shipment**—Members shall be protected with a water-resistant covering for shipment.

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I-Joist Specifications

- Refer to:
 - APA Form E30
 - APA PRI-400 (residential)
 - APA PRI-405 (commercial)
- Proprietary manufacturer published specifications



APA Performance Rated I-Joist Specification Guide

The following is a guide for specifying APA Performance Rated I-Joist (PRI) for use in residential floor applications. These structural products are available in depths of 8 1/2", 11 7/8", 14" and 16 inches and can be used in single- or multiple-span floor construction. Exercise care in use of wood joists in other floor dry conditions, is not recommended.

A. General

1. I-Joist shall be furnished and installed as shown by the approved building plans and installation instructions.
2. The designation of APA PRI shall be based on the applicable loading, joist spacing and spans shown in the plans. When not indicated using Tables 11 and 12, the contractor shall determine engineering conditions, see Table 11 of APA Performance Rated Joists, Form Z773, for PRI joist design properties. The qualification for joists required for a specific floor application shall include joist depth, designation, length and number of pieces required.
- Example: 21 spans - APA 8 1/2" PRI-405 30' long
3. All necessary products such as joist blocking, gables, rim boards, edge blocks, web stiffeners, etc., shall be provided and installed in accordance with the applicable installation details shown in APA Performance Rated Joists, Form Z773.
4. APA multilaminated structural glued laminated timber (glulam) or approved structural composite lumber (SCL) shall be furnished to load bearing end headers. The depth of these components shall be specified to match the joist depth when flush framing is required.
- The contractor shall use approved connected hardware that is specified in the plans. Such hardware shall be compatible with the width and depth of APA PRI, furnished, to provide flush nailing surfaces at blocking members and to prevent rotation.


B. Manufacture

1. **Materials, Manufacture and Quality Assurance**—Product quality shall conform to the manufacturer's approved quality manual with quality assurance inspection services provided by APA in accordance with

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CLT Specifications

- **Refer to:**
 - APA Form E30
 - ANSI/APA PRG 320 (basic CLT grades)
 - APA Product Reports (custom CLT grades)



Cross-Laminated Timber (CLT) Specification Guide

A. General
CLT shall be furnished and installed in accordance with the recommendations provided by the CLT manufacturer and the engineering drawing approved by the engineer of record. Permissible details shall be in accordance with the engineering drawing.


B. Manufacture

1. **Materials, Manufacture and Quality Assurance**—Product quality shall conform to ANSI/APA PRG 320, Standard for Performance-Rated Cross-Laminated Timber.
2. **Trademarks**—CLT products conforming to ANSI/APA PRG 320, Standard for Performance-Rated Cross-Laminated Timber, shall be marked with CLT grade, CLT thickness or identification, mill name or identification number, the APA logo and "ANSI/APA PRG 320". The top face of custom CLT panels with unbalanced layup used for roof or floor shall be marked with "TOP" stamp.
3. **Protection for Shipment**—Members shall be protected with a water-resistant covering for shipment.

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APA Product Reports

- Report indicates that product meets the intention of the listed codes when used as stated and within the specified limitations.
- Design properties are included.
- Available for download at www.apawood.org



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Engineered Wood: A Green Choice

www.apawood.org/green-verification-reports



Engineered Wood Product
Engineered Wood Manufacturing

Engineered Wood Manufacturing
1111 S. First Avenue
Woodtown, Ontario XXX111
www.EngineeredWoodManufacturing.com

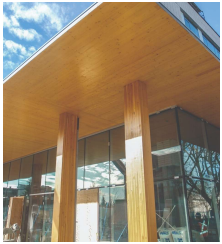
1. Basis of the green verification report:
 - 2012 and 2008 National Green Building Standard, ICC 700
 - 2009 LEED for New Construction and Major Renovations
 - 2009 LEED Canada for New Construction and Major Renovations
 - ASTM D5456-09 and D5456-05a recognized by the 2012 IBC and IRC, and 2009 IBC, respectively.
 - APA Q415, Green Verification Checklist – ICC 700-2012
 - APA L410, Green Verification Checklist – ICC 700-2008
 - APA L415, Green Verification Checklist – LEED
 - APA Product Report PR-L233
 - Documentation supporting green product verification
2. Product description:

GR-L000




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Mass Timber Today



- **Over 1,500 Mass Timber projects in the US***
- **Major Benefits:**
 - Environmentally responsible
 - Embodied carbon & Sequestered carbon
 - Faster installation than steel or concrete
 - Aesthetics of exposed wood
 - Biophilia effects
 - Code acceptance
- **Building types:**
 - Multi-Family and Hospitality (Hotels, Motels)
 - Multi-Story
 - Single-Family
 - Commercial

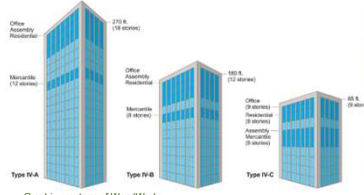
*per WoodWorks September 2022



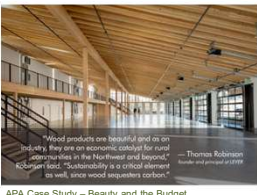
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Mass Timber

Mass timber is a strong, fast to erect and low carbon alternative to concrete and steel.




Graphic courtesy of WoodWorks



"Wood products are beautiful and as an industry, they are an economic catalyst for rural communities in the Northwest and beyond," Robert Leach, "Sustainability is a crucial element as well, since wood sequesters carbon." - Thomas Robinson, Executive Director of NWPC

APA Case Study – Beauty and the Budget
Engineered Wood's Appeal is More than Skin Deep



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Engineered Wood in Mass Timber Buildings

APA Members produce all the products required for Mass Timber applications

The "Traditional" Mass Timber Engineered Wood Products:

- **Cross Laminated Timber (CLT) – Roof, floor and wall panels**
 - Mass Plywood Panels or Mass Ply Lam (MPP-MPL) – Panels, columns and beams
 - Veneer Laminated Timber (VLT) (MPP-MPL) – Panels
- **Glued Laminated Timber (GLT)**
 - Glue laminated decking – Panels
 - Glue laminated beams – Beams, columns, rim and stair stringers
- **Nail Laminated Timber (NLT)* – Roof, floor and wall panels**
- **Dowel Laminated Timber (DLT)* – Roof, floor and wall panels**

* NON APA product. NLT and DLT are designed in accordance the AWC National Design Specification (NDS).



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Slide 42

DJ0 Now that we are aware of VLT it should also be noted here. It is somewhat different than MPP and MPL, but still developed under PRG-320

Perhaps make MPP-MPL and VLT sub headings under CLT - see next comment.

Drake Joslin, 2022-11-30T22:02:01.048

RAK0 0 Created sub heading

Robert A. Kuserk, 2022-12-05T17:12:56.351

DJ1 Reformat Slide with

Cross Laminated Timber (CLT)

Mass Plywood Panels / Mass Ply Lam
(MPP-MPL)

Veneer Laminated Timber (VLT)

Glued Laminated Timber (GLT)

Glued Laminated Beams, columns,
stair stringers, rim

Glued Laminated Decking

Nail Laminated Timber (NLT)*

Dowel Laminated Timber (DLT)*

Reasoning - MPP-MPL and VLT are manufactured as custom layups under PRG-320

Glued Laminated Timber (GLT) has many uses as beams, columns, decking panels, rim-board, stair stringers. GLT is not an acronym to be used just for decking as is indicated in slide 7.

Drake Joslin, 2022-11-30T23:54:24.751

RAK1 0 OK

Robert A. Kuserk, 2022-12-05T17:13:54.723

DJ2 Note slight change in wording in commentary to add (GLT) and (VLT)

Drake Joslin, 2022-12-01T00:00:25.030

RAK2 0 OK, I reordered to match bullets


Robert A. Kuserk, 2022-12-05T17:15:52.506

Engineered Wood in Mass Timber Buildings

APA Members produce all the products required for Mass Timber applications

The "Complimentary" Mass Timber Engineered Wood Products:

- **Laminated Veneer Lumber** – Beams and wall studs
- **Laminated Strand Lumber** – Beams, rim, stair stringer and wall studs
- **Plywood or OSB** – Diaphragm and wall sheathing




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CLT

Cross-Laminated Timber (CLT)

- Applications: long span walls, floors, roof panels
- Typical Sizing: 2-10' wide, ≤ 60' lengths, ≤ 20" thicknesses





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CLT Panels

Cross-laminated timber (CLT) is a large-scale, prefabricated, solid engineered wood panel.

- Lightweight & strong
- Excellent acoustic, fire, seismic and thermal performance
- Easy to install
- Little site waste
- Green product
- Alternative to concrete, masonry or steel



TYPICAL CLT TRADEMARK



1. Grade qualified in accordance with ANSI/APA PRG 320. 2. Product thickness. 3. APA mill number. 4. Referenced product standard.

1 V2 6 7/8" 2
3 - MILL 0001 ANSIRAM PRG 320-2019 4

PHOTO COURTESY OF NORDIC STRUCTURES

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Slide 43

DJ0 In your commentary - instead of "already discussed" I would suggest "previously discussed" since they have not been discussed in this presentation.

Drake Joslin, 2022-11-30T19:13:01.003

Slide 44

DJ0 In commentary - add (CNC) after Computer Numerical Controlled

Drake Joslin, 2022-11-30T19:15:30.236

RAK0 0 OK

Robert A. Kuserk, 2022-12-05T16:27:08.590

DJ1 Suggest discussing that although CLT is made to a Standard, CLT is not a commodity product. It is not something that can be obtained from a typical lumber distributor. Projects typically require early coordination with the CLT manufacturer.

Drake Joslin, 2022-11-30T19:20:34.319

RAK1 0 OK

Robert A. Kuserk, 2022-12-05T16:27:03.315

DJ2 How do you handle a specification that needs to be open to all bidders on a product that is essentially proprietary?

Drake Joslin, 2022-11-30T19:25:31.778

RAK2 0 I'm not sure, this is why we like to get them to a manufacturer, but I've seen projects come out for bid, I'm not sure how that is being handled. I'd need to check with WW, they probably have a better feel. I think by stating to coordinated early with a manufacturer helps.

Robert A. Kuserk, 2022-12-05T16:28:55.732

Slide 45

DJ0 Not sure everyone knows what Biophilia Effect means. Perhaps a definition or description would help.

Drake Joslin, 2022-11-30T17:52:29.012

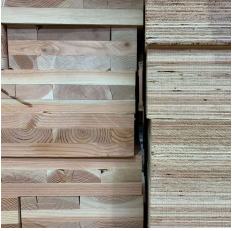

RAK0 0 I'll remove the term, I think it would get confusing defining it here.

Robert A. Kuserk, 2022-12-05T16:30:39.351

Mass Ply Panels (MPP) & Mass Ply Lam (MPL)

Mass Ply is a patented, veneer-based engineered wood product

- **MPP**
 - ANSI/APA PRG 320 certified as a Cross Laminated Timber (CLT) panel used as floor, roof and wall panels.
 - Same features and benefits as CLT
 - Dimensions: <= 11'-10" wide and 48' long, thicknesses are available in 1-inch increments from 2" to 12"
- **MPL are:**
 - ANSI/APA PRG 320 certified products for use as beams and columns
 - Dimensions: <= 24 inches x 47.5 inches in lengths up to 48 ft

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APA GLT DECKING





Glued Laminate Decking is a uniform grade glulam beam installed on edge. There are no extra certification requirements.

Panel Thickness:

- 1-3/4" to 13"


Typical Panel Dimensions:

- 1' to 4' wide
- Up to 60' length







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Mass Timber Projects



Marshall Elementary School Library
Vancouver, WA



Portland PDX Terminal B
Portland International Airport



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Slide 46

DJ0 Are there certain projects that would benefit from MPP / MPL because of relatively thinner laminations? i.e: Residential / smaller commercial perhaps?

Drake Joslin, 2022-11-30T18:20:42.298

DJ1 Add VLT here with a similar description from PR-L335

Drake Joslin, 2022-12-01T15:29:40.711

DJ2 Add Veneer Laminated Timber to the descriptions in the commentary.

Drake Joslin, 2022-12-01T15:31:10.771

Slide 47

DJ0 Change the order of Slide 7 and 8 since MPP-MPL are a subset of CLT.

Drake Joslin, 2022-11-30T18:13:26.715

RAK0 0 OK

Robert A. Kuserk, 2022-12-05T16:31:06.372

DJ1 Change title to GLT Decking

Drake Joslin, 2022-12-01T00:12:35.808

RAK1 0 ok

Robert A. Kuserk, 2022-12-05T16:31:23.711

DJ2 In the Commentary after "wide beam" add When glulam products are used vertically as glued laminated decking, the properties for Y-Y bending can be used for design.

Drake Joslin, 2022-12-01T15:19:06.450

RAK2 0 Revised Script

Robert A. Kuserk, 2022-12-05T16:32:48.141

Slide 48

DJ0 These are extremely difficult to find on the APA website. In fact, I haven't been able to find these two photos. I found a recent Sept 2022 DC Article on Portland PDX, but not this photo. Perhaps a simple guide to find them other than "on our website"

Drake Joslin, 2022-11-30T18:42:08.663

Where to find EWP Manufacturers & their products

APA Manufacturers by Product

1. Go to www.apawood.org
2. Select "Product" Tab (i.e. CLT)

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Where to find EWP Manufacturers & their products

APA Manufacturers by Product

1. Go to www.apawood.org
2. Select EWP product (i.e. CLT)
 1. Manufacturers
 2. Product Reports
 3. Green Verification Reports

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Using Engineered Wood in Type III Buildings

Issue - Type III Building detailing challenges

- Code requires exterior walls be noncombustible materials OR Fire Retardant Treated Wood (FRTW) with 2-hr fire resistance rating
- All other building elements must have 1-hr fire resistance rating
- Challenges:
 - Meeting the FRTW requirement of exterior walls
 - Floor to exterior wall intersection

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Slide 49

DJO Or - click on PRODUCTS under the APA symbol on the website - then click on the product for more information including hyperlinks to the manufacturers and Product Reports.

Drake Joslin, 2022-11-30T19:01:15.088

Using Engineered Wood in Type III Buildings

Fire Phraseology: FRT vs Fire Rating

- Fireproof? – Probably Not
 - Buildings have flammable content, so no such thing as a truly “fireproof” building.
- Fire Resistant Rated Assembly
 - Measures the length of time an assembly can resist a fire using a standardized fire exposure
- Fire Retardant Treated Wood
 - Wood products that have a pressure impregnated fire retardant treatment that inhibits flame spread
- False Equivalency: FRT = Fire Rating



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Using Engineered Wood in Type III Buildings

Fire-Resistance Rating Requirements - IBC Table 601

- Any normal wood construction assembly such as floor-ceiling or wall with a fire-resistive material added to protect the wood members.

**TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)**

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III			TYPE IV		TYPE V	
	A	B	A	B	A	B	C	HT	A	B	
Primary structural frame ^a (see Section 202)	3 ^h	2 ^{h, b}	1 ^{h, c}	0 ^f	1 ^{h, e}	0	3 ^h	2 ^h	2 ^h	HT	1 ^{h, c}
Bearing walls											
Exterior ^d	3	2	1	0	2	2	3	2	2	2	1
Interior	3 ^h	2 ^h	1	0	1	0	3	2	2	1/HT ^g	1
Nonbearing walls and partitions					See Table 705.5						
Exterior											
Interior ^e	0	0	0	0	0	0	0	0	0	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1
Roof construction and associated secondary structural members (see Section 202)	1 ^{1/2}	1 ^{h, f}	1 ^{h, f}	0 ^f	1 ^{h, f}	0	1 ^{1/2}	1	1	HT	1 ^{h, f}

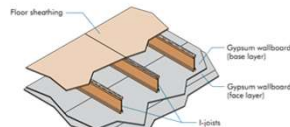


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Using Engineered Wood in Type III Buildings

One-hour Floor-Ceiling Assembly with I-joists

- 9-1/4" to 24" deep I-joists spaced up to 24" on-center
- 2-layers 1/2" Type C Gypsum Ceiling



**FIGURE 5.5
ONE-HOUR COMBUSTIBLE FLOOR-CEILING ASSEMBLIES WITH I-JOISTS^a**

A. BASIC ASSEMBLIES

1. Floor topping (optional). Verify reference sound ratings if applicable.
2. Floor sheathing. Min. 23/32-inch (18-mm) T&G wood structural panels. The sheets shall be installed with their long edge perpendicular to the joists with end joints as noted over the top flange of joist. Floor sheathing must be notched per code requirements.
3. Structural members. Min. 9 1/4 inches (235 mm) deep I-joists. Max. 24 inches (610 mm) on center spacing. Min. flange thickness of 1 1/2 inches (38 mm) and each flange area of at least 2.25 in² (1,452 mm²). Min. web thickness of 3/8 inch (9.5 mm).
4. Ceiling. Two layers of 1/2-inch (13 mm) Type C gypsum wallboard.
 - a. Base layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists using 1-inch (25-mm) Type S drywall screws at 12 inches (305 mm) on center. The end joints of the wallboard must be centered on the bottom flange of the joist and must be staggered.



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Using Engineered Wood in Type III Buildings

Fire-Retardant-Treated Structural Glued Laminated Timber

- APA Technical Topic TT-127, issued May 2020
- Joint pilot study
 - APA – The Engineered Wood Association
 - USDA Forest Products Laboratory
- Comparison of the bending properties of untreated glulam and FRT glulam
- Use in Type III construction
- Research in Progress for FRT LVL

APA Technical Topics

Fire-Retardant-Treated Structural Glued Laminated Timber

Engineered glued laminated timber (glulam) is required for fire resistance according to the International Building Code (IBC). The 2018 IBC code requires a minimum 1-hour fire resistance for Type III buildings. This document provides information on the use of fire-retardant-treated (FRT) glulam in Type III buildings. The document is intended for use by building officials, architects, engineers, and other professionals involved in the design and construction of Type III buildings. The document provides information on the use of FRT glulam in Type III buildings, including the requirements for FRT glulam, the use of FRT glulam in Type III buildings, and the use of FRT glulam in Type III buildings.

TABLE 1

Glulam Type	Minimum Fire Resistance (hr)	Minimum Thickness (in)	Minimum Depth (in)
1. Untreated	1	4	6
2. FRT	1	4	6
3. FRT	1	4	6
4. FRT	1	4	6

By the APA Forest Products Laboratory, Washington, DC 20005

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Using Engineered Wood in Type III Buildings

Fire-Retardant-Treated Structural Glued Laminated Timber

- APA Technical Topic TT-127, issued May 2020
- Research in Progress for FRT LVL

TABLE 2

24F-Va/DF GLULAM BEAMS^a

Treatment effect ^b	Bending Strength, MOR ^c	Modulus of Elasticity, MOE ^d
Untreated	0.76	0.96
Combined effect ^e	0.49	0.90

^a Glulam beam size was 5-1/2-in. wide x 6-in. deep x 114-in. long. Values represent the ratios between untreated and FRT-treated samples.

^b Treatment effect does not include the hygrothermal conditioning as noted in Footnote (5).

^c Combined effect includes the treatment with hygrothermal conditioning in accordance with ASTM D5664 (50 ± 4°F and 50% or higher relative humidity for 108 ± 3 days) [7].

^d Tested with a third point load method at a span of 108 in. [9] and the ratios are based on the 5th percentile with 75% confidence and the mean for MOR and MOE, respectively.

APA Technical Topics

Fire-Retardant-Treated Structural Glued Laminated Timber

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4. FRT	1	4	6

By the APA Forest Products Laboratory, Washington, DC 20005

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Course Description

This program will present the properties and applications of engineered wood products like wood structural panels, glulam, structural composite lumber, and mass timber timber. The webinar will cover proper specification in accordance with the International Building Code. New technologies, streamlined design options and sustainability issues will be addressed, as well the constructability benefits of engineered wood products.



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APA Update Newsletter
(www.apawood.org)

November 2020

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Wood University
Two courses, Engineered Wood Basics and Design of Wood Connectors, offer up to eight units through AIA or ASID.

APA

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APA Update Newsletter
(www.apawood.org)

The leading resource for information about engineered wood products

TECHNICAL RESEARCH MANUFACTURER DIRECTORY CONTACT

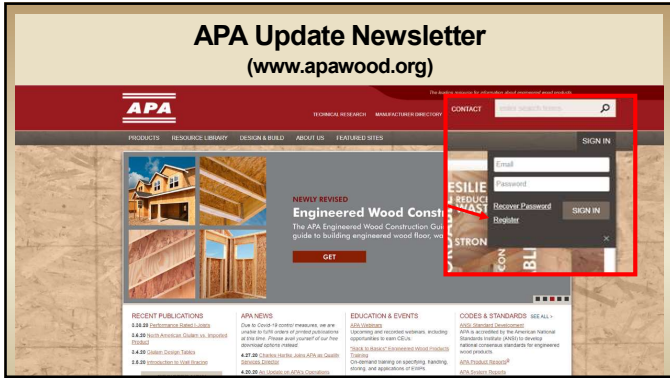
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NEWLY REVISED
Engineered Wood Construction Guide
The APA Engineered Wood Construction Guide, E30, is the authoritative guide to building engineered wood floor, wall and roof systems.

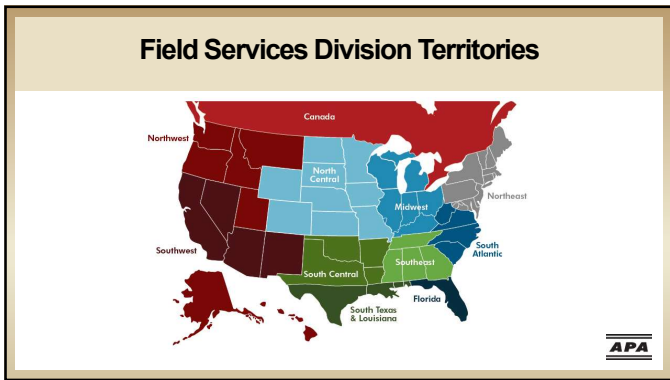
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