Statement of Verification

BREG EN EPD No: 000812 Issue: 01

This is to verify that the Environmental Product Declaration provided by:

RAAFT

are in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:
1 kilogram of Aluminium Joist with the estimated service life of 15 years

Company Address

RAAFT
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EC1V 9HL

RAAFT®

Signed for BRE Global Limited — Hayley Thomson, Operator

30 June 2026	30 June 2026	29 June 2031
Date of this Issue	Date of First Issue	Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: 000812

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Global Product Category Rules (PCR) for Type III EPD of Construction Products to EN 15804+A2. PN514 3.1
Commissioner of LCA study	**LCA consultant/Tool**
RAAFT 1 Old Street, London, EC1V 9HL	**Eight Versa** 2nd Floor, 28 Marshalsea Rd, London SE1 1HF LCA tool: SimaPro 9.3.0.3
Declared Unit	**Applicability/Coverage**
1 kilogram of Aluminium Joist with the estimated service life of 15 years	Product Average.
EPD Type	**Background database**
Cradle to Grave	Ecoinvent v3.7.1

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 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Bala Subramanian
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
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

The aluminium joist sold by RAAFT is manufactured by RAAFT's manufacturing partner located in the United Kingdom.

Construction Product:

Product Description

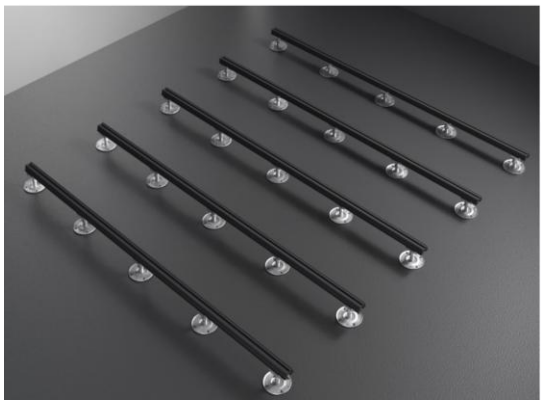
Rigid aluminium extruded joist rails for use as a support structure system to decking and paving. RAAFT joists are designed to be used on roof terraces, balconies and other external podium construction areas. Joists are manufactured from aluminium alloy 6063A which is a high-performance alloy with a high natural resistance to corrosive conditions in most environments. The product is manufactured in the UK from aluminium and comes in 2 variants with configurations. The LCA study analyses the environmental performance for 1 kilogram of the aluminium joist.

Technical Information

The aluminium joist made from aluminium comes in 2 variations. Technical data has been sourced from DS-SSRJ-0122 (Joist Datasheet). See table below for details.

Property	Value, Unit	Value, Unit
Configuration	Joist Type 1	Joist Type 2
Material	6063 T6 Aluminium	
Aluminium Joist weight	3.87 kg	4.26 kg
Dimensions	30mm X 60mm X 2.4m	50mm X 60mm X 2.4m
Max Cantilever	100 mm	200 mm
Max Loading	250 kg	250 kg

Technical data reported in this table has been sourced from: 1. DS-SSRJ-0122 (Joist Datasheet)



Main Product Contents

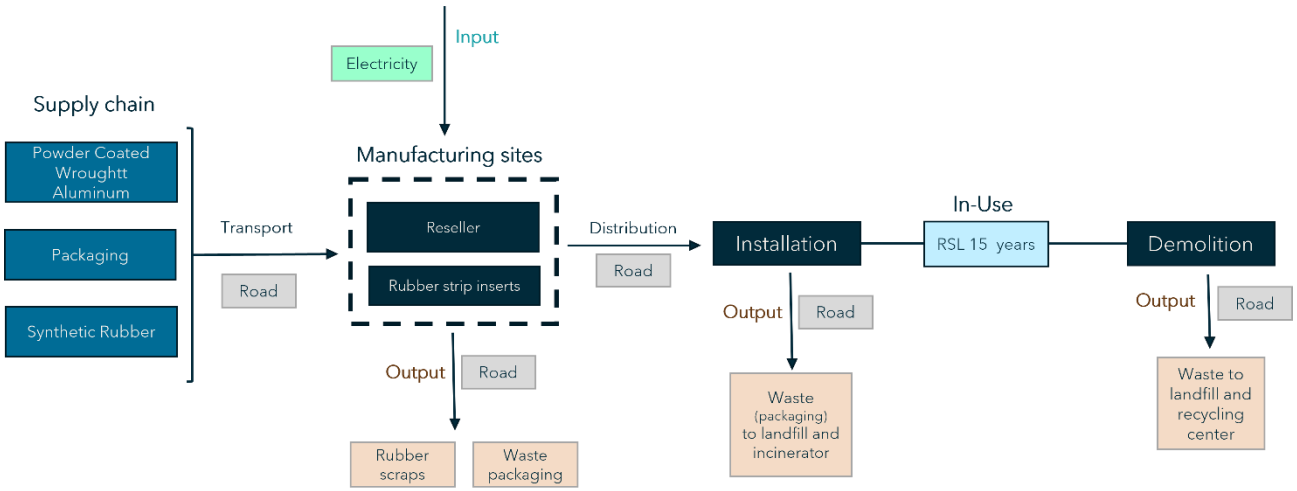
The aluminium joists are manufactured in the United Kingdom from powder coated aluminium and rubber strips.

Material/Chemical Input	%
Aluminium (including both recycled and virgin content)	99%
Recycled content – Aluminium	~30%
Rubber (for rubber strips)	1%

Manufacturing Process

The aluminium joist (aluminium with rubber inserts) is supplied to RAAFT by their manufacturer located in the Midlands and their downstream suppliers. Each joist is made from powder-coated aluminium and two rubber strips which is added manually. The aluminium and powder coating required to manufacture the aluminium joist is transported from within the European region. In the meantime, rubber strips and packaging materials required in the production process are transported from within the United Kingdom. The aluminium joists are packed with cardboard strips, wooden baton and PE wrap and stacked on a pallet. The aluminium joists are transported from RAAFT's storage facility located in South UK. It undergoes additional repackaging based on orders. The pallet and PE wrap associated with the product at the initial packaging will be incinerated, and they are repackaged into new pallets sourced locally, and the wrap is sourced from Europe.

Process flow diagram



Construction Installation

Aluminium joists are free-standing installation onto a firm level surface. Joists are sub-structure installations. This is installed with zero or no other external machinery and is mostly done manually. In the exceptional case that it includes the use of any machinery, this is limited and infrequent. Therefore, this has been excluded from the assessment.

Use Information

The reference service life of the product considered in this EPD is 15 years. The product is entirely made of powder coated aluminium, a material resistant to water and most oils, greases and chemical products. When installed, the product does not release substances into the ground and is not subject to mass loss. The emissions associated with the use of the product can be reasonably assumed to be zero or negligible. The product is statically installed; it is not subject to wear or other deterioration phenomena that require maintenance interventions during its life span. The correct installation of the product, in accordance with the specifications provided by RAAFT is a necessary condition to avoid undue maintenance / repairs.

End of Life

The product is made with a powder coated aluminium and rubber inserts and has potential to be recycled further. It can be readily recycled without the need for complex disassembly or additional processing.

This EPD includes a conservative scenario aligned with the secondary data BRE PCR for aluminium products in construction. This dataset models the disposal mix for 1 kg of aluminium in United Kingdom as 95% sent for recycling and 5% to the landfill. The rubber inserts are incinerated in this scenario.

Life Cycle Assessment Calculation Rules

Declared unit description
1 kilogram of Aluminium Joist with the estimated service life of 15 years

System boundary

The life cycle phases of a construction product can be classified into stages based on the processes as detailed in the EN 15804: 2012+A2:2019. This LCA study analyses the life cycle of 1 kilogram of Aluminium Joists from Cradle-to-Grave._Therefore, the system boundaries include:

- Production Stage - A1 – A3: A1 covers the supply of raw materials, including powder-coated aluminium joists manufactured and sourced within Europe, and rubber inserts from the UK. A2 includes transportation of raw materials (aluminium joists and rubber inserts) and packaging materials to UK manufacturing facility, transport of packaging materials to RAAFT's storage site, and transport of finished products from the manufacturing site to the storage facility. A3 encompasses the assembly process in the UK for the aluminium with a rubber insert, including cutting, CNC, press brake, slitting, blanking, polishing, sanitising, assembly and punching. The UK manufacturing facility only purchases the powder-coated joists, where the rubber strips are manually added onsite, before being packaged and transported to RAAFT's storage site for repackaging activities, where products are repacked to order using new pallets and stretch film.
- Construction Process Stage – A4, A5
- Use Stage – B1 -B7
- End of Life Stage – C1 – C4
- Benefits and loads beyond the system - D

PRODUCTION STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE BOUNDARIES OF THE SYSTEM
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly / Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

All modules from cradle to grave have been considered for this assessment.

Data sources, quality and allocation

For this LCA, secondary data were used for the main material inputs, including powder coated aluminium joists sourced as pre-finished products from Tier 2 suppliers in Europe. Upstream processes such as extrusion and raw material extraction were modelled using the Ecoinvent v3.7.1 database, which also covers ancillary materials (e.g. lubricating oils, hydraulic oils), water consumption, waste disposal, and wastewater. From the RAAFT manufacturing site onwards, primary data were collected for key aspects of the manufacturing process, specifically product composition (powder coated aluminium and rubber), energy usage, and packaging materials. The reference period for primary data collection was January 2022 to December 2022.

The powder coated aluminium joists are sourced as pre-finished products from the Tier 2 supplier, which manufactures and extrudes aluminium billets. As no primary data were available for the extrusion stage, secondary data from the Ecoinvent v3.7.1 database were used, which includes the extraction of the materials, ancillary materials (e.g. lubricating oil, hydraulic oil), water consumption, waste disposal and wastewater.

Primary data were used for the types and quantities of materials used for product packaging and for the transport distances between raw-material suppliers and the production site. Secondary data were used for all processes not covered by primary data; these are taken from the Ecoinvent database v3.7.1 available in the SimaPro 9.3.0.3 software, which was used for the calculations.

As the RAAFT storage site functions solely as a storage and distribution location and products are stored in ambient conditions with limited lighting requirements, no additional energy data were collected for this site as its contribution is considered immaterial. During repacking at the RAAFT site, packaging disposal associated with the aluminium joist primarily comprises two waste streams: untreated waste wood and mixed waste plastic.

Electricity consumption was modelled using secondary data reflecting the United Kingdom consumption mix. The total production quantity has been normalised to 1 kg, and the analysis includes all relevant aspects such as process waste and other associated wastes; including the waste rubber strips produced at RAAFT manufacturing facility during assembly. To ensure consistent and transparent reporting of energy and waste flows across the full system boundary:

- Cumulative Energy Demand (CED, LHV) was used to quantify primary energy demand. Although PERE, PENRE, and PERT values are available within individual datasets, using the CED method provides a harmonised aggregation of energy demand and is widely adopted in LCA studies.
- Waste indicators — including Hazardous Waste Disposed (HWD), Non-Hazardous Waste Disposed (NHWD), and Radioactive Waste Disposed (RWD) — were calculated using the EDIP 2003 method. This method ensures standardised classification of waste streams and consistent interpretation across life cycle stages.

Secondary data have been assessed to determine technological, geographical and time representativeness against the method specified in EN 15804:2012+A2:2019 - Annex E - Table E.1. The datasets have been ranked as ‘very good’, ‘good’, and ‘fair’. Primary data, covering a 12-month reference period (January to December 2022), reflects current, stable manufacturing conditions and is supplemented by consistent secondary data from the Ecoinvent v3.7.1 database, giving an overall time representativeness rating of Good. Material and process origins align with the UK-based geographic scope of the datasets used, resulting in a Good geographical representativeness rating in accordance with EN 15941. Primary data also reflects standard, well-established industrial practices, with Ecoinvent v3.7.1 used as an appropriate proxy where primary data was unavailable, giving an overall technological representativeness rating of Good.

The end-of-life system boundary of the product system is set where the system outputs (e.g., materials, products, or construction elements) have reached the end of waste state. Regarding virgin raw materials (e.g., packaging materials), both the impacts associated with the materials themselves and those associated with their production processes were considered. Whereas for the raw materials of recycled origin, only the impacts associated with their transformation from waste to product have been considered.

Recyclable outputs are considered inputs for the next lifecycle. Potential benefits and loads of reusable products, recyclable materials and useful energy carriers have been declared in module D. This includes benefits from the substitution of virgin materials as well as the energy recovery from packaging incineration.

The impacts of the production site at the manufacturing facility were allocated among the products being studied on a physical allocation basis using the allocation based on the mass of the products in the manufacturing site over the entire study period.

Cut-off criteria

Production-related emissions have been included in the assessment. Some minor exclusions have been made due to lack of data or irrelevance, all of which have been quantified through screening calculations confirming their impact is less than 5% and therefore not material. At the RAAFT manufacturing facility, energy used for hot water, office facilities, and water has been excluded as irrelevant to the production process, and packaging waste has been assumed to be treated through municipal incineration with energy recovery, with associated impacts considered negligible. At the RAAFT storage facility, the site functions solely as a distribution and repackaging facility where products are stored under ambient conditions; any emissions not directly linked to production, such as domestic hot water, office heating, or general building lighting, have been excluded from the analysis.

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_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	1.14E+01	1.11E+01	2.08E-01	1.27E-01	8.23E-07	7.36E-02	4.75E-03
	Transport	A2	6.64E-02	6.63E-02	1.53E-04	2.14E-05	1.52E-08	2.74E-04	4.41E-06
	Manufacturing	A3	-5.11E-02	3.24E-02	-8.37E-02	1.18E-04	2.81E-09	1.57E-04	1.12E-05
	Total (Consumption grid)	A1-3	1.14E+01	1.12E+01	1.25E-01	1.27E-01	8.41E-07	7.40E-02	4.76E-03
	Total (Residual+GO)	A1-3							
Construction process stage	Transport	A4	2.70E-02	2.69E-02	6.45E-05	9.07E-06	6.12E-09	1.08E-04	1.81E-06
	Construction	A5	2.43E-02	8.14E-03	1.62E-02	3.33E-07	9.87E-11	4.64E-06	1.80E-07
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
Market Based Scenario (95% recycled and 5% 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	8.32E-03	8.30E-03	1.99E-05	2.79E-06	1.88E-09	3.32E-05	5.57E-07
	Waste processing	C3	5.76E-02	5.54E-02	2.21E-03	2.91E-05	6.91E-09	1.45E-04	4.01E-06
	Disposal	C4	3.84E-02	3.83E-02	5.81E-05	1.99E-06	2.90E-10	1.80E-05	6.82E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6.16E+00	-6.00E+00	-4.17E-02	-1.10E-01	-4.62E-07	-4.43E-02	-2.67E-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 &metal	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	1.11E-02	1.09E-01	3.43E-02	8.89E-05	1.38E+02	2.57E+00	6.98E-07
	Transport	A2	8.35E-05	9.12E-04	2.81E-04	2.17E-07	1.01E+00	2.98E-03	4.93E-09
	Manufacturing	A3	4.86E-05	4.41E-04	1.58E-04	2.08E-07	6.76E-01	2.05E-02	1.97E-09
	Total (Consumption grid)	A1-3	1.12E-02	1.11E-01	3.47E-02	8.93E-05	1.40E+02	2.59E+00	7.05E-07
	Total (Residual+GO)	A1-3							
Construction process stage	Transport	A4	3.30E-05	3.60E-04	1.10E-04	9.71E-08	4.08E-01	1.16E-03	1.87E-09
	Construction	A5	3.87E-06	1.89E-05	5.34E-06	1.67E-09	8.98E-03	6.54E-05	4.59E-11
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
Market Based Scenario (95% recycled and 5% 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	1.02E-05	1.11E-04	3.39E-05	2.99E-08	1.26E-01	3.57E-04	5.75E-10
	Waste processing	C3	2.66E-05	2.89E-04	8.35E-05	6.39E-08	1.06E+00	1.40E-03	7.81E-10
	Disposal	C4	5.24E-06	5.65E-05	1.56E-05	6.19E-09	3.26E-02	1.13E-03	2.07E-10
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.89E-03	-5.83E-02	-1.94E-02	-3.33E-07	-7.59E+01	-1.44E+00	-4.15E-07

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	1.37E+00	2.53E+02	2.17E-08	3.33E-07	1.73E+01
	Transport	A2	5.24E-03	7.72E-01	2.67E-11	7.95E-10	8.12E-01
	Manufacturing	A3	3.87E-03	5.41E-01	9.57E-11	4.09E-10	6.13E+00
	Total (Consumption grid)	A1-3	1.38E+00	2.54E+02	2.19E-08	3.34E-07	2.42E+01
	Total (Residual+GO)	A1-3					
Construction process stage	Transport	A4	2.13E-03	3.11E-01	1.11E-11	3.16E-10	2.81E-01
	Construction	A5	7.94E-05	1.40E-02	9.56E-13	3.98E-11	5.17E-03
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
Market Based Scenario (95% recycled and 5% landfill)							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	6.55E-04	9.59E-02	3.42E-12	9.74E-11	8.64E-02
	Waste processing	C3	1.86E-02	3.15E-01	9.53E-12	1.85E-10	1.80E-01
	Disposal	C4	1.85E-04	3.07E+01	2.28E-12	6.98E-11	3.73E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-8.22E-01	-1.19E+02	-1.49E-08	-2.21E-07	-9.15E-01

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	3.37E+01	1.28E+00	3.50E+01	7.24E-04	1.38E+02	1.38E+02
	Transport	A2	9.74E-03	3.51E-03	1.33E-02	1.91E-05	1.01E+00	1.01E+00
	Manufacturing	A3	2.06E-02	1.12E+00	1.14E+00	1.40E-04	6.75E-01	6.75E-01
	Total (Consumption grid)	A1-3	3.37E+01	2.40E+00	3.61E+01	8.84E-04	1.40E+02	1.40E+02
	Total (Residual+GO)	A1-3						
Construction process stage	Transport	A4	4.00E-03	1.49E-03	5.49E-03	8.39E-06	4.08E-01	4.08E-01
	Construction	A5	3.30E-04	8.95E-05	4.19E-04	1.24E-07	8.98E-03	8.98E-03
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
Market Based Scenario (95% recycled and 5% 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	1.23E-03	4.60E-04	1.69E-03	2.58E-06	1.26E-01	1.26E-01
	Waste processing	C3	4.27E-02	3.54E-02	7.81E-02	4.19E-06	1.06E+00	1.06E+00
	Disposal	C4	1.33E-03	6.81E-04	2.01E-03	5.67E-07	3.26E-02	3.26E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.68E+01	-2.31E-01	-2.71E+01	-3.64E-04	-7.59E+01	-7.59E+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 net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	3.01E-01	0.00E+00	0.00E+00	2.04E-01
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	1.11E-04
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	5.70E-04
	Total (Consumption grid)	A1-3	3.01E-01	0.00E+00	0.00E+00	2.05E-01
	Total (Residual+GO)	A1-3				
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	4.41E-05
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	3.24E-06
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
Market Based Scenario (95% recycled and 5% 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	1.36E-05
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	1.12E-04
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	6.79E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-1.53E-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	1.60E-03	2.48E+00	5.24E-04
	Transport	A2	2.57E-06	5.84E-02	6.91E-06
	Manufacturing	A3	5.61E-07	6.02E-03	1.55E-06
	Total (Consumption grid)	A1-3	1.61E-03	2.54E+00	5.32E-04
	Total (Residual+GO)	A1-3			
Construction process stage	Transport	A4	1.06E-06	1.95E-02	2.79E-06
	Construction	A5	2.32E-08	2.62E-03	5.06E-08
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
Market Based Scenario (95% recycled and 5% landfill)					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.27E-07	6.01E-03	8.59E-07
	Waste processing	C3	8.61E-07	1.51E-03	5.34E-06
	Disposal	C4	5.66E-08	5.33E-02	1.25E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.90E-05	-1.56E+00	-3.09E-04

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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E-05
	Total (Consumption grid)	A1-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E-05
	Total (Residual+GO)	A1-3						
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	0.00E+00	0.00E+00	2.01E-02	1.43E-01	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
Market Based Scenario (95% recycled and 5% 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	9.39E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	1.15E-02	1.44E-01	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 results shown in this EPD considered a distribution scenario limited to the UK, assuming that 100% of the product is delivered throughout the UK by transport pallet networks. The transport distances have been calculated to cover the whole national territory based on primary data. These calculations are based on RAAFT's sales volume and distance from the manufacturing site to their client sites based on delivery postcodes. The postcodes have been grouped, and average distances have been calculated where applicable. The capacity utilisation factor is 50% which is based on the default assumption built into the Ecoinvent v3.7.1 dataset. Ecoinvent assumes an average loading of ~16 tonnes on a 32-tonne truck, accounting for partial loads and backhauls, resulting in an effective capacity utilisation of approximately 50%.		
	Fuel type / Vehicle type	Litre of fuel type per distance or vehicle type	Lorry 16-32 metric tonne
	Distance:	km	157.5
	Capacity utilisation (incl. empty returns)	%	50%
	Bulk density of transported products	kg/m^3	N/A
A5 – Installation in the building	A5 includes the manual installation process of the aluminium joists as sub-structure support systems and the disposal of all packaging materials (timber pallets, PE wrap, wooden batons, and cardboard strips) at the construction site		
B1 – Use	N/A		
B2 – Maintenance	N/A		
B3 – Repair	N/A		
B4 – Replacement	N/A		
B5 – Refurbishment	N/A		
Reference service life	The reference service life is 15 years.		
B6 – Use of energy; B7 – Use of water	N/A		
C1 – Demolition	C1 covers the manual deconstruction and demolition of the aluminium joists at end of life, with 100% recovery assumed and minimal machinery use		
C2 – Transport	C2 includes transportation of waste materials approximately 50 km to appropriate end-of-life facilities (recycling centres for aluminium, incinerators for rubber).		
C3 – Waste Processing	C3 encompasses waste processing, with 95% of aluminium directed to recycling (collecting, sorting, cleaning, and pressing) and 5% to landfill, while 100% of rubber is sent to municipal incineration.		
C4 – Disposal	C4 represents the final disposal of the 5% landfilled aluminium at sanitary landfill and incineration of rubber components.		

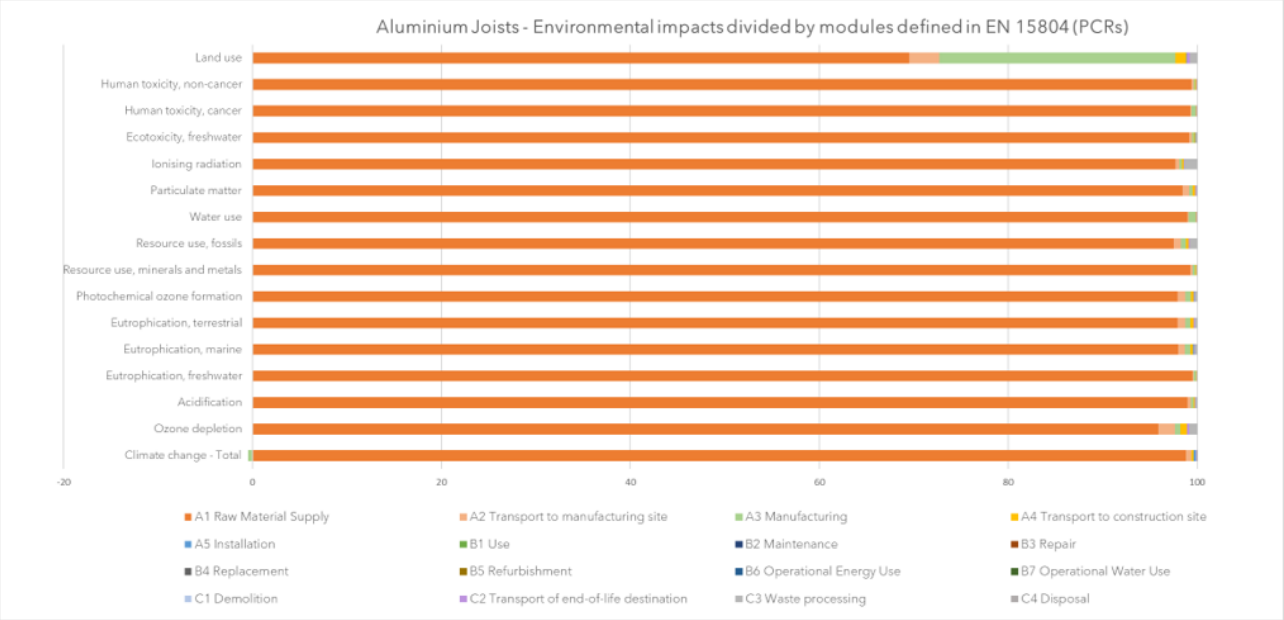
Scenarios and additional technical information			
Scenario	Parameter	Units	Results
Module D	Potential benefits and loads of reusable products, recyclable materials and useful energy carriers leaving the system boundaries at the end-of-waste state have been declared in module D. This module includes net benefits and loads arising from the reuse of products or the recycling or recovery of energy from end-of-waste state materials resulting from the construction stage (A4 – A5), the use stage (B) and the end-of-life stage (C). <u>Potential loads and benefits of net flows leaving the system boundaries in modules A5</u> The results presented in this EPD assume that a share of the packaging materials is disposed of in municipal incinerators with energy recovery (including both electricity and heating). The energy recovered can be used in subsequent product-systems, avoiding the production of the same amount of energy through other technologies. This avoided production represents a benefit beyond the system boundaries and has been included in module D. <u>Potential loads and benefits of net flows leaving the system boundaries in modules C1-C4</u> The first end-of-life scenario reported in this EPD assumes that 95% of the product at the end-of-life is recycled and 5% is sent to landfill. The benefit beyond the system boundaries of recycling aluminium to replace virgin materials (avoided production) has been calculated in this scenario and included in module D. The second end-of-life scenario reported in this EPD considers a full recyclability of the products at the end of their life. The amount of material exiting the system that will be recycled in a subsequent system is higher than the amount of recycled material recovered from a previous system; this implies that the products in subsequent systems will need an additional amount of virgin material to compensate this loss. This therefore can be classified as a load on the system and has been accounted for in Module D of this scenario.		
	Products Recycled Content (post-consumer)	Kg	0.30
	Recovered for recycling	Kg	0.94
	Recovered for re-use	Kg	0.00
	Recovered for energy	Kg	0.01

Summary, comments and additional information

Interpretation

The contribution analysis highlights the life cycle stages with the greatest environmental significance, informing where mitigation efforts would be most effective. The product stage (A1–A3) is the dominant contributor across all 16 impact categories, accounting for over 90% of total impacts. Within this stage, raw material extraction and processing at A1 is the primary driver, contributing more than 25% of impacts across 14 categories - a pattern that is typical for products of this material composition. No use-phase impacts have been identified for this product. At end of life, a 95% recycling diversion rate substantially limits the contribution of C-stage modules. The most impactful improvement opportunity lies in increasing recycled material content at the raw material stage, which would reduce the carbon and resource intensity of A1 without requiring changes to the manufacturing process itself.

The figure below shows the environmental impacts of the aluminium joist, expressed through 16 main impact categories and divided by each phase of the life cycle that has been analysed.



Aluminium Joist

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.

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

RAAFT Systems, Product Overview and Technical Documentation

Ecoinvent 3.7.1 (https://ecoinvent.org/the-ecoinvent-database/data-releases/ecoinvent-3-7-1/)

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