Statement of Verification

BREG EN EPD No: 000740 Issue: 01

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

Epwin Window Systems

are in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:
1.2 m × 1.2 m Epwin PVC-U double-glazed window frame uses 13.5 m of PVC profile at 1.48 kg/m, with a total weight of 19.98 kg.

Company Address

Epwin Window Systems,
Stafford Park 6,
Telford,
TF3 3AT

Epwin™ window systems

Signed for BRE Global Limited	Hayley Thomson Operator	
10 November 2025 Date of this Issue	10 November 2025 Date of First Issue	09 November 2030 Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: 000740

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2025 Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.2
Commissioner of LCA study	**LCA consultant/Tool**
Epwin Window Systems, Stafford Park 6, Telford, TF3 3AT	LCA consultant: Bala Subramanian LCA Tool: BRE LINA A2
Declared/Functional Unit	**Applicability/Coverage**
1.2 m × 1.2 m Epwin PVC-U double-glazed window frame uses 13.5 m of PVC profile at 1.48 kg/m, with a total weight of 19.98 kg.	Other (please specify). Product specific
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: Flavie Lowers
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
☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Epwin Window Systems,
Stafford Park 6,
Telford,
TF3 3AT

Construction Product:

Product Description

The declared product is a ‘typical 1.2m x 1.2m’ outward-opening casement window with two equally sized opening sashes designed to accommodate a double-glazed unit that meets UK Building Regulations. The final fabricated product contains approximately 13.5 m of PVC-U profile, with an average mass of 1.48 kg/m therefore the total weight of the window frame used for the analysis is 19.98 kg.

Therefore, the end user of this EPD can adjust the impacts proportionally based on the weight per metre of PVC-U profile used in their specific construction project. For end user calculations, please refer the table provided at the end of the document.

The windows consist of PVC-U extruded window frame profile which is cut to size and fusion welded together to form both the fixed element (outer frame) and the opening elements (sashes).

In this analysis, the PVC-U extruded window frame profile manufactured in Epwin window system has been modelled and the glass used at the final installation is excluded in the analysis.

Technical Information

Epwin Window Systems products are designed for use in the UK domestic and light commercial markets.

All systems are covered by BSI Kitemarks and in accordance with the following standards and accreditations.

Standard	Value, Unit
BS EN 12608- 1	PVC-U Profiles for the fabrication of windows & doors.
BS EN 12608/PAS 24:2022	Enhanced Security Window System Supplier.
BS EN ISO 9001	BSI Registered firm scheme: Quality Management Systems.
BS EN ISO 14001	Manufactured under an ISO 14001 Registered Environmental Management Systems.
BS ISO 45001	Occupational Health and Safety Management Systems.
SBD	The UK Police initiative supporting the principles of 'designing out crime' by use of crime prevention and security standards.
Vinylplus	A labelling scheme to identify the most sustainable and high performance PVC-U products.

Note: Data sourced from BSI Kitemarks data sheet. Please contact the Epwin Window Systems technical team for more information

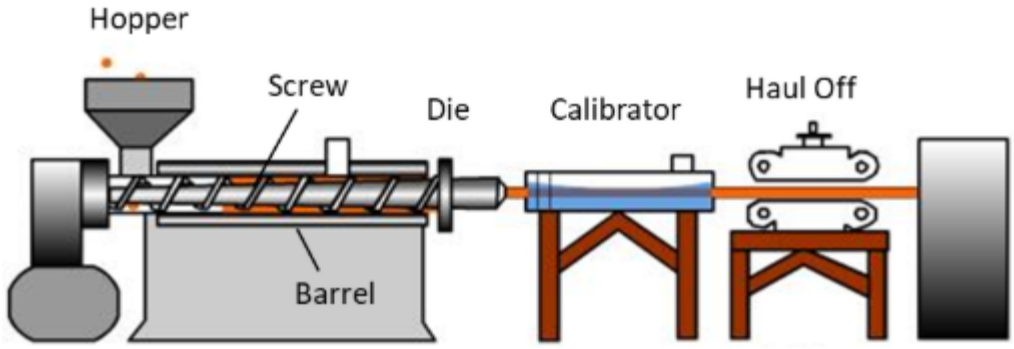
Note: The LCA results in this EPD cover only the window frame and exclude the glass, as glass is not part of Epwin's production.

Main Product Contents

Material/Chemical Input	%
PVC Resin	65-70
Post consumer Recycled PVC-U	10-15
Calcium carbonate chalk	5-10
Others	10-15

Manufacturing Process

The PVC-U Extrusion process is indicatively represented in the diagram below



The raw materials (blend) are loaded or fed into the hopper as the process begins.

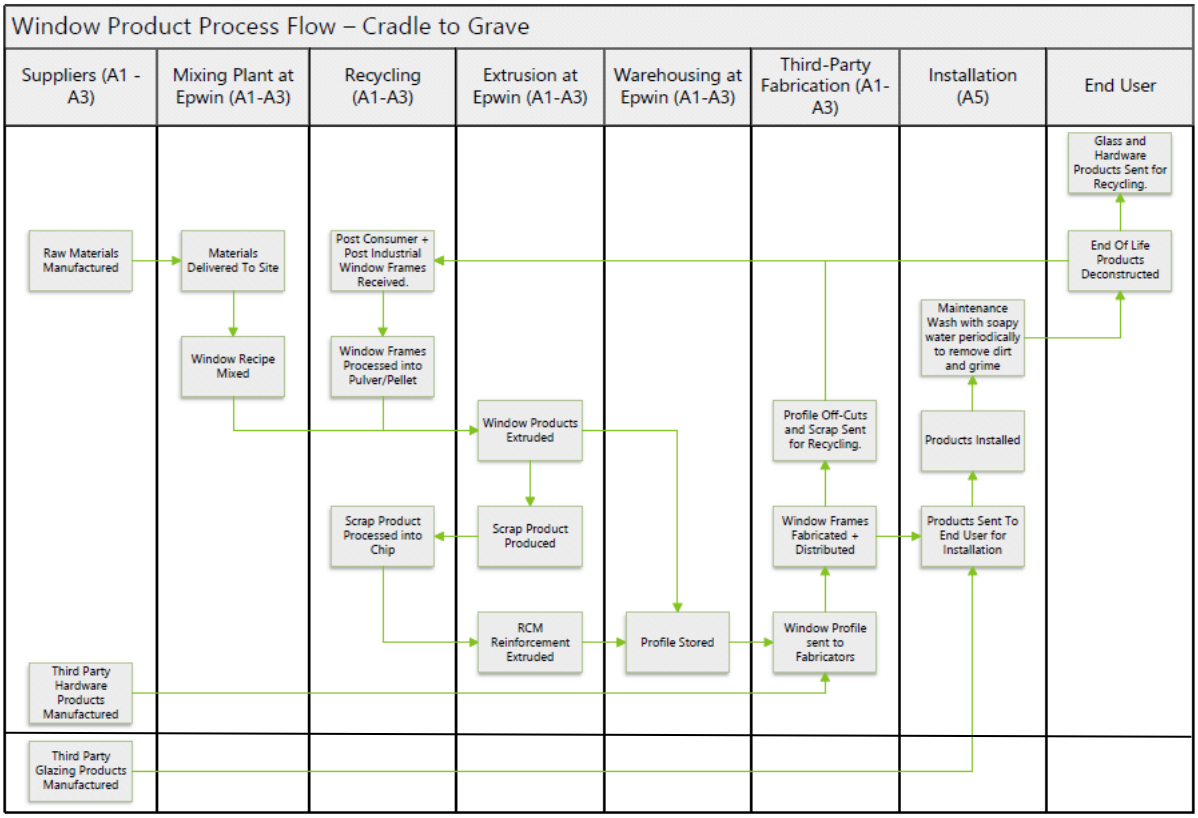
The hopper feeds the material into the barrel, and it is moved along the barrel by the screw which is driven by a motor gearbox.

A combination of an external heat source and the friction created between the screw and the material in the barrel causes the material to become molten. The screw then forces the molten material through the die, and the material takes the form of the die shape.

When the material leaves the die, it is still hot, soft and its form can easily be changed. The profile then passes through a calibrator where the profile shape is honed down to the final shape with the use of formers and vacuum.
The profiles are then cooled in a water bath then the excess water is blown off with air jets. The PVC-U window will contain a combination of both 'virgin' and post-consumer PVC-U material, the ration will be circa 50/50.
The frame and sash members can be 'reinforced' with either PVC-U or steel dependant on both its thermal and structural requirements. .

Epwin Window Systems is part of the Epwin Group of businesses which also supplies cladding, fascia's, doors, decking, rainwater goods, underground drainage and many other low maintenance building products supplied into new build, social housing, light commercial and domestic refurbishment markets. The window modelled in this EPD are manufactured and sold under the brand names of Profile 22 and Spectus.

Process flow diagram



Construction Installation

The installation of Epwin window profiles typically involves key steps such as preparing a clean, level opening, applying flashing tape, dry fitting the window, securing it, and ensuring proper sealing and operation. For detailed guidance, please contact the Epwin technical team.

In this LCA analysis, ancillary materials like fixings and sealant used to install a 1.2m x 1.2m white PVC-U framed window are included under Module A5. However, the glass installed on-site is not included in the analysis. The end user of this EPD can take the frame and A5 impacts, and they can add the glass impacts to calculate the impacts of the whole window frame.

An end-user calculation table has been provided at the end of the document to customise the impacts. Accordingly, the Ecoinvent 3.8 glass impacts (per kg CO_2-eq) are included. The end user may either apply the Ecoinvent figure or refer to the supplier's EPD.

Note: The PVC window profiles are manufactured in lengths based on customer requirements; therefore, an installation waste rate of 0% has been assumed and only the waste from the packaging is included.

End of Life

PVC-U windows have a reference service life of 30 Years as BRE PCR EN15804+A2, however there are many windows still installed with a much greater service life (since 70's/80"). Upon potential removal of 'Post Consumer' windows, the old windows are then shipped to UK recycling Centre via local collection hubs. Windows are then broken down and separated out into constituent material product streams and individually recycled. Only a cordless battery drill would be required for removal/installation and the energy used for the drill is negligible.

It's assumed as 100% of the product is recovered from the demolition site.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1.2 m × 1.2 m Epwin PVC-U double-glazed window frame uses 13.5 m of PVC profile at 1.48 kg/m, with a total weight of 19.98 kg.

System boundary

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

In general, Epwin manufactures the window frames as full-length profiles, which are then cut to size and fusion-welded together at the fabricator's facility. The energy use and waste generated from cutting the profiles at the fabricator's facility are included in the analysis. Therefore, the system boundary includes the following modules:

- A1 – Raw materials: Production of raw materials used to manufacture the PVC profiles.
- A2 – Transport: Transportation of raw materials, packaging, and other ancillary materials from the supplier to the Epwin production facility. This also includes transportation of the manufactured Epwin PVC profiles from the Epwin facility to the fabrication unit, which operates outside the control of the Epwin process.
- A3 – Manufacturing: Processes at the Epwin facility, including the consumption of ancillary materials, packaging, electricity, natural gas, and water, as well as process and non-production waste and water disposal. This module also includes the energy consumption and waste (production and non-production) generated during fabrication at third-party fabricator facilities. This module excludes the impact of glass which gets added to the frame at a later stage.
- A4 – Transport to site: Transportation of the fabricated window units from the fabrication facility to the construction site for installation.
- A5 – Installation: Installation of fully assembled windows in the building.
  Note: ancillary materials such as fixings and sealants used to install a 1.2 m × 1.2 m white PVC-U framed window are included under Module A5.
- C1–C4 – End-of-life stages: Covering deconstruction, transport, waste processing, and disposal of the product at end of life.
- Module D – Benefits and loads beyond the system boundary: Accounts for the benefits of recycling PVC waste recovered from waste processing operations.

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 was conducted for a 1.2 m × 1.2 m Epwin PVC-U double-glazed window frame, which uses 13.5 metres of PVC profile at 1.48 kg/m, resulting in a total weight of 19.98 kg. This includes the full amount of PVC profiles and ancillary mouldings used to manufacture the window frame over a one-year period (from 01/01/2024 to 31/12/2024). The product represents 92.23% of the total output by mass.

In addition to the Epwin PVC-U double glazed window frame, other products are manufactured. Therefore, the allocation of packaging, electricity, fuel, waste, water consumption, and discharge are required. This allocation has been carried out in accordance with the provisions of BRE PCR PN514 and EN 15804, using mass production quantities (kg) i.e., by 92.23%. Site-wide values for energy, water, and wastewater were taken from bills. Data for raw materials, ancillary material are based on the actual usage. It is assumed that 95% of the

water used for production and domestic purposes leaves the factory. During the production process, post-consumer PVC is used as a raw material input. However, there is no available dataset for recycled PVC in the backend database. As a result, the dataset for recycled polyethylene was used as a proxy. Upon reviewing the data, it was noted that the raw material output is slightly higher than the raw material input. However, this falls within the acceptable tolerance range; therefore, no adjustments were made to the data, and the original figures were used for the modelling.

Epwin manufactures the window frames as full-length profiles, which are then cut to size and fusion-welded together at the fabricator's facility. The energy use and waste generated from cutting the profiles at a typical fabricator's facility are included in the analysis. The packaging used for the extruded profiles, such as wooden pallets, cardboard boxes, and paper is considered waste and is sent for incineration or recycling within the product life cycle. Other packaging materials, such as protective film, are reused by the fabricator. At the fabrication site, additional packaging materials used in the process are also included in the analysis. During fabrication, the profiles are cut and welded according to customer requirements; therefore, product waste generated during this process is accounted for and included in the analysis.

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 approximately 1-2 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

Specific European datasets were selected from the ecoinvent LCI for this LCA. The manufacturer uses national grid electricity and natural gas for production, and the fabricator also uses national grid electricity for the fabrication process. Therefore, the national grid electricity dataset was used for the LCA modelling (Ecoinvent 3.8). The GWP carbon footprint for using 1 kWh of the UK consumption mix electricity is 0.239 kg CO_2e/kWh, and for 1 kWh of UK natural gas in an industrial furnace, it is 0.232 kg CO_2e/kWh.

Cut-off criteria

The inventory process in this LCA includes all data related to raw materials, packaging materials, energy, waste, water consumption and discharge, and consumable items used at the Epwin factory. These are included in the analysis, except for direct emissions to air, water, and soil, which are not measured at the Epwin facility.

At the fabrication unit, energy use, waste, and non-production waste are included in the analysis; however, quantities of ancillary materials, water consumption, and water discharge are not included, and direct emissions to air, water, and soil are also not included.

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	3.66E+01	3.61E+01	4.78E-01	2.71E-02	1.68E-05	2.26E-01	1.20E-02
	Transport	A2	1.54E+00	1.54E+00	1.31E-03	6.15E-04	3.55E-07	6.86E-03	9.97E-05
	Manufacturing	A3	4.19E+00	4.18E+00	9.09E-03	3.98E-03	3.17E-07	1.35E-02	8.16E-04
	Total (Consumption grid)	A1-3	4.24E+01	4.18E+01	4.88E-01	3.17E-02	1.75E-05	2.46E-01	1.29E-02
Construction process stage	Transport	A4	3.32E-01	3.32E-01	2.83E-04	1.30E-04	7.68E-08	1.35E-03	2.14E-05
	Construction	A5	7.03E+00	7.02E+00	-3.35E-03	6.78E-03	7.08E-07	3.92E-02	2.39E-03
End of life	Deconstruction, demolition	C1	8.64E-02	8.63E-02	1.49E-05	1.90E-05	1.66E-08	7.78E-04	4.93E-06
	Transport	C2	7.48E+00	7.46E+00	1.72E-02	4.77E-03	1.56E-06	4.18E-02	1.12E-03
	Waste processing	C3	7.43E+00	7.44E+00	-1.59E-02	4.60E-03	5.23E-07	2.09E-02	9.74E-04
	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	-4.40E+01	-4.38E+01	-2.11E-01	-4.26E-02	-2.03E-05	-2.03E-01	-1.26E-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

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	3.01E-02	2.77E-01	1.02E-01	5.95E-04	8.32E+02	3.20E+01	1.49E-06
	Transport	A2	2.03E-03	2.22E-02	6.72E-03	5.48E-06	2.32E+01	1.05E-01	1.32E-07
	Manufacturing	A3	3.51E-03	3.41E-02	1.11E-02	3.24E-05	1.02E+02	1.35E+00	1.35E-07
	Total (Consumption grid)	A1-3	3.56E-02	3.34E-01	1.20E-01	6.33E-04	9.57E+02	3.35E+01	1.75E-06
Construction process stage	Transport	A4	4.06E-04	4.44E-03	1.36E-03	1.15E-06	5.02E+00	2.26E-02	2.87E-08
	Construction	A5	6.95E-03	7.34E-02	2.35E-02	1.73E-04	8.34E+01	3.59E+00	5.34E-07
End of life	Deconstruction, demolition	C1	3.40E-04	3.67E-03	1.02E-03	1.19E-07	1.15E+00	8.71E-03	2.04E-08
	Transport	C2	1.27E-02	1.39E-01	4.53E-02	1.14E-04	1.11E+02	8.20E-01	8.13E-07
	Waste processing	C3	8.04E-03	6.33E-02	2.07E-02	3.69E-05	7.29E+01	1.71E+00	4.30E-07
	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	-4.00E-02	-3.96E-01	-1.31E-01	-6.63E-04	-9.44E+02	-2.51E+01	-1.85E-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.

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	5.28E+00	6.57E+02	4.04E-08	7.61E-07	1.10E+02
	Transport	A2	1.19E-01	1.81E+01	6.12E-10	1.90E-08	1.58E+01
	Manufacturing	A3	2.03E+00	5.85E+01	9.10E-09	4.12E-08	3.25E+01
	Total (Consumption grid)	A1-3	7.43E+00	7.34E+02	5.01E-08	8.21E-07	1.58E+02
Construction process stage	Transport	A4	2.58E-02	3.92E+00	1.27E-10	4.11E-09	3.45E+00
	Construction	A5	5.42E-01	2.08E+02	1.37E-07	1.64E-07	4.00E+01
End of life	Deconstruction, demolition	C1	5.35E-03	7.44E-01	4.13E-11	5.90E-10	3.99E-01
	Transport	C2	7.05E-01	1.12E+02	1.23E-08	1.44E-07	5.24E+01
	Waste processing	C3	3.93E-01	7.26E+01	8.94E-09	7.91E-08	5.68E+01
	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	-2.99E+00	-8.61E+02	-2.78E-08	-7.58E-07	-1.14E+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.

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	4.32E+01	5.92E-01	4.38E+01	3.98E+02	4.18E+02	8.17E+02
	Transport	A2	3.28E-01	0.00E+00	3.28E-01	2.28E+01	0.00E+00	2.28E+01
	Manufacturing	A3	1.55E+01	8.60E-01	1.63E+01	5.09E+01	6.53E+01	1.16E+02
	Total (Consumption grid)	A1-3	5.90E+01	1.45E+00	6.04E+01	4.72E+02	4.84E+02	9.56E+02
Construction process stage	Transport	A4	7.07E-02	0.00E+00	7.07E-02	4.93E+00	0.00E+00	4.93E+00
	Construction	A5	1.69E+01	7.24E-01	1.76E+01	8.23E+01	4.30E-01	8.27E+01
End of life	Deconstruction, demolition	C1	8.82E-03	0.00E+00	8.82E-03	-6.89E-01	1.70E+00	1.01E+00
	Transport	C2	3.07E+00	0.00E+00	3.07E+00	1.09E+02	0.00E+00	1.09E+02
	Waste processing	C3	1.18E+00	0.00E+00	1.18E+00	-8.39E+02	8.49E+02	9.92E+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	3.55E+01	0.00E+00	3.55E+01	5.56E+02	3.80E+02	9.36E+02

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	2.62E+00	0.00E+00	0.00E+00	1.47E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	2.59E-03
	Manufacturing	A3	6.05E-02	4.92E-05	0.00E+00	4.20E-02
	Total (Consumption grid)	A1-3	2.68E+00	4.92E-05	0.00E+00	1.51E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	5.60E-04
	Construction	A5	6.82E-01	0.00E+00	0.00E+00	9.76E-02
End of life	Deconstruction, demolition	C1	1.32E-04	0.00E+00	0.00E+00	2.10E-04
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	2.04E-02
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	4.13E-02
	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	0.00E+00	0.00E+00	0.00E+00	-6.02E-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

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	2.62E+00	6.06E+01	1.81E-03
	Transport	A2	2.59E-02	4.58E-01	1.51E+00
	Manufacturing	A3	4.58E-01	3.64E+00	5.41E-04
	Total (Consumption grid)	A1-3	3.10E+00	6.47E+01	1.52E+00
Construction process stage	Transport	A4	5.53E-03	9.83E-02	3.40E-05
	Construction	A5	5.88E+00	1.14E+01	1.92E-04
End of life	Deconstruction, demolition	C1	1.80E-03	2.98E-01	6.99E-06
	Transport	C2	2.36E-01	4.84E+00	7.30E+02
	Waste processing	C3	2.16E-01	3.12E+00	4.54E-05
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	3.13E+00	5.57E+01	1.18E-03

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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	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	1.14E+00	3.65E-07	3.93E-02	1.25E-02	-5.95E-03
	Total (Consumption grid)	A1-3	0.00E+00	1.14E+00	3.65E-07	3.93E-02	1.25E-02	-5.95E-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	0.00E+00	9.70E-03	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	3.62E-02	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	2.00E+01	0.00E+00	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

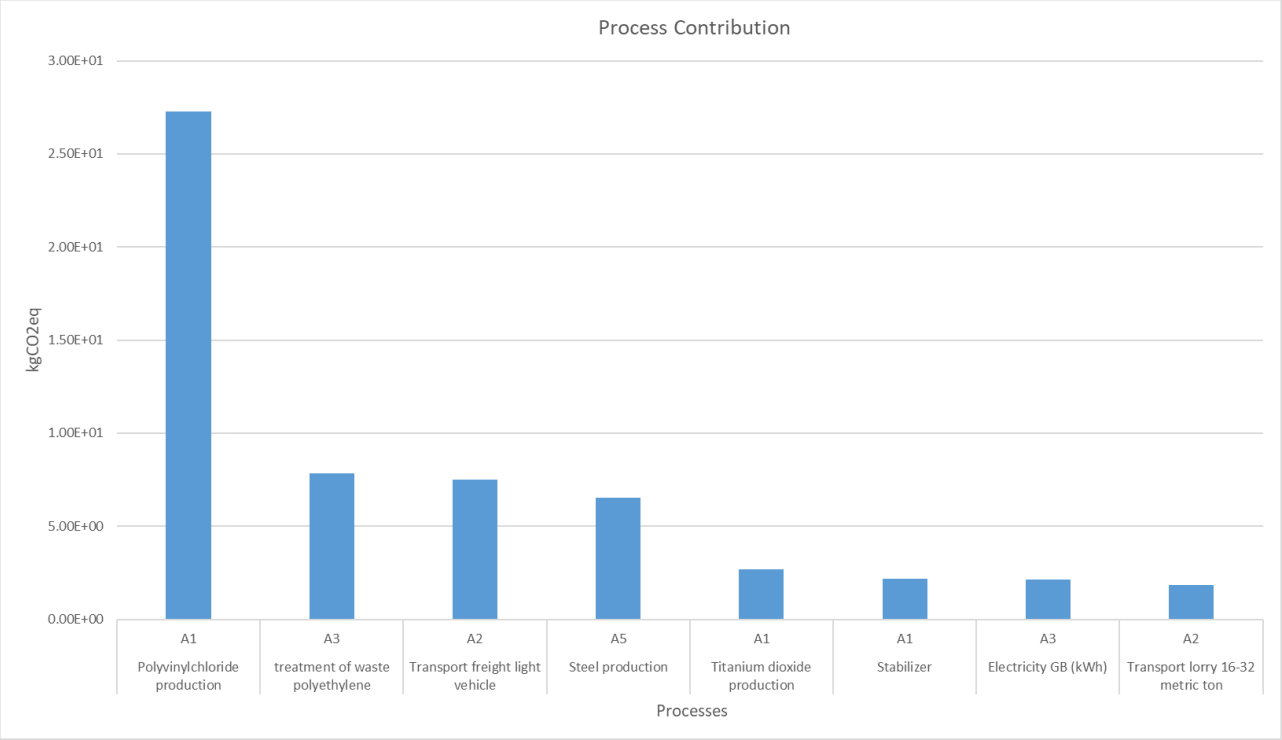
Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	100km by road has been modelled for module A4 as a typical distance from the fabricator site to the constriction unit. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module A4 if required		
	Road transport using 16-32 metric ton lorry	km	100
	Fuel consumption	l/km	0.227
	Capacity utilisation (incl. empty returns)	%	26
	Bulk density of transported products	kg/m^3	1440
A5 – Installation in the building	The installation of Epwin window profiles typically involves key steps such as preparing a clean, level opening, applying flashing tape, dry fitting the window, securing it, and ensuring proper sealing and operation. For detailed guidance, please contact the Epwin technical team. In this LCA analysis, ancillary materials like fixings and sealant used to install a 1.2m x 1.2m white PVC-U framed window are included under Module A5. However, the glass installed on-site is not included in the analysis. The end user of this EPD can take the frame and A5 impacts, and they can add the glass impacts to calculate the impacts of the whole window frame An end-user calculation table has been provided at the end of the document to customise the impacts. Accordingly, the Ecoinvent 3.8 glass impacts (per kg CO_2-eq) are included. The end user may either apply the Ecoinvent figure or refer to the supplier's EPD.		
Ancillary materials to install a 1.2m x 1.2m white PVC-U framed window	Installation wastage rate	%	0
	Silicon Sealant	kg	0.28
	Plastic Frame Packers	kg	0.04
	Furniture/Hardware - Locks, hinges, handles (Steel)	kg	1.05
	Frame Fixing Screws	kg	0.14
C1 – Deconstruction	PVC-U windows have a reference service life of 30 Years as per BRE PCR EN15804+A2, however there are many windows still installed with a much greater service life (since 70's/80"). Upon potential removal of 'Post Consumer' windows, the old windows are then shipped to UK recycling Centre via local collection hubs. Windows are then broken down and separated out into constituent material product streams and individually recycled. Only a cordless battery drill would be required for removal/installation and the energy used for the drill is negligible. It's assumed as 100% of the product is recovered from the demolition site and sent to poly-pure recycling facility for recycling.		
	Silicon Sealant waste to landfill	kg	0.28
	Plastic Frame Packers waste to recycling	kg	0.04
	Furniture/Hardware - Locks, hinges, handles (Steel) waste to recycling	kg	1.05
	Frame Fixing Screws waste to recycling	kg	0.14

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C2 – Transportation	This represents the transport from site to collection hub to Poly-Pure, the PVC Recycling centre owned by the group. 200km by road has been modelled for module C2 as a typical distance from the deconstruction site to collection hub to Poly-Pure. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module C2 if required		
	Road transport by Van	km	200
C3 – waste processing	The PVCu Window is dismantled at end of life into the different components: PVC Frame, Glass, Furniture/Hardware, Packers etc. These are segregated and sent to the relevant recycling/ landfill facility. The window frame is broken down into Stick or Shred and transported to Poly-Pure. Poly-Pure is a UK-based recycling facility acquired by Epwin Materials Limited. It specialises in recycling PVC building materials and is now part of the Epwin Group. Poly-Pure contributes to increasing the recycled content in Epwin's products. Therefore, in this analysis, it is assumed that all waste PVC sent to the Poly-Pure facility is 100% recycled.		
	PVC waste to recycling	kg	19.98
C4 – Disposal	100% of the waste will be recycled and no waste left to landfill		
Module D	Recycling PVC through the PolyPure recycling facility transforms waste PVC-U window systems into high-quality PVC Pulver and pellets. The Epwin Window Systems - PVC-U system is made up of post-consumer PVC waste and virgin PVC materials. In calculating the benefits of recycling the waste PVC at the end of life, the pre-existing recycled content has been removed, and the recycling benefits have been calculated for only virgin inputs.		
	Products Recycled Content (11.5% of post-consumer)	kg	2.30
	Recovered for recycling	kg	17.68

Interpretation of results

The bulk of the environmental impacts and primary energy demand are attributed to the manufacturing phase, covered by information modules A1-A3 of EN15804:2012+A2:2019.

The chart illustrates the process contribution to carbon emissions ($kgCO_2eq$), where polyvinylchloride (PVC) production (A1) stands out as the dominant contributor far exceeding all other processes. The next largest contributors are treatment of waste polyethylene (A3), followed by transport using light commercial vehicles (A2) and steel production (chromium steel, A5). Other processes, including titanium dioxide production, calcium zinc stabilizer, electricity use and transportation A2, have much lower impacts. Overall, the results highlight that PVC production is the critical driver of emissions, with transportation and waste treatment also making notable but smaller contributions compared to the overwhelming dominance of raw material production.



End-User Guidance Calculation

The LCA analysis has been conducted for 1.2 m × 1.2 m Epwin PVC-U double-glazed window frame uses 13.5 m of PVC profile at 1.48 kg/m, with a total weight of 19.98 kg, and the results are included in this EPD. Epwin Window Systems manufactures the window frames as full-length profiles, which are then cut to size and fusion-welded together at the fabricator's facility. At the installation site, the glass, fixings, and other components are added to complete the window system. Therefore, this EPD reports only the impacts of the manufacturing and fabrication of frame; to enable impact calculations for the complete window system and allow comparisons with similar window profiles, an end-user guidance table has been provided to customise the impacts based on different frame lengths. This allows comparisons with similar window profiles beyond the base case.

Name	Value	Units
Declared Unit Mass	19.98	kg
Reference Window (1.2m x 1.2m) uses 13.5 m of PVC profile at 1.48 kg/m	1.2 x 1.2	m
Reference PVC Frame Weight	19.98	kg
Glazing weight for Reference Window	18.58	kg
Weight of the ancillaries such as screws, sealant, window packers used for the product installation.	1.288	kg
Total Reference Window Mass	39.85	kg
PVC-U Double glazing frame GWP (including the extrusion and fabrication process) – Total for 19.98 kg weight	42.4	kgCO2eq
GWP total impact per kg	2.12	kg CO_2e/kg
Profile 1.48 kg per meter	3.14	kg CO_2e/m
Glass used for 1.2 m x 1.2 m is 18.58 kg; therefore, glazed area is 1.44 m^2	12.90	kg/m^2
GWP total impacts of 1 kg of glass*	0.974	kgCO2eq

* the Ecoinvent 3.8 glass impacts (per kg CO_2-eq) are included. The end user may either apply the Ecoinvent figure or refer to the supplier's EPD.

References

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A1:2013. London, BSI, 2013.

BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

BSI. Environmental management – Life cycle assessment – Principles and framework.
BS EN ISO 14040:2006. London, BSI, 2006.

BSI. Environmental management – Life cycle assessment – requirements and guidelines.
BS EN ISO 14044:2006. London, BSI, 2006.

BS EN 12608 - PVC-U Profiles for the fabrication of windows & doors.

BS EN 12608/PAS 24:2022 - Enhanced Security Window System Supplier.

BS EN ISO 9001 - BSI Registered firm scheme: Quality Management Systems.

BS EN ISO 14001 - Manufactured under an ISO 14001 Registered Environmental Management Systems.

BS ISO 45001 - Occupational Health and Safety Management Systems.

SBD - The UK Police initiative supporting the principles of ‘designing out crime’ by use of crime prevention and security standards.

Vinylplus - A labelling scheme to identify the most sustainable and high-performance PVC-U products.