

Statement of Verification

BREG EN EPD No.: 000573

Issue 01

This is to verify that the
Environmental Product Declaration
provided by:
Klasse Group



is in accordance with the requirements of:
EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:

1 m² of Klasse G-board® Gypsum External Sheathing Board (Outwear)

Company Address

Klasse Group
Beacon House,
Queensway,
Swansea West Business Park,
Swansea
SA5 4DH



Signed for BRE Global Ltd

Emma Baker
Operator

08 April 2024
Date of this Issue

08 April 2024
Date of First Issue

07 April 2029
Expiry Date



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Environmental Product Declaration

EPD Number: 000573

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2023 Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.1
Commissioner of LCA study	LCA consultant/Tool
Klasse Group Beacon House, Queensway, Swansea West Business Park, Swansea SA5 4DH	Bala Subramanian/LINA A2
Declared/Functional Unit	Applicability/Coverage
1 m ² of Klasse G-board® Gypsum External Sheathing Board (Outwear)	Other (please specify). Product specific
EPD Type	Background database
Cradle to Gate with options	ecoinvent
Demonstration of Verification	
CEN standard EN 15804 serves as the core PCR ^a	
Independent verification of the declaration and data according to EN ISO 14025:2010 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External	
(Where appropriate ^b)Third party verifier: Francis Yu	
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)	
Comparability	
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance	

Information modules covered

Product			Construction		Use stage							End-of-life				Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building						
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, Recovery and/or Recycling potential
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Klasse Group
Beacon House,
Queensway,
Swansea West Business Park,
Swansea
SA5 4DH

Construction Product:

Product Description

Klasse G-board is a high-performance external gypsum-based sheathing board made with special glass fibre and is durable against fire, moisture, mould, and impact. Lightweight and easy to carry, it facilitates fast, practical, and economical construction solutions.

Usage:

Used as an external sheathing board to provide weather protection to a lightweight steel frame construction prior to the installation of external wall insulation and façade system. Also suitable for modular and timber-framed buildings

In this EPD, Klasse G-Board with the standard dimension of 2400 x 1200 x 12.5 mm with the average weight of 11.3 kg/m² has been modelled and results are enclosed in this EPD.

Technical Information

Property	Value, Unit
Length	2400mm
Width	1200mm
Thickness	12.5 mm
Average weight	≤ 12 kg/m ²
Edge Type	Square
BBA Certificate 22/6085 Confirms the technical properties of the G-Board	

Standards:

Name	Standards
Flexural Breaking Load – Longitudinal direction to BS EN 15283-1:2008	761N
Flexural Breaking Load – Transverse direction to BS EN 15283-1:2008	601N
Reaction to fire to BS EN 13501-1:2018	Non-Combustible Euroclass A1
Thermal Conductivity to BS EN 12524	0.25 W/mK
Water Vapour resistance factor	10 μ
Total Water Absorption	$\leq 5\%$
Mould Resistance to MOAT33:1986	Mould Resistant
EN 15283-1:2008+A1:2009 - Gypsum boards with fibrous reinforcement — Definitions, requirements, and test Methods.	



Main Product Contents

Calcium sulphate dihydrate encased within a glass fibre mat. Additionally nominal amounts of additives such as starch, foaming agent, dispersants, wax, and glass fibre.

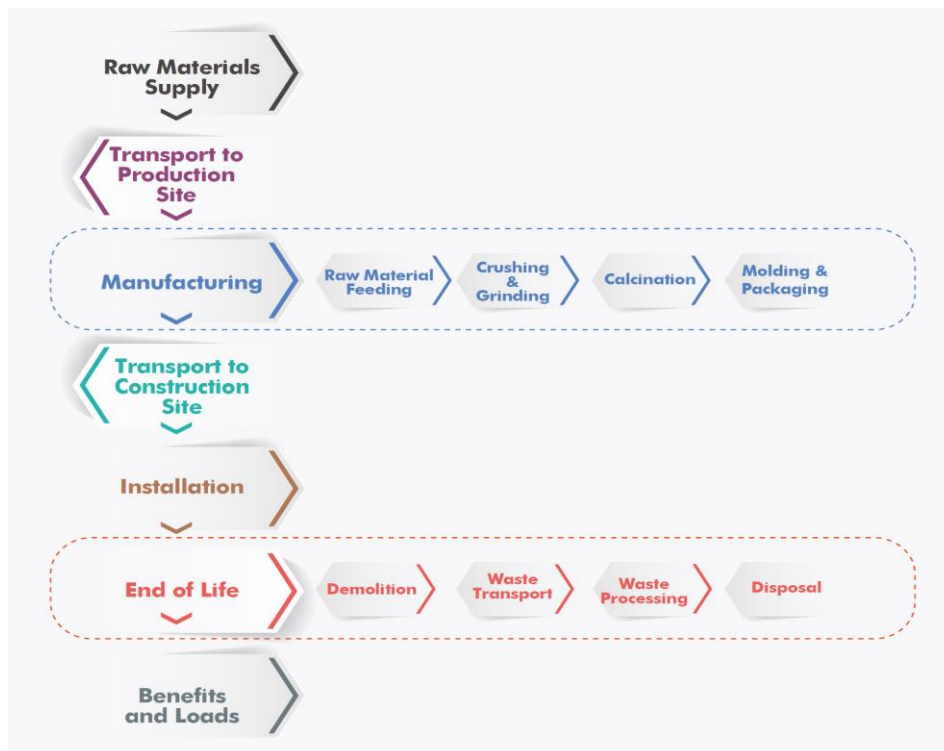
Appearance - Klasse G-board is coloured green on the front face and green on the back face.

Material/Chemical Input	%
Calcium Sulfate	50-55%
Water	40-45%
Paper	0-5%
Water Repellent - Polyester	0-5%
Additives	<1%

Manufacturing Process

Gypsum extracted from the gypsum quarry is first crushed in crusher to have smaller particle sizes. Then it is calcined in the kilns and transferred to the gypsum hemi-hydrate silos at plasterboard production area. Gypsum hemi-hydrate, additives and water are fed into mixer to have a homogenous mixture then slurry from mixer is poured between two layers of plasterboard paper. Before feeding to the drier, the plasterboard is cut. After they are drier, plasterboard is trimmed to exact dimensions, stacked, and packed.

Process flow diagram



Construction Installation

The Gypsum fibreboard is stored in warehouses which is then dispatched to the corresponding locations and for the installation of the Plasterboard; plaster, screws and metal profiles are used for the implementation of the product

End of Life

The gypsum core in Klasse G-board is fully recyclable. Gypsum powder from the recycled board fully meets the quality criteria of BSI PAS109 in relation to composition, paper fibre content and purity. This provides for diversion from landfill into recycling markets.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description.

1 m² of Klasse G-board® Gypsum External Sheathing Board (Outwear)

System boundary

This is a cradle-to-gate with options LCA, reporting all production life cycle stages of modules A1 to A3, construction and installation modules A4 – A5, and end of life stages C1-C4, and D in accordance with EN 15804:2012+A2:2019 and BRE 2021 Product Category Rules (PN 514 Rev 3.1).

Data sources, quality and allocation

Datasets are derived from Ecoinvent v3.8 and the LCA tool used was BRE LINA A2. The quantity used in the data collection for this EPD is therefore the total amount of Klasse G-Board distributed in the UK over the period of one year from 01/01/2022 to 31/12/2022. In this EPD, manufacturing impacts of G-board® were taken from the manufacturers EPD and combined with Klasse impacts for storage and distribution. Generally, Klasse Group receives the fully manufactured G-board from their third-party supplier, and they are stored in the Klasse Group warehouse and distributed all around the UK.

Further, Klasse provides the manufacturer's EPD, where the environmental impacts are calculated for the standard dimension of 2400 x 1200 x 12.5 mm with an average weight of 11.25 kg/m² using the ecoinvent 3.9.1 dataset and used the EN 15804 A2 PCR. Therefore, the manufacturing impacts A1-A3 were taken from the manufacturer's EPD and fed into the LINA tool as a raw material, and additional impacts from transportation and storage were calculated, and the results are enclosed in this EPD. Other products are manufactured in addition to G-Board; therefore, the allocation of electricity and water consumption and discharge are required, and this has been done by mass according to the provisions of BRE PCR PN514 and EN 15804. Upon the data review, it was noted that the input quantity is less than the production output, therefore a data uplift calculation has been made.

Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e., raw material production) from the ecoinvent 3.8 database. All ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN15804 A2.

ISO14044 guidance. Quality Level	Geographical representativeness	Technical representativeness	Time representativeness
Very Good	Data from area under study.	Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e., identical technology).	n/a
Very Good	n/a	n/a	There is approximately 1-2 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

Specific UK datasets have been selected from the ecoinvent LCI for this LCA. G-Boards are stored in Klasse warehouse, and the warehouse was powered by using the national grid electricity, therefore the national grid electricity dataset "Electricity – GB (kWh)" has been used for the LCA modelling (Ecoinvent 3.8). The GWP carbon footprint for using 1 kWh of Electricity – GB is 0.239 in kgCO₂e/kWh. The quality level of time representativeness is also Very Good as the background LCI datasets are based on ecoinvent v3.8 which was compiled in 2021. Therefore, there is less than 5 years between the ecoinvent LCI reference year and the time period for which the LCA was undertaken.

Cut-off Criteria:

All the raw materials, process energy, fuels, have been included. Direct emissions to air, water, and soil are not measured and no ancillary materials, packaging and water is used during the storage

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO ₂ eq	kg CO ₂ eq	kg CO ₂ eq	kg CO ₂ eq	kg CFC11 eq	mol H ⁺ eq	kg (PO ₄) ³⁻ eq
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (Consumption grid)	A1-3	5.28E+00	5.22E+00	5.26E-02	9.75E-03	4.45E-07	4.24E-02	1.07E-03
Construction process stage	Transport	A4	1.06E+00	1.06E+00	9.02E-04	4.15E-04	2.45E-07	4.29E-03	6.81E-05
	Construction	A5	3.06E+00	3.02E+00	3.15E-02	3.93E-03	1.58E-07	1.62E-02	8.99E-04
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
100% - Recycling									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.21E-01	1.21E-01	1.10E-04	5.70E-05	2.72E-08	4.81E-04	9.10E-06
	Waste processing	C3	3.73E-02	3.73E-02	1.32E-05	3.72E-06	7.97E-09	3.88E-04	1.16E-06
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.79E+00	-3.92E+00	1.46E-01	-6.67E-03	-2.07E-07	-2.69E-02	-1.23E-03

GWP-total = Global warming potential, total;
 GWP-fossil = Global warming potential, fossil;
 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; and
 EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			EP-marine	EP-terrestrial	POCP	ADP-mineral & metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m ³ world eq deprived	disease incidence
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (Consumption grid)	A1-3	9.93E-03	1.25E-01	3.45E-02	5.09E-05	8.91E+01	9.39E-01	2.10E-07
Construction process stage	Transport	A4	1.29E-03	1.41E-02	4.33E-03	3.68E-06	1.60E+01	7.20E-02	9.13E-08
	Construction	A5	3.18E-03	3.47E-02	1.05E-02	6.26E-05	3.50E+01	8.66E-01	2.09E-07
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
100% - Recycling									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.40E-04	1.53E-03	4.71E-04	5.52E-07	1.81E+00	9.21E-03	9.01E-09
	Waste processing	C3	1.72E-04	1.88E-03	5.17E-04	1.92E-08	5.12E-01	1.18E-03	9.44E-08
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.70E-03	-5.34E-02	-1.36E-02	-7.55E-06	-4.27E+01	-1.26E+00	-4.15E-07

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
 EP-terrestrial = Eutrophication potential, accumulated exceedance;
 POCP = Formation potential of tropospheric ozone;
 ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;

ADP-fossil = Depletion potential of the stratospheric ozone layer;
 WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
 PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U ²³⁵ eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG
	Total (Consumption grid)	A1-3	5.08E-01	3.10E+01	7.24E-09	4.74E-08	1.69E+01
Construction process stage	Transport	A4	8.22E-02	1.25E+01	4.04E-10	1.31E-08	1.10E+01
	Construction	A5	3.23E-01	8.00E+01	4.84E-08	6.10E-08	2.07E+01
Use stage	Use	B1	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND
100% - Recycling							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	9.60E-03	1.47E+00	5.39E-11	1.49E-09	1.07E+00
	Waste processing	C3	2.31E-03	2.99E-01	1.16E-11	2.17E-10	6.52E-02
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.05E-01	-1.40E+02	-1.59E-09	-4.06E-08	-4.32E+01

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;

HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (Consumption grid)	A1-3	7.98E+00	0.00E+00	1.58E+01	8.87E+01	0.00E+00	1.59E+02
Construction process stage	Transport	A4	2.25E-01	0.00E+00	2.25E-01	1.57E+01	0.00E+00	1.57E+01
	Construction	A5	7.01E+00	9.99E-02	7.42E+00	3.41E+01	1.70E+00	3.86E+01
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
100% - Recycling								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	2.87E-03	0.00E+00	2.87E-03	5.02E-01	0.00E+00	5.02E-01
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-8.51E+00	0.00E+00	-8.51E+00	-4.21E+01	0.00E+00	-4.21E+01

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
 PERM = Use of renewable primary energy resources used as raw materials;
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
 PENRM = Use of non-renewable primary energy resources used as raw materials;
 PENRT = Total use of non-renewable primary energy resource

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, secondary materials and fuels, use of water			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m ³
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (Consumption grid)	A1-3	1.24E-05	1.23E-08	0.00E+00	2.77E-02
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	1.78E-03
	Construction	A5	2.35E-01	3.28E-06	0.00E+00	2.59E-02
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
100% - Recycling						
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	2.29E-04
	Waste processing	C3	1.97E-04	0.00E+00	0.00E+00	2.92E-05
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.51E-01	0.00E+00	0.00E+00	-3.04E-02

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (Consumption grid)	A1-3	2.30E-02	3.04E-01	1.31E-04
Construction process stage	Transport	A4	1.76E-02	3.13E-01	1.08E-04
	Construction	A5	2.06E+00	4.11E+00	1.11E-04
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
100% - Recycling					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	6.71E-04	4.72E-03	3.54E-06
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.27E-01	-5.44E+00	-9.67E-05

HWD = Hazardous waste disposed;
 NHWD = Non-hazardous waste disposed;
 RWD = Radioactive waste disposed

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

			Other environmental information describing output flows – at end of life					
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (Consumption grid)	A1-3	0.00E+00	2.14E-07	9.14E-11	9.86E-06	1.53E-01	1.00E-03
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	3.63E-02	2.42E-08	2.62E-03	6.12E-03	4.00E-05
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
100% - Recycling								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	6.69E-07	1.07E-08	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	The Klasse G-board® Gypsum External Sheathing Board is stored in warehouses which is then dispatched to the corresponding locations.		
	Vehicle type	vehicle type	Lorry, 16 - 32 metric ton
	Distance:	km	563.3
	Capacity utilisation (incl. empty returns)	%	26
	Bulk density of transported products	kg/m ³	342
A5 – Installation in the building	Klasse G-board is supplied on pallets. Packs should be removed using a forklift truck or hydraulic trolley and stored in dry, flat conditions. Klasse G-board is weather-resistant when installed in the vertical plane.		
	Klasse G-board can be cut with a knife and no power tools are required with minimal dust generation. Boards are installed vertically in a staggered brick pattern with Carbon Steel self-drilling 4.2 x 32mm fasteners located at least 13mm but no more than 20mm from the board edges. Fix to light gauge steel frame studs at maximum 600mm centres with fixings at a maximum 300mm centres. Installation waste rate = 4%		
	Ancillary materials used for installation	kg	Lorry 16-32 metric ton
	Hand knife	0.002	50
	Drill bit	0.003	50
	Plaster	2	50
	Screws	0.016	50
Metal profile	0.4	50	
A5 - Wastages	Wastages from installation: 4% of product waste resulted from the installation and they will be ended in landfill and Klasse G-board comes with minimal packaging and the pallets are made of recyclable material.		
Packaging waste	Plastic Strip – 100% recyclable	kg	0.04
	Wood Pallet – 100% recyclable	kg	0.01
	Board waste 4% from installation to landfill	kg	0.452
C1- Deconstruction	At the end of its life, the product will be manually dismantled from the building sector without the use of power tools. The recovered waste plasterboards can readily be recycled into their constituent parts - gypsum and paper. The recycled gypsum has various uses in applications that currently uses the natural (mined or quarried) gypsum or synthetic gypsum (by-products from industrial processes). The recycling processes shall be carried out following the BSI PAS109 requirements for recycling plasterboard. The recovered plasterboard will be transported to the pre-processing unit for further processing.		
C2- Transportation	50km by road has been modelled for module C2 as a typical distance from the demolition site to the disposal unit. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module C2 if required.		
	Fuel type / Vehicle type	Road transport	16–32-ton lorry
	Deconstruction site to the disposal unit	km	50

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C3- Pre-Processing	The recovered gypsum plasterboard will be recycled in the waste processing sector following the BSI PAS 109 requirements. The gypsum resulting from the processing of waste plasterboard will adhere to the PAS standard and meet the specifications outlined in one of the product grades defined within the PAS. The recycled gypsum has various uses in applications that currently use the natural (mined or quarried) gypsum or synthetic gypsum (by-products from industrial processes).		
	The energy used in the processing of waste plasterboard is not included in this modelling.		
	Gypsum Plasterboard to recycling	kg	11.3
Module D	It is assumed as 100% of the product will be recycled at its end of life. Benefits and loads beyond the system boundary" (module D) accounts for the environmental benefits and loads resulting from net scrap that is used as raw material in the new system. The calculation assumes that there is no yield-loss during the recycling processes.		

Interpretation of results

The Klasse group receives the C-Board from their third-party supplier, so the impacts have been analysed based on product transportation and installation. It is observed that the greatest impact on global warming potential arises from the A5-installation phase. The primary reason for this is the production of steel profiles used in its installation rather than the plasterboard product. The largest impact from the plasterboard itself is attributed to the raw material stage.

References

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- BS EN 15283-1:2008+A1:2009 Gypsum boards with fibrous reinforcement. Definitions, requirements, and test methods Gypsum boards with mat reinforcement
- BS EN 12524:2000 Building materials and products - Hygrothermal properties - Tabulated design values.
- BSI PAS109 - Recycled gypsum from waste plasterboard: quality protocol
- BS EN 13501-1:2018 - Fire classification of construction products and building elements.
- MOAT33:1986 - Assessment of masonry coatings.