ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	**Fritz EGGER GmbH & Co. OG Holzwerkstoffe**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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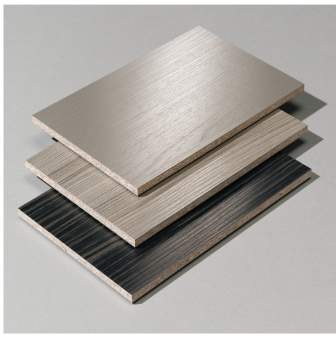
EURODEKOR® Melamine Faced Chipboard

Fritz EGGER GmbH & Co. OG Holzwerkstoffe

Institut Bauen und Umwelt e.V.

www.bau-umwelt.com / https://epd-online.com



1. General Information

Fritz EGGER GmbH & Co. OG	EURODEKOR®
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the Declaration** **Fritz EGGER GmbH & Co. OG** Holzwerkstoffe Weiberndorf 20 A – 6380 St. Johann in Tyrol
Declaration number EPD-EGG-20140035-IBB1-EN	**Declared product / Declared unit** **1 m² EURODEKOR® melamine faced chipboard**
This Declaration is based on the Product Category Rules: Wood based panels, 07.2014 (PCR tested and approved by the independent expert committee) **Issue date** 23.06.2014 **Valid to** 22.01.2021	**Scope:** This document refers to EURODEKOR® melamine faced chipboard manufactured in the following plants of the EGGER group: Fritz EGGER GmbH & Co. OG, Weiberndorf 20, 6380 St. Johann in Tyrol, Austria; Fritz EGGER GmbH & Co. OG, Tiroler Strasse 16, 3105 Unterradlberg, Austria. Production conditions in these plants are representative for the other plants. This document is translated from the German Environmental Product Declaration into English. It is based on the German original version EPD-EGG-20140035-IBB1-DE. The verifier has no influence on the quality of the translation. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	**Verification** The CEN Norm EN 15804 serves as the core PCR Independent verification of the declaration according to ISO 14025 ☐ internally ☒ externally
Dr. Burkhart Lehmann (Managing Director IBU)	Manfred Russ (Independent tester appointed by SVA)

2. Product

2.1 Product description

Melamine faced chipboard (EUROSPAN® and EURODEKOR®) is a board-shaped wood-based material according to EN 312 and EN 14322.
The decorative design of melamine faced chipboard is achieved through the use of printed decorative paper. At the same time, a corresponding feel can also be applied to the surface during pressing.
The boards are distinguished according to two criteria for use: load-bearing and non-load-bearing elements and use in dry or humid conditions:
P1: General-purpose boards for use in dry conditions
P2: Boards for interior fixtures (including furniture) for use in dry conditions
P3: Boards for non-load-bearing applications in humid conditions
P4: Boards for load-bearing applications in dry conditions
P5: Boards for load-bearing applications in humid conditions
P6: High-strength boards for load-bearing applications for use in dry conditions
The P7 application class outlined in the standard is not produced by Egger.

The average product under review is 17.6 mm thick. This was calculated by volume share across the total volumes produced in the St. Johann plant. The quantities of boards thicker than 8 mm were also included in the calculation. The production of boards with a maximum thickness of 8 mm falls into the category of thin chipboard and is not declared in this study.
Production conditions in Unterradlberg and St. Johann are representative for the other plants. They correspond with all technologies and standards applied at all locations.

2.2 Application

EURODEKOR® melamine faced chipboard is used primarily in decorative interior design and furniture applications. It is used in residential and commercial properties. EURODEKOR® E1 EPF-S CARB P2 CE and EURODEKOR® JP F 0.3 (F****) is used especially for furniture and interior design with increased demands on low formaldehyde emissions.

EURODEKOR® Flammex E1 P2 B/B1/M1 is available for increased fire safety.

2.3 Technical Data

	Mechanical properties *Average board values*	Unit	Board thicknesses							
	Density	[kg/m³]	specific to plant							
	Thickness ranges	**[mm]**	**3-6**		**>6-13**		**>13-20**	**>20-25**	**>25-32**	**>32-40**
P1	Transverse tensile strength /EN 319/	[N/mm²]	0.31		0.28		0.24	0.2	0.17	0.14
P1	Bending strength /EN 310/	[N/mm²]	11.5		10.5		10	10	8.5	7
	Thickness ranges	**[mm]**	**3-4**	**>4-6**	**>6-13**		**>13-20**	**>20-25**	**>25-32**	**>32-40**
P2	Transverse tensile strength /EN 319/	[N/mm²]	0.45	0.45	0.4		0.35	0.3	0.25	0.2
P2	Bending strength /EN 310/	[N/mm²]	13	12	11		11	10.5	9.5	8.5
P2	Bending elastic modulus /EN 310/	[N/mm²]	1800	1950	1800		1600	1500	1350	1200
P2	Surface soundness /EN 311/	[N/mm²]	0.8	0.8	0.8		0.8	0.8	0.8	0.8
P3	Transverse tensile strength /EN 319/	[N/mm²]	0.5	0.5	0.45		0.45	0.4	0.35	0.3
P3	Bending strength /EN 310/	[N/mm²]	13	14	15		14	12	11	9
P3	Bending elastic modulus /EN 310/	[N/mm²]	1800	1950	2050		1950	1850	1700	1550
P3	24-hr swelling /EN 317/	[%]	23	20	17		14	13	13	12
P3	Moisture resistance /EN 321/ *Transverse tensile strength after cyclic test*	[N/mm²]	0.18	0.18	0.15		0.13	0.12	0.1	0.09
P3	Moisture resistance /EN 321/ *Swelling in thickness after cyclic test*	[%]	15	14	14		13	12	12	11
	Thickness ranges	**[mm]**	**3-4**	**>4-6**	**>6-10**	**>10-13**	**>13-20**	**>20-25**	**>25-32**	**>32-40**
P4	Transverse tensile strength /EN 319/	[N/mm²]	0.45	0.45	0.4	0.4	0.35	0.3	0.25	0.2
P4	Bending strength /EN 310/	[N/mm²]	15	16	16	16	15	13	11	9
P4	Bending elastic modulus /EN 310/	[N/mm²]	1950	2200	2300	2300	2300	2050	1850	1500
P4	24-hr swelling /EN 317/	[%]	23	19	16	16	15	15	15	14
P5	Transverse tensile strength /EN 319/	[N/mm²]	0.5	0.45	0.45	0.45	0.45	0.4	0.35	0.3
P5	Bending strength /EN 310/	[N/mm²]	18	19	18	18	16	14	12	10
P5	Bending elastic modulus /EN 310/	[N/mm²]	2400	2450	2550	2550	2400	2150	1900	1700
P5	24-hr swelling /EN 317/	[%]	16	14	13	11	10	10	10	9
P5	Moisture resistance /EN 321/ *Transverse tensile strength after cyclic test*	[N/mm²]	0.3	0.3	0.25	0.25	0.22	0.2	0.17	0.15
P5	Moisture resistance /EN 321/ *Swelling in thickness after cyclic test*	[%]	12	12	12	12	12	11	10	9
P6	Bending strength /EN 310/	[N/mm²]	18	20	20	20	18	16	15	14
P6	Bending elastic modulus /EN 310/	[N/mm²]	2800	2900	3150	3150	3000	2550	2400	2200
P6	Transverse tensile strength /EN 319/	[N/mm²]	0.65	0.65	0.6	0.6	0.5	0.4	0.35	0.3
P6	24-hr swelling /EN 317/	[%]	18	16	16	16	15	15	15	14

General tolerances	Unit	Requirements		
Board moisture /EN 322/	[%]	5-13		
Tolerance on the mean density /EN 323/	[%]	±10.0		
Thickness tolerance /EN 324/ sanded boards	[mm]	±0.3		
Length and width tolerance /EN 324/	[mm]	±5.0		
Edge straightness tolerance /EN 324/	[mm/m]	±1.5		
Squareness /EN 324/	[mm/m]	±2.0		
Thermal conductivity /EN 12524/	[W/mK]	0.12		
Water vapour diffusion resistance factor /EN 12524/	[μ]	μ damp 15; μ dry 50		
Fire protection /EN 13986/		D-s2, d0 (thickness ≥ 9mm; density ≥ 600kg/m^3) E (thickness < 9mm; density < 600kg/m^3)		
Formaldehyde content /EN 120/	[mg/100g]	E1*, E1 EPF-S**		
General tolerances	**Unit**	**Thickness ranges**		
		< 15 mm	15 – 20 mm	> 20 mm
Thickness in relation to nominal dimension /EN 14323/	[mm]	±0.3 for abrasion category 1 and 2 +0.5/-0.3 for abrasion category 3A, 3B and shiny surfaces		
Length and width /EN 14323/ - *usual trade dimensions*	[mm]	±5		
Length and width /EN 14323/ - *cut to size boards*	[mm]	±2.5		
Warpage /EN 14323/	[mm/m]	-	≤2	
Edge splinters /EN 14323/ - *usual trade dimensions*	[mm]	≤10		
Edge splinters /EN 14323/ - *cut to size boards*	[mm]	≤3		
Surface properties	**Unit**	**Value**		
Surface defects /EN 14323/ *Points*	[mm^2/m^2]	≤2		
Surface defects /EN 14323/ *Length defects*	[mm/m]	≤20		
Resistance to scratching /EN 14323/	[N]	≥1.5		
Resistance to stains /EN 14323/	[Level]	≥3		
Susceptibility to cracking /EN 14323/	[Level]	≥3		
Abrasion resistance /EN 14323/ *Depending on the configuration of the layer construction, different levels can be achieved.*	[revo-lutions]	Class	IP	WP
		1	<50	<150
		2	≥50	≥150
		3A	≥150	≥350
		3B	≥250	≥650

Name	Value	Unit
Gross density /EN 197-1/	660	kg/m^3
Bending strength (longitudinal) /DIN EN 310/	7 - 20	N/mm^2
E-module (longitudinal) /DIN EN 310/	1200 - 3150	N/mm^2
Grammage Eurodekor with 17.6 mm	11.6	kg/m^2
Material dampness at delivery	5 - 13	%
Tensile strength rectangular	+-2.0 [mm/m]	N/mm^2
Thermal conductivity /EN 12524/	12	W/(mK)
Water vapour diffusion resistance factor /EN 12524/	moist 15; dry 50	-
Formaldehyde content: Varies depending on the product /EN 120/, /CARB/, /JIS A 5908/	E1[1],EPF-S[2], CARB[3], F**** (4)	
Deviation of density from average /EN 323/	±10.0	%
Thickness tolerance sanded boards /EN 323/	±0.3	[mm]
Length and width tolerance /EN 324/	±5.0	[mm]
Straightness of edges tolerance /EN 324/	±1.5	[mm]
Squareness /EN 324/	±2.0	[mm]
Fire safety EURODEKOR® /EN 13986/	D-s2, d0	
Fire safety EURODEKOR® Flammex E1 P2 B/B1/M1 /EN 13986/	B-s1, d0	

[1]) **E1** formaldehyde class has a limit value of 8 mg and a moving half-year average of 6.5 mg HCHO/100g according to test method /EN 120/.
[2]) **E1 EPF-S** chipboard with reduced formaldehyde release has a limit value of 4.0 mg HCHO/100g according to /EN 120/.
[3]) **CARB** chipboard certified to /California Air Resources Board (**CARB**) regulation CCR-17-93120.2(a) – Phase 2/
4) **F****** chipboard complies with formaldehyde class F**** according to the Japanese standard /JIS A 5908:2003/.

2.4 Placing on the market / Application rules

Placing on the market in the EU/EFTA is governed by /EU regulation 305/2011/ dated 9 March 2011. The products require a Declaration of Performance taking consideration of the /EN 13986:2005-03/ standard, Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking; German and English versions /EN 13986:2005/, and CE marking.

The /EN 312:2010-12, Particleboards – Specifications/; German version /EN 312:2010/ and /EN 14322:2004-06, Wood-based panels – Melamine-faced boards for interior uses; Definitions, requirements and classification/; German version /EN 14322:2004/ also apply.

The respective national guidelines apply for use of the products.

2.5 Delivery status

Standard format [mm]: 5610 x 2070 & 2800 x 2070
Thickness range [mm]: 8 bis 40

2.6 Base materials / Ancillary materials

Primary products:
Raw chipboard with thicknesses between 2.5 and 40 mm and an average density of 660 kg/m^3 comprising (specified as mass %age per 1 m^3 of production):

- approx. 84-86% wood mass
The production of chipboard only uses fresh wood from thinning measures as well as sawmill leftovers, primarily spruce and pine wood. Up to 30% of the raw material is recycled wood which can be used as material.

- approx. 4-7% water

- approx. 8-10% UF glue
Comprising urea formaldehyde resin; the aminoplastic adhesive hardens fully during the pressing process through polycondensation.

- <1% paraffin wax emulsion: A paraffin wax emulsion is added to the formulation during gluing for the purpose of hydrophobicity (improving resistance to moisture).

For the coating:
-Decorative paper with a grammage of 60-120 g/m^2
- Melamine formaldehyde resin: aminoplastic resin for impregnation of decorative paper for lamination; in the press, the resin hardens fully into a hard and hard-wearing surface.

2.7 Manufacture

Manufacturing the raw boards (EUROSPAN®):
1. Wood processing
- Log wood chipping
- Chip processing
- Waste wood processing
2. Drying the chips to approx. 2-3% residual moisture content
3. Sorting the chips

4. Gluing the chips
5. Spreading the glued chips onto a moulding conveyor
6. Compression of the chip mass using a continuous press (ContiRoll®)
7. Cutting and edge-trimming the raw boards
8. Cooling the raw boards in radial coolers
9. Sanding the top and bottom surfaces
10. Destacking onto large stacks

Production of the impregnating substances for lamination:
1. Unrolling the base papers
2. Intake of impregnating resin (MUF) in the system
3. Drying the impregnated paper in heated dryers
4. Dimensioning the endless paper using a crosscutter
5. Destacking the dimensioned boards onto pallets

Production of the melamine faced chipboard (EURODEKOR®):
1. Placing the impregnating material on the top and bottom surfaces of the raw board
2. Pressing the board in a hot press using various textured pressing plates
3. Quality sorting and destacking
4. Climatisation phase of up to 14 days

All leftovers incurred during production and final manufacturing (trimming, cutting and milling leftovers) are, without exception, routed to a thermal utilisation process.

2.8 Environment and health during manufacturing
The maximum permissible concentration values in the production processes are continuously monitored internally and regularly examined by certified test institutes. EGGER operates a health management system at all locations which has been awarded the seal of approval for workplace health promotion (BGF) in Austria. It includes measures such as access to physiotherapists directly in the workplace and regular inspection and improvement of all production workplaces in the form of personal inspections by safety experts and the works doctor.
The St. Johann plant in Tyrol (impregnation) has been awarded /ISO 14001 certification/ for its Environment Management System and /EFB+/ in its capacity as a specialist disposal company. The Unterradlberg plant (chipboard) has /EMAS/ validation and is also a specialist disposal company.

2.9 Product processing/Installation
EURODEKOR® can be sawn and drilled using normal (electric) tools. Carbide-tipped tools are recommended, especially for circular saws. Respiratory masks should be worn when using hand tools without a dust extraction device. Detailed information and processing recommendations are available at: www.egger.com .

2.10 Packaging
Particle board and corrugated cardboard covering as well as PET or steel straps and packing straps are used.

2.11 Condition of use
The components of melamine faced chipboard correspond in their fractions with those of the base material composition in section 2.6 Base materials. During pressing, the aminoplastic resin (UF) is cross-linked three-dimensionally through a non-reversible polycondensation reaction under the influence of heat. The binding agents are chemically and stably bound to the wood.

2.12 Environment and health during use
Environmental protection: According to current knowledge, there are no risks for water, air and soil when the products referred to are used as designated.
Health aspects: When used normally and in accordance with the designated purpose, no health risks or restrictions are to be anticipated by melamine faced chipboard in line with the current state of knowledge. Natural wood substances can be emitted in small amounts. With the exception of low, harmless volumes of formaldehyde, no emissions of pollutants can be detected.

2.13 Reference service life
Durability under conditions of use is defined through the classes of application (P1-P7) (see section on Product definition).
Influences on ageing when the recognised rules of technology are applied.

2.14 Extraordinary effects

Fire
Melamine faced chipboard displays the following reaction to fire in accordance with /EN 13501-1/:
Fire resistance

Name	Value
Building material class EURODEKOR®	D (normally flammable)
Burning droplets EURODEKOR®	d0 (no dripping / dropping while burning)
Smoke gas development EURODEKOR®	s2 (limited smoke development)
Building material class EURODEKOR® Flammex E1 P2 B/B1/M1	B (difficult to ignite)
Burning droplets EURODEKOR® Flammex E1 P2 B/B1/M1	d0 (no dripping / dropping while burning)
Smoke gas development EURODEKOR® Flammex E1 P2 B/B1/M1	s1 (very limited smoke development)

Change of phase (dripping / dropping while burning): dripping while burning is not possible as melamine faced chipboard does not liquefy when hot.

Water
No ingredients are washed out which could be hazardous to water. Chipboard is not resistant to sustained exposure to water, but damaged areas can be replaced easily on site.

Mechanical destruction
The breaking pattern of chipboard illustrates relatively brittle behaviour, and sharp edges can form at the breaking edges of the boards (risk of injury).
Resistance to mechanical impact corresponds with board types P1 to P6.

2.15 Re-use phase
Re-use / Further use: During remodelling or at the end of the utilisation phase of a building, EURODEKOR® can easily be separated and used again for the same applications if selective

deconstruction is practised. This is only possible if the wood-based boards have not been bonded over their entire surface.
Energetic utilisation (in approved systems): with a high calorific value of approx. 16.7 MJ/kg, energy utilisation for the generation of process energy and electricity (cogeneration systems) from construction board leftovers as well as boards from deconstruction measures is preferable to landfilling.

2.16 Disposal
EURODEKOR® leftovers which arise on the construction site as well as those from deconstruction measures should primarily be routed to a material utilisation stream. If this is not possible, they must be routed to energetic utilisation instead of a landfill (waste code according to /European Waste Catalogue/: 170201/030105).
The transport packaging of chipboard and steel as well as PET strapping can be recycled if sorted properly. In individual cases, external disposal can be arranged with the manufacturer.

2.17 Further information
Detailed information and recommendations are available at www.egger.com.

3. LCA: Calculation rules

3.1 Declared Unit
The Declaration refers to the production of 1 m² EURODEKOR® with an average thickness of 17.6 mm and an average density of 660 kg/m³.

Name	Value	Unit
Declared unit	1	m²
Conversion factor to 1 kg	86	-
Mass reference	-	kg/m³
Area density	11.6	kg/m²

3.2 System boundary
The EPD is therefore from the "cradle to plant gate, with options". The Life Cycle Assessment of the products under review comprises the "Product stage" and "Benefits and loads beyond the product system boundaries". The systems therefore include the following stages in accordance with EN 15804: Product stage (Modules A1-A3):
- A1 Raw material provision and processing and processing processes for secondary materials serving as input
- A2 Transport to the manufacturer
- A3 Production

The product stages, A4-A5, B1-B7 and C1-C4 were not taken into consideration in this study. Once the product has reached End-of-Waste status as waste wood chips, it is assumed that the product is routed to biomass incineration producing thermal energy and electricity. The ensuing impacts and credits are declared in Module D.
The optional Modules C1 to C4 were not integrated in the study. Integration of these modules would include calculation of the impacts for C3 by sorting and chipping wood for thermal utilisation. The anticipated impact of these modules compared to A1-A3 / D can be estimated as very low and is not therefore taken into consideration.

3.3 Estimates and assumptions
The End-of-Life system boundary between waste disposal and Module D is applied where outputs such as secondary materials or fuels reach their *End-of-Waste* status (EN 15804, section 6.4.3). It is assumed that waste wood reaches *End-of-Waste* status after sorting and processing.
In order to calculate the net flows, the waste wood quantity used for producing thermal energy and electricity was added to the waste wood volume contained in leftover wood incurred during production. In order to obtain the share of waste wood contained in wood leftovers, the total volume of input materials was divided by the waste wood input volume used in production. This can be explained by the fact that production leftovers represent a mixture of all input materials.
This gives rise to a waste wood share of around 33% in production leftovers.
The ensuing total was deducted from the overall product mass. The product mass reduced by the share of waste wood burned in production is then incinerated at the *End of Life*.

3.4 Cut-off criteria
All operating data was taken into consideration. Accordingly, material flows with a share of less than 1% were also balanced. It can therefore be assumed that the total processes ignored do not exceed 5% of the impact categories and the cut-off criteria are complied with in accordance with /EN 15804/.

3.5 Background data
All relevant background data sets were taken from the /GaBi 6/ (GABI 6 2013a) software data base and are not older than 10 years. The data used was obtained under consistent time- and method-based marginal conditions.

3.6 Data quality
Data on the products reviewed was captured directly at the production facility for fiscal 2010 on the basis of a questionnaire developed by the consulting firm PE International. The input and output data was made available by Egger and examined for plausibility with the result that good data representativity can be assumed.

3.7 Period under review
All primary data from the operational data survey by Egger for 2010 was taken into consideration, i.e. all of the output materials used for the formulation, energy requirements and all direct production waste were taken into consideration in the analysis. The actual transport distances and means of transport (L: truck, S: articulated truck, Z: rail) were applied for all inputs and outputs.

3.8 Allocation
Allocation of energy credits for electricity and thermal energy produced in the biomass power plant at the End-of-Life is on the basis of the input calorific value, whereby the efficiency of the plant is also considered. The credit for thermal energy is calculated on the basis of the "EU-27: Thermal energy from natural gas PE" data record; the credit for electricity is calculated from the "EU-27: Power mix PE".
The emissions dependent on input (e.g. CO2, HCl, SO2 or heavy metals) at the *End of Life* were

calculated in line with the content composition of the ranges used. Emissions dependent on technology (e.g. CO) are added in terms of waste gas volume.
Waste was also allocated to production in full.
The upstream chain for forestry was analysed as per Hasch 2002 in the Rüter and Albrecht update (2007). In the case of sawmill leftovers, the forestry process and associated transport are allocated to the wood in accordance with the volume share (or dry mass); no loads are allocated to sawmill leftovers as a result of the sawmill processes.

In order to distinguish the material flows from other products manufactured in the plant, a calculation key is applied in the manufacturer's Controlling Department. Accordingly, the respective input and output flows are allocated to the products by volume.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

4. LCA: Scenarios and additional technical information

The scenario includes a Eurodekor recycling rate of 100%, i.e. without scrap.
Once the product has reached *End-of-Waste* status, it is assumed that the product is routed to biomass incineration (EU-27 average) producing thermal energy and electricity. The ensuing impacts and credits are declared in Module D. It is assumed that the product has not been treated or maintained with chemicals during use with the result that biomass incineration is assumed to be suitable. It is assumed that the product can be utilised energetically after use with a calorific value of > 16.7 MJ/kg. By increasing the product moisture content during use, it is lower than the product's calorific value directly after production. As this study assumes incineration in a biomass power plant, R1>0.6 can be assumed as the efficiency of biomass plants is generally greater than 0.6.
Recycling the boards in a biomass power plant and the ensuing energy are allocated to Module D.
An *End-of-Life* scenario for the corresponding volume of waste wood was modelled in GaBi.

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement[1)]	Refurbishment[1)]	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling- potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m2 Eurodekor

Parameter	Unit	A1-A3	D
Global warming potential	[kg CO_2-Eq.]	-1.33E+1	5.94E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	9.68E-9	-4.10E-9
Acidification potential of land and water	[kg SO_2-Eq.]	2.36E-2	-6.75E-3
Eutrophication potential	[kg $(PO_4)^{3-}$- Eq.]	5.96E-3	8.58E-5
Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	4.26E-3	8.39E-4
Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	3.79E-6	-9.36E-7
Abiotic depletion potential for fossil resources	[MJ]	8.97E+1	-1.25E+2

RESULTS OF THE LCA - RESOURCE USE: 1 m2 Eurodekor

Parameter	Unit	A1-A3	D
Renewable primary energy as energy carrier	[MJ]	3.36E+1	-1.95E+1
Renewable primary energy resources as material utilization	[MJ]	1.09E+2	0.00E+0
Total use of renewable primary energy resources	[MJ]	1.43E+2	-1.95E+1
Non renewable primary energy as energy carrier	[MJ]	6.99E+1	-1.64E+2
Non renewable primary energy as material utilization	[MJ]	2.45E+1	0.00E+0
Total use of non renewable primary energy resources	[MJ]	9.44E+1	-1.64E+2
Use of secondary material	[kg]	4.41E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	4.37E+1	0.00E+0
Use of non renewable secondary fuels	[MJ]	2.19E-2	0.00E+0
Use of net fresh water	[m³]	3.20E-2	-3.74E-2

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m2 Eurodekor

Parameter	Unit	A1-A3	D
Hazardous waste disposed	[kg]	1.21E-1	-1.47E-2
Non hazardous waste disposed	[kg]	4.77E+0	1.12E-1
Radioactive waste disposed	[kg]	7.17E-2	-1.53E-2
Components for re-use	[kg]	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0

6. LCA: Interpretation

A comparison of impacts from Modules A1-A3 presents the following image:
Elementary and fossil abiotic depletion of resources, Ozone Depletion Potential, Acidification Potential and primary energy requirements result in credits for impact in Module D while loads arise in A1-A3.
The Global Warming Potential is primarily formed by the emissions incurred during thermal utilisation in Module D. Modules A1-A3 indicate a negative value for the Global Warming Potential on account of the CO2 stored in wood. 99% of the Eutrification Potential of Eurodekor is generated in Modules A1-A3 where Module D only accounts for a minor contribution. In terms of the POCP, Modules A1-A3 also represent the main contributors accounting for 83.5% of impact concerning Eurodekor while Module D is responsible for 16.5% and 19% of the POCP generated.

6.1 Water consumption

Water consumption for 1 m² EURODEKOR® is 3.25E-02 m³ in the product stage (A1-A3). In stage D, credits are offset amounting to -1.82E-02 m³.
Water consumption for the production of urea formaldehyde resin (UF) adhesives and processing waste wood accounts for more than 40% of water consumption during production. A high share is also used for chip processing (>16% of production).

6.2 Renewable and non-renewable primary energy

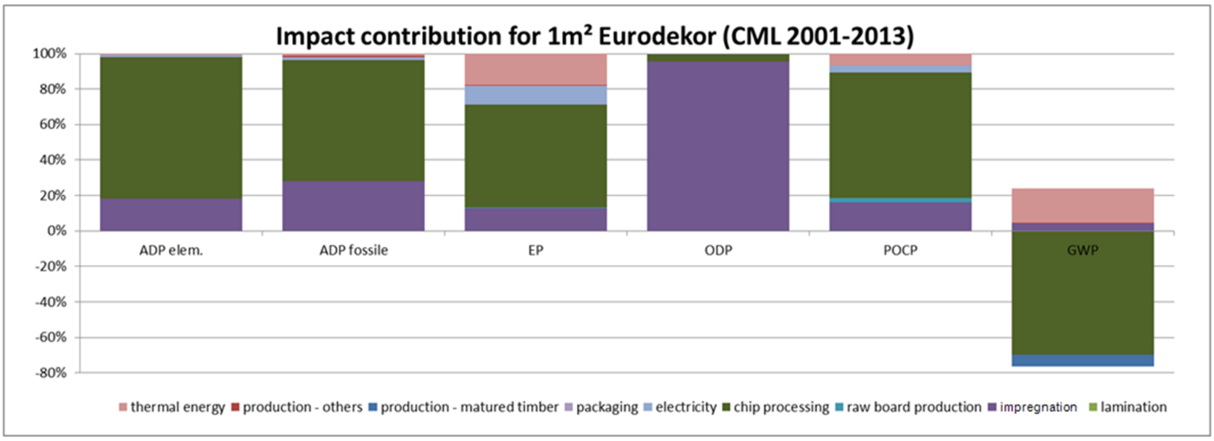
The raw materials and energy displaying the most non-renewable energy requirements are the urea formaldehyde resin (UF) adhesive system accounting for approx. 44% and melamine resin accounting for

20% of energy requirements by production. The main non-renewable consumer in terms of packaging materials is polyethylene foil. When considering the renewable primary energy requirements, approx. 58% concerns chips, 22% refers to wood logs and total electricity consumption accounts for 16%.
4.41 kg of waste wood (atro) are used for 1 m^2 Eurodekor. This was taken into consideration in calculating PERM and PERT. Waste wood is used for supplying production with thermal energy and electricity. This leads to a high percentage of renewable secondary energy used. The waste wood used in the production of thermal energy was not included in the PERT calculation.

At the *End of Life*, primarily credits are allocated for primary energy requirements. 17.5 MJ primary energy is used in incineration giving rise to electricity credits of 7081 MJ and thermal energy credits of 3401 MJ.

6.3 Waste

The largest share of waste produced is non-hazardous waste. Disposed of, radioactive waste is incurred in most cases by the utilisation of glue and energy in the upstream chains associated with preliminary products (electricity generation).



6.4 Global Warming Potential

The Global Warming Potential is dominated by carbon dioxide in manufacturing. The wood used means that CO_2 is bound in the renewable raw materials required for production.
Outside the system under review, all GWP-relevant emissions are incurred by incineration. Some of the global warming emissions are substituted by the credit. Chip processing represents the main contributor in terms of GWP. The negative balance in the global warming potential is incurred by the use of wood in chip processing.
At the *End of Life*, 15.5 kg CO_2 equivalent are generated through thermal utilisation of the Eurodekor boards (net flow). This figure is relativised by an electricity credit of 5.9 kg and a credit for thermal energy of 3.6 kg CO_2 equivalent. This gives rise to a GWP balance at the End of Life of 5.9 kg generated CO_2 equivalent.
A similar situation is depicted by the other impact categories with the exception of primary energy and ADP fossil.

6.5 Ozone Depletion Potential

The Ozone Depletion Potential is primarily incurred by impregnation by the adhesive system comprising urea formaldehyde resin (90%).
By substituting the energy utilised by Egger boards at the *End of Life*, the overall Ozone Depletion Potential is reduced. Organic emissions containing halogen are responsible for the ODP here.

6.6 Acidification Potential

The Acidification Potential of EURODEKOR® is primarily attributable to the use of the urea formaldehyde resin (UF) adhesive system in chip processing (30% of the total Acidification Potential during production). Another 21% arises during the production of thermal energy in the in-plant biomass power. Emissions are also incurred through the use of electricity, emulsion, chips and melamine resin. Sulphur dioxide, ammonia and nitric oxides make the largest contributions to the AP.

6.7 Eutrification Potential

The urea formaldehyde resin adhesive system accounts for approx. 40%, thermal energy during production accounts for 18% and electricity used during production contributes 10% to the EP.

6.8 Photochemical Ozone Creation Potential

The Photochemical Ozone Creation Potential is largely incurred by the adhesive system (accounting for 62% of the overall impact within the production phase (A1-A3)). NMVOCs (*non-methane volatile organic compounds*) and carbon monoxide emissions make the greatest contribution to the POCP.

6.9 Abiotic consumption of resources (fossil)

The ADPF (Abiotic Depletion Potential Fossil Fuels) is primarily incurred by the consumption of non-renewable fossil energy carriers such as natural gas, crude oil and pit coal. The main contributions are made by the production of UF adhesive (45%), wood chips (7%) and isocyanate (3%) during production of EURODEKOR®.
At the *End of Life*, primarily credits (electricity 67 MJ / thermal energy 59 MJ) are awarded for fossil ADP. A mere 0.257 MJ are used for incineration of Eurodekor.

6.10 Abiotic consumption of resources (elementary)

The ADPE (Abiotic Depletion Potential non-fossil resources) is primarily incurred by non-regenerative material resources such as salt and various metals. Adhesive production and isocyanate for chip processing represent the main contributors here.

7. Requisite evidence

7.1 Formaldehyde

Testing institute: WKI Fraunhofer Wilhelm-Klauditz-Institut
Testing, monitoring and certification site, Braunschweig, Germany
Test reports, date: QA-2013-0597 Melamine faced chipboard from 11.04.2013
Result: The formaldehyde content was examined using the gas analysis method in accordance with /EN 717-2/. The results are clearly below the limit value of 3.5 mg (average) and 2.5 (individual value).
Average result: 0.1 mg HCHO/m² h according to EN 717-2 for a board thickness of 18 mm (representative for thickness range 8-40 mm).

7.2 MDI (Methylene diphenyl diisocyanate)

Testing institute: Wessling Beratende Ingenieure GmbH, Germany
Test reports, date: IAL-08-0310 from 04.09.2008
Result: The boards to be tested with a total area of 1m² were placed in a 1000-litre test chamber with an air exchange of 1 h-1. The edges of the test samples were sealed using aluminium tape. The samples were taken 24 h after the chamber was loaded. The samples obtained were analysed for MDI emissions together with a blank value from the emission test chamber. Analysis of isocynates was carried out according to /BIA 7670/. After 2 hours, the emissions of MDI and other isocyanates in the test chamber were below the detection limit for the analysis method. The test method is identical to the test required in the PCR document according to /NIOSH P&CAM 142/.
As the formulation has not changed, these test reports remain valid.

7.3 Checking for pretreatment of the substances used

Testing institute: WKI Fraunhofer Wilhelm-Klauditz-Institut
Testing, monitoring and certification site, Braunschweig, Germany
Test reports, date: 2964/2008 from 27.08.2008
Result: The result of the test for pretreatment of the component materials provided the following results for the following analysis methods:
PCP (pentachlorophenol): 1 mg/kg (limit value 3 mg/kg)
Heavy metals: not detectable
PCB (polychlorinated biphenyls): not detectable
Total chlorine compounds: 140 mg/kg (limit value 600 mg/kg)
Total fluorine compounds: 12 mg/kg (limit value 100 mg/kg)
As the formulation has not changed, these test reports remain valid.

7.4 Toxicity of fire gases according to /EN 53436/

Testing institute: MFPA Leipzig GmbH, Division I – Construction Materials, Accredited testing laboratory, Gesellschaft für Materialforschung und Prüfungsanstalt für das Bauwesen Leipzig GmbH, Leipzig, Germany
Test reports, date: UB 1.1 / 08 – 162 – 2.1 Melamine faced chipboard from 15.08.2008
Result for melamine faced chipboard: The determination of toxic fire gases was performed according to /EN 4102 Part 1/ – Class A at 400 °C. The results show that after 30 minutes, 3,300 ppm of carbon monoxide was measured in the inhalation space. After 60 minutes, the following concentrations were found in the inhalation space: carbon monoxide 10,000 ppm (hence calculated >50% COHb), carbon dioxide 15,000 ppm, ammonia 1,500 ppm and hydrocarbons (styrene) 300 ppm. Hydrogen cyanide and hydrogen chloride were not detectable. The relative weight reduction at a test temperature of 400 °C was 48.4%. At the end of the test, dense white smoke was present in the inhalation space. As the formulation has not changed, these test reports remain valid.

7.5 VOC

Testing institute: WKI Fraunhofer Wilhelm-Klauditz-Institut
Testing, monitoring and certification site, Braunschweig, Germany
Test reports, date: MAIC-2013-1413 Melamine faced chipboard E1 from 22.05.2013
Test basis: /AgBB Scheme/
Test result after 28 days: The melamine faced chipboard product tested complies with the requirements of the /AgBB scheme/.

AgBB overview of results (28 days)

Name	Value	Unit
TVOC (C6 - C16)	22	µg/m³
Sum SVOC (C16 - C22)	0	µg/m³
R (dimensionless)	0.018	-
VOC without NIK	0	µg/m³
Carcinogenic Substances	0	µg/m³

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