epd-norway
Global Program Operator

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EPD

Environmental Product Declaration for KS NC QuadCore® LEC Wall & Ceiling Panel and KS NF QuadCore® LEC Wall Panel, in accordance with 14025 and EN 15804+A2

POWERED BY QuadCore™ TECHNOLOGY

Kingspan®

Environmental Product Declaration

In accordance with 14025 and EN15804 +A2

Kingspan KS NC QuadCore® LEC Wall & Ceiling Panel, KS NF QuadCore® LEC Wall Panel

Owner of the declaration:
Kingspan OY

Product name:
KS NC QuadCore LEC Wall & Ceiling Panel
KS NF QuadCore LEC Wall Panel

Functional unit:
1 square metre covering surface of installed panel, including waste treatment at end-of-life.

Product category /PCR:
NPCR 010 ver 4.0 Building Boards (22.03.2022)

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-5402-4714-EN

Registration number:
NEPD-5402-4714-EN

Issue date: 22.11.2023

Valid to: 22.11.2028

The Norwegian
EPD Foundation

General information

Products:
KS NC QuadCore LEC Wall & Ceiling Panel
KS NF QuadCore LEC Wall Panel

Program Operator:
The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Tlf: +47 23 08 80 00
e-mail: post@epd-norge.no

Declaration Number:
NEPD-5402-4714-EN

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serves as core PCR
NPCR part A ver 2.0 Construction products and services
NPCR Part B 010 ver 4.0 Building Boards

Statements:
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidence.

Declared unit:
1 m^2 covering surface of installed panel, including waste treatment at end-of-life.

Functional unit:
1 m^2 covering surface of installed panel, from cradle-to-grave, with activities needed for a study period of 60 years for the building.

Verification:
Independent verification of the declaration and data, according to ISO14025:2010

Internal ☐ external ☑

Martin Erlandsson, IVL Swedish Env Res Inst
Independent verifier approved by EPD Norway

Owner of the declaration:
Kingspan OY
Contact person: Eric Henningsson
Phone: +46 706353537
e-mail: eric.henningsson@kingspan.com

Manufacturer:
Kingspan OY
Halmeenkaty 7, 38700 Kankaanpää, FINLAND
Phone: +46 317202699
e-mail: info@kingspan.se

Place of production:
Kankaanpää, Finland

Management system:
ISO 14001, ISO 9001, ISO 45001, ISO 5001, ISO 37301, BES 6001

Organisation no:
FO-number: 2383916-7

Issue date:
22.11.2023

Valid to:
22.11.2028

Year of study:
2022

Comparability:
EPDs from other programmes than EPD Norge may not be comparable.

The EPD has been worked out by:
Niclas Silfverstrand and Hannes Westberg

Approved

Manager of EPD Norway

Product

Product description:

QuadCore® LEC insulated are part of our Lower Embodied Carbon solutions. QuadCore® insulation technology takes insulated panels to a superior level of thermal performance guaranteed within the whole building lifecycle, enhances fire protection and environmental credentials. QuadCore®LEC insulated panels can be installed in a variety of applications, especially where high thermal performance and a low carbon footprint are required.

Product specification:

The life cycle assessment is based on 1 m^2 Kingspan NF LEC and Kingspan NC LEC. Results are displayed for the Kingspan NF LEC variant of the panel, which is similar to the Kingspan NC LEC panel, but it comes with a sealant. The results for the Kingspan NF LEC variant are therefore a conservative representation of the Kingspan NC LEC panel. The difference in results between the panels is less than 1%.

The panel comes in seven different thicknesses and the results are displayed for the 120 mm variant of the panel. The results can be translated to other thicknesses using the conversion table in the results section.

Table 1: Composition of 1 m^2 Kingspan NF LEC panel.

Materials	Mass (kg)	Share %
PIR-foam	4.86	37%
Metal sheet	8.17	62%
Adhesive	0.07	0.5%
Sealing* and tape	0.03	0.3%
Sum of panel materials	**13.1**	**100%**
Packaging		
EPD (covers and support foot)	0,1	76%
Wrapping plastic (LLDPE)	0,005	3%
Packaging tape (PP)	0,001	0,3%
Packing plastic (LDPE	0,01	6%
Protective foil (polyolefins)	0,03	15%
Sum of packaging materials	0,19	**100%**
Total	**13,3**	

*Kingspan NC LEC has the same composition but without the sealing. Results for Kingspan NF are displayed as a conservative representation for both panels.

Technical data:

The mass of the Functional unit is 13.1 kg and the thickness is 120 mm.

Full technical specification, including but not limited to U-values and fire resistance classification, for all panel thicknesses can be found on the product page for the panels:

https://www.kingspan.com/fi/fi/tuotteet/eristetyt-paneelit/seinaelementit/qc-nf-lec-seinalementti/

https://www.kingspan.com/fi/fi/tuotteet/eristetyt-paneelit/seinaelementit/qc-nc-seinalementti/

Market:

The scenarios beyond cradle-to-gate are based on the Finnish market. The panels are sold to customers in Finland, Sweden, Norway, and Denmark.

Reference service life, product:

The reference service life of the panel is 60 years is when applied according to the product description.

Reference service life, building:

The reference service life of 60 years has been assumed for the building in all calculations.

LCA: Calculation rules

Functional unit:

1 m^2 covering surface of installed panel, including waste treatment at end-of-life.

The results are presented for the functional unit, 1 m^2 covering surface of installed panel, from cradle-to-grave, with activities needed for a study period of 60 years for the building.

System boundary:

A diagram of the system boundary is shown in figure 1 below.

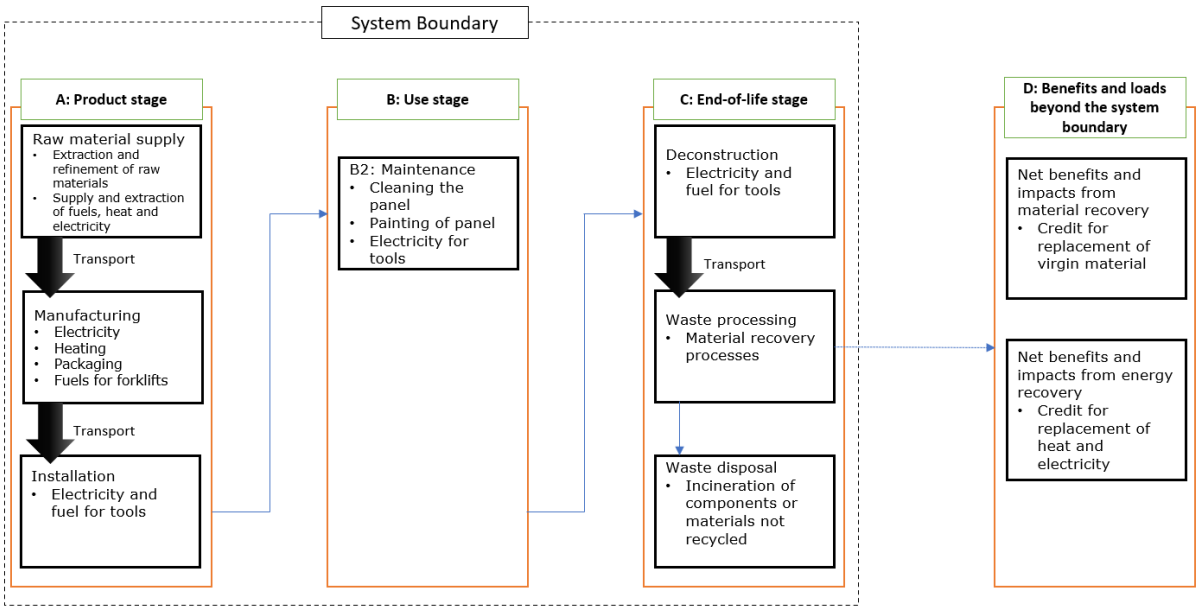

Figure 1: Illustration of the system boundary.

Data quality:

The data quality requirements are according to EN15804 and NPCR 010 ver 4.0 for building boards. Specific data for the production is used for a 12-month period in 2022 to 2023. The production data for the panels is from one production site, Kankaanpää in Finland, and therefore no average data has been used for different locations. Generic datasets were obtained from the Sphera Professional database 2023 and Ecoinvent v3.8. Specific data is used for the steel.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Cut-off criteria:

General cut-off criteria are given in standard EN 15804 clause 6.3.6. In compliance with the criteria, all major raw materials and all the essential energy are included. The infrastructure of the manufacturing site, joint insulation and sealants used during installation (small amounts) are not included. The cut-off rule does not apply for hazardous materials and substances.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to assembly/user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Truck	61	Euro V (28-32t gw), Truck	272	0.02 kg/tkm	0.7

The transport in A4 is a representative transport distance from production site in Finland to an assumed site in Helsinki.

Assembly (A5)

	Unit	Value
Auxiliary (steel flashing)	kg	0.47
Electricity consumption	kWh	0.017
Other energy carriers	kWh	0.044
Material loss	kg	0

The installation (A5) includes the energy and materials used for unloading of the panel packages from a truck, lifting up the panels to the building frame and fixing the panels with screws and selants. Module A5 is based on an estimated scenario for assembly and is not based on measured data.

Use (B1)

	Unit	Value
No LCA-related environmental impacts	-	-

No environmental impact has been identified in module B1 from the panel during the service life.

Maintenance (B2)/Repair (B3)

	Unit	Value
Paint used for maintenance	kg	0.24
Detergent used for cleaning	kg	0.2
Water used for cleaning	kg	7.6
Consumption of electricity	MJ	2

The maintenance (B2) of the panels is assumed to be performed by applying two layers of paint once during the life time of the panels. Cleaning of the surface of the panels using detergent four

times during the life time is also included. In normal use scenario, it is assumed that there is no repair (B3), replacement (B4) and refubrishment (B5) is needed.

Replacement (B4)/Refurbishment (B5)

	Unit	Value
Replacement cycle*	Years	60

*Number or RSL (Reference service life)

Operational energy (B6) and water consumption (B7)

No environmental impact has been identified in module B6-B7 from the panel during the service life.

End of Life (C1, C3, C4)

	Unit	Value
Recycling	kg	8,64
Energy recovery	kg	5,21

End-of-life life scenario, C1, C3 and C4, is based on materials being separated on site. The steel is assumed to be 100% recycled and the PIR-foam is assumed to be 100% incinerated. Energy for deconstruction is included in C1, and activities related to steel recycling is included in C3. The resource use for C1 is the same as A5. No environmental impact has been identified in module C4.

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Truck	61	Euro V (28-32t gw), Truck	50	0.02	1.2

The transport in module C2 represents the distance to recycling and incineration with energy recovery respectively.

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Net steel recycling	kg	1,20
Heat replaced – Finnish district heating	MJ	2.55
Electricity replaced – Finnish electricity grid mix	MJ	1.43

The net virgin steel minus 10% losses is in module D substituted with virgin steel produced on the european market. 9% of incoming steel to the system is virgin steel whereby 8% of the steel leaving C3 recieves a credit.

Moreover, the energy recovered is assumed to replace the local energy mixes, Finnish electrical and district heating mixes. European district heating mix was used as proxy data to represent the Finnish district heating mix.

LCA: Results

The calculations are based on the Kingspan NF LEC panel but is representative for the Kingspan NC LEC panel as well. The difference in between LCIA results is less than 1% for all presented categories. Results are presented for the 120 mm variant, use the conversion table to estimate impacts for the other thicknesses.

System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Benefits & loads beyond system boundary
Raw materials	Transport	Manufacturing	Transport	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	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Conversion table to other thicknesses (from 120 mm-results, presented below).

Table 2 Factors for the estimation of the environmental impact from different panel thicknesses. Multiply the LCA-result of each impact category in the environmental impact tables with the corresponding factors.

Thickness [mm]							
Parameter	50	80	103	120	150	170	200
GWP-total	0,66	0,81	0,92	1,00	1,15	1,24	1,39
GWP-fossil	0,66	0,81	0,92	1,00	1,15	1,24	1,39
GWP-biogenic	0,90	0,94	0,98	1,00	1,04	1,07	1,11
GWP-luluc	0,80	0,88	0,95	1,00	1,09	1,15	1,23
ODP	0,43	0,68	0,86	1,00	1,24	1,40	1,65
AP	0,73	0,84	0,93	1,00	1,12	1,19	1,31
EP-freshwater	0,55	0,74	0,89	1,00	1,19	1,32	1,52
EP-marine	0,73	0,84	0,93	1,00	1,12	1,20	1,31
EP-terrestrial	0,72	0,84	0,93	1,00	1,12	1,20	1,31
POCP	0,68	0,82	0,92	1,00	1,14	1,23	1,36
ADPm[1]	1,00	1,00	1,00	1,00	1,00	1,00	1,00
ADPf[1]	0,58	0,76	0,90	1,00	1,18	1,30	1,48
WDP[1]	0,72	0,84	0,93	1,00	1,12	1,20	1,32
PERE	0,91	0,95	0,98	1,00	1,04	1,06	1,10
PERM	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PERT	0,91	0,95	0,98	1,00	1,04	1,06	1,10
PENRE	0,58	0,76	0,90	1,00	1,18	1,30	1,48
PENRM	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PENRT	0,58	0,76	0,90	1,00	1,18	1,30	1,48
SM	1,00	1,00	1,00	1,00	1,00	1,00	1,00
RSF	0,42	0,67	0,86	1,00	1,25	1,42	1,67
NRSF	0,42	0,67	0,86	1,00	1,25	1,42	1,67
FW	0,64	0,80	0,91	1,00	1,15	1,25	1,41

Table 3: Weight per panel thickness.

Weight per square meter panel	Panel thickness [mm]						
	50	80	103	120	150	170	200
Weight [kg/m^2]	10,23	11,47	12,42	13,13	14,37	15,19	16,43

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	2,52E+01	3,12E-01	2,10E+00	0,00E+00	9,93E-01	0,00E+00	1,42E-02	6,00E-02	1,20E+01	0	-1,18E+00
GWP-fossil	kg CO2 eq.	2,52E+01	3,08E-01	2,10E+00	0,00E+00	1,14E+00	0,00E+00	1,40E-02	5,93E-02	1,20E+01	0	-1,18E+00
GWP-biogenic	kg CO2 eq.	1,01E-02	9,14E-04	2,38E-03	0,00E+00	-3,56E-01	0,00E+00	1,25E-04	1,75E-04	1,10E-03	0	-3,03E-03
GWP-LULUC	kg CO2 eq.	2,30E-02	2,86E-03	3,94E-04	0,00E+00	2,05E-01	0,00E+00	7,14E-05	5,48E-04	1,17E-04	0	-3,63E-04
ODP	kg CFC11 eq.	1,92E-07	2,70E-14	1,35E-13	0,00E+00	2,62E-08	0,00E+00	1,59E-14	7,70E-15	1,08E-07	0	-2,56E-12
AP	mol H^+ eq.	6,63E-02	1,18E-03	3,39E-03	0,00E+00	6,46E-03	0,00E+00	5,21E-05	2,31E-04	1,21E-02	0	-2,82E-03
EP-freshwater	kg P eq.	1,91E-04	1,13E-06	6,23E-07	0,00E+00	1,81E-04	0,00E+00	3,97E-08	2,16E-07	3,05E-05	0	-2,01E-06
EP-marine	kg N eq.	2,01E-02	5,49E-04	7,62E-04	0,00E+00	3,33E-03	0,00E+00	1,75E-05	1,08E-04	5,58E-03	0	-7,07E-04
EP-terrestial	mol N eq.	2,09E-01	6,15E-03	8,26E-03	0,00E+00	1,60E-02	0,00E+00	1,94E-04	1,21E-03	6,30E-02	0	-7,57E-03
POCP	kg NMVOC eq.	6,19E-02	1,06E-03	2,59E-03	0,00E+00	5,13E-03	0,00E+00	3,99E-05	2,09E-04	1,54E-02	0	-2,33E-03
ADP-M&M	kg Sb eq.	1,77E-03	1,99E-08	7,10E-06	0,00E+00	7,99E-06	0,00E+00	1,13E-09	3,90E-09	8,61E-07	0	-6,50E-08
ADP-fossil	MJ	5,36E+02	4,20E+00	1,32E+01	0,00E+00	2,38E+01	0,00E+00	2,99E-01	8,06E-01	1,02E+01	0	-1,24E+01
WDP	m^3	3,94E+00	3,56E-03	3,99E-01	0,00E+00	2,09E+00	0,00E+00	7,43E-04	7,15E-04	1,15E+00	0	-3,60E-02

GWP-total: *Global Warming Potential;* ***GWP-fossil:*** *Global Warming Potential fossil fuels;* ***GWP-biogenic:*** *Global Warming Potential biogenic;* ***GWP-LULUC:*** *Global Warming Potential land use and land use change;* ***ODP:*** *Depletion potential of the stratospheric ozone layer;* ***AP:*** *Acidification potential. Accumulated Exceedance;* ***EP-freshwater:*** *Eutrophication potential. fraction of nutrients reaching freshwater end compartment; See "additional Norwegian requirements" for indicator given as PO4 eq.* ***EP-marine:*** *Eutrophication potential. fraction of nutrients reaching freshwater end compartment;* ***EP-terrestrial:*** *Eutrophication potential. Accumulated Exceedance;* ***POCP****: Formation potential of tropospheric ozone;* ***ADP-M&M****: Abiotic depletion potential for non-fossil resources (minerals and metals);* ***ADP-fossil:*** *Abiotic depletion potential for fossil resources;* ***WDP:*** *Water deprivation potential. deprivation weighted water consumption*

Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – 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.

Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Resource use

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
RPEE	MJ	2,21E+02	2,97E-01	5,94E-01	0,00E+00	1,08E+01	0,00E+00	1,26E-01	5,86E-02	6,44E-01	0,00E+00	-3,94E+00
RPEM	MJ	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
TPE	MJ	2,21E+02	2,97E-01	5,94E-01	0,00E+00	1,08E+01	0,00E+00	1,26E-01	5,86E-02	6,44E-01	0	-3,94E+00
NRPE	MJ	4,05E+02	4,21E+00	2,14E+01	0,00E+00	2,41E+01	0,00E+00	2,99E-01	8,09E-01	1,34E+02	0,00E+00	-1,24E+01
NRPM	MJ	1,32E+02	0,00E+00	-8,23E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,24E+02	0,00E+00	0,00E+00
TRPE	MJ	5,37E+02	4,21E+00	1,32E+01	0,00E+00	2,41E+01	0,00E+00	2,99E-01	8,09E-01	1,02E+01	0	-1,24E+01
SM	kg	7,42E+00	0,00E+00	1,22E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00
RSF	MJ	5,05E-08	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	0,00E+00
NRSF	MJ	6,41E-07	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	0,00E+00
W	m^3	2,04E-01	3,27E-04	9,82E-03	0,00E+00	4,80E-02	0,00E+00	1,42E-04	6,42E-05	2,70E-02	0	-3,52E-03

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non-renewable primary energy resources used as energy carrier; NRPM Non-renewable primary energy resources used as materials; TRPE Total use of non-renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non-renewable secondary fuels; W Use of net fresh water

End of life - Waste

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	C1	C2	C3	C4	D
HW	KG	1,77E-04	1,56E-11	9,88E-09	0,00E+00	1,73E-10	0,00E+00	-1,83E-11	2,50E-12	2,67E-10	0	3,93E-10
NHW	KG	3,69E-01	6,07E-04	4,80E-02	0,00E+00	5,89E-01	0,00E+00	1,89E-04	1,23E-04	5,76E-02	0	-1,92E-02
RW	KG	8,46E-03	5,44E-06	6,54E-05	0,00E+00	9,52E-04	0,00E+00	4,72E-05	1,51E-06	1,24E-04	0	-6,86E-04

HW Hazardous waste disposed; NHW Non-hazardous waste disposed; RW Radioactive waste disposed.

End of life – output flow

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	C1	C2	C3	C4	D
CR	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	0,00E+00
MR	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	8,64E+00	0	0,00E+00
MER	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	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	1,43E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,98E+01	0	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	2,55E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,54E+01	0	0,00E+00

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy.

Reading example: 9.0 E-03 = 9.0*10-3 = 0.009

Information describing the biogenic carbon content at the factory gate.

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0
Biogenic carbon content in the accompanying packaging	kg C	0

Additional Norwegian requirements

Greenhous gas emission from the use of electricity in the manufacturing phase

National hydropower production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process(A3).

National electricity grid	Unit	Value
Finland, hydropower	kg CO2 -eq/kWh	0.014

Additional environmental impact indicators required in NPCR Part A for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP-IOBC	kg CO2 eq.	2,52E+01	3,11E-01	2,10E+00	0,00E+00	1,35E+00	0,00E+00	1,40E-02	5,98E-02	1,20E+01	0,00E+00	-1,18E+00

GWP-IOBC *Global warming potential calculated according to the principle of instantaneous oxidation.*

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

☑ The product contains no substances given by the REACH Candidate list or the Norwegian priority list.

Indoor environment

The product meets the requirements for low emissions (M1).

Guarantees of origin from the use of electricity in the manufacturing phase

Where guarantees of origin is applied in stead of national production mix – the electricity for the manufacturing prosess (A3) shall be stated clearly in the EPD per functional unit.

Electricity source	Foreground / core [kWh]	GWPtotal [kg CO2 - eq/kWh]	SUM [kgCO2 - eq]Unit
Amount of guarantee of origin electricity used in the foreground	2,55	0,01	0,04
Amount of residual mix electricity used in the foreground			

The guarantee of origin utilized in this EPD is provided by Helen Ltd, with a validity period between 1.1.2023 – 31.12.2023. The origin of elerctricity is Nordic Hydro-Electricity. Guarantees of origins was not stated in the EPD for the dataset from upstream activities (A1).

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epd-norway Global Program Operator	**Program Operator** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	tlf e-post: web	+47 23 08 80 00 post@epd-norge.no www.epd-norge.no
epd-norway Global Program Operator	**Publisher** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	tlf e-post: web	+47 23 08 80 00 post@epd-norge.no www.epd-norge.no
Kingspan	**Owner of the declaration** Kingspan OY Halmeenkatu 7, 38700 Kankaanpää Finland	tlf e-post: web	 www.kingspan.se
RAMBØLL	**Author of the life cycle assessment** Hannes Westberg Niclas Silfverstrand	tlf e-post: web	+46 10 615 33 27 Niclas.silfverstrand@ramboll.se www.ramboll.se
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