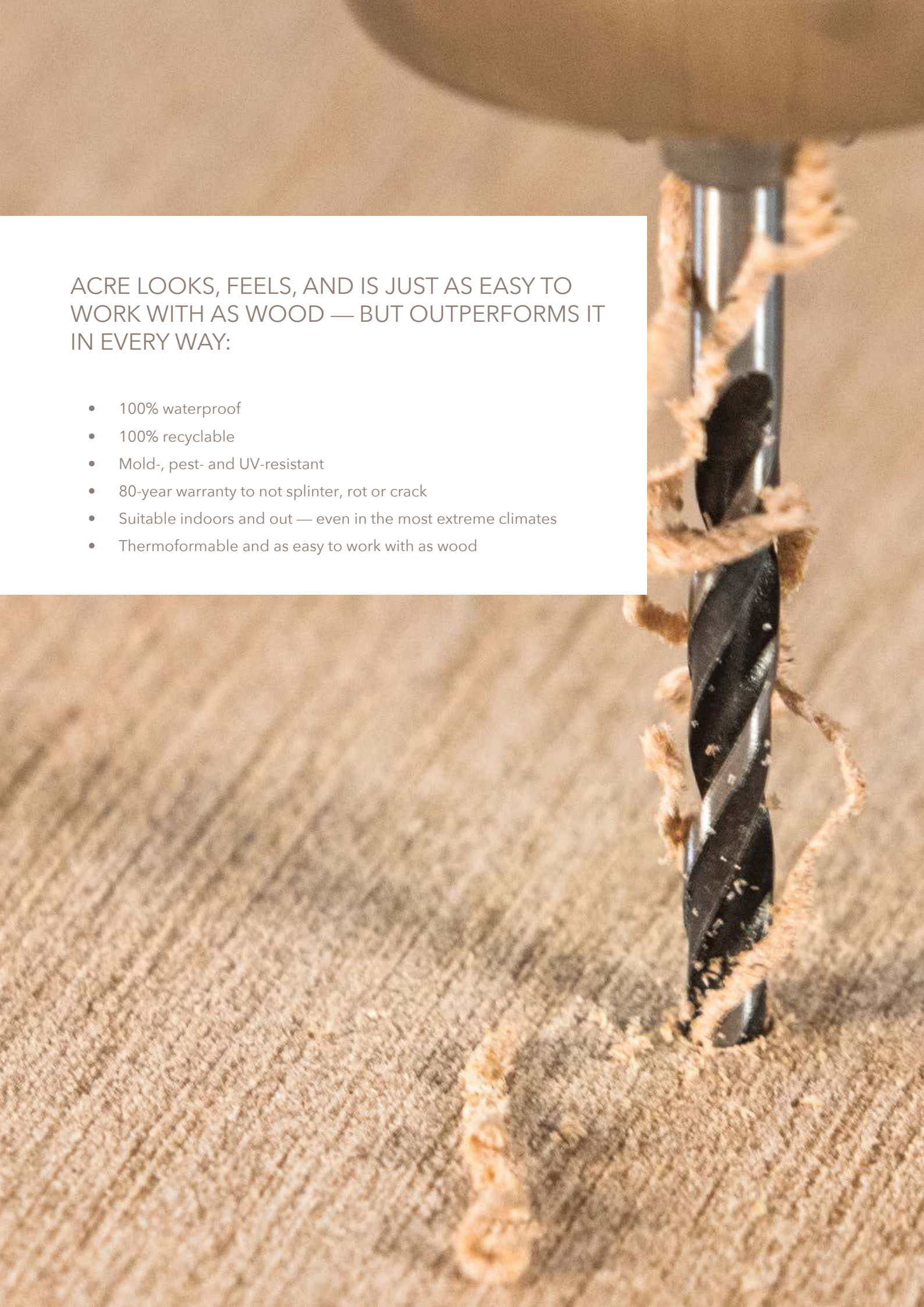


BUILDING A BREAKTHROUGH

Technical specifications for
tree-free building with ACRE™

ACRE™ BY MODERN·MILL



ACRE LOOKS, FEELS, AND IS JUST AS EASY TO WORK WITH AS WOOD — BUT OUTPERFORMS IT IN EVERY WAY:

- 100% waterproof
- 100% recyclable
- Mold-, pest- and UV-resistant
- 80-year warranty to not splinter, rot or crack
- Suitable indoors and out — even in the most extreme climates
- Thermoformable and as easy to work with as wood

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The team at Modern Mill is here to help.

For additional assistance please email us at support@modern-mill.com or call us at (601) 869-5050.

Build Better with ACRE

NATURAL BEAUTY

- Warm look and feel of wood
- Natural-looking grain
- Barefoot-friendly, low heat retention
- Wide range of finishing options: sand, stain, oil, glaze, paint, digital printing

SUSTAINABILITY

- Made in the U.S.A. Fewer emissions from transporting long distances
- 100% tree-free
- Upcycled natural fibers from discarded rice hulls, a rapidly renewable resource
- Free of phenol, formaldehyde and adhesives
- Zero-waste manufacturing
- 100% recyclable

TECHNICAL BENEFITS

- Uniform texture and finish-ready edge throughout
- Can be processed with common woodworking tools
- Accepts screws and nails easily with a flush finish
- Flexible and thermoformable
- Perfect for curved applications
- Easy to glue and bond
- Lightweight and easy to handle and install
- Skid-proof even in standing water

UNMATCHED DURABILITY

- 100% resistant to water, weather, pests and rot
- High UV- and fire-resistance
- No fading, splintering, cracking or warping
- No special maintenance or cleaning methods needed
- 80-year material guarantee

CUSTOMIZABLE SPECS

- Standard sheets: 4' x 8', 10, 12, 16'
- Standard thicknesses: 1/4", 1/2", 3/4" and 1"
- Other dimensions can be produced for custom orders



Material Overview



ACRE by Modern Mill is a new material, suited for a wide range of applications. Produced without touching a single tree, ACRE relies on up-cycled rice hulls. Rice hulls provide incredible resistance to water, weather, rot and pests along with great beauty and texture. ACRE is 100% waterproof — traditional maintenance and replacement associated with wood is not necessary.

RESPONSIBLE. SUSTAINABLE. LOCAL.

We use discarded rice hulls that would otherwise go to landfills, and we embrace a zero-waste manufacturing process.

ACRE products are free of phenolic plasticizers such as bisphenol A, formaldehyde, and adhesives. ACRE is 100% recyclable — post-industrial and post-consumer product can be cleaned, chipped and used to form new products at our manufacturing facility in Mississippi.

INSTALLERS LOVE ACRE

- Use regular woodworking tools — no special equipment or techniques
- ACRE has incredible oil, stain and coatings adhesion. Treat the surface just as you would treat wood
- Significantly less thermal expansion and contraction force of traditional wood alternatives and total hydroscopic stability
- Zero-moisture expansion
- No special training, tools, clips or fasteners
- No harmful by-products or emissions are created during installation

WARMTH AND BEAUTY OF WOOD

- Low maintenance
- 100% waterproof
- Infinite finishing options including staining, oiling, lacquering, painting, digital printing and more

UNMATCHED DURABILITY

- Consistent texture, waterproof, UV-resistant
- Low expansion and contraction force
- Will not rot, crack, splinter or swell
- Depending on the finish, will not fade
- Resistant to mildew, fungi and pests
- Sustainable and responsible

EASY TO WORK WITH

- Compatible with all woodworking tools
- Lightweight
- Homogeneous edge
- No need for subsequent veneer or banding
- Works with common patching / filling materials
- Bonding by means of a wide variety of glues
- Thermoformable

General Information

THERMAL PROPERTIES

- Similar to wood, during installation, keep ACRE at a consistent temperature, acclimated to the environment
- Acclimate ACRE sheets to the temperature they will be installed at for at least one hour, two is best, before cutting or processing

FASTENING AND CONSTRUCTION

- There are no special requirements for fastening
- ACRE accepts screws and nails easily with a flush finish
- Screws and / or ring shank nails are preferred
- Select the appropriate screw size and tighten slowly
- ACRE is easy to glue and bond
- Choose the mounting distances depending on the board thickness and substrate
- Fasten ACRE between 3/8" and 5/8" from the edge of the boards
- Sheets are available in varying thicknesses: 1/4", 1/2", 3/4" or 1"
- Support ACRE sheets at various thicknesses depending on application and environment

ACRE technology greatly reduces the thermal expansion force compared to conventional plastic sheets goods. ACRE can be used with traditional nails and screws to keep thermal expansion to a minimum.



SIDING AND CLADDING

- To avoid moisture and overheating in buildings, provide ventilation between siding and substrate. Follow code requirements for air gaps and drainage planes
- Class A or B fire ratings are available
- Ensure fire code and flammability requirements meet required code

HOMOGENEOUS EDGE CROSS SECTION

- The edges do not have to be laminated because of the homogeneous cross-section
- The ends and edges do not require sealing or special treatment as the material will not absorb moisture and does not swell in the presence of water

Mechanical Processing



CUTTING

Saws used in traditional woodworking can be used with ACRE:

- For circular saws, carbide tipped tools are recommended
- Fine tooth blades as well as coarse tooth blades may be used
- Using a fine-tooth blade produces a slightly more uniform finish

DRILLING

Drills used in traditional woodworking can be used with ACRE and without any special adjustments including:

- Standard twist drills for wood (HSS, carbide tipped)
- Hand drill
- Drill press
- CNC drills

You can process ACRE with traditional woodworking tools and machinery.

SANDING

ACRE can be sanded with traditional sandpaper:

- 24 to 60 grit is used to create the grain structure
- Finer grit sandpaper (> 80) to avoid staining and soiling
- Avoid sanding too deeply to protect and retain the surface grain

MILLING

ACRE can be processed with milling and shaping machinery:

- Router
- Shaper
- Milling table machines
- CNC milling
- Four-side processing machine
- Carbide tipped tools are recommended

*Collect dust and milling waste separately and **do not burn**.
The collected waste can be recycled. Contact Modern Mill for details.*



Thermoforming

With the application of heat, you can bend, mold, and manually shape ACRE. You can also use heat to bond pieces of ACRE together.

THERMOFORMING PROCESS

- Be sure to test a small amount before full application
- Radius will depend on the board thickness. If the radius is too tight, the surface may tear
- Allow sufficient time for heating
- Sufficient heating (approx. 1 - 1.5 min per mm board thickness)
- Temperature approx. 250 °F
- Hold (lock) — time at temperature approx. 3 - 4 mins
- Cooling down (approx. 1 - 1.5 min per mm plate thickness), or faster with water cooling
- ACRE can be thermoformed using a vacuum press
- A mold may be required or helpful for deep shapes

HEAT-SEALING

ACRE can be bonded by heat and compression (heat-sealing). The following short-term heat-sealing properties were determined:

SPECIFICATIONS:	
Heating Element Temperature	440°F
Heating Time	60s
Contact Pressure	0.2 MPa
Joining Pressure	0.2 MPa

	STANDARD	VALUE
Short Time Heat Sealing Factor (Tensile Strength)	DVS 2203 Part 2	0.68
Short Time Heat-Sealing Factor (Flexural Strength)	DVS 2203 Part 2	0.76

Fastening

ACRE can be joined with all standard fasteners, such as screws and nails. The appropriate fasteners should be selected in accordance with the application.

SCREWING

- Traditional screws for woodworking can be used and are recommended over nails
- Be sure to consider corrosion resistance with outdoor applications
- Pre-drilling can be helpful for guiding fasteners but is not necessary
- Screw retention depends on the screw
- It is recommended that screws penetrate the substrate

NAILING

- ACRE can be fastened with common nails
- Better results are achieved with nail specific for the application
- Be sure to consider corrosion resistance in exterior applications.
- The nail retention depends on the type of nail (ring shank, smooth).
- Nails should penetrate substrate no less than underconstruction

GLUING

- ACRE can be bonded with a variety of different adhesives to different substrates and materials
- Be sure to run preliminary tests to determine if the adhesives you're considering are fit for purpose
- Gluing works best on sanded surfaces, or surfaces roughened or pretreated with acetone or primer
- Any existing abrasive dust should be removed to improve adhesion

Surface Finish

ACRE can be finished with water-based oils, stains, varnishes, paints and lacquers:

- Choose finishes based on application and environmental needs
- ACRE is a natural material, surface coatings and color shades may vary
- To refinish ACRE, simply remove the existing surface and apply a new one
- Finishes can protect against soiling and make cleaning easier



Additional Applications

OUTDOOR

- We recommend using Modern Mill products for transparent, outdoor coating
- 25-year guarantee against flaking and peeling of surface coatings offered by Modern Mill
- Any coating not supplied by Modern Mill should be approved for use by the manufacturer

PRODUCT	DESCRIPTION	PROPERTIES
Modern Mill Primer	Clear primer	Strengthens bonding and improves brilliance of colors
Modern Mill Oil	Low maintenance decking oil	Can easily be reworked and refreshed
Modern Mill Semi-Transparent Layer	Single component, transparent, protective coating	Best for slightly to moderately stressed surfaces
Modern Mill Stain	Transparent, colored stain	Resilient, chemically resistant
Modern Mill Industrial Sealer	High-performance two-component urethane finish available in various sheens	Highly durable, highly chemically resistant, graffiti-resistant



INTERIOR

- We recommend Modern Mill's coatings
- Commercially available water-based products can be used
- Solvent-based products should not be used
- The choice of surface coating product depends on application and requirements
- Any coating not manufactured by Modern Mill should be approved for use by the manufacturer

DIGITAL PRINTING

- ACRE is suitable for digital printing
- We recommend a white base coat be applied prior to printing
- Adding a clear coat can protect against abrasion, dirt and weathering

EMBOSSING

- Due to the thermoplastic properties, ACRE can be embossed using heated tools
- Embossing tools should be heated between 210- and 270-degrees F



Additional Information

STORAGE / TRANSPORTATION:

- Store ACRE sheets and finished goods horizontally and on a flat surface
- When stored on pallets, the pallet must be the same size as the sheets or finished goods as they could deform
- Store and in a cool, dry place
- Avoid direct sunlight

PACKAGING

- Protect from moisture and direct sunlight
- Moisture trapped inside of airtight packaging has the potential to stain materials

DISPOSAL:

- ACRE cutting and sanding debris can be recycled
- Dispose of dust according to local regulations
- Do not burn cuttings or dust

Guarantee

Modern Mill guarantees, for a period of 80 years, that ACRE sheets will not swell, splinter, rot or crack. This applies in addition to existing statutory warranty rights of the end customer towards the respective seller. The guarantee certificate, defining the guarantee conditions in detail, is available by emailing support@modern-mill.com.

Modern Mill, LLC guarantees its end customers for a period of up to 25 years the “not flaking” of their surface products, in compliance with the processing instructions included in the respective packaging.

12. LEGAL NOTICE

ACRE products have no building-authority approval and are not suitable for load-bearing or constructional purposes. In individual cases, approvals must be clarified with the building authority. The local building regulations are to be observed. The construction and fastening have to be executed according to the general state of the art and have to be coordinated with the respective application and purpose. Check material quality prior to installation. Observe all current standards and regulations. The information and data contained herein are deemed to be accurate and have been compiled from reliable sources. Modern Mill makes, neither express nor implicit, assurances of any kind as to the accuracy or completeness of the information and data contained herein. Modern Mill is not liable for claims arising out of the use of, or reliance on the information and data contained herein, regardless of whether the claim refers to incorrect, incomplete or otherwise misleading information and data. They merely serve for evaluation, examination and testing by the user. Due to possible technical changes, it lies within the responsibility of the user to obtain the latest information. This information exclusively describes the safety requirements of the product / products and is based on the current state of our knowledge. It does not constitute an assurance of the described product / products in terms of statutory warranty regulations.



ACRE[™] BY MODERN·MILL

It's better building,
one tree-free board at a time.

MODERN·MILL

www.modern-mill.com

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