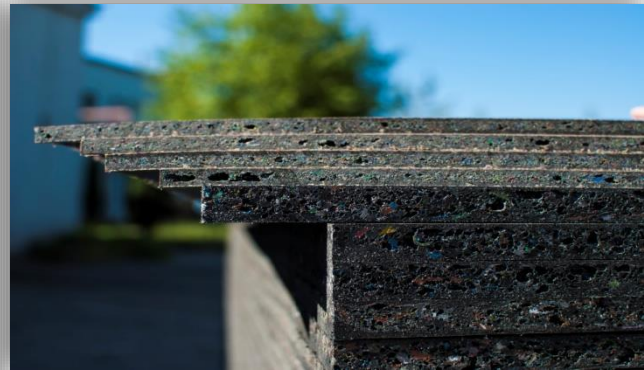


EKOply board made in recycling technology



Issuance date: 09.02.2017
Validity date: 09.02.2022

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Basic information

This declaration is the type III Environmental Product Declaration (ITB-EPD No 059/2017) based on EN 15804 and verified according to EN ISO 14025:2010 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (see point 5.3 of the standard).

Life cycle analysis (LCA): A1-A3 modules in accordance with EN 15804 (Cradle to Gate)

The year of preparing the EPD: 2017

Declared durability: Under normal conditions, a board made of recycled polymer has reference service life (RSL) up to last 10 years

Product standard: EN 15860 - Plastics. Thermoplastic semi-finished products for machining.

Requirements and test methods, EN ISO 9054:2001 - Cellular plastics, rigid - Test methods for self-skinned, high-density materials

PCR: PCR A (PCR based on EN 15804)

Declared unit: tonne of produced board

Reasons for performing LCA: B2B

Representativeness: Polish product

Manufacturer and Product Information

PLASTINVEST Sp. z o.o. produces EKOpoly board which nearly consists of 99% of recycled material. EKOpoly board covers different building applications including: insulation of pitched roof, agriculture, small architecture, shoring, roof and floor covering. EKOpoly sheets can be used as:

- alternative to plywood - they are durable, lighter than standard plywood, resistant to weather conditions,
- furniture surfaces, such as table tops, alternative to MDF or plywood,
- floors, for example in trucks as protection for a metal floor and noise reduction,
- small architecture in the gardens: houses, fences, kennels, simple furniture and toolboxes,
- security applications: protection against wind and rain, on construction sites, concerts, festivals and other events.



All EKOpoly sheets are resistant to moisture and water as well as to most substances and chemicals on the market. They have increased resistance to UV radiation. EKOpoly sheets are used in the construction industry, furniture, agriculture, outside and inside buildings. All products are available in five different colours: blue, green, earth brown, white fleck and standard grey.

The polymer EKOpoly sheet made in the technology of thermal bonding and forming substances apart from binder, totally obtained from recycling (polyethylene and polypropylene) as unified with distinctly isolated outer layers (skin) and the inner layer (core). Example of EKOpoly STANDARD ANTI-SLIP 19 is shown in Fig. 1.

Sheet's weight with 2440 mm x 1220 mm dimensions and 19 mm thickness is about 33kg. Specification of the product is shown in Table 1.

Table 1. Specification of EKOpoly board produced by PLASTINVEST Sp. z o.o.

EKOpoly: colour, anti-slip	
Thickness [mm]	10, 19, 21
Dimensions [mm]	2440 x 1220
Weight [kg]	33
Colour	blue, green, earth brown, grey, white



Fig. 1. EKOpoly STANDARD ANTI-SLIP 19 produced in Suchedniów factory (Poland)

The EKOpoly board does not contain dangerous substances according to REACH (1907/2006)

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Allocation

The allocation rules used for this EPD are based on general ITB-PCR A. The EKOpoly board production is a line process with multiple raw materials in one factory in Suchedniów. Allocation was done on product mass basis.

All impacts from raw materials extraction are allocated in A1 module of EPD. Base materials as polypropylene and polyethylene comes from recycling process. 100% of impacts from line production were inventoried and allocated to all EKOpoly board types production. Municipal waste and waste water of whole factory were allocated to module A3. Energy supply was inventoried for whole production process. Emissions in Plastinvest are not measured, because this type of production is not obliged to measure these indicators, hence emission impacts come from energy carrier characterization factors, and are presented in A3 module.

System limits

The life cycle analysis of the examined products covers “Product Stage”, A1-A3 modules (Cradle to Gate) in accordance with EN 15804+A1 and ITB-PCR A. The details of systems limits are provided in product technical report. All materials and energy consumption inventoried in factory were included in calculation. Office impacts were also taken into consideration. In the assessment, all significant parameters from gathered production data are considered, i.e. all material used per formulation, utilised thermal energy, internal fuel and electric power consumption, direct production waste.. It can be assumed that the total sum of omitted processes does not exceed 1% of all impact categories. In accordance with EN 15804, machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

A1 and A2 Modules: Raw materials supply and transport

Raw materials for EKOpoly board production come from local suppliers and more distant locations. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Means of transport include trucks and Polish and European fuel averages are applied.

A3: Production

The Fig. 2 shows the working process during the production of EKOpoly board. The raw materials (polyethylene, polypropylene) are mixed with BA (baking powder) pigments and processed for homogenisation. Recycled content in EKOpoly board production is 98,8% calculated on the mass basis. The raw materials are thermally bonded in matrix at high

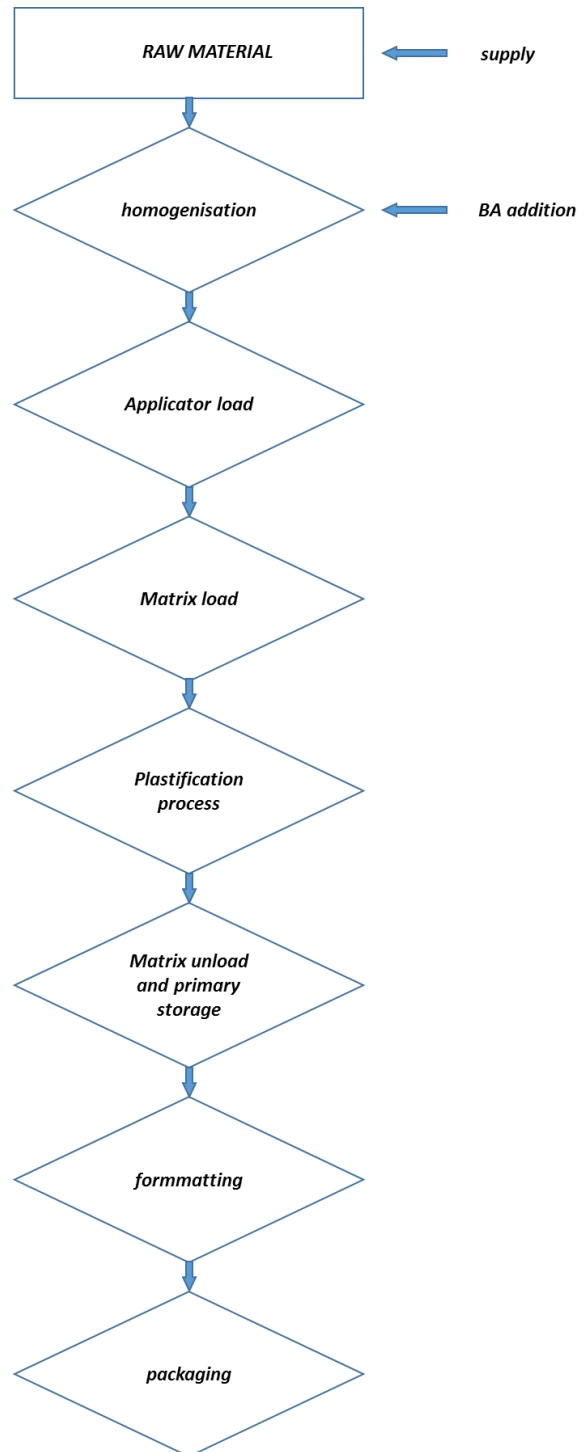


Fig. 2. EKOpoly board production scheme in Suchedniów factory (Poland)

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temperature, typically 200°C. Ready boards are cut into desired format and packed for shipping. The off-cuts from cutting process are recycled and after shredding recirculated in the process.

Data collection period

The data for manufacture of the examined products refer to period between 1.01.2016-31.12.2016. The life cycle assessments were prepared for Poland as reference area.

Data quality

The values determined to calculate the LCA originate from verified Plastinvest Sp. z o.o. inventory data.

Assumptions and estimates

The impacts of the representative EKOpoly products were aggregated using weighted average. Impacts were inventoried and calculated for all products in EKOpoly product group. Specific assumption was made for PP and PE delivered to the factory. Although they are recycled, they needed to be shredded, so estimated impacts were added to module A1.

Calculation rules

LCA was done in accordance with PCR A document.

Databases

The data for the processes come from the following databases: Ecoinvent, Ullmann's, ITB-Data. Specific data quality analysis was a part of external ISO 14001 audit. Characterization factors are CML ver. 4.2 based on EN 15804:2013+A1 version. (PN EN 15804+A1:2014-04)

LIFE CYCLE ASSESSMENT (LCA) - Results

Declared unit

The declaration refers to functional unit (FU) - 1 tone of EKOpoly board

Table 2. System boundaries for environmental characteristic for EKOpoly board

Environmental assessment information (MNA – Module not assessed, MD – Module Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life			Benefits and loads beyond the system boundary	
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
MD	MD	MD	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

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Environmental impacts: (FU) 1 tone					
Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	[kg CO ₂ eq.] (100 years)	43,04	41,36	394,26	478,67
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,34E-06	0,00E+00	0,00E+00	1,34E-06
Acidification potential of soil and water	[kg SO ₂ eq.]	1,59E-01	2,12E-01	1,09E+00	1,46E+00
Formation potential of tropospheric ozone	[kg Ethene eq.]	2,13E-02	1,90E-02	0,00E+00	4,02E-02
Eutrophication potential	[kg (PO ₄) ³⁻ eq.]	2,40E-02	3,71E-02	6,46E-02	1,26E-01
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	3,55E-01	0,00E+00	1,46E-03	3,57E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	375,87	1117,48	1526,58	3019,93
Environmental aspects on resource use: (FU) 1 tone					
Indicator	Unit				
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	278,89	78,22	289,00	278,89
Use of renewable primary energy resources used as raw materials	[MJ]	0,00	0,00	0,00	0,00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	278,89	78,22	289,00	278,89
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	460,20	0,00	1869,10	460,20
Use of secondary material	[kg]	0,00	0,00	988,00	0,00
Use of renewable secondary fuels	[MJ]	0,00	0,00	0,00	0,00
Use of non-renewable secondary fuels	[MJ]	0,00	0,00	0,00	0,00
Net use of fresh water	[dm ³]	0,61	0,04	0,11	0,61
Other environmental information describing waste categories: (FU) 1 tone					
Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	[kg]	3,74E-05	INA	9,88E-02	9,89E-02
Non-hazardous waste disposed	[kg]	36,20	INA	113,04	149,25
Radioactive waste disposed	[kg]	INA	INA	INA	INA
Components for re-use	[kg]	INA	INA	INA	INA
Materials for recycling	[kg]	5,64	INA	2,45	8,09
Materials for energy recover	[kg]	INA	INA	INA	INA
Exported energy	[MJ per energy carrier]	INA	INA	INA	INA

Verification

The process of verification of this EPD is in accordance with EN ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 & 8.3.1. <input checked="" type="checkbox"/> external <input type="checkbox"/> internal
Verification in compliance with Verification Form with requirements of ECO PLATFORM: Ph.D.Eng Halina Prejzner LCA, LCI audit and input data verification: M.Sc. Eng. Dominik Bekierski, d.bekierski@itb.pl Verification of LCA: PhD Eng. Michał Piasecki, m.piasecki@itb.pl

Normative references

- ITB PCR A- General Product Category Rules for Construction Products
- EN 15860 - Plastics. Thermoplastic semi-finished products for machining. Requirements and test methods,
- EN ISO 9054:2001 - Cellular plastics, rigid - Test methods for self-skinned, high-density materials
- ISO 14025:2006, Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures
- ISO 21930:2017, Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services
- ISO 14044:2006, Environmental management -- Life cycle assessment -- Requirements and guidelines
- ISO 15686-1:2011, Buildings and constructed assets -- Service life planning -- Part 1: General principles and framework
- ISO 15686-8:2008, Buildings and constructed assets -- Service-life planning -- Part 8: Reference service life and service-life estimation
- EN 15804:2012+A1:2013, Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.
- EN15942:2011, Sustainability of construction works. Environmental product declarations. Communication format business-to-business



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