



ECO-BOARDS[®]

Why Waste Wood

Environmental (C2C) Toxic Free (E0) Panels made from Agrifibre BIOMass

Mission Statement

"ECOBoard is committed to a role of environmental, sustainable and socially responsible leadership in all facets of our business. Changing the world one board at a time.

Goal

To create a Blue Biobased Economy by combining Environmentally-friendly innovations and having a large impact on our Carbon Footprint by storing CO₂ in Healthy Biobased Buildings & Furniture

Our Values

"We will conduct our business with the highest ethical standards, strive for excellence in all we do, and measure success by the relationships we build in the communities where we live and work."

1 piece of ECOBoard (1220 x 2440 x 18 mm)

Can store and avoid the emission of **150** kg CO₂ !

Can reduce the harmful effects of **4** kg formaldehyde !

One tree with a diameter of **25** cm and 2 m high will NOT be cut !
while the emission quantity is equal to the release of **100** kg Oxygen,
or the total amount of absorbed oxygen by **1** man per year.

Can change **40** kg of waste straw into treasure



ECOBoards

ECOBoard Bio based Panels are made from agricultural residues such as straw or reeds and are bonded together with the natural lignine of the cellulose fibres with only 3% additive without any formaldehyde nor other VOCs.



ECOBoards are a healthy and ecological alternative for chipboards, MDF, OSB or Plywood and can be used for a wide range of applications. They surpass the structural properties of wood based panels and can be cross-referenced to any relevant international standard such as BSEN 312 / EN 300 / ANSI A208 / etc..

ECOBoards have a NEGATIVE Carbon Footprint of MINUS - 0.98 kg so they actually store or sequester CO₂ about their own weight! ECOBoards can be used in virtually all applications where conventional boards are used, like the furniture & interior decoration industries, building & construction industries and for industrial packaging. Due to the fact that formaldehyde-free added resin (NAF) is used, ECOBoards have emission levels far below the strict European formaldehyde regulations (E0) and the USA (HUD 24) standards. ECOBoards are suitable for use in environmentally sensitive areas such as schools, nurseries, children's furniture, hospitals, public buildings, laboratories and nursing homes or any eco-friendly domestic application.

Moisture Resistance: ECOBoards are extremely moisture resistant and are specified for use in the most strenuous humid domestic interior conditions where dimensional stability and retained structural integrity are of great importance.



Fire Resistance: Standard ECOBoards are fire retardant for 30min, since they scorch rather than burn, and we also offer a full range of fire ratings up to 120 min, NEN 13501-1 class B.

High Strength, Lighter Weight: The excellent strength to weight ratio makes handling the product on-site easy.

Screw Tightness: Superior screw holding ability means that a wide choice of fittings can be used.

Machinable: ECOBoards are made in a single layer process giving homogenous consistency throughout its thickness, similar to MDF. Its superior internal bond (cross tensile) allows smooth strong profiling and sharp machined edges.

Finishing: When sanded, ECOBoards create an excellent finish and readily accept melamine, formica, paper foil laminates, and biobased or wood veneers. Painting after priming gives excellent results.

Thickness and Sizes: Standard thicknesses range from 3 to 28 mm with a density of 750 kg/m³ and to 42 mm with a density of 500 kg/m³



Benefits

ECOBoard Benefits

- 100% Biodegradable
- 100% Formaldehyde-free, E0
- 3% formaldehyde-free RESIN instead of 25% GLUE as in regular particleboards
- 100% Durable - Sustainable Source
- 100% Recyclable to equal product (Cradle 2 Cradle)
- Superior moisture resistant
- Amazing Fire Resistance
- Superior Screw strength and Elasticity
- Less Weight for same strength characteristics as industrial grades of particle board
- Homogeneous single layer can be finished with many effects including, painted, veneered, melamine, micro foils, etc..
- Machineable profiling
- Healthy working environment and less dust
- Conforms to all relevant Standards NEN / ANSI A208 / BSEN 312 / HUB / etc..
- Densities available from 200 kg/m3 soft board to 800 kg/m3 HD
- DUBO-keur certified, NaturePlus certification pending
- No fumigation necessary for container transport, is insect repellent
- Insulating & Constructif Properties 400 kg/m3 x 40 mm : R = 0.62 m² K/W
- Life Cycle Analysis : NEGATIVE CARBON FOOTPRINT [- 0.98 Co² eqv/kg] CARB 2“

Specifications ECO-Board 12 mm

Property	BSEN 312 P4	ANSI 208 M2	ECO-Board Panel (Wheat Straw)	ECO-Board Panel (Bagasse)
Density (kg/m3) *	No Requirement	640-800	650	710
MOR (N/mm2)	17	14,5	19	23
MOE (N/mm2)	2.300	2.250	2 850	2.500
Internal Bond (N/mm2)	0,4	0,45	0,7	0,9

Testrapport ECO-Board 18 mm

Test	Unit	Condition	ECO-Boar	MDF-E1
Bending rength	Mpa	MIn 1	38,3	29
Elasticity	Mpa	MIn 1600	3810	2980
Screw Pull	Surface	MIn 1100	1520	1000
Internal Bond	Mpa	MIn 0.35	0,80	0,51
Swelling in Thickness	%	max 8%	3,40%	10%
Moisture Content	%	max 13%	6%	9%
Formaldehyde	mg/100g	E1 max 0.9	0	0.5-0.9



Environment

Carbon Sequestration

Straw and other biomass from agriculture and/or horticulture will absorb about 1.78 kg CO2 per kg Agriculture absorbs even more CO2 than most forests or trees.

Straw is actually like a little tree that is already cut and that will grow back in a year or 6 months depending on the country. By using this straw to produce bio based materials like ECOBoards 1.78 kg of Carbon will be stored for every kg produced.



Impact

The Life Cycle Analysis shows that the impact to the environment after producing ECOBoards including all energy, additives and transport is MINUS 0.96 kg CO2 LESS per kg because they start at MIN 1.78 kg of CO2 . At end of life the old ECOBoards are reused as raw material for new ECOBoards and thus the Carbon remains saved > cradle2cradle .

Health

Traditionally woodchips are used for production of standard board material and are mixed with approximately 25% urea glue (10% for MDF). This urea glue contains formaldehyde, a toxic gas that is emitted during the material's lifetime. According to the Environmental Protection Agency; formaldehyde is a pungent gas that can cause cancer, nausea, asthma, irritations and severe allergic reactions. ECOBoards however are mainly bonded with the natural lignin from the cellulose fibres and use just 3% resin containing NO Formaldehyde and produce NO emissions.



Recycling

Traditional boards make environmentally safe recycling or processing for compost almost impossible without the release of toxic gasses and other related issues.

At end of life the old ECOBoard and leftovers are reused as raw material for new ECOBoards and this the recycling Carbon remains saved stored. This is even better than the Cradle 2 Cradle cycle.

Sustainable development

The factories which produce ECOBoards comply with the strictest international standards fo CARB. ISO 9001. Every factory is responsible for >200.000.000 kg CO2 LESS in the atmosphere!

ABCBOARD COMPANY

End of 2014, beginning of 2015 production of ECOBoards is starting in cooperation with ABC BOARD COMPANY International.



ECO-Boards are the alternative

*The current situation needs to be changed...
Harvest residue is mostly burned*



Worst case scenario >20% recycle wood is used and replanted but 50% of the world forest is already gone



The Wrong Choice



The Natural Choice



Building & Construction industries

ECOBoards are widely used in the construction industry in North America and are accredited by TECO as fully compliant within the industry. The excellent strength to weight ratio of the ECOBoard panels further eases handling on the construction site. ECOBoards were benchmarked against all relevant international standards such as BSEN 312 P4 to P1, ANSI A208.1, EN 300, etc...

ECOBoards can replace plywood, chipboard, OSB or multiplex for a wide range of applications. ECOBoards are also DUBOKEUR by NIBE Research in the Netherlands as best choice for particleboards in environmental and health point of view, advised in sensitive areas where the end user has concern for their living environment, such as: schools, nurseries, hospitals, public buildings, laboratories, museums, nursing homes, etc...



Industrial packaging & Packaging

The excellent strength to light weight ratio make ECOBoards an ideal choice for re-useable shipping crates. ECOBoards material has been tested and approved by Trada for use in tea chests. Since it is formaldehyde free it is used for fresh food and vegetable transportation. ECOBoards are insect-free and insect-repellent so no fumigation is necessary for container transport.



Applications

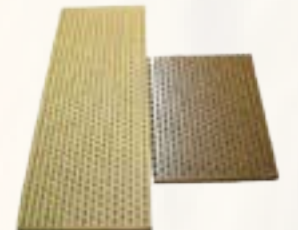
Furniture and Interior Decorating industries

ECOBoards can be used in virtually all applications where conventional boards are used. Their excellent strength to weight ratio, and screw hold properties mean that a variety of hardware can be used, including, hinges and brackets. Painting after priming gives excellent results.



Insulation with Constructive properties

ECOBoard Softboard is produced under lower pressure in order to keep the voids of the straws, therefore the thermal conductivity is close to that of foamed plastic and less than 0.65 W/(m*K). The thermal capacity is higher than that of inorganic materials. Meaning ECOBoards can be used both as Constructive and Insulating panel with a higher permeability than OSB.



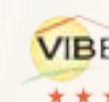
Sound Absorption

With ECOBoards we can make a special sound absorption board which fills a need of the decoration industry. At present, current sound absorption boards in the market are made of medium density board. In contrast sound absorption ECOBoard is made of equal quality ECOBoard, which has well-proportioned grain apertures. Sound mechanical process capabilities ease the process of installation.



Moisture resistant

Unlike traditional wood based boards, ECOBoards are extremely moisture resistant and are specified for use in the most strenuous humid domestic interior conditions where dimensional stability and retained strength are of great importance such as Kitchen & Bathroom furniture, skirting boards, moldings, compared to MDF structural integrity is preserved after contact with water.



Special Doors

ECOBoard Door Cores and Doors

Low density ECOBoards are ideally suited for quality low cost technical door cores and doors with extreme fire-retardant properties, solid compound doors and flush doors. Finished doors can be delivered to customers' specifications.

Features

- Green and environmentally friendly.
- Formaldehyde free.
- Many styles and thicknesses are available
- Easily processed, improving yield and reducing losses.
- Can be pasted directly with wood skin which reduces the quantity of surface decoration.
- Moisture resistant
- Standard Fire retardant - 30 min up to 120 min
- Anti-termite characteristics
- Much lighter (strength – weight ratio) than normal doors



Finished door examples



Fire Doors

Fire retardant ECOBoard

The special fire retardant ECOBoard easily exceeds the new European standards for fire and smoke development NEN 13501-1 class B. The fire retardant ECOBoard has excellent product processing properties and a burning behavior reaching flame resistance of level B1, as well as various higher physical chemical properties.

ECOBoard fire retardant doors and door cores

The standard ECOBoards are already untreated for 30 minutes fire retardant. They scorch rather than burn, therefore, ECOBoards are the perfect 'green' material to produce fire retardant doors and fire retardant door cores. ECOBoards offer a full range of fire rated panels and door cores to fit most applications. Our fire rated product line includes, fire retardant capabilities up to 120 minutes rated.



Example of Totally Biobased Door with Bamboo frame and Sugarcane Pulp Finish



EConnect



Ultimate Challenges

This project combines the potential for a predicted New Industrial Revolution with one of the greatest challenges the world faces: to build a 1-million-inhabitant city per week for the next 20 years for \$10,000 per family (Aravena, 2011). By opening up design to collaboration in a structured way we can arm ourselves with the greatest knowledge and creativity available, required to take up challenges of such scale. Where the first industrial revolution democratized consumption, the next one is expected to design and democratise production – through digital networks of shared knowledge and digital fabrication devices.

Performative Evolving Design

The developed process uses digital technologies to allow broadly defined building performance to become the main guiding design principle. The system of adjustment and advice does more than merely optimizing quantitative parameters. Moreover, it fully supports the designer in creatively and effectively balancing the many - sometimes conflicting - performance related aspects. Both the building

system itself and the intelligence behind the online information- and simulation driven design context have great potential to be developed collaboratively and thus evolve over time.

From digital to physical directly

The proven principle of CNC cut elements with integrated friction fit connections for full-scale building has been developed to reach new levels of adaptability, simplicity, material efficiency, aesthetics and structural performance.

A 21st century reinterpretation

The digital design process is tested and specified via a realistic case study related to the expected increase in demand for quickly realisable post-disaster housing for the mid-to long term. A transitional shelter is designed for Villa Rosa; an informal settlement south east of Port-Au-Prince, Haiti. Based on the mass-customisation principles of the new industrial revolution, the concept perfectly fits its climatic, cultural, technological and historical context. A concentrated solar power system integrated in the parabolic roof provides three basic needs: protection, electricity and clean drinking water. The ornamentation made possible by the building system is a modern re-interpretation Haitian vernacular architecture of highly decorated gingerbread houses.

The value proposition

The growing middle class in developing countries all over the world wants better housing; more comfortable, more reliable and simply more spacious. However they are on a budget. We leverage digital fabrication to create affordable housing which is locally produced and fully biobased. See below



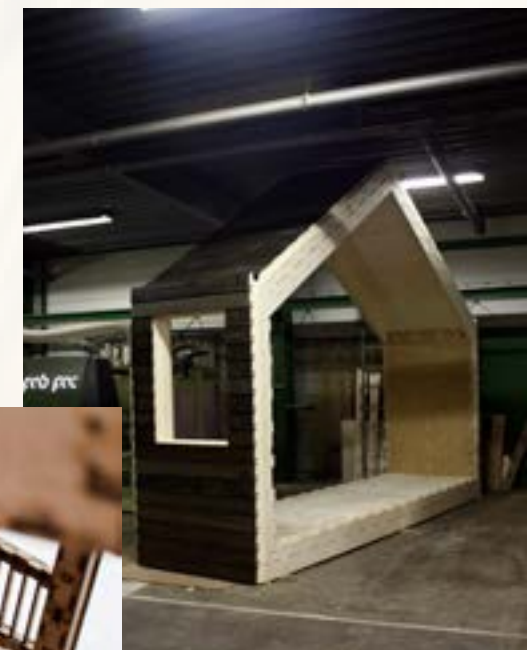
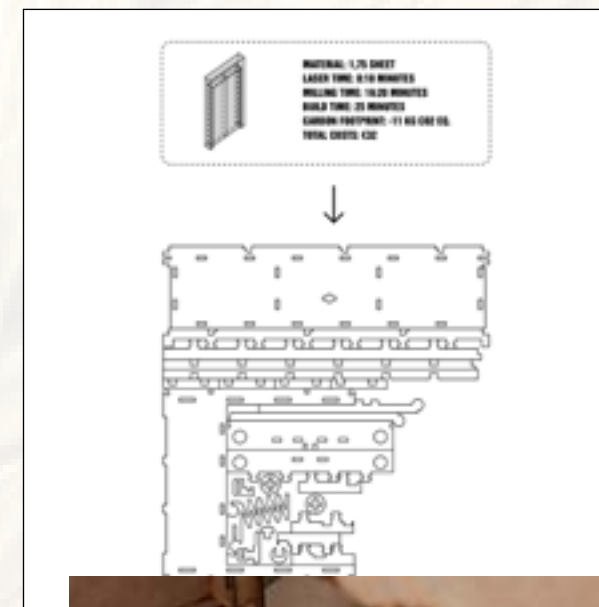
A digital fabrication product

Digital fabrication in EConnect translates into designing housing on the computer and have a robot - a CNC router - cut out the components. These components are like 3D puzzle pieces, together they make up an actual house. (picture)

Friction Fit

The design of such a building is made up of multiple layers. First layer : architectural design - What does the house look like and how does it functions ? Second layer contains the elements , for example, a truss or a door frame with door.

The elements are in turn made up of smaller parts which are cut by the CNC cutter and that ultimately form the house together. If it is a type of building design , it can be endlessly produced . It is even possible to modularly to offer the two rooms or four bedrooms , a veranda or extra floor ? The client may say , we are pressing the button. And can be predicted in detail how sheet is needed and how long does the production process . “ By the digital way of producing. “Another advantage of eConnect is the dimensional accuracy. The parts you produce a margin of 0.01 millimeter , all connections therefore fit perfectly . You can ‘ friction - fit’ make connections . Homes assemble without screws or glue joint !



Products



World Expo
Shanghai



Structural
Insulating
Panel



ECOBoards



ECOBoard 15mm Standard
Density 750 kg/m³



ECOBoard Paint High Gloss



ECOBoard Deco
Density 650 kg/m³



ECOBoard 8mm Standard
Density 750 kg/m³



ECOBoard 40/35mm Soft
Density 500 kg/m³



ECOBoard Deco
Density 650 kg/m³





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