Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

PMH-3080 High Density Polyethylene (HDPE) Pre-applied Waterproof Membrane

from

Beijing Oriental Yuhong Waterproof Technology Co., Ltd.

Programme:	The International EPD® System, www.environdec.com
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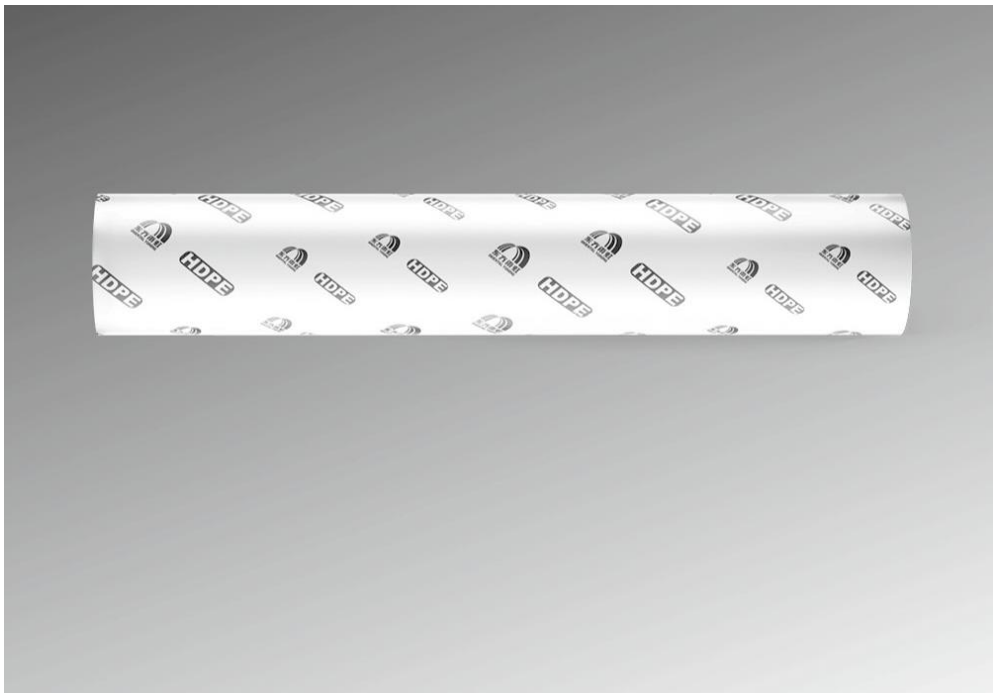


General information

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) and c-PCR-032 Flexible sheets for waterproofing (EN 17388-2024).*
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: *Lucia Zhang, Intertek* *lucia.zhang@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: *Freddy Navarro, LCACHECK S.A.S. de C.V.* 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:
Beijing Oriental Yuhong Waterproof Technology Co., Ltd.

Contact:
Yujia Li
liyj04@yuhong.com.cn

Description of the organization:
Founded in 1995, Oriental Yuhong, over the past 20-plus years, has been devoted to providing high-quality waterproofing system solutions for tens of thousands of major infrastructures and industrial, civil and commercial buildings. Having grown into a leading service provider in the construction and building materials industry, the company went public in 2008 and its operating revenue exceeded CNY 31.2 billion in 2021, nearly 44 times that of 2008. In the meantime, some of its products have been awarded the CE Mark of the EU, the EC1 Mark of Germany, and other marks at home and abroad. It has also won numerous titles including the 17th China Quality Award, National Quality Benchmark (2017), National Technological Innovation Demonstration Enterprise and has been included in the list of Fortune China 500 and China's Top 500 Private Enterprises.

Product-related or management system-related certifications:
ISO 9001:2015, ISO 45001:2018, ISO 50001:2018 and ISO 14001:2015

Name and location of production site(s):
GUANGDONG ORIENTAL YUHONG BUILDING MATERIALS CO., LTD.
No. 3, Zhongfu Road, Zhongxin Town, Zengcheng District, Guangzhou City

Product information

Product name:
PMH-3080 High Density Polyethylene (HDPE) Pre-applied Waterproof Membrane

Product description:
PMH-3080 is a pre-applied high-density polyethylene (HDPE) waterproofing membrane. It consists of a thick HDPE film, pressure-sensitive adhesive and weather resistance granular layer. One long edge of the membrane has a reserved 80mm wide self-adhesive overlap or a 100mm wide welding strip, used for watertight lap joint construction.

Characteristics		PMH-3080
Product thickness, mm		1.2
Product weight, kg/m^2		1.6
Product form, tiles or planks	Width, mm	1,200
	Length, mm	20,000

Products application:
The PMH-3080 is a non-self-adhesive waterproof membrane, the prepared concrete can be evenly poured directly onto the membrane to achieve the waterproof function.

UN CPC code:

3633 Plates, sheets, film, foil and strip, of plastics, not self-adhesive, non-cellular and not reinforced, laminated, supported or similarly combined with other materials

Geographical scope:
A1-A3 China; A4 From China to Global; A5 Global; C1-C4 Global; D Global.

LCA information

Declared unit:
1 m^2 of PMH-3080 High Density Polyethylene (HDPE) Pre-applied Waterproof Membrane
The conversion factor is 1.6 kg per m^2 (0.625 m^2/kg) based on the product of PMH-3080.

Reference service life:
The service life of the product is considered to be the same as that of the building as it is a product that is incorporated into the building's installations, i.e., >70 years.

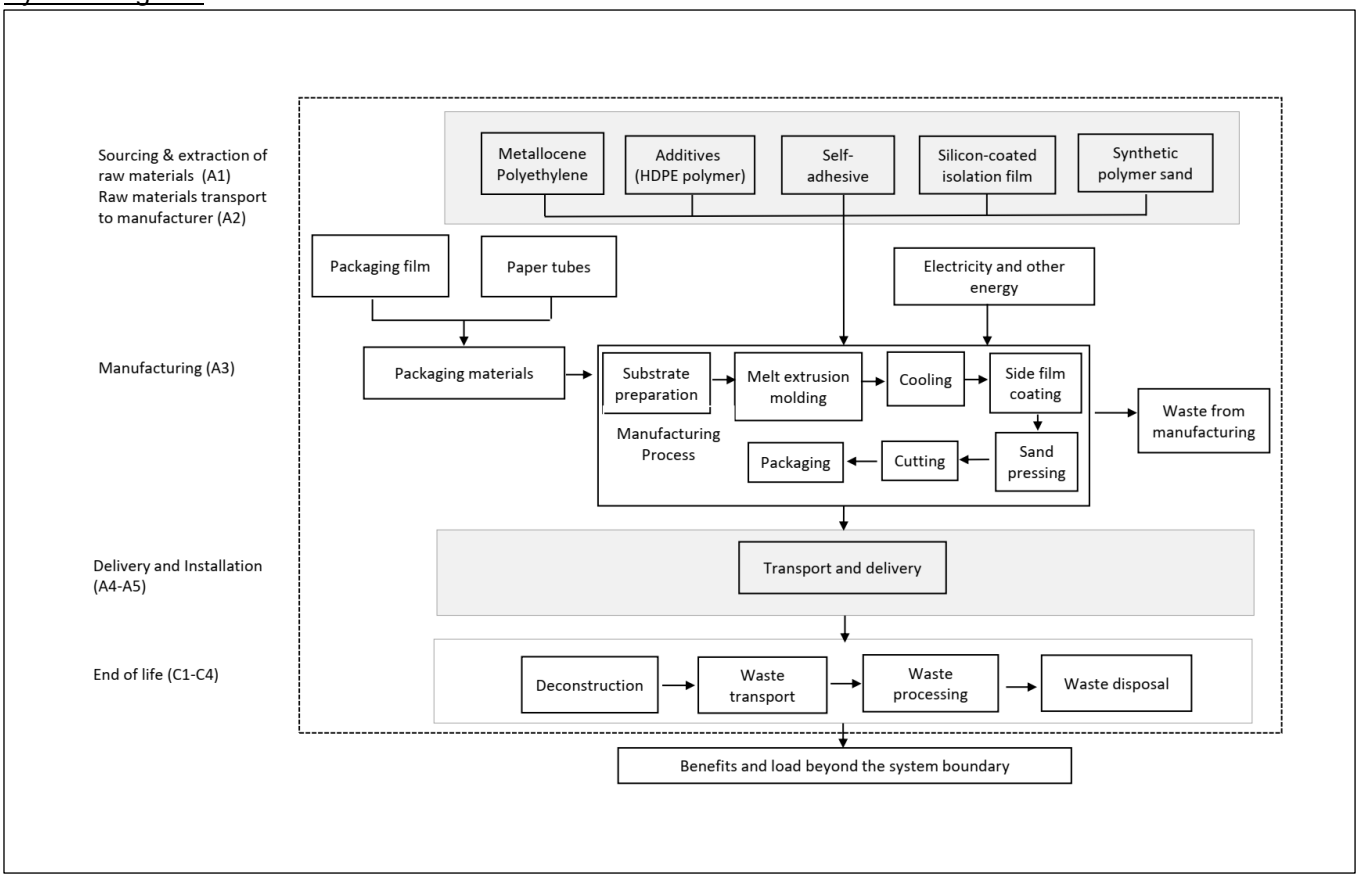
Time representativeness:
1st January 2024 to 31st December 2024 (12 months)

Database(s) and LCA software used:
Ecoinvent 3.10 (Allocation, cut-off by classification) and Simapro 9.6.0.1 software

Characterization factors:
Reference package EF 3.1

Description of system boundaries:
The system boundary refers to *Part 2: Cradle to gate with options and module D (EN 17388-2:2024)*, which included A1-A3 product stage, A4-A5 Construction and installation 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 GLO	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	31%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

More information:
Electricity data source used in the manufacturing process in A3: Market group for electricity, medium voltage, CN-CSG, in Ecoinvent 3.10 (cut-off)
GWP-GHG: 0.1892 kg CO_2 eq./kWh

Product stage (A1-A3)

A1, Raw material supply takes into account the extraction and processing of all raw materials and energy which occur upstream of the studied manufacturing process. Specifically, raw material supply covers the sourcing of Metallocene Polyethylene, Synthetic polymer sand, Silicon-coated isolation film, adhesive, and special additives.

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

A3, Manufacturing. The manufacturing process of PMH-3080 product mainly includes:

The raw material is mixed and heated, melted and extruded through a mold, and then the mixture is calendared into a sheet to create substrate. After cooling, the thickness of the substrate is measured, and then the surface is coated with self-adhesive and a layer of side film is laid, the protective layer is formed after sand-pressing. Cut the semi-finished product to size and curl it. The finished products are packed into cartons and sent to the warehouse.

Quality checks are made at each step of the production process.

Packaging-related flows in the production process are included in the manufacturing module, i.e. packaging film and paper tubes. Apart from the production of packaging material, the supply and transport of packaging material are also considered in the LCA model.

Construction process stage (A4-A5)

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 350 km transported by lorry and 4211 nautical miles (ie., 7800 km) transported by ship. Particularly, in the absence of specific data, the following scenario shall be used: transport with 16 t to 32 t truck (50 % Euro 4, 50 % Euro 5) with load capacity 85 % (outward journey) and 35 % (return journey) and fuel consumption of 34 L per 100 km, which is consistent with c-PCR-032.

A5, Installation into the buildings. The PMH-3080 is a non-self-adhesive waterproof membrane, the prepared concrete can be evenly poured directly onto the membrane to achieve the waterproof function. Furthermore, a manual vibrator shall be used to vibrate the poured concrete to ensure its uniformity and compaction. No additional fastening materials such as glue, adhesives, or mechanical fixation are needed for the installation.

The impacts associated with packaging disposal are included with the installation phase. The waste packaging, including paper tubes and packaging film shall be disposed of by the local waste management as a matter of priority to conform to the actual national conditions. According to the *Plastic waste management project launched in the KSA* in *Waste & Recycling MEA* magazine, 35% of municipal solid waste will be converted into sustainable substitute fuels and 14% will be recycled, as per statement. Also, the *Paper Recycling Confex MEA*, organised by *Waste & Recycling MEA* magazine, highlights the emerging trends in recovered fibre industry: the recycling rate in Africa is just about 24 percent, with Kenya's rate being 30 percent, the recovery rate in Asia is 52 percent. Therefore, the end-of-life scenario of paper tubes was assumed 52% for recycling, the remaining half was sent for energy recovery and landfill respectively based on the clarification of the EPD owner regarding the representative sales locations of the product.

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

C1, De-construction. The deconstruction of waterproofing membranes is anticipated to occur simultaneously with the demolition of the building structure. The environmental impact of demolishing the analysed product is negligible compared to demolishing the building structure. Thus, it is assumed that the energy consumed in dismantling PMH-3080 has minor significance and the environmental impact of this module is set to be zero.

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 to have the same weight as the declared product. A default distance of 50 km between the building where the product was installed and the waste manager facility (landfill) was considered in this module.
C3, Waste processing for reuse, recovery and/or recycling. It is assumed that 100% of the deconstructed products (C1) will be landfilled. Hence, no waste processing is required.
C4, Disposal. 100% of the deconstructed products are assumed to be sent to landfill.

Resource Recovery Stage (D)
D, Reuse/recovery/recycling potential.
100% of the deconstructed products are assumed to be sent to landfill. Hence, there are no benefits deriving from the reuse or recycling of the product after its end-of-life stage.
Need to add that, the benefits and loads regarding recycling potential of packaging materials were calculated.

The scenarios for modules A4-A5, C1-C4 and D are realistic and representative of one of the most probable alternatives. The scenarios do not include processes or procedures that are not in current use or whose feasibility has not been demonstrated. The module collects the most likely scenarios based on the best knowledge currently available. Particularly, regarding the C4 module, a statement shall be clarified that locally an additional calculation will be necessary based on the local applicable waste treatment scenario.

CUT-OFF CRITERIA

The study does not exclude any modules or processes that are stated mandatory in EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.
The study includes all major raw materials and energy consumption. All inputs and outputs of the unit processes, for which data is available, are included in the calculation. 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 environmental data sources follows the methodology “allocation, cut-off by classification”. This methodology is in line with the requirements of the EN 15804 standard.

During data collection, allocation according to physical was applied. Specifically, in allocating the input and output, i.e. energy within the production site such as electricity and heat, water among the various series of products, allocation is done by the mass ratio of the declared products produced on an annual average. For the allocation of waste, this study strictly follows the PCR. The waste allocation is based on the polluters pay principle. For environmental burden from the waste generated from the

manufacturing process, it is allocated to the studied product. For the environmental burden of the end-of-life stage, it is allocated to the studied product.

During the production process of the PMH-3080 product, there were co-products produced along with the studied products, which are product scraps from the manufacturing process. However, the product scrap was used internally in the same product system for the products included in this study. This is a case of closed-loop recycling, thereby no co-products leave the product system, and no allocation was done for the product scrap, i.e. burdens of materials entered the final products are calculated in this study.

Key assumptions

1. 100% of the deconstructed products are assumed to be sent to landfills.
2. For missing background data, the substitution of missing data using a similar background data approach was taken to shorten the gap. A sensitivity analysis was conducted.
---The pigment in Silicon-coated isolation film was replaced by carbon black production.
---The silicon dioxide in Synthetic polymer sand was replaced by silica sand production.

Inclusion or exclusion of Infrastructure and/or Capital goods

Depending on the PCR, in general, the production and end-of-life processes of infrastructure or capital goods used in the product system should be excluded, unless there is evidence that they are relevant in terms of their environmental impact, or when a generic LCI dataset includes infrastructure/capital goods, and it is not possible, within reasonable effort, to subtract the data on infrastructure/capital goods from this dataset (directly citation from section 4.3.2 of PCR 1.3.4). In this study, the infrastructure and capital goods are not included in the LCA analysis since they are used plenty of times for several years for the product manufacturing. According to the PCR, it should be excluded.

Content information

Product components	Weight, kg	Post-consumer recycled material, weight-% of component	Post-consumer recycled material, weight-% (versus product)	Biogenic material content of component, kg C/kg	Biogenic material, (versus product), kg C/kg declared unit
4009	0.5713	0%	0%	0	0
PPB-M02D	0.3082	0%	0%	0	0
DFDA-7042	0.0193	0%	0%	0	0
SIS-1615	0.0192	0%	0%	0	0
Synthetic polymer sand	0.4213	0%	0%	0	0
Adhesive	0.253	0%	0%	0	0
Silicon-coated isolation film	0.0077	0%	0%	0	0
TOTAL	1.6000	0%	0%	0	0
Packaging materials	**Weight, kg**	**Post-consumer recycled material, weight-% of component**	**Post-consumer recycled material, weight-% (versus product)**	**Biogenic material content of component, kg C/kg**	**Biogenic material, (versus product), kg C/kg declared unit**
Packaging film	0.2603	0%	0%	0	0
Paper tube	0.0374	0%	0%	0.4255	0.0159
TOTAL	0.2977	0%	0%	0.4255	0.0159

Substances, REACH – Very High Concern

The product does not contain any REACH SVHC substances in amounts greater than 0.1% (1000 ppm).

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804, EF3.1

Results per declaration unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	7.15E+00	2.81E-01	3.28E-01	ND	0.00E+00	1.56E-02	0.00E+00	1.82E-02	-1.03E-01
GWP-biogenic	kg CO_2 eq.	-4.88E-02	4.47E-05	7.24E-02	ND	0.00E+00	2.68E-06	0.00E+00	1.11E-04	2.86E-03
GWP-luluc	kg CO_2 eq.	3.72E-03	1.31E-04	2.19E-05	ND	0.00E+00	6.23E-06	0.00E+00	1.03E-05	1.51E-04
GWP-total	kg CO_2 eq.	7.11E+00	2.81E-01	4.01E-01	ND	0.00E+00	1.56E-02	0.00E+00	1.84E-02	-1.00E-01
ODP	kg CFC 11 eq.	2.68E-07	4.04E-09	4.88E-10	ND	0.00E+00	2.25E-10	0.00E+00	4.55E-10	-2.94E-09
AP	mol H^+ eq.	3.58E-02	4.94E-03	1.60E-04	ND	0.00E+00	5.85E-05	0.00E+00	1.94E-04	-3.59E-04
EP-freshwater	kg P eq.	1.25E-03	1.50E-05	4.38E-06	ND	0.00E+00	1.22E-06	0.00E+00	2.80E-05	-2.20E-05
EP-marine	kg N eq.	9.06E-03	1.28E-03	1.06E-04	ND	0.00E+00	2.03E-05	0.00E+00	4.84E-05	-5.73E-05
EP-terrestrial	mol N eq.	9.68E-02	1.41E-02	5.96E-04	ND	0.00E+00	2.21E-04	0.00E+00	5.21E-04	-6.97E-04
POCP	kg NMVOC eq.	3.90E-02	4.01E-03	2.11E-04	ND	0.00E+00	8.11E-05	0.00E+00	1.83E-04	-4.59E-04
ADP-minerals&metals*	kg Sb eq.	3.22E-05	5.63E-07	1.49E-07	ND	0.00E+00	5.01E-08	0.00E+00	4.02E-08	-6.57E-07
ADP-fossil*	MJ	1.43E+02	3.68E+00	4.74E-01	ND	0.00E+00	2.19E-01	0.00E+00	3.98E-01	-2.79E+00
WDP*	m^3	1.62E+00	1.25E-02	-1.71E-02	ND	0.00E+00	9.89E-04	0.00E+00	-2.55E-01	-2.36E-02
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 declaration unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	7.17E+00	2.81E-01	3.42E-01	ND	0.00E+00	1.56E-02	0.00E+00	1.84E-02	-1.00E-01

Resource use indicators

Results per declaration unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	5.28E+00	3.63E-02	2.43E-01	ND	0.00E+00	2.77E-03	0.00E+00	5.41E-03	-3.04E-01
PERM	MJ	4.81E-01	0.00E+00	-4.81E-01	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	5.76E+00	3.63E-02	-2.38E-01	ND	0.00E+00	2.77E-03	0.00E+00	5.41E-03	-3.04E-01
PENRE	MJ	1.43E+02	3.68E+00	9.98E+00	ND	0.00E+00	2.19E-01	0.00E+00	4.76E+01	-2.79E+00
PENRM	MJ	5.82E+01	0.00E+00	-1.11E+01	ND	0.00E+00	0.00E+00	0.00E+00	-4.72E+01	0.00E+00
PENRT	MJ	2.02E+02	3.68E+00	-1.07E+00	ND	0.00E+00	2.19E-01	0.00E+00	3.98E-01	-2.79E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	4.15E-02	3.81E-04	-3.64E-04	ND	0.00E+00	2.96E-05	0.00E+00	-5.92E-03	-6.21E-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									

Note: For the calculation of primary energy use indicators, the option A of ANNEX 3: GUIDANCE TO CALCULATING THE PRIMARY ENERGY USE INDICATORS from PCR 2019: 14 v1.3.4 was referenced.

[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 CO_2 is set to zero.

Waste indicators

Results per declaration unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	3.39E-03	7.14E-05	2.15E-03	ND	0.00E+00	5.51E-06	0.00E+00	1.83E-04	-3.03E-06
Non-hazardous waste disposed	kg	5.51E-01	8.86E-02	1.57E-01	ND	0.00E+00	1.03E-02	0.00E+00	1.60E+00	1.29E-03
Radioactive waste disposed	kg	6.00E-05	5.71E-07	1.64E-07	ND	0.00E+00	4.41E-08	0.00E+00	8.65E-08	-1.07E-06

Output flow indicators

Results per declaration unit										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	5.59E-02	ND	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	ND	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	ND	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	ND	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

General Programme Instructions of the International EPD® System. Version 5.0.

PCR 2019:14 Construction products, version 1.3.4

c-PCR-032 Flexible sheets for waterproofing (EN 17388: 2024), version: 2024-10-14

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

EN 15804:2012+A2:2019/AC:2021 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

Ecoinvent 3.10 database.

Beijing Oriental Yuhong Waterproof Technology Co., Ltd. LCA background report (version: 2025-06-18).

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