KERFKORE

ARCHITECT'S GUIDE TO **LIGHTWEIGHT PANELS**

Select **the right materials** to achieve your design vision.

INTRODUCTION

Some of the most impressive feats of architecture are structures that seem to defy gravity, such as skyscrapers or suspension bridges, which support an inconceivable amount of weight with incredibly efficient use of material. In order for such structures to stand, the materials used have to be greater than the sum of their parts.

When it comes to interior architectural design, we can also create stunning projects by utilizing another building material greater than the sum of its parts: the unassuming, yet mighty, lightweight sandwich panel.

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CHAPTER 1

Getting Started with Lightweight Sandwich Panels

WHAT ARE **LIGHTWEIGHT SANDWICH PANELS?**

Sandwich panels, also known as composite panels, are three-layer structures, with two outside layers consisting of thin, rigid material bonded to a thicker, lightweight middle layer.

This simple, yet powerful design is particularly useful in architecture as the outside layers create a durable exterior while the middle layer keeps the overall weight low, and depending on the material, can even provide insulation or other performance properties.

Sandwich panels are commonly used in non-structural architecture but can also be found in vehicles, furniture, and plenty of other projects that need aesthetically pleasing panels with a high strength to weight ratio.

WHY ARE LIGHTWEIGHT SANDWICH **PANELS USED IN ARCHITECTURE?**

As an architect, you're likely familiar with finding materials that balance strength, durability, cost, and aesthetics. Sandwich panels can be built to achieve all of those attributes, creating a versatile solution for a number of projects.

- The combination of materials creates a product that is stronger than the sum of its parts.
- Lightweight materials make sandwich panels easy to handle and transport, which creates a safer, less expensive, and more adaptable work environment.
- Since you can choose from a variety of options for the materials in a sandwich panel, they can be used in many different applications and designed for specific aesthetics.
- The panels are durable and easier to implement which gives designers and architects more freedom to design, without being limited by material weight.

Sometimes off-the-shelf solutions just won't cut it. Ask your supplier if they have the engineering capabilities to create *custom solutions* for you.

We suggest determining your core material first, based on necessary specifications or performance requirements. Then, choose your face material based on your desired finish.

CHAPTER 2

Selecting Materials

When it comes to creating a sandwich panel, there are typically two types of materials that need to be chosen. The durable, outside “face” materials and the lightweight “core” material.

Determining which combination of materials is right for your project is a matter of balancing the four attributes we outlined in Chapter 1: cost, strength, aesthetic, and durability.

But there are other factors to consider as well, such as whether the materials are sustainable, fire-resistant, moisture resistant, or readily available in your region.

Up next are some of the most common face materials used in non-structural architecture, as well as a breakdown of the benefits and drawbacks of each lightweight core material.

COMMON **FACE MATERIALS**

Wood

- High-Density Fiberboard
- Medium Density Fiberboard
- Plywood
- Hardboard

Other

- Cardboard
- Metal
- Polycarbonate Plastic

High Performance

- Carbon Fiber
- Fiberglass

CHAPTER 2

Selecting Materials

Lightweight Benefits Chart

MATERIAL	BENEFITS	DRAWBACKS
 FOAM	• Customizeable • Available fire rated • Moderate performance with insulation and moisture resistance • Multiple suppliers • Can be made up of recycled materials	• Non biodegradeable
 WOOD	• Solid wood board • Good machinability • Available in sustainable options • Often a familarity/comfort to work with	• Heavier than alternative lightweight options • Often times limited availabilty
 HONEYCOMB	• Effficient honeycomb shape yields a high strength-to-weight ratio and compressive strength • Various hexagonal cell sizes that affect overall strength and performance • Multiple suppliers • Sustainable options available	• Tends to be more limited on thickness sizes and customizations

CHAPTER 2

Selecting Materials

Materials Typically Used in Building & Construction

	LIGHTWEIGHT MDF	HOLLOW CORE PARTICLEBOARD	BALSA WOOD	PAPERBOARD HONEYCOMB	EXPANDED POLYSTYRENE	EXTRUDED POLYSTYRENE
Density (lbs/ft3)	30	27.5	9.5	4	2	2
Interior/Exterior Typical Usage	Interior	Interior	Interior	Interior	Interior	Interior
Sustainability						
Fire Rated		Unknown				
Strength	Better	Good	Best	Good	Better	Better
Moisture Resistance						
Good Machinability						
Thermal Insulation Value						
Availability	Limited	Limited	Limited	Good	Good	Good
Cost	$	$$	$$$$	$$	$$	$$$

Note: The numbers and ratings in this chart are based on an industry average. Be sure to check with your supplier for exact technical information.

CHAPTER 2

Selecting Materials

Materials Not Typically Used in Building & Construction

	POLYCARBONATE HONEYCOMB	POLYPROPYLENE HONEYCOMB	ALUMINUM HONEYCOMB	POLYETHYLENE-TEREPHTHALATE (PET) FOAM
Density (lbs/ft3)	4	3.5	1.4	4.4
Interior/Exterior Typical Usage	Both	Both	Both	Both
Sustainability				
Fire Rated				
Strength	Better	Good	Best	Better
Moisture Resistance				
Good Machinability				
Thermal Insulation Value				
Availability	Good	Good	Good	Good
Cost	$$$$	$$$$	$$$$$	$$$$

Note: The numbers and ratings in this chart are based on an industry average. Be sure to check with your supplier for exact technical information.

CHAPTER 3

Understanding Framing and Internal Banding

Adding to the versatility of sandwich panels is the ability to apply framing and internal banding.

Framing and internal banding create areas to secure mounting hardware on lightweight sandwich panels so the panels can be used in projects with larger and heavier attachments.

For example, maybe you'd like to use a lightweight sandwich panel to create an oversized door. Applying framing will provide the space necessary to attach hinges and hardware, creating a door that is aesthetically pleasing and lasts for years to come.

For fabricators, framing and internal banding create easy installation solutions. And for architects, this means they can create rooms with an unbelievable balance of aesthetics and practicality.

Ready to learn more about all the types of projects you can create with lightweight panels? *Check out our gallery.*

Important: To maintain balanced panels and avoid warping, be sure to apply equal finishes to both sides of your sandwich panel.

CHAPTER 4

Finishes

You can apply finishes to most lightweight sandwich panel faces to get the exact look your project calls for. Below are some of the most commonly used finishes.

LAMINATES

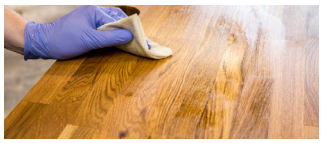
Vertical and standard high pressure laminates

VENEERS

Paperback veneer, and phenolic veneer

PAINT

Oil-based and latex paint

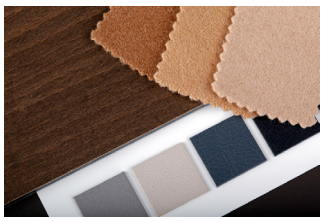


STAIN

Oil-based, water-based, varnish, gel, water-soluble, and lacquer

METALS

Antiqued, brushed, polished, hammered, and satin



LEATHERS

Leather laminate and leather veneer

CHAPTER 4

Finishes

EDGE **BANDING**

Once the faces of your lightweight panel are finished, it's time for the edges. Edge banding, a common finishing technique for furniture and cabinetry, covers up the visible edges on the lightweight panels.

In addition to its aesthetic advantages, edge banding protects panels from moisture damage and improves durability by providing impact resistance. Ultimately, choosing the right edge banding material is dependent on the specific panel used, as well as your overall desired finish. Here are some of the most common options for edge banding materials:

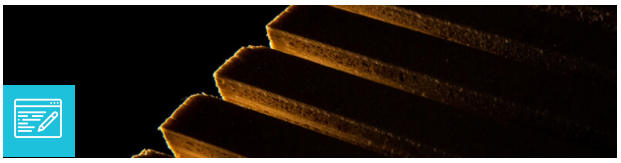
- Wood
- Wood veneers
- PVC
- ABS
- Acrylic
- Melamine

Note for Fabricators: If you plan on using an edgebander on a foam product, please exercise caution as edgebanding machines are prone to creating enough heat to melt the edges of the foam. If you would like to learn more about edgebanding and how to prevent potential issues such as melting the foam, check out our **Edgebanding Tip Sheet**.

CHAPTER 5

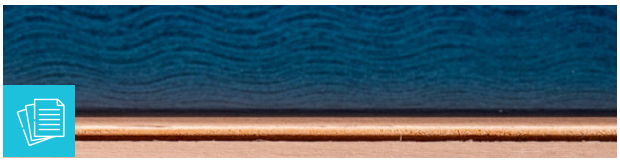
Architect Resources

We encourage you to take advantage of the many resources we provide for architects and fabricators including:



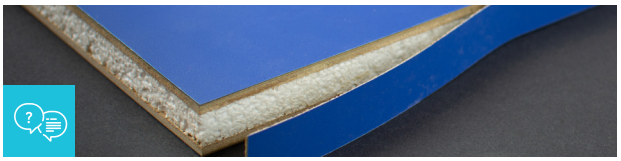
THE KERFKORE BLOG

Get wood industry news and pro tips about working with bendable plywood and lightweight panels. *Visit the blog*



PRODUCT SPECIFICATION & DATA SHEETS

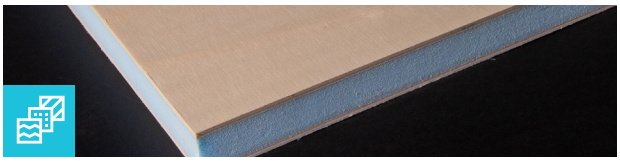
Get construction guides, do's and don'ts, and detailed product information. *View sheets*



FAQs

Learn answers to commonly-asked questions about Kerfore, Timberflex, Econokore, Worklite Foamkore, and more!

Get answers



PRODUCT SAMPLES

Receive flexible and lightweight samples delivered fast when you request the Kerfkore Architectural Kit. *Request your kit*

ARCHITECTURAL **GLOSSARY**

COMPRESSION STRENGTH: The ability of a certain material or structural element to withstand loads that reduce the size of that material.

EDGEBANDING: A common finishing technique for furniture and cabinetry, covers up the visible edges on the lightweight panels.

EPS: Abbreviation for expanded polystyrene (white foam).

INTERNAL BANDS: Lumber bands that can be manufactured along the center of a lightweight panel.

FINGER JOINTS: A woodworking cut, also known as comb joints, made by cutting a set of complementary, interlocking profiles in two pieces of wood, which are then glued.

CHAPTER 5

Architect Resources

FINGER JOINTED POPLAR: A strong, durable hardwood product that uses finger joints to create a straighter, flatter board. This lumber reduces the likelihood of warping and provide an extremely stable frame.

FRAMING: Lumber frames that can be added or manufactured around the outers edges of a lightweight panel.

NON-STRUCTURAL ARCHITECTURE/DESIGN: Interior elements or components that are not load- bearing or do not assist in the seismic design and do not require design computations for a building's structure

R-VALUE: The capacity of an insulating material to resist heat flow. The higher the R-value, the greater the insulating power.

SANDWICH PANEL: A three-layer structure, with the two outside layers consisting of thin, rigid material and the middle layer consisting of a thicker, lightweight material.

VENEER CHECKING: Cracks that appear on the surface of veneers.

VENEER MATCHING: Specifies how individual veneer leaves will be joined together on the face of the panel.

XPS: Abbreviation for extruded polystyrene (blue foam).