# Statement of Verification

BREG EN EPD No.: 000695 Issue 01

This is to verify that the

**Environmental Product Declaration**

provided by:

**Altro Limited**

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:

1m² of Altro Compact Floor Products with a thickness of 2mm and a weight of 2.66 kg/m²

## Company Address

Altro Limited
Works Road
Letchworth Garden City
Hertfordshire
SG6 1NW
United Kingdom

| | | |
|---|---|---|
| Signed for BRE Global Ltd | Hayley Thomson<br>Operator | 16 May 2025<br>Date of this Issue |
| 16 May 2025<br>Date of First Issue | | 15 May 2030<br>Expiry Date |

BRE Global Verified EPD

This Statement of Verification is issued subject to terms and conditions (for details visit www.greenbooklive.com/terms.

To check the validity of this statement of verification please, visit www.greenbooklive.com/check or contact us.

BRE Global Ltd., Garston, Watford WD25 9XX.
T: +44 (0)333 321 8811 F: +44 (0)1923 664603 E: Enquiries@breglobal.com

ECO PLATFORM EPD VERIFIED

# Environmental Product Declaration

EPD Number: **000695**

## General Information

| EPD Programme Operator | Applicable Product Category Rules |
|---|---|
| BRE Global<br>Watford, Herts<br>WD25 9XX<br>United Kingdom | BRE 2023 Product Category Rules (PN 514 Rev 3.1) for Type III environmental product declaration of construction products to EN 15804:2012+A2:2019. |
| **Commissioner of LCA study** | **LCA consultant/Tool** |
| Altro Limited<br>Works Road<br>Letchworth Garden City<br>Hertfordshire<br>SG6 1NW<br>United Kingdom | Bala Subramanian/ BRE LINA A2 |
| **Declared/Functional Unit** | **Applicability/Coverage** |
| 1m$^2$ of Altro Operetta, Altro Zodiac and Altro Wood flooring products with the thickness of 2mm and a weight of 2.66 kg/m$^2$ | Other (please specify). Product Specific |
| **EPD Type** | **Background database** |
| Cradle to Gate with Module C and D | Ecoinvent 3.8 |

| Demonstration of Verification |
|---|
| CEN standard EN 15804 serves as the core PCR [a] |
| Independent verification of the declaration and data according to EN ISO 14025:2010<br>☐Internal ☒ External |
| (Where appropriate [b]) Third party verifier:<br>Roger Connick |
| a: Product category rules<br>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 |
| ☑ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ | ☑ | ☑ | ☑ | | ☑ |

Note: Ticks indicate the Information Modules declared.

## Manufacturing site(s)

Altro Limited
Ebertalle 209
06846 Dessau
Germany

# Construction Product:

## Product Description

**Altro Operetta**, **Altro Zodiac** and **Altro Wood** are 2mm thick PVC based flooring with R10 slip resistance designed for medium to high traffic areas. Altro Operetta, Altro Zodiac and Altro Wood are available in a range of designs and colours, with a standard thickness of 2.00 mm and a standard weight of 2.66 kg/m$^2$. This product range representative EPD covers the products **Altro Operetta**, **Altro Zodiac** and **Altro Wood** and in this LCA analysis, the total production information of Altro Operetta and Altro Wood has been used to conduct an LCA analysis.

## Technical Information

The below table covers the basic technical properties of the Altro Operetta, Altro Wood, and Altro Zodiac products. For these and further properties, please see the products' pages on Altro's website: www.altro.com

| Property | Altro Operetta | Altro Zodiac | Altro Wood |
|---|---|---|---|
| Thickness (EN ISO 24346) | 2.0 mm | 2.0 mm | 2.0 mm |
| Mass per area (EN ISO 23997) | 2.66 kg/m$^2$ | 2.66 kg/m$^2$ | 2.66 kg/m$^2$ |
| **Slip Resistance** | | | |
| EN 16165 Annex C (PTV) | - | - | ≥36 |
| EN 13845 Annex C | - | - | ESf |
| EN 13893 | DS | DS | DS |
| EN 16165 Annex B | R10 | R10 | R10 |
| **Fire Performance** | | | |
| EN 13501-1 | Class Bfl s1 | Class Bfl s1 | Class Bfl s1 |
| CAN/ULC S102.2 | Tested | Tested | Tested |
| ASTM E648 | Class 1 | Class 1 | Class 1 |
| ASTM E662 | ≤ 450 | ≤ 450 | ≤ 450 |

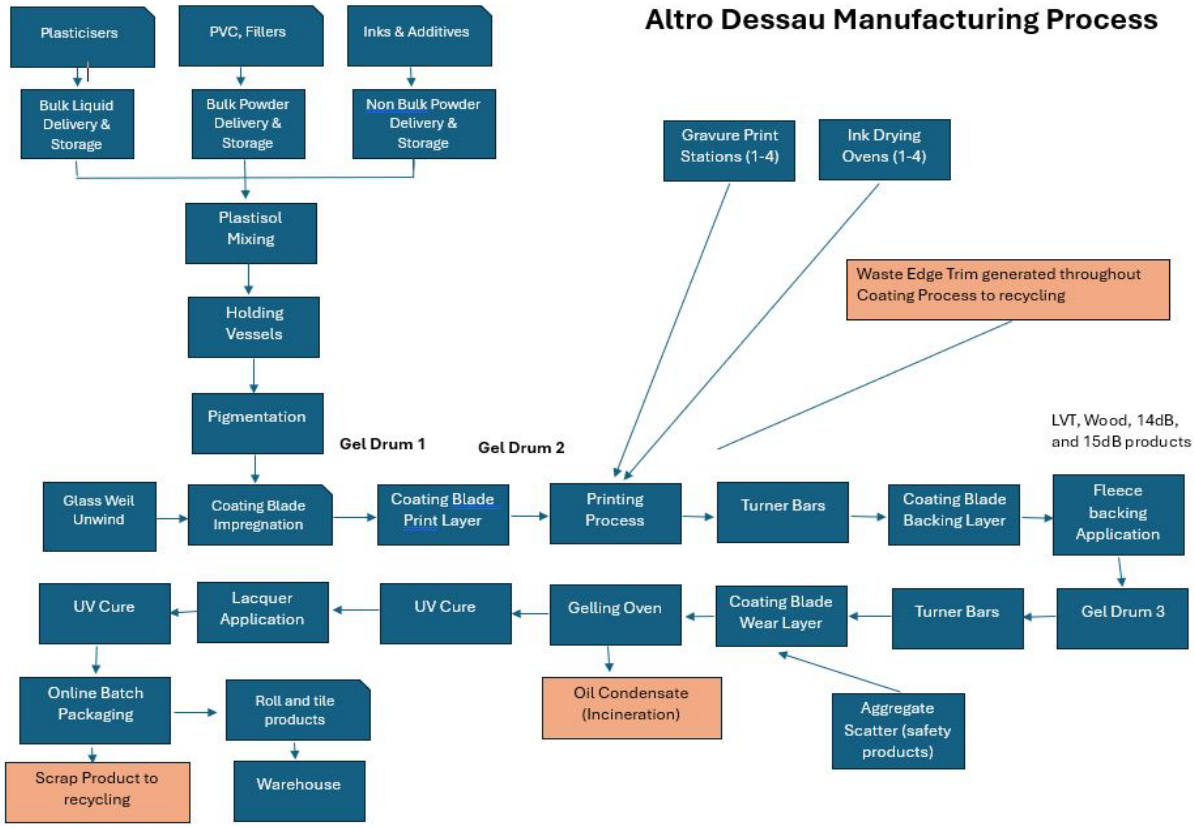
## Main Product Contents

| Material/Chemical Input | % |
|---|---|
| Plastisol | 97 |
| Scrim | 2 |
| Lacquer | <1 |
| Print Ink | <1 |

## Manufacturing Process

Bulk liquids, powders, aggregates and performance additives are mixed together into a plastisol and placed in a holding tank. The plastisol is then pigmented and passed into inline mixers. The pigmented plastisol is spread coated onto a scrim and gravure printed to give a range of designs. PUR is added for enhanced cleanability, and the product is then cured in an oven. The final product is then cut into rolls and packaged for dispatch.
*Note: For manufacturing, the Germany national grid electricity and the Germany natural gas has been used, and any processing waste generated during production will be sent for recycling and for incineration.*

## Process flow diagram




## End of Life

Altro Operetta, Altro Zodiac and Altro Wood cannot be recovered at the end of life as they are bonded to the floor with an adhesive. Therefore, according to BRE PCR 3.1, 100% of these products will end up in landfill.

# Life Cycle Assessment Calculation Rules

## Declared unit description.

1m$^2$ of Altro Operetta, Altro Zodiac and Altro Wood with the thickness of 2mm and a weight of 2.66 kg/m$^2$

## System boundary

This is a cradle-to-gate with modules C and D LCA, reporting all production life cycle stages of modules A1 to A3 and end of life stages C1-C4, and D in accordance with EN 15804:2012+A2:2019 and BRE 2023 Product Category Rules (PN 514 Rev 3.1).

## Data sources, quality and allocation

The supporting LCA study was carried out using BRE LINA A2 using manufacturer specific data provided by Altro for the production period of the 12 months (01/08/2022 - 31/07/2023) at the Germany site. The Germany site produces other PVC products in addition to the Altro Operetta, Altro Zodiac and Altro Wood, so allocation was applied to site wide values for packaging, energy, water, and wastewater, on a m$^2$ of production basis and production and non-production waste was allocated on a percentage mass of production basis. No uplift to the raw material input, as the total raw material usage for all Altro Operetta, Altro Zodiac and Altro Wood products made over the production period was used. As the total production information is used for the LCA analysis, the results can be considered to represent the 2.0 mm thick Altro Operetta, Altro Zodiac and Altro Wood product range. . Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e., raw material production) from the ecoinvent 3.8 database. All ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN15804 A2.

| ISO14044 guidance. **Quality Level** | **Geographical representativeness** | **Technical representativeness** | **Time representativeness** |
|---|---|---|---|
| Very Good | Data from area under study. | Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e., identical technology). | There is approximately 1-2 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken |

Specific European datasets have been selected from the ecoinvent LCI for this LCA. Manufacturer uses the national grid electricity and natural gas for production, therefore the national grid electricity dataset “Electricity – Germany (kWh)” has been used for the LCA modelling (Ecoinvent 3.8). The GWP carbon footprint for using 1 kWh of electricity, Germany kWh is 0.604 kgCO2e/kWh and for the Natural gas, at industrial furnace (kWh, EU) carbon footprint for using 1 kWh is 0.256 kgCO2eq. The quality level of time representativeness is also Very Good as the background LCI datasets are based on ecoinvent v3.8 which was compiled in 2021. Therefore, there is less than 5 years between the ecoinvent LCI reference year and the time period for which the LCA was undertaken.

## Cut-off criteria

No inputs or outputs have been excluded. All raw materials and packaging inputs, plus their transport, process and general energy and water use, production, and non-production waste, have been included where appropriate, except for direct emissions to air, water, and soil, which are not measured.

## LCA Results - 1m$^2$ of Altro Operetta / Altro Zodiac flooring with the thickness of 2mm and a weight of 2.66 kg/m$^2$

(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 $CO_2$ eq | kg $CO_2$ eq | kg $CO_2$ eq | kg $CO_2$ eq | kg CFC11 eq | mol $H^+$ eq | kg $(PO_4)^{3-}$ eq |
| Product stage | Raw material supply | A1 | 3.96E+00 | 5.08E+00 | -1.22E+00 | 9.87E-02 | 1.72E-06 | 3.56E-02 | 2.27E-03 |
| | Transport | A2 | 3.06E-01 | 3.05E-01 | 2.61E-04 | 1.20E-04 | 7.07E-08 | 1.24E-03 | 1.97E-05 |
| | Manufacturing | A3 | 1.86E+00 | 1.79E+00 | 6.70E-02 | 1.52E-03 | 1.56E-07 | 3.08E-03 | 1.25E-03 |
| | Total (Consumption grid) | A1-3 | 6.13E+00 | 7.18E+00 | -1.15E+00 | 1.00E-01 | 1.94E-06 | 3.99E-02 | 3.54E-03 |
| **100% - Landfill** | | | | | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 2.21E-02 | 2.21E-02 | 1.88E-05 | 8.68E-06 | 5.12E-09 | 8.97E-05 | 1.42E-06 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 3.12E-01 | 3.12E-01 | 2.01E-04 | 3.19E-05 | 8.57E-09 | 2.56E-04 | 4.69E-06 |
| 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 | 0.00E+00 |

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 | $m^3$ world eq deprived | disease incidence |
| Product stage | Raw material supply | A1 | 7.58E-03 | 7.54E-02 | 1.46E-02 | 6.69E-05 | 1.04E+02 | 6.41E+00 | 2.44E-07 |
| | Transport | A2 | 3.74E-04 | 4.08E-03 | 1.25E-03 | 1.06E-06 | 4.62E+00 | 2.08E-02 | 2.64E-08 |
| | Manufacturing | A3 | 1.05E-03 | 7.77E-03 | 2.24E-03 | 2.50E-06 | 2.76E+01 | 2.88E-01 | 1.88E-08 |
| | Total (Consumption grid) | A1-3 | 9.00E-03 | 8.72E-02 | 1.81E-02 | 7.05E-05 | 1.36E+02 | 6.72E+00 | 2.89E-07 |
| **100% - Landfill** | | | | | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 2.70E-05 | 2.95E-04 | 9.04E-05 | 7.69E-08 | 3.34E-01 | 1.50E-03 | 1.91E-09 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 5.69E-03 | 9.24E-04 | 3.31E-04 | 9.91E-08 | 6.80E-01 | 3.01E-02 | 4.83E-09 |
| 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 | 0.00E+00 |

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 $U^{235}$ eq | CTUe | CTUh | CTUh | dimensionless |
| Product stage | Raw material supply | A1 | 7.55E-01 | 1.25E+02 | 5.05E-09 | 1.08E-07 | 3.65E+01 |
| | Transport | A2 | 2.37E-02 | 3.60E+00 | 1.17E-10 | 3.78E-09 | 3.17E+00 |
| | Manufacturing | A3 | 1.72E-01 | 1.03E+01 | 3.46E-10 | 8.38E-09 | 4.60E+00 |
| | Total (Consumption grid) | A1-3 | 9.50E-01 | 1.39E+02 | 5.52E-09 | 1.20E-07 | 4.43E+01 |
| **100% - Landfill** | | | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 1.72E-03 | 2.61E-01 | 8.45E-12 | 2.73E-10 | 2.30E-01 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 3.31E-03 | 1.42E+00 | 2.28E-11 | 6.03E-10 | 1.58E+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 |

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 | 4.13E+00 | 5.87E-01 | 4.72E+00 | 4.84E+01 | 2.83E+01 | 7.67E+01 |
| | Transport | A2 | 6.50E-02 | 0.00E+00 | 6.50E-02 | 4.53E+00 | 0.00E+00 | 4.53E+00 |
| | Manufacturing | A3 | 1.18E+00 | 1.16E+00 | 2.34E+00 | 2.16E+01 | 6.02E+00 | 2.76E+01 |
| | Total (Consumption grid) | A1-3 | 5.38E+00 | 1.74E+00 | 7.12E+00 | 7.45E+01 | 3.44E+01 | 1.09E+02 |
| **100% - Landfill** | | | | | | | | |
| 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 | 4.71E-03 | 0.00E+00 | 4.71E-03 | 3.28E-01 | 0.00E+00 | 3.28E-01 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 1.39E-02 | 0.00E+00 | 1.39E-02 | -8.12E+01 | 8.19E+01 | 6.69E-01 |
| 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 |

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 net calorific value | MJ net calorific value | $m^3$ |
| Product stage | Raw material supply | A1 | 5.67E-02 | 0.00E+00 | 0.00E+00 | 1.52E-01 |
| | Transport | A2 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.15E-04 |
| | Manufacturing | A3 | 5.98E-02 | 0.00E+00 | 0.00E+00 | 7.12E-03 |
| | Total (Consumption grid) | A1-3 | 1.17E-01 | 0.00E+00 | 0.00E+00 | 1.59E-01 |
| **100% - Landfill** | | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.73E-05 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.08E-04 |
| 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 |

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 | 2.12E-01 | 5.16E+00 | 1.54E-04 |
| | Transport | A2 | 5.09E-03 | 9.04E-02 | 3.12E-05 |
| | Manufacturing | A3 | 7.02E-02 | 6.09E+00 | 6.07E-05 |
| | Total (Consumption grid) | A1-3 | 2.88E-01 | 1.13E+01 | 2.46E-04 |
| **100% - Landfill** | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 3.68E-04 | 6.54E-03 | 2.26E-06 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 1.43E-03 | 2.69E+00 | 3.99E-06 |
| Potential benefits and loads beyond the system boundaries | Reuse, recovery, recycling potential | D | 0.00E+00 | 0.00E+00 | 0.00E+00 |

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 | -1.17E-02 | 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 | 0.00E+00 | 1.48E-01 | 8.89E-10 | 0.00E+00 | 4.32E-03 | -1.97E-02 |
| | Total (Consumption grid) | A1-3 | 0.00E+00 | 1.48E-01 | 8.89E-10 | 0.00E+00 | -7.42E-03 | -1.97E-02 |
| **100% - Landfill** | | | | | | | | |
| 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+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

## LCA Results - 1 m² of Altro Wood flooring with a thickness of 2 mm and a weight of 2.66 kg/m²

(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 $CO_2$ eq | kg $CO_2$ eq | kg $CO_2$ eq | kg $CO_2$ eq | kg CFC11 eq | mol $H^+$ eq | kg $(PO_4)^{3-}$ eq |
| Product stage | Raw material supply | A1 | 3.98E+00 | 5.12E+00 | -1.24E+00 | 9.33E-02 | 1.73E-06 | 3.56E-02 | 2.27E-03 |
| | Transport | A2 | 3.19E-01 | 3.19E-01 | 2.73E-04 | 1.25E-04 | 7.38E-08 | 1.30E-03 | 2.06E-05 |
| | Manufacturing | A3 | 1.86E+00 | 1.79E+00 | 6.70E-02 | 1.52E-03 | 1.56E-07 | 3.08E-03 | 1.25E-03 |
| | Total (Consumption grid) | A1-3 | 6.16E+00 | 7.24E+00 | -1.18E+00 | 9.50E-02 | 1.96E-06 | 4.00E-02 | 3.54E-03 |
| **100% - Landfill** | | | | | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 2.21E-02 | 2.21E-02 | 1.88E-05 | 8.68E-06 | 5.12E-09 | 8.97E-05 | 1.42E-06 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 3.12E-01 | 3.12E-01 | 2.01E-04 | 3.19E-05 | 8.57E-09 | 2.56E-04 | 4.69E-06 |
| 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 | 0.00E+00 |

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 | $m^3$ world eq deprived | disease incidence |
| Product stage | Raw material supply | A1 | 7.64E-03 | 7.61E-02 | 1.47E-02 | 6.73E-05 | 1.04E+02 | 6.45E+00 | 2.46E-07 |
| | Transport | A2 | 3.90E-04 | 4.26E-03 | 1.31E-03 | 1.11E-06 | 4.82E+00 | 2.17E-02 | 2.75E-08 |
| | Manufacturing | A3 | 1.05E-03 | 7.77E-03 | 2.24E-03 | 2.50E-06 | 2.76E+01 | 2.88E-01 | 1.88E-08 |
| | Total (Consumption grid) | A1-3 | 9.08E-03 | 8.82E-02 | 1.82E-02 | 7.09E-05 | 1.37E+02 | 6.76E+00 | 2.92E-07 |
| **100% - Landfill** | | | | | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 2.70E-05 | 2.95E-04 | 9.04E-05 | 7.69E-08 | 3.34E-01 | 1.50E-03 | 1.91E-09 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 5.69E-03 | 9.24E-04 | 3.31E-04 | 9.91E-08 | 6.80E-01 | 3.01E-02 | 4.83E-09 |
| 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 | 0.00E+00 |

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 $U^{235}$ eq | CTUe | CTUh | CTUh | dimensionless |
| Product stage | Raw material supply | A1 | 7.61E-01 | 1.27E+02 | 5.29E-09 | 1.12E-07 | 3.66E+01 |
| | Transport | A2 | 2.48E-02 | 3.76E+00 | 1.22E-10 | 3.95E-09 | 3.31E+00 |
| | Manufacturing | A3 | 1.72E-01 | 1.03E+01 | 3.46E-10 | 8.38E-09 | 4.60E+00 |
| | Total (Consumption grid) | A1-3 | 9.58E-01 | 1.41E+02 | 5.76E-09 | 1.25E-07 | 4.45E+01 |
| **100% - Landfill** | | | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 1.72E-03 | 2.61E-01 | 8.45E-12 | 2.73E-10 | 2.30E-01 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 3.31E-03 | 1.42E+00 | 2.28E-11 | 6.03E-10 | 1.58E+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 |

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 | 4.13E+00 | 5.49E-01 | 4.68E+00 | 4.94E+01 | 2.85E+01 | 7.79E+01 |
| | Transport | A2 | 6.79E-02 | 0.00E+00 | 6.79E-02 | 4.73E+00 | 0.00E+00 | 4.73E+00 |
| | Manufacturing | A3 | 1.18E+00 | 1.16E+00 | 2.34E+00 | 2.16E+01 | 6.02E+00 | 2.76E+01 |
| | Total (Consumption grid) | A1-3 | 5.38E+00 | 1.70E+00 | 7.08E+00 | 7.58E+01 | 3.45E+01 | 1.10E+02 |
| **100% - Landfill** | | | | | | | | |
| 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 | 4.71E-03 | 0.00E+00 | 4.71E-03 | 3.28E-01 | 0.00E+00 | 3.28E-01 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 1.39E-02 | 0.00E+00 | 1.39E-02 | -8.12E+01 | 8.19E+01 | 6.69E-01 |
| 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 |

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 net calorific value | MJ net calorific value | $m^3$ |
| Product stage | Raw material supply | A1 | 5.54E-02 | 0.00E+00 | 0.00E+00 | 1.53E-01 |
| | Transport | A2 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.38E-04 |
| | Manufacturing | A3 | 5.98E-02 | 0.00E+00 | 0.00E+00 | 7.12E-03 |
| | Total (Consumption grid) | A1-3 | 1.15E-01 | 0.00E+00 | 0.00E+00 | 1.60E-01 |
| **100% - Landfill** | | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.73E-05 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.08E-04 |
| 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 |

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 | 2.65E-01 | 5.27E+00 | 1.56E-04 |
| | Transport | A2 | 5.31E-03 | 9.44E-02 | 3.26E-05 |
| | Manufacturing | A3 | 7.02E-02 | 6.09E+00 | 6.07E-05 |
| | Total (Consumption grid) | A1-3 | 3.41E-01 | 1.15E+01 | 2.49E-04 |
| **100% - Landfill** | | | | | |
| End of life | Deconstruction, demolition | C1 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Transport | C2 | 3.68E-04 | 6.54E-03 | 2.26E-06 |
| | Waste processing | C3 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 1.43E-03 | 2.69E+00 | 3.99E-06 |
| Potential benefits and loads beyond the system boundaries | Reuse, recovery, recycling potential | D | 0.00E+00 | 0.00E+00 | 0.00E+00 |

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 | -1.10E-02 | 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 | 0.00E+00 | 1.48E-01 | 8.89E-10 | 0.00E+00 | 4.32E-03 | -1.97E-02 |
| | Total (Consumption grid) | A1-3 | 0.00E+00 | 1.48E-01 | 8.89E-10 | 0.00E+00 | -6.65E-03 | -1.97E-02 |
| **100% - Landfill** | | | | | | | | |
| 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | Disposal | C4 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+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 |
| C1 - Deconstruction | When the product reaches the end of its life, it will be extracted from the building using power tools and sent to landfill. Unfortunately, the waste product cannot be recovered because it is contaminated with other materials such as the subfloor and adhesive. Therefore, according to BRE PCR 3.1, 100% of this product will end up in landfill. | | |
| C2 – Transportation | 50km by road has been modelled for module C2 as a typical distance from the demolition site to the disposal unit. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module C2 if required. | Litres per km | 0.227 |
| | Fuel type / Vehicle type | Road transport | 16–32-ton lorry |
| | Deconstruction site to the disposal unit | km | 50 |
| C3 – Preprocessing | No preprocessing as the product is 100% sent to landfill. | | |
| C4 – Disposal | The recovered waste is landfilled therefore no module D benefits.<br><br>PVC Waste – 100% landfill – 2.66 kg/m$^2$ | | |

## Interpretation of results

The bulk of the environmental impacts are attributed to the manufacturing of Altro Operetta, Altro Zodiac and Altro Wood by information modules A1-A3 and C1-C4 of EN15804:2012+A2:2019.

Figure 1 below breaks down the GWP of Altro Wood into clear categories, helping to identify the modules that contribute the most to the overall environmental impact. It is evident that the majority of the impact stems from the product modules (A1–A3). Stage A1 (raw material) accounts for nearly all emissions, with a minor contribution from A2 (transportation). Stage A3 (manufacturing) shows a significant negative value, indicating a reduction in $CO_2$ equivalent emissions from biogenic sources due to the use of cardboard for packaging. The product is landfilled at the end-of-life stage which leads to GWP emission at the C4 – Disposal stage.

Figure 2 provides a detailed breakdown of the processes contributing to the impact in the A1–A3 stages. PVC production and chemical production have the highest impact in Stage A1, followed by transportation (A2). In Stage A3 (manufacturing), factors such as natural gas consumption, electricity usage, waste treatment, and other processes contribute to the overall environmental impacts of the product.

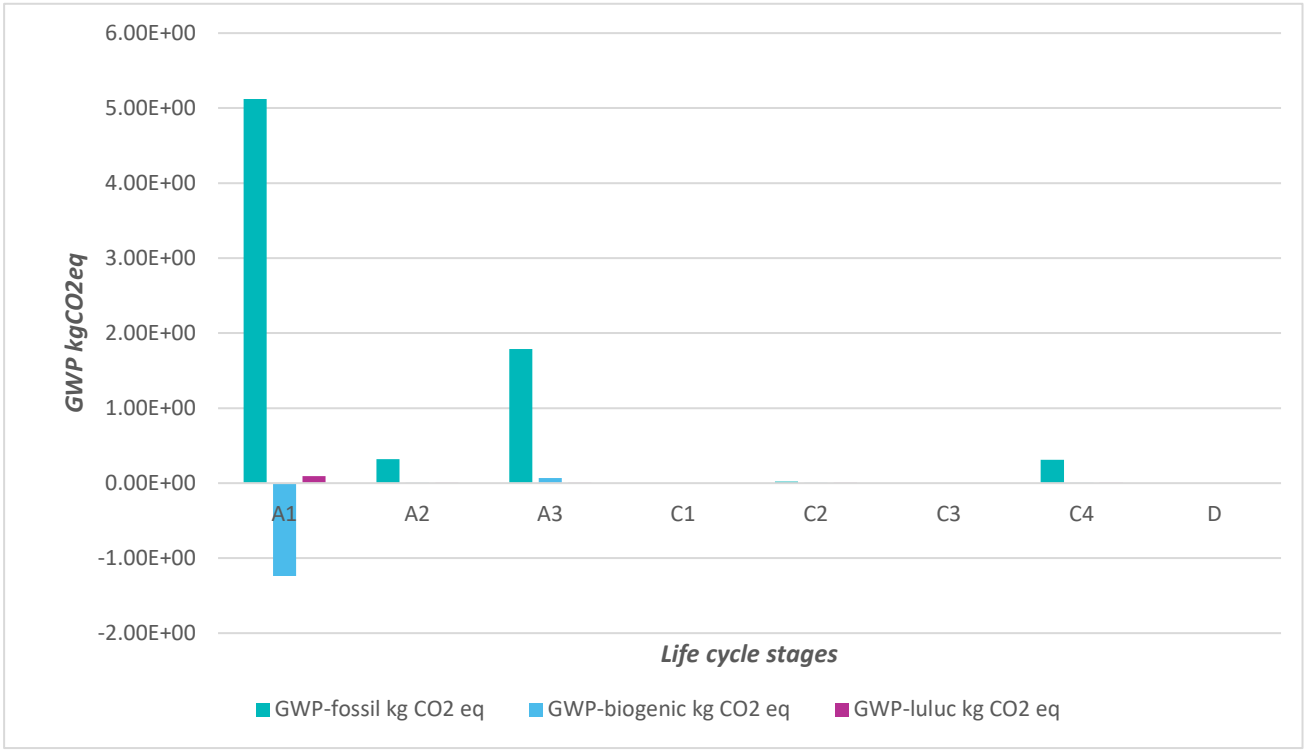



***Figure 1 GWP Contribution***

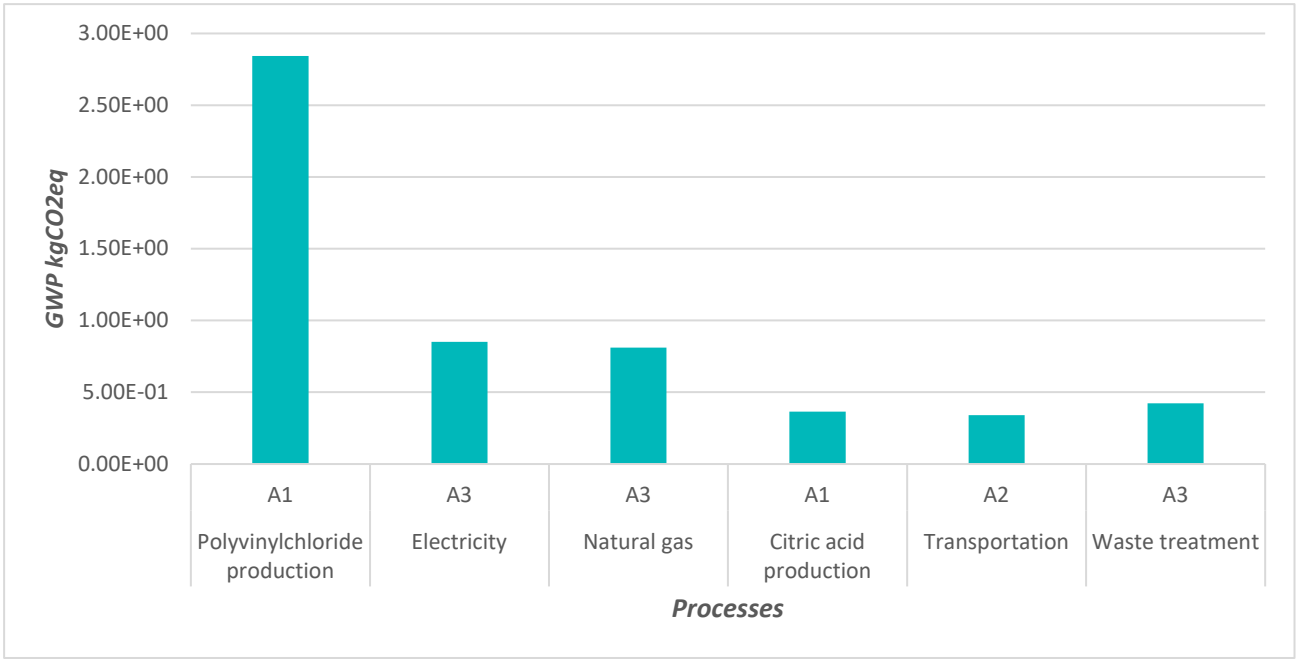



*Figure 2 Process contribution*

## References


BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A2:2019. London, BSI, 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.

Altro Sustainability - www.altro.com/uk/sustainability/our-sustainability-journey.

ISO 24346:2006 Resilient floor coverings — Determination of overall thickness

ISO 23997:2007 Resilient floor coverings — Determination of mass per unit area

EN 16165:2021 Determination of slip resistance of pedestrian surfaces - Methods of evaluation

EN 13845:2017 Resilient floor coverings - Polyvinyl chloride floor coverings with particle based enhanced slip resistance – Specification

EN 13893:2002 Resilient, laminate and textile floor coverings - Measurement of dynamic coefficient of friction on dry floor surfaces

EN 13501-1 - Fire classification of construction products and building elements - Classification using data from reaction to fire tests

CAN/ULC-S102.2, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.

ASTM E648, Test for Surface Burning Characteristics of Building Materials

ASTM E662 - Standard test method for specific optical density of smoke generated by solid materials