ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	**Fritz EGGER GmbH & Co. OG**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-EGG-20150045-IBA1-EN
Issue date	30.07.2015
Valid to	29.07.2020

EURODEKOR MDF

Fritz EGGER GmbH & Co. OG

Institut Bauen und Umwelt e.V.

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

1. General Information

Fritz EGGER GmbH & Co.OG Holzwerkstoffe

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-EGG-20150045-IBA1-EN

This Declaration is based on the Product Category Rules:
Wood based panels, 07.2014
(PCR tested and approved by the SVR)

Issue date
30.07.2015

Valid to
29.07.2020

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr. Burkhart Lehmann
(Managing Director IBU)

EURODEKOR MDF coated MDF boards

Owner of the Declaration
Fritz EGGER GmbH & Co. OG Holzwerkstoffe
Company Headquarters
Weiberndorf 20
A-6380 St. Johann in Tyrol

Declared product / Declared unit
1 square metre medium density fibreboard coated

Scope:
This document relates to coated medium density EGGER MDF fibreboards (average), which are produced in the group's following plant:
Egger Holzwerkstoffe Wismar GmbH & Co. KG, Am Haffeld 1, 23970 Wismar, Germany
The production conditions in Wismar are representative for the other plants. They correspond to the technologies and standards used in all locations. This document is translated from the German Environmental Product Declaration into English. It is based on the German original version EPD-EGG-20150045-IBA1-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.

Verification

The CEN Norm /EN 15804/ serves as the core PCR
Independent verification of the declaration according to /ISO 14025/
☐ internally ☒ externally

Matthias Klingler
(Independent verifier appointed by SVR)

2. Product

2.1 Product description
EURODEKOR MDF boards are panel-shaped materials in accordance with /EN 622-5/ and /EN 14322/. These raw material boards are predominantly used as furniture boards. They are used, for example, as deep drawer fronts in the kitchen area. The decorative pattern is achieved by means of printed decor paper. A corresponding texture is applied to the surface in the course of the pressing.

2.2 Application
Coated MDF boards are used indoors for high quality purposes in furniture construction. Due to their homogeneous structure, MDF boards can be milled three-dimensionally and then painted or faced with a foil in a membrane press. Boards produced in this way can happily be used as fronts for high quality kitchens.

2.3 Technical Data
Technical data for EGGER MDF-ST E1CE

Structural engineering data

Name	Value	Unit
Bulk density 15-19mm according to DIN EN 197-1	670-730	kg/m^3
Weight per unit area 18mm	12.1-13.1	kg/m^2
Bending strength 12-19mm according to EN 310	> 25	N/mm^2
Bending elastic modulus 12-19mm according to EN 310	> 2700	N/mm^2
Material moisture when delivered according to EN 322	4-8	%
Dimension change on plate level	n.r.	mm
Tensile strength rectangular	n.r.	N/mm²
Surface soundness according to EN 311	> 1.0	N/mm^2
Impact resistance classification	n.r.	-
Joint opening	n.r.	mm
Height difference between elements	n.r.	mm
Thickness tolerance 12-19mm according to EN 324	± 0.2	mm
Thermal conductivity according to	0.10 - 0.14	W/(mK)

EN 13986 Tab. 11		
Water vapour diffusion resistance factor according to EN 12524	12-20	µ moist
Water vapour diffusion resistance factor according to EN 12524	20-30	µ dry
Sound absorption level according to EN 13986 Tab. 10 250 Hz to 500 Hz	0.1	
Sound absorption level 1000 Hz to 2000 Hz	0.2	
Room sound improvement	n.r.	Sone
Airborne sound insulation according to EN 13986	R = 13 x lg(mA) + 14	(mA = board weight per unit area kg/m2)

n.r. = not relevant

2.4 Placing on the market / Application rules

Regulation (EU) no. 305/2011/ dated 9 March 2011 applies to bringing the product into circulation in the EU/EFTA (with the exception of Switzerland). The products require a declaration of performance declaration taking into account /EN 13986:2004 wood-based materials for use in construction – properties, evaluation of conformity/ and /CE marking/. Relevant national regulations apply to the use of the products.

2.5 Delivery status

Standard sizes [mm]: 2,800 x 2,070
5,610 x 2,070
Thickness range [mm]: 8-38

2.6 Base materials / Ancillary materials

MDF boards with a thickness between 8 and 40 mm and an average density of 720 kg/m³ consisting of (information in weight % per 1 m³ of production):

- Wood chips, wood type mainly spruce and pine, approximately 82 %
- Water approx. 5-7 %
- UMF glue (melamine-urea-formaldehyde resin) approx. 11 %Paraffin wax emulsion <1 %
- Decor papers with a grammage of 60 - 120 g/m²

2.7 Manufacture

Production of the rawboards:
1. Peeling logs
2. Chipping the wood to produce chips
3. Cooking the chips
4. Defibration in the refiner
5. Drying the fibres to approximately 2-3 % residual moisture
6. Application of resin to the fibres
7. Spreading the glue-coated fibres onto a forming belt
8. Compression of the fibre mat in a continuously operating hot press
9. Cutting and trimming the fibre strand into rawboard formats
10. Cooling the rawboards in star coolers
11. Piling into large stacks
12. Sanding the upper and lower sides after the acclimatisation phase

Production of the impregnated papers:
1. Processing the base paper
2. Addition of impregnation resins (MUF) in the plant
3. Drying the impregnated paper in heated dryers
4. Formatting the endless paper by means of a cross-cutter
5. Stacking the formatted sheets on pallets

Manufacturing the coated MDF boards:
1. Laying the impregnated papers onto the upper and lower sides of the rawboard
2. Pressing the board in the hot press with differently textured press plates/belts.
3. Sorting by quality and stacking
4. Acclimatisation phase of up to 14 days

All waste generated in the course of production (trimming, cutting and milling waste) is used thermally with no exceptions.

2.8 Environment and health during manufacturing

Employee training on environmental and health aspects takes place on a regular basis. Emissions are kept well below the thresholds prescribed by law by means of the latest exhaust air treatment facilities. There is no impact on water or soil. Waste water from production and waste water from the exhaust air treatment process is treated internally and returned to production. Noise protection measurements show that all readings from inside and outside the production plant fall below German limit levels. Noise-intensive parts of the plant such as debarking and chipping are structurally enclosed. All waste streams are collected separately as far as possible and fed to a downstream recycling facility.

2.9 Product processing/Installation

EURODEKOR MDF boards can be sawed and drilled with regular (electrical) machines. Hard metal tipped tools are recommended, particularly in the case of circular saws. Wear a respiratory mask if using hand tools without a dust extraction device. In the course of processing and installing MDF boards, compliance with the safety regulations commonly applicable to processing is required (safety goggles, face mask in case of dust development). Observe all liability insurance association regulations for commercial processing operations.

2.10 Packaging

The stacked pallets are wrapped with cardboard and fixed in place with steel packaging straps. For the transport packaging of the EURODEKOR MDF boards from the factory, underlays and cover panels (made of chipboards or MDF boards), polyethylene film, Euro pallets, corrugated cardboard and paper are used. Underlays, cover panels and pallets can be reused; PE film, corrugated cardboard and paper are recyclable.

2.11 Condition of use

The component materials comply in terms of their proportions to those of the basic material composition described in no. 2.6. In the course of pressing, the aminoplast resin (UMF) is cross-linked in three dimensions by a polycondensation reaction under the addition of heat. The bonding agents are chemically stable and mechanically bonded to the wood under normal conditions.

2.12 Environment and health during use

Environmental protection: When the described products are used properly in accordance with the area of application, there is no risk of water, air or ground contamination according to the current state of knowledge.

Health aspects: There are no known health hazards or effects to be expected from normal use, i.e. in accordance with the intended uses of EURODEKOR MDF boards. Natural wood constituents may be released in small quantities. With the exception of minor amounts of formaldehyde in quantities that are harmless to health, no emissions of hazardous substances can be detected (evidence see Section 7.1).

2.13 Reference service life

No reference service life is specified, as the service life depends on the application area.

2.14 Extraordinary effects

Fire

From a thickness of 9mm and a bulk density of > 600kg/m3, EURODEKOR MDF complies with fire classification D as per /EN 13501/ and falls into the categories S2 (normally smoky) and d0 (non-dripping). EURODEKOR MDF boards do not melt when exposed to heat; burning droplets are not possible. For increased fire protection requirements there is EURODEKOR MDF Flammex (B-s1, d0).

Fire protection EGGER MDF / MDF Flammex

Name	Value
Building material class	D/B
Burning droplets	s2/s1
Smoke gas development	d0/d0

Water

No water-polluting substances are washed out. EURODEKOR MDF boards are not resistant to the long-term effects of water (change to the mechanical properties from swelling of the fibres), yet damaged areas can be replaced at a local level.

Mechanical destruction

The fracture pattern of a EURODEKOR MDF board shows relatively brittle behaviour, with the possibility of sharp edges where the boards break (risk of injury).

2.15 Re-use phase

If selectively removed after renovation or end of use in a building, EURODEKOR MDF boards can be simply collected separately and reused for the same purpose. MDF boards can also be used for purposes other than the original application. Exceptions to this are boards that have been bonded over their surface.

2.16 Disposal

Residual material, trimmings and packaging materials produced on the construction site must be sorted by waste classes and collected. They should be taken first and foremost for material recycling. If this is not possible, due to the high calorific value of 18.5 MJ/kg (atro), energy recovery at a landfill site is to be favoured. When disposing of the material, the provisions of the local wast disposal authorities are to be taken into account. Waste code according to /European waste catalogue/: 170201/030105. If not mixed with other materials, EGGER MDF boards can be processed and returned to the manufacturing of wood-based materials.

2.17 Further information

www.egger.com

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the manufacturing of 1 m² of coated MDF board with an average thickness of 11.7 mm and a weight per unit area of 12.7 kg/m².

Specification of the declared unit

Name	Value	Unit
Declared unit	1	m^2
Common reference coated coated	12.7	kg/m²
Conversion factor to 1 kg	787	-

3.2 System boundary

This is a "from cradle to factory gate, with options" EPD. The life cycle analysis for the product under consideration encompasses the following segments of the life cycle: “Product stage” and “Credits and debits beyond the limits of the product system”. The systems therefore encompass the following stages according to /EN 15804/: Product stage (module A1-A3):

- A1 Procurement and processing of raw materials as well as processing of secondary raw materials serving as inputs
- A2 Transportation to the manufacturer
- A3 Production

Credits and debits beyond the limits of the product system (module D):

- D Reuse, recovery or recycling potential

3.3 Estimates and assumptions

The hydrophobic treatment used in the fibre preparation is estimated as an oil/water mixture (60 % oil, 40 % water). The environmental inventory of sheet steel (HDG) is used as an approximation for the grinding discs. The composition of the sanding belts is estimated with cardboard, sand, resin and cotton materials. The toluenesulphonamide used in the resin production is estimated with the GaBi dataset for sulphonamide (DE).
The estimations listed represent estimations as close to reality as possible, from which a slight effect on the overall result is to be expected.
It is assumed that the product can be reused for energy recovery. Given that the MDF boards can be expected to be reused in the EU area, the assumption of the substitution of thermal energy and electricity in accordance with EU-27 Mix corresponds to realistic conditions.

3.4 Cut-off criteria

All data from the operational data acquisition has been taken into account. Therefore, material flows with a proportion of less than 1 percent were also included in the assessment. It can therefore be assumed that the sum of disregarded processes does not exceed 5 % of

the impact categories and cut-off criteria according to /EN 15804/ are fulfilled.

3.5 Background data

All relevant background datasets were taken from the database of the /GaBi 6/ software (GABI 6 2013), which is not older than 10 years. The data used have been collected subject to consistent time and methodology constraints.

3.6 Data quality

For the products under review, the data were collected directly at the production site for the 2010 business year based on a questionnaire prepared by PE International, the consulting company. The input and output data were provided by EGGER and reviewed for plausibility. It can therefore be assumed that the data are highly representative.

3.7 Period under review

All primary data from the 2010 EGGER operational data collection were taken into account, i.e., all starting materials used in the composition, the energy needs, and all direct production waste were included in the assessment. Actual transport distances and transport means were applied for inputs and outputs.

3.8 Allocation

Energy credits for the electricity and thermal energy produced in the biomass power plant at the *end of the life* cycle are allocated according to the calorific value of the inputs and based on the efficiency of the plant. The credit for thermal energy is calculated based on the dataset "EU27: Thermal energy from natural gas PE"; the credit for the electricity from the data set "EU27: ElectricityMix PE". The calculation of the emissions dependent on the input (e.g. CO2, HCl, SO2 or heavy metals) at the *end of life* was performed according to the material composition of the introduced ranges. The technology-dependent emissions (e.g. CO) are allocated according to the exhaust emission quantity. Waste materials were also added in the total of the production. The upstream chain for harvesting was recorded according to /Hasch 2002/ in the update by Rüter and Albrecht (2007). As regards residual sawmill wood, the forestry process and associated transport are added to wood according to volume proportion (respectively dry mass), from the sawmill processes no encumbrances are added to residual sawmill wood. A calculation key is applied in the manufacturer's controlling in order to mark off material flows from other products manufactured in the plant. The respective input and output flows are attributed to the products by mass.
The net flows are computed by subtracting from the total product mass (12.7 kg/m²) the mass that could theoretically be used in A1-A3 as waste wood for energy supply. In the case of MDF boards, this results in a total of 8 kg atro (absolute dry) waste wood during the production phase. This mass may theoretically be recycled in module A1-A3 at the end of the board service life. Therefore, only the calculated net flow of 5 kg achieves module D.

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 *end of life* cycle assumes the thermal use of MDF boards as secondary fuel, given that wood-based materials reach the end of the waste status after removal from the building. The thermal recovery is modelled on a 100% processing rate of MDF boards. This scenario represents an assumption. When using the data set in the context of the building, it is necessary to assume a realistic processing rate. In the *end of life* case, the MDF boards are burned in a biomass power plant which corresponds to the EU average. Therefore, emission factors, current decoupling, and efficiency are adapted to the EU average.

Reuse, recuperation and recycling potential (D), relevant scenarios

Name	Value	Unit
Moisture during thermal reuse	12	%
Net flow in module D (moisture 12 %)	5	kg
Calorific value, wood (assumed equilibrium moisture of 12 %)	16	MJ/kg

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 BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	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	MND	MND	MND	MND	MND	MND	MND	X	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² MDF board coated

Parameter	Unit	A1-A3	C3	D
Global warming potential	[kg CO_2-Eq.]	-8.10E+0	1.46E+1	-1.13E+1
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.22E-8	IND	-1.94E-9
Acidification potential of land and water	[kg SO_2-Eq.]	3.18E-2	IND	-2.52E-3
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	1.22E-2	IND	9.84E-5
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	8.86E-3	IND	4.49E-4
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	5.62E-6	IND	-4.44E-7
Abiotic depletion potential for fossil resources	[MJ]	1.91E+2	IND	-5.94E+1

RESULTS OF THE LCA - RESOURCE USE: 1 m² MDF board coated

Parameter	Unit	A1-A3	C3	D
Renewable primary energy as energy carrier	[MJ]	1.48E+2	IND	IND
Renewable primary energy resources as material utilization	[MJ]	2.02E+2	IND	IND
Total use of renewable primary energy resources	[MJ]	3.51E+2	IND	-9.22E+0
Non-renewable primary energy as energy carrier	[MJ]	1.67E+2	IND	IND
Non-renewable primary energy as material utilization	[MJ]	3.42E+1	IND	IND
Total use of non-renewable primary energy resources	[MJ]	2.01E+2	IND	-7.77E+1
Use of secondary material	[kg]	4.72E-3	IND	-4.33E-4
Use of renewable secondary fuels	[MJ]	1.56E+2	IND	2.02E+2
Use of non-renewable secondary fuels	[MJ]	0.00E+0	IND	3.42E+1
Use of net fresh water	[m³]	4.28E-2	IND	-1.77E-2

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² MDF board coated

Parameter	Unit	A1-A3	C3	D
Hazardous waste disposed	[kg]	6.18E-3	IND	-6.99E-3
Non-hazardous waste disposed	[kg]	1.93E-1	IND	5.31E-2
Radioactive waste disposed	[kg]	3.93E-3	IND	-7.27E-3
Components for re-use	[kg]	0.00E+0	IND	IND
Materials for recycling	[kg]	0.00E+0	IND	IND
Materials for energy recovery	[kg]	IND	7.88E+0	IND
Exported electrical energy	[MJ]	IND	IND	IND
Exported thermal energy	[MJ]	IND	IND	IND

6. LCA: Interpretation

The sum results of modules A1-A3 from the current study tend to be lower than the sum of 2011. This is due to

1. Energy efficiency measures by Egger
2. Updated data in the background data database
3. Adaptation to /EN 15804/ compatibility
4. Updated foreground data

The following interpretation includes a summary of the LCA results relative to a functional unit of 1m³ coated MDF board.

During the production of coated MDF boards, a large proportion of the environmental impact and the use of primary energy is caused by the upstream chain, i.e. the production of the base materials. In this case, the raw materials used in fibre preparation represent a dominant factor.
When comparing the different process steps, fibre preparation is responsible for the majority of the effects incurred (80 %). Furthermore, contrary to the uncoated boards, a significant influence from the impregnation process (10-18 % of the effects of the ADP, EP, AP, PE categories looked at) can be observed. The impregnation is pressed onto the uncoated boards during the coating process. The upstream chains for the resins used for impregnation are mainly responsible for the environment effect caused.

The ozone depletion potential (ODP) of the coated boards is almost entirely due to the impregnation used for the coating process (98 %). A urea and formaldehyde-based adhesive system is used for

impregnation. The major influence on the ozone depletion potential arises in the upstream chains of the adhesive system.

The effect on summer smog (POCP) incurred during the impregnation process and the primary energy used play a subordinate role compared to the fibre preparation process.

7. Requisite evidence

7.1 Formaldehyde

Measurement authority: WKI Fraunhofer Wilhelm-Klauditz-Institute, testing and certification facility, Braunschweig, D
Test report: No. QA-2014-2373; EURODEKOR MDF E1 CE 12mm (representative for thickness range up to 40mm)
Date: 04 November 2014
Method: Gas analyisis method according to /EN 717-2/
Results: 0.1 mg formaldehyde / (h * m2) (threshold: 3.5mg

7.2 MDI

No MDI is used in the gluing system of EGGER MDF, no evidence is necessary.

7.3 Testing for pre-treatment of the applied materials

As EURODEKOR MDF does not contain any post consumer recycling wood, this evidence is not necessary.

7.4 Toxicity of the fire gases

Measurement authority: epa Energie- und Prozesstechnik Aachen GmbH, Aachen, Germany
Test report: No. 14/2014, EGGER MDF/HDF melamine-coated
Date: 25 June 2014
Method: Testing the toxic fire gases according to /DIN 4102 Part 1/ - Category A at 400°C
Results: Under the selected test conditions, it was not possible to establish any chlorine compounds (HCl detection limit 1 ppm) or any sulphur compounds (SO2 detection limit 2 ppm). The hydrocyanic acid concentration (HCN detection limit 2 ppm) corresponds to the concentration as emitted by wood under the same conditions. The gaseous contents released under the selected test conditions correspond largely to the emissions released by wood under the same conditions.

7.5 VOC emissions

Unspecified as optional with shortened validity of EPD.

7.6 PCP/Lindane

Measurement authority: WKI Fraunhofer Wilhelm-Klauditz-Institute, testing and certification facility, Braunschweig, D
Test report: No. QA-2014-1265; EURODEKOR MDF E1 CE uncoated 18mm (representative for thickness range >8<20mm)
Date: 12 June, 2014
Method: Gas chromotagraph with MS or ECD detection (EPH Dresden)
Results: The specimen contains no PCP and no lindane (detection limit 0.05 mg/kg).

8. References

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EN 324
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EN 717-2
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Publisher
Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@bau-umwelt.com
Web **www.bau-umwelt.com**

Programme holder
Institut Bauen und Umwelt e.V.
Panoramastr 1
10178 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@bau-umwelt.com
Web **www.bau-umwelt.com**

Author of the Life Cycle Assessment
PE International
Hütteldorferstr 63-65
A1150 Wien
Austria

Tel +43 (0) 1/ 8907820
Fax +43 (0) 1/ 890782010
Mail t.daxner@pe-international.com
Web **www.pe-international.com**

Owner of the Declaration
Fritz EGGER GmbH & Co.OG
Weiberndorf 20
A-6380 St. Johann in Tirol
Austria

Tel +43 (0) 50 600-0
Fax +43 (0) 50 600-10111
Mail info-sjo@egger.com
Web **http://www.egger.com**