

# Environmental Product Declaration

In accordance with  
ISO 14025 and EN 15804:  
2012+A2:2019 for:

**Revolution 54 Plus  
Aluminium Framed  
Single Glazed  
Partition Systems**



THE INTERNATIONAL EPD® SYSTEM  
EPD INTERNATIONAL AB  
EPD REGISTRATION NUMBER S-P-05435 V2.0  
ISSUED ON 2022-02-22  
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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](http://www.environdec.com)



# Optima

# Introduction

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Optima Products Limited (OPL) is a UK-based manufacturer of aluminium framed, glazed partition systems and doors. Based in Radstock, Bath, OPL 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 OPL's Revolution 54 Plus aluminium framed single glazed partition systems. It is a cradle-to-gate with options EPD in accordance with the requirements of EN 15804, covering modules A1-A5, C1-C4 and D defined in that standard.

Version 2 of the EPD reflects the changes in aluminium billets used for profile manufacturing to a specific grade of aluminium with high recycled content and melted using renewable electricity, as well as significant change to the packaging used by Optima Products Limited. The EPD is based on a life cycle assessment (LCA) study which used production data for the 12-month period 1 November 2022 to 31 October 2023 from Optima Products Limited's manufacturing facility in Radstock, UK. Background data were taken from the ecoinvent database (v3.6).

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 of partition system (including packaging).

## Company Profile

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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 Optima 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 the design and production management and operates an accredited quality management system 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 accredited environmental management system 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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## Revolution 54 Plus single glazed EPD

|   |  |
|---|--|
| EPD programme:  | The International EPD® System  |
| EPD programme operator:   | EPD International AB - Box 210 60 - SE-100 31<br>Stockholm - Sweden <a href="http://www.environdec.com">www.environdec.com</a>                             |
| EPD owner:  | Optima Products Limited, Mill Road, Radstock, Bath BA3 5TX, UK<br><a href="http://www.optimasystems.com">www.optimasystems.com</a>                         |
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| EPD based on Product Category Rules (PCR):                                  | The CEN standard EN 15804 serves as the core PCR<br>The International EPD® System's PCR 2019:14<br>Construction products, Version 1.11, 2021-02-05         |
| PCR review conducted by:  | The Technical Committee of the International EPD® System<br>Chair: Claudia Peña; contact via: <a href="mailto:info@environdec.com">info@environdec.com</a> |
| Independent verification of this EPD and data, according to ISO 14025/2006: | EPD process certification <input type="checkbox"/> external EPD verification <input checked="" type="checkbox"/>   |
| Third party verifier:   | Ugo Pretato - Recognised Individual Verifier   |
| Accredited or approved by:  | The International EPD® System  |
| LCA conducted by:   | EuGeos Limited - UK - <a href="http://www.eugeos.co.uk">www.eugeos.co.uk</a>   |
| LCA software:   | openLCA  |
| Background database:  | ecoinvent v3.6   |
| System boundaries:  | Cradle to gate with options (modules A4 & A5, C & D)   |
| Time representativeness:  | 1st November 2022 to 31st October 2023   |

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.

# Product Information

## REVOLUTION 54 PLUS ALUMINIUM FRAMED SINGLE GLAZED PARTITION SYSTEMS



Single glazed Revolution 54 Plus is available in two distinct designs, distinguished by the height of the frame: either 54mm (w) x 25mm (h) or 54mm (w) x 50mm (h) extrusions. Both inner and outer deflection heads are available, to suit your design intent, and each style can accommodate up to +/-25mm or up to +/-40mm deflection. To suit the desired aesthetic, the aluminium base channel can either be 25mm or 50mm deep and the glazing can be offset or centred.

Revolution 54 Plus can accommodate glass panels up to 1500mm wide, subject to height, configuration, and site logistics.

This partition system integrates seamlessly with generic drywall with the use of our aluminium tapeable glazing bar, making it an ideal solution for glazed fins or clerestory glazing, where acoustic performance and design aesthetics cannot be compromised.

The excellent acoustic performance, aesthetic appeal and adaptability of Revolution 54 Plus makes it one of our most popular systems.

Revolution 54 Plus is also available with our slimline aluminium Shoreditch Edition framework.

This EPD applies to the following Revolution 54 Plus single glazed partition systems (with 12.8mm acoustic laminated or 12mm toughened clear glass):

| Aluminium/m <sup>2</sup>                      |  |
|---|--|
| 1.2 - 1.4 kg (Category I)                     | 1.6 - 2.1 kg (Category II)   |
| with 54x25mm profiles;<br>no deflection head* | with 54x50mm profiles;<br>no deflection head*                            |
|   | with 54x25mm base/abutment profiles;<br>+/-25mm external deflection head |
|   | with 54x50mm base/abutment profiles;<br>+/-40mm external deflection head |

\* in the LCA, this model represents the whole category

Partitions are customisable, and indeed normally customised, to suit the context in which they are installed. The aluminium framework of all OPL's partition systems can be supplied in either powder coated or anodised finish.

All partition systems produced by OPL are classified CPC 4212 under the UN CPC classification system V2.1.

# Product Information

## Technical data

The technical characteristics of OPL's Revolution 54 Plus single glazed partition systems are summarised below.

| Name  | Value       | Unit                |
|---|-------------|---------------------|
| <b>Mass for a unit area*</b>  |             |                     |
| Category I  | 32.0 - 32.5 | kg/m <sup>2</sup>   |
| Category II   | 32.5 - 40.0 | kg/m <sup>2</sup>   |
| <b>Acoustic Testing (EN ISO 10140-1 &amp; 2) - Laboratory measurement of sound insulation of building materials</b> |             |                     |
| All 4 types   | max 38      | dB(R <sub>w</sub> ) |

\*Mass is provided for guidance only and is not part of the product specification

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.

## 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 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.

OPL 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 OPL 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 OPL operation and maintenance schedule - see [www.optimasystems.com](http://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 04 02 Aluminium
- EWC 17 02 03 Plastic
- EWC 17 04 05 Iron and steel

All OPL systems are designed to be re-usable and re-locatable if properly configured. We endeavour to ensure that appropriate after-use planning is implemented to make sure the correct OPL system configuration is specified.

# Product Information

## Content declaration

The material composition of Revolution 54 Plus aluminium framed single glazed partition systems characterised in this EPD is shown below. The masses quoted are indicative; total mass is not part of the product specification.

| Product components | Mass in declared unit, - kg |           | Post-consumer material, weight - % | Renewable material, weight - % |
|--------------------|-----------------------------|-----------|------------------------------------|--------------------------------|
|                    | Cat I                       | Cat II    | All systems                        |                                |
| Glass              | 30                          | 30        | 0                                  | 0                              |
| Aluminium          | 1.2 - 1.4                   | 1.6 - 2.1 | 81%                                | 0                              |
| PVC                | 0.1                         | 0.1       | 0                                  | 0                              |
| Other polymers     | 0.8                         | 0.8       | 0                                  | 0                              |
| Total:             | 32                          | 33        |                                    |                                |

| Packaging materials | Weight - kg |        | Weight - % (vs product) |        |
|---------------------|-------------|--------|-------------------------|--------|
|                     | Cat I       | Cat II | Cat I                   | Cat II |
| Cardboard           | 0.05        | 0.06   | 0.2                     | 0.2    |
| Total:              | 0.05        | 0.06   |                         |        |

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.

## Biogenic carbon

Carbon dioxide (CO<sub>2</sub>) is absorbed from the atmosphere by trees & other plants, so any plant-derived based product contains some carbon of this type. This carbon is considered as a negative emission in some carbon accounting systems. The biogenic carbon contained in the declared unit of each Category in this EPD is shown below.

| Biogenic carbon content per declared unit | Unit | Quantity   |             |
|---|------|------------|-------------|
|   |      | Category I | Category II |
| Biogenic carbon content in product        | kg C | n/a        | n/a         |
| Biogenic carbon content in packaging      | kg C | 0.03       | 0.03        |

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>

## Residual risks and emergencies

There are no residual risks associated with the normal day to day use of OPL partition systems 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](http://www.optimasystems.com)

# 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 with options EPD covers the production stage (modules A1 - A3), the construction stage (modules A4 & A5), the end-of-life stage (modules C1-C4) and module D - 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 & 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<br>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  |           |               |                            |          |           |             |        |             |               |                        |                       |                            |           |                |          |   |
| <10%  | -         | -             | -                          | -        | -         | -           | -      | -           | -             | -                      | -                     | -                          | -         | -              | -        | -   |
| Variation - products  |           |               |                            |          |           |             |        |             |               |                        |                       |                            |           |                |          |   |
| <10%  | -         | -             | -                          | -        | -         | -           | -      | -           | -             | -                      | -                     | -                          | -         | -              | -        | -   |
| Variation - sites   |           |               |                            |          |           |             |        |             |               |                        |                       |                            |           |                |          |   |
| n/a   | n/a       | n/a           | n/a                        | n/a      | -         | -           | -      | -           | -             | -                      | -                     | -                          | -         | -              | -        | -   |

# Environmental Performance-Related Information

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## Declared unit

The declared unit is one square metre. The LCA is calculated on the basis of a screen of width 5.0m and height 2.90m, using 12.8mm laminated glass, including head and base track and wall abutments. Refer to the content declaration for the mass of the declared unit; the stated masses are for guidance and are not part of the product specification.

## System boundaries

This EPD covers the product stage, delivery to site, installation, and 'end-of-life' management. It therefore 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
- A4 - delivery of construction products to the building site
- A5 - assembly
- C1 - removal from the building
- C2 - transport to waste treatment facility
- C3 - waste treatment
- C4 - final disposal
- D - benefits associated with recycling in a different product system

Modules A1, A2 and A3 comprise the product stage and are declared as one aggregated module A1 – A3. 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.

Modules A4 & A5 are part of the "Construction Process stage".

Module C1 - C4 cover the end-of-life stage.

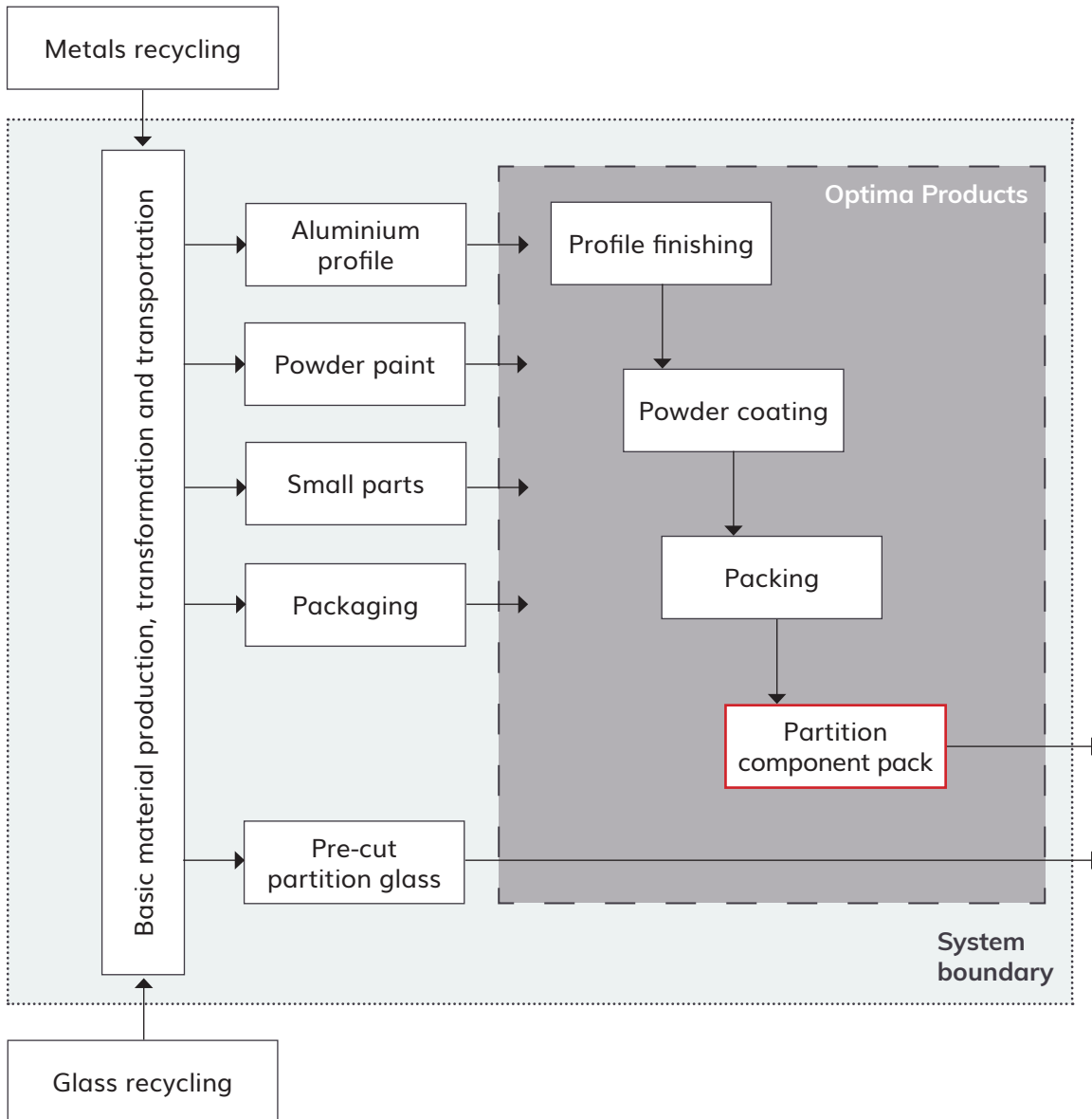
Module D provides an estimate of the potential benefits that would accrue to a different product system were the partition constituents and recycled wastes identified in data for other life cycle modules actually recycled or recovered at current rates and using current technologies.



# Environmental Performance-Related Information

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. Maintenance of equipment is also excluded.

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



SYSTEM BOUNDARIES (A1-A3) FOR PARTITION SYSTEM LCA

# Environmental Performance-Related Information

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## 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.

## 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 1 November 2022 to 31 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.

Other (generic) data sets 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

Background (generic) data for raw material inputs and fuels were taken from the ecoinvent v3.6 database, augmented 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.

## 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 OPL 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

OPL purchased electricity on a renewable tariff, supplied from wind generation and backed by REGO; the carbon footprint of the delivered electricity (GWP-GHG) is 0.03kgCO<sub>2e</sub>/kWh.

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

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

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.

| Scenario parameters - transport                |                               |                                 |
|--|-------------------------------|---------------------------------|
| Parameter                                      | A4 transport to site          | C2 transport to waste treatment |
|  | Quantity and unit             |                                 |
| Vehicle type                                   | lorry                         |                                 |
| Vehicle load capacity                          | 10t; n/a                      |                                 |
| Fuel type and consumption                      | diesel, 0.1 l/km              |                                 |
| Volume capacity utilisation factor             | 1                             |                                 |
| Capacity utilisation (including empty returns) | 38%                           | 33%                             |
| Distance to site                               | 200 km                        | 50 km                           |
| Bulk density of transported products           | n/a (mixed materials, packed) | n/a (mixed materials)           |

Installation (Module A5) is modelled on the basis of information from OPL. Consumption of 0.08kWh electricity per declared unit is assumed, to account for the use of hand-held power tools. Cardboard packaging is assumed to be recycled; the same assumptions are applied for its transport as in Module C2. Other material used to transport partition components to site are returned for re-use. Removal from the building (Module C1) is assumed to use the same energy as installation.

In the end-of-life modules, aluminium is assumed recycled and glass recovered for use as aggregate, therefore these are assumed to be separated in Module C3. As a simplification, treatment of these materials as wastes is omitted so that Module C4 is empty.

# Environmental Performance-Related Information

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/<br>recovery | Assumed fate | Displaced input flow    | Quality factor | Net output |       |
|                                  |              |                         |                | Quantity   | Units |
| Aluminium                        | 90% recycled | primary aluminium ingot | 1              | 0.2/0.3    | kg    |
| Glass                            | recovered    | limestone aggregate     | 1              | 30         | kg    |

## Environmental indicators

This EPD contains environmental information about OPL’s partition systems 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 parameters are listed below along with the abbreviations used for them in the tables of indicator values that follow.

| Parameter   | Abbreviation   | Units   |
|---|----------------|---|
| <b>Potential environmental impacts</b>                          |                |   |
| Climate change – GWP fossil                                     | GWP-fossil     | kg CO <sub>2</sub> eq                         |
| Climate change – GWP biogenic                                   | GWP-biogenic   | kg CO <sub>2</sub> eq                         |
| Climate change – GWP land transformation                        | GWP-luluc      | kg CO <sub>2</sub> eq                         |
| Climate change – GWP total                                      | GWP-total      | kg CO <sub>2</sub> eq                         |
| Climate change - GWP fossil & land transformation <sup>1</sup>  | GWP-GHG        | kg CO <sub>2</sub> eq                         |
| Acidification potential   | AP             | mol H <sup>+</sup> eq                         |
| Eutrophication – freshwater                                     | EP-freshwater  | kg P eq & kg PO <sub>4</sub> <sup>3-</sup> 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 <sup>2</sup> | ADPMM          | kg Sb eq                                      |
| Depletion of abiotic resources – fossil fuels <sup>2</sup>      | ADPFF          | MJ, ncv                                       |
| Water (user) deprivation potential <sup>2</sup>                 | WDP            | m <sup>3</sup> world-eq deprived              |

# Environmental Performance-Related Information

| Parameter   | Abbreviation | Units          |
|---|--------------|----------------|
| <b>Resource use</b>   |              |                |
| Renewable primary energy as energy carrier                                  | PERE         | MJ             |
| Renewable primary energy resources as material utilisation                  | PERM         | MJ             |
| Total renewable primary energy use<br>(sum of the two parameters above)     | PERT         | MJ             |
| Non-renewable primary energy as energy carrier                              | PENRE        | MJ             |
| Non-renewable primary energy resources<br>as material utilisation           | PENRM        | MJ             |
| Total non-renewable primary energy use<br>(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 <sup>3</sup> |
| <b>Wastes</b>   |              |                |
| Hazardous waste disposed  | HWD          | kg             |
| Non-hazardous waste disposed  | NHWD         | kg             |
| Radioactive waste disposed  | TRWD         | kg             |
| <b>Output flows</b>   |              |                |
| 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

## REVOLUTION 54 PLUS SINGLE GLAZED PARTITION SYSTEMS - CATEGORY I

Environmental indicator results are shown in the 4 following tables for the declared unit of one square metre; modules A1 - A3 are shown on an aggregated basis.

| Environmental Impacts (EN 15804 + A2) | Unit                                | A1 - A3   | A4        | A5       | C1        | C2        | C3        | C4       | D         |
|---------------------------------------|-------------------------------------|-----------|-----------|----------|-----------|-----------|-----------|----------|-----------|
| GWP-fossil                            | kg CO <sub>2</sub> eq               | 4.95E+01  | 1.14E-01  | 4.21E-02 | 3.46E-02  | 1.38E+00  | 6.94E-01  | 0.00E+00 | -1.94E+00 |
| GWP-biogenic                          | kg CO <sub>2</sub> eq               | -1.46E-01 | -4.36E-05 | 2.01E-01 | -3.58E-05 | -5.30E-04 | -4.98E-02 | 0.00E+00 | 6.69E-03  |
| GWP-luluc                             | kg CO <sub>2</sub> eq               | 3.62E-02  | 5.00E-05  | 2.76E-06 | 2.20E-06  | 6.00E-04  | 8.40E-04  | 0.00E+00 | -4.20E-03 |
| GWP-total                             | kg CO <sub>2</sub> eq               | 4.94E+01  | 1.14E-01  | 2.43E-01 | 3.46E-02  | 1.38E+00  | 6.45E-01  | 0.00E+00 | -1.94E+00 |
| GWP-GHG                               | kg CO <sub>2</sub> eq               | 4.97E+01  | 1.14E-01  | 4.21E-02 | 3.46E-02  | 1.38E+00  | 6.97E-01  | 0.00E+00 | -1.94E+00 |
| AP                                    | mol H <sup>+</sup> eq               | 1.21E-01  | 2.70E-04  | 8.80E-05 | 8.40E-05  | 3.27E-03  | 5.98E-03  | 0.00E+00 | -8.91E-03 |
| EP-freshwater                         | kg P eq                             | 9.30E-04  | 1.11E-06  | 1.13E-06 | 1.11E-06  | 1.34E-05  | 5.34E-05  | 0.00E+00 | -4.61E-05 |
|                                       | kg PO <sub>4</sub> <sup>3-</sup> eq | 2.85E-03  | 3.40E-06  | 3.46E-06 | 3.41E-06  | 4.10E-05  | 1.64E-04  | 0.00E+00 | -1.41E-04 |
| EP-marine                             | kg N eq                             | 1.67E-02  | 3.56E-05  | 1.96E-05 | 1.76E-05  | 4.30E-04  | 4.70E-04  | 0.00E+00 | -1.50E-03 |
| EP-terrestrial                        | mol N eq                            | 2.51E-01  | 3.90E-04  | 2.00E-04 | 1.90E-04  | 4.75E-03  | 6.08E-03  | 0.00E+00 | -1.79E-02 |
| POFP                                  | kg NMVOC eq                         | 6.60E-02  | 1.90E-04  | 5.62E-05 | 5.14E-05  | 2.28E-03  | 2.25E-03  | 0.00E+00 | -5.22E-03 |
| ODP                                   | kg CFC-11 eq                        | 7.52E-06  | 2.53E-08  | 3.81E-09 | 3.50E-09  | 3.05E-07  | 9.31E-08  | 0.00E+00 | -2.31E-07 |
| ADPMM                                 | kg Sb eq                            | 6.80E-04  | 4.12E-06  | 5.38E-08 | 2.69E-08  | 4.97E-05  | 4.18E-05  | 0.00E+00 | -6.40E-04 |
| ADPFF                                 | MJ, ncv                             | 7.07E+02  | 1.69E+00  | 9.82E-01 | 6.07E-01  | 2.03E+01  | 9.25E+00  | 0.00E+00 | -2.69E+01 |
| WDP                                   | m <sup>3</sup> world-eq dprv        | 6.49E+02  | 2.04E+00  | 5.05E-01 | 4.87E-01  | 2.46E+01  | 5.66E+01  | 0.00E+00 | -1.11E+02 |
| <b>Resource use</b>                   |                                     |           |           |          |           |           |           |          |           |
| PERE                                  | MJ                                  | 5.46E+01  | 2.91E-02  | 4.17E-03 | 3.78E-03  | 3.51E-01  | 1.70E+00  | 0.00E+00 | -1.55E+00 |
| PERM                                  | MJ                                  | 7.54E-01  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| PERT                                  | MJ                                  | 5.53E+01  | 2.91E-02  | 4.17E-03 | 3.78E-03  | 3.51E-01  | 1.70E+00  | 0.00E+00 | -1.55E+00 |
| PENRE                                 | MJ                                  | 6.82E+02  | 1.73E+00  | 9.82E-01 | 9.59E-01  | 2.09E+01  | 1.07E+01  | 0.00E+00 | -2.69E+01 |
| PENRM                                 | MJ                                  | 2.43E+01  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| PENRT                                 | MJ                                  | 7.07E+02  | 1.73E+00  | 9.82E-01 | 9.59E-01  | 2.09E+01  | 1.07E+01  | 0.00E+00 | -2.69E+01 |
| SM                                    | kg                                  | 1.46E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| RSF                                   | MJ                                  | 3.78E-01  | 1.05E-03  | 5.55E-05 | 4.49E-05  | 1.27E-02  | 4.36E-02  | 0.00E+00 | -1.43E-02 |
| 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 <sup>3</sup>                      | 3.99E-01  | 1.50E-04  | 1.50E-04 | 1.30E-04  | 1.76E-03  | 4.48E-03  | 0.00E+00 | -1.22E-02 |
| <b>Waste</b>                          |                                     |           |           |          |           |           |           |          |           |
| HWD                                   | kg                                  | 9.73E-01  | 2.01E-03  | 1.71E-03 | 1.68E-03  | 2.43E-02  | 5.49E-02  | 0.00E+00 | -2.36E-01 |
| NHWD                                  | kg                                  | 2.84E+01  | 1.12E-01  | 1.03E-01 | 4.78E-02  | 1.35E+00  | 3.30E+00  | 0.00E+00 | -2.66E+00 |
| TRWD                                  | kg                                  | 2.40E-03  | 1.16E-05  | 7.47E-06 | 7.33E-06  | 1.40E-04  | 5.61E-05  | 0.00E+00 | -1.00E-04 |
| <b>Output flows</b>                   |                                     |           |           |          |           |           |           |          |           |
| CRU                                   | kg                                  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| MFR                                   | kg                                  | 1.30E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 3.13E+01  | 0.00E+00 | -6.23E-02 |
| MER                                   | kg                                  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 4.80E-04  | 0.00E+00 | -2.60E-04 |
| EEE                                   | MJ                                  | 6.60E-04  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| EET                                   | MJ                                  | 6.60E-04  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |

# LCA Results

## REVOLUTION 54 PLUS SINGLE GLAZED PARTITION SYSTEMS - CATEGORY II

Environmental indicator results are shown in the 4 following tables for the declared unit of one square metre; modules A1 - A3 are shown on an aggregated basis.

| Environmental Impacts (EN 15804 + A2) | Unit                                | A1 - A3   | A4        | A5       | C1        | C2        | C3        | C4       | D         |
|---------------------------------------|-------------------------------------|-----------|-----------|----------|-----------|-----------|-----------|----------|-----------|
| GWP-fossil                            | kg CO <sub>2</sub> eq               | 5.20E+01  | 1.43E-01  | 4.28E-02 | 3.46E-02  | 1.40E+00  | 7.05E-01  | 0.00E+00 | -2.40E+00 |
| GWP-biogenic                          | kg CO <sub>2</sub> eq               | -1.79E-01 | -5.45E-05 | 2.31E-01 | -3.58E-05 | -5.30E-04 | -5.07E-02 | 0.00E+00 | 9.36E-03  |
| GWP-luluc                             | kg CO <sub>2</sub> eq               | 7.56E-02  | 6.25E-05  | 2.81E-06 | 2.20E-06  | 6.10E-04  | 8.60E-04  | 0.00E+00 | -5.82E-03 |
| GWP-total                             | kg CO <sub>2</sub> eq               | 5.19E+01  | 1.43E-01  | 2.74E-01 | 3.46E-02  | 1.40E+00  | 6.56E-01  | 0.00E+00 | -2.40E+00 |
| GWP-GHG                               | kg CO <sub>2</sub> eq               | 5.21E+01  | 1.43E-01  | 4.28E-02 | 3.46E-02  | 1.40E+00  | 7.09E-01  | 0.00E+00 | -2.41E+00 |
| AP                                    | mol H <sup>+</sup> eq               | 1.34E-01  | 3.40E-04  | 8.83E-05 | 8.40E-05  | 3.33E-03  | 6.08E-03  | 0.00E+00 | -1.15E-02 |
| EP-freshwater                         | kg P eq                             | 1.00E-03  | 1.39E-06  | 1.13E-06 | 1.11E-06  | 1.36E-05  | 5.44E-05  | 0.00E+00 | -6.22E-05 |
|                                       | kg PO <sub>4</sub> <sup>3-</sup> eq | 3.07E-03  | 4.25E-06  | 3.47E-06 | 3.41E-06  | 4.17E-05  | 1.67E-04  | 0.00E+00 | -1.91E-04 |
| EP-marine                             | kg N eq                             | 1.85E-02  | 4.45E-05  | 1.98E-05 | 1.76E-05  | 4.40E-04  | 4.80E-04  | 0.00E+00 | -1.94E-03 |
| EP-terrestrial                        | mol N eq                            | 2.72E-01  | 4.90E-04  | 2.00E-04 | 1.90E-04  | 4.83E-03  | 6.19E-03  | 0.00E+00 | -2.27E-02 |
| POFP                                  | kg NMVOC eq                         | 7.27E-02  | 2.40E-04  | 5.67E-05 | 5.14E-05  | 2.32E-03  | 2.28E-03  | 0.00E+00 | -6.53E-03 |
| ODP                                   | kg CFC-11 eq                        | 7.78E-06  | 3.17E-08  | 3.84E-09 | 3.50E-09  | 3.11E-07  | 9.47E-08  | 0.00E+00 | -2.52E-07 |
| ADPMM                                 | kg Sb eq                            | 6.90E-04  | 5.16E-06  | 5.63E-08 | 2.69E-08  | 5.05E-05  | 4.25E-05  | 0.00E+00 | -8.90E-04 |
| ADPFF                                 | MJ, ncv                             | 7.47E+02  | 2.11E+00  | 9.84E-01 | 6.07E-01  | 2.07E+01  | 9.41E+00  | 0.00E+00 | -3.30E+01 |
| WDP                                   | m <sup>3</sup> world-eq dprv        | 6.75E+02  | 2.56E+00  | 5.06E-01 | 4.87E-01  | 2.50E+01  | 5.75E+01  | 0.00E+00 | -1.53E+02 |
| <b>Resource use</b>                   |                                     |           |           |          |           |           |           |          |           |
| PERE                                  | MJ                                  | 6.54E+01  | 3.64E-02  | 4.20E-03 | 3.78E-03  | 3.57E-01  | 1.73E+00  | 0.00E+00 | -2.11E+00 |
| PERM                                  | MJ                                  | 8.24E-01  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| PERT                                  | MJ                                  | 6.62E+01  | 3.64E-02  | 4.20E-03 | 3.78E-03  | 3.57E-01  | 1.73E+00  | 0.00E+00 | -2.11E+00 |
| PENRE                                 | MJ                                  | 7.22E+02  | 2.16E+00  | 9.84E-01 | 9.59E-01  | 2.12E+01  | 1.09E+01  | 0.00E+00 | -3.30E+01 |
| PENRM                                 | MJ                                  | 2.46E+01  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| PENRT                                 | MJ                                  | 7.47E+02  | 2.16E+00  | 9.84E-01 | 9.59E-01  | 2.12E+01  | 1.09E+01  | 0.00E+00 | -3.30E+01 |
| SM                                    | kg                                  | 2.27E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| RSF                                   | MJ                                  | 3.90E-01  | 1.31E-03  | 5.65E-05 | 4.49E-05  | 1.29E-02  | 4.44E-02  | 0.00E+00 | -1.60E-02 |
| 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 <sup>3</sup>                      | 4.75E-01  | 1.80E-04  | 1.50E-04 | 1.30E-04  | 1.79E-03  | 4.55E-03  | 0.00E+00 | -1.64E-02 |
| <b>Waste</b>                          |                                     |           |           |          |           |           |           |          |           |
| HWD                                   | kg                                  | 1.06E+00  | 2.52E-03  | 1.71E-03 | 1.68E-03  | 2.47E-02  | 5.58E-02  | 0.00E+00 | -3.28E-01 |
| NHWD                                  | kg                                  | 3.04E+01  | 1.40E-01  | 1.08E-01 | 4.78E-02  | 1.37E+00  | 3.36E+00  | 0.00E+00 | -3.42E+00 |
| TRWD                                  | kg                                  | 2.60E-03  | 1.46E-05  | 7.49E-06 | 7.33E-06  | 1.40E-04  | 5.71E-05  | 0.00E+00 | -1.10E-04 |
| <b>Output flows</b>                   |                                     |           |           |          |           |           |           |          |           |
| CRU                                   | kg                                  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| MFR                                   | kg                                  | 2.03E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 3.19E+01  | 0.00E+00 | -8.63E-02 |
| MER                                   | kg                                  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 4.80E-04  | 0.00E+00 | -2.80E-04 |
| EEE                                   | MJ                                  | 1.06E-03  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| EET                                   | MJ                                  | 1.06E-03  | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  | 0.00E+00 | 0.00E+00  |

# Interpretation

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Glass accounts for >90% of the mass of a partition and between 70% and 80% of the GWPTotal indicator (carbon footprint). In all environmental categories, aluminium accounts for a higher proportion of indicator totals than the proportion it represents of total door or partition mass.

The Water Deprivation Potential and GWPluluc indicators are strongly influenced by data relating to aluminium production. However, there are weaknesses in the relevant background data, therefore the indicator values obtained are considered unreliable. GWPluluc makes only a small contribution to GWPTotal for these products.

For ODP, releases of Halon 1301, Halon 1211 and CFC-114 in generic inventory data for upstream processes account for almost 95% of the indicator values obtained. Some information sources of these 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

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

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



# References

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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](http://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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