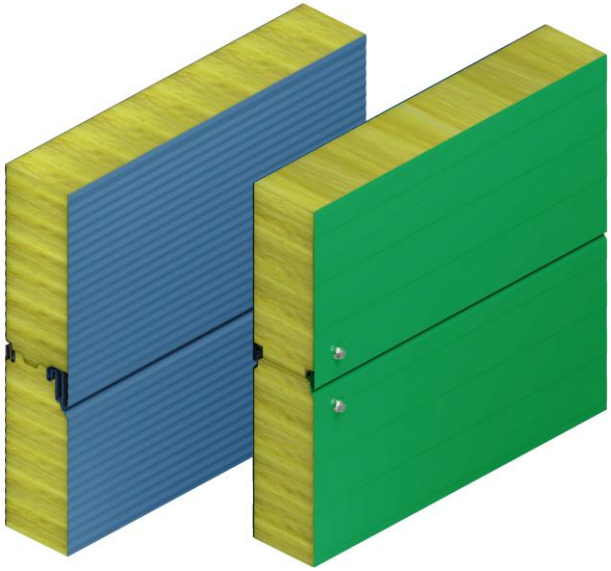


ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Kingspan sandwich panels with100mm mineral wool core type K-Roc® X LEC
Kingspan Kereskedelmi Kft



EPD HUB, HUB-3811
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Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.1 (5 Dec 2023) and JRC characterization factors EF 3.1.

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GENERAL INFORMATION

MANUFACTURER

Manufacturer	Kingspan Kereskedelmi Kft
Address	Újhartyán, Horka dűlő 1, 2367, Hungary
Contact details	info@kingspan.hu
Website	www.kingspan.hu

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Design phase EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Artur Krzywulski, Kingspan CEME
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Kingspan sandwich panels with100mm mineral wool core type K-Roc® X LEC
Additional labels	KS RB K-Roc® X LEC Wall Panel, KS RH K-Roc® X LEC Wall Panel, KS RB K-roc® (MSX LEC), KS RB K-roc® (MXB LEC), KS RH K-roc® (MSX LEC), KS RH K-roc® (MXB LEC), KS1000 RB-X LEC, KS1000 RB-B LEC, KS1150 RB-X LEC, KS1150 RB-B LEC, KS1000 RH-X LEC, KS1000 RH-B LEC, Hoesch® isorock HB LEC Mineral Wool Wall Panel, Hoesch® isorock vario HV LEC Mineral Wool Wall Panel, K-Roc EVO LEC, K-Roc EVO LEC Reveal 20, K-Roc EVO LEC Reveal 50
Product reference	-
Place(s) of raw material origin	EU
Place of production	Felsőlajos, Fő u. 36, 6055, Hungary
Place(s) of installation and use	EU
Period for data	01.01.2023 - 31.12-2023
Averaging in EPD	No grouping
Variation in GWP-fossil for A1-A3 (%)	-
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	92,3

ENVIRONMENTAL DATA SUMMARY

Declared unit	1m2
Declared unit mass	19,8 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	3,06E+01
GWP-total, A1-A3 ($kgCO_2e$)	2,94E+01
Secondary material, inputs (%)	79,9
Secondary material, outputs (%)	64,8
Total energy use, A1-A3 (kWh)	237
Net freshwater use, A1-A3 (m^3)	0,57

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Kingspan Kereskedelmi Kft. has been on the market since 1998 - and is a subsidiary of Kingspan Group, a global leader in manufacturing building products.

Kingspan Kft. specializes in the production of construction materials, including sandwich panels with both MW and PIR insulation cores, modular cold rooms, and cold store doors. Moreover, Kingspan also offers a wide variety of ancillary products that supplement the building envelope. The manufacturing plant in Felsolajos produces insulated sandwich panels with mineral wool insulation core. The products are dedicated to external and internal wall applications, and as well as ceiling elements. The panels produced in Hungary are mainly delivered to the south-east countries of Europe. To satisfy increasing interest in sustainable solutions in construction market, and demand from customers for products with low embodied carbon, Kingspan Kft introduces the LEC product range (LEC = Low Embodied Carbon). This product range is mainly driven by the use of low carbon steel, produced in EAF technology and utilizing high ratio of scrap as raw material. More information about the manufacturer and the products can be found at https://www.kingspan.com/hu/ .

PRODUCT DESCRIPTION

Kingspan wall and ceiling sandwich panels KS RB K-Roc® X LEC and KS RH K-Roc® X LEC are steel-faced sandwich panels with a core of stone(mineral) wool type MSX with declared density of 100kg/m3. The facings of Kingspan QuadCore® LEC sandwich panels are made from low embodied carbon (LEC) galvanized and coated carbon steel sheets according to EN 10346. The low embodied carbon steel is produced under EAF technology and utilizes steel scrap as raw material (no virgin iron ore is used). The thickness of LEC steel sheets is defined by project specific requirements and varies between 0.4mm and 0.7mm. The panels are manufactured and certified according to European standard EN 14509:2013. The KS RB K-Roc® X LEC and KS RH K-Roc® X LEC sandwich panels are used as external and internal wall elements and ceilings, in industrial, commercial, residential and office buildings, hospitals, chill stores, clean rooms and in the food industry. The panels with MSX mineral wool insulation core are available in thicknesses starting from 60mm up to 200mm. The products are also available in various modular widths, especially the product variants dedicated to facade finishes (EVO). The current EPD evaluation focuses on LEC panels with mineral wool core MSX thickness 100mm.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	52,6	EU
Minerals	44,9	EU
Fossil materials	2,5	EU
Bio-based materials	0	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1m2
Mass per declared unit	19,8 kg
Functional unit	-
Reference service life	50 years

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

Kingspan sandwich panels covered by this environmental product declaration are manufactured in Felsőlajos in Hungary. The production of sandwich panels is carried out on continuous production line as presented on the scheme below. All raw materials are transported to the manufacturing plant by road transport and short distance sea ferry. The manufacturing of insulated panels starts with the de-coiling of the internal and external steel coils. The liners are rolled into the desired profiled pattern. The mineral wool insulation core is made from solid slabs which are cut into lamellas of certain size and positioned in chessboard pattern between the steel sheets. The steel faces and mineral wool core are bonded together by means of two component polyurethane glue. The panels leaving the manufacturing line are stacked on EPS blocks (for forklift transport), then covered and protected with EPS sheets and distance blocks. Finally, the whole bundle is wrapped with stretch foil. Manufacturing waste from panels production - steel scrap and mineral wool dust - are sorted and collected separately. Steel scrap in 95% goes to recycling, remaining 5% goes for landfill. The mineral wool waste goes for landfill.

The faces of composite sandwich panel faces are made from low carbon hot-rolled galvanized and colour-coated steel sheets from recycled and renewable sources. These are produced using an electric arc furnace (EAF) technology with a high percentage of recycled steel and 100% renewable electricity certified by guarantees of origin. The low carbon steel used in Kingspan K-Roc® L LEC panels is manufactured in European facilities and complies with relevant EU standards (EN 10346 and EN 10169). The most popular steel quality used in Kingspan K-Roc® X LEC sandwich panels is S280GD+Z275, there are other types possible depending on end use application. The steel sheets are coated with organic coatings according to EN 10169. The type, thickness and colour of organic coating depends on final application environment and customer requirements.

The insulation core of the Kingspan sandwich panels KS RB(MSX) K-Roc® LEC and KS RH(MSX) K-Roc® LEC are made from mineral wool (stone wool) with average density of 100 kg/m3. Mineral wool insulation core is non-combustible and makes that whole panels reaction to fire rating is A2 class (acc. to EN 13501-1). Also, the fire resistance performance of whole panels achieves the ratings which contribute significantly to the passive fire safety protection of buildings.

The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), and its use is ensured throughout the validity period of this EPD.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

Panels are transported to the construction site by means of road transport. The transportation distance is assumed to be an average of 400km. The insulated panels are made to order, specific to the building's requirements. Installation guides are available to assist the contractor with correct installation of the product and any ancillaries. The installation scenario assumes as well steel fasteners for fixing the panels and necessary accessories (steel flashings) made of steel coated sheets. The average consumption of fasteners and flashings is based on manufacturer data: 0.045kg/DU for fasteners and 0.47kg/DU for steel coated flashings.

A conservative estimate of power necessary for installation works assumes electricity for a power tool (0.37kWh/DU) and diesel (10.53MJ/DU) for site handling. Installation losses are estimated at 2% (panel cut-offs) and as well all packaging materials are included as installation waste. The installation waste panels are separated into steel scrap and mineral wool core. 95% of steel scrap goes for recycling, and 5% goes to landfill (rates based on World Steel Association data), Mineral wool waste - 100% goes to landfill. The plastic packaging waste (mix of PE and EPS) goes for municipal incineration.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied.

The reference service life of 50 years is given as only additional information and is based on similar EPD's issued for sandwich panels with similar material specification and production technology.

Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At the end-of-life panels are uninstalled from the building structure and are separated into steel elements (panel faces, fasteners and steel flashings) and insulation core (mineral wool). For removal of the panels, a conservative estimate of electricity for a power tool (0,37kWh/DU) and diesel (3,81MJ/DU) for a crane has been made.

The scenario for steel is that 95% is being recycled, where the other 5% goes for landfill (according to World Steel Association, 2020). The mineral wool insulation core goes 100% to landfill. The estimated conservative distance of transport for landfill is 60km, the transport distance of the steel scrap to regional steel recycling hubs is estimated as 200km.

In Module D, the net benefit of recycling steel, waste treatment of packaging materials is included as avoided material production (from recycling) and electricity and heat production (from incineration).

ADDITIONAL INFORMATION

Kingspan LEC Panels with mineral wool core MSX (KS RB K-Roc® X LEC Wall Panel and KS RH K-Roc® X LEC Wall Panel) are manufactured according to legally defined measures in the occupational health and safety regulations, which apply to the complete manufacturing process for sandwich panels. In collaboration with the external advisors, voluntary "health and safety" audits are carried out at regular intervals. The results of these inspections correspond to the official workplace guidelines.

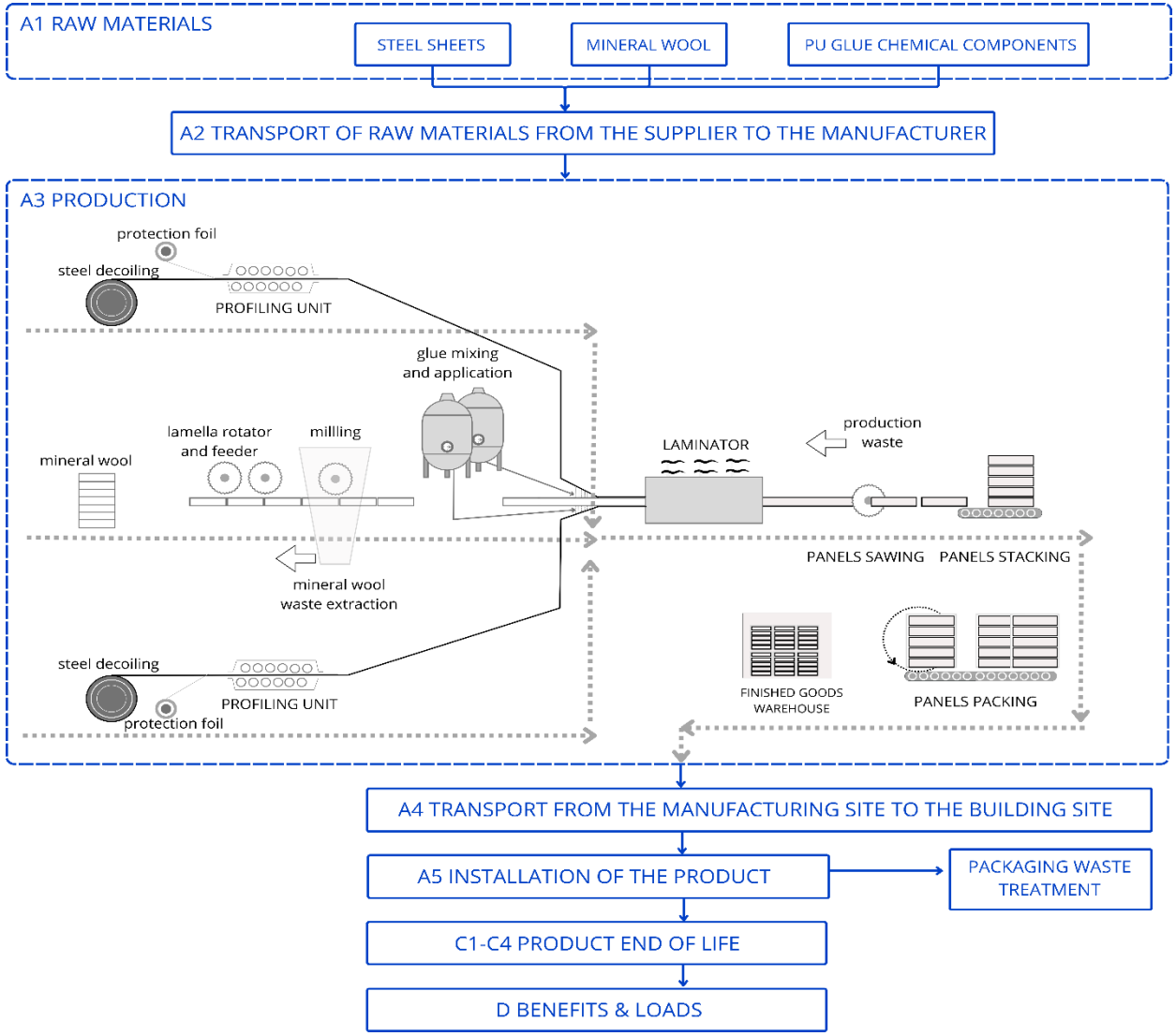
The panels are not harmful and do not emit any hazardous substances during their service life.

The Kingspan Kereskedelmi Kft. plant in Felsolajos is certified to ISO 9001, ISO 14001, ISO 37301, ISO 45001, and ISO 50001 management standards.

During the analysed period of production, the content of recycled material, in key raw materials (steel and MW), based on mass balance method, was:

- For steel sheets – 90.9% (LEC Steel),
- For mineral wool – 23.2%.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

In the Life-Cycle assessment there were NO excluding processes.

Based on the Bill of materials - there are only excluded raw materials which share by mass is significantly below 1% - chemicals, ancillaries and packaging. The total mass of avoided components does not exceed 1% of the mass of the product.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are made according to the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	Allocated by mass or volume
Packaging material	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

The current EPD document is a design EPD for Kingspan K-Roc® X LEC (Lower Embodied Carbon) sandwich panels thickness 100mm. The study is fully based on the earlier published EPD document number HUB-1785 – except – the specification of steel sheets (both sides). The manufacturing process and inputs and outputs are the same as for existing, already manufactured products Kingspan K-Roc® X sandwich panels 100mm. In the LCA evaluation ONLY the datapoints related to standard galvanized organic coated steel sheets in coils were replaced by the low carbon steel made in EAF process from recycled steel scrap. This replacement does not change the technical specification of sandwich panels; it only affects the environmental characteristics of the whole Kingspan K-Roc® X LEC sandwich panels. The K-Roc® X LEC sandwich panels consist of metals, mineral and fossil materials. The panels do not contain any bio-based materials. The different variants of K-Roc® X LEC panels are made at the same production line, the necessary application and geometry differences are achieved by using different profiling patterns.

Electricity datapoint represents the Hungarian grid electricity mix. Additional renewable electricity consumed by the factory is produced by roof-top PV installation which is installed on the production hall roof. The chemical substances evaluated under this EPD are NOT listed in the latest “Candidate List of Substances of Very High Concern".

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	-

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	2,15E+01	5,73E+00	2,22E+00	2,94E+01	1,78E+00	4,09E+00	MND	MND	MND	MND	MND	MND	MND	4,54E-01	6,31E-01	2,90E-01	7,74E-02	-1,72E+00
GWP – fossil	kg CO_2e	2,27E+01	5,72E+00	2,22E+00	3,06E+01	1,77E+00	4,11E+00	MND	MND	MND	MND	MND	MND	MND	4,54E-01	6,30E-01	2,90E-01	7,74E-02	-1,72E+00
GWP – biogenic	kg CO_2e	-1,23E+00	1,15E-03	2,30E-03	-1,22E+00	3,57E-04	-1,97E-02	MND	MND	MND	MND	MND	MND	MND	3,06E-04	1,27E-04	-6,16E-04	-2,46E-05	1,04E-04
GWP – LULUC	kg CO_2e	1,17E-02	2,06E-03	1,58E-03	1,53E-02	6,37E-04	1,75E-03	MND	MND	MND	MND	MND	MND	MND	4,06E-04	2,26E-04	3,58E-04	4,42E-05	-1,10E-04
Ozone depletion pot.	kg $CFC_{-11}e$	5,47E-07	1,14E-07	6,85E-08	7,30E-07	3,53E-08	3,62E-08	MND	MND	MND	MND	MND	MND	MND	7,32E-09	1,25E-08	3,90E-09	2,24E-09	-5,52E-09
Acidification potential	mol H^+e	3,74E+01	1,21E-02	8,79E-03	3,74E+01	3,69E-03	7,64E-01	MND	MND	MND	MND	MND	MND	MND	3,71E-03	1,31E-03	3,45E-03	5,49E-04	-6,22E-03
EP-freshwater[2)]	kg Pe	6,25E-03	3,85E-04	9,02E-04	7,54E-03	1,19E-04	3,03E-04	MND	MND	MND	MND	MND	MND	MND	1,22E-04	4,24E-05	1,87E-04	6,36E-06	-7,91E-04
EP-marine	kg Ne	2,20E-02	2,90E-03	1,98E-03	2,69E-02	8,87E-04	6,32E-03	MND	MND	MND	MND	MND	MND	MND	1,50E-03	3,15E-04	7,64E-04	2,09E-04	-1,40E-03
EP-terrestrial	mol Ne	2,29E-01	3,13E-02	1,97E-02	2,79E-01	9,57E-03	6,83E-02	MND	MND	MND	MND	MND	MND	MND	1,62E-02	3,40E-03	8,63E-03	2,28E-03	-1,51E-02
POCP ("smog")[3)]	kg NMVOCe	6,98E-02	1,99E-02	8,79E-03	9,85E-02	6,14E-03	2,06E-02	MND	MND	MND	MND	MND	MND	MND	4,88E-03	2,18E-03	2,56E-03	8,18E-04	-5,32E-03
ADP-minerals & metals[4)]	kg Sbe	1,75E+02	1,90E-05	7,44E-06	1,75E+02	5,91E-06	3,50E+00	MND	MND	MND	MND	MND	MND	MND	1,75E-06	2,10E-06	2,06E-05	1,23E-07	-1,56E-07
ADP-fossil resources	MJ	2,35E+02	8,05E+01	5,23E+01	3,68E+02	2,50E+01	4,30E+01	MND	MND	MND	MND	MND	MND	MND	7,17E+00	8,87E+00	3,89E+00	1,90E+00	-1,63E+01
Water use[5)]	m^3e depr.	9,03E-01	4,00E-01	1,05E+00	2,35E+00	1,24E-01	2,07E-01	MND	MND	MND	MND	MND	MND	MND	8,77E-02	4,41E-02	7,00E-02	5,48E-03	-2,75E-01

1) GWP = Global Warming Potential;

2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e;

3) POCP = Photochemical ozone formation;

4) ADP = Abiotic depletion potential;

5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	4,66E-07	4,22E-07	8,76E-08	9,75E-07	1,31E-07	3,03E-07	MND	MND	MND	MND	MND	MND	MND	8,78E-08	4,63E-08	4,69E-08	1,25E-08	-9,55E-08
Ionizing radiation[6]	kBq U235e	1,05E+00	1,04E-01	6,99E-01	1,85E+00	3,22E-02	1,23E-01	MND	MND	MND	MND	MND	MND	MND	7,98E-02	1,15E-02	3,30E-02	1,19E-03	3,13E-02
Ecotoxicity (freshwater)	CTUe	2,38E+02	1,07E+01	8,27E+00	2,57E+02	3,32E+00	8,97E+00	MND	MND	MND	MND	MND	MND	MND	6,69E-01	1,18E+00	2,27E+00	1,59E-01	-3,18E+00
Human toxicity, cancer	CTUh	7,86E-08	9,61E-10	4,59E-10	8,00E-08	2,98E-10	1,82E-09	MND	MND	MND	MND	MND	MND	MND	7,51E-11	1,06E-10	2,59E-10	1,43E-11	1,09E-10
Human tox. non-cancer	CTUh	7,34E-08	5,09E-08	1,33E-08	1,38E-07	1,58E-08	9,45E-09	MND	MND	MND	MND	MND	MND	MND	2,66E-09	5,60E-09	1,76E-08	3,28E-10	-2,44E-09
SQP[7]	-	1,51E+02	4,86E+01	7,00E+00	2,07E+02	1,51E+01	6,50E+00	MND	MND	MND	MND	MND	MND	MND	9,32E-01	5,35E+00	7,57E+00	3,74E+00	-3,71E+00

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator;
7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8]	MJ	3,24E+02	1,41E+00	3,71E+00	3,29E+02	4,37E-01	9,34E+00	MND	MND	MND	MND	MND	MND	MND	8,01E-01	1,55E-01	7,26E-01	1,83E-02	-1,43E-01
Renew. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	3,24E+02	1,41E+00	3,71E+00	3,29E+02	4,37E-01	9,34E+00	MND	MND	MND	MND	MND	MND	MND	8,01E-01	1,55E-01	7,26E-01	1,83E-02	-1,43E-01
Non-re. PER as energy	MJ	4,03E+02	8,05E+01	4,05E+01	5,24E+02	2,50E+01	3,64E+01	MND	MND	MND	MND	MND	MND	MND	7,17E+00	8,87E+00	3,89E+00	1,90E+00	-1,63E+01
Non-re. PER as material	MJ	1,46E+01	0,00E+00	1,15E+01	2,61E+01	0,00E+00	-1,15E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	-1,46E+01	0,00E+00
Total use of non-re. PER	MJ	4,18E+02	8,05E+01	5,21E+01	5,50E+02	2,50E+01	2,48E+01	MND	MND	MND	MND	MND	MND	MND	7,17E+00	8,87E+00	3,89E+00	-1,27E+01	-1,63E+01
Secondary materials	kg	1,58E+01	3,74E-02	7,79E-03	1,59E+01	1,16E-02	3,70E-01	MND	MND	MND	MND	MND	MND	MND	2,27E-03	4,11E-03	4,75E-03	4,77E-04	1,05E+00
Renew. secondary fuels	MJ	0,00E+00	4,72E-04	7,43E-03	7,90E-03	1,47E-04	1,87E-04	MND	MND	MND	MND	MND	MND	MND	8,44E-06	5,19E-05	2,21E-04	9,88E-06	5,06E-05
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	9,54E-03	9,54E-03	0,00E+00	1,91E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	5,31E-01	1,10E-02	2,66E-02	5,69E-01	3,40E-03	1,72E-02	MND	MND	MND	MND	MND	MND	MND	2,72E-03	1,21E-03	2,07E-03	1,98E-03	-3,95E-03

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	4,55E-04	1,17E-01	7,45E-02	1,92E-01	3,63E-02	6,94E-02	MND	MND	MND	MND	MND	MND	MND	1,20E-02	1,29E-02	2,54E-02	2,10E-03	4,45E-02
Non-hazardous waste	kg	9,54E-01	2,47E+00	7,68E+00	1,11E+01	7,66E-01	1,40E+00	MND	MND	MND	MND	MND	MND	MND	6,18E-01	2,72E-01	9,19E-01	4,79E-02	-4,63E+00
Radioactive waste	kg	7,59E-03	2,58E-05	1,67E-04	7,79E-03	8,00E-06	5,79E-04	MND	MND	MND	MND	MND	MND	MND	2,05E-05	2,85E-06	8,45E-06	2,91E-07	8,19E-06

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	6,12E-03	0,00E+00	8,09E-01	8,15E-01	0,00E+00	2,81E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	1,28E+01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	5,10E-03	5,10E-03	0,00E+00	2,81E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,29E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,12E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,17E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	2,27E+01	5,73E+00	2,22E+00	3,06E+01	1,78E+00	4,11E+00	MND	MND	MND	MND	MND	MND	MND	4,54E-01	6,31E-01	2,90E-01	7,74E-02	-1,72E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero.

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity datapoint represents the Hungarian grid electricity mix. Additional renewable electricity consumed by the factory is produced by roof-top PV installation which is installed on the production hall roof. The PV system is operated by 3rd party company under ESCO model. Used datapoints are based on current Eco Invent 3.10 database. The data quality is considered good.
Electricity CO2e / kWh	0,37
District heating data source and quality	The district heating datapoints are taken from the existing Eco Invent 3.10 database with geographical profile for Hungary. The fuel used for heat generation is natural gas. The data quality is considered good.
District heating CO2e / kWh	0,203

Transport scenario documentation A4

Scenario parameter	Value
Fuel and vehicle type. Eg, electric truck, diesel powered truck	Freight, lorry 16-32 metric ton, EURO6, diesel powered
Average transport distance, km	400
Capacity utilization (including empty return) %	70%
Bulk density of transported products	102,5
Volume capacity utilization factor	<1

Installation scenario documentation A5

Scenario information	Value
Ancillary materials for installation (specified by material) / kg or other units as appropriate	0,515
Water use / m^3	0
Other resource use / kg	0
Quantitative description of energy type (regional mix) and consumption during the installation process / kWh or MJ	3,295
Waste materials on the building site before waste processing, generated by the product's installation (specified by type) / kg	0
Output materials (specified by type) as result of waste processing at the building site e.g. collection for recycling, for energy recovery, disposal (specified by route) / kg	0,775
Direct emissions to ambient air, soil and water / kg	0

End of life scenario documentation

Scenario information	Value
Collection process – kg collected separately	25,23
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	12,83
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	12,40
Scenario assumptions e.g. transportation	Transport assumptions - landfill and incineration treatment the distance of 60km. Steel scrap transport for recycling - 200km.

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

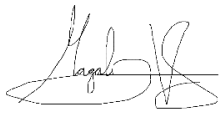
I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited
15.08.2025



VERIFIED ISO 14025

ANNEX I

SCALLING TABLES

Table No. 1								
Product Thickness [mm]		**60**	**80**	**100**	**120**	**150**	**175**	**200**
Product Weight [kg/m2]		15,72	17,85	19,79	21,86	25,16	27,29	29,75
Impact category		**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**
EN 15804+A2, PEF	GWP – total	0,875	0,939	1,00	1,068	1,166	1,243	1,323
	GWP – fossil	0,864	0,934	1,00	1,073	1,179	1,263	1,349
	GWP – biogenic	0,610	0,807	1,00	1,205	1,500	1,746	1,992
	GWP – LULUC	0,791	0,902	1,00	1,118	1,281	1,412	1,542
	Ozone depletion pot,	0,663	0,833	1,00	1,168	1,425	1,630	1,836
	Acidification potential	0,600	0,800	1,00	1,199	1,499	1,749	1,998
	EP-freshwater	0,641	0,821	1,00	1,180	1,446	1,671	1,897
	EP-marine	0,799	0,903	1,00	1,104	1,257	1,383	1,509
	EP-terrestrial	0,806	0,907	1,00	1,104	1,251	1,373	1,498
	POCP (“smog”)	0,813	0,909	1,00	1,096	1,239	1,360	1,472
	ADP-minerals & metals	0,600	0,800	1,00	1,200	1,500	1,750	2,000
	ADP-fossil resources	0,926	0,968	1,00	1,049	1,113	1,158	1,208
	Water use	1,030	0,983	1,00	0,898	0,826	0,779	0,728

Table No. 2								
Product Thickness [mm]		**60**	**80**	**100**	**120**	**150**	**175**	**200**
Product Weight [kg/m2]		15,72	17,85	19,79	21,86	25,16	27,29	29,75
Impact category		**A1-A5+C1-C4+D**	**A1-A5+C1-C4+D**	**A1-A5+C1-C4+D**	**A1-A5+C1-C4+D**	**A1-A5+C1-C4+D**	**A1-A5+C1-C4+D**	**A1-A5+C1-C4+D**
EN 15804+A2, PEF	GWP – total	0,882	0,943	1,00	1,063	1,155	1,228	1,303
	GWP – fossil	0,873	0,938	1,00	1,067	1,166	1,244	1,325
	GWP – biogenic	0,614	0,809	1,00	1,196	1,487	1,729	1,972
	GWP – LULUC	0,818	0,913	1,00	1,101	1,244	1,358	1,475
	Ozone depletion pot,	0,687	0,844	1,00	1,157	1,393	1,587	1,782
	Acidification potential	0,601	0,800	1,00	1,199	1,499	1,748	1,998
	EP-freshwater	0,664	0,833	1,00	1,168	1,422	1,629	1,839
	EP-marine	0,843	0,923	1,00	1,081	1,201	1,298	1,397
	EP-terrestrial	0,849	0,926	1,00	1,078	1,194	1,288	1,383
	POCP (“smog”)	0,849	0,926	1,00	1,078	1,194	1,288	1,383
	ADP-minerals & metals	0,600	0,800	1,00	1,200	1,500	1,750	2,000
	ADP-fossil resources	0,926	0,967	1,00	1,047	1,110	1,155	1,204
	Water use	1,011	0,979	1,00	0,920	0,869	0,840	0,804