Processing and handling manual

March 2022

www.honextmaterial.com

1. Data Sheet

PROPERTIES	REFERENCE TEST	UNITS	12MM
Density	EN 323	kg/m3	+/- 540
Content, emission and/or release of dangerous substances (1)	EN 16516	µg/m3 (At 28 days)	85
Vapour permeability	ISO 12572:2018	µ	2,7
Reaction to fire	EN 13823 (SBI)	Euroclass	C-s1,d0
Airborne sound insulation (surface mass)	ISO 354:2004	dB	24
Acoustic absorption	ISO 354:2004	α_w	0,15
Thermal conductivity	EN 12664:2002	W/m·K	0,093
Dimensional stability (variation of length)	EN 318	mm/m	2,2
Dimensional stability (variation of thickness)	EN 318	%	1,9
Impact resistance (soft impact body energy)	EAD 210132-00-0504	N·m	1,200
Impact resistance (hard impact body energy)	EAD 210132-00-0504	N·m	10

(1) The Honext board emission results according to basic level emission criteria of BREEAM Int.: Hea 02 Indoor air quality:

- Carcinogenic substances were not detectable after 28 days (< 0,001 mg/m3).

- The sum of VOC (“TVOC”) after 28 days was below the limit of 1,0 mg/m3.

- Formaldehyde after 28 days was below the limit of 0,06 mg/m3.

(2) The Honext board does not show collapse, penetration nor projection after the impacts. The energies tested are the highest energies considered by EAD 210132-00-0504.

Properties tested by Applus in 2021.

UNIQUE SPECIFICATIONS	VALUES
Raw material	Paper mill primary sludge and post-consumer cardboard
Recyclability	Recyclable
Cradle to Cradle	Silver Certified and Material Health Silver
CE Marking and ETA	Expected by 2022

2. General description

The raw materials of HONEXT® boards are primary paper sludge and post-consumer cardboard waste. Due to the origin of its raw material, its low environmental impact in manufacturing, use and end-of-life solutions allowing for recyclability, and its non-toxicity, the HONEXT® Board has an overall Cradle to Cradle Silver Certification, including Gold in Material Reutilization and Renewable Energy and Carbon Management. It lowers the carbon footprint of buildings where it is applied which increases LEED and BREEAM credits.

HONEXT® boards measure 2440×1220×12 mm. The material's thickness tolerance is +/- 0,5mm. The weight of a board is 19,3 kg. The base colour varies within the range of light beige and grey tones. Each side of the board is differently textured as a result of the water filtering meshes used during the manufacturing process (Figure 1 and 2).

HONEXT® boards have competitive mechanical and thermodynamic properties for applications in the interior built environment, with most common uses in shop fitting, wall cladding and ceilings, ephemeral architecture and in joinery and furniture parts. The HONEXT® Board has a fire reaction certification of class C-s1,d0.

HONEXT® Boards can be transformed using standard equipment and processes commonly used for wood-based panels. The purpose of this Processing and Installation Manual is to provide the customer with a reference guide on the processing and installation of HONEXT® boards.

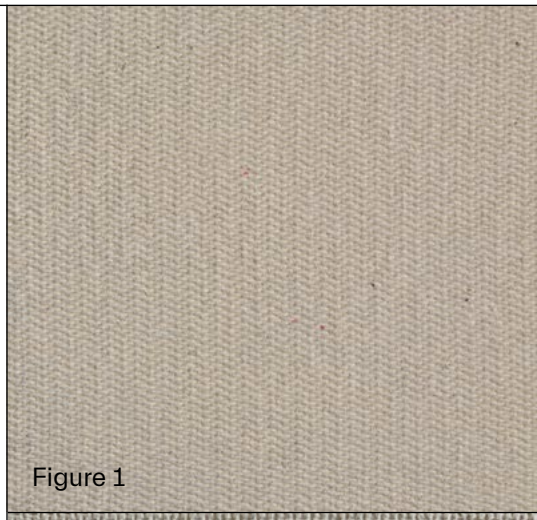

Figure 1

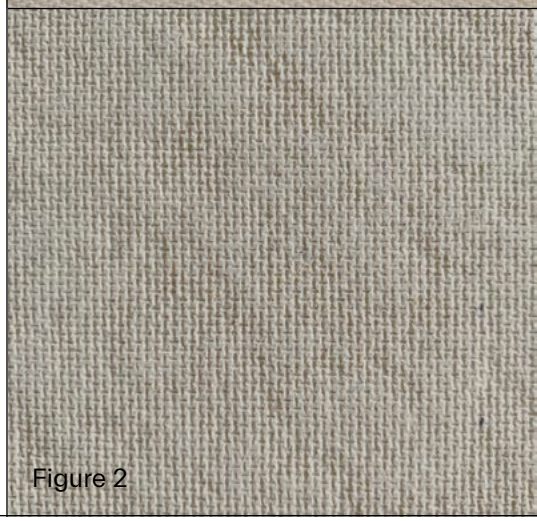

Figure 2

3. Machining

HONEXT® boards can be machined using standard equipment and processes commonly applied in wood-based fiberboards. For cutting and perforating, usually higher rpm are required to achieve the same results expected from fiberboards or aligned materials.

The dust generated when processing HONEXT® boards is similar to fiberboard dust, but in no case it is toxic nor it has added formaldehyde or VOCs. The use of a mask is recommended to avoid respiratory problems due to accumulation. Consult the Material Safety Data Sheet for further details.

For routing, follow the chip load recommendations in section 3.2. To avoid tool wear and burns, the tool in use should never reach more than 300 degrees celsius.

3.1 Cutting and Drilling

A. TABLE AND CIRCULAR SAWS

When cutting HONEXT®, 80–100 tooth composite blades are recommended.

B. JIGSAW

All types of jigsaws used for wood-base panels can be used. A high number of teeth is recommended to achieve a clean cut.

C. DRILL BITS

Wood and composite drill bits can be used for drilling, read section 3.2 for tool recommendations. A high rpm value is recommended when processing HONEXT® boards.

MACHINING

3.2 Routing

A. General parameters:
HONEXT® boards have to be routed with high revolutions to obtain clean results. The recommended speeds and feeds for CNC machining can be determined by using the chip load chart on the right. Figure 3, 4 and 5 show the results of machining with the recommended parameters and tools.

TOOL DIAMETER	HONEXT	HARD WOOD	PLYWOOD	MDF/PARTICLE	SOFT PLASTIC	HARD PLASTIC	COMPOSITES
3mm	0.02 - 0.04	0.08 - 0.13	0.10 - 0.15	0.10 - 0.18	0.08 - 0.15	0.05 - 0.1	0.08 - 0.13
6mm	0.03 - 0.04	0.23 - 0.28	0.28 - 0.33	0.33 - 0.41	0.18 - 0.26	0.15 - 0.23	0.23 - 0.31
10mm	0.04 - 0.05	0.41 - 0.46	0.43 - 0.51	0.51 - 0.59	0.26 - 0.31	0.20 - 0.26	0.41 -0.46
13mm - >	0.05 - 0.06	0.48 - 0.54	0.54 - 0.59	0.64 - 0.69	0.31 - 0.41	0.26 - 0.31	0.59 - 0.64
1/8 inch	.0008 - .0015	.003 - .005	.004 - .006	.004 - .007	.003 - .006	.002 - .004	.003 - .005
1/4 inch	.0011 - .0015	.009 - .011	.011 - .013	.013 - .016	.007 - .010	.006 - .009	.009 - .011
3/8 inch	.0015 - .0019	.015 - .018	.018 - .020	.020 - .023	.010 - .012	.008 - .010	.015 - .018
1/2 inch - >	.0019 -.0023	.019 - .021	.021 - .023	.025 - .027	.012 - .016	.010 - .012	.019 - .021

*Chip Load = Feed Rate (mm or inches per minute) / (RPM x number of flutes)

B. PROFILING

DIXI 72420-SH PCD, 6–8 mm diameter, 2 flutes, straight flute
Chip Load: 0.03 - 0.04mm

DIXI 7112, 5 - 5–8mm diameter, 2 flutes straight
Chip Load: 0.03 - 0.045mm

C. POCKETING

DIXI 7112, 5 - 8mm diameter, 2 flutes
Chip Load: 0.03 - 0.045mm

DIXI 7800, 20 - 35mm diameter, 4 - 6 flutes, straight
Chip Load: 0.01 - 0.017mm

D. DRILLING

DIXI 1290, 3 - 8mm diameter, 2 flutes, extraction
Chip Load: 0.04 - 0.06mm

E. ENGRAVING AND EDGING

DIXI 7628, 20mm diameter, 2 flutes, straight
Chip Load: 0.025mm

DIXI 7112, 5 - 8mm diameter, 2 flutes,
Chip Load: 0.03 - 0.045mm

DIXI 7834, 6 - 25mm diameter, 4 flutes, extraction.
Chip Load: 0.01 - 0.026mm

F. 3D MILLING
Roughing / Finishing:

DIXI 7834, 6 - 25mm diameter, 4 flutes, extraction.
Chip Load: 0.01 - 0.026mm

DIXI 7032, 12 - 16mm, 2 flutes, extraction.
Chip Load: 0.015 - 0.03mm

G. FACING

DIXI 7800, 20 - 35mm diameter, 4 - 6 flutes, straight
Chip Load: 0.01 - 0.017mm

dixipolytool.ch

Figure 3

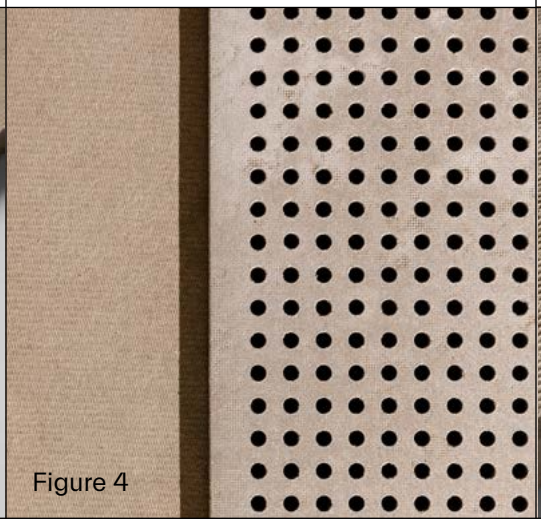

Figure 4

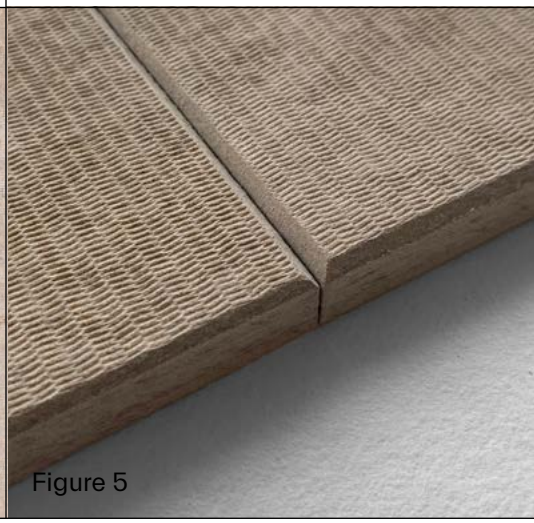

Figure 5

MACHINING

3.3 Sanding

HONEXT® board's surface and edges can be sanded using standard equipment and processes commonly applied for wood-based boards. If sanded for lamination, also standard calibrating equipment for wood-based boards can be used.

It is always recommended to apply the same process on both sides of the board to avoid tensions. Completely sanding the outer layers of the board until completely removing the textures may cause a reduction of the material's mechanical properties, as well as increase its porosity. In figure 6 the sanding process has not completely removed the texture maintaining the mechanical properties.

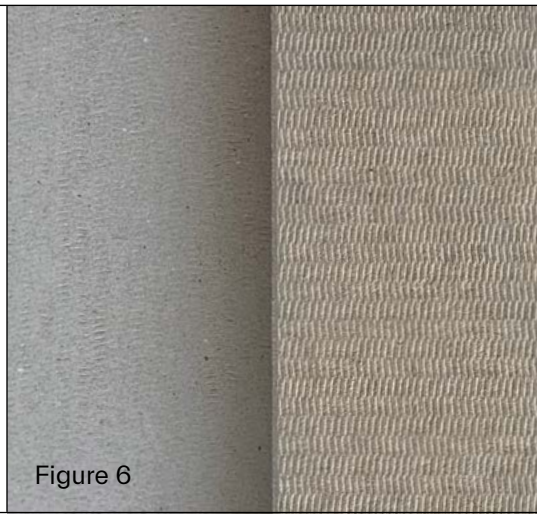

Figure 6

4. Fixings and adhesives

4.1 Screws

The boards will not split when screwed directly but for maximum performance, HONEXT® boards require pre-drilling before screwing on their main surfaces. Edges should always be pre-drilled to avoid splitting.

A. RECOMMENDED SCREWS
Wood screws can be used on HONEXT® boards. Untapered sheet-metal or production screws give the best results. HONEXT® boards can hold screws in line with most softwoods.

B. TENSILE LOAD
A 540kg/m3 HONEXT® board has around 70% of the screw tensile load of a 700kg/m3 fiberboard.

4.2 Pins and nails

Pinning and nailing can be used to install HONEXT® in cladding and covering applications when structural performance is not needed. The panels can be pinned on grid structures using a pneumatic nail gun. When installing HONEXT® on a wooden structure, we recommend using also PVA glue for best performance.

4.3 Adhesives

Standard glues advised for wood offer great bonding results with HONEXT®. The material absorbs 25–50% more adhesive than most wood and fiberboards - depending on the consistency of the glue. Standard industry glues will give great results with HONEXT® but may impact the panel's recyclability.

For recyclability and high performance, we recommend:

- POLYVINYL ACETATE (PVA OR WHITE GLUE)
Water-based PVA glues are recommended when laminating various HONEXT® Boards as well as laminating with other materials. Most PVA glues are non-toxic and they also allow for the recyclability of HONEXT® if they represent less than 5% of the board's volume.

- METHYL CELLULOSE
Methyl cellulose glues are recommended when laminating various HONEXT® boards as well as laminating with other cellulose-based materials. This type of glue is non-toxic and can be mixed with different amounts of water depending on the chosen application. It also allows the recycling of HONEXT® boards as long as it represents less than 5% of the board's volume.

5. Surface finishes

Surface finishes must be equally applied on both sides, or compensated to avoid any tensions in the board. A single-sided finish should only be applied when the product is fixed to a solid structure or surface.

From an environmental perspective, it is always better to use water-based surface additives and renewable or recyclable sheet materials when laminating.

5.1 Coatings

HONEXT® boards can be treated with the most common products for wood-based materials. The use of a sealing coating is always recommended to increase the durability and resistance of the boards.

For best performance it is recommended to follow the coating's application manual. Any application method can be used on HONEXT® boards. It is highly recommended to let the board dry on a flat surface to avoid deformations.

The use of water-based products is recommended, but they must be fast-drying and not be diluted. If a solvent-based product is used, the chemical smell of the product can persist. The natural products based on waxes and oils commonly used on wood materials deliver also aligned results when applied to HONEXT® boards.

In general, it is advisable to apply a primer before painting to seal the board's pores and decrease the panel's absorption. Some varnishes might accentuate the natural pigments found in the material, causing stains or spots on the board's surface.

The products recommended below are also used in wood and wood-based materials, and if used in small percentages (less than 5% of the total volume), they do not affect the potential recyclability of the material:

- Oil-based paints and dyes (Figure 7 showing HONEXT® board pieces coated with Rubio Monocoat Wood Cream)

- Water-based acrylic paints and varnishes (Figure 8 showing FA1019 by ICA Iberia)

- Polyurethane or enamel water-based varnishes

- Any primer specified for wood

5.2 Lamination

HONEXT® boards can be laminated using standard equipment and processes in line with other wood-based boards. It can be potentially recycled only if it is separated from the bonded sheets. The material withstands the use of hot and cold plate presses, with common industrial urea-based adhesives, aqueous dispersion adhesives based on polyvinyl acetate (white glue) and solvent-based polychloroprene contact adhesives (contact adhesive). Figure 9 shows HPL laminates using HONEXT® boards as core.

It is recommended to sand the board flat before laminating to improve adhesion. The edges of HONEXT® boards can be laminated continuously, industrially or manually in line with wood-based boards.

HONEXT® boards can be glued and pressed together forming a thicker board with the glues mentioned in section 4.3.

Figure 7

Figure 8

Figure 9

6. Maintenance

6.1 Preserving and cleaning

HONEXT® boards mostly have a surface finish applied. For regular, everyday maintenance, please check the surface finish specifications. If not indicated, for regular maintenance use a dry cloth or vacuum. For more thorough cleaning, use a moistened cloth with a soft degreaser, then wipe it with a dry cloth. Contact with oily substances must be avoided.

- Avoid using sponges made of steel or other abrasive materials that would scratch the surface
- Avoid banging or cutting the surface with blunt objects which could scratch it and remove its protective layer
- Do not use alcohol, stain removers, thinners, acetone, trichloroethylene, ammonia, bleach, vinegar, anti-limescale cleaners or any other fluid containing these substances
- Do not use abrasive powder cleaners or detergents which could ruin the aesthetic appearance and surface finish of the product
- Do not concentrate on one area when cleaning the surface, as this may alter its appearance
- Do not drag objects across the surface to avoid scratching

6.2 Repairs

To repair bumps or deep scratches, wood putty can be applied. If installed, the panel should be painted with plastic, enameled or thixotropic paint to obtain a homogeneous colouration both on the original surface and on the areas covered by putty. If the material has not been previously sanded, caulking makes it lose its texture, making repairs visible. These wood putties allow for the recycling of the material as long as they are applied in small quantities - not exceeding 5% of the panel's total volume.

7. Transportation and storage

We recommend HONEXT® pallets to contain a maximum of 30 panels. They must be stuck with the front side facing up (the front side is shown in Figure 1).

It is recommended to store HONEXT® boards in a space protected from the elements and without high temperature and relative humidity levels, always avoiding sudden changes in these conditions.

The boards must be flat during transportation and storage. They must be stacked by dimensions and mounted on supports or chocks that allow the batches to be lifted and handled without damaging the material. The edges must be protected whenever the material is handled and packed.

8. Sustainability

HONEXT® is a circular production material that can be potentially recycled once the logistical framework is in place. In this manual, we give recommendations on how to process the material to preserve its recyclability.

HONEXT® boards can be transformed using standard equipment and processes and products commonly used for wood-based panels, thus adapting to the needs of the industry and the market. However, at HONEXT® we recommend always using products and finishes that are aligned with our material's sustainability standards.

9. Other information

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