

Environmental Product Declaration



Of multiple products, based on worst-case results,
In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

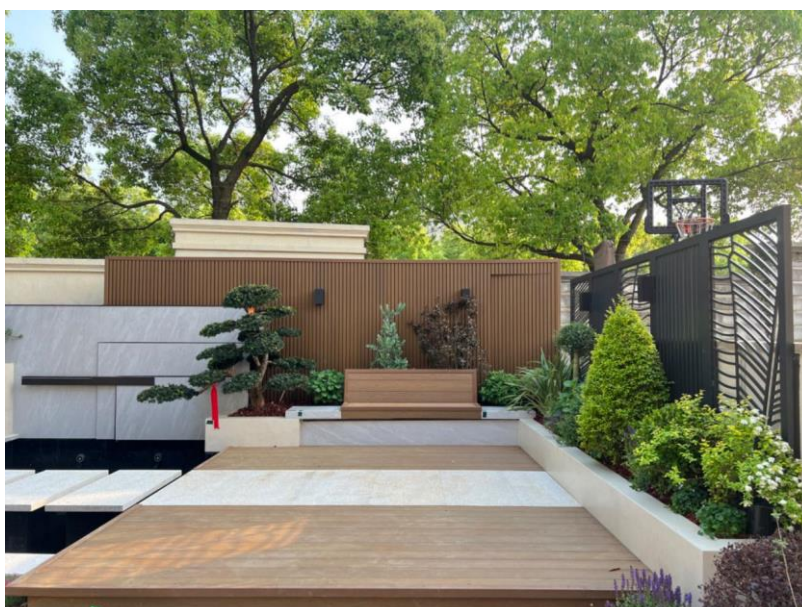
Yixing Hualong Wood Plastic Composite PRODUCT

from

YIXING HUALONG NEW MATERIAL LUMBER CO.,LTD

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	EPD-IES-0006214
Publication date:	2025-01-22
Valid until:	2030-01-21

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





General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

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

Product Category Rules (PCR): *PCR 2019:14 Construction products (version 1.3.4)*

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.*

Life Cycle Assessment (LCA)

LCA accountability: *Flora Fan, Intertek <Flora.Fan@intertek.com>*

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☒ EPD verification by individual verifier

Third-party verifier: *Silvia Vilčeková <silcertsro@gmail.com>*

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.



Company information

Owner of the EPD:

Yixing Hualong New Material Lumber Co.,Ltd

Contact:

James Xie, 18915392829,
james@hualong-wpc.com

Description of the organisation:

Yixing Hualong New Material Lumber Co., Ltd is a leading manufacturer in manufacturing wood plastic composite decking, cladding, railing and fencing. Yixing Hualong WPC was found in 2005 with its core value of engaging in the developing and producing environmental friendly products. The unique co extrusion technology by Yixing Hualong WPC takes the wood plastic composite products into a new generation with more natural colors, longer-lasting and 360-degree protection of the products from UV, aging, mildew and cracking.

Product-related or management system-related certifications:

Yixing Hualong WPC has been certified for compliance with the following standards:

ISO 9001:2015 - Quality Management System

ISO 14001:2015 - Environmental Management System

ISO 45001:2018 - Occupation health and safety management systems

FSC Chain-of-Custody

Name and location of production site(s):

The south develop area of Xinjian Town, Yixing city 214253, Jiangsu Province, China.

Product information

Product name:

Yixing Hualong Wood Plastic Composite Product

Product identification by standard

TEST ITEM	TEST METHOD	TEST RESULT (HOLLOW DECKING)
Resistance to indentation	EN15534	Brinell Hardness: 72Mpa Rate of elastic recovery: 60%
Flexural properties	EN15534	Bending strength: 30.2MPa Modulus of elasticity: 3119MPa Mean value of Maximum Load: 4075N Minimum value of Maximum Load: 3970N Deflection at 500N Mean value: 1.49mm Maximum value: 1.54mm
Falling mass impact resistance	EN15534	None of 10 test specimens show a failure. Max depth of residual indentation:0.16mm



Tensile strength perpendicular to the plane of the board	EN319:1993	Tensile strength:2.76N/mm ²
Boiling Test	EN15534	Swelling in thickness:1.7% Swelling in length:0.13% Swelling in width:0.03% Water absorption:1.3%
Degree of chalking	EN15534	After weathering test for 2000h, no visual chalking on the surface

Product description:

Yixing Hualong wood plastic composite product is mainly composed of recycled high-density polyethylene and claimed wood fibre and formed the shapes by high temperature and strong press. It combines the strong physical properties of plastic and beauty of wood, natural look and feel of wood, but more sustainable and eco-friendlier. Its unique 360-degree outer layer protects the product from weathering, UV, mildew and insects.

Products application:

Yixing Hualong wood plastic composite products can be applied for outdoor decking, cladding, railing and fencing with ultra-low maintenance, easy- to- install and no requirement of sealing and painting.

UN CPC code:

UN CPC code: 36910 Floor coverings of plastics, in rolls or in the form of tiles

Geographical scope:

A1-A3 China; A4 China to EU; A5 EU; C EU; D EU.

LCA information

Declared unit:

1 kg of Wood Plastic Composite Product (138*23mm)

Reference service life:

10 years

Time representativeness:

1st January 2023 to 31st December 2023 (12 months)

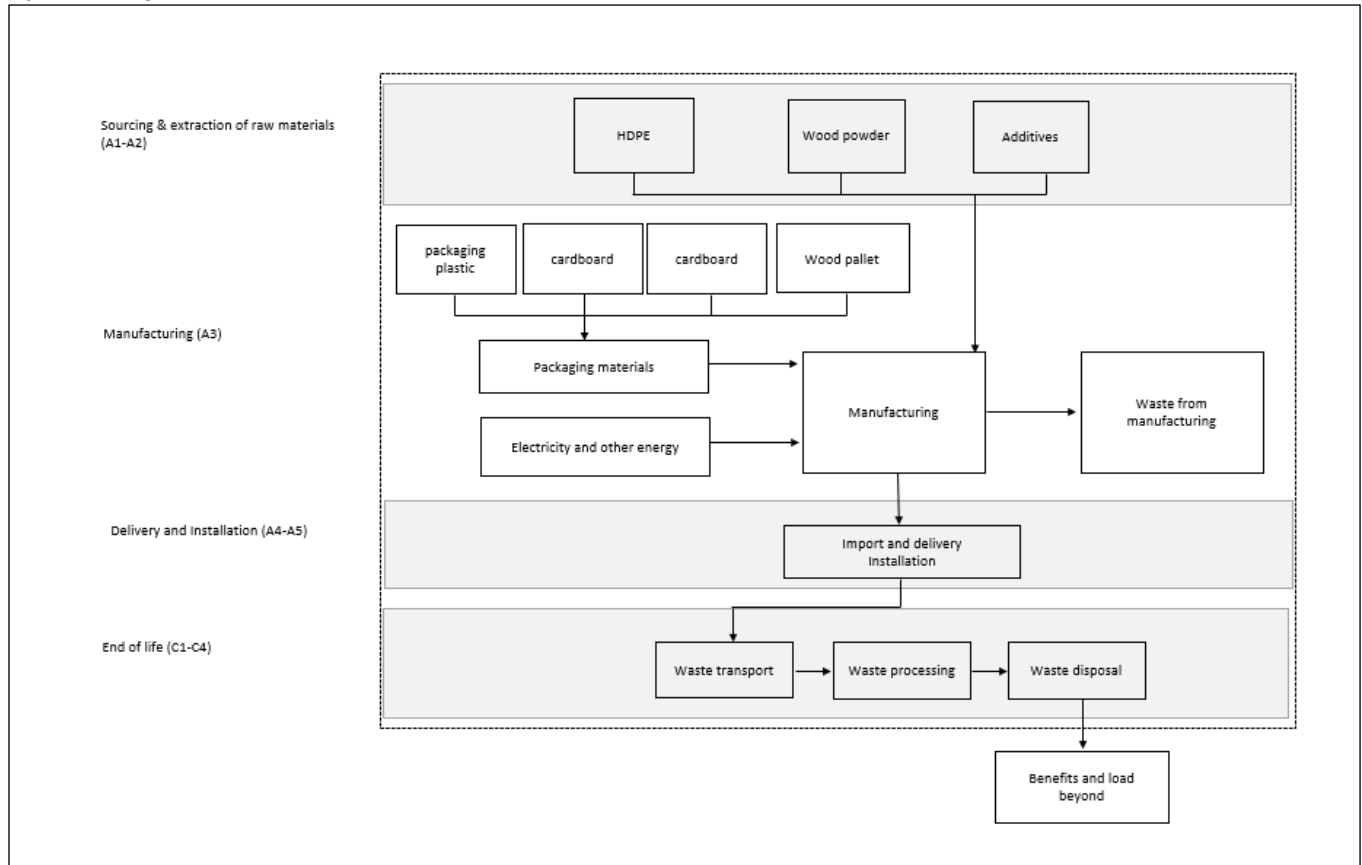
Database(s) and LCA software used:

Ecoinvent 3.10.1 (Allocation, cut-off by classification) and One Click LCA

Description of system boundaries:

The system boundary is the Cradle to gate with options, modules C1–C4, module D and with optional modules, including: A1-A3 product stage, A4-A5 construction process stage, C1-C4 end-of-life stage, and D benefits and loads beyond the system boundary.

System diagram:



Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	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	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	CN	CN	CN	CN to EU	EU	ND	ND	ND	ND	ND	ND	ND	EU	EU	EU	EU	EU
Specific data used	25%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

More information:

Electricity data source used in the manufacturing process in A3:

Scenario parameter	Value
Electricity data source and quality	LCA study for market group for electricity, medium voltage, in China. Ecoinvent 3.10.1, year:2024
Electricity kg CO ₂ e / kWh	1.01
District heating data source and quality	LCA study for market group for Market for heat, district or industrial, other than natural gas. Ecoinvent 3.10.1, year:2024
District heating kg CO ₂ e / kWh	0.11

Characterization factors EF 3.1 have been used throughout the study.

Product stage (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. The study also considers the material losses occurring during the manufacturing processes as well as handling of waste formed in the production processes at the manufacturing facilities.

The product stage of the WPC is divided into 3 modules: A1 “Raw material and supply”, A2 “Transport to the manufacturer” and A3 “Manufacturer”. The aggregation of the modules A1, A2 and A3 is a possibility considered by the EN 15804 standard. This rule is applied in this EPD.

A1, Raw material supply takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process. Specifically, WPC raw material supply covers sourcing of wood fibre, HDPE and additives. Electricity is taken account for China.

A2, Transport to the manufacturer. The transportation of the raw materials to the manufacturing site is studied in this module.

A3, Manufacturing. Manufacturing covers all processes linked to production, include: Mixing of all raw materials (including plant fibre, HDPE and additives); pelletizing; co-extrusion moulding; cooling; polishing and cutting process. Then products are packaged.

The environmental profile of these energy carriers is modelled for local conditions.

Packaging-related flows in the production process are included in the manufacturing module, i.e. wood pallet, packaging plastic, 3-plywood and cardboard. Apart from production of packaging material, the supply and transport of packaging material are also considered in the LCA model.

TRANSPORT AND INSTALLATION (A4-A5):

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The construction process is divided into 2 modules: A4 “Transport to the building site” and A5 “Installation in the building”.

A4, Transport to the building site. This module includes transport from the production gate to the building site. Transport is calculated on the basis of a scenario with the parameters described. The average transportation distance from production plant to building site is assumed as 280 km transported by lorry from plant to shanghai port, 16000 km transported by ship from shanghai port to Barcelona and then 60km from to site.

A5 Installation in the building occur in this stage. This module includes product installation losses and energy consumption during the installation of product, i.e. the additional production processes to compensate the loss. And the waste processing which occur in this stage.

Materials loss during installation are estimated as 2%.

The end of life of packaging are considered as, with reference to EU waste management:

Wood pallet: recycling 32%, landfill 19%, incineration 49%.

Plastic film: recycling 40.7%, landfill 19%, incineration 40.3%.

Cardboard: recycling 82.5%, landfill 19%, incineration 1.5%.

End-of-Life Stage (C1-C4):

The end-of life stage is divided into 4 modules: C1 “De-construction, demolition”, C2 “Transport to waste processing”, C3 “Waste processing for reuse, recovery and/or recycling”, C4 “Disposal”.

C1 De-construction, demolition. For WPCs, the energy consumption considered as 0.002kWh/declared unit.

C2 Transport to waste processing. It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed that it has the same weight with the declared product. All of the end-of-life product is assumed to be transported as separate construction waste to the closest

facilities. Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is lorry which is common.

C3 Waste processing for reuse, recovery and/or recycling. It is assumed that 95% of the product was sent to recycled

C4 Disposal. It is assumed that 5% of the product was sent to landfill.

Resource Recovery Stage (D)

D, Reuse/recovery/recycling potential.

benefit or load resulting from reuse/recovery/recycling beyond the product system boundary are calculated.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012 +A2:2019/AC:2021 and the applied PCR. The study does not exclude any hazardous materials or substances.

The clicks used during installation are 0.002kg/declare unit during installation. It is not more than 1% of each unit process mass. So considered to be cut-off flow.

The emission of NMVOC is 0.00036kg. It is not more than 1% of each unit process mass. So considered to be cut-off flow.

There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

Allocation used in Ecoinvent 3.10.1 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804-standard.

For data sets in this study, the allocation of the inputs is generally carried out via the mass. The consumption and transportation of raw materials was allocated by mass ratio.

For data sets in this study, the allocation of the inputs is generally carried out via the mass. The consumption and transportation of raw materials was allocated by mass ratio.

In this study one allocation occurs on WPC production, in allocating the input and output, i.e. energy within the production site such as electricity and emission such as off gas, among the various series of WPC products, allocation is done via total production (WPC products with the unit as kg) of all products produced on a yearly average.

During the production process of WPC, there are no other by-products produced from the production line, hence there is no occasion that requires allocation for multi-output processes.

For this project, there is only one production site. So, there is no allocation among plants.

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Recycled Ethylene Polymer	0.35	100	0
Natural Fiber	0.55	0	0.27
Additives	0.1	0	0
TOTAL product weight	1	35	0.27
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Wood pallet	0.0125	1.25	0.00487
Packaging plastic	0.000002	0.0002	0
Cardboard	0.000002	0.0002	0.000000796
3-plywood	0.000005	0.0005	0.00000188
TOTAL packaging weight	0.0125	1.25	0.00487

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional unit
None	None	None	0%

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per declared unit for 1 kg of Wood Plastic Composite Product									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1,10E+00	2,03E-01	4,23E-02	1,46E-03	1,08E-02	7,81E-02	3,12E-04	4,52E-02
GWP-biogenic	kg CO ₂ eq.	-8,73E-01	3,42E-05	1,79E-02	2,19E-06	1,22E-06	8,12E-01	4,28E-02	-5,95E-04
GWP-luluc	kg CO ₂ eq.	9,33E-04	1,06E-04	5,23E-05	2,88E-06	4,82E-06	1,43E-04	1,78E-07	5,86E-03
GWP-total	kg CO ₂ eq.	2,31E-01	2,03E-01	6,03E-02	1,46E-03	1,08E-02	8,91E-01	4,31E-02	5,05E-02
ODP	kg CFC 11 eq.	2,11E-08	2,93E-09	5,93E-10	1,01E-11	1,59E-10	4,42E-10	9,04E-12	1,02E-09
AP	mol H ⁺ eq.	6,03E-03	5,00E-03	3,04E-04	7,53E-06	3,67E-05	3,59E-04	2,22E-06	1,89E-04
EP-freshwater	kg P eq.	2,61E-04	8,08E-06	1,24E-05	6,59E-07	8,38E-07	2,32E-05	2,57E-08	1,00E-05
EP-marine	kg N eq.	1,04E-03	1,26E-03	6,67E-05	1,43E-06	1,26E-05	2,43E-04	8,44E-07	3,35E-05
EP-terrestrial	mol N eq.	1,02E-02	1,39E-02	6,54E-04	1,45E-05	1,31E-04	1,01E-03	9,21E-06	3,57E-04
POCP	kg NMVOC eq.	4,24E-03	3,84E-03	2,13E-04	4,32E-06	5,41E-05	3,18E-04	3,30E-06	1,91E-04
ADP-fossil*	MJ	7,02E-06	2,65E-07	2,41E-07	8,30E-09	3,00E-08	5,67E-07	4,96E-10	2,34E-07
ADP-minerals & metals*	kg Sb eq.	1,87E+01	2,57E+00	6,27E-01	1,88E-02	1,56E-01	6,61E-01	7,66E-03	1,01E+00
WDP*	m ³	2,63E-01	8,31E-03	9,63E-03	3,66E-04	7,72E-04	1,78E-02	2,21E-05	9,87E-03
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

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

Statement: The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Additional mandatory impact category indicators

Results per declared unit for 1 kg of Wood Plastic Composite Product									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP - GHG ¹	kg CO ₂ eq.	1,10E+00	2,03E-01	4,24E-02	1,46E-03	1,08E-02	7,82E-02	3,12E-04	5,11E-02
Particulate matter	disease inc.	7,80E-08	8,60E-09	2,63E-09	6,45E-11	1,08E-09	1,11E-08	5,04E-11	2,14E-09
Ionizing radiation ²	kBq U-235 eq	4,48E-02	1,38E-03	2,95E-03	1,98E-04	1,36E-04	2,96E-03	4,82E-06	1,38E-03
Ecotoxicity, freshwater ³	CTUe	9,34E+00	2,25E-01	2,44E-01	3,87E-03	2,21E-02	6,18E-01	6,43E-04	2,51E-01
Human toxicity, non-cancer ³	CTUh	7,00E-10	4,13E-11	2,07E-11	2,58E-13	1,78E-12	1,47E-10	5,76E-14	5,95E-12
Human toxicity, cancer ³	CTUh	1,02E-08	8,41E-10	4,05E-10	1,40E-11	1,01E-10	1,47E-09	1,32E-12	2,95E-10
Land use ³	Pt	1,34E+01	6,97E-01	3,39E-01	3,39E-03	1,57E-01	9,55E-01	1,51E-02	6,71E-01

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Resource use indicators

Results per declared unit for 1 kg of Wood Plastic Composite Product									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	-1,36E+00	2,28E-02	-1,44E-01	2,84E-03	2,14E-03	7,34E-02	7,39E-05	1,10E-01
PERM	MJ	3,91E+00	0,00E+00	-1,57E-01	0,00E+00	0,00E+00	-3,57E+00	-1,88E-01	-1,18E-02
PERT	MJ	2,55E+00	2,28E-02	-3,01E-01	2,84E-03	2,14E-03	-3,50E+00	-1,88E-01	9,78E-02
PENRE	MJ	-3,59E+00	2,57E+00	-6,67E-01	1,88E-02	1,56E-01	-3,97E+01	7,66E-03	1,01E+00
PENRM	MJ	1,93E+01	0,00E+00	-1,05E-02	0,00E+00	0,00E+00	-1,83E+01	-9,63E-01	-4,92E-01
PENRT	MJ	1,57E+01	2,57E+00	-6,78E-01	1,88E-02	1,56E-01	-5,80E+01	-9,55E-01	5,18E-01
SM	kg	3,46E-01	1,20E-03	7,03E-03	2,69E-06	6,65E-05	3,03E-03	1,93E-06	-1,21E-02
RSF	MJ	4,20E-03	5,00E-06	8,47E-05	1,71E-08	8,45E-07	2,49E-05	3,99E-08	5,35E-06
NRSF	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
FW	m ³	6,13E-03	2,17E-04	2,28E-04	1,03E-05	2,31E-05	3,59E-04	7,97E-06	2,46E-04
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								



Waste indicators

Results per declared unit for 1 kg of Wood Plastic Composite Product									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	9,09E-02	3,60E-03	3,39E-03	1,26E-04	2,65E-04	1,01E-02	8,46E-06	2,91E-03
Non-hazardous waste disposed	kg	2,34E+00	5,31E-02	1,03E-01	3,19E-03	4,90E-03	2,29E-01	1,93E-04	1,41E-01
Radioactive waste disposed	kg	1,13E-05	3,41E-07	7,38E-07	4,94E-08	3,38E-08	7,49E-07	1,19E-09	3,37E-07

Output flow indicators

Results per declared unit for 1 kg of co-extrusion products									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	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
Material for recycling	kg	7,00E-02	0,00E+00	2,55E-02	0,00E+00	0,00E+00	9,50E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	6,24E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	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

Disclaimer: it is discouraging the use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C.

References

EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products
ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework
ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines
ISO 14020:2022 Environmental statements and programmes for products — Principles and general requirements
ISO 14025:2010 Environmental labels and declarations — Type III environmental declarations — Principles and procedures
Int'l EPD System PCR 2019:14 Construction products, version 1.3.4, 2024-04-30
General Programme Instructions of the international EPD® system. Version 5.0
LCA background report of Yixing Hualong New Material Lumber Co.,Ltd

