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)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-EGG-20140003-IBD1-EN
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Valid to	07.06.2021

EUROSPAN® Raw 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 Holzwerkstoffe	EUROSPAN®
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 Tirol
Declaration number EPD-EGG-20140003-IBD1-EN	**Declared product / Declared unit** 1 m³ EUROSPAN® raw chipboard
This Declaration is based on the Product Category Rules: Wood based panels, 07.2014 (PCR tested and approved by the independent expert committee)	**Scope:** This document refers to EUROSPAN® raw chipboard manufactured in the following group of company plants: Fritz EGGER GmbH & Co. OG, Weiberndorf 20, 6380 St. Johann in Tyrol, Austria; Fritz EGGER GmbH & Co. OG, Tiroler Strasse 16, 3105 Unterradlberg, Austria. This document is translated from the German Environmental Product Declaration into English. It is based on the German original version EPD-EGG-20140003-IBD1-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.
Issue date 23.06.2014	
Valid to 07.06.2021	**Verification** The CEN Norm EN 15804 serves as the core PCR Independent verification of the declaration according to ISO 14025 ☐ internally ☒ externally
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	
Dr. Burkhart Lehmann (Managing Director IBU)	Manfred Russ (Independent tester appointed by SVA)

2. Product

2.1 Product description
EUROSPAN® raw chipboard is a board-shaped wood-based material according to EN 312. The board types are primarily divided based on their application as load-bearing or non-load-bearing elements in dry and humid areas:
P 1 General-purpose boards for use in dry conditions
P 2 Boards for interior fixtures (including furniture) for use in dry conditions
P 3 Boards for non-load-bearing applications in humid conditions
P 4 Boards for load-bearing applications in dry conditions
P 5 Boards for load-bearing applications in humid conditions
P 6 High-strength boards for load-bearing applications in dry conditions
P 7 High-strength boards for load-bearing applications in humid conditions (is not produced)

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

2.3 Technical Data

	Mechanical properties *Average board values*	Unit	Board thicknesses							
	Density	[kg/m^3]	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/mm^2]	0.31		0.28		0.24	0.2	0.17	0.14
P1	Bending strength /EN 310/	[N/mm^2]	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/mm^2]	0.45	0.45	0.4		0.35	0.3	0.25	0.2
P2	Bending strength /EN 310/	[N/mm^2]	13	12	11		11	10.5	9.5	8.5
P2	Bending elastic modulus /EN 310/	[N/mm^2]	1800	1950	1800		1600	1500	1350	1200
P2	Surface soundness /EN 311/	[N/mm^2]	0.8	0.8	0.8		0.8	0.8	0.8	0.8
P3	Transverse tensile strength /EN 319/	[N/mm^2]	0.5	0.5	0.45		0.45	0.4	0.35	0.3
P3	Bending strength /EN 310/	[N/mm^2]	13	14	15		14	12	11	9
P3	Bending elastic modulus /EN 310/	[N/mm^2]	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/mm^2]	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/mm^2]	0.45	0.45	0.4	0.4	0.35	0.3	0.25	0.2
P4	Bending strength /EN 310/	[N/mm^2]	15	16	16	16	15	13	11	9
P4	Bending elastic modulus /EN 310/	[N/mm^2]	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/mm^2]	0.5	0.45	0.45	0.45	0.45	0.4	0.35	0.3
P5	Bending strength /EN 310/	[N/mm^2]	18	19	18	18	16	14	12	10
P5	Bending elastic modulus /EN 310/	[N/mm^2]	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/mm^2]	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/mm^2]	18	20	20	20	18	16	15	14
P6	Bending elastic modulus /EN 310/	[N/mm^2]	2800	2900	3150	3150	3000	2550	2400	2200
P6	Transverse tensile strength /EN 319/	[N/mm^2]	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

Structural data

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	116	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* /EN 120/	E1[1], EPF-S[2], CARB[3], F**** [3]	
Deviation of density from average /EN 323/	±10.0	%
Thickness tolerance, sanded boards /EN 324/	±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 protection /EN 13986/ (raw density ≥ 600 kg/m^3 and thickness ≥ 9 mm)	D-s2, d0	

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

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, 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, Particleboard – Requirements; German version EN 312:2010 also applies.
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 to 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/m³ comprising (specified as mass %age per 1 m³ 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).

2.7 Manufacture

Production of the raw boards:

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

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

Egger chipboard 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 raw 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 stable and bonded firmly 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 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 (see section 7. Requisite evidence).

2.13 Reference service life

Durability under conditions of use is defined through the classes of application (P1-P7) (see section 2.1 Product definition).

2.14 Extraordinary effects

Fire
Raw chipboard displays the following reaction to fire in accordance with /EN 13501-1/: Change of phase (dripping by combustion / precipitation). Dripping by combustion is not possible as chipboard does not liquefy when hot.

Fire class

Name	Value
Building material class	D (normally flammable)
Burning droplets	d0 (non-dripping)
Smoke gas development	s2 (normal)

Water
No component materials 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- P6.

2.15 Re-use phase
Re-use / Further use: During remodelling or at the end of the utilisation phase of a building, Egger chipboard 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. 16.72 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
Egger chipboard 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, then they must be used for energy utilisation rather than being placed in the 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 manufacture of one cubic metre of EUROSPAN® board. The average raw density of raw boards is 660 kg/m³.

Name	Value	Unit
Declared unit	1	m^3
Conversion factor to 1 kg	0.0015	-
Density	660	kg/m³

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 for Module "D", the waste wood quantities for Egger raw chipboard are applied which are integrated in the system and thermally utilised in Modules A1-A3.
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 2013) 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 2013 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 raw board 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 > 16.72 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 m3 Rohspanplatte

Parameter	Unit	A1-A3	D
Global warming potential	[kg CO_2-Eq.]	-8.12E+2	3.38E+2
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.47E-8	-2.34E-7
Acidification potential of land and water	[kg SO_2-Eq.]	1.12E+0	-3.87E-1
Eutrophication potential	[kg $(PO_4)^{3-}$- Eq.]	2.80E-1	4.71E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	1.97E-1	4.77E-2
Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	1.72E-4	-5.34E-5
Abiotic depletion potential for fossil resources	[MJ]	3.61E+3	-7.16E+3

RESULTS OF THE LCA - RESOURCE USE: 1 m3 Rohspanplatte

Parameter	Unit	A1-A3	D
Renewable primary energy as energy carrier	[MJ]	1.45E+3	-1.11E+3
Renewable primary energy resources as material utilization	[MJ]	6.32E+3	0.00E+0
Total use of renewable primary energy resources	[MJ]	7.77E+3	-1.11E+3
Non renewable primary energy as energy carrier	[MJ]	2.68E+3	-9.35E+3
Non renewable primary energy as material utilization	[MJ]	1.10E+3	0.00E+0
Total use of non renewable primary energy resources	[MJ]	3.78E+3	-9.35E+3
Use of secondary material	[kg]	2.49E+2	0.00E+0
Use of renewable secondary fuels	[MJ]	1.93E+3	0.00E+0
Use of non renewable secondary fuels	[MJ]	9.17E-1	0.00E+0
Use of net fresh water	[m³]	1.53E+0	-2.13E+0

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m3 Rohspanplatte

Parameter	Unit	A1-A3	D
Hazardous waste disposed	[kg]	1.21E-1	-8.41E-1
Non hazardous waste disposed	[kg]	4.77E+0	6.39E+0
Radioactive waste disposed	[kg]	7.17E-2	-1.11E+0
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. This is the case for both products.
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. 98% of the Eutrification Potential of Eurospan 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 81% of impact concerning Eurospan while Module D is responsible for 19% of the POCP generated.

Chip processing represents the primary driver in almost all environmental impact categories. This is attributable to the fact that energy-intensive raw materials such as adhesive systems, for example, are primarily used here.

6.1 Water consumption

Water consumption for 1 m³ raw board is 1.54+00 m³ in the product stage (A1-A3). In stage D, credits are offset amounting to -1.08E+00 m³.
Water consumption by the raw chipboard is the result of water required during production (UF adhesive and waste wood) accounting for more than 50% of the total volume during production. A high share is also used for

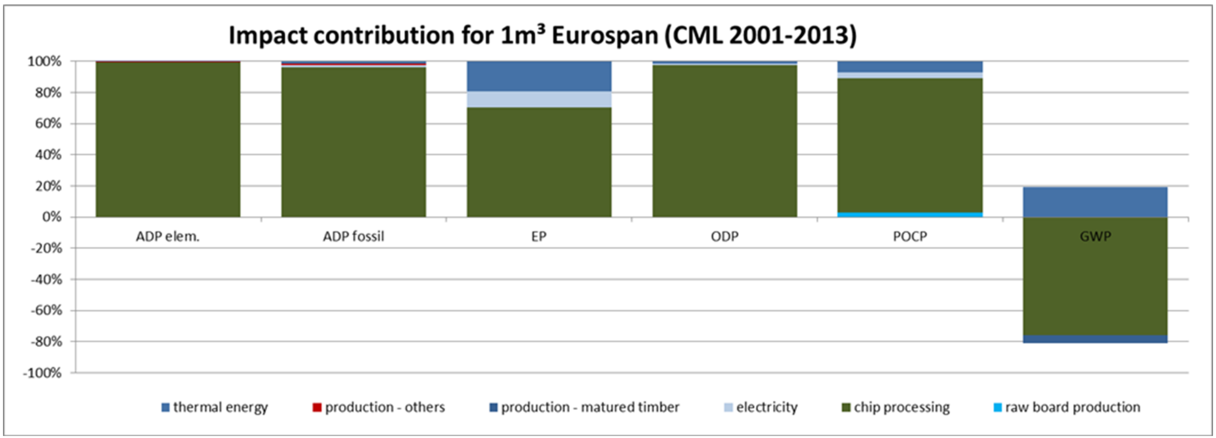
chip processing (>16% of production) and a significant percentage is credited outside the system.

6.2 Renewable and non-renewable primary energy

Non-renewable primary energy requirements in Eurospan are almost exclusively influenced by the use of UF adhesives (62%) in chip processing. When considering the renewable primary energy requirements, approx. 61% concerns chips, 22% refers to wood logs and electricity accounts for 14%.
Waste wood consumption (atro) in raw chipboard accounts for 249 kg. 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 carriers used. The waste wood used in the production of thermal energy was not included in the PERT calculation.
The non-renewable primary energy requirements are mainly characterised by the UF adhesive system accounting for approx. 44% and melamine resin accounting for 20% of total non-renewable primary energy requirements during production. The main driver in the packaging materials is polyethylene foil. When considering the renewable primary energy requirements, chips accounting for approx. 58%, wood logs (22%) and electricity consumption (16%) can be identified as the primary contributors.
17.5 MJ primary energy is used in incineration at the Eurospan *End-of-Life* phase, 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 disposed of, 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 CO2 is bound in the renewable raw materials required for production.
Outside the system under review, all GWP-relevant emissions (*Global Warming Potential*) are incurred by incineration. Some of the global warming emissions are substituted by the credit.
Chip processing represents the main contributor in terms of Global Warming Potential. The negative balance in the GWP is incurred by the use of wood in chip processing.
881 kg CO2 equiv. are emitted by Eurospan, whereby 336 kg are substituted in the form of electricity generated and 207 kg are substituted by the thermal energy generated.
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 the emulsion (38%) and UF adhesive system (27%) during overall production A1-A3 in EUROSPAN.
By substituting the energy utilised by EUROSPAN 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 by raw chipboard (EUROSPAN) is primarily incurred by the use of the UF adhesive system (35% of the overall total during production (A1-A3)) in the plant. Another 22% of the impact arises during the production of thermal energy in the in-plant biomass power plant and electricity consumption (11%). Sulphur dioxide, ammonia and nitric oxides make the largest contributions to the AP.

6.7 Eutrification Potential

By including the production of raw chipboard, the UF adhesive system contributes around 47%, thermal energy during production 19% and electricity consumption during production 10% to the EP.

6.8 Photochemical Ozone Creation Potential

The Photochemical Ozone Creation Potential is largely incurred by the UF adhesive system (accounting for 77% of the overall impact of within the production phase (A1-A3)). NMVOCs 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 UF (63%), wood chips (10%) and isocyanate (5%) during production.

At the *End of Life*, primarily credits (electricity 3821MJ / thermal energy 3349MJ) are awarded for fossil ADP. A mere 15 MJ are used for incineration of Eurospan.

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-2013-0599 Raw chipboard E1 from 11.04.2013
QA-2013-0597 Melamine faced chipboard from 11.04.2013
Result: The formaldehyde content test was performed according to the perforator method according to EN 120.
Limit value of 6.5 mg (half-year average) and 8.0 mg (individual value).
Result:
5.1 mg HCHO/100g according to /EN 120/ 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. The isocyanate analysis was performed 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 Testing pretreatment of 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:
Pentachlorophenol (PCP): 1 mg/kg (limit value 3 mg/kg)
Heavy metals: not detectable
Polychlorinated biphenyls (PCB): 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 Raw chipboard from 15.08.2008
Result for raw 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, 4000 ppm of carbon monoxide was measured in the inhalation space, while all other chemical compounds were not detectable within this timeframe. After 60 minutes, the following concentrations were found in the inhalation space: carbon monoxide 10,000 ppm (hence calculated >50% COHb), carbon dioxide 20,000 ppm, hydrogen cyanide 10 ppm and hydrocarbons (styrene) 400 ppm. Ammonia and hydrogen chloride were not detectable. The relative weight reduction at a test temperature of 400 °C was 59%. At the end of the test, dense white smoke was present in the inhalation space. The gaseous emissions released under the selected test conditions largely correspond to the emissions released from wood under the same test conditions.
As the formulation has not changed, these test reports remain valid.

7.5 Lindane / PCP

Testing institute: WKI Fraunhofer Wilhelm-Klauditz-Institut
Testing, monitoring and certification site, Braunschweig, Germany
Test reports, date: QA-2013-0898 Raw chipboard E1 EPF-S CARB from 07.05.2013
Result: The pentachlorophenol content was 0.3 mg/kg and the lindane content was below the detection limit with the result that both values comply with the requirements of the German chemicals prohibition ordinance.

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