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PROVIDER NUMBER: J518

INNOVATIONS AND BEST PRACTICES FOR SPECIFYING HIGH-QUALITY CASEWORK



IMPORTANT DRIVERS OF A SUCCESSFUL LAMINATE CASEWORK SPECIFICATION

Presented by: **CASE SYSTEMS, INC.**
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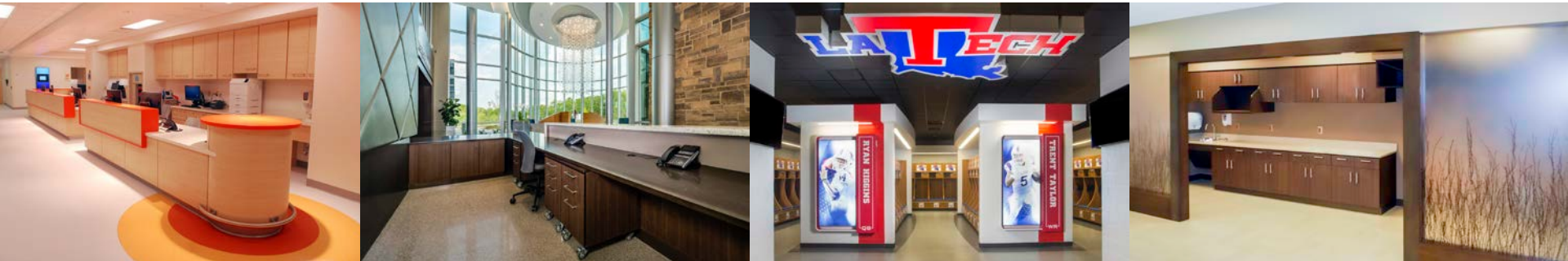


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COURSE DESCRIPTION

Engineered casework has evolved over the last few decades due to innovations in materials, concepts, and manufacturing technologies. This presentation is intended to give a thorough understanding of the best practices and options to be specified to ensure quality casework is manufactured and installed.





LEARNING OBJECTIVES

1

Define areas that need to be included when specifying casework, including edge, core, and hardware. Explain how the proper detailing can lead to a successful project that is aesthetically pleasing and maintains the welfare of building occupants.

2

Compare and contrast different core materials and what unique characteristics they each have regarding the safety of building occupants.

3

Identify current trends and code considerations when specifying laminate casework and how adhering to safety standards will produce a project that is durable and environmentally conscious.

4

Discuss how Division 6 and Division 12 specifications and AWI Qualifications impact your casework project.

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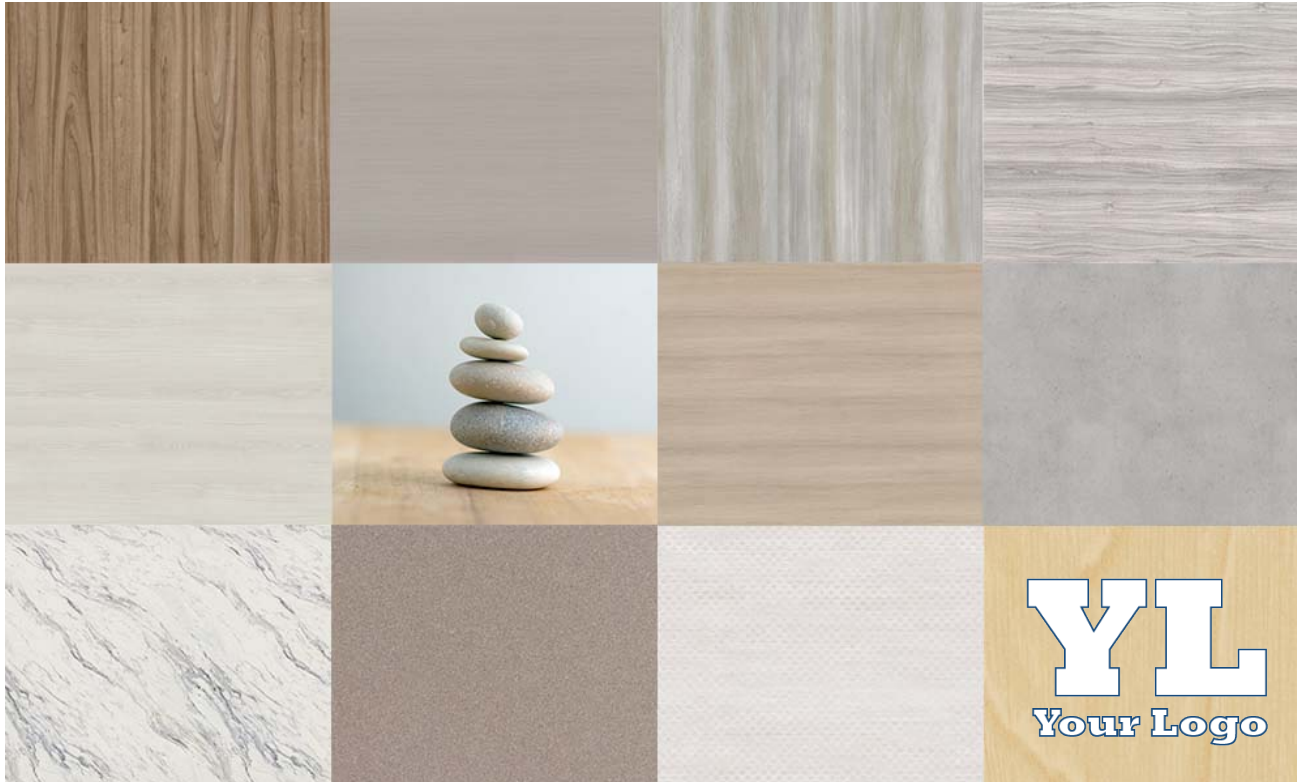
- ❑ Introduction
- ❑ Substrate
- ❑ Laminate
- ❑ Comparison with Wood Veneer
- ❑ Edgeband
- ❑ Joinery
- ❑ Hardware
- ❑ Construction
- ❑ Engineered Casework vs Millwork
- ❑ AWI Qualifications
- ❑ Lessons Learned



INTRODUCTION

INTRODUCTION

PLASTIC LAMINATE CASEWORK OFFERS A WORLD OF COLOR OPTIONS



INTRODUCTION

LAMINATE COLOR OPTIONS & BIOPHILIC DESIGNS

Biophilia means “a love of nature.” Biophilic design incorporates nature into building spaces to contribute to the health and well-being of occupants.

The role of laminate:

- Offers a plethora of natural colors, patterns, and designs
- Can help shape a space that follows biophilic principles
- Supports a healthy environment for learning, healing, and working.



INTRODUCTION

POPULAR APPLICATIONS OF PLASTIC LAMINATE CASEWORK



EDUCATION



HEALTHCARE



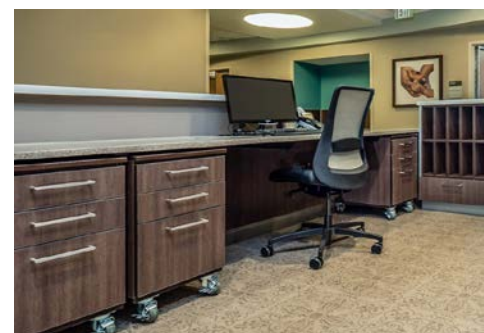
COMMERCIAL



LABORATORIES



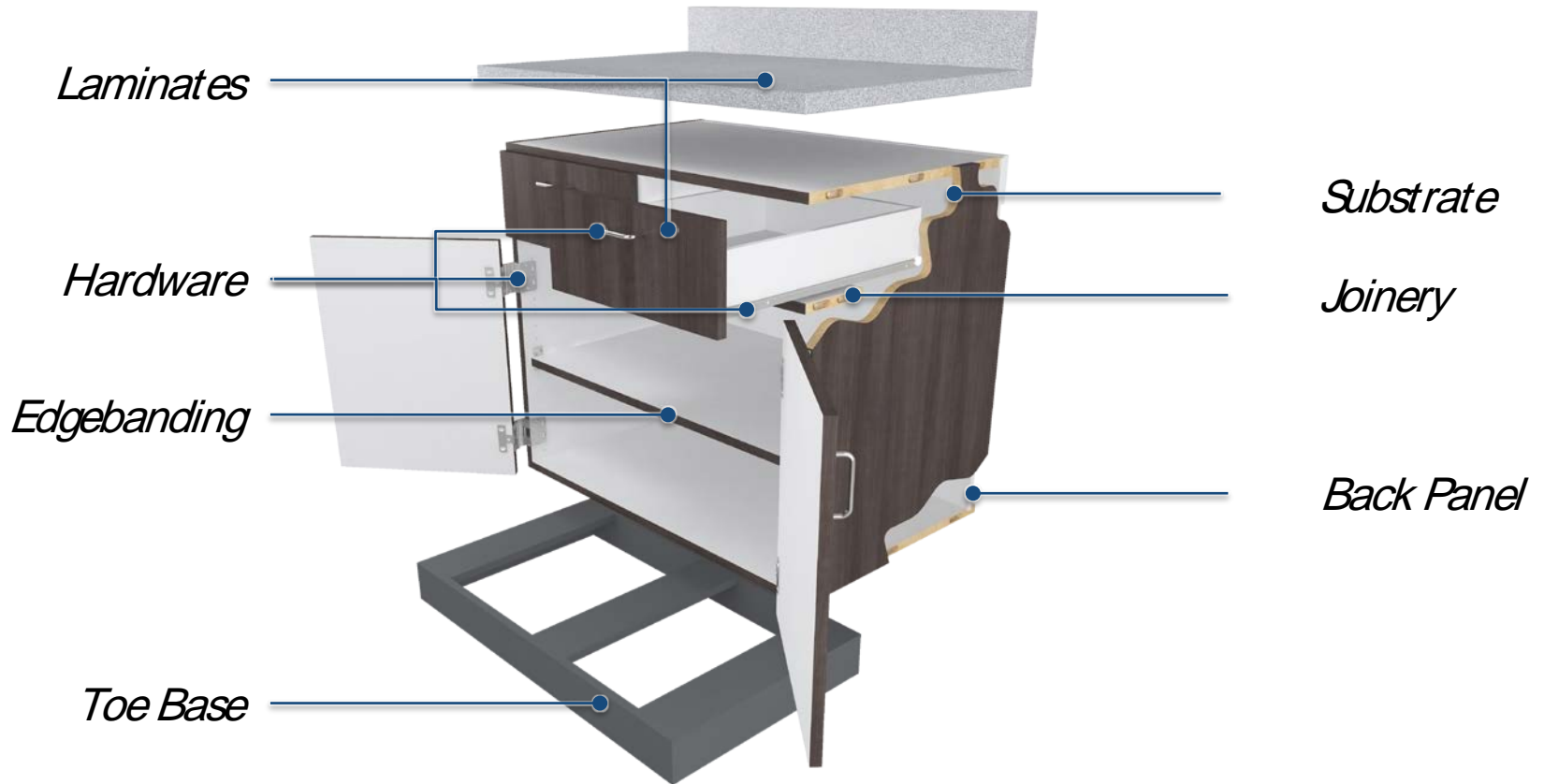
ATHLETICS



MOBILE

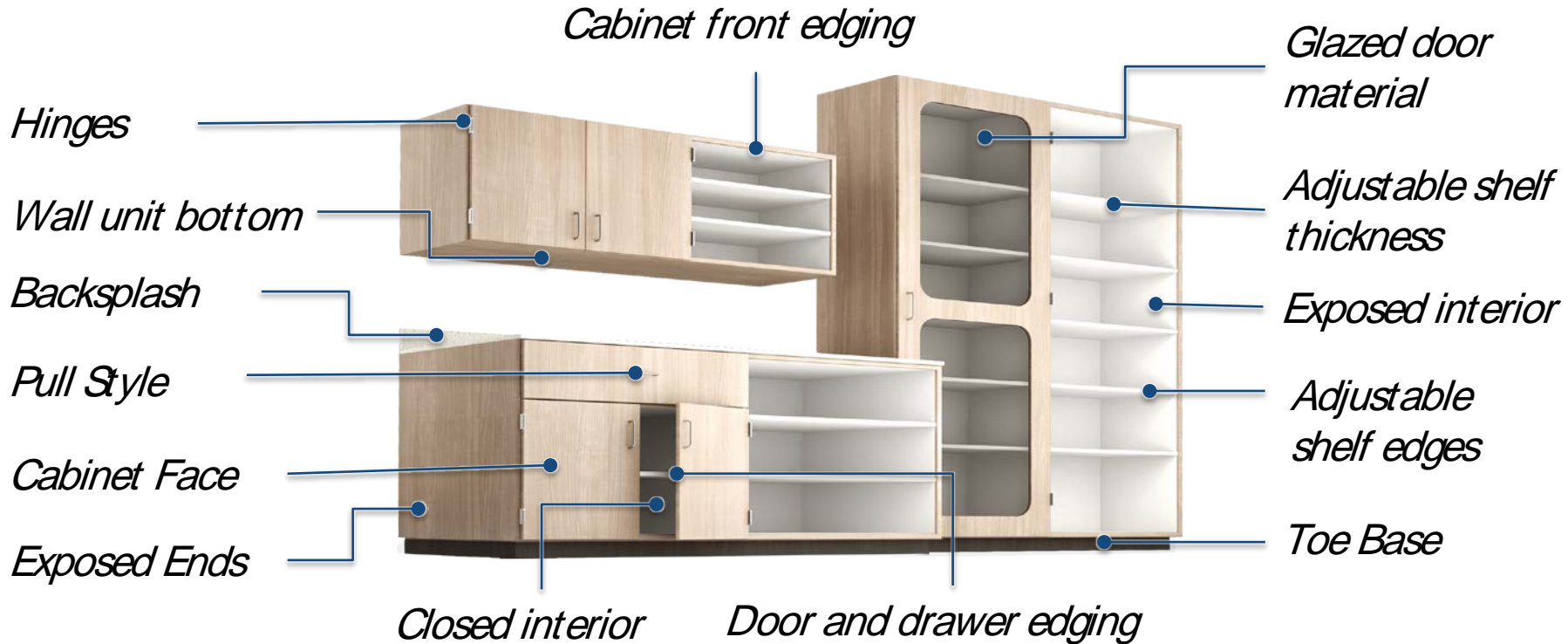
INTRODUCTION

OVERVIEW : IMPORTANT COMPONENTS OF CASEWORK



INTRODUCTION

OVERVIEW : SPECIFICATION AREAS



SUBSTRATE

SUBSTRATE

DIFFERENT GRADES OF ENGINEERED PARTICLEBOARD

- ❑ Screw Holding Face
- ❑ Screw Holding Edge
- ❑ Internal Bond
- ❑ Modulus Of Rupture
- ❑ Modulus Of Elasticity



USE THE RIGHT BOARD FOR YOUR SPECIFICATIONS!

SUBSTRATE

STRENGTH COMPARISON

Screwholding Strength (lbs)

	Face	Edge
M1	NS	NS
MS	180	157
M2	202	180

M2 board is the industry standard.



USE THE RIGHT BOARD FOR YOUR SPECIFICATIONS!

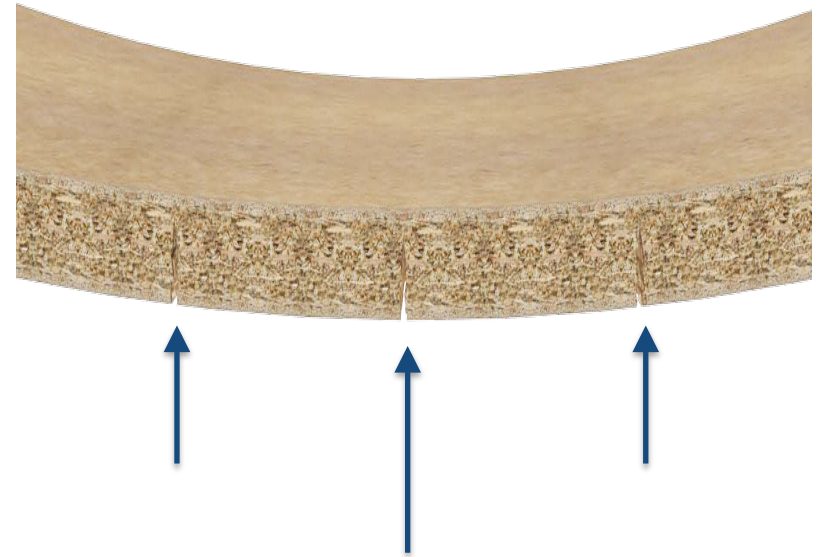
SUBSTRATE

RUPTURE

Modulus of Rupture

	psi
M1	1450
MS	1595
M2	1885

M2 board is the industry standard.



USE THE RIGHT BOARD FOR YOUR SPECIFICATIONS!

SUBSTRATE

ELASTICITY

Modulus of Elasticity

	psi
M1	224,800
MS	246,600
M2	290,100

M2 board is the industry standard.



USE THE RIGHT BOARD FOR YOUR SPECIFICATIONS!

SUBSTRATE

INTERNAL BOND

	psi
M1	52
MS	52
M2	58

M2 board is the industry standard.



USE THE RIGHT BOARD FOR YOUR SPECIFICATIONS!

SUBSTRATE

PLYWOOD VS PARTICLE BOARD

- ❑ Less Susceptible To Moisture Damage
- ❑ More Light Weight
- ❑ More Prone To Warping



USE THE RIGHT BOARD FOR YOUR SPECIFICATIONS!

SUBSTRATE

MEDIUM DENSITY FIBERBOARD (MDF) VS PARTICLE BOARD

- ❑ Engineered wood composite like industrial particleboard, but is denser and therefore heavier
- ❑ Lower screw holding strength than particleboard (<-14%)
- ❑ Lower Modulus of Elasticity than particleboard (<-15%)
- ❑ Highest dimensional stability

MDF and particleboard are both more stable to dimensional changes due to variations in humidity and temperature than solid wood and plywood.



USE THE RIGHT BOARD FOR YOUR SPECIFICATIONS!

SUBSTRATE

HEALTH, SAFETY & WELFARE CONSIDERATIONS

The substrate is the backbone of a cabinet. It will influence the stability and safety of your project over time.

Cabinets may look the same from the outside, but the core material will decide if your cabinet fails causes injuries to the occupants of your space.



LAMINATE

LAMINATE

TYPES OF LAMINATES

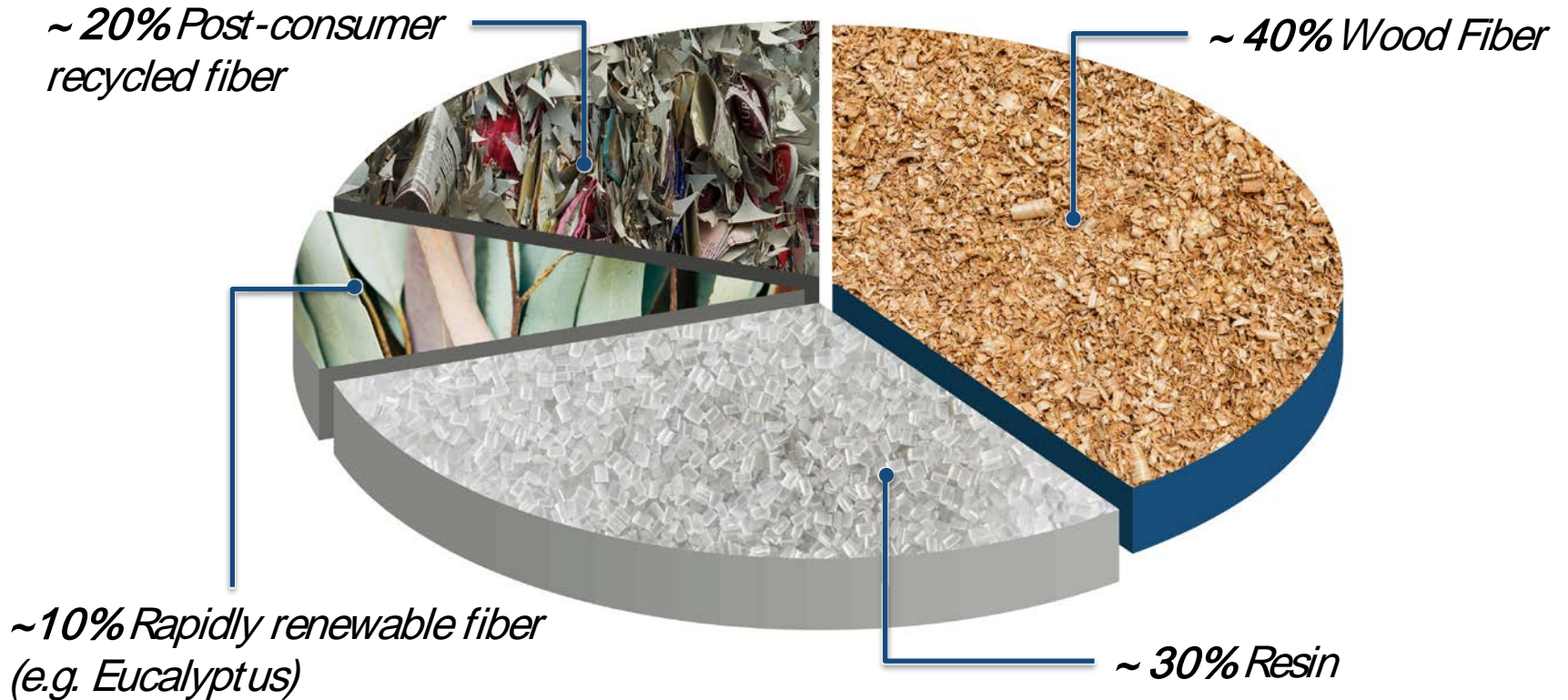
- ❑ High Pressure Laminate
- ❑ Thermally Fused Laminate
- ❑ Top Coated Melamine



USE THE RIGHT LAMINATE FOR YOUR SPECIFICATIONS!

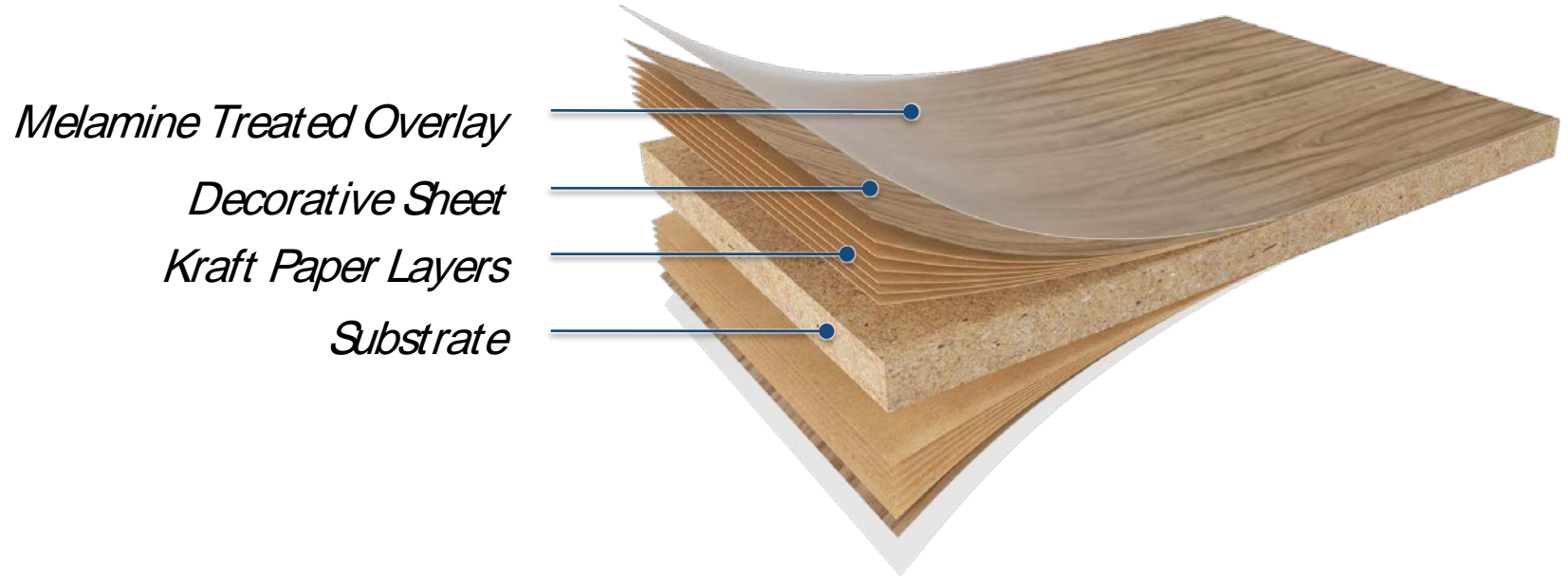
LAMINATE

WHAT IS HIGH-PRESSURE LAMINATE MADE OF?



LAMINATE

COMPONENTS OF HIGH-PRESSURE LAMINATE



LAMINATE

COMPONENTS OF THERMALLY FUSED MELAMINE

Decorative Sheet
saturated with melamine resin

Substrate



LAMINATE

THERMALLY FUSED LAMINATE

- Viable alternative in the right application (vertical; low impact environments)
- Thermally fused melamine can be coordinated with High Pressure Laminate in a complementary design



LAMINATE

BALANCED CONSTRUCTION

Door exterior:
HPL



Door Interior:
CL20



Cabinet Box:
TFL



*High Pressure
Laminate (HPL)*



*Cabinet Liner
(CL20)*

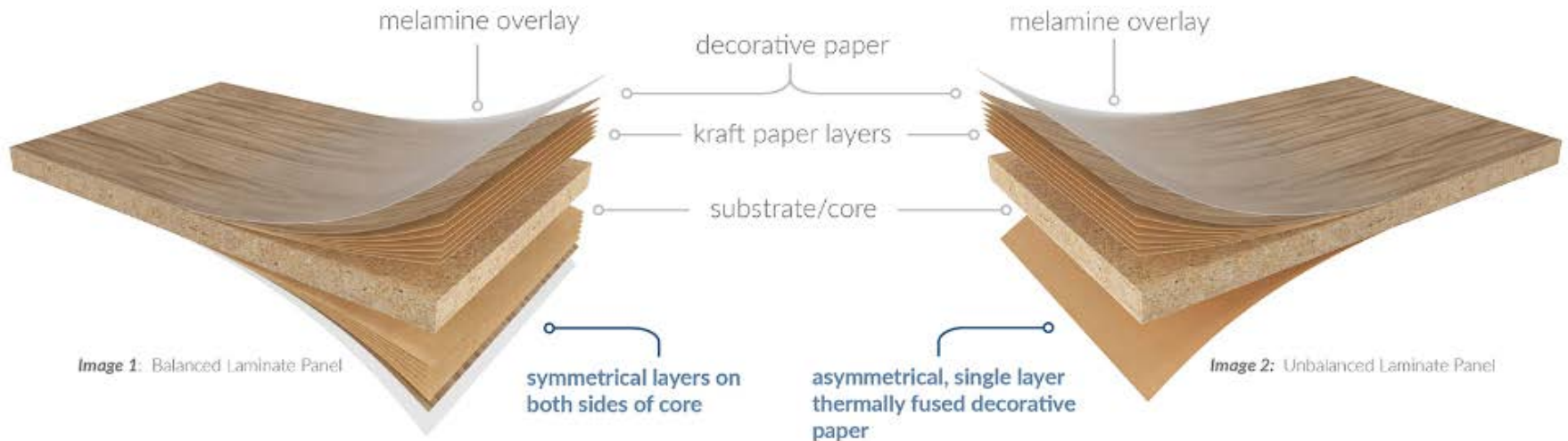


*Thermally Fused
Laminate (TFL)*

LAMINATE

BALANCED CONSTRUCTION

- Why is it important?
- Reduce Risk of Warping



LAMINATE

TOP COATED MELAMINE

- ❑ Same paper used to make high pressure laminate
- ❑ Top coated with melamine resin
- ❑ Glued to the substrate
- ❑ Poor abrasion resistance
- ❑ Poor chemical resistance
- ❑ Delaminates and peels



LAMINATE

WEAR RESISTANCE - TABER ABRADER TESTS

The Taber Abrader is used to perform accelerated wear testing.

Referenced in numerous international standards for materials including plastics, coatings, laminates, leather, paper, ceramics, carpeting, safety glazing, and many others.

Developed by NEMA



LAMINATE

WEAR RESISTANCE - TABER ABRADER TESTS

HPL 400 CYCLES:



TFL 400 CYCLES:

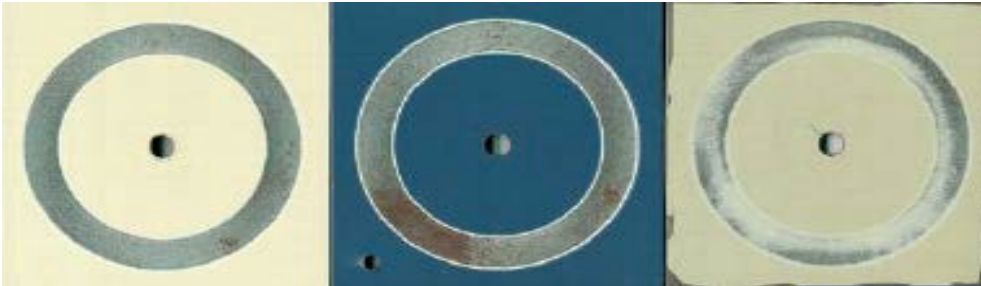


LAMINATE SURFACES

4X

More Abrasion Resistant
Than Metal Surfaces

METAL 200 CYCLES:



WOOD 125 CYCLES:



LAMINATE

LAMINATE ADHESIVES

- Water based
- Contact adhesive



LAMINATE

LAMINATE ADHESIVES

- ❑ Polyvinyl Acetate (PVA) is a **water-based adhesive** used to bond laminate sheets to a core material.
- ❑ PVA gains bonding strength by utilizing the water as a vehicle to penetrate the surface of the substrate and open its pores allowing for linking with sub-surface fibers.
- ❑ PVA is mechanically applied to the substrate with a glue spreader and the laminate sheet is then either a cold or hot pressed.
- ❑ **They are non-toxic and do not emit harmful VOCs or hazardous air pollutants.**

LAMINATE

CONTACT ADHESIVE

- Adhesion is created with a “J” roller
 - No guarantee of consistent pressure and uniform application
 - Inconsistent pressure and application can lead to poor adhesion and result in delamination

- **For best results, ensure that your supplier uses a hot press in the lamination process**



EDGE BAND

EDGE BAND

COMMON TYPES OF EDGE BANDING

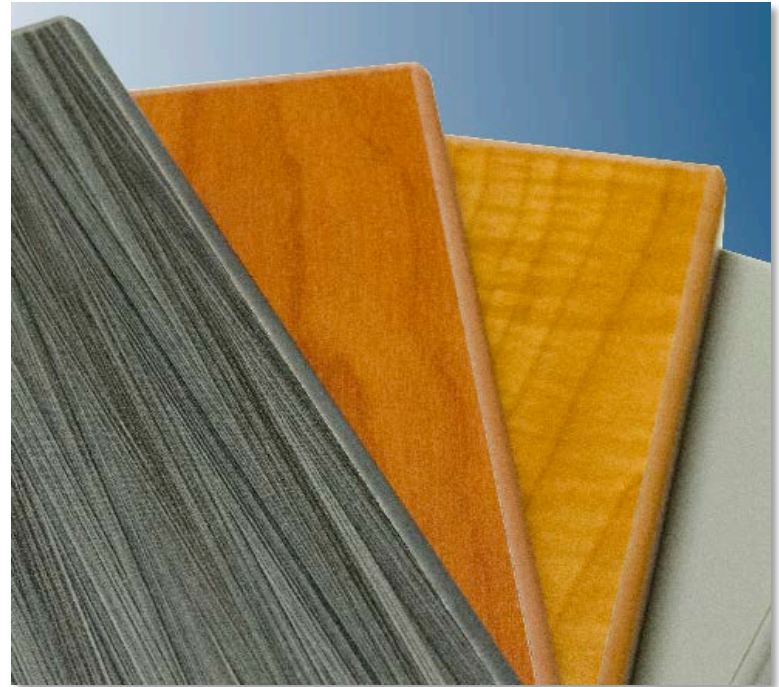
- ❑ 3mm Edge
- ❑ 0.020" Edge
- ❑ Self Edge
- ❑ Flexible Edge



EDGEBAND

3MM EDGE

- ❑ Applied With Hot Melt Adhesive
- ❑ Visually Attractive, As It Forms A Rounder Smooth Edge
- ❑ **Best Impact Resistance**



EDGE BAND

0.020" EDGE

- ❑ Applied With Hot Melt Adhesive
- ❑ Consistent Color
- ❑ Commercially Matched To Most Laminates



EDGE BAND

SELF EDGE

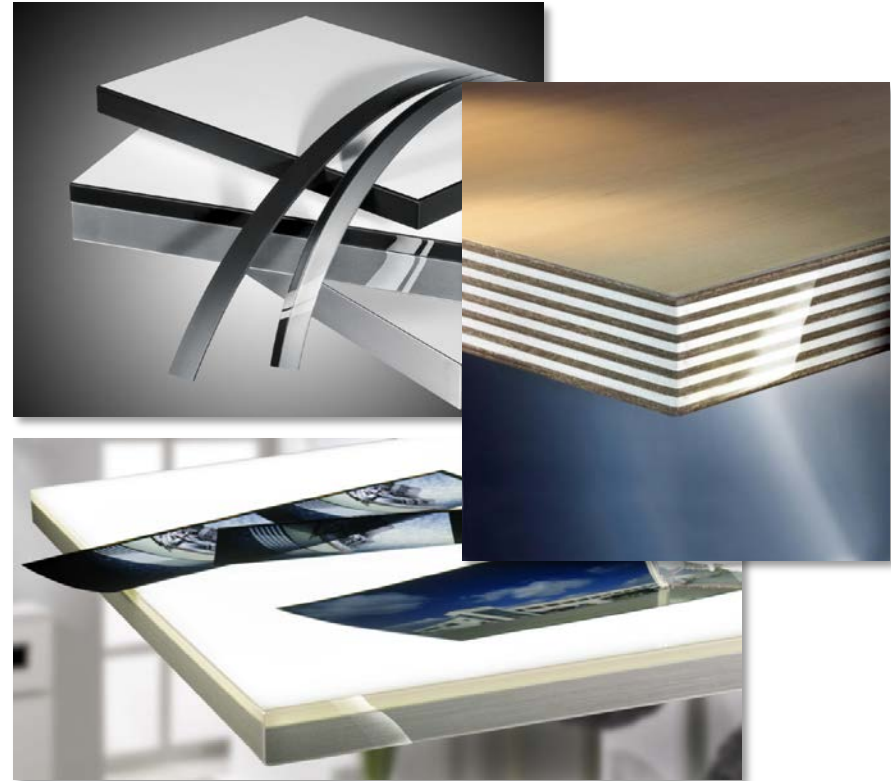
- ❑ HPL is cut in strips and glued to the substrate.
- ❑ Leaves the cabinet vulnerable to damage from any blunt object including desk chairs.
- ❑ **Warranty issues!**



EDGE BAND

CREATIVE POSSIBILITIES

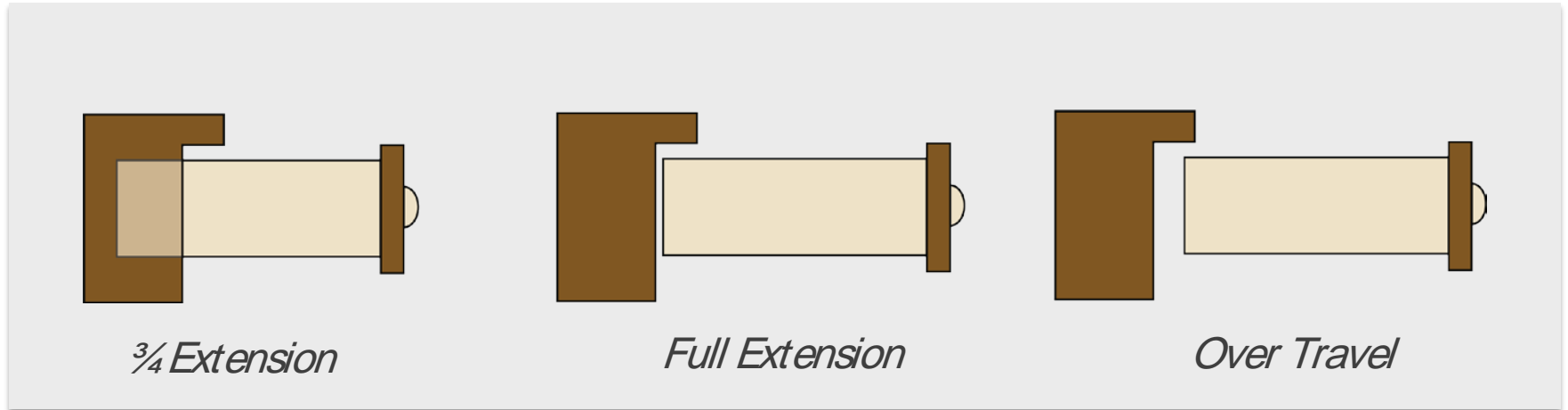
- ❑ **3D**: three-dimensional effect created with transparent acrylic and print on the reverse side
- ❑ **2-in-one**, high gloss back painted 3D Edgebanding, can look like glass
- ❑ 3D Edgebanding may be glued using most EVA, or PUR5 based hot melt adhesive.
- ❑ High-end aesthetics options without the cost



HARDWARE

HARDWARE

DRAWER SLIDES- TYPES OF EXTENSION



USE THE RIGHT DRAWER SLIDE FOR YOUR APPLICATION

Specify: 100 pound rated, minimum Grade 1 per ANSI/ BHMA A156.9.

HARDWARE

TYPES OF HINGES

- **5-Knuckle Hinge**
 - Most commonly specified
 - Ultra Durable
 - No interior space loss
 - Uses roller or magnetic catches
 - 270° swing



- **3-Knuckle Hinge**
 - Durable
 - Self closing in last 10°
 - 270° swing



- **Concealed Hinges**
 - Multiple areas of adjustment
 - Consumes interior space
 - Self closing in last 10°
 - 170° swing only
 - Clean exterior design
 - Aka “European hinges”



HARDWARE

PULLS

- ❑ **Most Common: Aluminum Wire**
- ❑ Contour
- ❑ Brass core
- ❑ Epoxy-coated
- ❑ Stainless Steel
- ❑ ABS semi-recessed
- ❑ Oversized semi-recessed
- ❑ Anti-ligature
- ❑ Custom



CONSTRUCTION

WHAT TO LOOK FOR IN THE CONSTRUCTION OF YOUR CASEWORK

- ❑ AWI Approved Joinery
- ❑ Separate Recessed Toebase
- ❑ Durable Drawer Construction
- ❑ Strong Backpanel
- ❑ 32 mm System



JOINERY

AWI APPROVED JOINERY



Mechanical System



Dowel Pin Construction

JOINERY

MECHANICAL JOINERY SYSTEM

- ❑ Mechanical joinery systems use spring steel clips and threaded studs.
- ❑ PRO: Racking is absorbed by steel spring – returns “home”



JOINERY

DOWEL PIN JOINERY

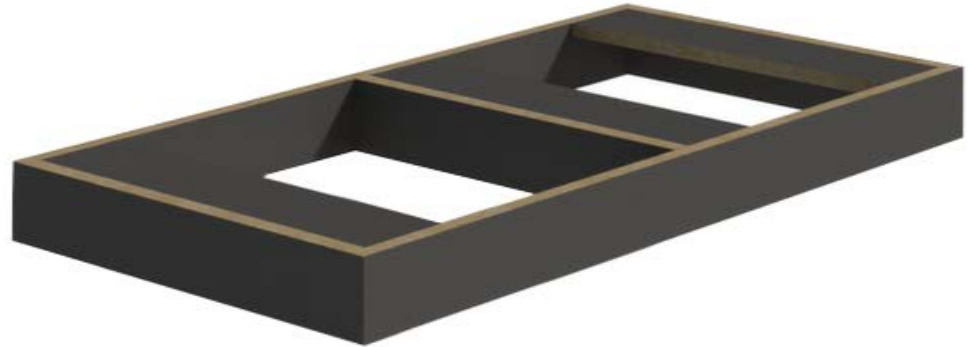
- ❑ Dowel pin joinery uses glue to form a rigid bond
- ❑ PRO: Exact Tolerances



CONSTRUCTION

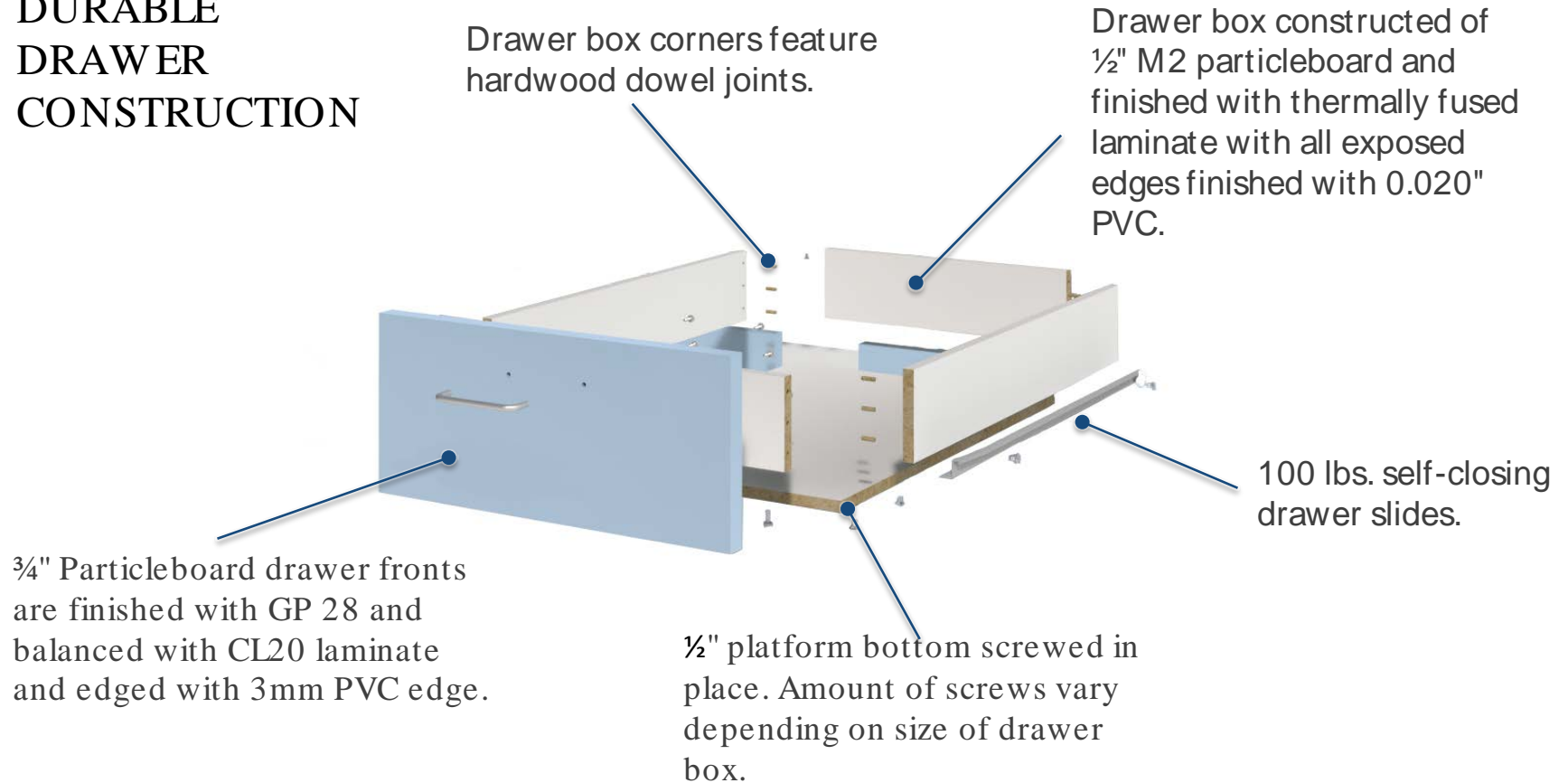
SEPARATE RECESSED TOEBASES

- ❑ Protect the cabinet from moisture, dampness, spills or wet cleaning.
- ❑ Gives cabinet full support of end panel and bottom.
- ❑ Generally assembled at manufacturing facility but may be assembled on-site.
- ❑ If damaged, can be replaced separately from cabinet.
- ❑ Allow use of different material for the base such as raw exterior grade plywood.



CONSTRUCTION

DURABLE DRAWER CONSTRUCTION



CONSTRUCTION

STRONG BACK PANELS

- A fully captured ½" panel will not fail.
 - Wall hung cabinets are hung by fasteners through the cabinet back
 - ½" panels are structurally the best for this application.
- Surface applied, glued or stapled-on back panels, do not provide any structural strength and can fail, causing damage or injury.
- Thinner back panels may not provide the necessary rigidity or strength (especially on wall cabinets) to prevent failure.
- Caution against painted back panels as they do not wear well.



CONSTRUCTION

STRETCHER

*Tall Cabinet:
Upper, middle,
and lower
stretcher.*



*Wall Cabinet:
Upper and lower
stretcher.*

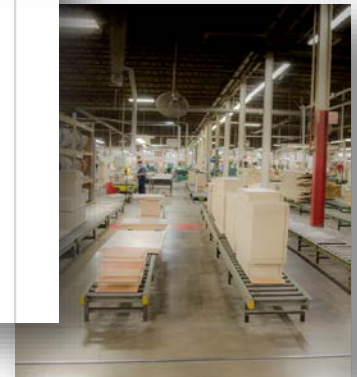
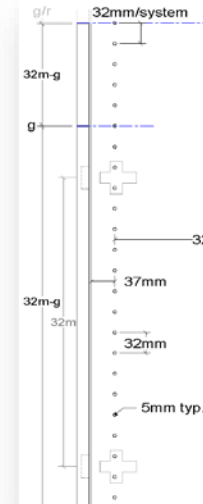
*Base Cabinet:
Top stretcher only since
weight is transferred to the
floor and back panel is fully
captured.*

CONSTRUCTION

32mm MANUFACTURING SYSTEM

- ❑ European standard of hole boring designed for hardware and fittings.
- ❑ The use of the 32mm pattern allows for the most options in design and hardware with the most efficient use of manufacturing resources.

Does your casework manufacturer utilize a 32mm system or lean principals to keep your price down?



CONSTRUCTION

HEALTH, SAFETY & WELFARE CONSIDERATIONS

Cabinet construction and materials influence the health and safety of occupants.

- ❑ Failing cabinet components can cause injuries.
- ❑ Sharp edges can be a risk factor in specific uses.
- ❑ Ensure the use of non-toxic glues.
- ❑ Ease of maintenance and cleanability will ensure a long and safe use of the product.



MILLWORK vs

ENGINEERED CASEWORK

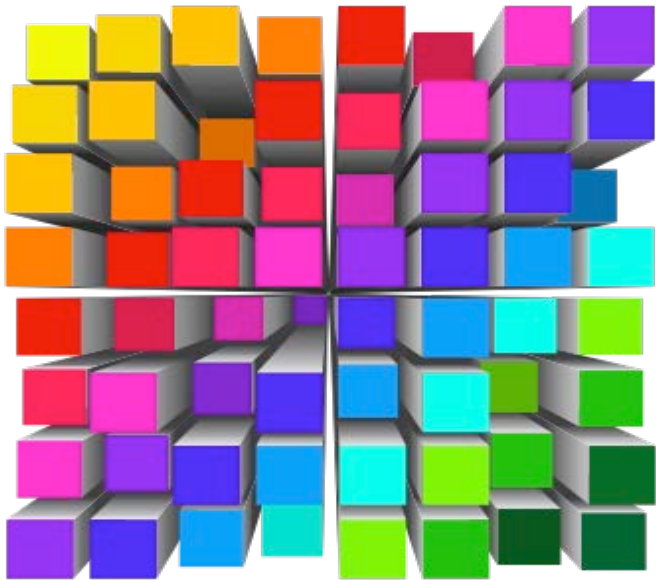
MILLWORK vs ENGINEERED CASEWORK



A DECISION WITH IMPORTANT CONSEQUENCES

MILLWORK vs ENGINEERED CASEWORK

REPEATABILITY and CONSISTENCY



DIVISION 6

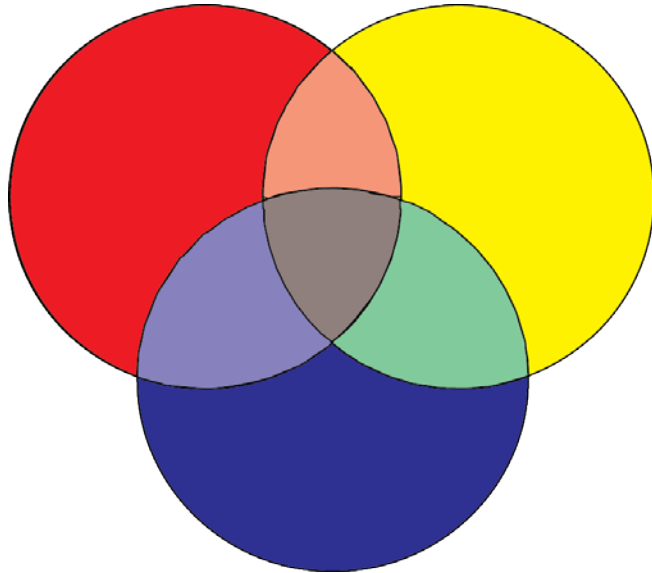


DIVISION 12

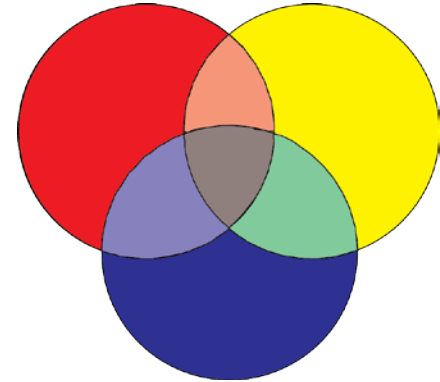


MILLWORK vs ENGINEERED CASEWORK

CUSTOMIZATION



DIVISION 6

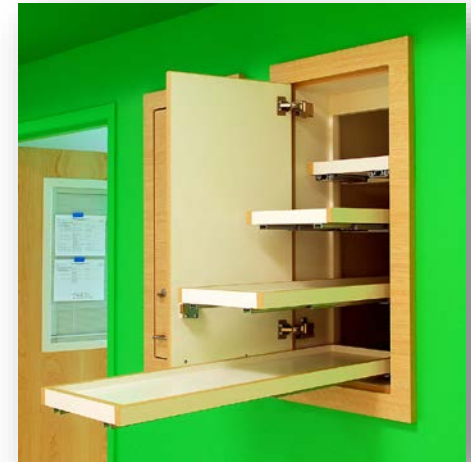


DIVISION 12



MILLWORK vs ENGINEERED CASEWORK

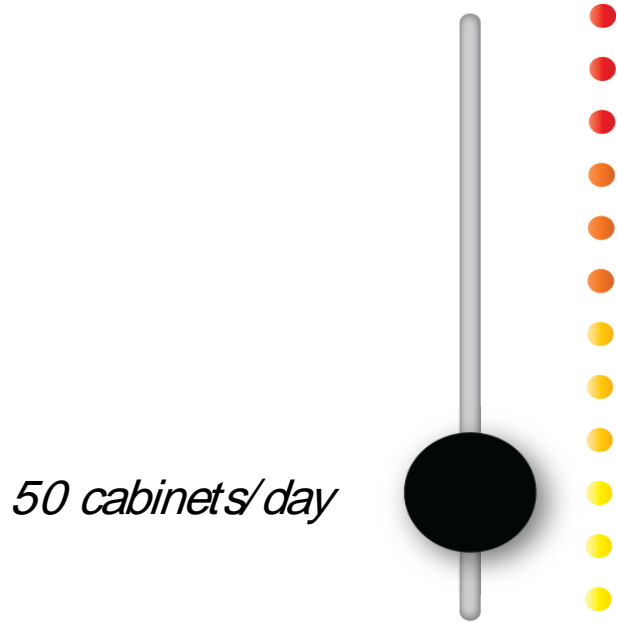
APPLICATION EXAMPLE *Custom Double-sided Built-in Nurse Servers*



REPEATABLE CUSTOMIZATION DIVISION 12

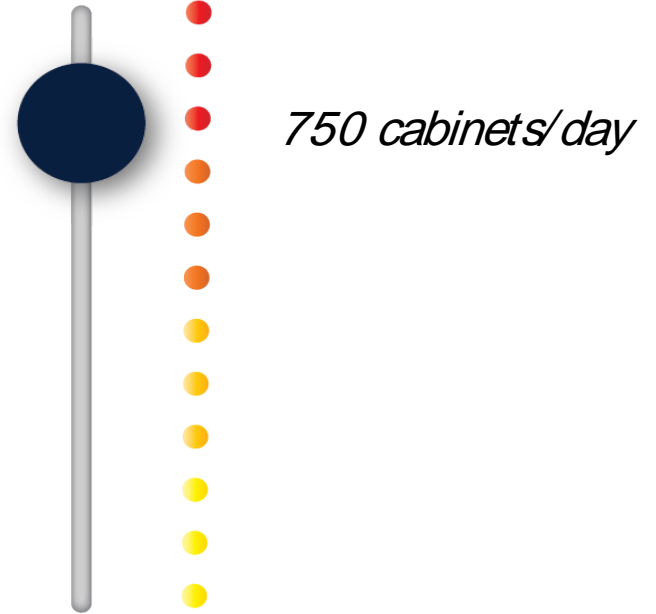
MILLWORK vs ENGINEERED CASEWORK

VOLUME



50 cabinets/day

DIVISION 6



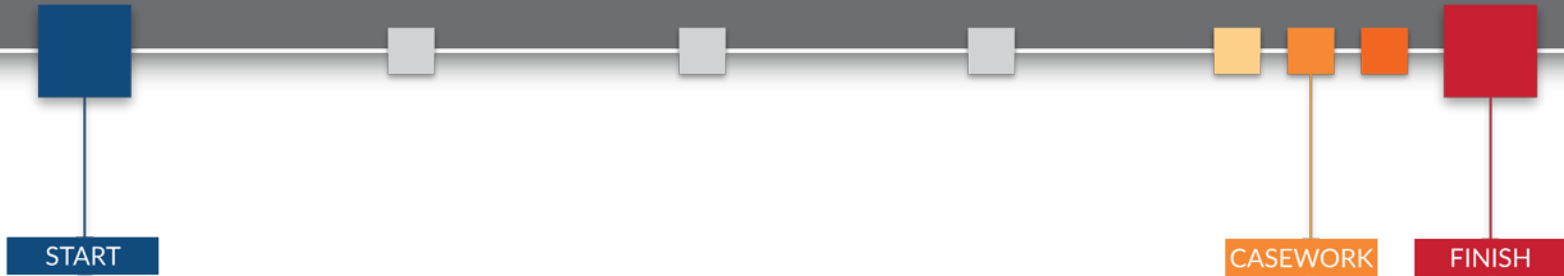
750 cabinets/day

DIVISION 12



MILLWORK vs ENGINEERED CASEWORK

TIME LINE OF A TYPICAL CASEWORK PROJECT



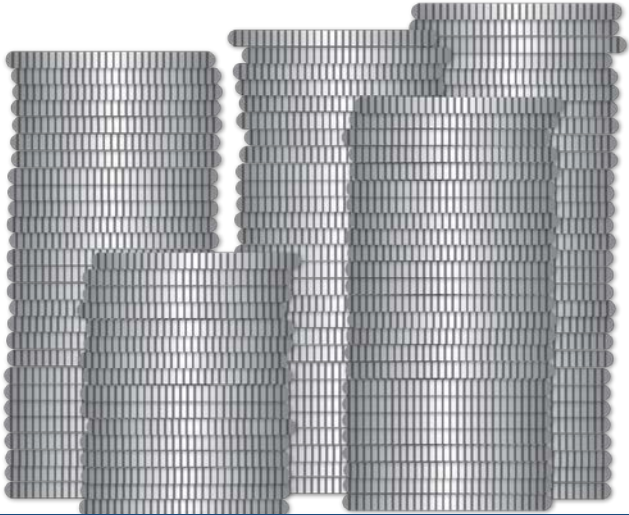
In the *race against time* the *volume* your supplier can produce is a crucial factor.

MILLWORK vs ENGINEERED CASEWORK

FINANCIAL STABILITY



DIVISION 6



DIVISION 12



MILLWORK vs ENGINEERED CASEWORK

WARRANTY



DIVISION 6



DIVISION 12



AWI QUALIFICATIONS

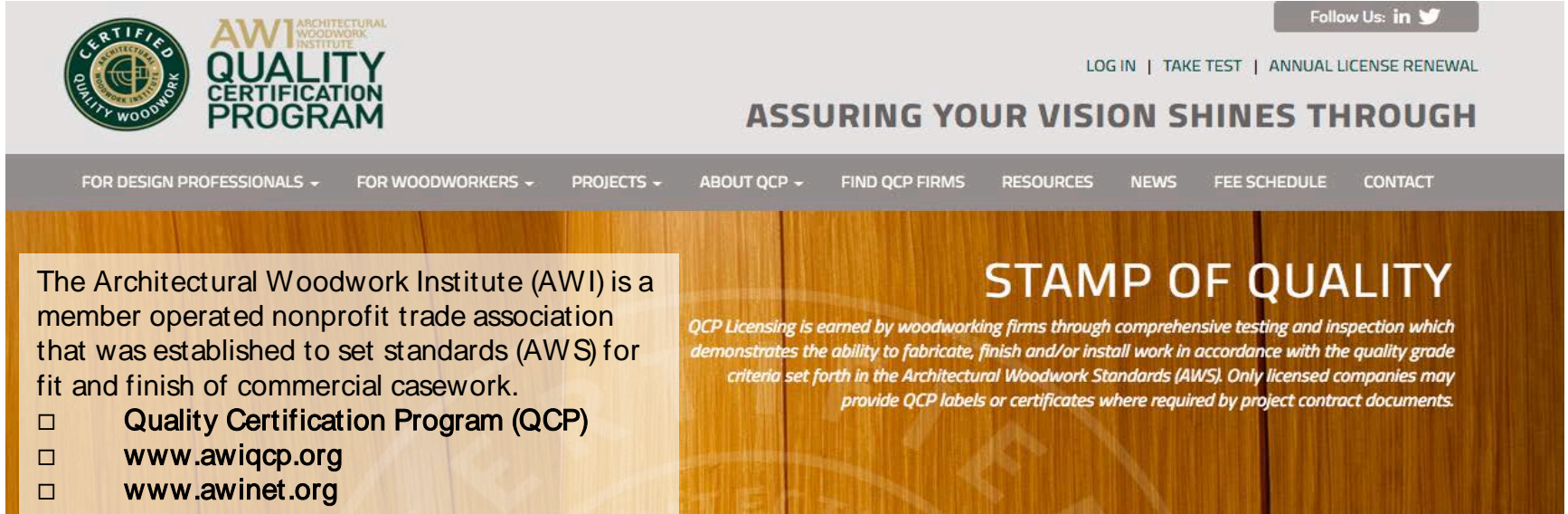
STANDARDS & RESOURCES

RESOURCES ON INSTITUTIONAL CASEWORK

- ❑ **Architectural Woodwork Institute (AWI) - Quality Certification Program (QCP)**
- ❑ **Scientific Equipment and Furniture Association (SEFA)**
- ❑ **Leadership in Energy & Environmental Design (LEED)**
- ❑ **National Electrical Manufacturers Association (NEMA)**
- ❑ **Manufacturer Qualification Statements & Quality Standards**



AWI QUALIFICATIONS



CERTIFIED QUALITY WOODWORK **AWI ARCHITECTURAL WOODWORK INSTITUTE QUALITY CERTIFICATION PROGRAM**

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ASSURING YOUR VISION SHINES THROUGH

FOR DESIGN PROFESSIONALS ▾ FOR WOODWORKERS ▾ PROJECTS ▾ ABOUT QCP ▾ FIND QCP FIRMS RESOURCES NEWS FEE SCHEDULE CONTACT

The Architectural Woodwork Institute (AWI) is a member operated nonprofit trade association that was established to set standards (AWS) for fit and finish of commercial casework.

- Quality Certification Program (QCP)**
- www.awiqcp.org
- www.awinet.org

STAMP OF QUALITY

QCP Licensing is earned by woodworking firms through comprehensive testing and inspection which demonstrates the ability to fabricate, finish and/or install work in accordance with the quality grade criteria set forth in the Architectural Woodwork Standards (AWS). Only licensed companies may provide QCP labels or certificates where required by project contract documents.

AWI – QCP SPECIFICATION OPTIONS

- Require a copy of the manufacturer's AWI membership certificate and AWI QCP letter certifying that the manufacturer is licensed and entitled by the AWI Quality Certification Program (QCP) to certify and label for compliance with the AWS guidelines.
- Require AWI QCP certification labels.
- Registered with AWI/ QCP.

What Cabinet Grade Can Your Casework Manufacturer Produce?

Typical Standard Construction



*Vertical grain on doors
and horizontal grain
on drawer fronts*



Custom Grade



Vertical grain match on doors and drawer fronts



Premium Grade



Vertical grain match on doors and drawer fronts, with all cathedrals pointed up



AWI QUALIFICATIONS

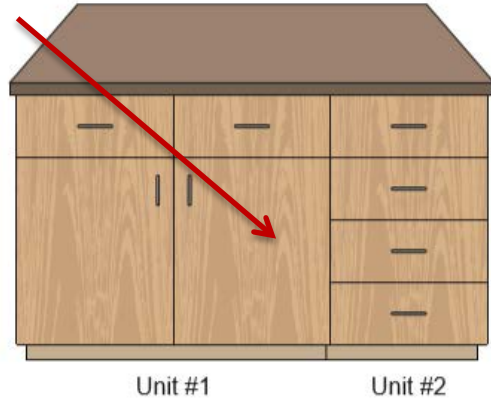


Figure 20 - Grain Layout, Flush Panel, Premium Grade

3.4.2.5 Doors and Drawer Fronts, Flush Overlay

- a) When veneer cores are specified for doors, they may be susceptible to warp and shall not be subject to warp/flatness tolerances contained within this standard.
- b) Grained or patterned faces on doors, drawer fronts, and false fronts shall:

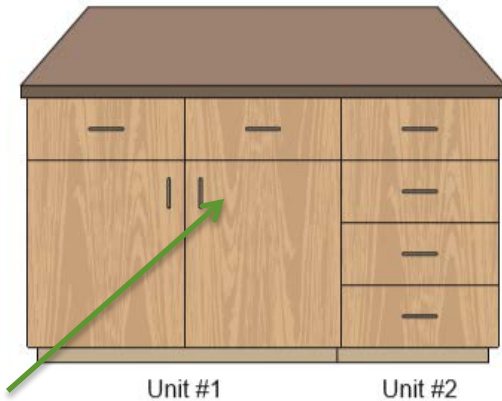
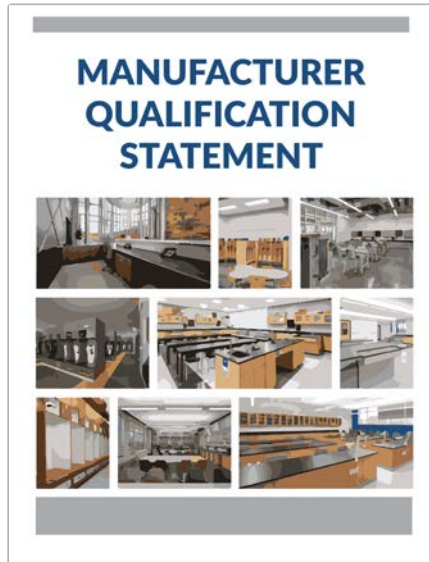


Figure 21 - Grain Layout, Flush Panel, Custom Grade

Premium	Custom	Economy
<p>Run and match vertically and be sequenced horizontally within each cabinet. At cathedral grain, the crown shall be pointing up and run in the same direction for the entire project. Doors, drawer fronts, and false fronts shall be well-matched for color and grain across multiple cabinet faces in one elevation. Requirement for blueprint or sequencing between cabinets must be so specified. (See Figure 22)</p>	<p>Run and match vertically within each cabinet. Doors and drawer fronts shall be compatible in color across multiple faces in each room. (See Figure 21)</p>	<p>Run either vertically or horizontally at the option of the manufacturer/ supplier for the entire project. Doors shall be vertical. Mismatch is permitted. (See Figure 20)</p>

MANUFACTURER QUALIFICATIONS & STANDARDS

While AWI is a reliable industry standard for casework construction, look for manufacturers that go further and offer additional documentation to ensure a high-quality experience of the entire casework delivery process:



LESSONS LEARNED



RECAP

Now, you'll be able to:

1

Define areas that need to be included when specifying casework, including edge, core, and hardware. Explain how the proper detailing can lead to a successful project that is aesthetically pleasing and maintains the welfare of building occupants.

2

Compare and contrast different core materials and what unique characteristics they each have regarding the safety of building occupants.

3

Identify current trends and code considerations when specifying laminate casework and how adhering to safety standards will produce a project that is durable and environmentally conscious.

4

Discuss how Division 6 and Division 12 specifications and AWI Qualifications impact your casework project.

LESSONS LEARNED

10 SPECS FOR YOUR PEACE OF MIND

Specification Checklist Case Work Projects:

- ☑ Minimum M2 Grade Particle board
- ☑ High Pressure Laminate
- ☑ Balanced Construction
- ☑ 3mm Edgeband
- ☑ AWI Approved Joinery
- ☑ Minimum ANSI Grade 1 Drawer Slides
- ☑ Separate Recessed Toe Base
- ☑ Fully Captured Back Panel
- ☑ Division 12
- ☑ AWI –QCP Licensed Manufacturer

THANK YOU
FOR YOUR TIME AND ATTENTION!

Can we answer any questions?

This concludes The American Institute of Architects Continuing Education Systems Program.