Statement of Verification

BREG EN EPD No: 000844 Issue: 02

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

Permadoor Limited

are in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

1 unit of GRP composite door set in Diamond range weighing 61.45kg and dimensions of 1018 mm width x 2090 mm height.

Company Address

Permadoor Ltd
Station Road Industrial Estate,
Upton upon Severn,
Worcester, WR8 0RX



Signed for BRE Global Limited	Hayley Thomson Operator	
29 September 2026 Date of this Issue	04 September 2026 Date of First Issue	03 September 2031 Expiry Date

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Environmental Product Declaration

EPD Number: 000844

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE 2025 Product Category Rules (PN 514 Rev 3.2) for Type III environmental product declaration of construction products to EN 15804:2012+A2:2019
Commissioner of LCA study	**LCA consultant/Tool**
Permadoor Ltd Station Road Industrial Estate, Upton upon Severn, Worcester, WR8 0RX	Mustafa Ali/BRE LINA A2
Declared/Functional Unit	**Applicability/Coverage**
1 unit of GRP composite door set in Diamond range weighing 61.45kg and dimensions of 1018 mm width x 2090 mm height.	Representative Product.
EPD Type	**Background database**
Cradle to Gate with options	Ecoinvent 3.8

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 ☒Internal ☐ External
(Where appropriate [b])Third party verifier: Kim Allbury
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

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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
☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Permadoor Ltd
Station Road Industrial Estate,
Upton upon Severn,
Worcester, WR8 0RX

Construction Product:

Product Description

Permadoor Ltd provide GRP Composite Doorset for the building industry. In this EPD, 1 unit of Permadoor GRP doorset from the Diamond range has been modelled.

The Permadoor GRP door from the Diamond range is a high-performance composite entrance door, manufactured to bespoke specifications. Each door slab features a durable, weather resistant Glass Reinforced Plastic outerskin offering superior durability, thermal performance and weather resistance. The core is constructed from high density polyurethane foam engineered to provide exceptional thermal efficiency and insulation performance and security.

The declared product is a ‘ 1 unit of GRP composite door set in Diamond range weighing 61.45kg and dimensions of 1018 mm width x 2090 mm height. The final product is based on Permadoor Causley Door which is equivalent to the Worcester in the diamond range.

The Permadoor Worcester door and the Safedoors Causley door are the same physical product manufactured by Permadoor. The products are marketed under different brand names to serve different market sectors, with Worcester used within the Permadoor range and Causley used within the Safedoors trade retail range. There are no differences in material composition, component specification, dimensions, manufacturing process, performance characteristics, assembly methods or intended application. As such, the two products are technically identical and the use of Causley product data is directly representative of the Worcester product. The Causley door should therefore not be considered a proxy product but an alternative trade designation for the same doorset.

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The Causley doorset was selected for assessment as it represents the largest proportion of Permadoor's new-build GRP composite door sales volume. As the highest-volume product within the assessed product category, it provides the most representative basis for assessing the environmental impacts of the product range and is considered the most appropriate product for EPD development. The selected product is identical to the Worcester doorset sold through the Permadoor brand and therefore provides a representative assessment of both product designations. The environmental impacts reported within this EPD are applicable to both the Permadoor Worcester and Safedoors Causley doorsets. No proxy product manufacturing datasets were used for the modelling. The assessed Causley doorset is technically identical to the Worcester doorset and is marketed under an alternative brand name only.

The end user of this EPD can adjust the impacts proportionally based on the size of the door (in m2) purchased. For end user calculations, please refer to the table provided at the end of the document. The door consists of a GRP slab, which is cut to size and apertured. A glazing unit, hardware, reinforcement bars, cills and an outerframe are added to create the final door profile.
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Technical Information

Technical details for Permadoor GRP from the Diamond range can be accessed at: Composite Doors | Bespoke Composite Front Doors. Further technical information can be obtained by contacting Swish Permadoor directly.

Property	Value, Unit
Structural	Products have sufficient strength and stiffness to sustain associated design loads where no access is provided other than necessary for cleaning and repair.
Durability	Permadoor has an estimated service life of more than 40 years and highly resistant to denting, peeling, flaking or fading
Moisture	GRP is unaffected by moisture.

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Main Product Contents

Material/Chemical Input	%
Glass fibre reinforced plastic, polyester	63.67
PVC for outer frame	8.95
Rubber coated material for main frame reinforcement	4.69
Door glass	4.19
Others (Steel, aluminium, PVC and PP)	18.5

Final packaging consists mainly of polyethylene-based foam strips, handle protectors, shrink wrap, etc.

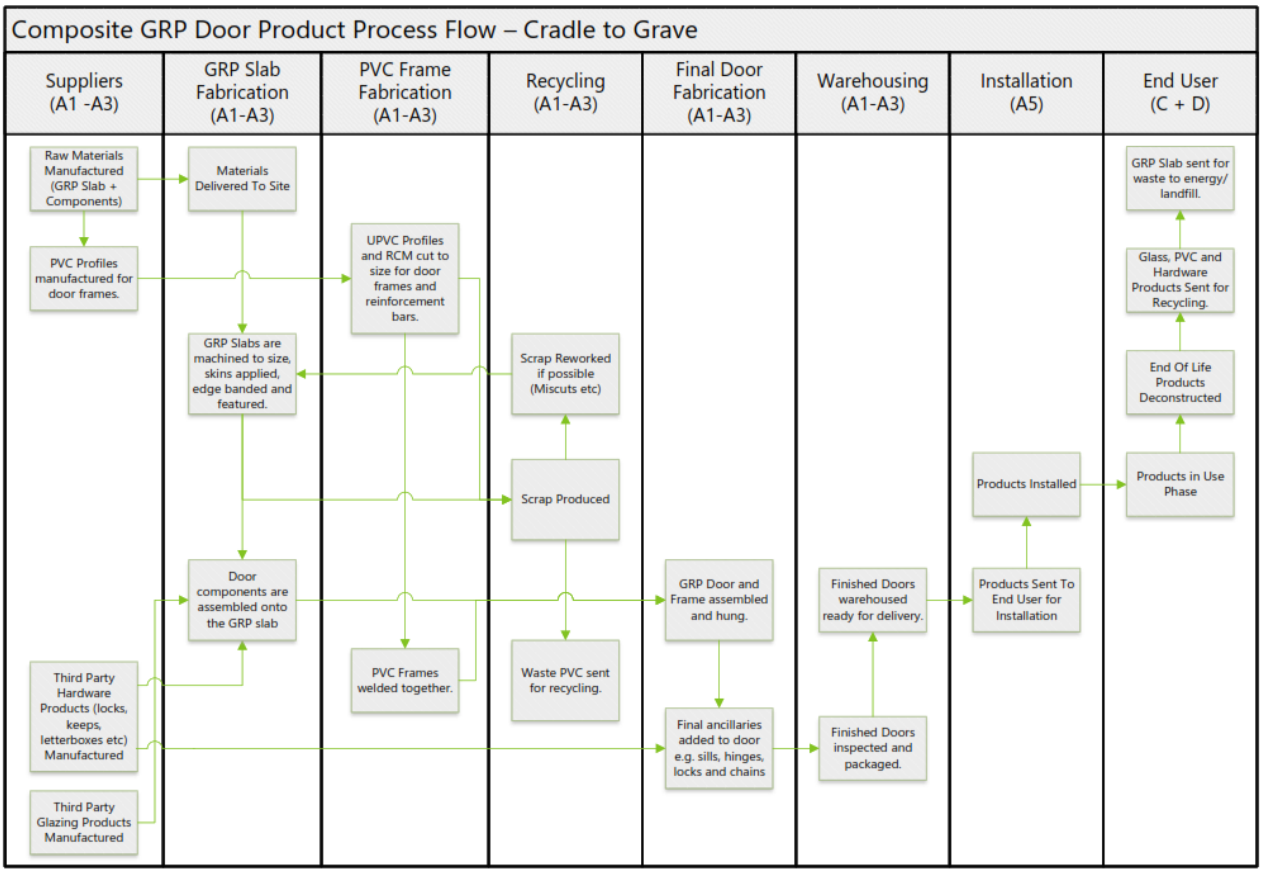
Manufacturing Process

High performance GRP slab is sized, machined and edge banded to all 4 sides, The apertures are then glazed with a Laminated / Toughened Low E glass unit and gasketed cassette. High performance hardware is then fitted handles, lock, viewer, door knocker, chain and weather bar. The UPVC frames are cut, machined and

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welded for the GRP door leaf to be hung into with adjustable hinges. The Door and frame go through vigorous checks within each process before going through a final inspection prior to packaging with foam strips and shrink-wrap ready for shipping. All production waste is recycled. For non-production waste, wood pallets, corner protectors, shrink wrap and vacuum bags are recycled; foam strips and foam handle protectors are sent to landfill, and general waste is landfilled/incinerated.

Process flow diagram



Construction Installation

Ancillary materials to install the door (such as screws) are provided which can be fixed using manual tools.

Use Information

All GRP products are manufactured to the highest standards, are lightweight and virtually maintenance free, requiring only a periodical wipe down to remove any surface dirt/dust.

End of Life

At the end of its life, the product will be deconstructed or dismantled during building demolition using non-powered hand tools. Once removed, the waste product will be sent to a waste processing unit for final disposal. The electricity used to dismantle the product is not included in the analysis because it is assumed to be negligible when compared to the overall electricity consumption during building demolition.
According to the manufacturer, at end of life, door is dismantled into recyclable pieces. The main GRP slab is not yet currently recyclable so ends up in a waste to energy cycle. Ancillaries like glass, metals and PVC are recyclable and can be dealt with via relevant government recycling schemes.

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Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 unit of GRP composite door set in Diamond range weighing 61.45kg and dimensions of 1018 mm width x 2090 mm height

System boundary

This is a Cradle-to-Gate with Options EPD, reporting the upstream processing stages A1 to A3, construction stages A4-A5, end-of-life stages C1-C4 and D in accordance with BRE 2025 Product Category Rules (PN 514 Rev 3.2) for Type III environmental product declaration of construction products to EN 15804:2012+A2:2019.

Data sources, quality and allocation

The datasets are derived from Ecoinvent v3.8, and the LCA tool used was BRE LINA A2. The LCA analysis is conducted for the 1 unit of Permadoor GRP doorset, with manufacturing data covering the period of one year (from 01/01/2024 to 31/12/2024).

In addition to the Permadoor GRP product in the Diamond range, other products are manufactured. Therefore, the allocation of electricity, fuel, waste, water consumption, and discharge are required. This allocation has been done according to the provisions of BRE PCR PN514 and EN 15804, using the mass production quantity. Site wide values for energy, water and wastewater have been taken from bills. Figures for the raw materials, ancillary materials and packaging were from actual usages. No data uplift was applied to the inputs or outputs. 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 EN 15804:2012+A2:2019.

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).	There is less than 3 years years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

The data quality assessment presented above has been carried out in accordance with Table E.1 in the Annex section of the BRE PCR EN 15804+A2 V3.2.

Location-based approach has been used for the modelling. Specific European datasets have been selected from the ecoinvent LCI for this LCA. Manufacturer uses the national grid electricity for production, so therefore the national grid electricity dataset has been used for the LCA modelling (Ecoinvent 3.8). The GWP carbon footprint for using 1 kWh of electricity, GB kWh is 0.239 $kgCO_2e/kWh$ and for the UK natural has carbon footprint for using 1 kWh is 0.232 $kgCO_2eq$. 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 raw materials and energy input to the manufacturing process have been included, except for direct emissions to air, water, and soil, which are not measured. The inventory process in this LCA includes all data related to raw material, packaging material and consumable items. *In addition, 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.

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LCA Results (1 unit of GRP composite door set in Diamond range weighing 61.45kg and dimensions of 1018 mm width x 2090 mm height.)

(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	2.93E+02	2.90E+02	2.91E+00	2.89E-01	3.29E-05	1.56E+00	8.35E-02
	Transport	A2	2.30E+00	2.29E+00	1.95E-03	9.00E-04	5.30E-07	9.33E-03	1.48E-04
	Manufacturing	A3	4.86E+01	2.69E+01	2.09E+01	7.27E-03	1.80E-06	3.66E-02	2.28E-03
	Total (Consumption grid)	A1-3	3.44E+02	3.19E+02	2.38E+01	2.97E-01	3.52E-05	1.61E+00	8.59E-02
Construction process stage	Transport	A4	1.73E+00	1.73E+00	1.53E-03	7.56E-04	3.94E-07	6.94E-03	1.22E-04
	Construction	A5	1.66E+00	1.64E+00	1.63E-02	1.02E-03	3.89E-07	6.97E-03	5.22E-04
Mix of recycling, incineration and landfill									
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	5.11E-01	5.11E-01	4.35E-04	2.01E-04	1.18E-07	2.07E-03	3.29E-05
	Waste processing	C3	1.16E+02	1.16E+02	6.59E-02	4.81E-03	1.01E-06	4.40E-02	1.44E-03
	Disposal	C4	1.91E-02	1.89E-02	1.62E-04	1.85E-05	5.41E-09	1.59E-04	2.83E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-8.88E+01	-8.82E+01	-4.67E-01	-1.02E-01	-4.47E-06	-5.31E-01	-3.80E-02

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

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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 &metal	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	2.92E-01	3.03E+00	1.01E+00	3.74E-03	4.38E+03	1.40E+02	1.85E-05
	Transport	A2	2.81E-03	3.07E-02	9.40E-03	7.97E-06	3.47E+01	1.56E-01	1.98E-07
	Manufacturing	A3	3.62E-02	1.16E-01	4.18E-02	5.13E-05	3.65E+02	4.25E+00	4.29E-07
	Total (Consumption grid)	A1-3	3.31E-01	3.18E+00	1.06E+00	3.80E-03	4.78E+03	1.44E+02	1.91E-05
Construction process stage	Transport	A4	2.05E-03	2.24E-02	6.88E-03	7.07E-06	2.60E+01	1.26E-01	1.38E-07
	Construction	A5	1.92E-03	1.48E-02	5.67E-03	1.90E-05	2.48E+01	1.19E+00	9.82E-08
Mix of recycling, incineration and landfill									
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	6.24E-04	6.82E-03	2.09E-03	1.78E-06	7.72E+00	3.47E-02	4.41E-08
	Waste processing	C3	1.87E-02	1.68E-01	4.30E-02	5.94E-05	6.10E+01	4.78E+01	3.67E-07
	Disposal	C4	5.29E-05	5.77E-04	1.67E-04	5.50E-08	4.24E-01	1.87E-02	3.14E-09
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-8.69E-02	-8.89E-01	-2.66E-01	-1.36E-04	-1.11E+03	-2.39E+01	-5.42E-06

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.

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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	2.44E+01	7.12E+03	1.00E-06	9.40E-06	8.97E+02
	Transport	A2	1.78E-01	2.70E+01	8.76E-10	2.84E-08	2.38E+01
	Manufacturing	A3	3.12E+00	2.26E+02	1.10E-08	1.83E-07	7.02E+01
	Total (Consumption grid)	A1-3	2.77E+01	7.37E+03	1.01E-06	9.61E-06	9.91E+02
Construction process stage	Transport	A4	1.36E-01	2.08E+01	7.23E-10	2.14E-08	1.64E+01
	Construction	A5	1.38E-01	4.52E+01	6.58E-09	5.33E-08	6.84E+00
Mix of recycling, incineration and landfill							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.97E-02	6.03E+00	1.95E-10	6.32E-09	5.30E+00
	Waste processing	C3	3.54E-01	1.45E+03	1.33E-08	6.80E-07	3.07E+01
	Disposal	C4	1.94E-03	7.63E+01	1.42E-11	2.60E-10	9.73E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.21E+01	-1.78E+03	-8.45E-08	-1.56E-06	-2.80E+02

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.

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LCA Results (continued)

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

Parameters describing resource use, primary energy

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	3.16E+02	0.00E+00	3.16E+02	4.13E+03	2.19E+02	4.35E+03
	Transport	A2	4.88E-01	0.00E+00	4.88E-01	3.40E+01	0.00E+00	3.40E+01
	Manufacturing	A3	-1.73E+02	1.94E+02	2.12E+01	-1.21E+02	4.96E+02	3.75E+02
	Total (Consumption grid)	A1-3	1.43E+02	1.94E+02	3.38E+02	4.04E+03	7.15E+02	4.76E+03
Construction process stage	Transport	A4	1.61E-01	0.00E+00	1.61E-01	1.12E+01	0.00E+00	1.12E+01
	Construction	A5	1.63E+00	0.00E+00	1.63E+00	-3.31E+01	5.50E+01	2.19E+01
Mix of recycling, incineration and landfill								
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	1.09E-01	0.00E+00	1.09E-01	7.58E+00	0.00E+00	7.58E+00
	Waste processing	C3	4.29E+00	0.00E+00	4.29E+00	-1.37E+03	1.42E+03	5.84E+01
	Disposal	C4	8.37E-03	0.00E+00	8.37E-03	4.17E-01	0.00E+00	4.17E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.23E+02	0.00E+00	-1.23E+02	-1.11E+03	0.00E+00	-1.11E+03

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

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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	4.03E+00	0.00E+00	0.00E+00	3.44E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	3.86E-03
	Manufacturing	A3	6.04E-02	6.81E-05	0.00E+00	1.13E-01
	Total (Consumption grid)	A1-3	4.09E+00	6.81E-05	0.00E+00	3.56E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	3.11E-03
	Construction	A5	4.81E-02	0.00E+00	0.00E+00	2.84E-02
Mix of recycling, incineration and landfill						
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	8.61E-04
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	1.11E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	4.39E-04
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-6.04E-01

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

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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	4.93E+01	3.86E+02	8.82E-03
	Transport	A2	3.82E-02	6.78E-01	2.34E-04
	Manufacturing	A3	9.96E-01	3.60E+01	1.30E-03
	Total (Consumption grid)	A1-3	5.03E+01	4.23E+02	1.04E-02
Construction process stage	Transport	A4	1.26E-02	2.24E-01	7.73E-05
	Construction	A5	2.66E-01	2.49E+00	4.22E-05
Mix of recycling, incineration and landfill					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	8.51E-03	1.51E-01	5.22E-05
	Waste processing	C3	7.27E+00	5.63E+01	2.50E-04
	Disposal	C4	2.41E-03	1.40E-01	2.49E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.10E+01	-2.05E+02	-3.67E-03

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

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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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E-03
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	9.22E+00	1.33E-06	6.43E-02	5.79E-03	2.52E-01
	Total (Consumption grid)	A1-3	0.00E+00	9.22E+00	1.33E-06	6.43E-02	5.79E-03	2.53E-01
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	7.78E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mix of recycling, incineration and landfill								
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	0.00E+00	4.94E+01	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	-3.61E-04	-2.19E-06	-3.65E-01	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

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Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	44 sites in 2024, miles have been calculated to each individual site then an average has been taken from all calculations.		
	Fuel type / Vehicle type	Litre of fuel type per distance or vehicle type	17.5T Lorry / 7.5T Van 50/50 Split
	Distance:	Km	74
	Weight of transported product	Kg	61.45
A5 – Installation in the building	Upon arrival at the site, Permodoor is unwrapped with all packing waste sent to recycling or landfilling. The product is affixed using screws, silicone, foam and fixing packers. These fixings have been included in this LCA. Installation waste includes packaging materials (foam strip, handle protector, corner protector, shrink wrap and vacuum bags). 100 km (by 16-32 tonne lorry) has been selected as a reasonable average distance to the installation site.		
Ancillary materials	Screws	Kg	0.217
	Silicone	Kg	0.114
	Fixing foam	Kg	0.043
	Packers	Kg	0.12
Packaging waste	Polystyrene to landfill	Kg	0.338
	General plastic waste to recycling	Kg	0.06
	Polyethylene waste to recycling	Kg	0.71
C1 - Deconstruction	It is assumed that 100% of the Permadoor will be removed at end of life using non-powered hand tools.		
C2 - Transportation	50 km (by 16-32 tonne lorry) has been selected as a reasonable average distance to a waste processing facility, and if required, the end user of the EPD can calculate impacts for a bespoke distance by dividing the C2 impacts by 50 and multiplying them by a bespoke distance.		
C3 – Pre-processing	As per the latest BRE's latest PCR based on EN15804 standard, 95% of Aluminium and steel parts will be recycled and 100% of PVC and other plastics will be incinerated. Similarly, 61% of glass will also be recycled.		
C4 - Disposal	As per BRE's latest PCR based on EN15804 standard, 39% of the glass and 5% of Aluminium and 5% of steel is to be landfilled.		

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Scenarios and additional technical information			
Scenario	Parameter	Units	Results
Module D	The material recovery from this material is via standard recycling methods of metal, glass and PVC. Additionally, the GRP core of the door is not yet recyclable so, is dealt with via waste to Energy. Overall, 38 kg of GRP in the Permadoor GRP will be incinerated for energy recovery at end of life. It is assumed that it will be incinerated in the UK, so the UK electricity dataset has been selected. The dataset used to calculate the avoided impacts of electricity consumption in a future system was 'Electricity, medium voltage {GB}| market for | Alloc Def, U'. This process is energy-efficient, with 37.4% of the combustion heat recovered after incineration. The efficiency rate of 37.4% has been calculated by taking the weighted average of the number of waste incineration plants available in the UK. According to the Environmental Agency's 2013 article on "CHP Ready Guidance for Combustion and Energy from Waste Power Plants" in the UK, EFW plants have an efficiency of 33%, and CHP plants have an efficiency of 55%. Additionally, according to Azapagic, A., & Jeswani, H. K. (2016), there are currently 25 MSW incinerators with energy recovery in the UK. It is assumed that 20 plants generate heat and power at 33%, while 5 plants generate electricity at 55%. Therefore, a weighted average calculation is used to determine the efficiency, which is calculated at 37.5%.		
	Recovered for recycling (Steel, aluminium and glass)	Kg	7.17
	Recovered for energy (GRP, PVC and PP)	Kg	48.99

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Summary, comments and additional information

The bulk of the environmental impacts are attributed to the manufacturing of Permadoor Diamond range covered by information modules A1-A3 of EN15804:2012+A2:2019. Figure1 below breaks down the GWP of Permadoor into clear categories to understand the modules which cause the largest environmental impact. It's clear that the majority of the environmental impact stems from the product modules (A1 – A3). Stage A1 (raw material) accounts for nearly all emissions, with a minor contribution from A3 (manufacturing). Stage A2 (transport) shows the minimum value. Figure 2 provides a detailed breakdown of the processes contributing to the impact in the A1–A3 stages. GFRP has the highest impact in Stage A1, followed by that from plastic waste incineration (C3).

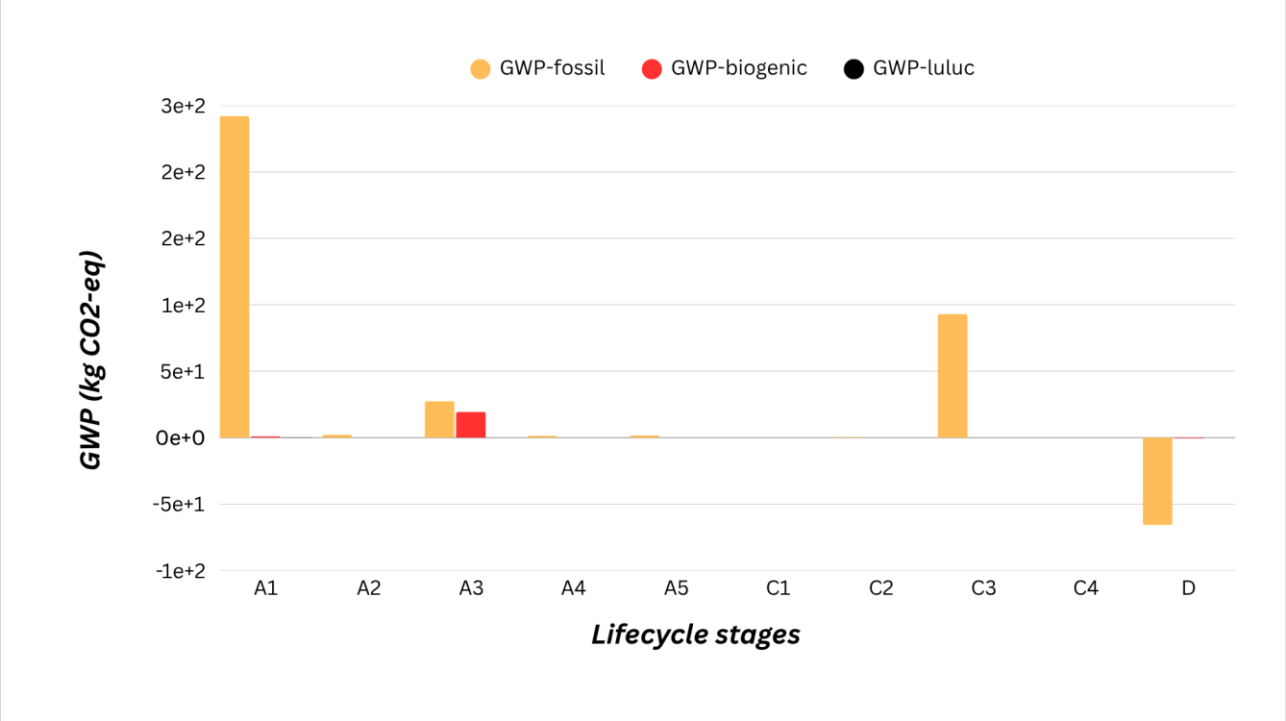


Figure 1

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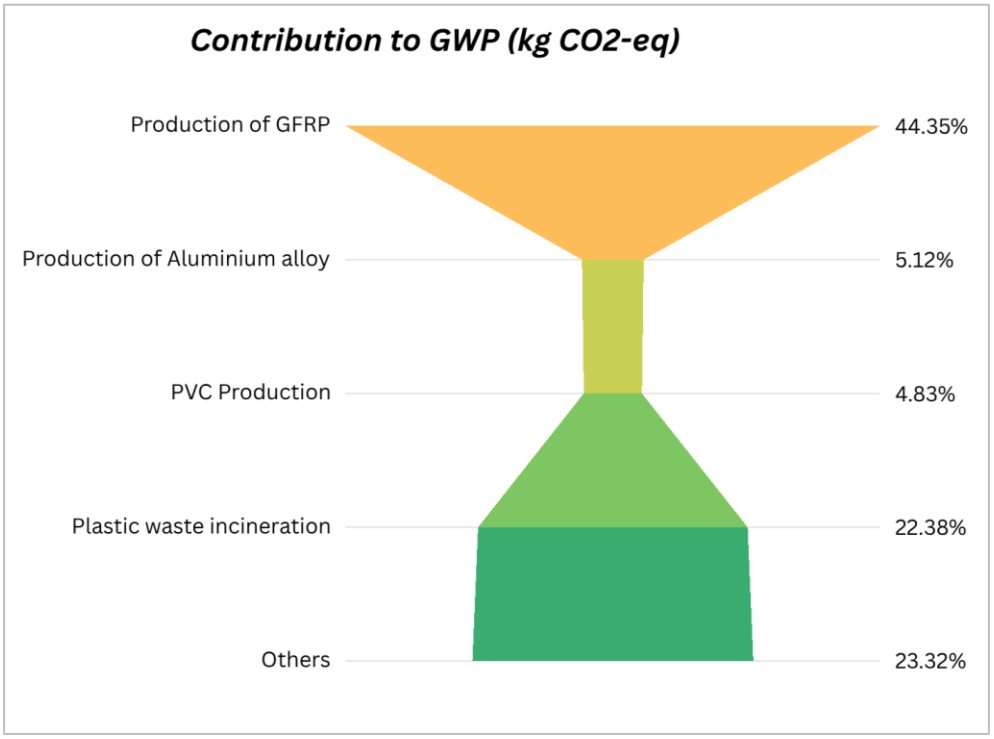


Figure 2

End-User Guidance Calculation

The LCA analysis has been conducted for 1 unit of GRP composite door set in Diamond range weighing 61.45kg and dimensions of 1018 mm width x 2090 mm height and the results are included in this EPD. This EPD reports the impacts of this particular door as a reference product to enable impact calculations. To allow for comparisons with similar doors, an end-user guidance table has been provided to customise the impacts based on different doors. The door has been divided into primary constituents. The end user can use the table to scale the results for a door with different weights for each of these constituents.

Name	Value	Units
Declared Unit Mass	61.45	kg
Reference door dimensions	1018 width x 2090 height	mm
Reference weight	61.45	kg
Weight of Cill (0.62 kg/m^2)	1.32	kg
Weight of glass unit (1.63 kg/m^2)	3.46	kg
Weight of GRP slab (18.62 kg/m2)	38.84	kg
Weight of Hardware (3.98 kg/m^2)	8.46	kg
Weight of outer frame (2.80 kg/m^2)	5.95	kg
Weight of PVC reinforcements (1.31 kg/m^2)	2.78	kg
Weight of steel reinforcements (0.14 kg/m^2)	0.29	kg
Weight of ancillary hardware (0.16 kg/m^2)	0.34	kg
GWP for reference door (A1-A3 stages)	3.44E+02	kg CO_2-eq
GWP/kg	5.59	kg CO_2-eq
GWP/m^2 (Door surface area is 2.12 m^2)	162.26	kg CO_2-eq

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