Environmental Product Declaration

In accordance with
ISO 14025: 2006 and EN 15804: 2012+A2:2019/AC:2021 for:

Axile Pulse Door

THE INTERNATIONAL EPD® SYSTEM
EPD INTERNATIONAL AB
EPD REGISTRATION NUMBER:
EPD-IES-0015194:001
ISSUED ON 2024-08-29
VALID TO 2029-08-29

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

This EPD covers multiple products based on worst-case results; it has been verified by an independent third party

ECO PLATFORM EPD VERIFIED

Optima

Introduction

This EPD provides environmental performance indicators for Optima's Axile Pulse Doors. It is a multiple-product, cradle-to-gate with modules A4, A5, C1–C4 & D EPD in accordance with the requirements of EN 15804.

The EPD is based on a life cycle assessment (LCA) study which used production data for the 12-month period 1st November 2022 to 31st October 2023 from Optima Products Limited's (OPL's) manufacturing facility in Radstock, UK.

The EPD presents details of the LCA, a description of the product life cycle it covers, values for the environmental indicators specified by EN 15804:2012+A2:2019, with a brief explanation of those results.

The declared unit is one square metre ($1m^2$) of door.

Company Profile

Optima Products Limited, UK (OPL) designs and produces aluminium framed glass partition systems and doors from its manufacturing base in Radstock. The manufacturing facility uses the latest design techniques to ensure high quality products which are rigorously tested both in-house and externally before going to market.

The OPL product range is sold and installed through the OPL contracting divisions in the UK, Dubai and Kuala Lumpur and through a worldwide network of selected contracting partners.

OPL puts quality at the heart of design and production management, and operates a quality management system accredited to ISO 9001: 2015 (bmtrada certificate 2367).

In keeping with OPL's determination to drive good environmental practice in the entire product cycle, OPL operates an environmental management system accredited to ISO 14001: 2015 bmtrada certificate 1827). In addition, it is a requirement on all our principal supply chain partners that they also operate similar systems.

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Axile Pulse Door EPD

Programme Information	
EPD programme:	The International EPD® System
EPD programme operator:	EPD International AB - Box 210 60 - SE-100 31 Stockholm - Sweden www.environdec.com
Accountabilities for PCR, LCA and independant, third-party verification	
EPD based on Product Category Rules (PCR):	The CEN standard EN 15804:2012 + A2:2019 serves as the core PCR
	The International EPD® System's PCR 2019:14 Construction products (EN 15804:A2), Version 1.3.4, 2024-04-30 and c-PCR-007 Windows and doors (EN 17213)
PCR review conducted by:	The Technical Committee of the International EPD® System; see www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile The review panel may be contacted via info@environdec.com
LCA conducted by:	Chris Foster, EuGeos Limited - UK - www.eugeos.co.uk
LCA software:	openLCA from GreenDelta
Background data:	ecoinvent database (v3.8)
Independent verification of this EPD and data, according to ISO 14025/2006, via:	EPD verification by individual verifier: Yes ☑ No ☐
Third party verifier:	Ugo Pretato - Studio Fieschi & soci (Italy); Approved by The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier:	Yes ☐ No ☑

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPD within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must:
- be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs;
- cover products with identical functions, technical performances and use (e.g. identical declared/functional units);
- have equivalent system boundaries and descriptions of data;
- apply equivalent data quality requirements, methods of data collection, and allocation methods;
- apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors);
- have equivalent content declarations; be valid at the time of comparison.

For further information about comparability, see EN 15804 and ISO 14025.

Product Information

Axile Pulse Door

The Axile Pulse door is a frameless glass door, the absence of a door frame makes this a suitable product for design schemes which require clean lines and minimalism, and where acoustic performance is not a prime consideration.

The Axile Pulse door features 10mm or 12mm thick toughened glass leaf supplied with Optima's stainless steel top and bottom patch pivots.

This EPD applies to Axile Pulse doors in 12mm heat-soaked toughened glass with aluminium top and bottom rails as the representative product (worst-case) for all Axile Pulse doors.

OPL's Axile Pulse doors are classified 4212 under the UN CPC system v2.1.

Manufacturing

OPL's Radstock manufacturing facility carries out the following manufacturing activities:

- Storage of raw materials, components and packaging
- Aluminium profile finishing and coating
- Preparation of door components
- Packing of finished products

Packaging

Doors are packed onto wooden pallets for transport to the project site, or in wooden crates if exported. Door-frame profiles are packed in cardboard boxes.

OPL uses only FSC certified wood products for deliveries to customers. All pallets are set aside at their destination and returned for re-use.

Installation

The doors are installed in OPL's partition systems, in most instances with a frame kit. In any particular partition system, different doors may be used according to the technical requirements of the overall system. Installation involves manual work and the use of hand power-tools.

Product Information

Product use and maintenance

All OPL's doors are designed and tested to satisfy the requirements for Class 5 (Normal use) Pedestrian doors according to EN 12400: 2002. Doors should be subjected to regular inspection and maintenance in accordance with the published Optima operation and maintenance schedule – see www.optimasystems.com for further details.

End-of-life

It is recommended that doors being permanently removed from site, and with no planned re-use, be separated from the general waste disposal regime and the glass and aluminium stripped out for potential recycling using a regulated recycling scheme.

The European Waste Catalogue (EWC) codes below apply to the product or parts of it when removed from the building:
EWC 17 02 02 Glass
EWC 17 04 02 Aluminium
EWC 17 02 03 Plastic
EWC 17 04 05 Iron and steel

Residual risks and emergencies

There are no residual risks associated with the normal day to day use of Optima's doors in the context for which they are designed and specified.

Further product information

Detailed product information and datasheets can be found on our website: www.optimasystems.com

LCA Information

This section of the EPD records key features of the LCA on which it is based.

The LCA was carried out by EuGeos using openLCA software and production data for a continuous 12-month period between 1st November 2022 and 31st October 2023 from OPL's manufacturing facility in Radstock, UK. Background data were taken from the ecoinvent database (v3.8).

Declared unit

The declared unit (DU) is one square metre ($1m^2$) of door.

The LCA is calculated on the basis of a door of width 1.23m and height 2.18m, using 12mm heat-soaked toughened glass and equipped with top and bottom aluminium rails.

Refer to the content declaration for the mass of the declared unit.

Content declaration

The material compositions of OPL's door characterised in this EPD are shown below. The masses quoted are indicative; total mass is not part of the product specification.

Components/Materials	Weight (kg)*	Post-consumer material, (weight %)*	Biogenic material (weight % and kg C / kg)*
Aluminium	3.7	2.97	0
Glass	30	0	0
Steel	2.2	unknown	0
Total:	35.9	2.97	0

Packaging	Weight (kg)*	Weight vs product (%)*	Biogenic material weight (kg C /kg)*
Plastics wrapping	<0.1	<1	0
Cardboard	<0.1	<1	<0.01
Wood (pallet)	2.6	7	0.04
Total:	2.6	7	0.05

* values per declared unit

At the time of data collection no substance on the "Candidate List of Substances of Very High Concern for authorisation" derived under REACH is present in this door either above the limits for registration with the European Chemicals Agency or in excess of 0.1 weight-% of the product.

LCA Information

LCA Scope

The scope of the EPD is defined using the modular approach set out in EN 15804.

Product stage			Construction process stage		Use stage							End of life stage				Benefits & loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste disposal	Disposal	Reuse- recovery- recycling- potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared X included in LCA - ND: module not declared - NR: module not relevant																
X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography																
GLO	GLO	GB	GB	GB	-	-	-	-	-	-	-	GB	GB	GB	GB	GLO
Specific data used																
18%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products																
-28%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites																
0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

GLO: Global
GB: United Kingdom

LCA Information

System boundaries

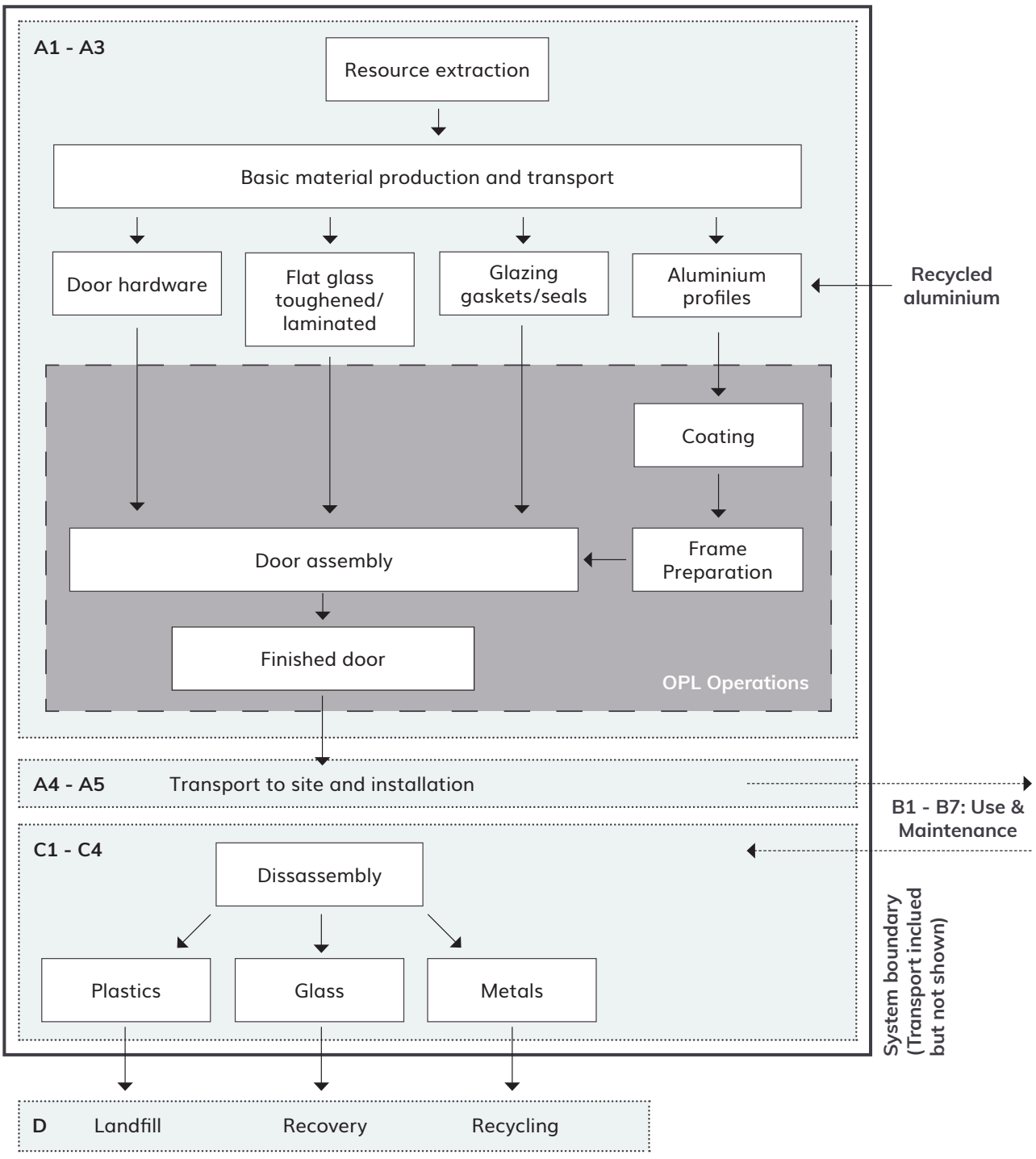
This EPD covers the production stage (modules A1-A3), delivery to site (A4), on-site installation (A5), end-of-life management (modules C) and module D (see table below). As required by the PCR, modules A1-A3 are declared in aggregated form.

Modules A1, A2 and A3 comprise the product stage and are declared as one aggregated module A1 – A3, as required by the PCR. This stage includes the extraction and manufacture of raw materials, intermediate products and energy, as well as waste processing up to the end-of-waste state (i.e. no longer considered a waste material) or disposal of final residues arising during the product stage.

Module D provides an estimate of the benefits (and/or environmental load) that would accrue to a different product system were the product be recycled after use at current recycling rates and using current technologies.

All upstream resource extraction and manufacturing processes are included in the system. All energy used in factories and offices at OPL's Radstock site is included; energy used in OPL's offices at locations other than Radstock is excluded. Capital equipment and its maintenance are excluded from the foreground system but capital equipment is included in the background datasets used. The product life cycle covered by this EPD is illustrated on the following page.

LCA Information



Geographical scope

Modules A1 - A3 represent production at the manufacturing facilities in Radstock, UK from raw materials sourced from European suppliers and global supply-chains of basic commodities; modules A4 & A5, delivery and installation in the UK; modules C, end-of-life scenarios in the UK.

Reference service life

The use phase ('B' Modules) is not declared therefore no specific reference service life for the product is applied.

LCA Information

Primary data - time representativeness

Data used for this EPD were collected following guidance in ISO 14044:2006; the most current available data were used in accordance with EN 15804.

The manufacturer-specific data used in LCA calculations cover a period of one year from 1st November 2022 to 31st October 2023. They are therefore based on 1 year averaged data and have been updated within the 5 years prior to publication of the EPD. These data were checked to ensure that sufficient materials and water were included within the inputs to account for all outputs, including products and wastes. Their technological coverage reflects physical reality for the declared product.

Background data

Background (generic) data for raw material inputs and fuels were taken from the ecoinvent v3.8 database, supplemented where necessary to ensure the data used are as representative as possible of the materials actually used by OPL. This fulfils the EN 15804 requirement that generic data used in the LCA have been updated within the last 10 years.

Data quality has been reviewed for all processes that contribute significantly to the overall LCA.

Cut-off criteria

According to EN 15804 and the PCR, flows can be omitted (cut-off) from a core process in the LCA up to a maximum of 1% of the total mass of material inputs. The total of input flows omitted in this way for any single module must not exceed 5% of the total energy usage and mass inputs for that module. The following must be included in all cases, regardless of the proportion of mass or energy they represent:

- inputs giving rise to significant environmental effects or energy use in their extraction, use or disposal
- inputs or outputs classified as hazardous waste

The data collected from OPL encompassed all raw materials, packaging materials and process aids, as well as associated transport to the manufacturing site. Process energy and water use, and direct production waste are included within the data. There are no emissions to air or water apart from un-monitored combustion gases and trade effluent; these are quantified by virtue of mass balance (trade effluent) or by their inclusion in generic processes characterising inputs (gas combustion). Non-hazardous material inputs amounting, in combination, to <0.5% of all inputs during the data period were omitted from the LCA.

Allocation

In the background data, the ecoinvent default allocation is applied to all processes except those in which secondary materials are used, where the "cut-off" allocation is applied. This ensures that secondary materials are free of upstream burdens that arise prior to their reaching the "end of waste" state, in accordance with Section 6.3.4.2 of EN 15804.

Manufacturing data for OPL's Radstock facility have been sub-divided where possible to avoid allocation. Remaining inputs and outputs are allocated on the basis of physical relationships.

LCA Information

Assumptions and estimates

Inputs to and outputs from the system are accounted for over a 100-year time period; long-term emissions are therefore omitted from the LCIA.

The "primary energy used as material (PERM; PENRM)" indicators are calculated using - as characterisation factors - published values for constituent materials which can yield energy on combustion, where available, and from published calorific values where PERM or PENRM values are not available.
In this EPD, the following values are used:

- renewable primary energy as material: wood - 16MJ/kg; cardboard – 14MJ/kg
- non-renewable primary energy as material: 27 MJ/kg for all polymer content

Energy used as raw material is declared as an input to the module where it enters the product system and is only declared as an output if it leaves the product system as useful energy; energy in materials that is assumed lost (in landfill or incineration) remains as part of the indicator for energy used for raw materials. "Primary energy as fuel" indicators (PENRE, PERE) are calculated as the total primary energy demand minus primary energy used as material.

The heat-soaking of toughened glass is omitted from the LCA because of a lack of data.

Electricity modelling

OPL purchases electricity on a renewable tariff supplied from wind generation and backed by REGO; the carbon footprint of the delivered electricity (GWP-GHG) is 0.032kgCO_2e/kWh. In the LCA this is modelled according to the conventional ecoinvent approach: production is represented by a mix of high-voltage generating sources, while transmission losses, grid infrastructure and emissions of ozone and nitrous oxide are included in the transformation of this high-voltage production mix to medium-voltage supply. The high-voltage production mix is approximately 57% offshore and 43% onshore wind generation. The ratios of generating sources reflect the ratios of those sources in the wind-derived fraction of the ecoinvent dataset for average UK high-voltage electricity production.

Scenarios

Delivery of the product to users' sites, installation and transport to waste processing and final disposal are modelled using scenarios. The relevant parameters for the transport scenarios are shown in the table below.

Module A4

Module A4 uses a scenario for transport from the factory to the construction site; the parameters applied in this scenario are set out in the table below.

Scenario parameters - transport A4	
Parameter	**Quantity and unit**
Vehicle type	lorry
Vehicle load capacity	10t
Fuel type & consumption	diesel, 0.1 l/km
Volume capacity utilisation factor	1
Capacity utilisation (including empty returns)	c.33%
Distance to site	200 km
Bulk density of transported products	n/a (mixed materials, packed)

LCA Information

Module A5

Installation (Module A5) is modelled on the basis of information from Optima. Consumption of 0.15kWh electricity per declared unit is assumed, to account for the use of hand-held power tools. Cardboard and plastic films are assumed to be landfilled, along with 10% of wooden packaging (pallets or crates). The remaining wooden packaging is assumed re-used, and leaves the system as components for re-use. Other items used to transport doors to site are returned for re-use.

Modules C

Removal from the building (Module C1) is assumed to use the same energy as installation.

In the end-of-life modules, aluminium and steel are assumed to be separately collected and recycled, with glass recovered for use as aggregate along with other inert materials. Both the glass and the metals are assumed to be treated by compacting and/or shredding in Module C3.

The materials remaining after separation of glass and metals represent 0.1% - 0.5% of the total mass of the installed product. It is assumed that these are disposed of in landfill; as a simplification, these materials are modelled as mixed plastic waste.

Scenario parameters - transport C2	
Parameter	**Quantity and unit**
Vehicle type	lorry
Vehicle load capacity	10t
Fuel type & consumption	diesel, 0.1 l/km
Volume capacity utilisation factor	1
Capacity utilisation (including empty returns)	c.33%
Distance to site	50 km
Bulk density of transported products	n/a (mixed materials, packed)

Module D

Module D quantifies the benefits and loads associated with recycling materials and the exported energy from waste management activities, were those recycled materials and recovered energy to be used in another product system. Net output quantities of materials used in the Module D calculation are shown in the table below, with the associated "quality factors" and the virgin materials assumed to be displaced.

Scenario parameters - Module D					
Output to recycling/ recovery	**Assumed fate**	**Displaced input flow**	**Quality factor**	**Net output Quantity**	**Units**
Aluminium	100% recycled	primary aluminium ingot	1	0.70	kg
Glass	recovered	limestone aggregate	1	30	kg
Steel	100% recycled	generic converter steel after remelting of recycled steel in EAF	0.9	1.16	kg

In calculating the net output quantities, architectural glass is assumed to have no recycled content; for aluminium the recycled content specified by Hydro for Circal is applied (81%); for steels, the recycled content of steels is assumed to be 48%, the global average for stainless steels quoted by "Team Stainless" for 2019. While this is an unrealistic value for carbon steels, most of the steel present in this door is stainless steel in the hardware, and in the context of this calculation it represents a conservative approach for other steels.

LCA Information

Environmental indicators

This EPD contains environmental information about OPL's Axile Pulse door in the form of quantitative indicator values for a number of parameters, which encompass calculated environmental impact potentials, resource and energy use, waste generation and material and energy outputs from the product system that may be reused, recycled or recovered into other, unspecified product life cycles; these are shown on the following pages.

The EF 3.0 package has been used for calculating the environmental impacts.

The environmental indicator results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Parameter	Abbreviation	Units
Potential environmental impacts		
Climate change – GWP fossil	GWP-fossil	kg CO_2 eq
Climate change – GWP biogenic	GWP-biogenic	kg CO_2 eq
Climate change – GWP land transformation	GWP-luluc	kg CO_2 eq
Climate change – GWP total	GWP-total	kg CO_2 eq
Climate change - GWP fossil & land transformation [1]	GWP-GHG	kg CO_2 eq
Acidification potential	AP	mol H^+ eq
Eutrophication – freshwater	EP-freshwater	kg P eq & kg PO_4^{3-} eq
Eutrophication – marine	EP-marine	kg N eq
Eutrophication – terrestrial	EP-terrestrial	mol N eq
Photochemical ozone formation	POFP	kg NMVOC eq
Ozone depletion	ODP	kg CFC-11 eq
Depletion of abiotic resources – minerals & metals [2]	ADPMM	kg Sb eq
Depletion of abiotic resources – fossil fuels [2]	ADPFF	MJ, ncv
Water (user) deprivation potential [2]	WDP	m^3 world-eq deprived

LCA Information

Parameter	Abbreviation	Units
Resource use		
Renewable primary energy as energy carrier	PERE	MJ
Renewable primary energy resources as material utilisation	PERM	MJ
Total renewable primary energy use (sum of the two parameters above)	PERT	MJ
Non-renewable primary energy as energy carrier	PENRE	MJ
Non-renewable primary energy resources as material utilisation	PENRM	MJ
Total non-renewable primary energy use (sum of the two parameters above)	PENRT	MJ
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ
Use of non-renewable secondary fuels	NRSF	MJ
Net use of fresh water	FW	m^3
Wastes		
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	TRWD	kg
Output flows		
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported energy - electrical	EEE	MJ
Exported energy - thermal	EET	MJ

1 - GWP-GHG includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013

2 - The results of this environmental impact indicator shall be used with care because either the uncertainties associated with the results are high or there is limited experience with the indicator

LCA Results

AXILE PULSE DOOR
Environmental indicator results for all declared modules are shown in the tables for the declared unit of 1m^2 of door; the A1 - A3 modules are shown on an aggregated basis as mandated by PCR 2019:14 §5.4.5; the results of modules A1 - A3 should not be used without considering the results of module C. The mass of the declared unit is approximately 39kg (including packaging).

	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
Environmental Impacts (EN 15804 + A2)									
GWP-total	kg CO_2 eq	6.84E+01	1.28E+00	1.20E-01	3.17E-01	3.85E-01	2.17E-01	0.00E+00	-5.00E+00
GWP-fossil	kg CO_2 eq	6.79E+01	1.28E+00	2.48E-02	3.16E-01	3.85E-01	2.16E-01	0.00E+00	-4.99E+00
GWP-biogenic	kg CO_2 eq	2.75E-01	5.10E-04	9.48E-02	4.40E-04	1.74E-04	5.50E-04	0.00E+00	-4.76E-03
GWP-luluc	kg CO_2 eq	2.02E-01	4.96E-04	2.61E-05	4.40E-04	1.79E-04	2.10E-04	0.00E+00	-9.25E-03
ODP	kg CFC-11 eq	8.46E-06	2.96E-07	2.16E-09	2.17E-08	8.65E-08	4.12E-08	0.00E+00	-3.41E-07
AP	mol H^+ eq	2.27E-01	5.01E-03	9.14E-05	1.10E-03	1.53E-03	1.64E-03	0.00E+00	-2.79E-02
EP-freshwater	kg P eq	1.45E-02	8.24E-05	3.89E-06	6.03E-05	2.89E-05	7.01E-05	0.00E+00	-1.48E-03
EP-marine	kg N eq	3.83E-02	1.57E-03	1.90E-04	2.40E-04	4.45E-04	5.80E-04	0.00E+00	-4.59E-03
EP-terrestrial	mol N eq	4.61E-01	1.70E-02	2.50E-04	2.66E-03	5.03E-03	6.23E-03	0.00E+00	-5.71E-02
POFP	kg NMVOC eq	1.37E-01	5.40E-03	9.44E-05	6.60E-04	1.49E-03	1.74E-03	0.00E+00	-1.95E-02
ADPMM	kg Sb eq	7.30E-04	4.44E-06	1.94E-07	3.61E-06	1.75E-06	8.31E-07	0.00E+00	-4.54E-05
ADPFF	MJ, ncv	9.86E+02	1.98E+01	5.29E-01	8.75E+00	5.89E+00	4.32E+00	0.00E+00	-6.45E+01
WDP	m^3 world-eq dprv	3.26E+01	8.71E-02	7.18E-03	6.77E-02	2.91E-02	9.93E-02	0.00E+00	-6.82E-01
Environmental impacts (EN 15804 + A2) (additional)									
GWP-GHG	kg CO2 eq	6.83E+01	1.28E+00	1.20E-01	3.17E-01	3.85E-01	2.17E-01	0.00E+00	-5.00E+00
Resource use									
PERE	MJ	1.36E+02	1.27E+00	9.12E-02	1.78E+00	9.70E-02	3.18E-01	0.00E+00	-3.19E+00
PERM	MJ	4.17E+01	-1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.78E+02	2.73E-01	9.12E-02	1.78E+00	9.70E-02	3.18E-01	0.00E+00	-3.19E+00
PENRE	MJ	9.85E+02	2.08E+01	5.29E-01	8.75E+00	5.89E+00	4.32E+00	0.00E+00	-6.45E+01
PENRM	MJ	9.91E-01	-1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	9.86E+02	1.98E+01	5.29E-01	8.75E+00	5.89E+00	4.32E+00	0.00E+00	-6.45E+01
SM	kg	3.27E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E-01
RSF	MJ	1.32E+00	5.78E-03	1.30E-04	2.08E-03	2.15E-03	7.43E-03	0.00E+00	-7.82E-03
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	7.50E-01	2.21E-03	1.80E-04	1.73E-03	7.42E-04	2.46E-03	0.00E+00	-1.84E-02
Waste									
HWD	kg	7.51E+01	4.28E-01	2.01E-02	3.33E-01	1.51E-01	3.09E-01	0.00E+00	-6.84E+00
NHWD	kg	1.01E+01	9.88E-01	3.32E-01	1.81E-02	2.41E-01	5.27E+00	0.00E+00	-5.54E-01
TRWD	kg	6.64E-02	3.85E-04	1.20E-04	2.34E-03	1.29E-04	4.70E-04	0.00E+00	-5.00E-04
Output flows									
CRU	kg	0.00E+00	0.00E+00	2.32E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	5.85E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.92E+00	0.00E+00	-2.65E-01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.95E-01
EEE	MJ	1.11E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	6.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

LCA Results

Additional Environmental Information
AXILE PULSE DOOR
For information, indicator values calculated using the methods prescribed in the earlier version of EN 15804 (EN 15804+A1:2013) are provided in the table below for the declared unit of 1m² of Optima's Axile Pulse Door; modules A1 - A3 are shown on an aggregated basis.

Environmental Impacts (EN 15804 + A1)		Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
Global warming potential	GWP	kg CO_2 eq	6.70E+01	1.27E+00	7.45E-02	3.12E-01	3.81E-01	2.13E-01	0.00E+00	-4.77E+00
Depletion potential of the stratospheric ozone layer	ODP	kg CFC-11 eq	8.46E-06	2.96E-07	2.16E-09	2.17E-08	8.65E-08	4.12E-08	0.00E+00	-3.41E-07
Acidification potential of land and water	AP	kg SO_2 eq	2.01E-01	4.24E-03	9.18E-05	9.30E-04	1.21E-03	4.79E-03	0.00E+00	-2.45E-02
Eutrophication potential	EP	kg PO_4^{3-} eq	6.56E-02	8.82E-04	9.80E-04	2.90E-04	2.70E-04	4.30E-04	0.00E+00	-6.16E-03
Formation potential of tropospheric ozone photochemical oxidants	POCP	kg ethene eq	1.17E-02	1.65E-04	1.93E-05	3.98E-05	5.03E-05	4.10E-05	0.00E+00	-1.92E-03
Abiotic depletion potential for non-fossil resources	ADPE	kg Sb eq	7.30E-04	4.44E-06	1.94E-07	3.61E-06	1.75E-06	8.31E-07	0.00E+00	-4.54E-05
Abiotic depletion potential for fossil resources	ADPF	MJ	9.86E+02	1.98E+01	5.29E-01	8.75E+00	5.89E+00	4.32E+00	0.00E+00	-6.45E+01

AXILE PULSE WITH 10MM TOUGHENED GLASS AND STAINLESS STEEL TOP AND BOTTOM PATCH PIVOTS
The table below shows the environmental impact indicator results for 1m² of Optima's Axile Pulse door with 10mm toughened glass and stainless steel top and bottom patch pivots, as the best-case product; the mass of 1m² of product is approximately 31kg.

Environmental Impacts (EN 15804 + A2)	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO_2 eq	4.92E+01	1.01E+00	4.05E-02	3.17E-01	3.00E-01	1.57E-01	0.00E+00	-1.48E+00
GWP-total	kg CO_2 eq	4.92E+01	1.02E+00	4.05E-02	3.17E-01	3.00E-01	1.57E-01	0.00E+00	-1.48E+00
GWP-fossil	kg CO_2 eq	4.89E+01	1.02E+00	1.86E-02	3.16E-01	3.00E-01	1.56E-01	0.00E+00	-1.49E+00
GWP-biogenic	kg CO_2 eq	2.38E-01	4.04E-04	2.19E-02	4.40E-04	1.35E-04	4.50E-04	0.00E+00	3.47E-03
GWP-luluc	kg CO_2 eq	3.64E-02	3.94E-04	2.46E-05	4.40E-04	1.39E-04	1.70E-04	0.00E+00	9.20E-04
ODP	kg CFC-11 eq	5.13E-06	2.35E-07	1.91E-09	2.17E-08	6.74E-08	3.01E-08	0.00E+00	-1.74E-07
AP	mol H^+ eq	1.67E-01	3.97E-03	7.86E-05	1.10E-03	1.19E-03	1.16E-03	0.00E+00	-4.48E-03
EP-freshwater	kg P eq	1.39E-02	6.53E-05	3.62E-06	6.03E-05	2.25E-05	5.69E-05	0.00E+00	-4.20E-04
EP-marine	kg N eq	3.02E-02	1.24E-03	1.10E-04	2.40E-04	3.47E-04	4.00E-04	0.00E+00	-4.80E-04
EP-terrestrial	mol N eq	3.62E-01	1.34E-02	2.20E-04	2.66E-03	3.92E-03	4.24E-03	0.00E+00	-1.67E-02
POFP	kg NMVOC eq	1.05E-01	4.28E-03	6.42E-05	6.60E-04	1.16E-03	1.19E-03	0.00E+00	-8.62E-03
ADPMM[2]	kg Sb eq	9.70E-04	3.52E-06	1.90E-07	3.61E-06	1.36E-06	6.67E-07	0.00E+00	1.15E-06
ADPFF[2]	MJ, ncv	6.86E+02	1.57E+01	5.05E-01	8.75E+00	4.59E+00	3.18E+00	0.00E+00	-1.98E+01
WDP[2]	m^3 world-eq dprv	2.58E+01	6.91E-02	6.27E-03	6.77E-02	2.27E-02	8.10E-02	0.00E+00	7.03E-01

1 - GWP-GHG includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013

2 - The results of this environmental impact indicator shall be used with care because either the uncertainties associated with the results are high or there is limited experience with the indicator

Interpretation

Environmental impact potentials associated with the product stage (modules A1 – A3) are much greater than those associated with other modules; nevertheless, the results for the product stage should not be used without considering the results of module C.

The product variant with the lowest carbon footprint is the Axile Pulse door with stainless steel top and bottom pivots, for which the GWP-GHG indicator is approximately 25% less than the value shown in the results tables (see also the "variation-products" value in the table in the LCA Scope section above).

Raw material production accounts for over 80% of the indicator totals in all categories. Because of the high significance of data about upstream activities, many of which are represented by generic data in the LCA, there is a moderate level of uncertainty in the indicator values obtained. The overall uncertainty is considered to be at least +/- 10 - 15% for the climate change category indicator values, and is likely higher for other categories.

Resource depletion indicators (ADPFF, ADPMM), stratospheric ozone depletion (ODP), water use (NFW) and water deprivation (WDP) potential should be used with particular caution.

No untreated wastes leave the modelled system, which includes waste treatment activities as required by EN 15804. The waste indicators HWD, NHWD and TRWD presented in this EPD therefore represent waste flows within the modelled system.

Energy used as raw materials is declared as an input to the module where it enters the product system in the PERM and PENRM indicators. Energy content remaining in materials that are landfilled or incinerated is not counted as energy leaving the system (in effect, it remains as part of the indicator for energy used for raw materials), therefore the sum of PENRM and PERM across Modules A1 – C4 will not be zero.

The reporting of Module D shows benefits as negative indicator values.

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Glossary

The International EPD® System: a programme for Type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. (www.environdec.com)

Life cycle assessment (LCA): LCA studies the environmental aspects and quantifies the potential impacts (positive or negative) of a product (or service) throughout its entire life. ISO standards ISO 14040 and ISO 14044 set out conventions for conducting LCA.

REACH Regulation: REACH is the European Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals. It entered into force in 2007, replacing the former legislative framework for chemicals in the EU.

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