

Alubond® U.S.A
Fire Retardant Metal Composites

VERIFIED by SCS Global Services
ENVIRONMENTAL PRODUCT DECLARATION
BASED ON LCA

Declaration Owner
Eurocon Building Industries F.Z.E.
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Products
Alubond® A2 and FR Panels

Functional Unit
1 m^2 of sandwich panel

EPD Number and Period of Validity
SCS-EPD-10008
EPD Valid: April 22, 2025 through April 21, 2030

Product Category Rule
International EPD Product Category Rule for Construction Products, 2019:14, v1.3.4, 2024.04.30

Program Operator
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SCSglobal SERVICES

Declaration owner:	Eurocon Building Industries F.Z.E.
Address:	Plot 2E-03, 2E-08, Hamriyah Freezone, Sharjah, UAE
Declaration Number:	SCS-EPD-10008
Declaration Validity Period:	EPD Valid: April 22, 2025 through April 21, 2030
Program Operator:	SCS Global Services, 2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
General Program Instructions:	SCS Type III Environmental Declaration Program: Program Operator Manual. V11.0
Product(s):	Alubond® A2 and FR Panels
Declared Unit or Functional Unit:	One square meter of sandwich panels
Product's Intended Application and Use:	For use as insulated cladding in commercial buildings.
Product RSL (if applicable):	20 years
Markets of Applicability:	Global
EPD Type:	Product specific
EPD Scope:	Cradle to Grave
Year(s) of Reported Manufacturer Primary Data:	2023
LCA Software & Version Number:	OpenLCA 2.1.1
LCI Database(s) & Version Number:	Ecoinvent 3.10
LCIA Methodology & Version Number:	EN15804 + A2 Method
Reference PCR:	International EPD Product Category Rule for Construction Products, 2019:14, v1.3.4, 2024.04.30
Reference PCR Review:	PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
LCA Practitioner:	Millicent Gabriel, SCS Global Services
Independent critical review of the LCA and data, according to ISO 14044 and the PCR:	☐ internal ☒ external
LCA Reviewer:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Independent verification of the declaration and data, according to ISO 14025 and the PCR:	☐ internal ☒ external
EPD Verifier:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
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Disclaimers: *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.*

Conformity: *This EPD conforms to ISO 14025:2006, and EN 15804:2012+A2:2019/AC:2021*

Ownership: *The EPD owner has the sole ownership, liability, and responsibility of the EPD.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of environmental performance using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR. Full conformance with this PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences in results for upstream or downstream of the life cycle stages declared.*

The owner of the declaration shall be liable for the underlying information and evidence; SCS shall not be liable with respect to manufacturer information, life cycle assessment data, and evidence supplied or made available to SCS.

1. About Alubond® from Eurocon Building Industries

Alubond® is an Aluminum Composite Panels (ACP) and Metal Composite Material (MCM) brand owned by Mulk Holdings International. The company has emerged as one of the world's largest ACP and MCM Brands with a 25 million m^2 manufacturing and processing capacity from its various facilities in UAE, Oman, Serbia, India and Turkey.

Alubond® offers a full range of Fire Rated Metal Panels including Solid Aluminum, FR-A1 Mineral Core, FR-A2 Mineral Core, FR Euroclass B and various other panels like Exotic Metal Panels in a choice of metal skins like Galvanized Steel, Stainless Steel, Copper, Bronze and Titanium.

In addition to the production of metal composites, the company also has complete backward and forward integrated manufacturing facilities producing different grades of fire-retardant mineral cores and granules, fire rated bonding adhesives, color coated coils, and custom paints. Detailed product specifications and performance results can be found at the manufacturer's website: https://Alubond.com/

2. Product

2.1 PRODUCT DESCRIPTION

Alubond® products A2 and FR are double aluminum skin metal faced sandwich panels designed for industrial settings and intended to be installed in commercial buildings such as airports, stadiums, healthcare and hospitality sector facilities.

The aluminum skins are sandwiched with a mineral filled, flame retardant core material in a continuous co-extrusion process. Alubond® A2, Eurocon's non-combustible aluminum composite panel, achieves an A2 class 0 rating for their fire rated mineral core while Eurocon's Alubond® FR composite panels achieve a B class 0 fire rating when tested in accordance with European Standard EN 13501-1. The outer aluminum skin for exterior grade Alubond® panels are coated with PVDF Kynar 500 fluorocarbon coatings providing thermal stability. The lower aluminum skin is chromate treated and polyester coated. Alubond® A2 and FR panels are available in 4 mm and 6 mm thicknesses.

2.2 PRODUCT SPECIFICATION

Alubond® products belong to the Wall Panels specification code, CSI code 07 42 13.19 (Insulated Metal Wall Panels) and the following UNSPSC codes:

- 30150000 (Exterior finishing materials)
- 30151500 (Roofing materials)
- 30151514 (Metal roof tile)
- 30151601 (Roof Fascias)
- 30151602 (Flashings)
- 30151608 (Soffits)
- 30151800 (Siding and exterior wall materials)
- 30151900 (Finishing materials and products)
- 30151902 (Canopy)
- 30151903 (Structural canopy)
- 30152000 (Fencing)
- 30152001 (Metal fencing)

2.3 APPLICATION

The Alubond® A2 and FR panel products provide the primary function of providing thermally insulated facades for various commercial building applications. These aluminum composite panels are intended to be laid with overlapping edges in roofs, outer walls, wall paneling, walls, and suspended ceilings inside the building envelope with insulating materials in the core that act as a barrier against the transmission of heat.

2.4 TECHNICAL DATA

Table 1. *Technical specification for the Alubond® products in this study.*

Property	Unit	Alubond A2 (4 mm)	Alubond A2 (6 mm)	Alubond FR (4 mm)	Alubond FR (6 mm)
Density of the insulation	kg/m^3	1760	1760	1500	1500
Total product thickness	mm	4	6	4	6
Thickness of insulation core	mm	3	5	3	5
Thickness of each outer layer	mm	0.5	0.5	0.5	0.5
Section modulus (W) according to DIN 53293	cm^3/m	1.62	1.62	1.62	1.62
Rigidity (Poisson's ratio μ = 0.3) according to DIN 53294	KN cm^2/m	2300	2300	2300	2300
Temper according to EN 515	...	H16/H18	H16/H18	H16/H18	H16/H18
Flexibility according to ASTM D 4145	T	2T	2T	2T	2T
Impact resistance according to ASTM D 732	psi	4092 psi (28.2 Mpa)	4092 psi (28.2 Mpa)	4092 psi (28.2 Mpa)	4092 psi (28.2 Mpa)
Modulus of elasticity according to EN 1999 1-1	N/mm^2	≥70000	≥70000	≥70000	≥70000
Tensile strength of aluminum according to EN 485-2	N/mm^2	$R_m \geq 135$	$R_m \geq 135$	$R_m \geq 135$	$R_m \geq 135$
0.2% Proof stress according to EN 485-2	N/mm^2	$R_{po} \geq 85$	$R_{po} \geq 85$	$R_{po} \geq 85$	$R_{po} \geq 85$
Elongation according to EN 485-2	%	$A_{50} \geq 6$	$A_{50} \geq 6$	$A_{50} \geq 6$	$A_{50} \geq 6$
Linear thermal expansion according to ASTM D 696	mm/mm @100ºC	2.4º10^{-6}min	2.4º10^{-6}min	2.4º10^{-6}min	2.4º10^{-6}min
Fire rating of core according to EN 13501-1:2007+A1:2009 Clause 8 & NFPA 285/BS6853	Class 0	Class A2-s1, d0 Passed	Class A2-s1, d0 Passed	Class B2 Passed	Class B2 Passed
Type of finish	...	PVDF	PVDF	PVDF	PVDF
Gloss retention according to ASTM D 523-89	80% after 4000 hours	Passed	Passed	Passed	Passed
Gloss @60ºC according to ECCA T2	%	20-35	20-35	20-45	20-45
Color retention according to ASTM D 2244-89	Max rating 5 units after 4000 hours	Passed	Passed	Passed	Passed
Color change @-20ºC and @80ºC according to ATI, YORK USA	No visible change	Passed	Passed	Passed	Passed
Delaminating @-20ºC and @80ºC according to ATI, YORK USA	No delamination	Passed	Passed	Passed	Passed
Pencil hardness according to ECCA T4	...	Min HB	Min HB	Min HB	Min HB
Thermal resistance R according to DIN 52612	M^2 K/W	0.003	0.003	0.0103	0.0103
Temperature resistance	ºC	-50...+80	-50...+80	-50...+80	-50...+80
Deflection temperature according to ASTM D 648	...	119 min	119 min	116 min	116 min
Sound absorption factor according to ISO 354	...	0.05	0.05	0.05	0.05
Sound transmission loss (Rw) according to ASTM E90	dB	STC: 26 OITC:22	STC: 26 OITC:22	STC: 26 OITC:22	STC: 26 OITC:22
French VOC regulation	...	A+	A+	A+	A+

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Property	Unit	Alubond A2 (4 mm)	Alubond A2 (6 mm)	Alubond FR (4 mm)	Alubond FR (6 mm)
French CMR components; Italian CAM components	...	Passed	Passed	Passed	Passed
ABG	...	Passed	Passed	Passed	Passed
Belgian regulation	...	Passed	Passed	Passed	Passed
Indoor Air Comfort GOLD	...	Passed	Passed	Passed	Passed
Formaldehyde emission class	...	E1	E1	E1	E1
Adhesive dry according to ASTM D 3359	No change	Passed	Passed	Passed	Passed
Adhesive wet according to ASTM D 3359	No change 37.8ºC 24 hrs	Passed	Passed	Passed	Passed
Boiling water (method 8) according to ASTM D 3359	No change 100ºC 60 min	Passed	Passed	Passed	Passed
Abrasive resistance according to ASTM D 968-81	> 50 ltr/mils	Passed	Passed	Passed	Passed
Salt spray resistance according to ASTM B 117-85	Up to 3000 hrs	Passed	Passed	Passed	Passed

2.5 DELIVERY STATUS

Table 2. *Product delivery information for the Alubond® products in this study.*

Property	Unit	Alubond A2 (4 mm)	Alubond A2 (6 mm)	Alubond FR (4 mm)	Alubond FR (6 mm)
Weight of the product	kg/m^2	8	11.5	7.2	10.2
Density of the insulation	kg/m^3	1760	1760	1500	1500
Total product thickness	mm	4	6	4	6
Thickness of insulation core	mm	3	5	3	5
Aluminum skin thickness (top/bottom)	mm	0.5	0.5	0.5	0.5
Standard diagonal length	mm	2500	2500	2500	2500
Side straightness	% of length	< 0.5	< 0.5	< 0.5	< 0.5

3. Methodological Framework

3.1 FUNCTIONAL UNIT

According to ISO 14044, the functional unit is "the quantified performance of a product system, for use as a reference unit." The functional unit for the Alubond® A2 and FR panels is defined as 1 m^2 of sandwich panels.

Table 3. *Functional unit for the Alubond® A2 and FR products.*

Property	Unit	Alubond A2 (4 mm)	Alubond A2 (6 mm)	Alubond FR (4 mm)	Alubond FR (6 mm)
Declared Functional Unit	m^2	1	1	1	1
Weight of the product	kg/m^2	8	11.5	7.2	10.2
Total product thickness	mm	4	6	4	6

3.2 SYSTEM BOUNDARY

The scope of the EPD is cradle-to-grave, including raw material extraction and processing, transportation, product manufacture, product delivery, installation, maintenance, and product disposal. The life cycle phases included in the EPD scope are described in Table 4 and Figure 2.

Table 4. *System boundary for Alubond® products.*

	Production			Construction		Use							End-of-life				Resource Recovery
	A1	A2	A3	A4	A5	B1	B1	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	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
Module Declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	GLO	GLO	UAE	GLO		GLO							GLO				GLO
Share of Specific Data	>90%			>90%		-	-	-	-	-	-	-	-	-	-	-	-

X = Module Included | MND = Module Not Declared

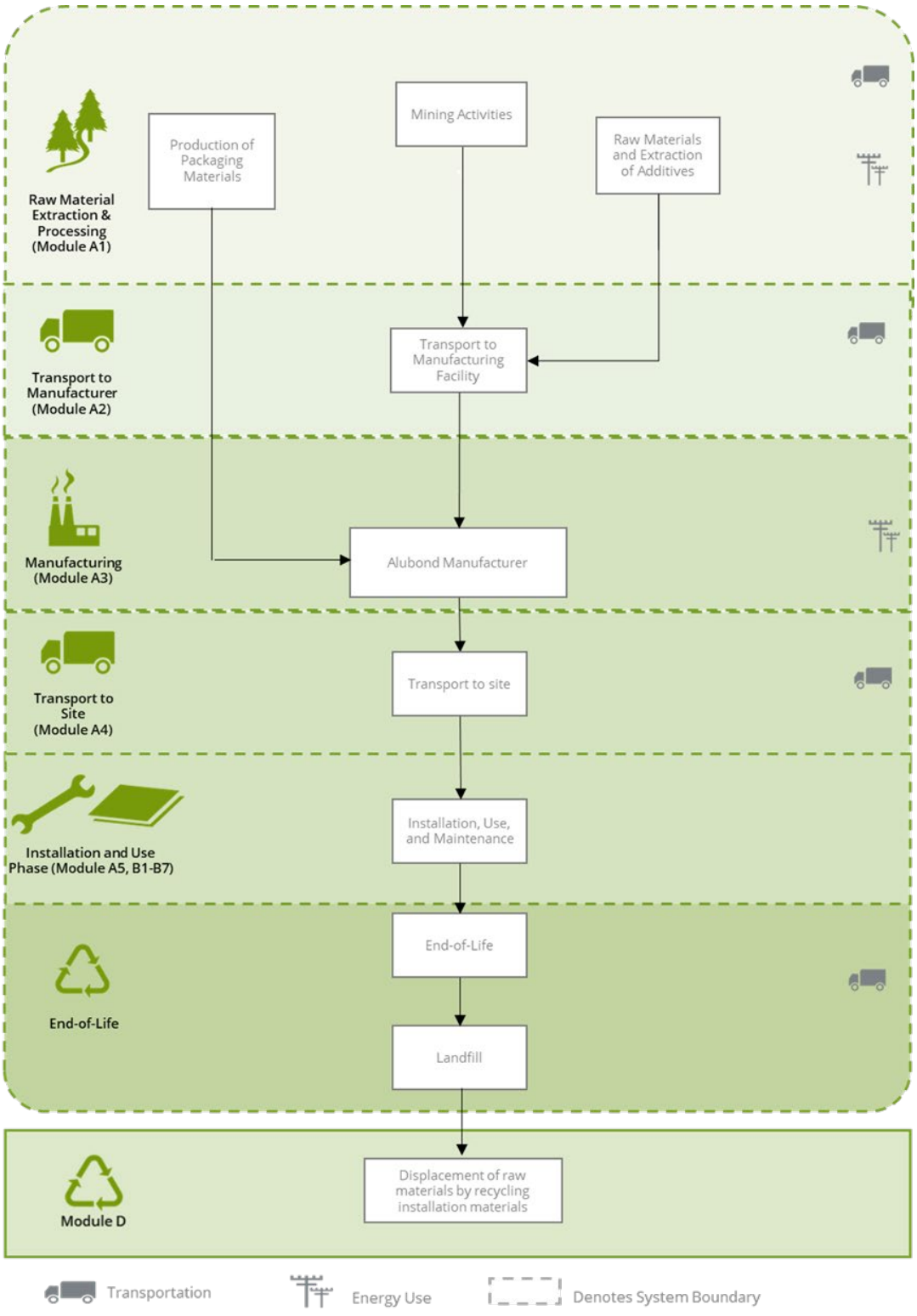


Figure 1. *System boundaries for the life cycle of the Alubond® panel products.*

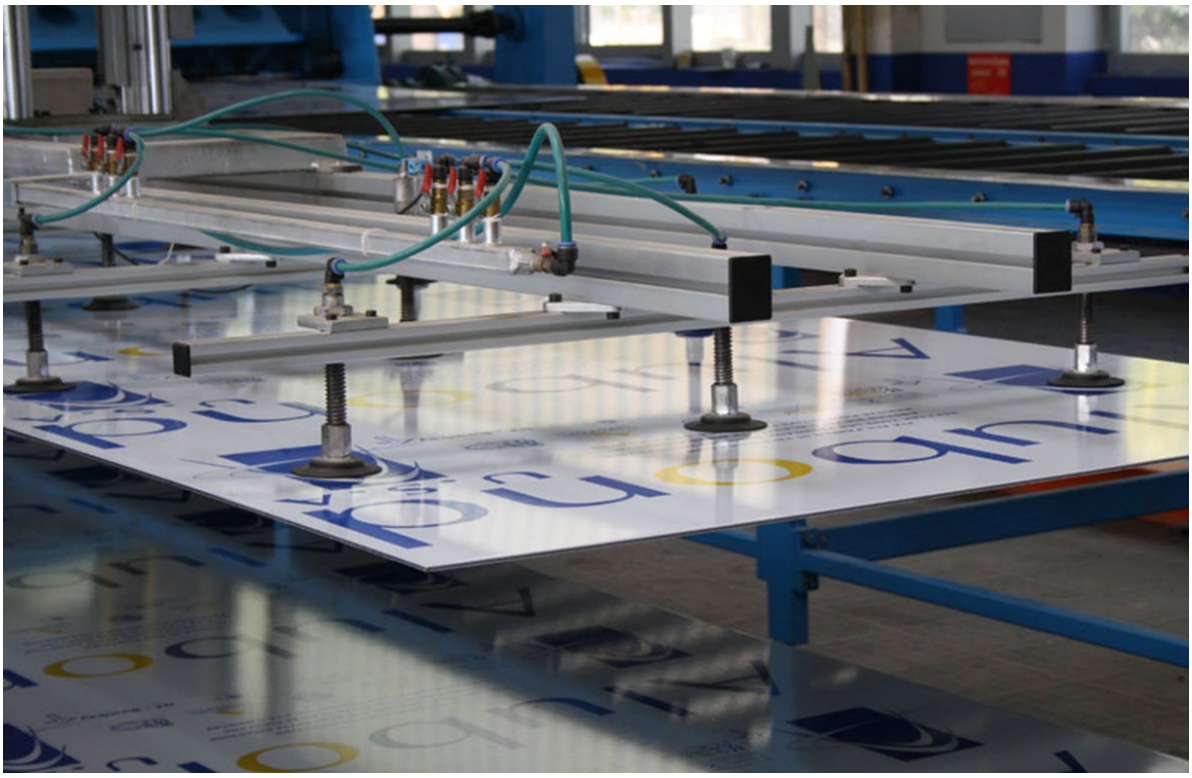


Figure 2. *Alubond® panel manufacturing process*

3.3 ALLOCATION PROCEDURES

This study follows the allocation guidelines of ISO 14044 and sought to minimize the use of allocation wherever possible. In general, manufacturing facilities may produce multiple products, and in such cases it is necessary to divide the environmental impacts between the different products. The PCR require the use of mass or other physical relationships (e.g., mass, volume) for allocation of multi-input and output processes. Resource and electricity use for the manufacturing facility was allocated using a mass-based approach, based on the total production of finished products at the facility as provided by the Sharjah facility. The materials for each product covered in this report are listed in detail in Table 5.

The secondary databases used for the product system apply allocation based primarily on physical relationships (e.g., volume, energy content, or mass-based relationships). Impacts from the transportation, including product distribution to the installation site, were allocated based on the mass of material and distance transported.

3.4 CUT-OFF RULES

According to the PCR, at least 95% of the total environmental impacts per module shall be included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No known flows are deliberately excluded from this EPD.

Capital equipment, construction and infrastructure were excluded from the system boundary as these are assumed to have a negligible impact on environmental effects due to the general long lifetime of the manufacturing buildings and capital equipment.

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3.5 ESTIMATES AND ASSUMPTIONS

- Specific data were not available on proprietary materials for the Alubond® cores in the product recipe. Secondary datasets were used from the Ecoinvent database.
- Final product distribution is modeled with a scenario of transport to Europe. A distance of 11,255 km by container ship as modeled by shipment from Sharjah, UAE to Paris, France. A transport distance of 125 km by truck was used to account for land transport.
- Installation of the products is assumed to be manual, requiring no additional energy use beyond hand held power tools.
- Product waste from installation is assumed to be 0%.
- The recovery and recycling rate for aluminum is assumed to be 95% per UL PCR Part B: Aluminum Construction Product EPD Requirements v2 (Feb 16, 2022).
- Transport of the packaging waste at installation is assumed to be 100 km by truck.
- Packaging waste is assumed to be disposed in a landfill.
- The Reference Service Life (RSL) of the products was modeled as 20 years as recommended by the manufacturer.
- The Estimated Service Life (ESL) of the building/construction works was assumed to be 75 years, as required by the SCS General Program Manual, in order to be consistent with ASHRAE 189.1 (2014, Section 9.5.1).
- The product is assumed to require no repair or refurbishment over its service life.
- According to the manufacturer, the product requires cleaning twice per year using a soap and water solution.
- The product requires no operational energy or operational water usage during its service life.
- Transport of the product at end-of-life to waste processing and disposal is assumed to be 100 km by truck.
- For the product end-of-life, disposal of product is assumed to be in a landfill.

3.6 DATA SOURCES

The life cycle inventory (LCI) of each unit process comprises material and energy inputs, emissions, and wastes. Primary data, as well as datasets from commercial LCI databases are used to model each unit process within the product system and include data quantifying the elementary and technology flows necessary to calculate environmental impacts in the LCIA phase. These include the following general types of data:

- Inputs from nature: biotic and abiotic resources
- Inputs from the technosphere: ancillary materials, services such as waste management and transport, energy inputs, etc.; and
- Outputs to nature: emission to air, water, and soil.

To the extent available, primary data are used for foreground processes (e.g., product manufacturing), while background processes are modeled using secondary data sourced from the Ecoinvent 3.10 LCI databases with a bias towards the most recent and representative data.

Unit processes were developed with the OpenLCA v2.1.1 LCI model, drawing data from multiple sources. Primary data were provided by Eurocon for the manufacturing facility in Sharjah, United Arab Emirates. The principal source of secondary LCI data is the Ecoinvent database. The datasets used in the LCA model to represent the manufacture of the Eurocon Building Industries Alubond® A2 and FR panels are shown in Table 5. Please note the emissions factor for the purchased electricity used during the manufacturing of Alubond® panels within the United Arab Emirates is reported as 0.624 kg CO_2 eq/kWh, using calculated using the electricity dataset show in Table 5 using the GWP-GHG indicator.

Table 5. *LCI datasets and associated databases used to model the Alubond® products.*

Component	Dataset	Geography	Data Source	Publication Date
Product				
A2 Core	Proprietary	RoW	EcoInvent 3.10	2023
FR Core	Proprietary	RoW	EcoInvent 3.10	2023
Adhesive Film	market for packaging film, low density polyethylene | packaging film, low density polyethylene | Cutoff, U - GLO	GLO	EcoInvent 3.10	2023
Protective Film	packaging film production, low density polyethylene | packaging film, low density polyethylene | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
PVDF Paint	polyvinylfluoride production, emulsion polymerisation | polyvinylfluoride, emulsion polymerised | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
PE Paint	acrylic dispersion production, product in 65% solution state | acrylic dispersion, without water, in 65% solution state | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Aluminum Coil	market for sheet rolling, aluminium | sheet rolling, aluminium | Cutoff, U - GLO	GLO	EcoInvent 3.10	2023
Packaging				
Plywood	plywood production | plywood | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
White Wood (Pine)	sawing and planing, paraná pine, kiln dried | sawnwood, paraná pine, dried (u=10%) | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
PET Strips	polyethylene terephthalate production, granulate, amorphous | polyethylene terephthalate, granulate, amorphous | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Nails 5"	wire drawing, steel | wire drawing, steel | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Nails 4"	wire drawing, steel | wire drawing, steel | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Transport				
Truck Transport	market for transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Container Ship Transport	market for transport, freight, sea, container ship | transport, freight, sea, container ship | Cutoff, U - GLO	GLO	EcoInvent 3.10	2023
Manufacture Inputs				
Electricity	electricity voltage transformation from high to medium voltage | electricity, medium voltage | Cutoff, U - AE	AE	EcoInvent 3.10	2023
Natural Gas	heat production, natural gas, at industrial furnace >100kW | heat, district or industrial, natural gas | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Diesel	market for diesel | diesel | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Water	market for tap water | tap water | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Installation Materials				
G.I. Nut & bolt M8 x 25 with double washer	wire drawing, steel | wire drawing, steel | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
M8 x 65 Anchor bolt with single washer	wire drawing, steel | wire drawing, steel | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Runners	section bar extrusion, aluminium | section bar extrusion, aluminium | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
0.8mm U- channel (18mmx18mmx18mm)	section bar extrusion, aluminium | section bar extrusion, aluminium | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Fixing Screw PH # 10x19	wire drawing, steel | wire drawing, steel | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Sealant	market for polysulfide, sealing compound | polysulfide, sealing compound | Cutoff, U - GLO	GLO	EcoInvent 3.10	2023
Rockwool	market for glass wool mat | glass wool mat | Cutoff, U - GLO	GLO	EcoInvent 3.10	2023
Siderise - Lametherm 120	market for glass wool mat | glass wool mat | Cutoff, U - GLO	GLO	EcoInvent 3.10	2023
Maintenance				
Water	market for tap water | tap water | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Soap	cottonseed oil refinery operation | soap | Cutoff, U - US	US	EcoInvent 3.10	2023
Waste Outputs				
Wastewater	market for wastewater, average | wastewater, average | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Wood Waste	market for waste wood, untreated | waste wood, untreated | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023
Inert Waste	market for inert waste, for final disposal | inert waste, for final disposal | Cutoff, U - RoW	RoW	EcoInvent 3.10	2023

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3.7 DATA QUALITY

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

Table 6. *Data quality assessment for the Alubond® products.*

Data Quality Parameter	Data Quality Discussion
Time-related Coverage: Age of data and the minimum length of time over which data is collected	The manufacturer provided primary data on product manufacturing for the Sharjah, UAE facility on an annual production scale for 2023. Representative datasets (secondary data) for upstream and background processes are generally less than 5 years old.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Electricity use for product manufacture is modeled using representative data modelled for the specific electricity grids represented in this study. Surrogate data used in the assessment are representative of global or European operations and are considered sufficiently similar to actual processes.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative component datasets, specific to the type of material, are used to represent the actual processes, as appropriate.
Precision: Measure of the variability of the data values for each data expressed	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the products. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represents typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards Ecoinvent v3.10 data where available. Different portions of the product life cycle are equally considered.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of the data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data: Description of all primary and secondary data sources	Data representing energy use at the Sharjah, UAE facility represent a 12-month average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. For secondary LCI data, Ecoinvent v3.10 data are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the products and packaging is low. Actual supplier data for upstream operations was not available for all suppliers and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years) but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment methodology includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

3.8 PERIOD UNDER REVIEW

The period of review is calendar year 2023.

3.9 GEOGRAPHIC REPRESENTATIVENESS

The Alubond® products are manufactured at the Eurocon Building Industries facility in Sharjah, United Arab Emirates. Transportation of final products is assumed to include truck transportation and shipping container transportation ranging throughout the globe.

3.10 COMPARABILITY AND BENCHMARKING

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.

3.11 UNITS

All data and results are presented using SI units.

4. Technical Information and Scenarios

4.1 MATERIAL COMPOSITION AND PACKAGING

Table 7. *Material composition summary for Alubond® A2 (4 mm) panels.*

Raw Materials	Recycled Content (%)	Mass Input (kg)	Mass Final Product (kg)	Percent of Product (%)
Aluminum Coil	45.0	2.73	2.55	32.0
Mineral Core	0.00	5.30	4.96	62.0
Adhesive Film	30.0	0.150	0.140	2.00
Polyethylene Protective Film	30.0	7.20×10^{-2}	7.00×10^{-2}	1.00
PVDF Paint	0.00	0.264	0.250	3.00
PE Paint	0.00	1.05×10^{-2}	1.00×10^{-2}	0.123
Total:		**8.53**	**8.00**	**100%**
Biogenic Carbon Content in Product:			0.00 kg C	
Packaging			**Mass (kg)**	**Packaging (%)**
Plywood			1.24×10^{-2}	23.0
White Wood (Pine)			4.12×10^{-2}	76.0
PET Strips			1.88×10^{-4}	0.35
Nails 5"			2.16×10^{-4}	0.40
Nails 4"			1.38×10^{-4}	0.25
Total:			**5.42×10^{-2}**	**100%**
Biogenic Carbon Content in Packaging:			8.80×10^{-2} kg C	

Table 8. *Material composition summary for Alubond® A2 (6 mm) panels.*

Raw Materials	Recycled Content (%)	Mass Input (kg)	Mass Final Product (kg)	Mass Final Product (%)
Aluminum Coil	45.0	2.73	2.61	23.0
Mineral Core	0.00	8.83	8.45	73.0
Adhesive Film	30.0	0.150	0.140	1.00
Polyethylene Protective Film	30.0	$7.20x10^{-2}$	$7.00x10^{-2}$	1.00
PVDF Paint	0.00	0.264	0.250	2.00
PE Paint	0.00	$1.05x10^{-2}$	$1.00x10^{-2}$	0.100
Total:		**12.1**	**11.6**	**100%**
		Biogenic Carbon Content in Product:	0.00 kg C	
Packaging			**Mass (kg)**	**Mass Packaging (%)**
Plywood			$2.49x10^{-2}$	23.0
White Wood (Pine)			$8.25x10^{-2}$	76.0
PET Strips			$3.77x10^{-4}$	0.35
Nails 5"			$4.32x10^{-4}$	0.40
Nails 4"			$2.76x10^{-4}$	0.25
Total:			**0.108**	**100%**
		Biogenic Carbon Content in Packaging:	0.176 kg C	

Table 9. *Biogenic composition for Alubond® FR (4 mm) panels.*

Raw Materials	Recycled Content (%)	Mass Input (kg)	Mass Final Product (kg)	Mass Final Product (%)
Aluminum Coil	45.0	2.73	2.53	35.0
Mineral Core	0.00	4.50	4.17	58.0
Adhesive Film	30.0	0.150	0.140	2.00
Polyethylene Protective Film	30.0	$7.20x10^{-2}$	$7.00x10^{-2}$	1.00
PVDF Paint	0.00	0.264	0.240	3.00
PE Paint	0.00	$1.05x10^{-2}$	$1.00x10^{-2}$	0.100
Total:		**7.73**	**7.20**	**100%**
		Biogenic Carbon Content in Product:	0.00 kg C	
Packaging			**Mass (kg)**	**Mass Packaging (%)**
Plywood			$1.24x10^{-2}$	23
White Wood (Pine)			$4.12x10^{-2}$	76
PET Strips			$1.88x10^{-4}$	0.35
Nails 5"			$2.16x10^{-4}$	0.40
Nails 4"			$1.38x10^{-4}$	0.25
Total:			**$5.42x10^{-2}$**	**100%**
		Biogenic Carbon Content in Packaging:	$8.80x10^{-2}$ kg C	

Table 10. *Biogenic composition for Alubond® FR (6 mm) panels.*

Raw Materials	Recycled Content (%)	Mass Input (kg)	Mass Final Product (kg)	Mass Final Product (%)
Aluminum Coil	45.0	2.73	2.59	25.0
Mineral Core	0.00	7.50	7.11	70.0
Adhesive Film	30.0	0.150	0.140	1
Polyethylene Protective Film	30.0	$7.20x10^{-2}$	$7.00x10^{-2}$	1
PVDF Paint	0.00	0.264	0.250	2.00
PE Paint	0.00	$1.05x10^{-2}$	$1.00x10^{-2}$	0.100
Total:		**10.7**	**10.2**	**100%**
		Biogenic Carbon Content in Product:	0.00 kg C	
Packaging			**Mass (kg)**	**Mass Packaging (%)**
Plywood			$2.49x10^{-2}$	23.0
White Wood (Pine)			$8.25x10^{-2}$	76.0
PET Strips			$3.77x10^{-4}$	0.35
Nails 5"			$4.32x10^{-4}$	0.40
Nails 4"			$2.76x10^{-4}$	0.25
Total:			**0.108**	**100%**
		Biogenic Carbon Content in Packaging:	0.176 kg C	

4.2 MANUFACTURING

The Eurocon Building Industries Alubond® panels are manufactured in Sharjah within the United Arab Emirates. Within this facility the Alubond® panels are manufactured, assembled and packaged. The manufacturer provided primary data over a span of twelve months covering facility production, resource use, electricity consumption, and waste generation. Electricity consumption is modeled using Ecoinvent datasets for the regional resource mix with the closest match to the facility.

4.3 TRANSPORTATION

Eucoron Building Industries is a global corporation with Alubond® panel clients around the world. In this report transportation distance from the manufacturing facility to installation is modeled as transport from the manufacturing site in Sharjah, UAE to Paris, France. Total transport distances by truck are assumed to be 125 km. Transport by ocean freighter is modeled as leaving a shipping port in Abu Dhabi for a port in Le Havre, France. Modeling parameters for product distribution, by transport mode and distance, are summarized in Table 11.

Table 11. *Distribution transportation summary for Alubond® A2 and FR panel products.*

Name	Unit	Alubond A2 (4 mm)	Alubond A2 (6 mm)	Alubond FR (4 mm)	Alubond FR (6 mm)
Vehicle type	-	Truck	Truck	Truck	Truck
Fuel type	-	Diesel	Diesel	Diesel	Diesel
Liters of fuel	l/100km	4.68	4.68	4.68	4.68
Transport distance	km	125	125	125	125
Capacity utilization	%	-	-	-	-
Gross density of products transported	kg/m^3	-	-	-	-
Capacity utilization volume factor	-	1	1	1	1
Gross mass of products transported including packaging	kg	8.05	11.6	7.20	10.2

4.5 INSTALLATION

The installation of Alubond® panels is completed using prefabricated cassette fasteners. Waste generated from the disposal of the packaging material is modeled as required in the PCR. Table 12 summarizes the modeling parameters for Alubond® panel installation.

Table 12. *Installation summary for Alubond® panel products.*

Name	Unit	Value
Ancillary materials	kg	13.5
Net freshwater consumption specified by water source and fate	m^3	0
Other resources	kg	0
Electricity consumption	kwh	0.35
Other energy carriers	MJ	0
Product loss per functional unit	kg	0
Waste materials at the construction site before waste processing, generated by product installation	kg	0
Output materials resulting from on-site waste processing	kg	0
Mass of packaging waste specified by type		
Recycle	kg	0
Landfill	kg	$5.42x10^{-2}$
Incineration	kg	0
Biogenic carbon contained in packaging	kg CO_2	$8.80x10^{-2}$
Direct emissions to ambient air, soil, and water	kg	0
VOC emissions	$\mu g/m^3$	0

4.6 REFERENCE SERVICE LIFE AND ESTIMATED BUILDING SERVICE LIFE

No repairs of the product are required, as indicated by the manufacturer. The Reference Service Life (RSL) of the product is 20 years. During the Estimated Service Life (ESL) of 75 years the product will have to be replaced 2.75 times, detailed in Table 13.

Table 13. *Reference Service Life (RSL) summary for Alubond® panel products.*

Replacement	Unit	Value
Reference Service Life	Years	20
Number of Replacements	-	2.75
Energy input	kWh	0.963
Net freshwater consumption	m^3	0
Ancillary materials	kg	37.4
Replacement of materials	kg	-
Direct emissions to ambient air, soil, and water	kg	0

4.7 PRODUCT USE

Typical maintenance involves surface cleaning with soapy water twice a year, as specified by the manufacturer. Table 14 provides the relevant information for the maintenance of Alubond® panels over the RSL.

Table 14. *Maintenance summary for Alubond® panel products.*

Maintenance	Unit	Reference Service Life (20 years)	Estimated Service Life (75 years)
Description of process	-	Soapy water wash twice a year	Soapy water wash twice a year
Maintenance cycle	-	40	150
Freshwater consumption *(Tap Water)*	mL	400	1500
Ancillary materials			
Soap (kg)	kg	$2.92x10^{-3}$	$1.09x10^{-2}$
Other resources	kg	0	0
Energy input	kWh	0	0
Other energy carriers	kWh	0	0
Power output of equipment	kW	0	0
Waste materials from maintenance	kg	0.403	1.51
Direst emissions to ambient air, soil, and water	kg	0	0
Further assumptions for scenario development	-	1% soap solution	1% soap solution

4.8 END-OF-LIFE

Impacts for deconstruction and dismantling processes (Module C1) were not applicable to this study as it is a manual process with hand tools and does not require energy for the removal of the product. Transport of the waste material at end-of-life is assumed to be 100 km. Module C3 (Waste Processing) is not applicable to this study as the end-of-life disposal is assumed to be 100% landfilled with a transportation distance of 100 km from the installation site to landfill. Module C4 represents the typical disposal of Alubond® panels. Table 15 summarizes the relevant information for the end-of-life of Alubond® panels within the system boundaries.

Table 15. *End-of-Life summary for Alubond® panel products.*

End-of-life		Unit	A2 (4 mm)	A2 (6 mm)	FR (4 mm)	FR (6 mm)
Collection process	Collected separately	kg	0.00	0.00	0.00	0.00
	Collected with mixed construction waste	kg	8.05	11.6	7.20	10.2
Disposition	Reuse	kg	0.00	0.00	0.00	0.00
	Recycling	kg	0.00	0.00	0.00	0.00
	Energy recovery	kg	0.00	0.00	0.00	0.00
	Landfill	kg	8.05	11.6	7.20	10.2

4.9 RECYCLED AND RECOVERED MATERIAL

According to EN 15804+A2, potential benefits as a direct result of recycling, reuse or energy recovery from a product occurring beyond a building's life cycle where said product is installed can be declared in an additional module known as Module D. In this case, the virgin aluminum runners and U-channels used for the Alubond® panel installation can be recycled at the product's end of life. The recycling of these materials is assumed to offset a portion of the burdens of virgin aluminum production.

The Module D calculations methods are taken from EN 15804:2012+A2:2019 and the end of life recycling rates necessary for these calculations are taken from the UL PCR Part B: Aluminum Construction Product EPD Requirements. The recycled content is assumed to be 0% for the aluminum runners and U-channels based on the primary data.

5. LCA: Results

Results of the Life Cycle Assessment are presented below. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. All LCA results are stated to three significant figures in agreement with the PCR and therefore the sum of the total values may not exactly equal 100%.

The impact indicators specified by the PCR include:

- Potential for Global Warming,
- Acidification Potential,
- Eutrophication Potential,
- Ozone Depletion Potential,
- Photochemical Oxidant (smog) Creation Potential.
- Abiotic Depletion Potential, and
- Water Use Deprivation Potential

Impact category indicators are estimated using the characterization factors, as prescribed by the PCR, from methodologies defined by EN 15804 reference package based on EF v3.1. Results reported in MJ are calculated using lower heating values. Additional LCIA indicators allowed by the PCR are also reported for a North American market using the TRACI 2.1 characterization method. These impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, EPD users shall not use additional measures for comparative purposes.

The following inventory parameters, specified by the PCR, are also reported:

- Renewable Primary Resources,
- Non-Renewable Primary Resources,
- Secondary Materials,
- Renewable Secondary Fuels,
- Non-Renewable Secondary Fuels,
- Recovered Energy,
- Consumption of Freshwater,
- Hazardous Waste Disposal,
- Non-Hazardous Waste Disposal,
- High Level Radioactive Waste,
- Intermediate and Low-Level Radioactive Waste,
- Components for Reuse,
- Materials for Recycling,
- Materials for Energy Recovery,
- Recovered Energy Exported from the Product System, and
- Recovered Energy Exported from the Product System

Per the PCR, aggregating of results of multiple life cycle stages is not presented, save the production stages displayed in Modules A1-A3. However, as the scope of this EPD is cradle-to-grave, use of the aggregated production stage results presented is discouraged without giving additional consideration to the results of the end-of-life stage (Modules C1-C4).

5.1 LCA RESULTS FOR ALUBOND® PANEL PRODUCTS

Table 16. *EF v3.1 and EN 15804 Environmental Impact Results for Eurocon Alubond® A2 (4 mm) per one m² of panel.*

LCIA Indicator	Unit	Life Cycle Module										
		A1	A2	A3	A1-A3 Total:	A4	A5	B2	B4	C2	C4	D
GWP fossil	kg CO_2 eq	72.7	0.218	1.57	**74.5**	1.11	10.1	$1.69x10^{-2}$	235	0.194	0.183	-2.56
GWP biogenic	kg CO_2 eq	$-8.80x10^{-2}$	0.00	0.00	**$-8.80x10^{-2}$**	0.00	$-8.8x10^{-2}$	0.00	0.00	0.00	0.00	0.00
GWP luluc	kg CO_2 eq	$9.00x10^{-2}$	$1.50x10^{-4}$	$9.84x10^{-5}$	**$9.02x10^{-2}$**	$8.10x10^{-4}$	$1.60x10^{-2}$	$1.92x10^{-3}$	0.299	$1.00x10^{-4}$	$4.70x10^{-4}$	$-3.35x10^{-3}$
GWP total	kg CO_2 eq	72.8	0.218	1.62	**74.6**	1.11	10.2	$2.12x10^{-2}$	236	0.195	0.183	-2.61
GWP GHG	kg CO_2 eq	72.4	0.217	1.61	**74.6**	1.11	10.1	0.021	237	0.194	0.182	-2.58
ODP	kg CFC-11 eq	$1.95x10^{-6}$	$3.27x10^{-8}$	$3.58x10^{-8}$	**$2.02x10^{-6}$**	$1.70x10^{-8}$	$1.80x10^{-7}$	$5.47x10^{-10}$	$6.10x10^{-6}$	$3.08x10^{-9}$	$3.81x10^{-9}$	$2.35x10^{-8}$
AP	Mol H+ eq	0.452	$5.47x10^{-3}$	$2.44x10^{-3}$	**0.46**	$2.82x10^{-2}$	$5.82x10^{-2}$	$2.90x10^{-4}$	1.26	$8.60x10^{-4}$	$1.00x10^{-3}$	$-1.28x10^{-2}$
EP freshwater	kg P eq	$2.15x10^{-2}$	$9.99x10^{-6}$	$2.13x10^{-5}$	**$2.15x10^{-2}$**	$4.63x10^{-5}$	$3.57x10^{-3}$	$2.70x10^{-4}$	0.069	$1.58x10^{-5}$	$1.51x10^{-5}$	$-1.00x10^{-3}$
EP marine	kg N eq	$7.70x10^{-2}$	$1.38x10^{-3}$	$6.30x10^{-4}$	**$7.91x10^{-2}$**	$7.17x10^{-3}$	$1.13x10^{-2}$	$6.70x10^{-4}$	0.270	$3.20x10^{-4}$	$3.80x10^{-4}$	$-2.73x10^{-3}$
EP terrestrial	mol N eq	0.788	$1.52x10^{-2}$	$6.54x10^{-3}$	**0.812**	$7.91x10^{-2}$	0.149	$1.17x10^{-3}$	2.62	$3.35x10^{-3}$	$4.10x10^{-3}$	$-2.66x10^{-2}$
POCP	kg NMVOC eq	0.234	$4.04x10^{-3}$	$4.97x10^{-3}$	**0.243**	$2.16x10^{-2}$	$3.59x10^{-2}$	$7.73x10^{-5}$	0.663	$1.15x10^{-3}$	$1.44x10^{-3}$	$-8.27x10^{-3}$
ADP Mineral & Metal	kg Sb eq	$1.10x10^{-4}$	$4.07x10^{-7}$	$7.29x10^{-7}$	**$1.11x10^{-4}$**	$1.51x10^{-6}$	$1.00x10^{-4}$	$9.34x10^{-8}$	$5.80x10^{-4}$	$6.26x10^{-7}$	$4.73x10^{-7}$	$-3.18x10^{-5}$
ADP fossil	MJ	683	2.89	24.8	**711**	14.1	135	0.169	2365	2.77	3.26	-35.3
WDP*	m^3	10.7	$8.31x10^{-3}$	0.12	**10.8**	$4.58x10^{-2}$	4.79	0.496	43.9	$1.41x10^{-2}$	$8.11x10^{-2}$	-1.43

**The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.*

Table 17. *EF v3.1 and EN 15804 Environmental Impact Results for Eurocon Alubond® A2 (6 mm) per one m² of panel.*

LCIA Indicator	Unit	Life Cycle Module										
		A1	A2	A3	A1-A3 Total:	A4	A5	B2	B4	C2	C4	D
GWP fossil	kg CO_2 eq	77.8	0.218	1.57	**79.6**	1.61	10.1	$1.69x10^{-2}$	250	0.194	0.183	-2.56
GWP biogenic	kg CO_2 eq	-0.176	0.00	0.00	**-0.176**	0.00	-0.176	0.00	0.00	0.00	0.00	0.00
GWP luluc	kg CO_2 eq	$9.16x10^{-2}$	$1.50x10^{-4}$	$9.84x10^{-5}$	**$9.18x10^{-2}$**	$1.17x10^{-3}$	$1.60x10^{-2}$	$1.92x10^{-3}$	0.304	$1.00x10^{-4}$	$4.70x10^{-4}$	$-3.35x10^{-3}$
GWP total	kg CO_2 eq	78	0.218	1.62	**79.8**	1.61	10.2	$2.12x10^{-2}$	251	0.195	0.183	-2.61
GWP GHG	kg CO_2 eq	77.5	0.217	1.61	**79.3**	1.61	10.1	0.021	251	0.194	0.182	-2.58
ODP	kg CFC-11 eq	$2.00x10^{-6}$	$3.27x10^{-8}$	$3.58x10^{-8}$	**$2.07x10^{-6}$**	$2.46x10^{-8}$	$1.80x10^{-7}$	$5.47x10^{-10}$	$6.20x10^{-6}$	$3.08x10^{-9}$	$3.81x10^{-9}$	$2.35x10^{-8}$
AP	Mol H+ eq	0.474	$5.47x10^{-3}$	$2.44x10^{-3}$	**0.482**	$4.10x10^{-2}$	$5.83x10^{-2}$	$2.90x10^{-4}$	1.59	$8.60x10^{-4}$	$1.00x10^{-3}$	$-1.28x10^{-2}$
EP freshwater	kg P eq	$2.26x10^{-2}$	$9.99x10^{-6}$	$2.13x10^{-5}$	**$2.26x10^{-2}$**	$6.70x10^{-5}$	$3.57x10^{-3}$	$2.70x10^{-4}$	0.072	$1.58x10^{-5}$	$1.51x10^{-5}$	$-1.00x10^{-3}$
EP marine	kg N eq	$8.07x10^{-2}$	$1.38x10^{-3}$	$6.30x10^{-4}$	**$8.27x10^{-2}$**	$1.04x10^{-2}$	$1.13x10^{-2}$	$6.70x10^{-4}$	0.289	$3.20x10^{-4}$	$3.80x10^{-4}$	$-2.73x10^{-3}$
EP terrestrial	mol N eq	0.828	$1.52x10^{-2}$	$6.54x10^{-3}$	**0.85**	0.115	0.149	$1.17x10^{-3}$	3.06	$3.35x10^{-3}$	$4.10x10^{-3}$	$-2.66x10^{-2}$
POCP	kg NMVOC eq	0.249	$4.04x10^{-3}$	$4.97x10^{-3}$	**0.258**	$3.13x10^{-2}$	$3.59x10^{-2}$	$7.73x10^{-5}$	0.895	$1.15x10^{-3}$	$1.44x10^{-3}$	$-8.27x10^{-3}$
ADP Mineral & Metal	kg Sb eq	$1.20x10^{-4}$	$4.07x10^{-7}$	$7.29x10^{-7}$	**$1.21x10^{-4}$**	$2.18x10^{-6}$	$1.00x10^{-4}$	$9.34x10^{-8}$	$6.10x10^{-4}$	$6.26x10^{-7}$	$4.73x10^{-7}$	$-3.18x10^{-5}$
ADP fossil	MJ	728	2.89	24.8	**756**	20.4	135	0.169	2505	2.77	3.26	-35.3
WDP*	m^3	11.4	$8.31x10^{-3}$	0.12	**11.5**	$6.64x10^{-2}$	4.79	0.496	45.8	$1.41x10^{-2}$	$8.11x10^{-2}$	-1.43

**The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.*

Table 18. *EF v3.1 and EN 15804 Environmental Impact Results for Eurocon Alubond® FR (4 mm) per one m² of panel.*

LCIA Indicator	Unit	Life Cycle Module										
		A1	A2	A3	A1-A3 Total:	A4	A5	B2	B4	C2	C4	D
GWP fossil	kg CO_2 eq	73.3	0.218	1.57	**75.0**	1.13	10.1	$1.69x10^{-2}$	236	0.194	0.183	-2.56
GWP biogenic	kg CO_2 eq	$-8.80x10^{-2}$	0.00	0.00	**$-8.80x10^{-2}$**	0.00	$-8.8x10^{-2}$	0.00	0.00	0.00	0.00	0.00
GWP luluc	kg CO_2 eq	$9.10x10^{-2}$	$1.50x10^{-4}$	$9.84x10^{-5}$	**$9.12x10^{-2}$**	$7.3x10^{-4}$	$1.60x10^{-2}$	$1.92x10^{-3}$	0.301	$1.00x10^{-4}$	$4.70x10^{-4}$	$-3.35x10^{-3}$
GWP total	kg CO_2 eq	73.5	0.218	1.62	**75.3**	1.13	10.2	$2.12x10^{-2}$	237	0.195	0.183	-2.61
GWP GHG	kg CO_2 eq	73.0	0.217	1.61	**74.8**	1.13	10.1	0.021	238	0.194	0.182	-2.58
ODP	kg CFC-11 eq	$2.01x10^{-6}$	$3.27x10^{-8}$	$3.58x10^{-8}$	**$2.01x10^{-6}$**	$1.53x10^{-8}$	$1.80x10^{-7}$	$5.47x10^{-10}$	$6.00x10^{-6}$	$3.08x10^{-9}$	$3.81x10^{-9}$	$2.35x10^{-8}$
AP	Mol H+ eq	0.453	$5.47x10^{-3}$	$2.44x10^{-3}$	**0.461**	$2.55x10^{-2}$	$5.82x10^{-2}$	$2.90x10^{-4}$	1.49	$8.60x10^{-4}$	$1.00x10^{-3}$	$-1.28x10^{-2}$
EP freshwater	kg P eq	$2.17x10^{-2}$	$9.99x10^{-6}$	$2.13x10^{-5}$	**$2.17x10^{-2}$**	$4.17x10^{-5}$	$3.57x10^{-3}$	$2.70x10^{-4}$	0.070	$1.58x10^{-5}$	$1.51x10^{-5}$	$-1.00x10^{-3}$
EP marine	kg N eq	$7.76x10^{-2}$	$1.38x10^{-3}$	$6.30x10^{-4}$	**$7.96x10^{-2}$**	$6.45x10^{-3}$	$1.13x10^{-2}$	$6.70x10^{-4}$	0.270	$3.20x10^{-4}$	$3.80x10^{-4}$	$-2.73x10^{-3}$
EP terrestrial	mol N eq	0.793	$1.52x10^{-2}$	$6.54x10^{-3}$	**0.815**	$7.13x10^{-2}$	0.149	$1.17x10^{-3}$	2.85	$3.35x10^{-3}$	$4.10x10^{-3}$	$-2.66x10^{-2}$
POCP	kg NMVOC eq	0.243	$4.04x10^{-3}$	$4.97x10^{-3}$	**0.252**	$1.95x10^{-2}$	$3.59x10^{-2}$	$7.73x10^{-5}$	0.846	$1.15x10^{-3}$	$1.44x10^{-3}$	$-8.27x10^{-3}$
ADP Mineral & Metal	kg Sb eq	$1.30x10^{-4}$	$4.07x10^{-7}$	$7.29x10^{-7}$	**$1.31x10^{-4}$**	$1.36x10^{-6}$	$1.00x10^{-4}$	$9.34x10^{-8}$	$6.40x10^{-4}$	$6.26x10^{-7}$	$4.73x10^{-7}$	$-3.18x10^{-5}$
ADP fossil	MJ	740	2.89	24.8	**768**	12.7	135	0.169	2517	2.77	3.26	-35.3
WDP*	m^3	11.5	$8.31x10^{-3}$	0.12	**11.6**	$4.13x10^{-2}$	4.79	0.496	46.5	$1.41x10^{-2}$	$8.11x10^{-2}$	-1.43

**The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.*

Table 19. *EF v3.1 and EN 15804 Environmental Impact Results for Eurocon Alubond® FR (6 mm) per one m² of panel.*

LCIA Indicator	Unit	Life Cycle Module										
		A1	A2	A3	A1-A3 Total:	A4	A5	B2	B4	C2	C4	D
GWP fossil	kg CO_2 eq	78.8	0.218	1.57	**80.6**	1.42	10.1	$1.69x10^{-2}$	253	0.194	0.183	-2.56
GWP biogenic	kg CO_2 eq	-0.176	0.00	0.00	**-0.176**	0.00	-0.176	0.00	0.00	0.00	0.00	0.00
GWP luluc	kg CO_2 eq	$9.30x10^{-2}$	$1.50x10^{-4}$	$9.84x10^{-5}$	**$9.32x10^{-2}$**	$1.04x10^{-3}$	$1.60x10^{-2}$	$1.92x10^{-3}$	0.308	$1.00x10^{-4}$	$4.70x10^{-4}$	$-3.35x10^{-3}$
GWP total	kg CO_2 eq	79	0.218	1.62	**80.8**	1.42	10.2	$2.12x10^{-2}$	253	0.195	0.183	-2.61
GWP GHG	kg CO_2 eq	78.5	0.217	1.61	**80.3**	1.42	10.1	0.021	254	0.194	0.182	-2.58
ODP	kg CFC-11 eq	$2.09x10^{-6}$	$3.27x10^{-8}$	$3.58x10^{-8}$	**$2.15x10^{-6}$**	$2.17x10^{-8}$	$1.80x10^{-7}$	$5.47x10^{-10}$	$6.40x10^{-6}$	$3.08x10^{-9}$	$3.81x10^{-9}$	$2.35x10^{-8}$
AP	Mol H+ eq	0.475	$5.47x10^{-3}$	$2.44x10^{-3}$	**0.48**	$3.62x10^{-2}$	$5.83x10^{-2}$	$2.90x10^{-4}$	1.57	$8.60x10^{-4}$	$1.00x10^{-3}$	$-1.28x10^{-2}$
EP freshwater	kg P eq	$2.29x10^{-2}$	$9.99x10^{-6}$	$2.13x10^{-5}$	**$2.29x10^{-2}$**	$5.92x10^{-5}$	$3.57x10^{-3}$	$2.70x10^{-4}$	0.073	$1.58x10^{-5}$	$1.51x10^{-5}$	$-1.00x10^{-3}$
EP marine	kg N eq	$8.15x10^{-2}$	$1.38x10^{-3}$	$6.30x10^{-4}$	**$8.35x10^{-2}$**	$9.17x10^{-3}$	$1.13x10^{-2}$	$6.70x10^{-4}$	0.288	$3.20x10^{-4}$	$3.80x10^{-4}$	$-2.73x10^{-3}$
EP terrestrial	mol N eq	0.834	$1.52x10^{-2}$	$6.54x10^{-3}$	**0.856**	0.101	0.149	$1.17x10^{-3}$	3.04	$3.35x10^{-3}$	$4.10x10^{-3}$	$-2.66x10^{-2}$
POCP	kg NMVOC eq	0.263	$4.04x10^{-3}$	$4.97x10^{-3}$	**0.272**	$2.77x10^{-2}$	$3.59x10^{-2}$	$7.73x10^{-5}$	0.923	$1.15x10^{-3}$	$1.44x10^{-3}$	$-8.27x10^{-3}$
ADP Mineral & Metal	kg Sb eq	$1.50x10^{-5}$	$4.07x10^{-7}$	$7.29x10^{-7}$	**$1.61x10^{-5}$**	$1.93x10^{-6}$	$1.00x10^{-4}$	$9.34x10^{-8}$	$3.30x10^{-4}$	$6.26x10^{-7}$	$4.73x10^{-7}$	$-3.18x10^{-5}$
ADP fossil	MJ	822	2.89	24.8	**850**	18	135	0.169	2755	2.77	3.26	-35.3
WDP*	m^3	12.6	$8.31x10^{-3}$	0.12	**12.7**	$5.87x10^{-2}$	4.79	0.496	49.1	$1.41x10^{-2}$	$8.11x10^{-2}$	-1.43

**The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.*

Table 20. *TRACI 2.1 Environmental Impact Results for Eurocon Alubond® A2 (4 mm) per one m² of panel.*

LCIA Indicator	Unit	Life Cycle Module									
		A1	A2	A3	A1-A3 Total:	A4	A5	B2	B4	C2	C4	D
GWP	kg CO_2 eq	71.3	0.216	1.58	**73.1**	1.10	10	$2.09x10^{-2}$	231	0.151	0.141	-2.54
ODP	kg CFC-11 eq	$2.34x10^{-6}$	$3.46x10^{-8}$	$3.76x10^{-8}$	**$2.41x10^{-6}$**	$1.83x10^{-8}$	$2.51x10^{-7}$	$6.71x10^{-10}$	$7.33x10^{-6}$	$2.65x10^{-9}$	$3.22x10^{-9}$	$-9.98x10^{-9}$
AP	kg SO_2 eq	0.384	$4.64x10^{-3}$	$2.08x10^{-3}$	**0.391**	$2.40x10^{-2}$	$4.93x10^{-2}$	$2.10x10^{-4}$	1.07	$5.90x10^{-4}$	$7.00x10^{-4}$	$-1.14x10^{-2}$
EP	kg N eq	0.194	$2.90x10^{-4}$	$1.76x10^{-3}$	**0.196**	$1.31x10^{-3}$	$8.54x10^{-2}$	$3.56x10^{-3}$	0.782	$1.40x10^{-4}$	$1.90x10^{-4}$	$-1.38x10^{-2}$
SFP	kg O_3 eq	4.46	$8.72x10^{-2}$	$3.80x10^{-2}$	**4.59**	0.452	0.628	$1.48x10^{-3}$	15.5	$1.51x10^{-2}$	$1.86x10^{-2}$	-0.15
FFD	MJ Surplus	39	0.416	3.89	**39.8**	2.04	10.7	$1.42x10^{-2}$	145	0.303	0.36	-2.16

Table 21. *TRACI 2.1 Environmental Impact Results for Eurocon Alubond® A2 (6 mm) per one m² of panel.*

LCIA Indicator	Unit	Life Cycle Module									
		A1	A2	A3	A1-A3 Total:	A4	A5	B2	B4	C2	C4	D
GWP	kg CO_2 eq	76.5	0.216	1.58	**78.3**	1.6	10	$2.09x10^{-2}$	247	0.218	0.204	-2.54
ODP	kg CFC-11 eq	$2.40x10^{-6}$	$3.46x10^{-8}$	$3.76x10^{-8}$	**$2.47x10^{-6}$**	$2.66x10^{-8}$	$2.51x10^{-7}$	$6.71x10^{-10}$	$7.80x10^{-6}$	$3.83x10^{-9}$	$4.65x10^{-9}$	$-9.98x10^{-9}$
AP	kg SO_2 eq	0.402	$4.64x10^{-3}$	$2.08x10^{-3}$	**0.409**	$3.48x10^{-2}$	$4.93x10^{-2}$	$2.10x10^{-4}$	1.35	$8.50x10^{-4}$	$1.02x10^{-3}$	$-1.14x10^{-2}$
EP	kg N eq	0.211	$2.90x10^{-4}$	$1.76x10^{-3}$	**0.213**	$1.90x10^{-3}$	$8.55x10^{-2}$	$3.56x10^{-3}$	0.831	$2.10x10^{-4}$	$2.70x10^{-4}$	$-1.38x10^{-2}$
SFP	kg O_3 eq	4.69	$8.72x10^{-2}$	$3.80x10^{-2}$	**4.82**	0.655	0.629	$1.48x10^{-3}$	16.8	$2.18x10^{-2}$	$2.69x10^{-2}$	-0.15
FFD	MJ Surplus	43.9	0.416	3.89	**48.2**	2.96	10.7	$1.42x10^{-2}$	171	0.438	0.521	-2.16

Table 22. *TRACI 2.1 Environmental Impact Results for Eurocon Alubond® FR (4 mm) per one m² of panel.*

LCIA Indicator	Unit	Life Cycle Module									
		A1	A2	A3	A1-A3 Total:	A4	A5	B2	B4	C2	C4	D
GWP	kg CO_2 eq	72	0.216	1.58	**73.8**	0.992	10	$2.09x10^{-2}$	232	0.14	0.127	-2.54
ODP	kg CFC-11 eq	$2.41x10^{-6}$	$3.46x10^{-8}$	$3.76x10^{-8}$	**$2.48x10^{-6}$**	$1.65x10^{-8}$	$2.51x10^{-7}$	$6.71x10^{-10}$	$7.52x10^{-6}$	$2.39x10^{-9}$	$2.89x10^{-9}$	$-9.98x10^{-9}$
AP	kg SO_2 eq	0.386	$4.64x10^{-3}$	$2.08x10^{-3}$	**0.393**	$2.16x10^{-2}$	$4.93x10^{-2}$	$2.10x10^{-4}$	1.27	$5.30x10^{-4}$	$6.30x10^{-4}$	$-1.14x10^{-2}$
EP	kg N eq	0.21	$2.90x10^{-4}$	$1.76x10^{-3}$	**0.212**	$1.18x10^{-3}$	$8.54x10^{-2}$	$3.56x10^{-3}$	0.826	$1.30x10^{-4}$	$1.70x10^{-4}$	$-1.38x10^{-2}$
SFP	kg O_3 eq	4.5	$8.72x10^{-2}$	$3.80x10^{-2}$	**4.63**	0.407	0.628	$1.48x10^{-3}$	15.6	$1.36x10^{-2}$	$1.67x10^{-2}$	-0.15
FFD	MJ Surplus	47	0.416	3.89	**51.3**	1.84	10.7	$1.42x10^{-2}$	176	0.273	0.324	-2.16

Table 23. *TRACI 2.1 Environmental Impact Results for Eurocon Alubond® FR (6 mm) per one m² of panel.*

LCIA Indicator	Unit	Life Cycle Module									
		A1	A2	A3	A1-A3 Total:	A4	A5	B2	B4	C2	C4	D
GWP	kg CO_2 eq	77.4	0.216	1.58	**79.2**	1.41	10	$2.09x10^{-2}$	248	0.192	0.18	-2.54
ODP	kg CFC-11 eq	$2.51x10^{-6}$	$3.46x10^{-8}$	$3.76x10^{-8}$	**$2.58x10^{-6}$**	$2.35x10^{-8}$	$2.51x10^{-7}$	$6.71x10^{-10}$	$7.82x10^{-6}$	$3.38x10^{-9}$	$4.10x10^{-9}$	$-9.98x10^{-9}$
AP	kg SO_2 eq	0.406	$4.64x10^{-3}$	$2.08x10^{-3}$	**0.412**	$3.07x10^{-2}$	$4.93x10^{-2}$	$2.10x10^{-4}$	1.35	$7.50x10^{-4}$	$9.00x10^{-4}$	$-1.14x10^{-2}$
EP	kg N eq	0.237	$2.90x10^{-4}$	$1.76x10^{-3}$	**0.239**	$1.67x10^{-3}$	$8.55x10^{-2}$	$3.56x10^{-3}$	0.901	$1.80x10^{-4}$	$2.40x10^{-4}$	$-1.38x10^{-2}$
SFP	kg O_3 eq	4.74	$8.72x10^{-2}$	$3.80x10^{-2}$	**4.87**	0.579	0.629	$1.48x10^{-3}$	16.7	$1.92x10^{-2}$	$2.37x10^{-2}$	-0.15
FFD	MJ Surplus	56.7	0.416	3.89	**61**	2.62	10.7	$1.42x10^{-2}$	205	0.386	0.459	-2.16

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Table 24. *Resource use indicator results for Eurocon Alubond® A2 (4 mm) per one m² of panel.*

Module	RPR_E	RPR_M	RPR_T	$NRPR_E$	$NRPR_M$	$NRPR_T$	SM	RSF	NRSF	RE	FW
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	MJ	m^3
A1	6.74	0.00	6.74	104	0.00	104	1.23	0.00	0.00	0.00	2.37
A2	$2.42x10^{-2}$	0.00	$2.42x10^{-2}$	2.86	0.00	2.86	0.00	0.00	0.00	0.00	$7.34x10^{-3}$
A3	5.19	0.00	5.19	25.1	0.00	25.1	0.00	0.00	0.00	0.00	0.150
A1-A3 Total:	**12.0**	**0.00**	**12.0**	**132**	**0.00**	**132**	**1.23**	**0.00**	**0.00**	**0.00**	**2.53**
A4	0.243	0.00	0.243	25.5	0.00	25.5	0.00	0.00	0.00	0.00	$7.64x10^{-2}$
A5	14.4	0.00	14.4	132	0.00	132	0.00	0.00	0.00	0.00	4.52
B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	0.131	0.00	0.131	0.167	0.00	0.167	0.00	0.00	0.00	0.00	0.496
B3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B4	73.1	0.00	73.1	804	0.00	804	3.36	0.00	0.00	0.00	20.6
B5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	$2.75x10^{-2}$	0.00	$2.75x10^{-2}$	2.16	0.00	2.16	0.00	0.00	0.00	0.00	$9.32x10^{-3}$
C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	$3.05x10^{-2}$	0.00	$3.05x10^{-2}$	2.54	0.00	2.54	0.00	0.00	0.00	0.00	$6.30x10^{-2}$
D	-5.54	0.00	-5.54	-34.9	0.00	-34.9	0.00	0.00	0.00	0.00	-1.43

Table 25. *Resource use indicator results for Eurocon Alubond® A2 (6 mm) per one m² of panel.*

Module	RPR_E	RPR_M	RPR_T	$NRPR_E$	$NRPR_M$	$NRPR_T$	SM	RSF	NRSF	RE	FW
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	MJ	m^3
A1	7.75	0.00	7.75	132	0.00	132	1.23	0.00	0.00	0.00	2.64
A2	$2.42x10^{-2}$	0.00	$2.42x10^{-2}$	2.86	0.00	2.86	0.00	0.00	0.00	0.00	$7.34x10^{-3}$
A3	10.3	0.00	10.3	26.2	0.00	26.2	0.00	0.00	0.00	0.00	0.181
A1-A3 Total:	**18.1**	**0.00**	**18.1**	**161**	**0.00**	**161**	**1.23**	**0.00**	**0.00**	**0.00**	**2.83**
A4	0.351	0.00	0.351	37.1	0.00	37.1	0.00	0.00	0.00	0.00	0.111
A5	14.4	0.00	14.4	132	0.00	132	0.00	0.00	0.00	0.00	4.52
B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	0.131	0.00	0.131	0.167	0.00	0.167	0.00	0.00	0.00	0.00	0.496
B3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B4	90.0	0.00	90.0	919	0.00	919	3.36	0.00	0.00	0.00	21.7
B5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	$3.98x10^{-2}$	0.00	$3.98x10^{-2}$	3.12	0.00	3.12	0.00	0.00	0.00	0.00	$1.35x10^{-2}$
C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	$4.02x10^{-2}$	0.00	$4.02x10^{-2}$	3.35	0.00	3.35	0.00	0.00	0.00	0.00	$8.31x10^{-2}$
D	-5.54	0.00	-5.54	-34.9	0.00	-34.9	0.00	0.00	0.00	0.00	-1.43

Table 26. *Resource use indicator results for Eurocon Alubond® FR (4 mm) per one m² of panel.*

Module	RPR_E	RPR_M	RPR_T	$NRPR_E$	$NRPR_M$	$NRPR_T$	SM	RSF	NRSF	RE	FW
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	MJ	m^3
A1	7.61	0.00	7.61	162	0.00	162	1.23	0.00	0.00	0.00	2.37
A2	$2.42x10^{-2}$	0.00	$2.42x10^{-2}$	2.86	0.00	2.86	0.00	0.00	0.00	0.00	$7.34x10^{-3}$
A3	5.19	0.00	5.19	25.1	0.00	25.1	0.00	0.00	0.00	0.00	0.150
A1-A3 Total:	**12.8**	**0.00**	**12.8**	**190**	**0.00**	**190**	**1.23**	**0.00**	**0.00**	**0.00**	**2.53**
A4	0.218	0.00	0.218	23.0	0.00	23.0	0.00	0.00	0.00	0.00	$6.88x10^{-2}$
A5	14.4	0.00	14.4	132	0.00	132	0.00	0.00	0.00	0.00	4.52
B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	0.131	0.00	0.131	0.167	0.00	0.167	0.00	0.00	0.00	0.00	0.496
B3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B4	75.2	0.00	75.2	954	0.00	954	3.36	0.00	0.00	0.00	36.1
B5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	$2.47x10^{-2}$	0.00	$2.47x10^{-2}$	1.95	0.00	1.95	0.00	0.00	0.00	0.00	$8.39x10^{-3}$
C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	$2.74x10^{-2}$	0.00	$2.74x10^{-2}$	2.29	0.00	2.29	0.00	0.00	0.00	0.00	5.67
D	-5.54	0.00	-5.54	-34.9	0.00	-34.9	0.00	0.00	0.00	0.00	-1.43

Table 27. *Resource use indicator results for Eurocon Alubond® FR (6 mm) per one m² of panel.*

Module	RPR_E	RPR_M	RPR_T	$NRPR_E$	$NRPR_M$	$NRPR_T$	SM	RSF	NRSF	RE	FW
	MJ	MJ	MJ	MJ	MJ	MJ	kg	MJ	MJ	MJ	m^3
A1	9.21	0.00	9.21	229	0.00	229	1.23	0.00	0.00	0.00	2.26
A2	$2.42x10^{-2}$	0.00	$2.42x10^{-2}$	2.86	0.00	2.86	0.00	0.00	0.00	0.00	$7.34x10^{-3}$
A3	10.3	0.00	10.3	26.2	0.00	26.2	0.00	0.00	0.00	0.00	0.181
A1-A3 Total:	**19.5**	**0.00**	**19.5**	**258**	**0.00**	**258**	**1.23**	**0.00**	**0.00**	**0.00**	**2.45**
A4	0.310	0.00	0.310	32.7	0.00	32.7	0.00	0.00	0.00	0.00	$9.77x10^{-2}$
A5	14.4	0.00	14.4	132	0.00	132	0.00	0.00	0.00	0.00	4.52
B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	0.131	0.00	0.131	0.167	0.00	0.167	0.00	0.00	0.00	0.00	0.496
B3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B4	93.8	0.00	93.8	1171	0.00	1171	3.36	0.00	0.00	0.00	20.4
B5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	$3.51x10^{-2}$	0.00	$3.51x10^{-2}$	2.76	0.00	2.76	0.00	0.00	0.00	0.00	$1.19x10^{-2}$
C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	$3.88x10^{-2}$	0.00	$3.88x10^{-2}$	3.24	0.00	3.24	0.00	0.00	0.00	0.00	$8.03x10^{-2}$
D	-5.54	0.00	-5.54	-34.9	0.00	-34.9	0.00	0.00	0.00	0.00	-1.43

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Table 28. *Waste and Output indicators for Eurocon Alubond® A2 (4 mm) per one m² of panel.*

Module	HWD	NHWD	HLRW/ILLRW	CRU	MFR	MER	EEE	EET
	kg	kg	kg	kg	kg	kg	MJ, LHV	MJ, LHV
A1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A3	0.00	0.624	0.00	0.00	0.00	0.00	0.00	0.00
A1-A3 Total:	**0.00**	**0.624**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
A4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A5	0.00	$8.10x10^{-2}$	0.00	0.00	0.00	0.00	0.00	0.00
B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B4	0.00	22.6	0.00	0.00	8.20	0.00	0.00	0.00
B5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	0.00	8.00	0.00	0.00	2.98	0.00	0.00	0.00
D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 29. *Waste and Output indicators for Eurocon Alubond® A2 (6 mm) per one m² of panel.*

Module	HWD	NHWD	HLRW/ILLRW	CRU	MFR	MER	EEE	EET
	kg	kg	kg	kg	kg	kg	MJ, LHV	MJ, LHV
A1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A3	0.00	0.624	0.00	0.00	0.00	0.00	0.00	0.00
A1-A3 Total:	**0.00**	**0.624**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
A4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A5	0.00	$8.16x10^{-2}$	0.00	0.00	0.00	0.00	0.00	0.00
B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B4	0.00	30.9	0.00	0.00	8.20	0.00	0.00	0.00
B5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	0.00	10.6	0.00	0.00	2.98	0.00	0.00	0.00
D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 30. *Waste and Output indicators for Eurocon Alubond® FR (4 mm) per one m² of panel.*

Module	HWD	NHWD	HLRW/ILLRW	CRU	MFR	MER	EEE	EET
	kg	kg	kg	kg	kg	kg	MJ, LHV	MJ, LHV
A1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A3	0.00	0.624	0.00	0.00	0.00	0.00	0.00	0.00
A1-A3 Total:	**0.00**	**0.624**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
A4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A5	0.00	$8.10x10^{-2}$	0.00	0.00	0.00	0.00	0.00	0.00
B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B4	0.00	21.5	0.00	0.00	8.20	0.00	0.00	0.00
B5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	0.00	7.20	0.00	0.00	2.98	0.00	0.00	0.00
D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 31. *Waste and Output indicators for Eurocon Alubond® FR (6 mm) per one m² of panel.*

Module	HWD	NHWD	HLRW/ILLRW	CRU	MFR	MER	EEE	EET
	kg	kg	kg	kg	kg	kg	MJ, LHV	MJ, LHV
A1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A3	0.00	0.624	0.00	0.00	0.00	0.00	0.00	0.00
A1-A3 Total:	**0.00**	**0.624**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
A4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A5	0.00	$8.16x10^{-2}$	0.00	0.00	0.00	0.00	0.00	0.00
B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B4	0.00	29.8	0.00	0.00	8.20	0.00	0.00	0.00
B5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4	0.00	10.2	0.00	0.00	2.98	0.00	0.00	0.00
D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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6. LCA: Interpretation

The graphical analysis below of the LCIA was completed without regard to the replacement Module B4 as it simply represents modules A1 through C4. Contributions to total impact indicator results for the Alubond® products are dominated by the A1 Raw Material Module and the A5 Installation Module. Figure 3 shows the contribution analysis of the EF v3.1 and TRACI 2.1 impact indicator results for the A2 4mm Alubond® panels, Figure 4 for the A2 6mm Alubond® panels and Figures 5 and 6 for the FR 4mm and 6mm Alubond® panels respectively within the cradle to gate system boundaries.

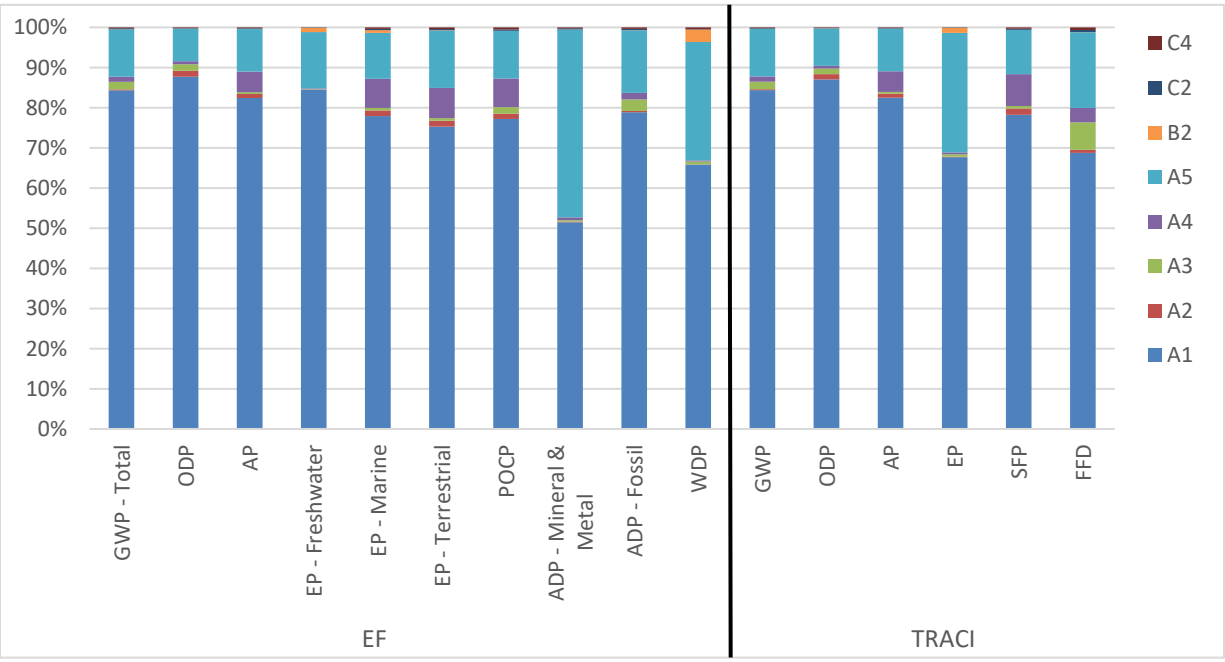


Figure 3. *Contribution analysis for the 4mm Alubond® A2 panels.*

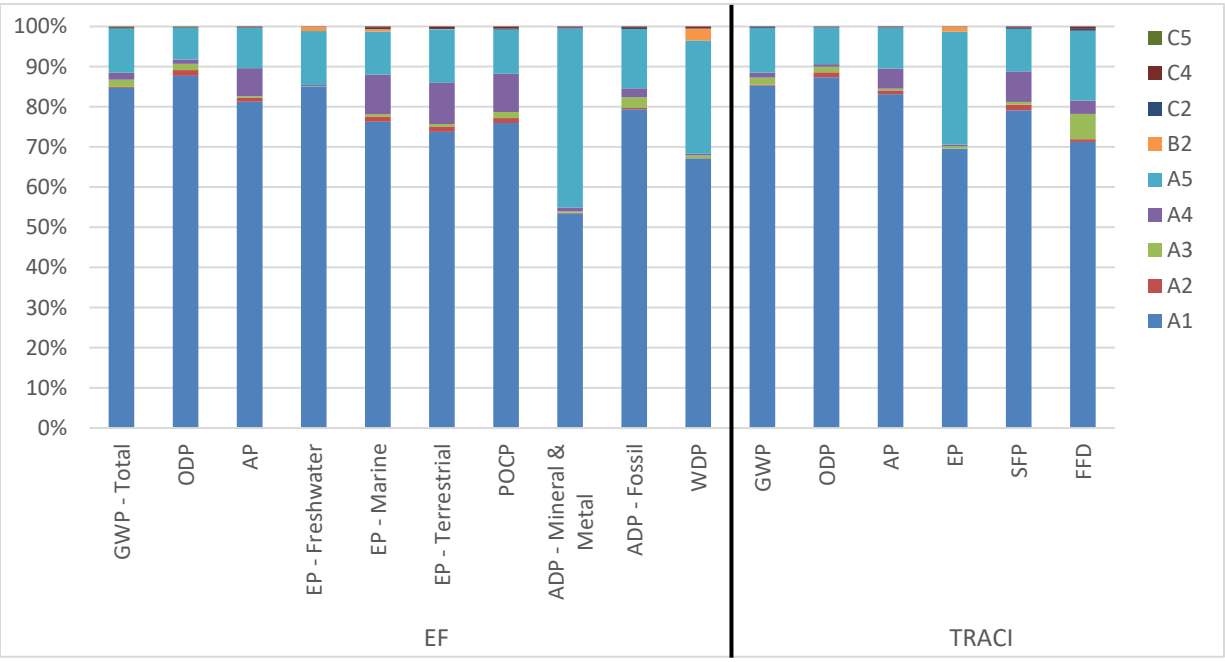


Figure 4. *Contribution analysis for the 6mm Alubond® A2 panels.*

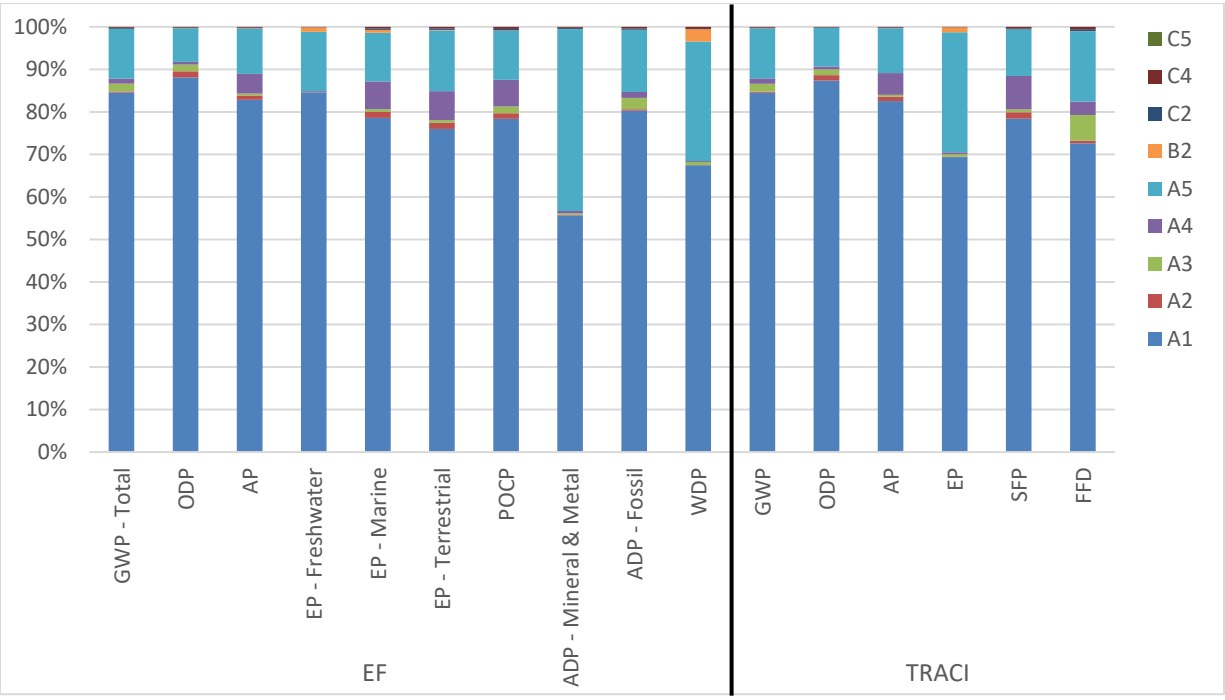


Figure 5. *Contribution analysis for the 4mm Alubond® FR panels.*

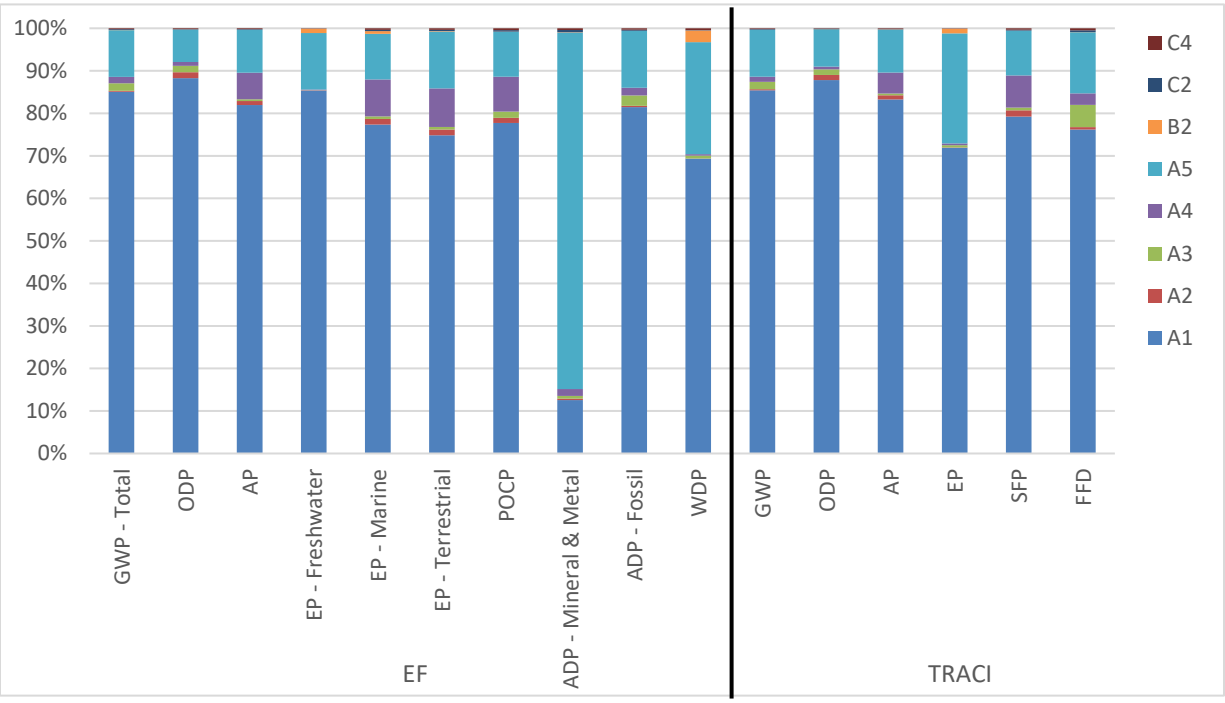


Figure 6. *Contribution analysis for the 6mm Alubond® FR panels.*

7. Additional Environmental Information

7.1 ENVIRONMENT AND HEALTH DURING MANUFACTURING

No environmental or health impacts are expected during the manufacture of the product.

7.2 ENVIRONMENT AND HEALTH DURING INSTALLATION

No environmental or health impacts are expected due to normal use of the products.

7.3 EXTRAORDINARY EFFECTS

No environmental or health impacts are expected due to extraordinary effects including fire and/or water damage and unforeseeable mechanical destruction.

7.4 DELAYED EMISSIONS

No delayed emissions are expected due to normal use of the products.

7.5 ENVIRONMENTAL ACTIVITIES AND CERTIFICATIONS

There are no know environmental activities and certifications.

7.6 FURTHER INFORMATION

Further information on the product can be found on the manufacturers' website: https://Alubond®.com/

8. References

- Life Cycle Assessment of Alubond® Products. SCS Global Services Report. Prepared for Eurocon Building Industries F.Z.E. November 2024.
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
- ISO 14040: 2006 Environmental Management – Life cycle assessment – Principles and Framework
- ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.
- ISO 21930: 2017 Sustainability in building construction – Environmental declaration of building products.
- SCS Type III Environmental Declaration Program: Program Operator Manual. V12.0 December 2023. SCS Global Services.
- International EPD Product Category Rule for Construction Products, 2019:14, v1.3.4, 2024.04.30
- OpenLCA 2.0.2, GreenDelta, August 14, 2023. https://www.openlca.org/releases/
- Ecoinvent Centre (2020) ecoinvent data from v3.9. Swiss Center for Life Cycle Inventories, Dübendorf, 2022, http://www.ecoinvent.org
- EN 15804:A1:2012+A2:2019+AC:2021 Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

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