

## Statement of Verification

BREG EN EPD No.: 000564

Issue 01

This is to verify that the  
**Environmental Product Declaration**  
provided by:  
**Duco Ventilation & Sun Control**



is in accordance with the requirements of:  
**EN 15804:2012+A2:2019**  
and  
**BRE Global Scheme Document SD207**

This declaration is for:  
**DucoSun Cubic fixed**

### Company Address

Duco Ventilation & Sun Control  
Bedrijvenlaan 2  
8630 Veurne  
Belgium



Emma Baker  
Operator

04 March 2024  
Date of this Issue

04 March 2024  
Date of First Issue

03 March 2029  
Expiry Date





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## Environmental Product Declaration

EPD Number: 000564

### General Information

|   |   |
|---|---|
| <b>EPD Programme Operator</b><br>BRE Global<br>Watford, Herts<br>WD25 9XX<br>United Kingdom   | <b>Applicable Product Category Rules</b><br>BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.1  |
| <b>Commissioner of LCA study</b><br>Duco Ventilation & Sun Control<br>Bedrijvenlaan 2<br>8630 Veurne<br>Belgium<br> | <b>LCA consultant/Tool</b><br>Enperas NV<br>Thorpark 8300<br>B-3600 Genk<br>Belgium<br>   |
| <b>Declared/Functional Unit</b><br>1 m <sup>2</sup> of installed sun shading system based on a reference system of 6x6 m.<br><br>The weight per reference flow is 15,60 kg.                           | <b>Applicability/Coverage</b><br>'DucoSun Cubic fixed' product range: DucoSun Cubic 100/45°, DucoSun Cubic 150/45°, DucoSun Cubic 200/45°, DucoSun Cubic 300/45° and DucoSun Cubic 400/45°<br><br>DucoSun Cubic 300/45° is used as the representative product. A variability study has been done (see further). |
| <b>EPD Type</b><br>Cradle-to-grave  | <b>Background database</b><br>Ecoinvent 3.8 and Industry 2.0  |

### Demonstration of Verification

CEN standard EN 15804 serves as the core PCR <sup>a</sup>

Independent verification of the declaration and data according to EN ISO 14025:2010

Internal  External

(Where appropriate <sup>b</sup>)Third party verifier:  
Pat Hermon

a: Product category rules

b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

### Comparability

Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance

## Information modules covered

| Product                             |                                     |                                     | Construction                        |                                     | Use stage                           |                                     |                                     |                                     |                                     |                                     |                                     | End-of-life                         |                                     |                                     |                                     | Benefits and loads beyond the system boundary |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---|
|                                     |                                     |                                     |                                     |                                     | Related to the building fabric      |                                     |                                     |                                     |                                     | Related to the building             |                                     |                                     |                                     |                                     |                                     |   |
| A1                                  | A2                                  | A3                                  | A4                                  | A5                                  | B1                                  | B2                                  | B3                                  | B4                                  | B5                                  | B6                                  | B7                                  | C1                                  | C2                                  | C3                                  | C4                                  | D   |
| Raw materials supply                | Transport                           | Manufacturing                       | Transport to site                   | Construction – Installation         | Use                                 | Maintenance                         | Repair                              | Replacement                         | Refurbishment                       | Operational energy use              | Operational water use               | Deconstruction demolition           | Transport                           | Waste processing                    | Disposal                            | Reuse, Recovery and/or Recycling potential    |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>           |

Note: Ticks indicate the Information Modules declared.

## Manufacturing site(s)

Duco Ventilation & Sun Control  
Bedrijvenlaan 2, 8630 Veurne, Belgium

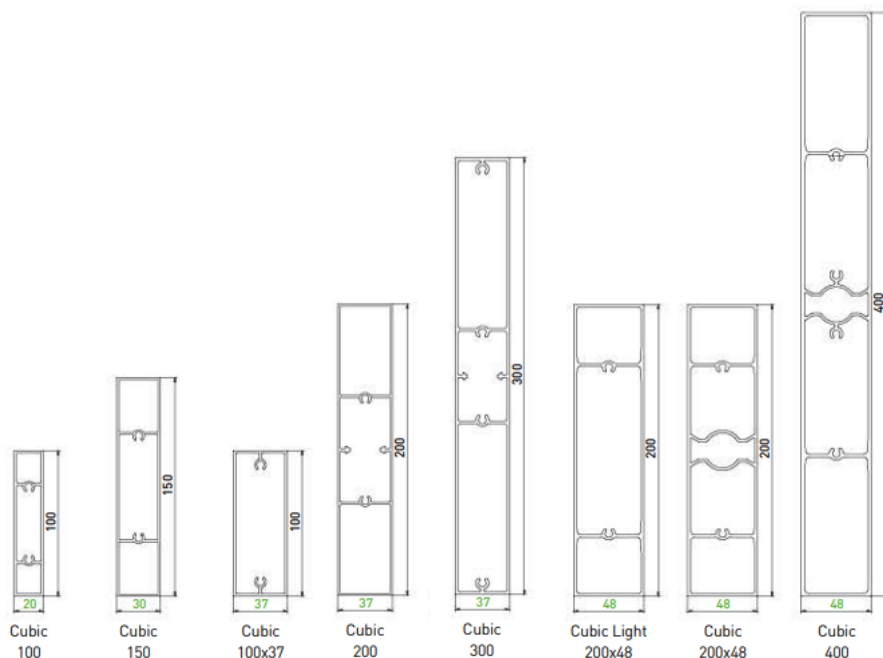
## Construction Product:

### Product Description

The DucoSun Cubic (100-150-200-300-400) is available with fixed or with electronically adjustable louvre blades. In the scope of the EPD only the fixed range is included. These are installed on site in the support structure (horizontal or vertical). Depending on the type, the fixed louvre blades are installed below an angle of 0° or 90°.

### Technical Information

Shading studies can be done, but they are always project-based. A specific system on an east façade in London will give different results from the same slat on a south façade in South of France.



### Main Product Contents

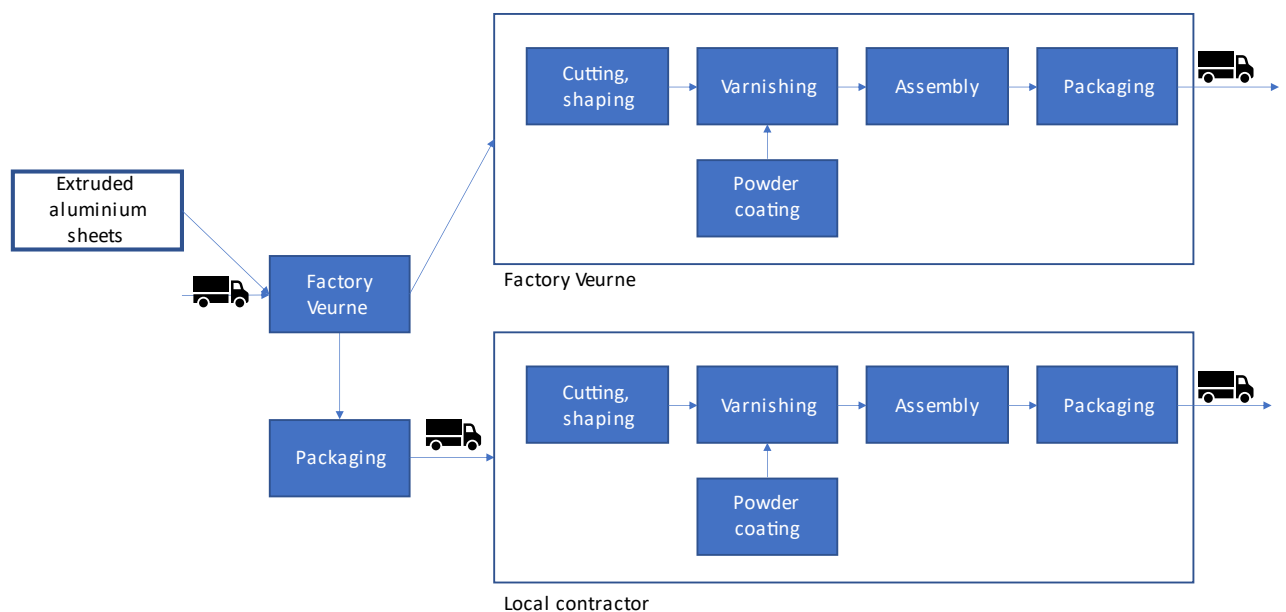
| Material/Chemical Input          | %       |
|----------------------------------|---------|
| Aluminium (75% recycled content) | +/- 98% |
| Powder coating                   | +/- 2%  |

## Manufacturing Process

Veurne, Belgium. At this point two possible manufacturing routes exist. The components are either processed into the final product at the factory in Veurne or they are further shipped to a local subcontractor in the country of installation, who will process the components into the final product according to DUCO’s design and specifications. The processing of the components consists of cutting and forming to correct size and shape, varnishing the aluminium with a powder coating, assembly of the product and packed for transportation. The assembly is depending on the product sometimes performed directly at the installation site.

Note that in the reference model the manufacturing impact is based on the inputs/outputs used in the headquarters in Veurne, Belgium. It is important to consider that the type of operations at the local subcontractors are the same as in DUCO Veurne. Therefore, it can be assumed that the main difference is the electricity mix used. The variability between the electricity mix in Veurne and the UK has been described in the section ‘Variability study’.

## Process flow diagram



## Construction Installation

The distance between Veurne (Belgium) and Manchester (UK) has been used as a representative distance between Veurne and the UK

The following scenario was adopted: use of an articulating boom at a speed of installation of 10 m<sup>2</sup>/hour. The electricity consumption is assumed to be 15.12 kWh/hour, based on the technical specifications of articulating boom ‘GENIE Z-34/22N’ (48 V, 315 Ah).

This product is attached with aluminium side plates to the customer's supporting structure. The customer's structure can be very different (steel, wood, directly on building façade, combination with walkway), therefore it has been excluded from the scope of the EPD.



### Use Information

No emissions arise during the use phase, no maintenance/repair is required under normal conditions of use.

### End of Life

The aluminium and steel are 95% recycled and 5% landfilled.

## Life Cycle Assessment Calculation Rules

### Declared / Functional unit description

1 m<sup>2</sup> of installed sun shading system based on a reference system of 6x6 m.

The weight per reference flow of the representative product is 15,60 kg.

### System boundary

This is a cradle-to-grave EPD

### Data sources, quality and allocation

#### Information on data collection

Manufacturer specific data have been collected for the year 2021.

Company specific data for the production at the factory in Veurne has been collected by Duco and were provided to Enperas through an excel file. The LCI data has been checked by the EPD verifier (Pat Hermon). Enperas uses publicly available generic data for all background processes such as the production of electricity, transportation by means of a specific truck, etc. Primary data is used for modules A1, A2, A3 and A5. The rest of the study is based on scenarios (modules A4, C1-C4, and module D).

#### Software

For the calculation of the LCA results, the software program SimaPro 9.3.0.3 (PRé Consultants, 2021) has been used in combination with a specific LCA software program for Duco. This specific LCA tool has been verified by BRE.

#### Data sources

Ecoinvent 3.8 and Industry 2.0

Electricity from the grid: Electricity, medium voltage {BE}| market for | Cut-off, U

Electricity from own solar panels: Electricity, low voltage {BE}| electricity production, photovoltaic, 3kWp slanted-roof installation, single-Si, panel, mounted | Cut-off, U

Aluminium (main impact): recycled content of 75%. For the 25% primary material the European average 'market for' (i.e. including import from outside Europe) datatrecord has been used.

#### Information on allocation

For processes, where allocation is necessary (multiple input or output processes), the allocation procedure described by the European standard EN 15804+A2 has been followed. Furthermore, joint co-production, where the processes cannot be divided, as well as allocation of secondary materials or secondary fuels is not applicable in this study.

- No co-products are produced.
- Allocation of factory data: at DUCO, different products are produced. For the baseline products only facility level data were available for the energy consumption (i.e. electricity, natural gas, diesel ...), water use and ancillary materials. The facility level data have been allocated to 1 kg of product by dividing the factory data by the total production volume (approximated by total purchased aluminium). The percentage of production at local subcontractors has also been considered in this calculation.

### Cut-off criteria

The following processes are considered below cut-off:

- Ancillary materials at production site
- General waste at production site. Only aluminium waste has been considered, as this is the main waste flow and general waste stream also contains waste from offices, sanitary facilities etc ...
- Environmental impacts caused by the personnel of the production plants are not included in the LCA, e.g. waste from the cafeteria and sanitary installations, accidental pollution caused by human mistakes, or environmental effects caused by commuter traffic. Heating or cooling of the plants to ensure a comfortable indoor climate for the personnel for example is also neglected.



## LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

| Parameters describing environmental impacts               |                                      |      | GWP-total             | GWP-fossil            | GWP-biogenic          | GWP-luluc             | ODP         | AP                    | EP-freshwater                          |
|---|--------------------------------------|------|-----------------------|-----------------------|-----------------------|-----------------------|-------------|-----------------------|--|
|   |                                      |      | kg CO <sub>2</sub> eq | kg CO <sub>2</sub> eq | kg CO <sub>2</sub> eq | kg CO <sub>2</sub> eq | kg CFC11 eq | mol H <sup>+</sup> eq | kg (PO <sub>4</sub> ) <sup>3-</sup> eq |
| Product stage   | Raw material supply                  | A1   | 6,47E+01              | 6,49E+01              | -9,69E-01             | 7,71E-01              | 4,74E-06    | 5,03E-01              | 3,31E-03                               |
|   | Transport                            | A2   | 7,76E-01              | 7,76E-01              | 2,75E-04              | 3,07E-04              | 1,79E-07    | 3,15E-03              | 5,48E-06                               |
|   | Manufacturing                        | A3   | 8,46E+00              | 1,29E+01              | -4,44E+00             | 1,94E-02              | 2,00E-06    | 2,84E-02              | 2,38E-04                               |
|   | Total (Consumption grid)             | A1-3 | 7,40E+01              | 7,85E+01              | -5,41E+00             | 7,90E-01              | 6,92E-06    | 5,34E-01              | 3,55E-03                               |
| Construction process stage                                | Transport                            | A4   | 1,90E+00              | 1,90E+00              | 6,78E-04              | 7,58E-04              | 4,39E-07    | 5,38E-03              | 1,35E-05                               |
|   | Construction                         | A5   | 7,25E+00              | 1,44E+00              | 5,79E+00              | 8,64E-03              | 1,38E-07    | 7,88E-03              | 4,77E-05                               |
| Use stage   | Use                                  | B1   | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00    | 0,00E+00              | 0,00E+00                               |
|   | Maintenance                          | B2   | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00    | 0,00E+00              | 0,00E+00                               |
|   | Repair                               | B3   | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00    | 0,00E+00              | 0,00E+00                               |
|   | Replacement                          | B4   | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00    | 0,00E+00              | 0,00E+00                               |
|   | Refurbishment                        | B5   | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00    | 0,00E+00              | 0,00E+00                               |
|   | Operational energy use               | B6   | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00    | 0,00E+00              | 0,00E+00                               |
|   | Operational water use                | B7   | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00              | 0,00E+00    | 0,00E+00              | 0,00E+00                               |
| <b>Market Scenario</b>                                    |                                      |      |                       |                       |                       |                       |             |                       |  |
| End of life   | Deconstruction, demolition           | C1   | 4,80E-01              | 4,79E-01              | 3,70E-04              | 6,60E-04              | 3,29E-08    | 1,67E-03              | 1,03E-05                               |
|   | Transport                            | C2   | 5,63E-01              | 5,63E-01              | 2,01E-04              | 2,25E-04              | 1,30E-07    | 1,60E-03              | 4,01E-06                               |
|   | Waste processing                     | C3   | 5,05E-01              | 3,68E-01              | 1,27E-01              | 3,33E-04              | 4,36E-08    | 2,19E-03              | 1,26E-05                               |
|   | Disposal                             | C4   | 4,50E-01              | 4,43E-01              | 6,75E-03              | 4,23E-05              | 1,22E-08    | 3,91E-04              | 1,51E-06                               |
| Potential benefits and loads beyond the system boundaries | Reuse, recovery, recycling potential | D    | -3,08E+01             | -2,74E+01             | -2,91E+00             | -5,20E-01             | -2,11E-06   | -1,87E-01             | -1,11E-03                              |

GWP-total = Global warming potential, total;  
 GWP-fossil = Global warming potential, fossil;  
 GWP-biogenic = Global warming potential, biogenic;  
 GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;  
 AP = Acidification potential, accumulated exceedance; and  
 EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

| Parameters describing environmental impacts               |                                      |      | EP-marine | EP-terrestrial | POCP        | ADP-mineral&metals | ADP-fossil              | WDP                              | PM                |
|---|--------------------------------------|------|-----------|----------------|-------------|--------------------|-------------------------|----------------------------------|-------------------|
|   |                                      |      | kg N eq   | mol N eq       | kg NMVOC eq | kg Sb eq           | MJ, net calorific value | m <sup>3</sup> world eq deprived | disease incidence |
| Product stage   | Raw material supply                  | A1   | 5,80E-02  | 6,66E-01       | 2,09E-01    | 1,44E-03           | 8,93E+02                | 2,52E+01                         | 4,24E-06          |
|   | Transport                            | A2   | 9,36E-04  | 1,03E-02       | 3,17E-03    | 2,09E-06           | 1,17E+01                | 3,53E-02                         | 6,64E-08          |
|   | Manufacturing                        | A3   | 7,64E-03  | 8,05E-02       | 2,52E-02    | 6,14E-05           | 2,72E+02                | 1,93E+00                         | 4,31E-07          |
|   | Total (Consumption grid)             | A1-3 | 6,66E-02  | 7,56E-01       | 2,37E-01    | 1,51E-03           | 1,18E+03                | 2,71E+01                         | 4,74E-06          |
| Construction process stage                                | Transport                            | A4   | 1,07E-03  | 1,19E-02       | 4,58E-03    | 5,13E-06           | 2,88E+01                | 8,75E-02                         | 1,52E-07          |
|   | Construction                         | A5   | 1,33E-03  | 1,48E-02       | 4,36E-03    | 1,88E-05           | 2,69E+01                | 3,12E-01                         | 7,13E-08          |
| Use stage   | Use                                  | B1   | 0,00E+00  | 0,00E+00       | 0,00E+00    | 0,00E+00           | 0,00E+00                | 0,00E+00                         | 0,00E+00          |
|   | Maintenance                          | B2   | 0,00E+00  | 0,00E+00       | 0,00E+00    | 0,00E+00           | 0,00E+00                | 0,00E+00                         | 0,00E+00          |
|   | Repair                               | B3   | 0,00E+00  | 0,00E+00       | 0,00E+00    | 0,00E+00           | 0,00E+00                | 0,00E+00                         | 0,00E+00          |
|   | Replacement                          | B4   | 0,00E+00  | 0,00E+00       | 0,00E+00    | 0,00E+00           | 0,00E+00                | 0,00E+00                         | 0,00E+00          |
|   | Refurbishment                        | B5   | 0,00E+00  | 0,00E+00       | 0,00E+00    | 0,00E+00           | 0,00E+00                | 0,00E+00                         | 0,00E+00          |
|   | Operational energy use               | B6   | 0,00E+00  | 0,00E+00       | 0,00E+00    | 0,00E+00           | 0,00E+00                | 0,00E+00                         | 0,00E+00          |
|   | Operational water use                | B7   | 0,00E+00  | 0,00E+00       | 0,00E+00    | 0,00E+00           | 0,00E+00                | 0,00E+00                         | 0,00E+00          |
| <b>Market Scenario</b>                                    |                                      |      |           |                |             |                    |                         |                                  |                   |
| End of life   | Deconstruction, demolition           | C1   | 3,33E-04  | 4,03E-03       | 1,00E-03    | 3,20E-06           | 1,26E+01                | 2,75E-02                         | 7,26E-09          |
|   | Transport                            | C2   | 3,18E-04  | 3,54E-03       | 1,36E-03    | 1,52E-06           | 8,53E+00                | 2,60E-02                         | 4,52E-08          |
|   | Waste processing                     | C3   | 6,84E-04  | 6,51E-03       | 1,80E-03    | 6,27E-06           | 4,34E+00                | 5,07E-02                         | 3,35E-08          |
|   | Disposal                             | C4   | 1,23E-04  | 1,31E-03       | 3,62E-04    | 5,14E-07           | 8,67E-01                | 7,88E-02                         | 5,38E-09          |
| Potential benefits and loads beyond the system boundaries | Reuse, recovery, recycling potential | D    | -2,44E-02 | -2,69E-01      | -9,02E-02   | 2,97E-04           | -3,53E+02               | -5,78E+00                        | -2,18E-06         |

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;  
 EP-terrestrial = Eutrophication potential, accumulated exceedance;  
 POCP = Formation potential of tropospheric ozone;  
 ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;

ADP-fossil = Depletion potential of the stratospheric ozone layer;  
 WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and  
 PM = Particulate matter.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

| Parameters describing environmental impacts               |                                      |      | IRP                     | ETP-fw    | HTP-c     | HTP-nc    | SQP           |
|---|--------------------------------------|------|-------------------------|-----------|-----------|-----------|---------------|
|   |                                      |      | kBq U <sup>235</sup> eq | CTUe      | CTUh      | CTUh      | dimensionless |
| Product stage   | Raw material supply                  | A1   | 4,16E+00                | 2,10E+03  | 1,35E-07  | 3,16E-06  | 4,14E+02      |
|   | Transport                            | A2   | 5,09E-02                | 9,17E+00  | 2,99E-10  | 9,60E-09  | 8,01E+00      |
|   | Manufacturing                        | A3   | 1,43E+00                | 1,69E+02  | 3,85E-09  | 1,02E-07  | 7,14E+02      |
|   | Total (Consumption grid)             | A1-3 | 5,65E+00                | 2,27E+03  | 1,39E-07  | 3,27E-06  | 1,14E+03      |
| Construction process stage                                | Transport                            | A4   | 1,25E-01                | 2,26E+01  | 7,26E-10  | 2,28E-08  | 2,00E+01      |
|   | Construction                         | A5   | 2,87E-01                | 3,73E+01  | 1,95E-09  | 4,14E-08  | 1,94E+01      |
| Use stage   | Use                                  | B1   | 0,00E+00                | 0,00E+00  | 0,00E+00  | 0,00E+00  | 0,00E+00      |
|   | Maintenance                          | B2   | 0,00E+00                | 0,00E+00  | 0,00E+00  | 0,00E+00  | 0,00E+00      |
|   | Repair                               | B3   | 0,00E+00                | 0,00E+00  | 0,00E+00  | 0,00E+00  | 0,00E+00      |
|   | Replacement                          | B4   | 0,00E+00                | 0,00E+00  | 0,00E+00  | 0,00E+00  | 0,00E+00      |
|   | Refurbishment                        | B5   | 0,00E+00                | 0,00E+00  | 0,00E+00  | 0,00E+00  | 0,00E+00      |
|   | Operational energy use               | B6   | 0,00E+00                | 0,00E+00  | 0,00E+00  | 0,00E+00  | 0,00E+00      |
|   | Operational water use                | B7   | 0,00E+00                | 0,00E+00  | 0,00E+00  | 0,00E+00  | 0,00E+00      |
| <b>Market Scenario</b>                                    |                                      |      |                         |           |           |           |               |
| End of life   | Deconstruction, demolition           | C1   | 2,19E-01                | 7,35E+00  | 2,01E-10  | 5,76E-09  | 5,55E+00      |
|   | Transport                            | C2   | 3,70E-02                | 6,70E+00  | 2,15E-10  | 6,77E-09  | 5,95E+00      |
|   | Waste processing                     | C3   | 2,33E-02                | 2,48E+01  | 5,64E-10  | 1,08E-08  | 1,41E+01      |
|   | Disposal                             | C4   | 4,47E-03                | 4,81E+02  | 9,30E-11  | 3,56E-09  | 1,57E+00      |
| Potential benefits and loads beyond the system boundaries | Reuse, recovery, recycling potential | D    | -1,54E+00               | -4,49E+02 | -6,78E-08 | -7,45E-07 | -3,26E+02     |

IRP = Potential human exposure efficiency relative to U235;  
ETP-fw = Potential comparative toxic unit for ecosystems;  
HTP-c = Potential comparative toxic unit for humans;

HTP-nc = Potential comparative toxic unit for humans; and  
SQP = Potential soil quality index.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

|  |                                      |      | Parameters describing resource use, primary energy |           |           |          |           |          |
|--|--------------------------------------|------|--|-----------|-----------|----------|-----------|----------|
|  |                                      |      | PERE   | PERM      | PERT      | PENRE    | PENRM     | PENRT    |
|  |                                      |      | MJ   | MJ        | MJ        | MJ       | MJ        | MJ       |
| Product stage                                  | Raw material supply                  | A1   | 2,57E+02   | 1,41E+01  | 2,72E+02  | 1,06E+03 | 1,14E+01  | 1,07E+03 |
|  | Transport                            | A2   | 1,64E-01   | 0,00E+00  | 1,64E-01  | 1,18E+01 | 0,00E+00  | 1,18E+01 |
|  | Manufacturing                        | A3   | 1,07E+02   | 3,98E+01  | 1,47E+02  | 2,96E+02 | 5,01E-01  | 2,96E+02 |
|  | Total (Consumption grid)             | A1-3 | 3,64E+02   | 5,39E+01  | 4,18E+02  | 1,37E+03 | 1,19E+01  | 1,38E+03 |
| Construction process stage                     | Transport                            | A4   | 1,59E-01   | 0,00E+00  | 4,04E-01  | 1,13E+01 | 0,00E+00  | 2,89E+01 |
|  | Construction                         | A5   | 1,95E+01   | -3,19E+01 | -1,24E+01 | 3,02E+01 | -2,77E-01 | 3,01E+01 |
| Use stage                                      | Use                                  | B1   | 0,00E+00   | 0,00E+00  | 0,00E+00  | 0,00E+00 | 0,00E+00  | 0,00E+00 |
|  | Maintenance                          | B2   | 0,00E+00   | 0,00E+00  | 0,00E+00  | 0,00E+00 | 0,00E+00  | 0,00E+00 |
|  | Repair                               | B3   | 0,00E+00   | 0,00E+00  | 0,00E+00  | 0,00E+00 | 0,00E+00  | 0,00E+00 |
|  | Replacement                          | B4   | 0,00E+00   | 0,00E+00  | 0,00E+00  | 0,00E+00 | 0,00E+00  | 0,00E+00 |
|  | Refurbishment                        | B5   | 0,00E+00   | 0,00E+00  | 0,00E+00  | 0,00E+00 | 0,00E+00  | 0,00E+00 |
|  | Operational energy use               | B6   | 0,00E+00   | 0,00E+00  | 0,00E+00  | 0,00E+00 | 0,00E+00  | 0,00E+00 |
|  | Operational water use                | B7   | 0,00E+00   | 0,00E+00  | 0,00E+00  | 0,00E+00 | 0,00E+00  | 0,00E+00 |
| <b>Market Scenario</b>                         |                                      |      |  |           |           |          |           |          |
| End of life                                    | Deconstruction, demolition           | C1   | 2,63E+00   | 0,00E+00  | 2,63E+00  | 1,38E+01 | 0,00E+00  | 1,38E+01 |
|  | Transport                            | C2   | 1,20E-01   | 0,00E+00  | 1,20E-01  | 8,58E+00 | 0,00E+00  | 8,58E+00 |
|  | Waste processing                     | C3   | 4,41E-02   | 0,00E+00  | 4,19E-01  | 5,02E-01 | 0,00E+00  | 4,77E+00 |
|  | Disposal                             | C4   | 1,15E-01   | 0,00E+00  | 9,33E-02  | 1,25E+01 | -1,14E+01 | 9,38E-01 |
| Potential benefits and loads beyond the system | Reuse, recovery, recycling potential | D    | 0,00E+00   | 2,90E+01  | 2,90E+01  | 0,00E+00 | 1,47E-01  | 1,47E-01 |

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;  
 PERM = Use of renewable primary energy resources used as raw materials;  
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;  
 PENRM = Use of non-renewable primary energy resources used as raw materials;  
 PENRT = Total use of non-renewable primary energy resource

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

| Parameters describing resource use, secondary materials and fuels, use of water |                                      |      | SM       | RSF                       | NRSF                      | FW             |
|---|--------------------------------------|------|----------|---------------------------|---------------------------|----------------|
|   |                                      |      | kg       | MJ<br>net calorific value | MJ<br>net calorific value | m <sup>3</sup> |
| Product stage   | Raw material supply                  | A1   | 1,27E+01 | 0,00E+00                  | 0,00E+00                  | 1,36E+00       |
|   | Transport                            | A2   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 8,54E-04       |
|   | Manufacturing                        | A3   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 5,99E-02       |
|   | Total (Consumption grid)             | A1-3 | 1,27E+01 | 0,00E+00                  | 0,00E+00                  | 1,42E+00       |
| Construction process stage  | Transport                            | A4   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 2,11E-03       |
|   | Construction                         | A5   | 1,27E-01 | 0,00E+00                  | 0,00E+00                  | 1,77E-02       |
| Use stage   | Use                                  | B1   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 0,00E+00       |
|   | Maintenance                          | B2   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 0,00E+00       |
|   | Repair                               | B3   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 0,00E+00       |
|   | Replacement                          | B4   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 0,00E+00       |
|   | Refurbishment                        | B5   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 0,00E+00       |
|   | Operational energy use               | B6   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 0,00E+00       |
|   | Operational water use                | B7   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 0,00E+00       |
| <b>Market Scenario</b>  |                                      |      |          |                           |                           |                |
| End of life   | Deconstruction, demolition           | C1   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 2,39E-03       |
|   | Transport                            | C2   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 6,27E-04       |
|   | Waste processing                     | C3   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 1,72E-03       |
|   | Disposal                             | C4   | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | 6,97E-03       |
| Potential benefits and loads beyond the system boundaries                       | Reuse, recovery, recycling potential | D    | 0,00E+00 | 0,00E+00                  | 0,00E+00                  | -6,17E-01      |

SM = Use of secondary material;  
RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;  
FW = Net use of fresh water

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

| Other environmental information describing waste categories |                                      |      | HWD      | NHWD      | RWD       |
|---|--------------------------------------|------|----------|-----------|-----------|
|   |                                      |      | kg       | kg        | kg        |
| Product stage   | Raw material supply                  | A1   | 1,14E-01 | 1,65E+01  | 4,07E-03  |
|   | Transport                            | A2   | 3,07E-05 | 6,00E-01  | 7,92E-05  |
|   | Manufacturing                        | A3   | 6,12E-04 | 1,65E+00  | 1,38E-03  |
|   | Total (Consumption grid)             | A1-3 | 1,14E-01 | 1,88E+01  | 5,53E-03  |
| Construction process stage                                  | Transport                            | A4   | 7,50E-05 | 1,51E+00  | 1,94E-04  |
|   | Construction                         | A5   | 1,16E-03 | 1,88E+00  | 1,82E-04  |
| Use stage   | Use                                  | B1   | 0,00E+00 | 0,00E+00  | 0,00E+00  |
|   | Maintenance                          | B2   | 0,00E+00 | 0,00E+00  | 0,00E+00  |
|   | Repair                               | B3   | 0,00E+00 | 0,00E+00  | 0,00E+00  |
|   | Replacement                          | B4   | 0,00E+00 | 0,00E+00  | 0,00E+00  |
|   | Refurbishment                        | B5   | 0,00E+00 | 0,00E+00  | 0,00E+00  |
|   | Operational energy use               | B6   | 0,00E+00 | 0,00E+00  | 0,00E+00  |
|   | Operational water use                | B7   | 0,00E+00 | 0,00E+00  | 0,00E+00  |
| <b>Market Scenario</b>                                      |                                      |      |          |           |           |
| End of life   | Deconstruction, demolition           | C1   | 1,13E-05 | 3,46E-02  | 1,10E-04  |
|   | Transport                            | C2   | 2,23E-05 | 4,47E-01  | 5,76E-05  |
|   | Waste processing                     | C3   | 1,14E-05 | 3,18E-01  | 2,72E-05  |
|   | Disposal                             | C4   | 1,01E-05 | 1,21E+00  | 5,17E-06  |
| Potential benefits and loads beyond the system boundaries   | Reuse, recovery, recycling potential | D    | 2,63E-02 | -7,88E+00 | -1,46E-03 |

HWD = Hazardous waste disposed;  
 NHWD = Non-hazardous waste disposed;  
 RWD = Radioactive waste disposed

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

| Other environmental information describing output flows – at end of life |                                      |      | CRU      | MFR      | MER      | EE                    | Biogenic carbon (product) | Biogenic carbon (packaging) |
|--|--------------------------------------|------|----------|----------|----------|-----------------------|---------------------------|-----------------------------|
|  |                                      |      | kg       | kg       | kg       | MJ per energy carrier | kg C                      | kg C                        |
| Product stage  | Raw material supply                  | A1   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Transport                            | A2   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Manufacturing                        | A3   | 1,51E-01 | 5,13E-01 | 0,00E+00 | 1,32E+00              | 0,00E+00                  | 1,69E+00                    |
|  | Total (Consumption grid)             | A1-3 | 1,51E-01 | 5,13E-01 | 0,00E+00 | 1,32E+00              | 0,00E+00                  | 0,00E+00                    |
| Construction process stage   | Transport                            | A4   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Construction                         | A5   | 1,51E-03 | 1,49E+00 | 0,00E+00 | 4,03E+00              | 0,00E+00                  | 0,00E+00                    |
| Use stage  | Use                                  | B1   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Maintenance                          | B2   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Repair                               | B3   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Replacement                          | B4   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Refurbishment                        | B5   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Operational energy use               | B6   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Operational water use                | B7   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
| <b>Market Scenario</b>   |                                      |      |          |          |          |                       |                           |                             |
| End of life  | Deconstruction, demolition           | C1   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Transport                            | C2   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Waste processing                     | C3   | 0,00E+00 | 1,45E+01 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |
|  | Disposal                             | C4   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 3,41E+00              | 0,00E+00                  | 0,00E+00                    |
| Potential benefits and loads beyond the system boundaries                | Reuse, recovery, recycling potential | D    | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00              | 0,00E+00                  | 0,00E+00                    |

CRU = Components for reuse;  
MFR = Materials for recycling

MER = Materials for energy recovery;  
EE = Exported Energy

## Scenarios and additional technical information

| Scenarios and additional technical information |  |                    |                          |
|--|--|--------------------|--------------------------|
| Scenario                                       | Parameter  | Units              | Results                  |
| A4 – Transport to the building site            | The distance between Veurne (Belgium) and Manchester (UK) has been used as a representative distance between Veurne and the UK   |                    |                          |
|  | Fuel type / Vehicle type   | liter of diesel/km | 0.254                    |
|  | Distance   | km                 | 600                      |
|  | Capacity utilisation (incl. empty returns)   | %                  | Ecoinvent                |
|  | Bulk density of transported products   | kg/m <sup>3</sup>  | 2710 (density aluminium) |
| A5 – Installation in the building              | The following scenario was adopted: use of an articulating boom at a speed of installation of 10 m <sup>2</sup> /hour. The electricity consumption is assumed to be 15.12 kWh/hour, based on the technical specifications of articulating boom 'GENIE Z-34/22N' (48 V, 315 Ah). Thus, 1.512 kWh/FU.  |                    |                          |
|  | The dimensions of the products are made to measure at the manufacturer, and therefore the installation losses are very limited. As a conservative approach and to account for some unexpected losses a percentage of 1% has been declared.<br><br>This product is attached with aluminium side plates to the customer's supporting structure. The customer's structure can be very different (steel, wood, directly on building façade, combination with walkway), therefore it has been excluded from the scope of the EPD.   |                    |                          |
| Reference service life                         | 50 years   |                    |                          |
| B use phase                                    | No emissions arise during the use phase<br>No maintenance/repair/refurbishment required under normal conditions of use<br>No operational water/energy use.   |                    |                          |
| C1 to C4<br>End of life,                       | The following end-of-life scenario has been assumed: <ul style="list-style-type: none"> <li>Aluminium and steel components: 95% recycling and 5% landfill</li> </ul> For the transport to the waste treatment facilities the following distance have been assumed: <ul style="list-style-type: none"> <li>From the installation site to the sorting facility: 30 km</li> <li>From the sorting facility to landfill: 50 km</li> <li>From the sorting facility to incineration: 150 km</li> <li>From the sorting facility to recycling: 200 km</li> <li>In all cases a 16-32 Truck EURO6 is used</li> </ul>  |                    |                          |
| Module D                                       | Recycling of aluminium components <ul style="list-style-type: none"> <li>Loads after end-of-waste state: remelting of aluminium scrap into new aluminium alloy</li> <li>Benefits: avoided impact of virgin aluminium alloy</li> <li>The net amount of scrap is considered. Note that the recycled content of the aluminium used to produce the product under study (75%) is considered by subtracting this from the recycled amount and end-of-life.</li> </ul> Recycling of steel components <ul style="list-style-type: none"> <li>Loads after end-of-waste state: remelting of steel scrap into new steel ingot</li> <li>Benefits: avoided impact of virgin steel ingot</li> </ul> Energy recovery and benefits from recycling of packaging materials are also considered, but are less significant |                    |                          |



## Variability study

To prove the representativeness of **DucoSun Cubic 300/45°** for the other products included in the scope of the EPD a variability was performed. The analysis shows that the variability is less than +/- 20%, and thus **DucoSun Cubic 100/45°**, **DucoSun Cubic 150/45° (→ MIN variation -20%)**, **DucoSun Cubic 200/45°**, **DucoSun Cubic 300/45°**, **DucoSun Cubic 350/45°**, **DucoSun Cubic 400/45° (→ MAX variation +20%)**.

The table below shows an overview of the amount of aluminium components per declared unit for the different products. Note that the amount of aluminium is the most important factor influencing the environmental impact of the product. The variability study showed that the variation in the environmental impact is proportional to the variation in the aluminum content.

| Product name          | Relative weight of aluminium components compared to the reference product (in %) |
|-----------------------|--|
| DucoSun Cubic 100/45° | 86%  |
| DucoSun Cubic 150/45° | 81%  |
| DucoSun Cubic 200/45° | 81%  |
| DucoSun Cubic 300/45° | <b>100% → Reference</b>  |
| DucoSun Cubic 400/45° | 120%   |

|  | DucoSun Cubic 150/45° (MIN variation) | DucoSun Cubic 400/45°(MAX variation) |
|--|---------------------------------------|--------------------------------------|
| 15804+A2-Climate change                | 82%                                   | 119%                                 |
| 15804+A2-Ozone depletion               | 82%                                   | 119%                                 |
| 15804+A2-Ionising radiation            | 83%                                   | 118%                                 |
| 15804+A2-Photochemical ozone formation | 82%                                   | 119%                                 |
| 15804+A2-Particulate matter            | 82%                                   | 119%                                 |
| 15804+A2-Human toxicity, non-cancer    | 82%                                   | 119%                                 |
| 15804+A2-Human toxicity, cancer        | 82%                                   | 120%                                 |
| 15804+A2-Acidification                 | 82%                                   | 119%                                 |
| 15804+A2-Eutrophication, freshwater    | 82%                                   | 120%                                 |
| 15804+A2-Eutrophication, marine        | 82%                                   | 119%                                 |
| 15804+A2-Eutrophication, terrestrial   | 82%                                   | 119%                                 |
| 15804+A2-Ecotoxicity, freshwater       | 82%                                   | 119%                                 |
| 15804+A2-Land use                      | 82%                                   | 119%                                 |
| 15804+A2-Water use                     | 82%                                   | 120%                                 |
| 15804+A2-Resource use, fossils         | 83%                                   | 119%                                 |
| 15804+A2-Resource use, mineral, metals | 82%                                   | 119%                                 |

### Production at local factories

The products are processed from aluminium sheets to final products at DUCO, Veurne (Belgium), or the sheets are shipped to a local subcontractor at the location of installation (i.e. UK) where it is further processed. Note that in the reference model the manufacturing impact at local subcontractors is extrapolated based on the inputs/outputs used in the headquarters in Veurne, Belgium. In other words, it is assumed that the local factories have the same impact per declared unit. It should be noted that the type of operations at the local subcontractors are the same as in DUCO Veurne, therefore it can be assumed that mainly the difference in electricity mix used will cause the variability.

A variability study from cradle-to-grave (Module A1-C4) between the reference product using 100% electricity mix at the factory in Veurne and a product using 100% UK electricity mix, has been performed in the LCA background report. This

exercise showed that the variance is <5%, if the local subcontractors use the same production process and thus same energy consumption as at the production site in Veurne, Belgium.

## Interpretation of the results

This EPD shows the environmental profile of 1 m<sup>2</sup> of DucoSun Cubic sun shading system with fixed slats based on a reference system of 6x6 m. The EPD contains multiple products for which DucoSun Cubic 300/45° is used as representative product.

The environmental profile shows that the raw materials have the highest contribution on most impact categories followed by the production process. The other life cycle stages are less significant.

When looking at the raw materials the production of aluminium contributes more than 80% to the environmental impact. During the production process, energy consumption is most relevant.

Outside the system's boundaries, module D shows benefits from the recycling of aluminium, recycling of steel and energy recovery from plastic components. Also recycling and energy recovery of packaging is included in module D but is not significant. As aluminium is the main component of the product, the main benefit in module D comes from recycling of aluminium. Note that to calculate the benefits from recycling in module D the recycled content of the aluminium (75%) used to produce the product under study has been considered by subtracting this from the recycled amount and end-of-life.

## References

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804+A2:2019.

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

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

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