EN 15804+A2 EPD

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2.
Owner of the Declaration – QEF Ltd.

Declaration number: EPDIE-24-131
Issue date 12th February 2024
Valid to 11th February 2029

EPD Programme - EPD Ireland
Programme Operator - Irish Green Building Council
www.epdireland.org

Aluminium Louvered Systems

1. General information

PROGRAMME OPERATOR	OWNER OF DECLARATION
Irish Green Building Council 19 Mountjoy Square, Dublin D01 E8P5 info@igbc.ie	QEF Limited Kilkenny Commercial Centre, Dublin Road, Kilkenny, Ireland R95 TR82 +353 (0)56 776 4910; www.qefltd.ie
DECLARATION NUMBER	**PRODUCTION SITE**
EPDIE-24-131	QEF Limited Kilkenny Commercial Centre, Dublin Road, Kilkenny, Ireland R95 TR82 +353 (0)56 776 4910; www.qefltd.ie
ECO PLATFORM EPD	**DECLARED UNIT**
Yes	1 tonne of installed aluminium louvered system
APPLICABLE PRODUCT CATEGORY RULES	**DECLARED PRODUCT**
1. EN 15804:2012+A2:2019 2. EPD Ireland PCR Part A, Version 2.1, 2022	1 tonne of installed aluminium louvered system
DATE OF ISSUE	**SCOPE OF EPD**
12th February 2024	Cradle to gate with options, modules C1–C4, and module D
DATE OF EXPIRY	**LCA CONSULTANT OR PERSON RESPONSIBLE FOR LCA**
11th February 2029	Ecoreview, Kilkenny, Ireland. +353 (087) 258 9783 www.ecoreview.ie
TYPE OF EPD: SINGLE OR MULTI PRODUCT	**LCA SOFTWARE AND DEVELOPER IF APPLICABLE**
Single product EPD	Ecochain version 4.3.0
PRODUCT CLASSIFICATION OR NACE CODE	**NAME AND VERSION OF INVENTORY USED**
UN CPC 4219 Structural metal products and parts thereof (aluminium)	Ecoinvent version 3.8
COMPARABILITY	
Environmental Product Declarations from different programmes may not be directly 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	
The CEN Norm /EN 15804 serves as the core PCR	
Independent verification of the declaration according to ISO 14025	

Internally ☐ Externally ✕

SIGNATURE OF PROGRAMME OPERATOR	SIGNATURE VERIFIER
Pat Barry - CEO - Irish Green Building Council  IGBC IRISH GREEN BUILDING COUNCIL	Kim Allbury  Kim Allbury LCA

2. Scope and Type of EPD

Scope

This EPD is Cradle-to-gate with options. The Modules that are declared are shown in the table below.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse – Recovery – Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
MDT	MDT	MDT	OP	OP	OP	OP	OP	OP	OP	OP	OP	MDT	MDT	MDT	MDT	MDT

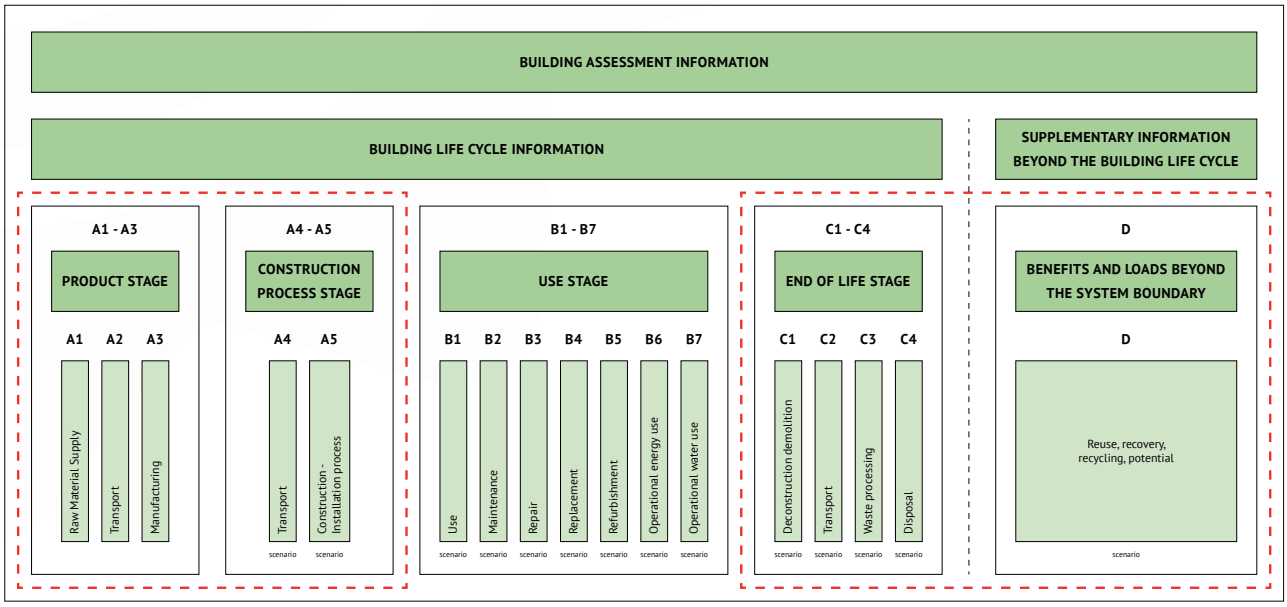
X = Module declared; ND = Module not declared; MDT = Mandatory; OP = Optional.

Declared Functional Unit

1 tonne of installed aluminium louvered system.

System Boundaries

This LCA covers the Product (A1 - A3), Construction Process (A4 - A5), end of Life (C1 - C4), and benefits and loads beyond the system boundary (D).



3. Detailed product description

This EPD is for one tonne of installed QEF aluminium louvered systems. The louvered systems are manufactured from bespoke extruded aluminium profiles, which are initially cut to prcise lengths, and then powder coated and assembled in to 1.1 x 1.1 m2 panels, for installation on building facades. The QEF aluminium louvered systems are used as facades on buildings.

The Representative Product of this EPD is 1,000 kg of powder coated aluminium profiles assembled in a louvered system, with a mean aluminium element thickness of 1.8 5mm, and powder coating thickness of 70 micron on both faces. This Representative Product is based on production at QEF where 90% of aluminium material used is 1.8 mm thick, and 5% each is 3.0 mm and 1.6 mm thick.

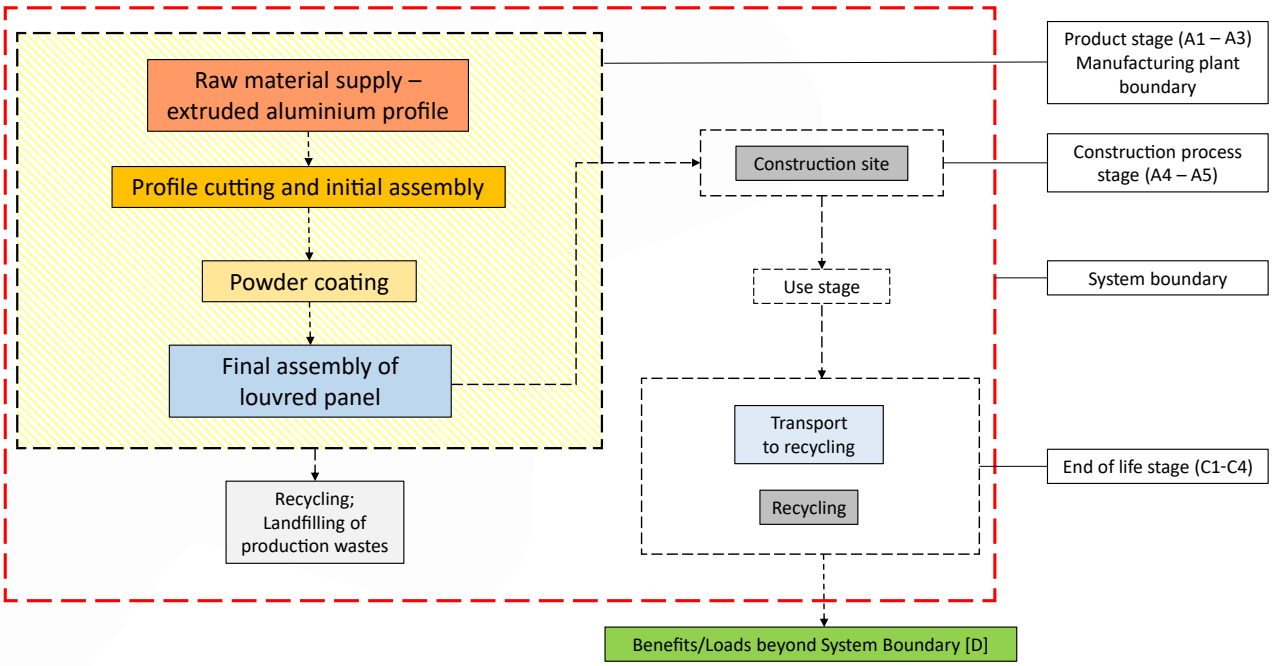
The aluminium is extruded aluminium alloy 6063 T6. The powder coating is polyester. The manufactured systems are tested, and comply to, EN 13030:2001 Ventilation for buildings. Terminals. Performance testing of louvres subjected to simulated rain.

3.1 Manufacturing Process Description

The manufacturing process comprises receiving lengths of extruded aluminium profiles from the supplier. Upon receipt of the profiles they are cut for assembly as a louvered system. Before final assembly, the cut profiles are powder coated. After powder coating they are assembled into the final louvered systems for installation on the building facade.

The assembled louvres are loaded onto a lorry at the manufacturing plant site, where they are supported by and tied to rigid frames, for onward delivery to the customers. There is no packaging used in the supply of these products to the market. The panles are installed manually on to the building facades.

Unused aluminium off-cuts are sent off-site for recycling.



4.1.A. LCA results - QEF Aluminium Louvered Systems

Core Environmental impact per 1 tonne tonne of installed powder-coated aluminium façade

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	[kg CO_2 eq.]	1.34E+04	2.33E+01	3.07E+02	1.38E+04	2.28E+01	4.25E+02	ND	ND	ND	ND	ND	ND	ND	0.00E+00	8.42E+00	1.86E+02	0.00E+00	-8.27E+03
GWP-fossil	[kg CO_2 eq.]	1.33E+04	2.32E+01	3.05E+02	1.36E+04	2.28E+01	4.18E+02	ND	ND	ND	ND	ND	ND	ND	0.00E+00	8.41E+00	1.82E+02	0.00E+00	-8.04E+03
GWP-biogenic	[kg CO_2 eq.]	3.13E+01	2.12E-02	1.90E+00	3.33E+01	2.08E-02	2.30E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	7.67E-03	3.91E+00	0.00E+00	-4.74E+01
GWP-luluc	[kg CO_2 eq.]	1.63E+02	9.29E-03	2.52E-01	1.64E+02	9.12E-03	4.66E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	3.36E-03	2.43E-01	0.00E+00	-1.81E+02
ODP	[kg CFC-11 eq.]	8.47E-04	5.38E-06	3.75E-05	8.90E-04	5.28E-06	2.56E-05	ND	ND	ND	ND	ND	ND	ND	0.00E+00	1.95E-06	1.43E-05	0.00E+00	-8.50E-04
AP	[mol H+ eq.]	9.47E+01	6.60E-02	6.57E-01	9.54E+01	6.47E-02	2.87E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	2.39E-02	9.09E-01	0.00E+00	-4.62E+01
EP-freshwater[1]	[kg P eq.]	5.04E-01	1.66E-04	2.62E-03	5.07E-01	1.63E-04	1.59E-02	ND	ND	ND	ND	ND	ND	ND	0.00E+00	6.00E-05	6.32E-03	0.00E+00	-4.05E-01
EP-marine	[kg N eq.]	1.24E+01	1.31E-02	1.48E-01	1.25E+01	1.29E-02	3.90E-01	ND	ND	ND	ND	ND	ND	ND	0.00E+00	4.75E-03	1.60E-01	0.00E+00	-5.13E+00
EP-terrestrial	[mol N eq.]	1.38E+02	1.46E-01	1.65E+00	1.39E+02	1.43E-01	4.35E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	5.29E-02	1.87E+00	0.00E+00	-5.77E+01
POCP	[kg NMVOC eq.]	4.38E+01	5.62E-02	4.95E-01	4.43E+01	5.51E-02	1.37E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	2.03E-02	5.13E-01	0.00E+00	-2.14E+01
ADP-minerals&metals[2]	[kg Sb eq.]	2.54E-02	8.24E-05	4.42E-03	2.99E-02	8.08E-05	1.81E-03	ND	ND	ND	ND	ND	ND	ND	0.00E+00	2.98E-05	2.12E-02	0.00E+00	-1.70E-02
ADP-fossils[2]	[MJ] ncv	1.55E+05	3.52E+02	4.83E+03	1.60E+05	3.46E+02	4.83E+03	ND	ND	ND	ND	ND	ND	ND	0.00E+00	1.28E+02	1.98E+03	0.00E+00	-1.19E+05
WDP[2]	m^3 world eq. deprived	2.86E+03	1.07E+00	4.50E+01	2.90E+03	1.05E+00	9.11E+01	ND	ND	ND	ND	ND	ND	ND	0.00E+00	3.88E-01	2.03E+02	0.00E+00	3.10E+02

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels (GWP-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; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossils = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption.

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

ND = Module not declared; INA = Indicator not assessed.

4.1.B. LCA results - QEF Aluminium Louvered Systems

Resource use per 1 tonne tonne of installed powder-coated aluminium façade

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	4.35E+04	5.03E+00	5.41E+02	4.41E+04	4.94E+00	1.34E+03	ND	ND	ND	ND	ND	ND	ND	0.00E+00	1.82E+00	2.16E+02	0.00E+00	-4.71E+04
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	4.35E+04	5.03E+00	5.41E+02	4.41E+04	4.94E+00	1.34E+03	ND	ND	ND	ND	ND	ND	ND	0.00E+00	1.82E+00	2.16E+02	0.00E+00	-4.71E+04
PENRE	[MJ]	1.65E+05	3.74E+02	5.29E+03	1.71E+05	3.67E+02	5.14E+03	ND	ND	ND	ND	ND	ND	ND	0.00E+00	1.35E+02	2.14E+03	0.00E+00	-1.26E+05
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	1.65E+05	3.74E+02	5.29E+03	1.71E+05	3.67E+02	5.14E+03	ND	ND	ND	ND	ND	ND	ND	0.00E+00	1.35E+02	2.14E+03	0.00E+00	-1.26E+05
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	2.42E+02	3.99E-02	1.14E+00	2.44E+02	3.91E-02	7.14E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	1.44E-02	5.31E+00	0.00E+00	-3.12E+02

PERE = Use of renewable primary energy excluding renewable primary energy resources 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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water.

ND = Module not declared; INA = Indicator not assessed.

4.1.C. LCA results - QEF Aluminium Louvered Systems

Output flows and waste categories per 1 tonne tonne of installed powder-coated aluminium façade

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	8.90E-02	9.19E-04	2.62E-01	3.51E-01	9.02E-04	2.97E-03	ND	ND	ND	ND	ND	ND	ND	0.00E+00	3.33E-04	1.58E+00	0.00E+00	-7.22E-02
NHWD	[kg]	3.34E+03	1.84E+01	3.30E+01	3.39E+03	1.81E+01	1.35E+02	ND	ND	ND	ND	ND	ND	ND	0.00E+00	6.68E+00	3.31E+01	0.00E+00	-2.28E+03
RWD	[kg]	5.20E-01	2.38E-03	1.02E-02	5.32E-01	2.34E-03	1.58E-02	ND	ND	ND	ND	ND	ND	ND	0.00E+00	8.62E-04	6.37E-03	0.00E+00	-7.79E-01
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	1.03E+03	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

ND = Module not declared; INA = Indicator not assessed.

4.1.D. LCA results - QEF Aluminium Louvered Systems

Additonal Environmental impact per 1 tonne tonne of installed powder-coated aluminium façade

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	1.03E-03	1.87E-06	4.94E-06	1.04E-03	1.83E-06	3.25E-05	ND	ND	ND	ND	ND	ND	ND	0.00E+00	6.76E-07	8.09E-06	0.00E+00	-5.91E-04
IRP[1]	kBq U235 eq	5.34E+02	1.53E+00	7.87E+00	5.44E+02	1.50E+00	1.64E+01	ND	ND	ND	ND	ND	ND	ND	0.00E+00	5.54E-01	7.16E+00	0.00E+00	-8.19E+02
ETP-fw[2]	CTUe	3.13E+05	2.76E+02	2.82E+03	3.16E+05	2.71E+02	1.05E+04	ND	ND	ND	ND	ND	ND	ND	0.00E+00	1.00E+02	9.86E+03	0.00E+00	-1.34E+05
HTP-c[2]	CTUe	2.70E-05	8.89E-09	1.05E-07	2.71E-05	8.72E-09	1.70E-06	ND	ND	ND	ND	ND	ND	ND	0.00E+00	3.22E-09	2.80E-07	0.00E+00	-2.32E-05
HTP-nc[2]	CTUe	4.24E-04	2.79E-07	2.55E-06	4.27E-04	2.74E-07	1.29E-05	ND	ND	ND	ND	ND	ND	ND	0.00E+00	1.01E-07	8.11E-06	0.00E+00	-3.15E-04
SQP[2]	dimensionless	2.17E+04	2.45E+02	7.15E+02	2.27E+04	2.41E+02	8.56E+02	ND	ND	ND	ND	ND	ND	ND	0.00E+00	8.89E+01	1.26E+03	0.00E+00	-8.08E+03

PM = Potential incidence of disease due to PM emissions, 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, SQP = Potential soil quality index.

[1] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuelcycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

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

ND = Module not declared; INA = Indicator not assessed.

5. Calculation rules

The measurement of environmental impacts in this EPD uses the LCIA methodologies recommended for PEF3.0. The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented in the LCA report. The 'polluter pays' and 'modularity' principles have been followed.

In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated which can be accessed via the Ecochain LCA tool. This data portfolio contains a summary of all the data used in this LCA.

Electricity modelling

The electricity fuel mix is that indicted by the supplier, Electric Ireland, on the invoices supplied to QEF. The electricity has been modelled as as combination of wind and wind, onshore, with a mena intensity of 0.175 kg CO_2 (GWPt) per kWh.

Cut-off criteria

The cut-off criteria of section 6.3.6 of EN15804 +A2 have been followed.

Data Quality

The dataset is representative for the production processes used in 2023. The data Quality Level, according to Table E.1 of EN 15804 +A2, Annex E, is as follows:

- Time Representativeness is considered to be good
- Geographical Representativeness is considered to be very good
- Technical Representativeness is considered to be very good

Allocations

Allocation of energies, electricity types and amounts to the various manufacturing processes has been provided by QEF, along with production waste; allocation of impacts to the products is based on the product mass.

6. Scenarios and additional technical information

The product and data used in this EPD are based on the being manufactured in the Republic of Ireland, and transported a mean distance of 140 km from the production site in Kilkenny, Co. Kilkenny, to customers within the island of Ireland.

A4. Transport to customer

Distance to the customer is 140 km.

Parameter	Value / Description
Transport vehicle type	Freight lorry 16-32 metric ton, EURO6
Distance	140 km
Capacity Utilisation	64%
Bulk density of transported goods	2700 kg/m^3

A5. Installation

Parameter	Value / Description
On-site losses	0%
Aluminium cleats	26.7 kg
Stainless steel fixings	6.7 kg

C. End of Life Scenarios, Module

C1. De-construction demolition

In the deconstruction/demolition phase C1 it is assumed that the louvered are removed manually from the building, thus no energy or materials are required for module C1, and the impacts are assumed to be zero in C1.

C2. Transport

In the transport phase C2, it is assumed that the removed materials travel 50km to recycling. Transport vehicle type: Freight lorry 16-32 metric ton, EURO6.

C3. Waste processing

100% of the remove panels and fixings are recycled.

C4. Disposal

No materials are disposed of.

D. Reuse – Recovery – Recycling potential

As all the aluminium and steel is recycled, these replace the manufacture and production of virgin aluminium and steel.

Declaration of biogenic carbon content at the production gate

Biogenic carbon (kg per declared unit)	Quantity	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in packaging	0	kg C

Additional Technical Information

N/A.

7. Mandatory additional information on release of dangerous substances to indoor air, soil and water

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, or they do not exceed the limit for registration with the European Chemicals Agency.

8. Other optional additional environmental information

N/A.

9. References

[1] 'ISO 14040: Environmental management -Life cycle assessment – Principles and Framework, International Organisation for Standardisation, ISO14040:2006.

[2] 'ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines, International Organisation for Standardisation, ISO14044:2006.

[3] 'ISO 14025: Environmental labels and declarations - Type III environmental declarations - Principles and procedures, International Organisation for Standardisation, ISO14025:2006.

[4] [4 EN 15804:2012+A2:2019: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products EN 15804:2012+A2:2019.

[5] Ecochain 4.3.0, 2023, web: http://app.Ecochain.com.

[6] Product Category Rules: Part A, Implementation and use of EN 15804:2012+A2:2019 and CEN TR 16970:2016 in Ireland for the development of Environmental Product Declarations; Version 2.1, issue date: 05.03.2022, published by the EPD Ireland Programme operator (Irish Green Building Council).

10. Annex

N/A.