Type III Environmental Product Declaration No. 445/2023

Issuance date: 21.04.2023
Validity date: 21.04.2028

MMF Floor Coverings

Owner of the EPD:

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ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1-A5, C1-C4 and D modules in accordance with EN 15804
(Cradle-to-Gate with options)
The year of preparing the EPD: 2022
Product standard: EN 16511
Service Life: 30 years
PCR: ITB-PCR A
Declared unit: 1 m^2
Reasons for performing LCA: B2B
Representativeness: Poland, European, 2021

MANUFACTURER

The manufacturing plant in Jasło (Poland) is one of 12 Kronospan plants in the world producing floors and one producing floors in SPC technology.

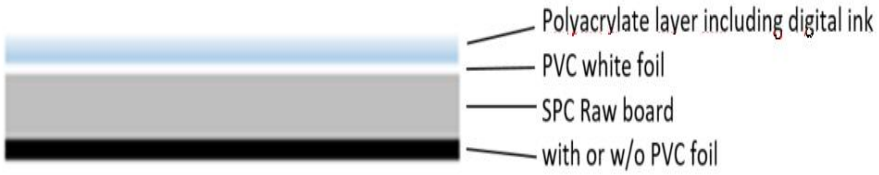
The plant specializes in the production of floors and wall coverings in the SPC technology - the latest in the field of vinyl floors.

The floors are characterized by dimensional stability, excellent design and appearance, thanks to the unique production technology.

The plant started operating in 2018.

The MMF Floor Coverings covered by this environmental declaration is a very flexible and dimensionally stable product, which was obtained by using over 50% calcium carbonate and the addition of PVC for its production. The SPC compound contains also recycled material.

PRODUCT DESCRIPTION



The European Standard EN 16511 defines multilayer modular floor coverings (MMF) as: “floor panel: semi-rigid decorative floor covering (…) – typically in a plank or tile format – having a multiple layer product structure consisting of a wear-resistant top layer, a decorative surface layer, a substrate and usually a backer, the planks/tiles having worked edges that allow the product to be joined together to form a larger integral unit.” The „Multilayer Modular Floor Coverings“ (MMF) comprises: semi-rigid, decorative floor covering having a multiple layer product structure, in tile format, consisting of a wear-resistant top layer, a decorative surface layer, a substrate and usually a backer, tiles having worked edges that allow the product to be joined together to form a larger integral unit, installed in so-called ‘floating floor fitting’ using a click connection (thus glue-free). The waterproof flooring represents the latest generation of SPC (Stone Plastic Composite), for use in domestic and commercial areas. The core of MMF Flooring (Table 1-2) is made with over 70% of marble, PVC (20%), finished with a decorative layer and covered with high-quality UV varnish. All technical information can be found at manufacturer site.

Table 1. Product types covered by EPD

Product type	Dimensions	Surface density
SPC/MMF flooring Imitation: Stone, Wood Colour: light, medium, dark	600 x 295 x 5 mm 1210 x 234 x 5 mm 1210 x 192 x 5 mm 1210 x 295 x 5 mm 1280 x 295 x 4 mm 1280 x 192 x 4 mm	~ 8,0 – 9,0 kg/m^2

Classification of reaction to fire in accordance with EN 135101-1:2018. Density is 1900 – 2100 kg/m^3

Table 2. MMF Floor Covering - technical information

DIMENSIONS				
dimensions	thickness	4,0 mm · tmax tmin ≤ 0,50 mm		
	length	1280 mm · lmax lmin ≤ 0,50 mm		
	width	192 295 ± 0,10 mm · wmax wmin ≤ 0,20 mm		
profile	long side	1clic 2go pure	short side	1clic 2go pure
groove	long side		short side	

TOLERANCE			
squareness	EN 16511	≤ 0,20 mm	
straightness	EN 16511	≤ 0,30 mm / m	
flatness crosswise	EN 16511	concave: ≤ 0,15% · convex: ≤ 0,20%	
flatness lengthwise	EN 16511	concave: ≤ 0,50% · convex: ≤ 1,00%	
openings between elements	EN 16511	average: ≤ 0,15 mm · max: ≤ 0,20 mm	
height difference between elements	EN 16511	average: ≤ 0,10 mm · max: ≤ 0,15 mm	
TEST			
abrasion resistance method B	EN 16511	≥ 3000 cycles	
impact resistance	EN 16511	≥ 1200 mm	
micro scratch resistance	EN 16511	≤ MSR A3	
stain resistance group 1 & 2	EN 16511	grade 5	
stain resistance group 3		grade 4	
castor chair test	EN 16511	no change in appearance after 25.000 cycles	
effect of furniture leg	EN 16511	no visible damage	
thickness swelling	EN 16511	no swelling	
residual indentation	EN 16511	≤ 0,20 mm	
light fastness	EN 20105-B02	blue wool scale	6
	EN 20105-A02	grey scale	≥ 4
locking strength	EN 16511	long side	≥ 1,0 kN/m
		short side	≥ 1,5 kN/m
dimensional stability	EN 16511	≤ 0,25 %	
ENVIRONMENT			
emission of formaldehyde	EN 717-1	class E1, formaldehyde free, no emission	
PHYSICAL BEHAVIOR			
fire behaviour	EN 13501-1	Bfl s1	
slide resistance	EN 13893	DS	
walking noise reduction	IHD-W-431	41%	
impact sound reduction	EN ISO 10140-3	5 dB	

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declaration refers to 1 m^2 of MMF Floor Covering product (5 mm, 8.5 kg/m^2).

System boundary

Type of the EPD is: cradle to gate - with options. The following life cycle stages were considered. Production stage including: A1 – Raw material extraction and processing, A2 – Transport to the manufacturer and A3 – Manufacturing, A4 – transport to the construction site. End-of-life stage: C1-Deconstruction, C2 – Transport to waste processing, C3 – Waste processing, C4 – Disposal (landfill). This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues. EPD includes D module- declaration of all benefits and loads beyond product system. Energy and water consumption, emissions as well as information on generated wastes were inventoried. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804+A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Allocation

The allocation rules used for this EPD are based on general ITB's document PCR A (EN 15804+A2). The total average recipe per declared unit is used. Mass allocation was used.

System limits

All raw materials submitted for the formulations and production data were taken into consideration. In the assessment, all available data from production have been considered, i.e. all raw materials/elements used as per formulation process, utilized thermal energy for heating, and electric power consumption. Thus, material and energy flows contributing less than 1 % of mass or energy have been considered. It can be assumed that the total sum of neglected processes does not exceed 1 % of energy usage and mass per modules.

Modules A1 and A2: *Raw materials supply and transport*

The modules A1 and A2 represent the extraction and processing of raw materials and components and transport to the production site (including PVC, calcium carbonate, inks, primers, lacquers, foils, modifiers, wax, additives). For A2 module (transport) European averages for fuel data are applied. All distances and types of vehicles for all input products were declared by manufacturer and considered. Data on mode of transport and distances, as reported by suppliers were used for those materials and parts contributing more than 0.1 % of total product mass.

Module A3: *Production*

The manufacturing process (as presented on Figure 1) occurs in factory located in Jasło, Poland. Electricity is consumed in the process and gas.

Module A4: transport to construction site

Transport of the packed textile floorcovering from factory gate to the place of installation is considered. Delivery of the final product over a distance of 800 km by truck (Euro 5) was assumed.

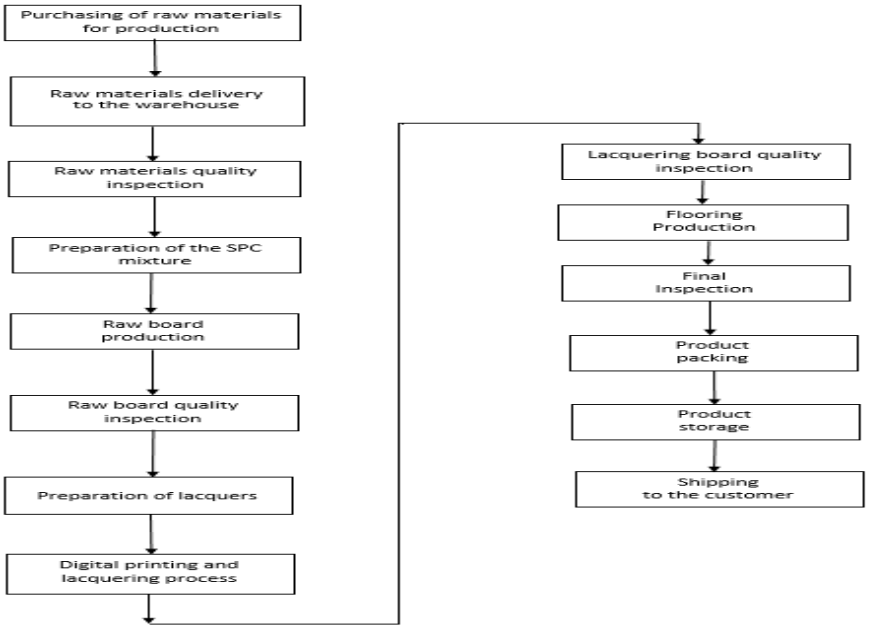


Fig. 1. A basic scheme of MMF floor coverings manufacturing process (A3)

Modules *C and D: End-of-life (EOL)*

The product (at the end of life in building) is to be removed form a building using electrical tool. The End of Life scenario is based on respective destination rates for material (Table 3). In the applied scenario, the polymer based elements are incinerated (50%), and rest is landfilled (50%). In the adapted end-of-life scenario, the de-constructed products are transported to recycling plant 100 km on > 16t lorry EURO 5. The recycling potentials of materials is presented in table 2 (incineration benefits). Module D presents credits resulting from energy recovered (incineration). Regarding incineration, model for the waste incineration is adapted according to the material composition and heating value of the end of life material. The reuse, recovery and recycling stage is considered beyond the system boundaries (D). Each scenario assumes that rate % of the material is sent to that scenario (table 3).

Table 3. End-of-life scenario for the end of life component.

Material	Landfilling %	Energy recovery %
End of life material	50	50

Electricity at end-of-life (module D) has been modelled using an average EU-27 electricity mix.

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2021 – 31.12.2021 (1 year). The life cycle assessments were prepared for Italy and Europe as reference area.

Data quality

The data selected for LCA originate from ITB-LCI questionnaire completed by producer and verified via data audit. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency is judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.9 (energy carriers, PVC, calcium carbonate, additives, waste treatment, incineration, and packaging). The background data for energy is national based on KOBiZE reports (Polish electricity mix and combustion factors for fuels). Specific (LCI) data quality analysis was a part of the input data

verification. Where no background data was available, data gaps were complemented by literature research.

Assumptions and estimates

The impacts of the representative product were aggregated using mass averaged approach per unit. The average product density was assumed as 8.5 kg/m^2.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN15804+A2. Emission of greenhouse gases was calculated using the IPCC 2013 GWP method with a 100-year horizon. Emission of acidifying substances, Emission of substances to water contributing to oxygen depletion, Emission of gases that contribute to the creation of ground-level ozone, Abiotic depletion, and ozone depletion emissions where all calculated with the CML-IA baseline method

Additional information

Polish electricity mix used (production) is 0.698 kg CO_2/kWh (KOBiZE 2021). European electricity mix used is 0.430kg CO_2/kWh for the end of life (Ecoinvent v3.9, RER).
As a general rule, no particular environmental or health protection measures other than those specified by law are necessary. There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product. Product has the Hygienic Certificate no. 396/322/403/2020. The product contains up to 30% of recycled material (mostly pre-consumer). Product is a formaldehyde free.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 m^2. The following life cycle modules (Table 4) were included in the analysis. The following tables 5-8 present the environmental impacts of the life cycle of MMF Floor coverings.

Table 4. System boundaries for the environmental characteristic included in LCA

Environmental assessment information (MD – Module Declared, MND – Module Not 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**	**MD**	**MD**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MD**	**MD**	**MD**	**MD**	**MD**

Table 5. Life cycle assessment (LCA) results for MMF floor covering products- environmental impacts (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	1.25E+01	1.15E+00	6.88E+00	2.06E+01	9.03E-02	2.26E-02	1.12E-02	1.88E-01	4.13E+00	6.03E-02	-2.01E+00
Greenhouse potential - fossil	eq. kg CO_2	1.28E+01	1.15E+00	6.68E+00	2.06E+01	8.77E-02	2.19E-02	1.10E-02	1.87E-01	4.13E+00	5.96E-02	-2.01E+00
Greenhouse potential - biogenic	eq. kg CO_2	-2.83E-01	3.74E-03	1.93E-01	-8.65E-02	2.56E-03	6.40E-04	3.20E-04	6.39E-04	0.00E+00	6.02E-04	-9.61E-04
Global warming potential - land use and land use change	eq. kg CO_2	1.92E-02	4.77E-04	2.31E-03	2.20E-02	3.07E-05	7.68E-06	3.84E-06	7.34E-05	0.00E+00	6.04E-05	-8.73E-05
Stratospheric ozone depletion potential	eq. kg CFC 11	2.23E-06	2.64E-07	1.44E-07	2.64E-06	1.79E-09	4.48E-10	2.24E-10	4.33E-08	0.00E+00	1.81E-08	-1.98E-07
Soil and water acidification potential	eq. mol H+	7.13E-02	2.15E+01	7.32E-02	2.17E+01	9.73E-04	2.43E-04	1.22E-04	7.59E-04	8.92E-02	5.03E-04	-2.17E-03
Eutrophication potential - freshwater	eq. kg P	3.83E-03	7.54E-05	1.25E-02	1.64E-02	1.66E-04	4.16E-05	2.08E-05	1.26E-05	0.00E+00	1.73E-05	-2.65E-05
Eutrophication potential - seawater	eq. kg N	2.14E-02	1.86E-03	1.06E-02	3.39E-02	1.41E-04	3.52E-05	1.76E-05	2.29E-04	4.68E-02	1.74E-04	-3.92E-04
Eutrophication potential - terrestrial	eq. mol N	1.33E-01	2.03E-02	8.96E-02	2.43E-01	1.19E-03	2.98E-04	1.49E-04	2.50E-03	5.12E-01	1.89E-03	-4.24E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.54E-02	5.93E-03	2.51E-02	7.64E-02	3.33E-04	8.32E-05	4.16E-05	7.66E-04	1.27E-01	5.46E-04	-2.01E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	4.25E-04	3.97E-06	3.22E-05	4.61E-04	4.28E-07	1.07E-07	5.34E-08	6.63E-07	0.00E+00	2.02E-07	-1.44E-06
Abiotic depletion potential - fossil fuels	MJ	1.97E+02	1.69E+01	1.13E+02	3.27E+02	1.48E+00	3.71E-01	1.86E-01	2.78E+00	0.00E+00	1.38E+00	-2.78E+01
Water deprivation potential	eq. m^3	7.25E+00	7.71E-02	2.32E+00	9.65E+00	3.07E-02	7.68E-03	3.84E-03	1.28E-02	4.66E-02	8.00E-03	-1.81E-02

Table 6. Life cycle assessment (LCA) results– additional impacts indicators (DU: 1 m^2)

Indicator	Unit	A1-A5	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Table 7. Life cycle assessment (LCA) results for MMF floor covering products - the resource use (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.56E+01	2.38E-01	8.27E+00	2.42E+01	1.10E-01	2.75E-02	1.38E-02	3.98E-02	0.00E+00	0.00E+00	0.00E+00
Consumption of renewable primary energy resources used as raw materials	MJ	3.14E+00	0.00E+00	0.00E+00	3.14E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	1.88E+01	2.38E-01	8.27E+00	2.73E+01	1.10E-01	2.75E-02	1.38E-02	3.98E-02	0.00E+00	2.42E-02	-6.39E-02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.52E+02	1.69E+01	1.12E+02	2.81E+02	1.49E+00	3.72E-01	1.86E-01	2.78E+00	-4.93E+01	0.00E+00	0.00E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	4.45E+01	0.00E+00	0.00E+00	4.45E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.93E+01	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.97E+02	1.69E+01	1.13E+02	3.27E+02	1.49E+00	3.72E-01	1.86E-01	2.78E+00	0.00E+00	1.49E+00	-3.08E+01
Consumption of secondary materials	kg	6.29E-02	5.81E-03	1.04E-02	7.92E-02	1.36E-04	3.39E-05	1.70E-05	9.31E-04	0.00E+00	0.00E+00	-2.16E-03
Consumption of renew. secondary fuels	MJ	1.07E-01	6.09E-05	5.72E-05	1.07E-01	7.56E-07	1.89E-07	9.45E-08	1.03E-05	0.00E+00	0.00E+00	-5.03E-06
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	9.03E-02	9.03E-02	1.20E-03	3.00E-04	1.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	1.02E-01	2.08E-03	3.57E-02	1.40E-01	4.03E-04	1.01E-04	5.04E-05	3.49E-04	0.00E+00	2.15E-04	-3.72E-04

Table 8. Life cycle assessment (LCA) results MMF floor covering products – waste categories (DU: 1 unit)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	3.98E-04	1.93E-02	1.71E-03	2.14E-02	1.54E-05	3.84E-06	1.92E-06	3.12E-03	0.00E+00	2.17E-06	-2.77E-05
Non-hazardous waste	kg	1.68E-02	3.31E-01	6.63E-02	4.14E-01	7.99E-04	2.00E-04	9.98E-05	5.53E-02	0.00E+00	5.68E+00	-1.48E-02
Radioactive waste	kg	2.31E-04	1.23E-06	8.40E-05	3.17E-04	1.11E-06	2.78E-07	1.39E-07	2.07E-07	0.00E+00	8.38E-06	-5.64E-06
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	3.94E-03	1.45E-04	1.74E-02	2.15E-02	1.54E-06	3.84E-07	1.92E-07	8.60E-06	0.00E+00	0.00E+00	-6.40E-05
Materials for energy recovery	kg	1.93E-05	4.25E-07	1.21E-04	1.41E-04	1.34E-08	3.36E-09	1.68E-09	6.95E-08	0.00E+00	0.00E+00	-2.06E-07
Exported Energy	MJ	6.10E-01	1.08E-03	3.34E-01	9.45E-01	4.43E-03	1.11E-03	5.54E-04	0.00E+00	0.00E+00	0.00E+00	-1.33E-02

Verification

The process of verification of this EPD is in accordance with 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 (sub clause 8.1.3.) [x] external [ ] internal
External verification of EPD: Halina Prejzner, PhD. Eng. LCA, LCI audit and input data verification: Michał Piasecki, PhD., D.Sc., Eng.

Note: The declaration owner has the sole ownership, liability, and responsibility for the declaration. Declarations of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- EN 16511, Loose-laid panels - Semi-rigid multilayer modular floor covering (MMF) panels with wear resistant top layer (includes Amendment :2019).
- EN 14041:2004- Resilient, textile and laminate floor coverings - Essential characteristics
- 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+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business

Signature Not Verified
Dokument podpisany przez Michał Piasecki; ITB
Data: 2023.04.21 11:13:43 CEST

Instytut Techniki Budowlanej

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Thermal Physics, Acoustics and Environment Department

02-656 Warsaw, Ksawerów 21

CERTIFICATE № 445/2023

of TYPE III ENVIRONMENTAL DECLARATION

Products:

MMF Floor covering

Manufacturer:

Kronoflooring Sp. z o.o.

ul. Wojska Polskiego 3, 39-300 Mielec, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2

Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.

This certificate, issued on 7th April 2023 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics and Environment Department

Agnieszka Winkler-Skalna, PhD

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director for Research and Innovation

Krzysztof Kuczyński, PhD

Warsaw, April 2023