Buildonix®

Environmental Product Declaration (EPD)

Environmental Product Declaration (EPD) in accordance with ISO 14025 and EN 15804:2012+A2:2019 for Buildonix® building components, from Stonelake Pty Ltd

Product Name: Buildonix® Building Components | Product Category Rules PCR 2019:14, version 1.11 Construction Products EPD International., 2021-02-05. CEN standard EN 15804 serves as the core Product Category Rules (PCR)

Programme Operator: EPD Australasia Limited | EPD Registration No: S-P-08460 | Publication Date: 24-05-2023 | Version Number 1.0 | Date of Revision: NA | Valid until: 23-05-2028 | Geographical Scope: Buildonix® is manufactured in Australia and the product is currently produced for the Australian market.

An EPD should provide current information and may be updated if conditions change. The stated validity is, therefore, subject to the continued registration and publication at www.environdec.com.

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

ECO PLATFORM EPD VERIFIED

Table of Contents

Stonelake Pty Ltd

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The Buildonix Building System is a product invented by the Stonelake Group of companies. Buildonix Aus/NZ Pty Ltd produces and distributes the Buildonix building system to the Australian market, specialising in residential projects and internal fit-out and external façade commercial projects. The Stonelake Group of companies are a vertically integrated construction technology producer and supplier in the Australian market, designing, testing, producing and distributing a range of different components and construction material products which are collectively referred to as the Buildonix building technology.

The Buildonix building technology consists of a set range of components that can be assembled to form an infinite range of custom design variations with both commercial and residential applications. This means that Buildonix components are generic across all our structures, removing the need for custom-designed, single-use materials or components.

The Buildonix building technology provides our clients with unparalleled project speed achieving projects between 60% and 70% faster than comparable projects using traditional methods, complete design customisability made possible through our mass customisation capability, complete design adaptability allowing clients to disassemble, alter, expand and re-assemble a structure with no waste or damage and the imbedded environmental sustainability which comes from re-useable building components which can be used over multiple lifecycles.

Product-related or management system-related certifications:

The Buildonix building system is a high-quality residential and commercial building technology that is systematically tested to meet Australian building standards in the National Construction Code for residential construction.

Stonelake commits to producing high-quality products tested and assessed to Australian Standards in both material component production and building assembly.

Beyond this, Stonelake R&D Management P/L and the Stonelake Group of companies do not yet hold any ISO certifications.

Name and location of production site(s):

Buildonix components are designed and produced in NSW at our Coffs Harbour Manufacturing Facilities (Unit 4/9-11 Keona Circuit, Coffs Harbour). Once produced, completed components are quality checked, catalogued, and warehoused on-site.

A Buildonix building can be packed and delivered to the site for assembly quickly and easily. All components are specifically designed to enable fast and waste-free assembly, allowing for packing containers to be returned to shipping facilities for ongoing project reuse.

Buildonix® Building Components

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Geographical Scope: Australia

Product Name: Buildonix building components; MUSIC (Multifunctional Universal Structural Integrated Component), Sole Plate, Corner Block, Corner Bracket Standard, Web Brackets, Heavy Load Bracket, Spacer Blocks, Floor Rails, Floor Pods, Window Interface Component.

Product Identification: Buildonix building components have been designed to embody the principles of the circular economy.

Product Description: Stonelake Pty Ltd has developed a Life Cycle Assessment (LCA) and Environmental Product Disclosure (EPD) for Buildonix building components. The components included in this EPD are music, sole plate, corner block, corner bracket standard, web brackets, heavy load bracket, spacer blocks, floor rails, floor pods and window interface. These components are used to build the Buildonix structure, which is a prefabricated building structure, and it can be disassembled and re-assembled. This prefabricated building structure can be used for both residential and commercial projects.

UN CPC Code:
GROUP: 387 (Prefabricated Buildings)
CLASS: 3870 (Prefabricated Buildings)
SUBCLASS: 38702 (Prefabricated Buildings, of metal)
HS 2007: 9406
CPC 2: 38702
ISIC 4: 2511

Other codes for product classification:
2222 (Prefabricated Metal Building Manufacturing)

LCA Information

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Functional unit / declared unit: In this life cycle assessment, a declared unit is taken into consideration instead of a functional unit. The declared unit of the EPD study is '1kg of each Buildonix component' (for example 1kg of music 90, 1kg of floor pod etc.). The life cycle stages included in this study are cradle-to-gate with modules C1–C4 and module D (A1–A3 + C + D).

As Buildonix products consist of different materials, sizes, and shapes the unit of 1kg is seen as more suitable and scalable.

Reference service life: RSL has not been declared because module B (Use stage) is not included in the LCA.

Time representativeness: Primary data were collected from participating sites for the 2020/21 financial year.

Database(s) and LCA software used: The life cycle assessment is calculated using the software SimaPro 9.1.1.7. Most data are taken from ecoinvent 3.6 and AUSLCI V1.34. It is to be noted that, the ecoinvent dataset was chosen only if the relevant datasets are not available in the AusLCI dataset. Considering the manufacturing location of material in Australia, the ecoinvent datasets have been modified adopting the Australian electricity dataset. Only a few datasets have been taken from Industry Data 2.0 when the relevant datasets are not in AusLCI and ecoinvent datasets. Only one dataset (Disposal, packaging cardboard, 19.6% water, to sanitary landfill/CH U/AusSD U) has been chosen from AusLCI SD datasets due to the unavailability of relevant datasets.

Description of system boundaries: The module selected for the Buildonix components LCA study is 'cradle-to-gate with options – modules C and module D'. However, the manufacturing of production equipment, buildings, vehicle production, maintenance and other capital goods, business travels of personnel, and labour work are not counted in this study. The excluded processes are assumed to have a negligible contribution to the overall LCA results.

It is to be noted that no inventory data was used for module C1 as the Buildonix system is deconstructed manually. The components of the Buildonix system can be separated manually at the end-of-life stage; therefore, inventory data for module C3 is also not considered. All modules included in this EPD are marked as X in Table 1 below, and those excluded are marked as 'Not declared' (ND). The system boundary for this EPD is depicted in Figure 1.

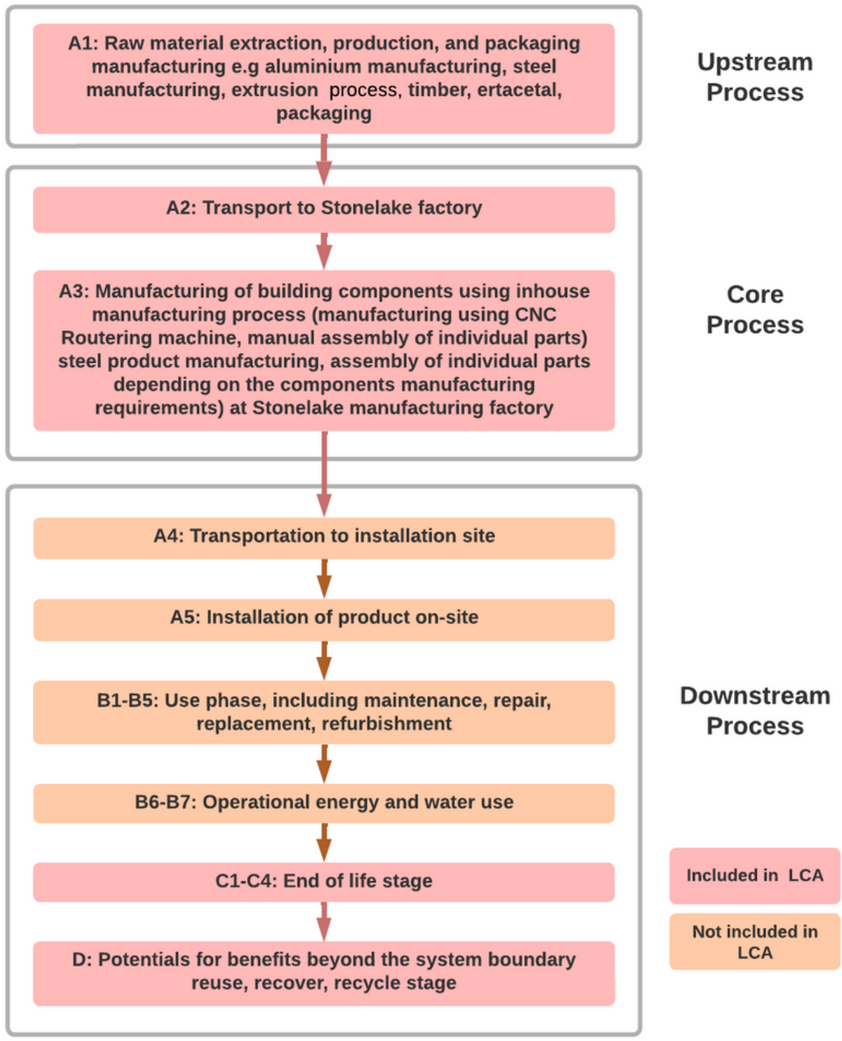

Figure 1. System boundary

Process Description

The life cycle assessment of Buildonix components is divided into three processes: upstream, core and downstream. The upstream processes include the flow of raw materials. The core processes include all activities the manufacturing organisation controls, i.e., transportation of the materials to the manufacturing factory and the actual process of manufacturing the final product. The upstream process consists of the extraction and manufacturing of raw materials. This section also includes packaging materials.

Buildonix's structure consists of different components. Different suppliers from different manufacturing locations supply raw materials for different components. These raw materials include aluminium, galvanised steel sheet, ertacetal, timber and plywood sheet. Stonelake provided information on raw material manufacturing. Then these raw materials are transported to the Stonelake manufacturing site to manufacture the components of the Buildonix structure through Stonelake's internal manufacturing process.

Stonelake's internal manufacturing process includes CNC turning machine and manual assembly for component manufacturing. Depending on the components, the manufacturing process is different. Some components are sent to Stonelake in completed form. Floor pods are assembled manually. These are the core process of manufacturing at Stonelake's internal manufacturing. The upstream process includes raw materials/packaging manufacturing for different components, e.g. aluminium, steel, extrusion process, ertacetal and timber.

CNC turning machine provides the final product with the required design and wastage of metal. As per the ecoinvent dataset of the CNC turning process, 'Aluminium removed by turning, average, conventional {RoW}| aluminium turning, average, conventional | Cut-off, U'- every 1kg of aluminium used in CNC has a wastage of 0.23kgs. Polyoxymethylene (POM/Acetal) is used to make spacer block - using the same CNC machine. The ecoinvent dataset of the CNC turning process only had a CNC machine used for metal. Hence adjustments were made to the current library to be relevant to the production of POM. Only 10% of wastage occurs during the production of POM. It is to be noted that some of the components are supplied to the Stonelake location in complete form.

The downstream processes include the steps controlled by a consumer and the disposal or recycling options of the products. At the end-of-life, some of the component materials are recycled. These components include music components, standard corner brackets, corner blocks, web brackets, H load brackets, sole plate, window interface, rail attachment bracket and floor rail. At the end-of-life, other components are disposed of through general waste, including the floor pod and spacer block.

Table 1 Stages and modules included in this EPD

	Product stage			Construction process stage		Use stage							End-of-life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	AU	AU	AU										AU	AU	AU	AU	AU
Specific data used	>90			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Data Quality

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Stonelake Pty Ltd has supplied the primary data for the components, and the raw material used for the components is for FY2020/21.

Background data have been sourced from AusLCI and ecoinvent datasets. All background data used was less than ten years old. The data quality assessment (Table 2) is based on EN 15804. (EN 15804:2012+A2:2019, 2020).

Table 2. Data quality assessment

Module	Input/Output	Data resource	Temporal Scope	Data Quality*
A1	Raw materials used for Buildonix components manufacture and packaging	The component schedule document is provided by the manufacturer, which includes detailed drawings of the components, images of the components, component material, manufacturing location of the raw materials, the manufacturing process involved with raw materials and end-of-life details. They also provided information on different packaging materials used by the suppliers.	2020-2021	Very good
A2	Transport of raw materials with packaging materials			
A3	The manufacturing process of the Buildonix components, manufacturing waste, waste treatment of manufacturing waste, packaging waste and transport of waste	The manufacturer provided information on the internal manufacturing process used for each component. They also provided information on the components used to manufacture the Buildonix system and the weight and number of each component used to manufacture a Buildonix system (6.5m x 3.5m one-storey office building). The components manufacturing process includes a CNC Routering machine and manual assembly. For the CNC turning process, the LCI data for the Aluminium turning machine process are based on the ecoinvent v3.4 dataset of "Aluminium removed by turning, average, conventional {RoW}| aluminium turning, average, conventional | Cut-off, U" which includes all the resources for turning process. This dataset has been updated with the electricity data inputs to the process flow in order to make the process more representative of Australia.	2020-2021	Very good
C1	Demolition of the construction product (e.g., manual demolition/ deconstruction/ machine used for demolition)	The manufacturer provided information that the Buildonix system can be deconstructed manually. No data on the energy requirements for this stage was available. Environmental impacts coming from this stage were therefore neglected.	2020-2021	Fair
C2	Transport of waste to the waste processing site of recycling/landfill disposal	Assumption – an average distance of 100km is taken into consideration as per resource recovery and waste treatment facilities in Australia.	2020-2021	Good
C3	End-of-life waste processing for reuse/recycling/recovery (e.g., manual separation of recyclable product)	The manufacturer provided information that the components of the Buildonix system can be separated manually at the end-of-life stage.	2020-2021	Fair
C4	End-of-life disposal of product and packaging material (packaging materials which are used for finished product packaging	The manufacturer provided information for end-of-life disposal of components.	2020-2021	Fair
D	End-of-life waste for recycling	The manufacturer provided information for Buildonix components end-of-life reuse and recycle.	2020-2021	Fair

*Note**
Very good (Data from area and processes under study, within 3-year timeframe)
Fair (Data from area with similar conditions, similar technology, within 3-year timeframe, based on assumptions)
Good (Data from area and processes under study with similar technologies, within 3-year timeframe)

Cut-off Rules

According to the Construction Products PCR, the life cycle inventory data shall, according to EN 15804, include a minimum of 95% of total inflows (mass and energy) per module. In case of insufficient input data for a unit process, the cut-off criteria shall be 1% of primary energy usage and 1% of the total mass input of that unit process.

Proxy data or extrapolation should be used to achieve 100% completeness if only 95% of total inflow data is available. Inflows not included in the LCA shall be documented in the EPD (The International EPD System, 2021).

For this study, 100% of the inflows required for the manufacture of the components are taken into consideration.

Allocation

In the manufacturing of Buildonix components, no co-product or by-product is obtained. Allocation of any production processes to more than one product is therefore not needed. Any allocations directly embedded in the LCA database processes were adopted. In the International EPD System framework, the methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP).

This means that the generator of the waste shall carry the full environmental impact until the point in the product's lifecycle at which the waste is transported to a scrapyard or the gate of a waste processing plant (collection site). The subsequent user of the waste shall carry the environmental impact from the processing and refinement of the waste but not the environmental impact caused in any previous life cycles (EPD International, 2021). The assessments of the individual Buildonix components are modelled this way.

Key Assumptions

- The manufacturers provided information that the Buildonix system is deconstructed manually, and the components of the Buildonix system can be separated manually at the end-of-life stage. No inventory data on the energy requirements for this stage were available. Therefore, it was assumed that environmental impacts from lifecycle modules C1 and C3 were considered negligible.
- For module C2, it was assumed that the average distance is 100km which was considered as per resource recovery facilities in Australia.
- For Module D (end-of-life), it was assumed that 100% aluminium and steel are recycled.
- An assumption was made for the packaging materials of 9% of the total weight of the materials (Pongrácz, 2007).

Table 3. Content information

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Music 90	Aluminium	1	0	0
	Total	1		
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0.03		
	Polyfoam wrap	0.03		
	Packaging film	0.03		
	Cardboard	0		
	Total	0.09	9%	

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Sole plate	Aluminium	1	0	0
	Total	1		
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0.03		
	Polyfoam wrap	0.03		
	Packaging film	0.03		
	Cardboard	0		
	Total	0.09	9%	

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Corner block	Aluminium	1	0	0
	Total	1		
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0.03		
	Polyfoam wrap	0.03		
	Packaging film	0.03		
	Cardboard	0		
	Total	0.09	9%	

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Standard corner bracket	Steel	1	0	0
	Total	1		
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0		
	Polyfoam wrap	0		
	Packaging film	0.045		
	Cardboard	0.045		
	Total	0.09	9%	

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Web bracket	Aluminium	1	0	0
	Total	1		
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0.03		
	Polyfoam wrap	0.03		
	Packaging film	0.03		
	Cardboard			
	Total	0.09	9%	

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
H load bracket	Aluminium	1	0	0
	Total			
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0.03		
	Polyfoam wrap	0.03		
	Packaging film	0.03		
	Cardboard			
	Total	0.09	9%	

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Spacer blocks	Ertacetal	1	0	0
	Total	1		
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0.09		
	Polyfoam wrap			
	Packaging film			
	Cardboard			
	Total	0.09	9%	

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Floor Rails	Steel	1	0	0
	Total	1		
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0.09		
	Polyfoam wrap	0		
	Packaging film	0		
	Cardboard	0		
	Total	0.09	9%	

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Floor Pods	Timber	1	100%	0
	Total	1		
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0.03		
	Polyfoam wrap	0.03		
	Packaging film	0.03		
	Cardboard			
	Total	0.09	9%	

Product components name	Materials of the component	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Window Interface	Aluminium	1	0	0
	Total	1		
	Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
	Wood	0.03		
	Polyfoam wrap	0.03		
	Packaging film	0.03		
	Cardboard			
	Total	0.09	9%	

The products included in this EPD do not have environmental/ hazardous properties and do not contain any substances of very high concern as defined by European REACH regulation in concentrations >0.1% (m/m).

The potential environmental impacts used in this EPD are explained in Table 4.

Table 4. Environmental indicators used in the EPD

Environmental Indicators	Explanation	Assessment Method
Core environmental impact indicators		
Global Warming Potential – total, kg CO_2 eq.	Climate change can cause adverse effects on ecosystem health, human health, and material welfare. The indicators within this category are related to emissions of greenhouse gases into the air. Fossil CO_2 eq: This is defined as greenhouse gas emissions caused due to fossil fuels in Carbon-di-oxide equivalent. **Biogenic CO_2 eq**: This is defined as greenhouse gas emissions caused by the natural carbon cycle. **CO_2 eq from land transformation:** This is defined as Greenhouse emissions caused due to direct or indirect land use by humans.	IPCC 2013 baseline (as part of Environmental Footprint 3.0) (Fazio, et al., 2018)
Global Warming Potential – fossil, kg CO_2 eq.		
Global Warming Potential – biogenic, kg CO_2 eq.		
Global Warming Potential – land use and land use change, kg CO_2 eq.		
Stratospheric ozone depletion potential, kg CFC 11 eq	Stratospheric ozone depletion can harm on human health, animal health, terrestrial and aquatic ecosystems, and biochemical cycles. The indicators within this category are related to hydrocarbons containing combined bromine, fluorine and chlorine, and chlorofluorocarbons (CFCs).	WMO (as part of Environmental Footprint 3.0)
Acidification potential, mol H^+ eq	This category considers acidifying substances that cause a wide range of effects on soil, groundwater, surface water, organisms, ecosystems, and materials.	Accumulated exceedance (as part of Environmental Footprint 3.0)
Eutrophication potential – aquatic freshwater, kg P eq	The eutrophication process that occurs in freshwater bodies due to emissions of phosphorus-containing substances is called freshwater eutrophication.	Accumulated exceedance (as part of Environmental Footprint 3.0)
Eutrophication potential – aquatic marine, kg N eq	The eutrophication process that occurs in marine water bodies due to the emission of nitrogen-containing substances is called marine water eutrophication.	EUTREND model (as part of Environmental Footprint 3.0)
Eutrophication potential – terrestrial, mol N eq.	Air pollution due to excess atmospheric nitrogen or ammonia deposition is called terrestrial eutrophication.	EUTREND model (as part of Environmental Footprint 3.0)
Formation potential of tropospheric ozone, kg NMVOC eq.	It estimates photochemical smog (air pollution) potential as kg C_2H_4 eq.	LOTOS-EUROS model (as part of Environmental Footprint 3.0)
Abiotic depletion potential – non fossil resources[1], kg Sb eq.	It estimates the impact on minerals reserves as antimony (Sb) equivalents.	CML (as part of Environmental Footprint 3.0)
Abiotic depletion potential – fossil resources[1], MJ	This category considers the impact on fossil fuels reserves as MJ.	CML (as part of Environmental Footprint 3.0)
Water deprivation potential [m^3 world eq. deprived][1]	It assesses the potential of water deprivation, to either humans or ecosystems, and serves in calculating the impact score of water consumption at midpoint in LCA or to calculate a water scarcity footprint as per ISO 14046.	Model developed by UNEP-SETAC Task Force on particulate matter (PM) in 2016 (as part of Environmental Footprint 3.0)
Particulate matter	It estimates the potential incidence of disease due to PM emissions.	USEtox 2.1 (as part of Environmental Footprint 3.0)
Ionizing radiation, human health[2] , kBq U-235 eq	Estimates the human health impact caused due to releases of radioactive material to the environment.	Frischknecht et al 2000 (as part of Environmental Footprint 3.0)
Eco-toxicity (freshwater) [1], CTUe	Comparative Toxic Unit for ecosystems (CTUe) expressing an estimate of the potentially affected fraction of species (PAF) integrated over time and volume per unit mass of a chemical emitted (PAF m3 year/kg).	USEtox 2.1 (as part of Environmental Footprint 3.0)
Human toxicity, cancer[1], CTUe	Comparative Toxic Unit for human (CTUh) expressing the estimated increase in morbidity in the total human population per unit mass of a chemical emitted (cases per kilogram).	USEtox 2.1 (as part of Environmental Footprint 3.0)
Human toxicity, non-cancer effects[1], CTUe	Comparative Toxic Unit for humans (CTUh) expressing the estimated increase in morbidity in the total human population per unit mass of a chemical emitted (cases per kilogram).	
Land use related impacts[1], Pt	Land use is soil quality index.	LANCA (as part of Environmental Footprint 3.0)
Resource Use Parameters		
Primary energy resources – renewable, use as energy carrier (PERE) [MJ, net calorific value]	PERE are (first use) bio-based materials used as an energy source. Hydropower, solar and wind power used in the technosphere is also included in this indicator (ISO 21930, 2017).	Cumulative Energy Demand V1.11 The Cumulative Energy Demand V1.11 method is based on the method published by ecoinvent version 2.0 and expanded by PRé Consultants for raw materials.
Primary energy resources – non-renewable, use as energy carrier (PENRE) [MJ, net calorific value]	PENRE are (first use) materials such as oil, gas, coal and uranium used as an energy source.	
Primary energy resources – renewable, use as raw materials (PERM) [MJ, net calorific value]	PERM are (first use) bio-based materials used as materials (e.g. wood, hemp, etc.).	Calculated manually based on the lower heating value of renewable raw materials
Primary energy resources – non-renewable, use as raw materials (PENRM) [MJ, net calorific value]	PENRM are (first use) primary resources such as oil, gas and coal, used for products (e.g., plastic-based products).	Calculated manually based on the higher heating value of non-renewable raw materials
Primary energy resources – Renewable – Total (PERT)	PERT are the total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials).	Calculated manually (PERE + PERM)
Primary energy resources – Non-renewable – Total (PENRT)	PENRT are the total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials).	Calculated manually (PENRE + PENRM)
Use of secondary material [kg]	Secondary materials are materials recycled from previous use or waste (e.g., scrap metal, broken concrete, broken glass, plastic and wood) that are used as material input from another product system. These include both renewable and non-renewable resources, with or without energy content, depending on the status of the material when it was originally extracted from the environment.	N/A
Use of renewable secondary fuels [MJ, net calorific value]	Renewable secondary fuels are renewable materials with an energy content that have crossed the system boundary between product systems and are used as fuel input (energy source) in another product system (e.g., biomass residue pellets, chipped waste wood).	N/A
Use of non-renewable secondary fuels [MJ, net calorific value]	Non-renewable secondary fuels are non-renewable materials with an energy content that have crossed the system boundary between product systems and are used as fuel input (energy source) in another product system (e.g., processed solvents, shredded tyres).	N/A
Net freshwater use [m^3]	It estimates the use of net freshwater.	ReCiPe 2016 midpoint method
Waste Flow Parameters		
Hazardous waste disposed [kg]	It estimates the hazardous waste disposed.	EDIP 2003
Non-hazardous waste disposed [kg]	It estimates the non-hazardous waste disposed.	
Radioactive waste disposed [kg]	It estimates the radioactive waste disposed/ stored.	
Output Flows		
Components for reuse, [kg]	It estimates the components for re-use.	Calculated manually
Materials for recycling, [kg]	It estimates the material for recycling.	
Materials for energy recovery, [kg]	It estimates the materials for energy recovery.	
Exported energy, MJ	It estimates the recovered energy from exported system.	
Exported energy, thermal, [MJ]	It estimates the recovered energy from thermally exported system.	
Additional GWP-GHG indicator		
GWP-GHG	The GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic CO2 uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013).	IPCC 2013 GWP 100a

Table 5 below shows the environmental impact information for each Buildonix building component according to the declared unit of 1kg of each component.

Table 5. Environmental impacts of MUSIC 90, Corner block per declared unit

Environmental Impact Indicators	Unit	A1	A2	A3	C1	C2	C3	C4	D
Core environmental indicators									
Global Warming Potential – total	kg CO_2 eq	2.74E+01	2.04E-01	2.77E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.96E+01
Global Warming Potential – fossil	kg CO_2 eq	2.73E+01	2.04E-01	2.00E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.96E+01
Global Warming Potential – biogenic	kg CO_2 eq	5.86E-02	1.99E-04	7.77E-01	0.00E+00	3.77E-05	0.00E+00	0.00E+00	-5.26E-02
Global Warming Potential – land use and land use change	kg CO_2 eq	6.82E-02	1.93E-06	1.04E-03	0.00E+00	3.66E-07	0.00E+00	0.00E+00	-8.55E-05
Stratospheric ozone depletion potential	kg CFC11 eq	9.14E-07	2.71E-08	1.28E-07	0.00E+00	5.15E-09	0.00E+00	0.00E+00	-5.64E-07
Formation potential of tropospheric ozone	kg NMVOC eq	8.70E-02	1.43E-03	7.84E-03	0.00E+00	2.72E-04	0.00E+00	0.00E+00	-5.60E-02
Acidification potential	mol H+ eq	1.75E-01	1.55E-03	1.17E-02	0.00E+00	2.94E-04	0.00E+00	0.00E+00	-1.29E-01
Eutrophication potential – aquatic freshwater	kg P eq	8.34E-03	8.54E-06	5.63E-04	0.00E+00	1.62E-06	0.00E+00	0.00E+00	-5.76E-04
Eutrophication potential – aquatic marine	kg N eq	2.90E-02	4.08E-04	4.72E-03	0.00E+00	7.75E-05	0.00E+00	0.00E+00	-1.72E-02
Eutrophication potential – terrestrial	mol N eq	3.00E-01	4.47E-03	2.73E-02	0.00E+00	8.48E-04	0.00E+00	0.00E+00	-1.87E-01
Acidification potential	mol H+ eq	1.75E-01	1.55E-03	1.17E-02	0.00E+00	2.94E-04	0.00E+00	0.00E+00	-1.29E-01
Eutrophication potential – aquatic freshwater	kg P eq	8.34E-03	8.54E-06	5.63E-04	0.00E+00	1.62E-06	0.00E+00	0.00E+00	-5.76E-04
Eutrophication potential – aquatic marine	kg N eq	2.90E-02	4.08E-04	4.72E-03	0.00E+00	7.75E-05	0.00E+00	0.00E+00	-1.72E-02
Water deprivation potential[1]	m^3 depriv.	6.66E+01	2.48E+00	1.37E+01	0.00E+00	4.70E-01	0.00E+00	0.00E+00	-4.75E+02
Abiotic depletion potential – fossil resources[1]	MJ	2.49E+02	2.55E+00	1.68E+01	0.00E+00	4.85E-01	0.00E+00	0.00E+00	-1.07E+02
Abiotic depletion potential – non fossil resources[1]	kg Sb eq	2.10E-04	1.08E-06	2.13E-04	0.00E+00	2.05E-07	0.00E+00	0.00E+00	-6.62E-06
GWP – GHG[3]	kg CO_2 eq	2.65E+01	2.01E-01	2.58E+00	0.00E+00	3.82E-02	0.00E+00	0.00E+00	-1.91E+01
Additional impact categories and indicators									
Ionising radiation[2]	kBq U-235 eq	5.20E-01	1.26E-04	6.64E-02	0.00E+00	2.39E-05	0.00E+00	0.00E+00	-8.17E-03
Particulate matter	disease inc.	2.20E-06	1.05E-08	3.26E-07	0.00E+00	1.99E-09	0.00E+00	0.00E+00	-1.57E-06
Human toxicity, non-cancer[1]	CTUh	6.21E-07	2.33E-09	5.33E-08	0.00E+00	4.42E-10	0.00E+00	0.00E+00	-2.67E-07
Human toxicity, cancer[1]	CTUh	3.48E-08	6.45E-11	5.33E-09	0.00E+00	1.22E-11	0.00E+00	0.00E+00	-1.98E-08
Eco-toxicity, freshwater[1]	CTUe	6.68E+02	1.52E+00	7.19E+02	0.00E+00	2.88E-01	0.00E+00	0.00E+00	-9.63E+01
Land use impacts	Pt	7.70E+01	1.17E+00	3.58E+01	0.00E+00	2.22E-01	0.00E+00	0.00E+00	-4.58E+01

Other environmental information describing waste categories									
Hazardous waste disposed	kg	1.15E-04	4.10E-06	5.79E-05	0.00E+00	7.79E-07	0.00E+00	0.00E+00	7.81E-04
Non-hazardous waste disposed	kg	5.04E+00	2.27E-02	8.51E-01	0.00E+00	4.31E-03	0.00E+00	0.00E+00	-2.36E+00
Radioactive waste disposed	kg	3.32E-04	1.76E-08	3.71E-05	0.00E+00	3.34E-09	0.00E+00	0.00E+00	-1.17E-06
Parameters describing resource use									
Primary energy resources – non-renewable - Excluding use as raw materials	MJ	2.65E+02	2.72E+00	1.80E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-1.14E+02
Primary energy resources – Non-renewable - Used as raw materials	MJ	2.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Non-renewable - Total	MJ	2.68E+02	2.72E+00	1.80E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-1.14E+02
Primary energy resources – Renewable - Excluding use as raw materials	MJ	2.78E+01	4.95E-02	1.95E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	-1.25E+01
Primary energy resources – Renewable - Used as raw materials	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Renewable - Total	MJ	2.78E+01	4.95E-02	1.95E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	-1.25E+01
Net use of fresh water	m3	1.60E+00	5.76E-02	3.22E-01	0.00E+00	1.09E-02	0.00E+00	0.00E+00	-1.10E+01
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indicators describing output flows									
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	Indicator	Unit	Quantity
Biogenic content (MUSIC 90, Corner block)	Biogenic carbon content in product	kg C	0.00E+00
	Biogenic carbon content in packaging	kg C	1.27E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Table 6. Environmental impacts of Spacer block per declared unit

Environmental Impact Indicators	Unit	A1	A2	A3	C1	C2	C3	C4	D
Core environmental indicators									
Global Warming Potential – total	kg CO_2 eq	3.75E+00	2.49E-01	4.06E+00	0.00E+00	3.88E-02	0.00E+00	1.17E-01	0.00E+00
Global Warming Potential – fossil	kg CO_2 eq	3.75E+00	2.49E-01	3.28E+00	0.00E+00	3.88E-02	0.00E+00	1.17E-01	0.00E+00
Global Warming Potential – biogenic	kg CO_2 eq	2.43E-03	2.42E-04	7.74E-01	0.00E+00	3.77E-05	0.00E+00	1.18E-05	0.00E+00
Global Warming Potential – land use and land use change	kg CO_2 eq	9.15E-09	2.35E-06	3.31E-03	0.00E+00	3.66E-07	0.00E+00	4.63E-06	0.00E+00
Stratospheric ozone depletion potential	kg CFC11 eq	1.96E-07	3.31E-08	2.36E-07	0.00E+00	5.15E-09	0.00E+00	3.27E-09	0.00E+00
Formation potential of tropospheric ozone	kg NMVOC eq	4.95E-03	1.75E-03	1.26E-02	0.00E+00	2.72E-04	0.00E+00	1.25E-04	0.00E+00
Acidification potential	mol H+ eq	7.12E-03	1.89E-03	2.10E-02	0.00E+00	2.94E-04	0.00E+00	9.94E-05	0.00E+00
Eutrophication potential – aquatic freshwater	kg P eq	2.62E-04	1.04E-05	1.68E-03	0.00E+00	1.62E-06	0.00E+00	1.64E-06	0.00E+00
Eutrophication potential – aquatic marine	kg N eq	1.35E-03	4.98E-04	5.14E-03	0.00E+00	7.75E-05	0.00E+00	2.14E-03	0.00E+00
Eutrophication potential – terrestrial	mol N eq	1.42E-02	5.45E-03	3.68E-02	0.00E+00	8.48E-04	0.00E+00	3.52E-04	0.00E+00
Water deprivation potential[1]	m^3 depriv.	2.55E+01	3.02E+00	1.18E+01	0.00E+00	4.70E-01	0.00E+00	3.69E-02	0.00E+00
Abiotic depletion potential – fossil resources[1]	MJ	7.84E+01	3.12E+00	3.77E+01	0.00E+00	4.85E-01	0.00E+00	2.51E-01	0.00E+00
Abiotic depletion potential – non fossil resources[1]	kg Sb eq	1.76E-06	1.32E-06	1.09E-04	0.00E+00	2.05E-07	0.00E+00	1.13E-07	0.00E+00
GWP - GHG[3]	kg CO_2 eq	3.66E+00	2.45E-01	3.84E+00	0.00E+00	3.82E-02	0.00E+00	1.02E-01	0.00E+00
Additional impact categories and indicators									
Ionising radiation[2]	kBq U-235 eq	5.59E-01	1.54E-04	2.85E-01	0.00E+00	2.39E-05	0.00E+00	1.16E-03	0.00E+00
Particulate matter	disease inc.	6.05E-08	1.28E-08	3.44E-07	0.00E+00	1.99E-09	0.00E+00	1.78E-09	0.00E+00
Human toxicity, non-cancer[1]	CTUh	1.48E-08	2.84E-09	1.12E-07	0.00E+00	4.42E-10	0.00E+00	2.40E-10	0.00E+00
Human toxicity, cancer[1]	CTUh	8.24E-10	7.87E-11	5.94E-09	0.00E+00	1.22E-11	0.00E+00	7.42E-12	0.00E+00
Eco-toxicity, freshwater[1]	CTUe	1.08E+02	1.85E+00	5.82E+02	0.00E+00	2.88E-01	0.00E+00	5.30E-01	0.00E+00
Land use impacts	Pt	7.25E+00	1.43E+00	2.94E+01	0.00E+00	2.22E-01	0.00E+00	5.95E-01	0.00E+00

Other environmental information describing waste categories									
Hazardous waste disposed	kg	2.08E-08	5.00E-06	9.93E-05	0.00E+00	7.79E-07	0.00E+00	3.82E-07	0.00E+00
Non-hazardous waste disposed	kg	7.96E-05	2.77E-02	8.14E-01	0.00E+00	4.31E-03	0.00E+00	1.00E+00	0.00E+00
Radioactive waste disposed	kg	2.35E-10	2.15E-08	1.09E-04	0.00E+00	3.34E-09	0.00E+00	1.48E-06	0.00E+00
Parameters describing resource use									
Primary energy resources – Non-renewable - Excluding use as raw materials	MJ	8.63E+01	3.32E+00	4.03E+01	0.00E+00	5.16E-01	0.00E+00	2.67E-01	0.00E+00
Primary energy resources – non-Renewable - Used as raw materials	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Non-renewable - Total	MJ	8.63E+01	3.32E+00	4.03E+01	0.00E+00	5.16E-01	0.00E+00	2.67E-01	0.00E+00
Primary energy resources – Renewable - Excluding use as raw materials	MJ	1.19E+00	6.04E-02	5.18E+00	0.00E+00	9.40E-03	0.00E+00	4.62E-03	0.00E+00
Primary energy resources – Renewable - Used as raw materials	MJ	1.88E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Renewable - Total	MJ	3.07E+00	6.04E-02	5.18E+00	0.00E+00	9.40E-03	0.00E+00	4.62E-03	0.00E+00
Net use of fresh water	m^3	5.93E-01	7.02E-02	2.83E-01	0.00E+00	1.09E-02	0.00E+00	8.70E-04	0.00E+00
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indicators describing output flows									
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	Indicator	Unit	Quantity
Biogenic content (Spacer block)	Biogenic carbon content in product	kg C	0.00E+00
	Biogenic carbon content in packaging	kg C	3.81E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Table 7. Environmental impact of Web bracket and Sole plate per declared unit

Environmental Impact Indicators	Unit	A1	A2	A3	C1	C2	C3	C4	D
Core environmental indicators									
Global Warming Potential – total	kg CO_2 eq	2.73E+01	5.20E-04	2.77E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.96E+01
Global Warming Potential – fossil	kg CO_2 eq	2.72E+01	5.20E-04	2.00E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.96E+01
Global Warming Potential – biogenic	kg CO_2 eq	5.10E-02	5.05E-07	7.77E-01	0.00E+00	3.77E-05	0.00E+00	0.00E+00	-5.26E-02
Global Warming Potential – land use and land use change	kg CO_2 eq	6.82E-02	4.91E-09	1.04E-03	0.00E+00	3.66E-07	0.00E+00	0.00E+00	-8.55E-05
Stratospheric ozone depletion potential	kg CFC11 eq	9.03E-07	6.90E-11	1.28E-07	0.00E+00	5.15E-09	0.00E+00	0.00E+00	-5.64E-07
Formation potential of tropospheric ozone	kg NMVOC eq	8.68E-02	3.65E-06	7.84E-03	0.00E+00	2.72E-04	0.00E+00	0.00E+00	-5.60E-02
Acidification potential	mol H+ eq	1.79E-01	3.95E-06	1.17E-02	0.00E+00	2.94E-04	0.00E+00	0.00E+00	-1.29E-01
Eutrophication potential – aquatic freshwater	kg P eq	8.30E-03	2.17E-08	5.63E-04	0.00E+00	1.62E-06	0.00E+00	0.00E+00	-5.76E-04
Eutrophication potential – aquatic marine	kg N eq	2.89E-02	1.04E-06	4.72E-03	0.00E+00	7.75E-05	0.00E+00	0.00E+00	-1.72E-02
Eutrophication potential – terrestrial	mol N eq	2.98E-01	1.14E-05	2.73E-02	0.00E+00	8.48E-04	0.00E+00	0.00E+00	-1.87E-01
Water deprivation potential[1]	m^3 depriv.	6.62E+01	6.30E-03	1.37E+01	0.00E+00	4.70E-01	0.00E+00	0.00E+00	-4.75E+02
Abiotic depletion potential – fossil resources[1]	MJ	2.48E+02	6.50E-03	1.68E+01	0.00E+00	4.85E-01	0.00E+00	0.00E+00	-1.07E+02
Abiotic depletion potential – non fossil resources[1]	kg Sb eq	3.05E-04	2.75E-09	2.13E-04	0.00E+00	2.05E-07	0.00E+00	0.00E+00	-6.62E-06
GWP GHG[3]	kg CO_2 eq	2.65E+01	5.12E-04	2.58E+00	0.00E+00	3.82E-02	0.00E+00	0.00E+00	-1.91E+01
Additional impact categories and indicators									
Ionising radiation[2]	kBq U-235 eq	5.16E-01	3.21E-07	6.64E-02	0.00E+00	2.39E-05	0.00E+00	0.00E+00	-8.17E-03
Particulate matter	disease inc.	2.17E-06	2.66E-11	3.26E-07	0.00E+00	1.99E-09	0.00E+00	0.00E+00	-1.57E-06
Human toxicity, non-cancer[1]	CTUh	6.33E-07	5.92E-12	5.33E-08	0.00E+00	4.42E-10	0.00E+00	0.00E+00	-2.67E-07
Human toxicity, cancer[1]	CTUh	3.51E-08	1.64E-13	5.33E-09	0.00E+00	1.22E-11	0.00E+00	0.00E+00	-1.98E-08
Eco-toxicity, freshwater[1]	CTUe	6.66E+02	3.87E-03	7.19E+02	0.00E+00	2.88E-01	0.00E+00	0.00E+00	-9.63E+01
Land use impacts	Pt	5.49E+01	2.97E-03	3.58E+01	0.00E+00	2.22E-01	0.00E+00	0.00E+00	-4.58E+01
Other environmental information describing waste categories									
Hazardous waste disposed	kg	1.27E-04	1.04E-08	5.79E-05	0.00E+00	7.79E-07	0.00E+00	0.00E+00	7.81E-04
Non-hazardous waste disposed	kg	5.03E+00	5.77E-05	8.51E-01	0.00E+00	4.31E-03	0.00E+00	0.00E+00	-2.36E+00
Radioactive waste disposed	kg	3.31E-04	4.48E-11	3.71E-05	0.00E+00	3.34E-09	0.00E+00	0.00E+00	-1.17E-06
Parameters describing resource use									
Primary energy resources – Non-renewable - Excluding use as raw materials	MJ	2.64E+02	6.92E-03	1.80E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-1.14E+02
Primary energy resources – Non-renewable - Used as raw materials	MJ	2.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Non-renewable - Total	MJ	2.67E+02	6.92E-03	1.80E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-1.14E+02
Primary energy resources – Renewable - Excluding use as raw materials	MJ	2.72E+01	1.26E-04	1.95E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	-1.25E+01
Primary energy resources – Renewable - Used as raw materials	MJ	7.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Renewable - Total	MJ	2.79E+01	1.26E-04	1.95E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	-1.25E+01
Net use of fresh water	m3	1.59E+00	1.47E-04	3.22E-01	0.00E+00	1.09E-02	0.00E+00	0.00E+00	-1.10E+01
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indicators describing output flows									
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	Indicator	Unit	Quantity
Biogenic content (web bracket, sole plate)	Biogenic carbon content in product	kg C	0.00E+00
	Biogenic carbon content in packaging	kg C	1.27E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Table 8. Environmental impact of Standard corner bracket per declared unit

Environmental impact indicators	Unit	A1	A2	A3	C1	C2	C3	C4	D
Core environmental indicators									
Global Warming Potential – total	kg CO_2 eq	3.22E+00	2.19E-01	2.31E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.22E+00
Global Warming Potential – fossil	kg CO_2 eq	3.22E+00	2.19E-01	2.09E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.22E+00
Global Warming Potential – biogenic	kg CO_2 eq	1.26E-03	2.13E-04	2.21E-01	0.00E+00	3.77E-05	0.00E+00	0.00E+00	1.08E-04
Global Warming Potential – land use and land use change	kg CO_2 eq	7.54E-04	2.07E-06	2.49E-03	0.00E+00	3.66E-07	0.00E+00	0.00E+00	-7.40E-07
Stratospheric ozone depletion potential	kg CFC11 eq	-2.89E-09	2.91E-08	1.49E-07	0.00E+00	5.15E-09	0.00E+00	0.00E+00	-2.17E-08
Formation potential of tropospheric ozone	kg NMVOC eq	5.73E-03	1.54E-03	6.33E-03	0.00E+00	2.72E-04	0.00E+00	0.00E+00	-4.08E-03
Acidification potential	mol H+ eq	9.15E-03	1.66E-03	9.68E-03	0.00E+00	2.94E-04	0.00E+00	0.00E+00	-4.87E-03
Eutrophication potential – aquatic freshwater	kg P eq	7.72E-05	9.15E-06	8.43E-04	0.00E+00	1.62E-06	0.00E+00	0.00E+00	-7.07E-07
Eutrophication potential – aquatic marine	kg N eq	2.03E-03	4.37E-04	2.33E-03	0.00E+00	7.75E-05	0.00E+00	0.00E+00	-9.28E-04
Eutrophication potential – terrestrial	mol N eq	2.18E-02	4.79E-03	2.03E-02	0.00E+00	8.48E-04	0.00E+00	0.00E+00	-1.08E-02
Water deprivation potential[1]	m3 depriv.	2.18E-02	4.79E-03	2.03E-02	0.00E+00	8.48E-04	0.00E+00	0.00E+00	-1.08E-02
Abiotic depletion potential – fossil resources[1]	MJ	3.73E+01	2.74E+00	2.46E+01	0.00E+00	4.85E-01	0.00E+00	0.00E+00	-8.56E+00
Abiotic depletion potential – non fossil resources[1]	kg Sb eq	7.51E-06	1.16E-06	4.94E-05	0.00E+00	2.05E-07	0.00E+00	0.00E+00	4.52E-10
GWP - GHG[3]	kg CO_2 eq	3.13E+00	2.16E-01	2.22E+00	0.00E+00	3.82E-02	0.00E+00	0.00E+00	-1.16E+00
Additional impact categories and indicators									
Ionising radiation[2]	kBq U-235 eq	2.35E-02	1.35E-04	1.47E-01	0.00E+00	2.39E-05	0.00E+00	0.00E+00	-1.04E-04
Particulate matter	disease inc.	1.61E-07	1.12E-08	1.39E-07	0.00E+00	1.99E-09	0.00E+00	0.00E+00	-7.80E-08
Human toxicity, non-cancer[1]	CTUh	8.26E-09	2.49E-09	6.35E-08	0.00E+00	4.42E-10	0.00E+00	0.00E+00	-4.74E-08
Human toxicity, cancer[1]	CTUh	3.37E-09	6.91E-11	4.96E-09	0.00E+00	1.22E-11	0.00E+00	0.00E+00	-4.78E-10
Eco-toxicity, freshwater[1]	CTUe	1.06E+01	1.63E+00	1.47E+02	0.00E+00	2.88E-01	0.00E+00	0.00E+00	-2.43E+01
Land use impacts	Pt	-1.14E+00	1.25E+00	1.04E+01	0.00E+00	2.22E-01	0.00E+00	0.00E+00	-2.01E+00
Other environmental information describing waste categories									
Hazardous waste disposed	kg	1.24E-05	4.40E-06	4.89E-05	0.00E+00	7.79E-07	0.00E+00	0.00E+00	-1.74E-04
Non-hazardous waste disposed	kg	7.83E-02	2.43E-02	4.22E-01	0.00E+00	4.31E-03	0.00E+00	0.00E+00	-3.31E-02
Radioactive waste disposed	kg	5.22E-06	1.89E-08	6.92E-05	0.00E+00	3.34E-09	0.00E+00	0.00E+00	-1.41E-08
Parameters describing resource use									
Primary energy resources – Non-renewable - Excluding use as raw materials	MJ	3.95E+01	2.92E+00	2.63E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-9.01E+00
Primary energy resources – Non-renewable - Used as raw materials	MJ	1.84E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Non-renewable - Total	MJ	4.13E+01	2.92E+00	2.63E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-9.01E+00
Primary energy resources – Renewable - Excluding use as raw materials	MJ	2.70E+00	5.31E-02	2.08E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	2.65E-02
Primary energy resources – Renewable - Used as raw materials	MJ	6.21E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Renewable - Total	MJ	3.32E+00	5.31E-02	2.08E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	2.65E-02
Net use of fresh water	m3	-2.42E-03	6.17E-02	1.51E-02	0.00E+00	1.09E-02	0.00E+00	0.00E+00	-6.35E-02
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indicators describing output flows									
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	Indicator	Unit	Quantity
Biogenic content (Standard corner bracket)	Biogenic carbon content in product	kg C	0.00E+00
	Biogenic carbon content in packaging	kg C	0.00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Table 9. Environmental impact of H load bracket per declared unit

Environmental impact indicators	Units	A1	A2	A3	C1	C2	C3	C4	D
Core environmental indicators									
Global Warming Potential – total	kg CO_2 eq	2.86E+01	5.20E-04	2.76E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.96E+01
Global Warming Potential – fossil	kg CO_2 eq	2.85E+01	5.20E-04	1.98E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.96E+01
Global Warming Potential – biogenic	kg CO_2 eq	5.91E-02	5.05E-07	7.76E-01	0.00E+00	3.77E-05	0.00E+00	0.00E+00	-5.26E-02
Global Warming Potential – land use and land use change	kg CO_2 eq	6.87E-02	4.91E-09	1.04E-03	0.00E+00	3.66E-07	0.00E+00	0.00E+00	-8.55E-05
Stratospheric ozone depletion potential	kg CFC11 eq	9.52E-07	6.90E-11	1.26E-07	0.00E+00	5.15E-09	0.00E+00	0.00E+00	-5.64E-07
Formation potential of tropospheric ozone	kg NMVOC eq	9.24E-02	3.65E-06	7.75E-03	0.00E+00	2.72E-04	0.00E+00	0.00E+00	-5.60E-02
Acidification potential	mol H+ eq	1.79E-01	3.95E-06	1.16E-02	0.00E+00	2.94E-04	0.00E+00	0.00E+00	-1.29E-01
Eutrophication potential – aquatic freshwater	kg P eq	8.77E-03	2.17E-08	5.63E-04	0.00E+00	1.62E-06	0.00E+00	0.00E+00	-5.76E-04
Eutrophication potential – aquatic marine	kg N eq	3.01E-02	1.04E-06	4.69E-03	0.00E+00	7.75E-05	0.00E+00	0.00E+00	-1.72E-02
Eutrophication potential – terrestrial	mol N eq	3.11E-01	1.14E-05	2.71E-02	0.00E+00	8.48E-04	0.00E+00	0.00E+00	-1.87E-01
Water deprivation potential[1]	m^3 depriv.	6.67E+01	6.30E-03	1.35E+01	0.00E+00	4.70E-01	0.00E+00	0.00E+00	-4.75E+02
Abiotic depletion potential – fossil resources[1]	MJ	2.63E+02	6.50E-03	1.66E+01	0.00E+00	4.85E-01	0.00E+00	0.00E+00	-1.07E+02
Abiotic depletion potential – non fossil resources[1]	kg Sb eq	1.89E-04	2.75E-09	2.13E-04	0.00E+00	2.05E-07	0.00E+00	0.00E+00	-6.62E-06
GWP - GHG[3]	kg CO_2 eq	2.77E+01	5.12E-04	2.57E+00	0.00E+00	3.82E-02	0.00E+00	0.00E+00	-1.91E+01
Additional impact categories and indicators									
Ionising radiation[2]	kBq U-235 eq	5.55E-01	3.21E-07	6.64E-02	0.00E+00	2.39E-05	0.00E+00	0.00E+00	-8.17E-03
Particulate matter	disease inc.	3.07E-06	2.66E-11	3.25E-07	0.00E+00	1.99E-09	0.00E+00	0.00E+00	-1.57E-06
Human toxicity, non-cancer[1]	CTUh	6.30E-07	5.92E-12	5.32E-08	0.00E+00	4.42E-10	0.00E+00	0.00E+00	-2.67E-07
Human toxicity, cancer[1]	CTUh	4.13E-08	1.64E-13	5.33E-09	0.00E+00	1.22E-11	0.00E+00	0.00E+00	-1.98E-08
Eco-toxicity, freshwater[1]	CTUe	6.94E+02	3.87E-03	7.19E+02	0.00E+00	2.88E-01	0.00E+00	0.00E+00	-9.63E+01
Land use impacts	Pt	7.99E+01	2.97E-03	3.58E+01	0.00E+00	2.22E-01	0.00E+00	0.00E+00	-4.58E+01

Other environmental information describing waste categories									
Hazardous waste disposed	kg	1.18E-04	1.04E-08	5.76E-05	0.00E+00	7.79E-07	0.00E+00	0.00E+00	7.81E-04
Non-hazardous waste disposed	kg	5.29E+00	5.77E-05	8.50E-01	0.00E+00	4.31E-03	0.00E+00	0.00E+00	-2.36E+00
Radioactive waste disposed	kg	3.44E-04	4.48E-11	3.71E-05	0.00E+00	3.34E-09	0.00E+00	0.00E+00	-1.17E-06
Parameters describing resource use									
Primary energy resources – Non-renewable - Excluding use as raw materials	MJ	2.80E+02	6.92E-03	1.78E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-1.14E+02
Primary energy resources – Non-renewable - Used as raw materials	MJ	2.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Non-renewable - Total	MJ	2.82E+02	6.92E-03	1.78E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-1.14E+02
Primary energy resources – Renewable - Excluding use as raw materials	MJ	2.84E+01	1.26E-04	1.95E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	-1.25E+01
Primary energy resources – Renewable - Used as raw materials	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Renewable - Total	MJ	2.84E+01	1.26E-04	1.95E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	-1.25E+01
Net use of fresh water	m^3	1.61E+00	1.47E-04	3.18E-01	0.00E+00	1.09E-02	0.00E+00	0.00E+00	-1.10E+01
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indicators describing output flows									
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	Indicator	Unit	Quantity
Biogenic content (H load bracket)	Biogenic carbon content in product	kg C	0.00E+00
	Biogenic carbon content in packaging	kg C	1.27E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Table 10. Environmental impact of Rail attachment profile per declared unit

Environmental impact indicators	Unit	A1	A2	A3	C1	C2	C3	C4	D
Core environmental indicators									
Global Warming Potential – total	kg CO_2 eq	2.79E+00	6.77E-04	5.27E-01	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.22E+00
Global Warming Potential – fossil	kg CO_2 eq	2.79E+00	6.76E-04	4.22E-01	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.22E+00
Global Warming Potential – biogenic	kg CO_2 eq	2.50E-03	6.57E-07	1.05E-01	0.00E+00	3.77E-05	0.00E+00	0.00E+00	1.08E-04
Global Warming Potential – land use and land use change	kg CO_2 eq	5.99E-04	6.38E-09	6.19E-05	0.00E+00	3.66E-07	0.00E+00	0.00E+00	-7.40E-07
Stratospheric ozone depletion potential	kg CFC11 eq	-1.06E-08	8.97E-11	1.76E-08	0.00E+00	5.15E-09	0.00E+00	0.00E+00	-2.17E-08
Formation potential of tropospheric ozone	kg NMVOC eq	-1.06E-08	8.97E-11	1.76E-08	0.00E+00	5.15E-09	0.00E+00	0.00E+00	-2.17E-08
Acidification potential	mol H+ eq	7.88E-03	5.14E-06	2.58E-03	0.00E+00	2.94E-04	0.00E+00	0.00E+00	-4.87E-03
Eutrophication potential – aquatic freshwater	kg P eq	2.03E-06	2.83E-08	9.47E-05	0.00E+00	1.62E-06	0.00E+00	0.00E+00	-7.07E-07
Eutrophication potential – aquatic marine	kg N eq	1.70E-03	1.35E-06	4.91E-04	0.00E+00	7.75E-05	0.00E+00	0.00E+00	-9.28E-04
Eutrophication potential – terrestrial	mol N eq	1.84E-02	1.48E-05	5.21E-03	0.00E+00	8.48E-04	0.00E+00	0.00E+00	-1.08E-02
Water deprivation potential[1]	m^3 depriv.	6.91E-01	8.20E-03	6.59E+00	0.00E+00	4.70E-01	0.00E+00	0.00E+00	-2.72E+00
Abiotic depletion potential – fossil resources[1]	MJ	2.86E+01	8.45E-03	3.58E+00	0.00E+00	4.85E-01	0.00E+00	0.00E+00	-8.56E+00
Abiotic depletion potential – non fossil resources[1]	kg Sb eq	1.00E-05	3.57E-09	3.88E-06	0.00E+00	2.05E-07	0.00E+00	0.00E+00	4.52E-10
GWP - GHG[3]	kg CO_2 eq	2.72E+00	6.66E-04	4.96E-01	0.00E+00	3.82E-02	0.00E+00	0.00E+00	-1.16E+00
Additional impact categories and indicators									
Ionising radiation[2]	kBq U-235 eq	3.08E-02	4.18E-07	5.81E-03	0.00E+00	2.39E-05	0.00E+00	0.00E+00	-1.04E-04
Particulate matter	disease inc.	1.25E-07	3.46E-11	2.89E-08	0.00E+00	1.99E-09	0.00E+00	0.00E+00	-7.80E-08
Human toxicity, non-cancer[1]	CTUh	2.17E-08	7.70E-12	7.81E-09	0.00E+00	4.42E-10	0.00E+00	0.00E+00	-4.74E-08
Human toxicity, cancer[1]	CTUh	1.09E-09	2.14E-13	1.35E-09	0.00E+00	1.22E-11	0.00E+00	0.00E+00	-4.78E-10
Eco-toxicity, freshwater[1]	CTUe	4.18E+00	5.03E-03	7.27E+00	0.00E+00	2.88E-01	0.00E+00	0.00E+00	-2.43E+01
Land use impacts	Pt	-8.19E-01	3.87E-03	1.45E+00	0.00E+00	2.22E-01	0.00E+00	0.00E+00	-2.01E+00

Other environmental information describing waste categories									
Hazardous waste disposed	kg	1.89E-08	1.36E-08	1.62E-05	0.00E+00	7.79E-07	0.00E+00	0.00E+00	-1.74E-04
Non-hazardous waste disposed	kg	6.94E-02	7.51E-05	1.74E-01	0.00E+00	4.31E-03	0.00E+00	0.00E+00	-3.31E-02
Radioactive waste disposed	kg	2.13E-10	5.83E-11	4.63E-06	0.00E+00	3.34E-09	0.00E+00	0.00E+00	-1.41E-08
Parameters describing resource use									
Primary energy resources – Non-renewable - Excluding use as raw materials	MJ	3.02E+01	9.00E-03	3.82E+00	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-9.01E+00
Primary energy resources – Non-renewable - Used as raw materials	MJ	1.71E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Non-renewable - Total	MJ	3.19E+01	9.00E-03	3.82E+00	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-9.01E+00
Primary energy resources – Renewable - Excluding use as raw materials	MJ	2.13E+00	1.64E-04	2.59E-01	0.00E+00	9.40E-03	0.00E+00	0.00E+00	2.65E-02
Primary energy resources – Renewable - Used as raw materials	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Renewable - Total	MJ	2.13E+00	1.64E-04	2.59E-01	0.00E+00	9.40E-03	0.00E+00	0.00E+00	2.65E-02
Net use of fresh water	m3	1.97E-02	1.91E-04	1.53E-01	0.00E+00	1.09E-02	0.00E+00	0.00E+00	-6.35E-02
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indicators describing output flows									
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	Indicator	Unit	Quantity
Biogenic content (Rail attachment profile)	Biogenic carbon content in product	kg C	0.00E+00
	Biogenic carbon content in packaging	kg C	3.81E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Table 11. Environmental impact of Floor pod per declared unit

Environmental impact indicators	Unit	A1	A2	A3	C1	C2	C3	C4	D
Core environmental indicators, units									
Global Warming Potential – total	kg CO_2 eq	1.36E+00	2.59E-01	1.59E-01	0.00E+00	3.88E-02	0.00E+00	1.08E+00	0.00E+00
Global Warming Potential – fossil	kg CO_2 eq	1.34E+00	2.58E-01	6.76E-03	0.00E+00	3.88E-02	0.00E+00	-6.74E-02	0.00E+00
Global Warming Potential – biogenic	kg CO_2 eq	1.34E-02	2.51E-04	1.53E-01	0.00E+00	3.77E-05	0.00E+00	1.15E+00	0.00E+00
Global Warming Potential – land use and land use change	kg CO_2 eq	4.12E-03	2.44E-06	3.86E-07	0.00E+00	3.66E-07	0.00E+00	5.75E-08	0.00E+00
Stratospheric ozone depletion potential	kg CFC11 eq	9.71E-08	3.43E-08	1.68E-09	0.00E+00	5.15E-09	0.00E+00	3.30E-09	0.00E+00
Formation potential of tropospheric ozone	kg NMVOC eq	7.97E-03	1.81E-03	2.63E-03	0.00E+00	2.72E-04	0.00E+00	1.93E-02	0.00E+00
Acidification potential	mol H+ eq	1.02E-02	1.96E-03	1.13E-04	0.00E+00	2.94E-04	0.00E+00	3.45E-04	0.00E+00
Eutrophication potential – aquatic freshwater	kg P eq	2.12E-04	1.08E-05	4.36E-07	0.00E+00	1.62E-06	0.00E+00	-1.48E-08	0.00E+00
Eutrophication potential – aquatic marine	kg N eq	2.34E-03	5.16E-04	8.31E-04	0.00E+00	7.75E-05	0.00E+00	3.80E-04	0.00E+00
Eutrophication potential – terrestrial	mol N eq	2.81E-02	5.65E-03	7.52E-04	0.00E+00	8.48E-04	0.00E+00	4.17E-03	0.00E+00
Water deprivation potential[1]	m3 depriv.	1.61E+01	3.13E+00	-2.16E-01	0.00E+00	4.70E-01	0.00E+00	-2.39E+00	0.00E+00
Abiotic depletion potential – fossil resources[1]	MJ	1.78E+01	3.23E+00	9.87E-02	0.00E+00	4.85E-01	0.00E+00	-1.15E-01	0.00E+00
Abiotic depletion potential – non fossil resources[1]	kg Sb eq	1.59E-05	1.36E-06	4.71E-08	0.00E+00	2.05E-07	0.00E+00	-1.05E-08	0.00E+00
GWP - GHG[3]	kg CO_2 eq	1.33E+00	2.54E-01	1.30E-01	0.00E+00	3.82E-02	0.00E+00	8.70E-01	0.00E+00
Additional impact categories and indicators									
Ionising radiation[2]	kBq U-235 eq	4.31E-02	1.60E-04	8.13E-05	0.00E+00	2.39E-05	0.00E+00	5.89E-07	0.00E+00
Particulate matter	disease inc.	4.46E-07	1.32E-08	3.82E-10	0.00E+00	1.99E-09	0.00E+00	-1.09E-09	0.00E+00
Human toxicity, non-cancer[1]	CTUh	3.38E-08	2.94E-09	7.60E-10	0.00E+00	4.42E-10	0.00E+00	4.92E-09	0.00E+00
Human toxicity, cancer[1]	CTUh	6.23E-09	8.16E-11	4.13E-12	0.00E+00	1.22E-11	0.00E+00	8.75E-12	0.00E+00
Eco-toxicity, freshwater[1]	CTUe	4.23E+01	1.92E+00	1.70E-01	0.00E+00	2.88E-01	0.00E+00	1.54E-01	0.00E+00
Land use impacts	Pt	3.43E+02	1.48E+00	1.34E-01	0.00E+00	2.22E-01	0.00E+00	3.75E-01	0.00E+00

Other environmental information describing waste categories									
Hazardous waste disposed	kg	2.55E-05	5.19E-06	1.69E-07	0.00E+00	7.79E-07	0.00E+00	-8.93E-08	0.00E+00
Non-hazardous waste disposed	kg	1.86E-01	2.87E-02	1.86E-01	0.00E+00	4.31E-03	0.00E+00	8.97E-01	0.00E+00
Radioactive waste disposed	kg	3.32E-05	2.23E-08	9.84E-08	0.00E+00	3.34E-09	0.00E+00	4.40E-11	0.00E+00
Parameters describing resource use									
Primary energy resources – Non-renewable - Excluding use as raw materials	MJ	1.92E+01	3.44E+00	1.05E-01	0.00E+00	5.16E-01	0.00E+00	-1.23E-01	0.00E+00
Primary energy resources – Non-renewable - Used as raw materials	MJ	2.14E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Non-renewable - Total	MJ	2.14E+01	3.44E+00	1.05E-01	0.00E+00	5.16E-01	0.00E+00	-1.23E-01	0.00E+00
Primary energy resources – Renewable - Excluding use as raw materials	MJ	7.30E+01	6.27E-02	-5.97E-03	0.00E+00	9.40E-03	0.00E+00	-6.24E-02	0.00E+00
Primary energy resources – Renewable - Used as raw materials	MJ	6.27E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Renewable - Total	MJ	7.37E+01	6.27E-02	-5.97E-03	0.00E+00	9.40E-03	0.00E+00	-6.24E-02	0.00E+00
Net use of fresh water	m3	3.75E-01	7.28E-02	-5.02E-03	0.00E+00	1.09E-02	0.00E+00	-5.56E-02	0.00E+00
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indicators describing output flows									
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	Indicator	Unit	Quantity
Biogenic content (Floor pod)	Biogenic carbon content in product	kg C	0.679080997
	Biogenic carbon content in packaging	kg C	0.0127005

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Table 12. Environmental impact of Window interface per declared unit

Environmental impact indicators	Unit	A1	A2	A3	C1	C2	C3	C4	D
Core environmental indicators									
Global Warming Potential – total	kg CO_2 eq	2.73E+01	2.54E-01	2.76E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.96E+01
Global Warming Potential – fossil	kg CO_2 eq	2.72E+01	2.54E-01	1.99E+00	0.00E+00	3.88E-02	0.00E+00	0.00E+00	-1.96E+01
Global Warming Potential – biogenic	kg CO_2 eq	5.03E-02	2.47E-04	7.72E-01	0.00E+00	3.77E-05	0.00E+00	0.00E+00	-5.26E-02
Global Warming Potential – land use and land use change	kg CO_2 eq	6.82E-02	2.40E-06	1.04E-03	0.00E+00	3.66E-07	0.00E+00	0.00E+00	-8.55E-05
Stratospheric ozone depletion potential	kg CFC11 eq	9.12E-07	3.37E-08	1.27E-07	0.00E+00	5.15E-09	0.00E+00	0.00E+00	-5.64E-07
Formation potential of tropospheric ozone	kg NMVOC eq	8.67E-02	1.78E-03	7.72E-03	0.00E+00	2.72E-04	0.00E+00	0.00E+00	-5.60E-02
Acidification potential	mol H+ eq	1.75E-01	1.93E-03	1.17E-02	0.00E+00	2.94E-04	0.00E+00	0.00E+00	-1.29E-01
Eutrophication potential – aquatic freshwater	kg P eq	8.34E-03	1.06E-05	5.63E-04	0.00E+00	1.62E-06	0.00E+00	0.00E+00	-5.76E-04
Eutrophication potential – aquatic marine	kg N eq	2.89E-02	5.07E-04	4.62E-03	0.00E+00	7.75E-05	0.00E+00	0.00E+00	-1.72E-02
Eutrophication potential – terrestrial	mol N eq	2.98E-01	5.55E-03	2.72E-02	0.00E+00	8.48E-04	0.00E+00	0.00E+00	-1.87E-01
Water deprivation potential[1]	m^3 depriv.	6.62E+01	3.08E+00	1.36E+01	0.00E+00	4.70E-01	0.00E+00	0.00E+00	-4.75E+02
Abiotic depletion potential – fossil resources[1]	MJ	2.49E+02	3.17E+00	1.67E+01	0.00E+00	4.85E-01	0.00E+00	0.00E+00	-1.07E+02
Abiotic depletion potential – non fossil resources[1]	kg Sb eq	2.10E-04	1.34E-06	2.13E-04	0.00E+00	2.05E-07	0.00E+00	0.00E+00	-6.62E-06
GWP - GHG[3]	kg CO_2 eq	2.65E+01	2.50E-01	2.57E+00	0.00E+00	3.82E-02	0.00E+00	0.00E+00	-1.91E+01
Additional impact categories and indicators									
Ionising radiation[2]	kBq U-235 eq	5.19E-01	1.57E-04	6.64E-02	0.00E+00	2.39E-05	0.00E+00	0.00E+00	-8.17E-03
Particulate matter	disease inc.	2.19E-06	1.30E-08	3.25E-07	0.00E+00	1.99E-09	0.00E+00	0.00E+00	-1.57E-06
Human toxicity, non-cancer[1]	CTUh	6.14E-07	2.89E-09	5.33E-08	0.00E+00	4.42E-10	0.00E+00	0.00E+00	-2.67E-07
Human toxicity, cancer[1]	CTUh	3.48E-08	8.01E-11	5.33E-09	0.00E+00	1.22E-11	0.00E+00	0.00E+00	-1.98E-08
Eco-toxicity, freshwater[1]	CTUe	6.66E+02	1.89E+00	7.19E+02	0.00E+00	2.88E-01	0.00E+00	0.00E+00	-9.63E+01
Land use impacts	Pt	5.31E+01	1.45E+00	3.58E+01	0.00E+00	2.22E-01	0.00E+00	0.00E+00	-4.58E+01

Other environmental information describing waste categories									
Hazardous waste disposed	kg	1.15E-04	5.10E-06	5.77E-05	0.00E+00	7.79E-07	0.00E+00	0.00E+00	7.81E-04
Non-hazardous waste disposed	kg	5.04E+00	2.82E-02	8.40E-01	0.00E+00	4.31E-03	0.00E+00	0.00E+00	-2.36E+00
Radioactive waste disposed	kg	3.31E-04	2.19E-08	3.71E-05	0.00E+00	3.34E-09	0.00E+00	0.00E+00	-1.17E-06
Parameters describing resource use									
Primary energy resources – Non-renewable - Excluding use as raw materials	MJ	2.64E+02	3.38E+00	1.79E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-1.14E+02
Primary energy resources – Non-renewable - Used as raw materials	MJ	2.14E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Non-renewable - Total	MJ	2.66E+02	3.38E+00	1.79E+01	0.00E+00	5.16E-01	0.00E+00	0.00E+00	-1.14E+02
Primary energy resources – Renewable - Excluding use as raw materials	MJ	2.68E+01	6.15E-02	1.95E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	-1.25E+01
Primary energy resources – Renewable - Used as raw materials	MJ	6.27E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Primary energy resources – Renewable - Total	MJ	2.75E+01	6.15E-02	1.95E+00	0.00E+00	9.40E-03	0.00E+00	0.00E+00	-1.25E+01
Net use of fresh water	m^3	1.59E+00	7.15E-02	3.21E-01	0.00E+00	1.09E-02	0.00E+00	0.00E+00	-1.10E+01
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indicators describing output flows									
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	Indicator	Unit	Quantity
Biogenic content (Window interface)	Biogenic carbon content in product	kg C	0.00E+00
	Biogenic carbon content in packaging	kg C	1.27E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

NOTE: The range/variability of the LCIA results if significant; the description of the range can be qualitative or quantitative.
NOTE: The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risk

[1] The results of this environmental impact indicator shall be used with care as uncertainties on these results are high or as there is limited experience with the indicator.
[2] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.
[3] This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR. The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product.

Interpretation of Results

This LCA was undertaken to evaluate the environmental impact of the Buildonix building components. Besides this, the following analysis has been undertaken, as shown in Figure 2.

The following can be summarised from this LCA study:

- Module A1 (raw material and packaging) contributes about 87% of global warming impact. The recycling benefits are the environmental benefits due to avoided production of virgin materials.
- Aluminium accounts for a significant share of the material used for the Buildonix structure. Hence, a significant share of environmental impact is expected from aluminium. In terms of materials, aluminium is the most significant contributor (83%) to the Buildonix building structure.
- In terms of components, Music components contribute about 75% of the global warming impact for the Buildonix building structure.

The results presented in this report provide an understanding of the Buildonix building components and the products' environmental impacts. Stonelake can utilise these results to minimise the environmental impact across the product lifecycle.

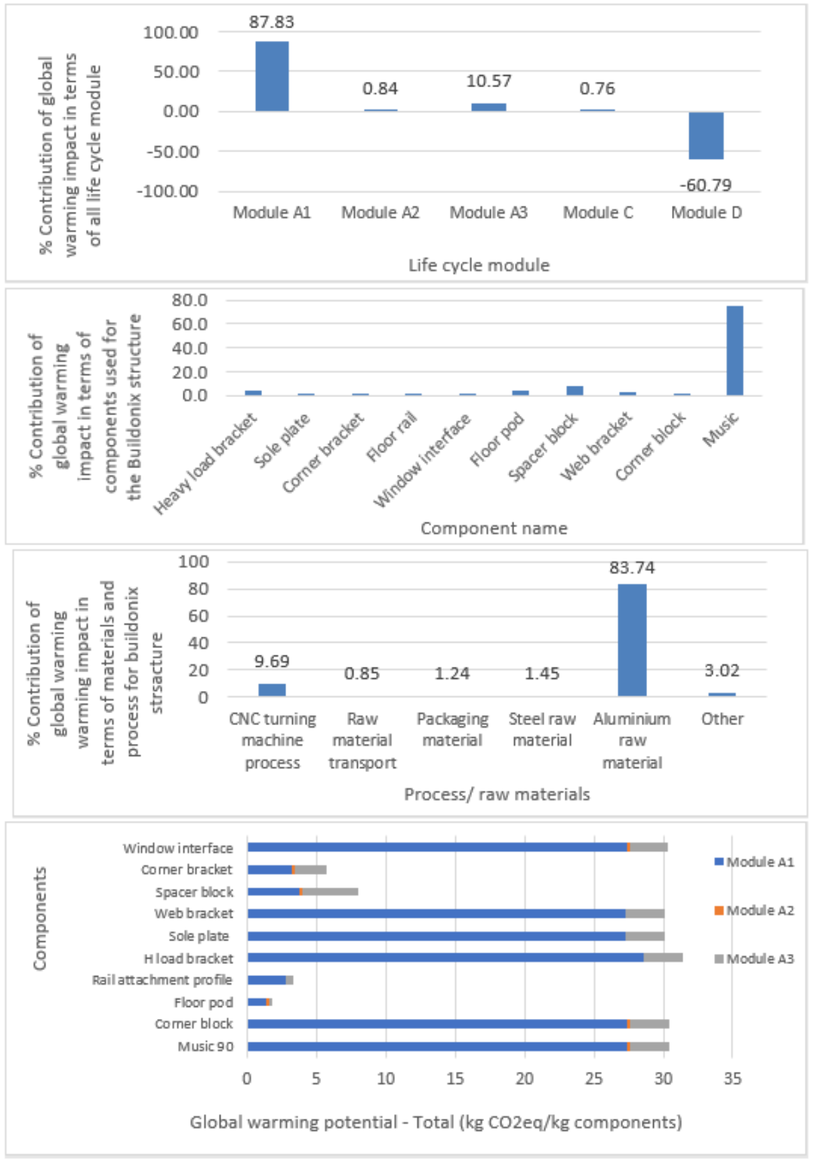

Figure 2. Contribution of climate change impact in terms of lifecycle module, in terms of materials and process, in terms of components used in the Buildonix structure and in terms of impact per kg components, respectively.

Program Information and Vertification

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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product category rules (PCR): PCR 2019:14, version 1.11 Construction Products. EPD International., 2021-02-05

PCR review was conducted by: The Technical Committee of the International EPD® System

Important Notice

The EPD owner has the sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

Declaraton Owner:

Stonelake Pty Ltd
Unit 4/9-11 Keona Circuit Coffs Harbour NSW 2450
Website: www.buildonix.com.au
Email: maurice@stonelake.com.au

EPD produced by:

GECA
Website: www.geca.eco
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Phone: 02 9699 2850

EPD Program Operator:

EPD Australasia Limited
Post: 315a Hardy Street, Nelson, New Zealand 7010
Website: www.epd-australasia.com
Email: info@epd-australasia.com

PCR Information:

PCR: PCR 2019:14, version 1.11 Construction Products. EPD International., 2021-02-05
PCR review conducted by:
The Technical Committee of the International EPD® System.

Third Party Verifier

Independent verification of the declaration and data, according to ISO 14025:
☐ EPD process certification (Internal)

☑ EPD verification (External)

Jonas Bengtsson, Edge Environment
L5, 39 East Esplanade, Manly NSW 2095 Australia.

In case of recognised individual verifiers
Approved by: EPD Australasia Limited

Procedure Follow-up

Procedure for follow-up of data during EPD validity involves third party verifier:
☑ Yes ☐ No

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