

The logo for the Environmental Product Declaration (EPD) system, consisting of a horizontal bar with four segments of varying shades of green and grey, followed by the letters "EPD" in a bold, sans-serif font.

THE INTERNATIONAL EPD® SYSTEM

EPD registration number: S-P-00481.

Issued on 14 February 2017 – valid to 13 February 2022.

The environmental impacts of this product have been assessed from cradle to factory gate.

This Environmental Product Declaration has been verified by an independent third party.

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804

Aluminium Framed Glazed Partition Systems

Introduction

Optima Products Limited is a UK-based manufacturer of aluminium framed, glazed partition systems and doors. Based in Radstock, Bath, Optima Products Limited has been designing and producing innovative and performance-driven aluminium and glass-based partition and door systems since the 1980s.

This EPD provides environmental performance indicators for an aluminium-framed glazed partition systems.

This is a cradle-to-gate EPD in accordance with the requirements of EN 15804, and thus covers the modules A1–A3 defined in that standard.

The EPD is based on a life cycle assessment (LCA) study which used production data for the 12-month period November 1, 2014 to October 31, 2015 from Optima Products Limited’s manufacturing facility in Radstock, UK. Background data were taken from the ecoinvent database (v3.2).

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 and a brief explanation of those results.

The declared unit is a screen of width 3.0m and height 2.7m, with a 1m-wide door opening, including glass, head and base track, wall abutments and a door frame (reveal).

Indicator values are declared separately for double-glazed partitions and single-glazed partitions.

Aluminium Framed Glazed Partition Systems

EPD programme:	The International EPD® System
EPD programme operator:	EPD International AB - Stockholm - Sweden www.environdec.com
EPD owner:	Optima Products Limited Mill Road Radstock Bath BA3 5TX - UK www.optimasystems.com
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EPD verification:	Independent verification of this EPD and data, according to ISO 14025/2006: <input type="checkbox"/> internal certification <input checked="" type="checkbox"/> external verification
Third party verifier:	Ugo Pretato - Recognised Individual Verifier
Accredited or approved by:	The International EPD® System
LCA conducted by:	EuGeos Limited - UK +44 (0)1625 434423 - www.eugeos.co.uk 

EPDs within the same product category but from different programmes may not be comparable.

EPDs of construction products may not be comparable if they do not comply with EN 15804.

Company Profile

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

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

Optima Products Limited puts quality at the heart of the design and production management and operates an accredited quality management system to ISO 9001: 2008.

In keeping with Optima's determination to drive good environmental practice in the entire product cycle, Optima Products Limited operates an accredited environmental management system to ISO 14001: 2004. In addition, it is a requirement on all our principal supply chain partners that they also operate similar systems.

Optima Products Limited believes in openness and transparency in the supply chain and manufacturing process and has published Health Product Declarations in accordance with HPD Standard version 1.0.

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Product Information

Product Name: Aluminium-Framed Glazed Partition Systems

UN CPC classification 4212 (CPC V2.1)

This EPD applies to partition systems in the following Optima Products' ranges:

Product Name: **Single Glazed Partition Systems**

Product Types: Optima 117 plus
Revolution 54
Revolution 100
Kinetic
Technishield 25/54

Specification: Aluminium framed partition systems comprising glazing tracks and door jambs extruded in grade 6063 aluminium. All non-fire-rated systems are typically glazed butt jointed using PETg or PVC glass to glass joints. Technishield 25/54 butt jointed using silicone. Systems may be glazed with glass up to 17.5mm thickness depending on track chosen. Glass panels, typically not wider than 1200mm, may be either toughened or annealed and laminated glass. Technishield 25/54 can be glazed with 15mm thick intumescent glass up to maximum width 1000mm.

Performance: Sound Reduction of up to Rw42dB.



Product Name: **Double Glazed Partition Systems**

Product Types: Optima 217 plus
Revolution 54
Revolution 100
Technishield 54

Specification: Aluminium framed partition systems comprising glazing tracks and door jambs extruded in grade 6063 aluminium. All non-fire-rated systems typically glazed butt jointed using PETg or PVC glass to glass joints. Optima 217 plus incorporates integral interstitial mullions. Revolution 100 may be glazed with exposed mullions and transoms if desired. Technishield 25/54 butt jointed using silicone. Systems capable of glazing with glass up to 17.5mm thickness depending on track selection. Glass panels, typically not wider than 1200mm may be either toughened or annealed and laminated glass. Technishield 25/54 may be glazed with 15mm thick intumescent glass up to maximum width 1000mm.

Performance: Sound Reduction of up to Rw53dB.



The aluminium framework of all Optima Products' partition systems can be supplied in either powder coated or anodised finish. Partitions are customisable, and indeed normally customised, to suit the context in which they are installed. This EPD applies to representative (reference) single- and double-glazed partition systems from Optima's ranges, each including a door opening and static door frame (reveal). The reference products correspond to partitions from the Revolution 54 range with Microflush doorframe.

The specifications of the reference, maximum and minimum partition systems are based on data for partitions produced by Optima Products in the period November 1, 2014 to October 31, 2015.

Product Information

Manufacturing

Optima Products' Radstock factory carries out the following manufacturing activities:

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

Packaging

Partition components are packed in cardboard boxes for delivery to site. The glass element is normally delivered directly to the construction site from, and packed by, the glass supplier.

Optima Products Limited uses only FSC certified wood products in its palletisation of material deliveries. All pallets are set aside at their destination and returned for re-use.

Product Use and Maintenance

All Optima partition systems are designed and manufactured to satisfy the strength and robustness criteria of BS 5234, where they can be reasonably applied, for Medium Duty.

Systems should be regularly inspected and maintained in accordance with the published Optima operation and maintenance schedule – see www.optimasystems.com for further details.

End-of-Life

It is recommended that partition systems 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 02 03 Plastic

EWC 17 04 02 Aluminium

EWC 17 04 05 Iron and Steel.

Further Product Information

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

Product Information

Content Declaration

The material composition of an aluminium-framed glazed partition system is shown below:

Material input	% of inputs per declared unit					
	Single-glazed partition			Double-glazed partition		
	Min	Reference Product	Max	Min	Reference Product	Max
Glass	74	90	92	81	94	97
Aluminium	25	9	7	18	5	2
Steel	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Polymers	<1	<1	<1	<0.5	<0.5	<0.5

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

Technical Data

The technical characteristics of Optima Products' aluminium framed glazed partition systems are summarised below.

Name	Value	Unit
Mass for a unit area (single-glazed : double-glazed)	26–47 : 40–85	kg/m ²
Acoustic Testing (EN ISO 10140-1 & 2) – Laboratory measurement of sound insulation of building materials		
Optima 117 plus (up to)	42	dB(Rw)
Optima 217 plus (up to)	43	dB(Rw)
Revolution 54 (up to)	46	dB(Rw)
Revolution 100 (up to)	53	dB(Rw)
Kinetic (up to)	39	dB(Rw)
Technishield 25/54 (up to)	45	dB(Rw)
Fire resistance (BS 476-22: 1987) – Fire tests on building materials and structures. Method for determination of the fire resistance of non-loadbearing elements of construction. EN 13501-1:2007 + A1:2009 – Fire classification of construction products and building elements. Classification using test data from reaction to fire test.		
Technishield 25/54	EI30	–

Residual Risks and Emergencies

Where toughened glass is used, users should be aware of the small inherent risk of spontaneous failure. Optima Products Limited strongly advocates the use of heat soaking after toughening to mitigate some of this risk.

Environmental Performance-Related Information

LCA Information

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

Scope

This cradle-to-gate EPD covers the production stage (modules A1–A3; see below); as permitted by EN 15804 modules A1–A3 are declared in aggregated form.

Product Stage			Construction Process Stage		Use Stage							End-of-Life Stage				Benefits and 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	Deconstruction Demolition	Transport	Waste Disposal	Disposal	Re-use/Recovery/ Recycling Potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X: included in LCA; MND: module not declared or NR for not relevant.

Declared Unit

The declared unit is a screen of width 3.0m and height 2.70m, incorporating a door opening 1m wide. The declared unit includes 12mm thick glass, head and base track, wall abutments and a door frame (reveal). Indicator values are declared separately for double-glazed partitions and single-glazed partitions. The mass of the declared unit is 175kg (single-glazed) or 333kg (double-glazed).

The minimum mass of a screen of the specified dimensions in a single-glazed partition system with 10mm glass is 149kg; its maximum is 228kg (16mm glass). The minimum mass of this screen in a double-glazed partition system with 6mm and 10mm glass faces is 230kg; its maximum is 438kg (both faces in 16mm glass).

Environmental Performance-Related Information

System Boundaries

The product stage is the only stage covered by this EPD. It includes the following information modules:

- A1 – raw material extraction and processing, and the processing of secondary material input
- A2 – transport of raw materials and secondary material inputs to the manufacturer
- A3 – manufacturing of the construction product and packaging.

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.

All upstream resource extraction and manufacturing processes are included in the system. All energy used in factories and offices at Optima Products' Radstock site is included; energy used in the company's offices at locations other than Radstock is excluded.

The product life cycle covered by this EPD is illustrated below.

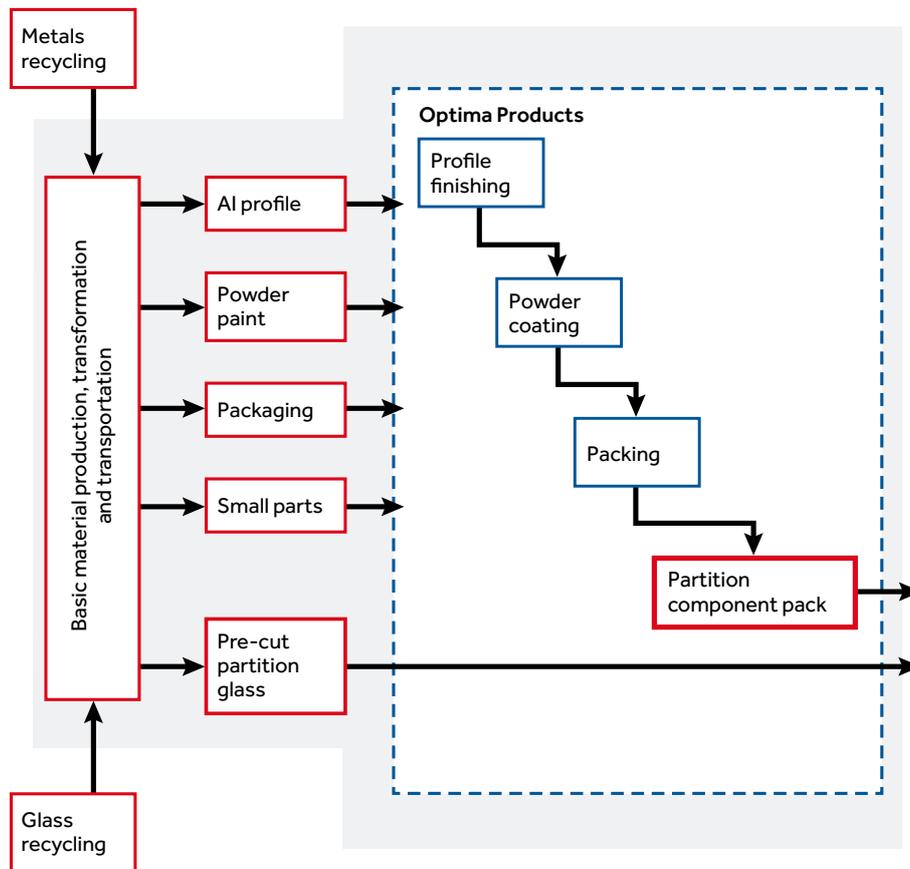


Figure 1: System boundaries for aluminium-framed glazed partition systems LCA.

Environmental Performance-Related Information

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 Optima Products 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 unmonitored 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 <0.1% of all inputs during the data period were omitted from the LCA.

Data Sources and Data Quality

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 1 year from November 1, 2014 to October 31, 2015. 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.

Other (generic) datasets used for calculations have been updated within the last 10 years.

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.

Background Data

Gate-to-gate data for glass production was taken from "Life Cycle Assessment of Float Glass", Glass for Europe, November 2010, revised February 2011. Aluminium profile production is represented by generic data for extrusion and Al production from the ecoinvent database, with the primary:secondary ratio of Al entering the processing phase based on actual recycled content reported in statements from Optima Products' suppliers. Background (generic) data for other raw material inputs and fuels were taken from the ecoinvent v3.2 database; this fulfils the EN 15804 requirement that generic data used in the LCA have been updated within the last 10 years. Where raw materials are sourced by Optima Products from actual production facilities, datasets representing production have been used; where raw materials or components are sourced by Optima Products from agents, market datasets have been used. Data quality has been reviewed for all processes that contribute significantly to the overall LCA and judged to be fit for purpose.

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.

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

Environmental Performance-Related Information

Assumptions and Estimates

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 PEM values are not available.

In this EPD, the following values are used:

- renewable primary energy as material: not applicable
- non-renewable primary energy as material: 27 MJ/kg.

“Primary energy as fuel” indicators (PENRE, PERE) are calculated as the total primary energy demand minus primary energy used as material.

For model consistency transport of glass to Optima Products’ factory has been included in the LCA, based on distances from Optima’s UK glass supplier. However, in practice the glass elements of partition systems are normally delivered directly to the construction site.

LCA Results

Environmental Indicators and Interpretation

Environmental indicator results for the A1–A3 modules on an aggregated basis are shown in the 4 following tables for the declared unit of a screen of width 3.0m and height 2.70m, incorporating a door opening 1m wide. The mass of the declared unit is 175kg (single-glazed) or 333kg (double-glazed).

Parameter – Environmental Impacts	Unit	Modules A1–A3	
		Single-glazed	Double-glazed
Global warming potential (GWP)	kg CO ₂ -eq	4.09E+02	6.18E+02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11-eq	3.99E-05	6.63E-05
Acidification potential of land and water (AP)	kg SO ₂ -eq	2.51E+00	3.93E+00
Eutrophication potential (EP)	kg PO ₄ ³⁻ -eq	2.55E-01	4.20E-01
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg ethene-eq	1.25E-01	1.73E-01
Abiotic depletion potential for non-fossil resources (ADPE)	kg Sb-eq	9.10E-04	1.48E-03
Abiotic depletion potential for fossil resources (ADPFF)	MJ	5.47E+03	8.36E+03

Parameter – Resource Use	Unit	Modules A1–A3	
		Single-glazed	Double-glazed
Renewable primary energy as energy carrier (PERE)	MJ	5.46E+02	6.85E+02
Renewable primary energy resources as material utilization (PERM)	MJ	0.00E+00	0.00E+00
Total use of renewable primary energy resources (PERT)	MJ	5.46E+02	6.83E+02
Non-renewable primary energy as energy carrier (PENRE)	MJ	6.20E+03	9.35E+03
Non-renewable primary energy as material utilization (PENRM)	MJ	3.27E+01	3.27E+01
Total use of non-renewable primary energy resources (PENRT)	MJ	6.23E+03	9.38E+03
Use of secondary material (SM)	kg	1.97E+01	3.07E+01
Use of renewable secondary fuels (RSF)	MJ	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	MJ	0.00E+00	0.00E+00
Use of net fresh water (FW)	m ³	7.90E+00	1.26E+01

Parameter – Waste	Unit	Modules A1–A3	
		Single-glazed	Double-glazed
Hazardous waste disposed (HW)	kg	3.68E+01	4.20E+01
Non-hazardous waste disposed (NHW)	kg	6.12E+01	9.21E+01
Radioactive waste disposed (RW)	kg	3.41E-02	5.33E-02

Parameter – Output Flows	Unit	Modules A1–A3	
		Single-glazed	Double-glazed
Components for re-use	kg	0.00E+00	0.00E+00
Materials for recycling	kg	3.68E+01	6.37E+01
Materials for energy recovery	kg	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00

LCA Results

Interpretation

Float glass accounts for some 50% of the GWP indicator value for single-glazed partitions and over 60% for double-glazed partitions; in either case, the contribution from float glass increases as glass thickness increases. The contribution of aluminium is higher than its proportion by mass in the declared unit. A similar pattern is observed for AP, EP, ADPF and POCP, although for POCP the contribution of aluminium is slightly higher than that of glass for the single-glazed partition.

For ODP, releases of Halon 1301, Halon 1211 and CFC-114 in generic inventory data for upstream processes – particularly hydrocarbon production and transport – account for almost 95% of the indicator values obtained. Some information sources underlying this generic data predate Montreal Protocol deadlines for replacement of these substances in all but essential uses. ODP indicator values should therefore be treated with caution.

The quality of generic data for water consumption underlying major contributions to the FW indicator is also low, therefore there is high uncertainty associated with the FW indicator values.

PENRE and ADPF, although reported in the same units, are calculated by different methods. PENRE includes nuclear energy and energy in wood extracted from primary forests, whereas ADPF does not. The fossil fuel-derived component of PENRE is identical to the ADPF indicator value.

Tables below indicate the range between maximum and minimum LCIA indicator values for single- and double-glazed partitions respectively.

Parameter – Environmental Impacts	Unit	Modules A1–A3			
		Single-glazed			
		Minimum		Maximum	
		Indicator Value	% Reference Product Value	Indicator Value	% Reference Product Value
Global warming potential (GWP)	kg CO ₂ -eq	2.74E+02	67%	7.62E+02	186%
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11-eq	2.99E-05	75%	6.49E-05	163%
Acidification potential of land and water (AP)	kg SO ₂ -eq	1.67E+00	67%	4.70E+00	187%
Eutrophication potential (EP)	kg PO ₄ ³⁻ -eq	1.81E-01	71%	4.44E-01	174%
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg ethene-eq	7.61E-02	61%	2.57E-01	206%
Abiotic depletion potential for non-fossil resources (ADPE)	kg Sb-eq	6.50E-04	71%	1.58E-03	174%
Abiotic depletion potential for fossil resources (ADPFF)	MJ	3.78E+03	69%	9.87E+03	181%

Parameter – Environmental Impacts	Unit	Modules A1–A3			
		Double-glazed			
		Minimum		Maximum	
		Indicator Value	% Reference Product Value	Indicator Value	% Reference Product Value
Global warming potential (GWP)	kg CO ₂ -eq	3.85E+02	62%	1.04E+03	168%
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11-eq	4.43E-05	67%	9.93E-05	150%
Acidification potential of land and water (AP)	kg SO ₂ -eq	2.41E+00	61%	6.58E+00	167%
Eutrophication potential (EP)	kg PO ₄ ³⁻ -eq	2.68E-01	64%	6.60E-01	157%
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg ethene-eq	1.01E-01	59%	3.20E-01	185%
Abiotic depletion potential for non-fossil resources (ADPE)	kg Sb-eq	9.50E-04	64%	2.32E-03	157%
Abiotic depletion potential for fossil resources (ADPFF)	MJ	5.32E+03	64%	1.37E+04	163%

References

BS 476-22:1987 – Fire tests on building materials and structures. Method for determination of the fire resistance of non-loadbearing elements of construction.

ecoinvent database (v3.2) (www.ecoinvent.ch).

EN 13501-1:2007 + A1:2009 – Fire classification of construction products and building elements. Classification using test data from reaction to fire test.

EN 15804:2012 + A1:2013 - Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products.

General Program Instructions, Version 2.5, 2015-05-11 – The International EPD® System – EPD International AB.

HPD 1.0 Health Product Declaration Standard version 1.0.

IBU Part B: Requirements on the EPD.

ISO 9001:2008 – Quality management system. Requirements.

ISO 14001:2004 – Environmental management systems – Requirements with guidance for use.

ISO 14025:2009-11: Environmental labels and declarations – Type III environmental declarations - Principles and procedures.

LCA of Doors & Partition Systems – Report for Optima Products Limited – EuGeos Limited (2016).

Life Cycle Assessment of Float Glass – Glass for Europe (November 2010, revised February 2011).

PCR 2012:01 Construction products and Construction services, Version 2.01, 2016-03-09 – The International EPD® System – EPD International AB.

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.

Summary

This Environmental Product Declaration provides environmental performance indicators for an aluminium-framed glazed partition system.

This is an Environmental Product Declaration in accordance with ISO 14025 and EN 15804, and is third-party verified. It is a cradle-to-gate EPD in accordance with the requirements of EN 15804, and thus covers the modules A1–A3 defined in that standard. All other stages are dependent on the specific application of the product and should be included in a whole-of-life model.

This EPD is based on a life cycle assessment (LCA) study which used production data for the 12-month period November 1, 2014 to October 31, 2015 from Optima Products Limited's manufacturing facility in Radstock, UK. Background data were taken from the ecoinvent database (v3.2).

The declared unit is one screen of width 3.0m and height 2.70m, incorporating a door opening 1m wide. The mass of the declared unit is 175kg (single-glazed) or 333kg (double-glazed).

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