



ECOR[®]

**CORE
CATALOG
GUIDE**

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INTRODUCTION

Welcome to the world of ECOR®. The ECOR® Catalog is intended to provide helpful information to customers, manufacturers, and artisans purchasing and working with this remarkable new material. ECOR® products can inspire innovative designs, new products and new applications. Our goal is to help you realize your fabrication objectives as quickly and economically as possible.

Working with ECOR® does not require significant capital investment in specialized equipment. Basic wood working tools coupled with proper blades, bits and fasteners yield excellent professional results.

This Buying Guide is organized to cover the basics of cutting, fastening, edging, joining, curving and surfacing. Each section provides an overview, description, tool tips, pictures and illustrations.

We will be updating this Guide on a regular basis, and welcome your tips and discoveries.

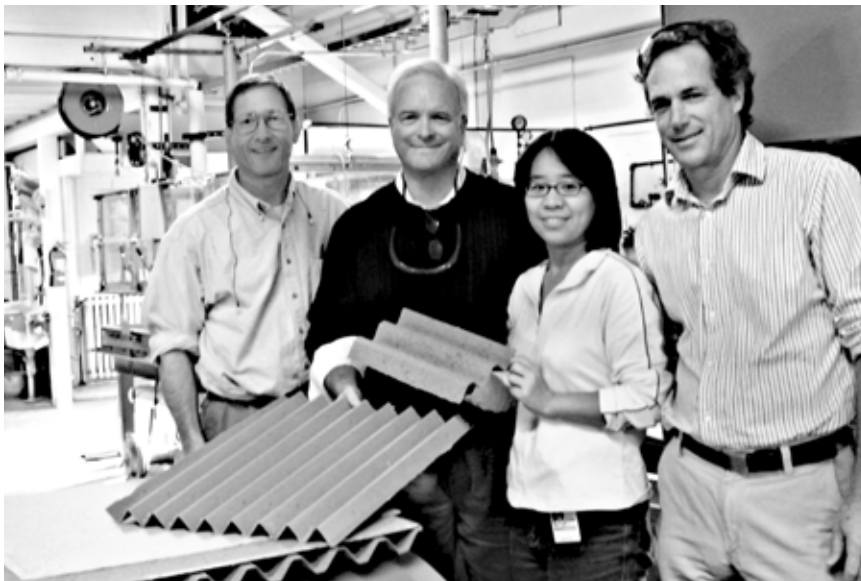
Please email info@ecorglobal.com so that we can advance our own thinking and share the wealth with fellow ECOR® users.

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Noble Environmental Technologies, (NET) Inc., is a clean technology and manufacturing company created to commercialize new sustainable materials. ECOR® is our first patent-pending product. The basic ECOR® process technology was originally invented and patented by a team of scientists at the Forest Products Laboratory in Madison, Wisconsin (a division of the U.S. Department of Agriculture). NET was incorporated in 1992 to develop and commercialize this technology. Since then, NET has taken the lab technology, developed patents-pending products, manufacturing processes, factory

specifications, highlighted markets for the products, and is now expanding capacity to meet a growing market demand. NET is the exclusive owner of patents-pending in a wide range of commercial applications including exhibits and displays, stage sets, furniture and cabinetry, toys and games, construction products, building systems, and transportation applications. NET is commercializing ECOR® and through collaborative research work, NET and the USDA will continue to generate future product technologies through public/private partnerships which will generate substantial benefits to the economy, the American people and the world as a whole.

ECOR® panels are made by molding cellulose fibers into three-dimensional structures to create high performance panels from recycled resources.



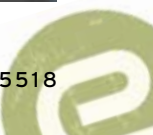
Pictured: John Hunt RME, PE, Robert Noble AIA LEE®, AP, Hongmei Gu, Ph.D., Tim Newburn at Forest Products Laboratory, Madison Wisconsin.



The manufacturing process that produces ECOR® panels is a model of refined simplicity. Similar to the “wet” process used for many years to produce paper and cardboard, the ECOR® process creates a wet fiber “stew” or matrix similar to paper pulp, which can be formed in a flat or corrugated mold to a uniform thickness. Water is extracted from the fiber matrix, first using suction, then by using heat and pressure, which are applied in a process that allows the cellulose fibers to form naturally strong yet pliable bonds. Many different fibers and fiber combinations (matrices) have been tested successfully to create strong but lightweight, flat and three-dimensional molded fiber panels.

The Company’s proprietary manufacturing technology for processing, molding, and bonding new and recycled cellulose fibers (wood, plants, recycled paper, etc.) achieves equal or better fiber adhesion, panel strength and uniformity compared to traditional “dry-process” products, but with less weight and no toxic additives. In addition, the wet process allows for a much broader range of potential raw material sources.

- Old Corrugated Cardboard (OCC)
- Old Corrugated Cardboard and Bovine Process Fibers (OCC & BPF)
- Spruce & Thermal Mechanical Pulp (Spruce & TMP)
- Old Newsprint (ONP)
- ONP & OCC
- BPF & ONP



FlatCOR™

ECOR[®] is formed into component parts, the first of which is a flat sheet known as FlatCOR™. Currently, FlatCOR™ is produced in 2' x 8' sheets with a nominal thickness of 1/8" and is available in single, multi-ply or custom configurations.



WavCOR™

The second component part of ECOR[®] is formed into a corrugated panel known as WavCOR™. Currently, WavCOR™ is produced in 2' x 8' sheets with a nominal thickness of 1 5/8".



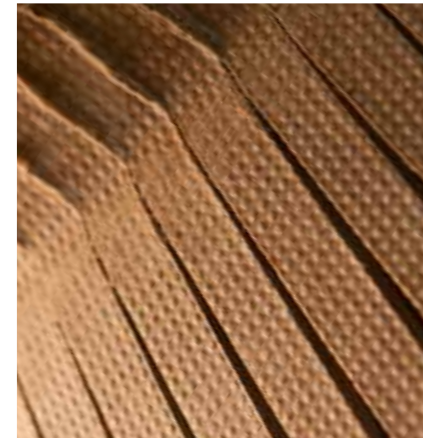
HoneyCOR™

HoneyCOR™ is a honeycomb core created by utilizing a WavCOR™ (corrugated) sheet that is cut at horizontal points and glued together. HoneyCOR™ can be engineered in different configurations and shaped in a variety of custom thicknesses. Currently, HoneyCOR™ is available in 1/2" - 2" thicknesses as well as custom.



3D ESP (Environmental Structural Panel) WavCOR™ & HoneyCOR™

When two FlatCOR™ sheets and one WavCOR™ (or HoneyCOR™) panel are glued together rib to rib, they produce a three-dimensional (3D), Environmental Structural Panel (ESP). Currently, ECOR[®] 3D ESP's come in 1/2" - 2" thicknesses, custom and 3D ESP PLUS.



PERFORMANCE

ECOR® standard panels can provide equivalent performance as an aluminum skinned honeycomb core panel (3DEF Panel Mechanical Properties, 2007).

- Superior Strength-to-Weight Performance
- Cost Competitive with Other Light-Weight Cores
- Curvable to Custom and Compound Radii
- Unique Aesthetic and Environmental Features
- Design, Fabrication and Application Flexibility
- Non-toxic, Recycled, Recyclable

ECOR® Specification Sheet*

Product Description: ECOR® products are engineered molded fiber stressed skin panels. Proprietary technology facilitates the pressure forming of pulp into three-dimensional geometric ribs with molded faces. When laminated together, they form honeycomb panels with high strength-to-weight features and impressive design, fabrication and application benefits. ECOR® panels can be engineered to custom specifications.

Size 2' x 8' x 3/4" thick (Nominal)

Thickness Tolerance ± 1/32"

Weight 1.1 Pounds per Square Foot

Density 17.6 Pounds per Cubic Foot

Bending Strength ASTM C393 @ 50% RH:

Shear Modulus 10,011 PSI

Modulus of Elasticity 769,500 PSI

Flat Crush ASTM E 1091 Type IV 404 PSI (HoneyCOR™@1.564 thickness)

Edge Crush The performance of a 3D ESP having an MOE of 2M PSI would provide the same edge crush strength as an aluminum skinned honeycomb @ .032" thickness. (Estimated 1' long sections)

Flame Spread ASTM E-84: Class C (Class A pending)

VOC Emissions Test No formaldehyde emission detected ~60 µg/m2/h.

*Specifications listed here were in effect on the date tested and are based on 3/4" ECOR® HoneyCOR™ 3D ESP.

Note: Changes in raw material content can affect the structural characteristics of the panels. If surfaced with coatings, veneers or laminates, panels should be balanced with similar treatments on both faces to prevent warping.

In keeping with its policy of continual product development, NET reserves the right to change specifications without notice.

ENVIRONMENTAL FEATURES

GREEN TECHNOLOGY PRODUCTS

- No VOC emissions during manufacturing, fabrication or after installation
- Safer work places; reduced employee health claims and meets or exceeds OSHA requirements
- Healthier living environments; reduced liability to claims of chemical sensitivity
- Meets emerging European Common Market environmental standards

ABUNDANT RAW MATERIALS

- Provides a viable market for paper waste and agricultural material
- Slows deforestation, preserves habitats, provides jobs in rural communities
- Provides sustainable materials for twenty-first century development

CLEAN TECHNOLOGY & MANUFACTURING

- Process recycles over 90% of the water back into the system
- Generates no toxic water or air emissions
- Can also be scaled to either small batch plants or large manufacturing facilities
- Can be located wherever there are available raw materials and markets



FLATCOR



FC-1 2' x 8' x 1/8" single panel



FC-3 2' x 8' x 1/4" 3 Ply



FC-2 2' x 8' x 3/16" 2 Ply



FC-C 2' x 8' Custom



FlatCOR™ HIGH PERFORMANCE FLAT PANEL

ECOR® Advanced Environmental Composite features: Made from 100% recycled materials, non-toxic, formaldehyde-free, no added adhesives, and little to no VOC's.

Fiber sources include: Old corrugated cardboard, bovine processed fibers, and other agricultural fibers. Multi-ply panels are constructed utilizing an eco burlap and white PVA glue.

See price list

WAVECOR



WaveCOR™ HIGH PERFORMANCE CORRUGATED PANEL

ECOR® Advanced Environmental Composite features: Made from 100% recycled materials, non-toxic, formaldehyde-free, no added adhesives, and little to no VOC's.

Fiber sources include: Old corrugated cardboard, bovine processed fibers, and other agricultural fibers. WCESP and WCEXP are constructed utilizing white PVA glue.

See price list

WC-1 2' x 8' x 1 1/2" single panel



WCEXP 2' x 8' x 1 7/8"



WC-C Custom Available



HONEYCOR



HoneyCOR™ STRUCTURAL CORE MATERIAL (Grid Only)

ECOR® Advanced Environmental Composite features: Made from 100% recycled materials, non-toxic, formaldehyde-free, no added adhesives, and little to no VOC's.

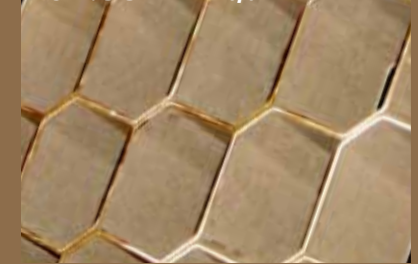
Fiber sources include: Old corrugated cardboard, bovine processed fibers, and other agricultural fibers. HCCOR's are constructed utilizing white PVA glue.

See price list

HC-1.5 2' x 8' x 1/2"



HC-1.58 2' x 1 5/8"



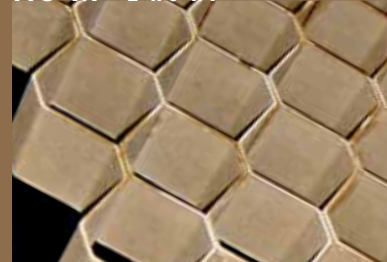
HC-1.75 2' x 8' x 3/4"



HC-2 2' x 8' x 2"



HC-1.1 2' x 8' x 1"



HC-C Custom Cores Available



HC-1.125 2' x 8' x 1 1/4"



3D ESP

Three Dimensional Environmental Structural Panel



3D ESP ENVIRONMENTAL STRUCTURAL PANEL WavCOR™, HoneyCOR™ & HoneyCOR™ PLUS

ECOR® Advanced Environmental Composite features: Made from 100% recycled materials, non-toxic, formaldehyde-free, no added adhesives, and little to no VOC's.

Fiber sources include: Old corrugated cardboard, bovine process fibers, and other agricultural fibers. HCESP's & HC3DP's are constructed utilizing white PVA glue.

HoneyCOR™ 3D ESP is also available in PLUS which provides expanded structural rigidity and strength.

See price list

HCESP-1.5 2' x 8' x 1/2"



HCESP-1.58 2' x 8' x 1 5/8"



HCESP-1.75 2' x 8' x 3/4"



HCESP-2 2' x 8' x 2"



HCESP-1.1 2' x 8' x 1"



HCESP-C 2' x 8' Custom



HCESP-1.125 2' x 8' x 1 1/4"



WCESP-1 2' x 8' x 1 5/8"



GLOBAL APPLICATIONS

USER GUIDE

ECOR® panels are an ideal core material for art boards, graphic signage, point of purchase displays, trade show exhibits, toys and games, furniture and cabinetry and interior design applications. They can be painted, laminated, edged and veneered. They also can be curved to custom radii and compound shapes.

With the addition of additives and coatings for increased water resistance and fire retardants, ECOR® panel products will eventually be used in a number of global applications. Advanced product features are currently in development. However, untreated ECOR® standard panels are NOT recommended for external applications where exposure to moisture will degrade the material. ECOR® panels are not currently rated or certified for structural applications such as housing or construction.



CURVE ECOR®

OVERVIEW

One of the materials' most dynamic features is its ability to create structural curves. Bend an ECOR® sub panel over a form, then glue a second sub panel down to the first piece. This creates a strong, light-weight curve.

Bending Over Form

The most common way to curve ECOR® panels is to create a rigid form in the shape of the desired radius. We have used everything from hardboard bent over a wood frame to paper tubes and drums for tighter radii. Apply PVA glue to the WAVECOR® ribs of the first sub panel. Place the next sub panel (or ECOR® flat sheet if thinner curves are required) face down onto the first sub panel. Bend it over the frame, clamp it securely and let it dry. When the curve is removed from the frame, it will maintain its shape with very little spring-back.

Wrapping the curve using non-stick plastic wrap (stretch wrap) works well as a uniform clamping system.

Vacuum Bagging

For multiple parts and industrial quantity manufacturing, vacuum bagging over a form can be an effective way to curve an ECOR® panel. Again, heat is not required or recommended.



CURVING

Positive/Negative Forms

For tight curves and compound shapes, a top and bottom form can be created similar to those used to make plywood seat backs and bottoms. Moistening the panel prior to insertion into the mold will increase its bendability. Heat is not required for this process.

Kerfing

It is also possible to create temporary or permanent curves in ECOR® panels by using a kerfing method. Simply make a series of cuts across the panel, from edge to edge, through the face and ribs, leaving the bottom face of the panel intact. The radius of the curve is determined by the spacing of the kerf cuts and the width of the cuts themselves. For a permanent curve, simply apply glue into cuts and bend to form. Secure the assembly until the glue has dried.



CUT ECOR®

OVERVIEW

Before revving up your power tools, take a moment to get the feel of the material. You will immediately notice that ECOR® panels are both rigid and light. The panels are remarkably uniform in consistency and quality. As a result, they behave well when being cut. Airborne materials are easier to clean up and less irritating than particleboard or MDF, and you can say "good-bye" to chips and splinters.

Success in getting clean cuts with ECOR® panels depends on the sharpness of your tools. Standard blades will cut ECOR® panels, but for superior results we recommend using sharp High ATB (40 degree/60-80 tooth) carbide blades.

For optimal results, we recommend continuous teeth per inch (TPI) blades.

To clean up your edges after a cut, use a fine sandpaper on a sanding block at an angle to the face. A sander mounted on a drill press also works well to clean up the edge cells, but simply blowing out the edge fuzz with compressed air will yield satisfying results.



Standard blades will cut ECOR® panels, but for superior results we recommend using sharp High ATB (40 degree/60-80 tooth) carbide blades.



Hand Saws & Knives

A sharp, sturdy utility knife works well with the material, particularly when performing detailed work with ECOR® sub panels or with ECOR® flat sheets. There are specialty utility knives which cut very well, particularly when the blade is set at a slight angle to the material.

Hand cutting is best accomplished with a Japanese pull saw type of tool. These saws are razor sharp, with teeth raked forward to cut in the pull direction, and do a superior job cutting ECOR® panels. (Rip saws tend to fray the edges and are therefore not recommended for anything but fast, rough cuts.)



Circular Saw

With wood, the stiffness of the fibers and their embodiment with lignin or resin allows a less than sharp blade to shear the fibers and achieve a decent edge. In contrast, ECOR® panel fibers are mechanically locked together and will pull if cut with a dull or low angle blade. The more the blade's approach to the material approximates a slicing action, the cleaner the cut.

Because ECOR® panels have glue lines in the center, residual adhesive tends to build up on the saw face. This should be cleaned regularly to prevent friction and heat. Plywood steel blades (60 teeth) cut very rapidly but do not yield as clean a cut as carbide tipped blades (60-80 teeth, best with no teeth separation) moving at slightly slower speeds through the material. Lubricants will also improve overall performance.

Again, carbide tipped blades with a high ATB give the cleanest cuts, with little fray on the exit side. The lower the kerf, the better. ECOR® sub panels are best cut with the ribs in contact with the table top. You may find that there is some ragging on the trail edge of the internal cell material, which can be cleaned up with fine sandpaper. If your goal is to reveal the hexagonal ribs, you may want to flip the panel over to achieve cleaner rib appearance.

A professional panel saw equipped with an 8" 60-80 tooth carbide-tipped blade cuts ECOR® standard panels very well. Additionally, a table saw with kerf blades also works well in cutting the material.

Band Saw

Clean curvilinear cuts can be made on ECOR® panels using a band saw. Several users have utilized 20" wheels top and bottom, with a 7 TPI by 1/2" deep blade. The material cuts quickly, requiring close attention to the line of the cut as the material is fed into the saw. Knocking down the ridge with fine sandpaper is recommended.

A number of band saw blades have been tried, but standard carbide blades work best. Bi-metal blades, while making a cleaner exit cut, tend to have an irregular surface along the edge. Knife blades and scalloped butcher blades leave a very clean edge, but tend to overheat unless care is taken to move the saw slowly through the material.

Jig Saw

In general, hand-held jig saws work well with ECOR® products. A smoother cut can be obtained with a universal medium blade (10 teeth per inch). Both require cleanup of the exit surface. A leather cutting smooth blade (razor knife) makes a very smooth cut. Again, the blade can overheat and the surface of the cut may develop a burnished glaze if the cut is done too fast.

Variable speed scroll saws cut ECOR® panels well. Blades with 12 teeth per inch and .016" thick by 0.43" wide have worked well in some applications.

Drilling

ECOR® panels can be drilled in a fashion similar to working with wood, using either a hand-held drill or drill press. The bit tends to punch through the bottom surface of the panel, leaving a ridge of fiber around the hole. Placing a piece of wood between the ECOR® panel and the table while drilling will reduce this problem. Hole saws and spade bits will work with this material, but firm clamping of the panel is required. Again, better results are achieved by placing the ECOR® panel on a backer board to avoid punch-through. Dry coat will improve performance.

Routing

More research on machine routing ECOR® products is required, particularly in tooling and bit configurations. Preliminary results indicate that 18,000 rpm is an acceptable tool rate, and 600 feet per minute is a good feed rate. Two-flute (up-shear/down-shear) 1/2" bits with micro coatings are preferred when cutting the material.



OVERVIEW

Most adhesives work extremely well with ECOR® panels. The material will bond securely to itself as well as to other wood, fiber and plastic materials. Rib alignment will increase strength when gluing up ECOR® panels. The larger the bonding surface area, the stronger the bond will be.

In many applications, contact cement, epoxy and urethane adhesives have enough initial tack to hold joints together while curing. Other adhesives may require joints to be clamped while the material sets to assure a permanent bond.

PVAs

(Dries clear and rock hard)

Carpenter's glue and any white glue work well with ECOR® products. In fact, PVA's are used to bond the two sub panels together in the standard 3/4" product. PVA's work well when fastening wood to ECOR® panels, for example to insert wood edges.

For faster set up times use modified PVAs for fast cure.

(NOTE: If you are veneering or laminating to ECOR® panels in a hot press, be sure to use a different core adhesive, as the water-based PVAs will steam and delaminate the panels. NET can supply panels with heat resistant adhesives upon request.)



Contact Cement

Contact cements work well, particularly when constructing mitered corners, box beams, or when applying veneers and laminates in a cold press. Make sure to remove all frayed or fuzzed fibers from the panel surfaces prior to gluing. Apply contact cement to both surfaces according to manufacturer's instructions. Clean up the edges with a block of fine sandpaper.

Most contact cements will work well. Water-based cements can be slightly more difficult to use due to their slow set up times.

Construction Adhesives

If at all possible, keep it green. Titebond® Green Choice Construction Adhesive is a product we highly recommend.



FASTEN ECOR®

OVERVIEW

Withdrawal resistance is a common measure of the holding power of particular fasteners for a given material. Resistance normally depends upon the density of the material, the diameter of the fastener, and the depth of its penetration.

Because ECOR® panels have a hollow, honeycomb structure, attention must be paid to appropriate fastening systems. Nails are not recommended in most applications.

However, there are a number of fasteners that work well with ECOR® panel products.



Because ECOR® panels have a varied honeycomb structure, attention must be paid to appropriate fastening systems.



Screws

Screws hold well in ECOR® panels, particularly when driven through both faces of the panel. Coarse drywall screws and wide profile plastic screws can achieve pull values of over 200 pounds. Using plastic toggle inserts in combination with screws will further increase holding power and provide face protection to reduce denting. "Potting" or filling the cells to be fastened with epoxy will greatly increase screw holding power.

Fastening into the honeycomb edge with 1.5" screws can produce withdrawal resistance of 40 to 60 pounds. Filling the ECOR® cells with epoxy will improve pull strength.

Staples

Staples can fasten ECOR® products. Keep the air pressure on the staple gun low so that the fastener does not blow through the face of the panel. 2" long x 7/16" wide staples deliver a withdrawal resistance of over 100 pounds. Finishing staples also work well. Pneumatic nails are not recommended for most applications.



Pop Rivets

While drywall and other screws will work with ECOR® panel rivets work even better. They are cost effective and yield very satisfying results in many ECOR® product applications. 3/16" dome peel (pop) rivets are recommended. They can be placed blind into the ECOR® face material, without regard for rib alignment.

A pilot hole is required. Both manual and pneumatic rivet guns are available. Pre-threaded rivets which have screw tapping capabilities are also available.

(NOTE: The snapped off steel mandrels end up inside the honeycomb cells and may rattle around inside. This can be reduced by putting a drop of glue on the head of the rivet before inserting into the panel.)

Tapes

In general, tapes do not adhere exceptionally well to untreated ECOR® panels because of the fibrous nature of the material. However, once ECOR® panels have been sealed, the holding power of a number of tapes is quite good, making it an acceptable fastening solution for temporary assemblies. Duct tape has good holding power and can even be used to apply a fast edge to the material.

Bolts

Bolts are another effective means of fastening ECOR® panels. Wide, flat-head bolts which thread into each other are a fastening solution often used in honeycomb construction. The use of washers will increase their holding power and reduce face deformation of the panels.

Flathead stove bolts are also effective. Countersinking the head of the bolt does not seem to effect the fastener's performance, and does sit flatter and have a cleaner appearance. Bolting within 3/4" inches from the perimeter is not recommended because it tends to crush the edge.

RTA Fasteners

A wide range of fasteners are available from companies such as Hettich and Haeffele, which can achieve blind fastening, particularly for making 90 degree angles. We recommend filling the panel cells with reinforced epoxy, or using wood inserts or dowels in combination with these fasteners, for more structural applications.



Insert Fasteners

There are many types of insert fasteners, including threaded inserts which have been designed for honeycomb applications. Filling an ECOR® cell with epoxy compound creating a hard point in conjunction with an insert fastener can yield exceptional holding power.

Biscuit Joinery

Plastic or wood biscuits can work well, particularly for joining panels or wall assemblies edge-to-edge. We recommend using these fasteners in conjunction with wood inserts dadoed into the edge of the ECOR® panel. Use plastic friction biscuits for knock-down assemblies, and wood biscuits with PVA adhesives for permanent installations.

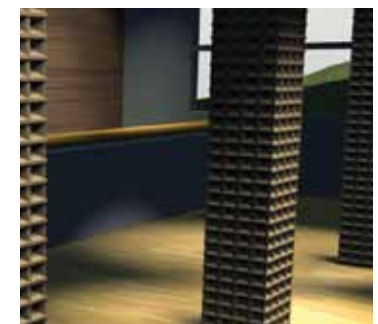


Raw

While there are many ways to edge ECOR® panels, there is a certain aesthetic to revealing the inner core. If desired, you can seal the honeycomb edges with clear acrylic or polyurethane coatings to provide some protection from moisture absorption. Try humidity crosslinking polyurethane based adhesives.

FlatCOR™

NET manufactures ECOR® FlatCOR™ flat sheets, a thin sheet stock material which can be cut in strips and used as a natural edge-banding material. It can be hand applied or run through a commercial edge-banding machine. The fiber material bonds to itself with most adhesives. Sanding is required for clean-up.



Edge-Banding

ECOR® panels can be successfully run through commercial edge-banding equipment, but some adjustments are required for satisfactory results. Edge-banders are set up to pull much heavier sheet stock down the line. As a result, the pinch rollers tend to dent or crush ECOR® panels. Reducing the pressure on the pinch rollers and slowing down the line speed will improve performance.

Unlike particleboard or plywood, ECOR® panels have a honeycomb interior. As a result, the edge material must span from rib to rib. Thin material such as 1mm veneer or PVC tends to telegraph this rib pattern. We recommend using thicker edge-banding stock (for example 2mm or 3mm PVC) for best results.

For arts and crafts applications, standard hot melt glues will hold both wood and plastic edging.



Edge Fillers

Several varieties of filling compounds have been used to seal ECOR® edges. Quick dry fillers and epoxy-based syntactic foams work best. (Drywall joint compound is too wet and thin to stay in the ribs and creates an uneven surface.) After applying filler, sand the edge with 100-grit paper, or trim the edges on your table saw for clean results.

Syntactic foams are used widely in aerospace and marine applications for filling honeycomb materials and can be adopted when fabricating with ECOR® panels. The foams can be formulated to harden either rapidly or slowly, to accept screws or not, and to yield exceptional crush strengths. They can also be pigmented to match other finishes.



Wood Inserts

Mortised wood inserts are another excellent way to edge ECOR® panels. Dado out the ECOR® edge material, leaving the top and bottom faces intact. Insert the wood molding using a PVA adhesive, then trim and sand to specification. This edge will provide increased crush strength to the panel, as well as provide hard points for hinges, biscuits and RTA fasteners.

Picture Framing

A number of fabricators have created a box construction with ECOR® products by building a frame around the material. This can be accomplished either by dadoing out the edges and inserting the picture frame, or running the wood framing around the periphery of the ECOR® panel, then laminating or veneering the entire assembly together.



T-Molding

It is possible to use plastic and metal T-molding with ECOR® products making a kerf and using an adhesive to assure a secure hold is advised. Molding with teeth on the inserted edge provides more permanent bonding. Plastic and aluminum molding have been successfully used in a number of applications.

Extrusions

There are a wide variety of plastic and metal extrusions on the market that work well with ECOR® panel products. They are easy to apply, protect the edge of the honeycomb and can be purchased in many colors and profiles. Some of these extrusions, for example "H" channel, also provide panel-to-panel fastening. Extrusions can be secured to ECOR® panels using either glue or pop rivets.



JOIN ECOR®

OVERVIEW

Building elegant, structural, three dimensional assemblies with ECOR® panels is very easy. However, the honeycomb nature of the material does present challenges. Here are some suggestions.

Building elegant, structural, three dimensional assemblies with ECOR® panels is very easy.



Butt Joint

While it is possible to simply glue ECOR® pieces together at a 90 degree angle, this type of joint can be strengthened significantly by inserting hard edges and using appropriate fasteners or hinges in combination with adhesives or pop rivets.

“L” shaped angle aluminum or “H” channel extrusions can be used on either side of the joint to support the structure. It is also possible to use wooden dowels glued into ECOR® panels to serve as hard points for screws and other fasteners.

Rabbet Joint

Rabbet joints can also be accomplished with ECOR® panels. A dado blade installed on your table saw can be used to remove one face and the adjoining hexagonal ribs, leaving a notch. Glue the next panel directly into the notch.



Miter Joint

Mitered joints are an excellent assembly technique. Follow standard safety procedures when setting up your 45° saw cut. Make sure to clean the surface areas of all fuzz and fiber prior to applying glue.

Contact cement is a good choice for this joint because it does not require clamping. Apply two coats to each surface, letting them dry for the period recommended by the manufacturer, then join the pieces to form a strong bond. Clean up edges with fine sandpaper. Epoxy or urethane adhesives can be used to make an even stronger miter joint, but it is also more difficult to clean up after the process, and may require clamping.



Seam Treatments

When more than one ECOR® panel is used to make an assembly and a seamless look is required, the joint can be treated in several ways. A layer of material such as muslin, cheesecloth or kraft paper can be glued on the front of the panel over the seam prior to painting or surfacing. Muslin seems to work best since the material smoothes out well. The edges fray slightly, eliminating the harsh line of the seam.



Wall or “flat” assembly

A wonderful feature of ECOR® products is their ability to make light-weight vertical walls or “flats” for theatrical, exhibit and interior design applications. One set builder has constructed an 8’x10’ rectilinear flat using only peripheral 1”x3” pine framing. The final assembly can be easily moved by two people. This construction technique reduces time and materials, provides a smooth, grainless surface, and has a fastener-free surface. 1.24” drywall screws fastened through the framing and into the back face of the ECOR® panel have more than enough holding power for most applications. Peripheral framing is all that is required, but framing along the adjoining seams is suggested for panel-to-panel alignment and gap reduction. Wall units can be fastened together using wood or plastic biscuits, dowels or cam locks.



SURFACE ECOR®

SURFACING

Sealing

Priming or sealing ECOR® panels contributes to dimensional stability of the panels, and can improve their final appearance. Dry wall primer is a cost-effective product that works very well with ECOR® panels. They can be sprayed, rolled or brush applied.

We encourage the use of low VOC, water-based paints. Water based acrylics and latex primers as well as mineral spirit based polyurethanes yield fine, smooth surface finishes. The first coat will often raise the grain pattern of the fibers, requiring a second base coat or a thicker finish coat. Fine sanding between coats yields best results.

We have found that ultra-violet light (UV) cured epoxy coatings provide exceptional finishes on ECOR® panels. If properly applied, they yield a very hard, durable surface similar to lacquers. The UV process generates little or no VOC's in the process. A special UV line is required to perform this operation.

We highly recommend AFM/Safecoat®. For more information, please visit: afmsafecoat.com

Painting

ECOR® panels can be painted with virtually all commercially available products. Again, we encourage water-based low VOC paints, and highly recommend AFM/SAFE COAT products for best results, always using a primer prior to the finish coat.

Paint on ECOR® panels will often dry to the touch faster than on plywood or particleboard. Make sure to coat both sides to avoid warping. Once the paint dries, it yields a very hard surface, suggesting that certain paint coatings can replace the use of high pressure laminates and other surfaces.

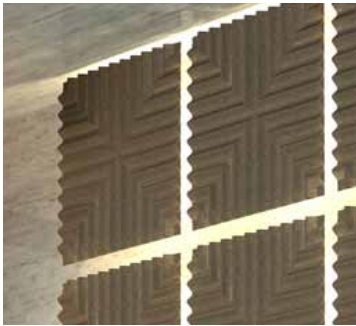
Brushes, sprayguns and rollers all work well on the material.



Texturing

Exciting textures can be applied to ECOR® products for theatrical, interior design and exhibit applications. To create a stucco or concrete appearance, flexible glue and potters clay (one part clay, three parts glue) can be applied with a putty knife or trowel. Mixtures of sawdust and paint or glue can also be used to texture ECOR® panels. Once dried, paint can be applied.

Some customers have found that ECOR® panels hold plaster extremely well. Textured paints also deliver professional results.



Flame Proofing

Many theatrical, exhibit and interior design applications require non-combustible materials. A number of fire retardent coatings are available which are formulated for cellulose and synthetic textile fibers. Many of these are compatible with ECOR® products. Retardent can be mixed into the primer and/or into the final paint coat. Most solutions will not effect the color or appearance of the finished panel.

Water Proofing

There are many widely available water proofing coatings and treatments including environmentally-friendly products. We recommend AFM/SAFE COAT products including RoofGuard™ and Acrylaq™, for more information go to www.afmsafecoat.com.

High Performance

Please contact us for other performance coatings or treatments.



Laminating

As with all panel products, it is important to balance the panel, particularly when applying laminates or veneers. Using a phenolic-impregnated backer material will accomplish this while saving time and money. For cold press laminates, use PVA adhesives.

If you are applying laminates without a press, we recommend using contact cement.

Fiberglassing

ECOR® panels bond very well to fiberglass and resin. For best results, pour the resin evenly over the surface and brush in or squeegee down the cloth against the surface. Let dry and apply finish coats according to manufacturer's recommendations.

Make sure to work in a well-ventilated area and properly dispose of all waste materials.



Veneering

Wood veneers can be effectively applied to ECOR® panels. Make sure to achieve a balanced component by covering both sides with a similar veneer or appropriate phenolic paper backer.

The maximum pressure ECOR® panels can safely withstand in a press is about 120 PSI. If using a hot press, epoxy or modified PVA adhesives must be used to bond the panels. Please contact NET and ask about custom orders of epoxy or modified PVA bonded panels in order to prevent delamination during hot pressing.



SAND ECOR®

OVERVIEW

All ECOR® standard panels are production screen finished unless otherwise requested. Sanding provides a smooth, paintable surface and more exact panel thickness tolerances.

For best results in staining, painting or cleaning up after cutting ECOR® panels, use fine grades of sandpaper (100-150 grit). A light touch with a hand block is generally all that is needed. An orbital sander with 100-grit works well to remove excess fiber from the edges, but beware of oversanding. If you raise some fuzz, it won't go away by pressing harder. Use a finer grit and less pressure for best results. Belt and disc sanders remove fiber very quickly and are recommended only for rougher jobs.

For best results in cleaning up after cutting ECOR® panels, use fine grades of sandpaper (100 -150 grit). A light touch with a hand block is generally all that is needed.



ECOR® AS A GRAPHIC SUBSTRATE

OVERVIEW

ECOR® panels provide an exceptional substrate for painters and graphic artists. Unlike canvas, it does not have to be stretched or framed. It will not warp as readily as hardboard or foam panels. It also contains no toxic binders and will not off gas. ECOR® panels are a perfect medium for mounting photography, interior signage and other graphics. ECOR® can also be silk

screened on to directly. Solid edges can be accomplished using commercial edge-banding equipment, solid wood profiles or ECOR® flat sheets.

Latex gesso works well as a primer/sealer for acrylic and oil painting. We recommend sealing both sides of the panel to assure balance and to reduce warping.



ECOR® panels are a perfect medium for mounting photography, interior signage and other graphics.



The ECOR team is here to help you:

- Raw Panel Product Sales
- Complete Product Manufacturing
- Scalable Manufacturing Facility Sales & Solutions
- Technology Licensing & Distribution
- Design Assistance & Collaboration
- Rapid Prototyping CAD/CAM Capabilities
- Custom Cut to Size Services
- Just in Time Inventory Management
- Research & Evaluation of Raw Material Sources

For more information, contact us at: 866.417.5518 or info@ecorglobal.com.





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