

Environmental Product Declaration



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

Plywood

from

Xuzhou Xinshidai Wood Co., Ltd.

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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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 2019:2014 Construction products (version 1.2.5);

c-PCR-006 (to PCR 2019:2014) – Wood and wood-based products for use in construction (EN 16485:2014) (version 2019-12-20);

UNCPC Code: 3151

PCR review was conducted by:

The Technical Committee of the International EPD® System. The review panel could be contacted via info@environdec.com.

Life Cycle Assessment (LCA)

LCA accountability:

Sijia YANG, Juanjuan YAO, and Yanjing ZHU from IVL Swedish Environmental Research Institute

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:

Katrin Molina-Besch, Miljögiraff AB (katrin@miljogiraff.se) under the guidance of Pär Lindman, Miljögiraff AB (par@miljogiraff.se)

Approved by: The International EPD® System

OR

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

EPD verification by accredited certification body

Third-party verification: *<name, organisation>* is an approved certification body accountable for the third-party verification

The certification body is accredited by: *<name of accreditation body & accreditation number, where applicable>*

OR

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

EPD verification by EPD Process Certification*

Internal auditor: <name, organisation>

Third-party verification: <name, organisation> is an approved certification body accountable for third-party verification

Third-party verifier is accredited by: <name of accreditation body & accreditation number, where applicable>

*For EPD Process Certification, an accredited certification body certifies and reviews the management process and verifies EPDs published on a regular basis. For details about third-party verification procedure of the EPDs, see GPI.

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

Yes No

[Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

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:

Xuzhou Xinshidai Wood Co., Ltd

Contact:

Yanlei WANG

Panelproduct@outlook.com

Description of the organisation:

Xuzhou Xinshidai Wood Co., Ltd. is a leading enterprise of Xuzhou Municipal Agricultural Industrialisation in Pizhou City, Jiangsu Province. The company was established in October 2014, which currently covers an area of 100,000 square meters and a building area of 60,000 square meters for producing wood products. It has four plywood production lines, with domestic advanced Yimasding thick sanding machine, Qingdao Qianchuan sanding and corresponding dust removal equipment, roller dryer, etc. Xuzhou Wood company has 50 employees in 2022. The main products are series of multi-layer boards, high-grade film-coated boards, special-shaped boards, etc., with high quality, and the products are sold well in the United States, Europe, the Middle East, and other regions.

Name and location of production site(s):

Shuanggou Village, Guanhu Town, Pizhou City, Jiangsu Province, China

Product information

Product name:

Plywood

Product description:

The Plywood product reported in this EPD is the main product produced in the Xuzhou Xinshidai Wood factory, which is made of thin multiple cross-banded veneer, the nominal thickness of veneers ranges from 1.4mm - 2.5mm. In general, plywood products are sustainable material for permanent buildings and infrastructure. Panels of plywood products are strong, stiff, and lightweight and hence suitable for multiple different uses in building and construction applications, such as roofing, flooring, wall sheeting and concrete forming. For the Plywood product in this LCA study, except for the poplar timber, it also contains the phenolic resin adhesive, wheat flour, and hard paper to get the advanced function. The density of the product is 541 kg/m³. The Plywood product is mainly sold to the Europe countries, especially selling to the Nordic countries such as Sweden and Finland.

About the technical function, the average value on bending strength of the Plywood product for longitudinal is 50.5 N/mm², for cross grain is 49.6 N/mm². For modulus of Elasticity in bending of the product, the average value of longitudinal is 5340 N/mm² and the cross grain is 4620 N/mm². The bonding quality of the product on gluelines, the mean shear strength is from 1.07 to 1.31 N/mm² and the Mean apparent cohesive wood failure 10% to 20% on different gluelines.

UN CPC code:

3151

Geographical scope:

A1-A3 China; A4 From China to Europe; A5 Europe; B Europe; C Europe; D Europe.

LCA information

Declared unit:

1 m³ of plywood product throughout its whole life cycle from cradle to grave.

Reference service life:

100 years.

Depending on the function of the Plywood product, the reference service life (RSL) of the Plywood product is 100 years. Plywood products are used indoors in dry or moderately humid conditions (refer to Conditions of Use) and are often used for roofing, flooring, and wall panels. Studies and practical experience have shown that plywood products such as plywood could have an expected service life similar to that of solid wood in dry and moderately humid conditions. When properly installed and used, and with less exposure to highly humid environments (i.e., with suitable or low humidity), plywood can have a service life of up to 100 years.

Time representativeness:

The primary data for manufacturing stage (A3) is provided by the Plywood producer, representing the year of 2021. The secondary data is cited from the ecoinvent and/or Sphera databases, all of them are no older than 10 years.

Database(s) and LCA software used:

The ecoinvent and Sphera databases are used in the study. Gabi 10.6 is the LCA software.

Description of system boundaries:

The system boundary is the cradle to grave and module D (A + B + C + D). All life cycle stages are analysis in the study, including: A1-A3 product stage, A4-A5 construction stage, B use stage, C1-C4 end-of-life stage, and D benefits and loads beyond the system boundary.

System diagram:

Modules	Life cycle stage	Key points	Included in the study (Yes/No)
A1-A3 Product Stage	A1 Raw material supply	A1 – raw material supply, including processing of secondary material input	Yes
	A2 Transport	A2 – transport of raw material and secondary material to the manufacturer	Yes
	A3 Manufacturing	A3 – manufacture of the construction products, and all upstream processes from cradle to gate	Yes
A4-A5 Construction Process Stage	A4 Transport	A4 – transport of construction products to the building site	Yes
	A5 Construction installation	A5 – the building installation/construction and associated waste	Yes
B Use Stage	B1 Use	B1 – use of the installed product, service or appliance	Yes
	B2 Maintenance	B2 – maintenance of the product	
	B3 Repair	B3 – repair of the product	
	B4 Replacement	B4 – replacement of the product	
	B5 Refurbishment	B5 – refurbishment of the construction product	
	B6 Operational energy use	B6 – operational energy	
	B7 Operational water use	B7 – operational water use	
C End of Life Stage	C1 Deconstruction, demolition	C1 – demolition of the building/building product	Yes
	C2 Transport	C2 – transport of the demolition waste comprising the end-of-life construction product to waste processing facility or to final disposal	Yes
	C3 Waste processing	C3 – waste processing operations for reuse, recovery or recycling	Yes
	C4 Disposal	C4 – final disposal of end-of-life construction product	Yes
D Benefits and Loads Beyond the System Boundary	D Reuse, recovery, recycling,	D – reuse/recovery/recycling potential evaluated as net impacts and benefits	Yes

LCA practitioner

Organisation:

SIWALIYA Environmental Technologies (Beijing) Co. Ltd
IVL Swedish Environmental Research Institute Beijing Office

Contact:

Juanjuan YAO, Project Manager, juanjuan.yao@ivl.se

More information

Allocation:

Allocation rules for multifunctional products and multiproduct processes are mentioned in PCR. The Xuzhou Xinshidai Wood has co-products when producing the Plywood product in this production line, the economic allocation rule (in specific, the revenue ratio of the Plywood product and the co-product) is applied in this study. For the timber and electricity consumption in the production line, the economic allocation rule is applied for allocating the usage by the Plywood product and the co-product respectively. The Xuzhou Xinshidai Wood produces other wood products in the factory, which have the similar economic value with the Plywood product. To allocate the auxiliary materials usage, energy consumption, emissions and solid waste of the factory, the physical allocation rule is applied depending on the annual yield rate of the Plywood product and other products.

Cut-off rules:

The cut-off criteria established by the PCR is that data for elementary flows to and from the product system contributing to a minimum of 95% of the declared environmental impacts shall be included (not including processes that are explicitly outside the system boundary). This study strictly follows the cut-

off rule. Raw materials with high environmental impacts were reserved in calculation even though their mass is smaller than 5% of the whole product. The cut-off rule is only applied on packages for raw and packaging materials of the Plywood product. The total amount of packages for raw and packaging materials of the Plywood product is fully below 1% and no high emission material is used for those packages.

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	X	X	X	X	X	X	X	X	X	X	X	X
Geography	CN	CN	CN	CN to EU*	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

* The product is sold to European countries. In this study, to a conservative consideration, the longest distance from the manufacturing factory to the overseas destination port is considered as the representative shipping distance in A4, which is from China to Sweden.

A1: The raw materials are supplied from the supplier to the Xuzhou Xinshidai Wood factory. For the wood material, there are two types. One is the timber, the other is the board. The timber will be processed to form boards in the Xuzhou Xinshidai Wood factory for the following manufacturing processes to make the Plywood product. Meanwhile, the factory also purchases some boards from the supplier, which could be used directly in the following process.

A2: The transportation of the raw material and package material to the Xuzhou Xinshidai Wood factory.

A3: The manufacturing of the Plywood product in the Xuzhou Xinshidai Wood factory.

A4: The transportation of the Plywood product to the construction site. This stage contains the overseas shipping from China to Europe.

A5: The construction of the Plywood product. The package will be wasted in the stage and 5% of the product will be lost during the construction.

B1-B7: No energy and materials are consumed in the whole use stage. No wastes and emissions generated due to the product from the stage.

C1: No energy and materials are consumed in the deconstruction stage. No wastes and emissions generated due to the product from the stage.

C2: The transportation of the waste product to the waste processing plant.

C3: The waste processing stage. The incineration with energy recovery is considered as the end-of-life treatment process of the Plywood product. The credit from the energy recovery in this stage is calculated in Module D.

C4: No waste product is sent to C4.

D: The credit from the energy recovery in C3 is calculated as the thermal energy and electricity in Sweden level.

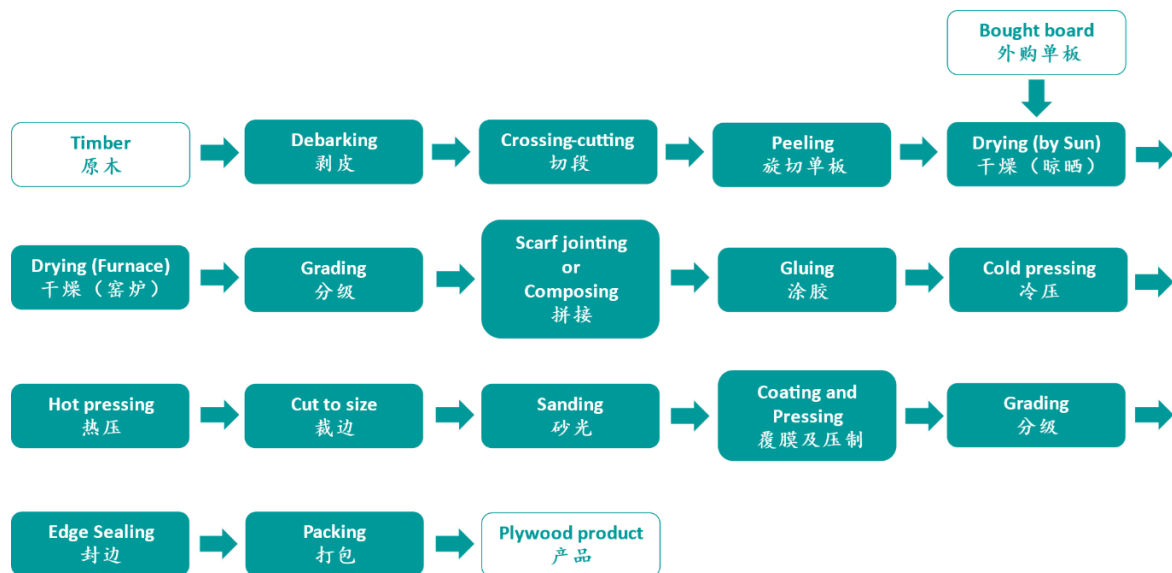


Figure 1. The Plywood manufacturing processes in the Xuzhou Xinshidai Wood factory (A3)

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Timber	843.37	0%	100%, 0.494 kg C/kg dry mass
Board	81.12	0%	100%, 0.494 kg C/kg dry mass
Phenolic resin adhesive	80.32	0%	0%
Wheat flour	20.58	0%	100%, 0.475 kg C/kg
Hard paper (melamine impregnated paper)	21.67	0%	28.26%, 0.143 kg C/kg
TOTAL	1047.06	0%	90.84%, 0.448 kg C/kg (i.e., 242.62 kg C/m³ product)
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Wooden pallet	3.56	0.6580%	0.588
PE film	0.09	0.0166%	0
Iron belt	1.59	0.2939%	0
Paint	0.53	0.0979%	0.200
Corrugated board	0.85	0.1571%	0.450
Corner protection (Plastic, PVC)	0.03	0.0055%	0
Paper packaging	1.83	0.3383%	0.417
TOTAL	8.48	1.5675%	0.0062 kg C/kg (i.e., 3.34 kg C/m³ product)

For one cubic meter Plywood product, it contains 242.62 kg bio-carbon from the raw material and its package contains 3.34 kg bio-carbon.

To be noted that the total amount of raw materials is higher than the product density when considering mass loss during the production, which mainly due to the water evaporation from the wood materials.

There are no SVHC substances in the product.

Environmental Information

For construction services, the total value of A1-A3 shall be replaced with the total value of A1-A5.

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional or declared unit										
Indicator	Unit	A1-A3 Total	A4	A5	B	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	- 8.87E+02	6.73E+01	1.28E+01	0.00E+00	0.00E+00	4.40E+00	1.52E+03	0.00E+00	- 9.39E+01
GWP-fossil	kg CO ₂ eq.	5.27E+02	6.70E+01	5.22E-01	0.00E+00	0.00E+00	4.37E+00	1.09E+02	0.00E+00	- 9.28E+01
GWP-biogenic	kg CO ₂ eq.	- 1.42E+03	7.80E-06	1.23E+01	0.00E+00	0.00E+00	3.66E-05	1.41E+03	0.00E+00	- 1.03E+00
GWP-luluc	kg CO ₂ eq.	7.07E+00	2.85E-01	2.02E-03	0.00E+00	0.00E+00	2.96E-02	1.51E-03	0.00E+00	-1.16E-01
ODP	kg CFC 11 eq.	1.19E-05	6.24E-12	6.94E-14	0.00E+00	0.00E+00	4.32E-13	3.06E-11	0.00E+00	-1.51E-10
AP	mol H ⁺ eq.	2.76E+00	5.71E-01	3.82E-04	0.00E+00	0.00E+00	5.19E-03	4.55E-01	0.00E+00	-5.49E-01
EP-freshwater	kg P eq.	7.57E-02	1.54E-04	1.08E-06	0.00E+00	0.00E+00	1.57E-05	1.84E-05	0.00E+00	-4.72E-03
EP-marine	kg N eq.	9.28E-01	1.61E-01	1.25E-04	0.00E+00	0.00E+00	1.73E-03	2.07E-01	0.00E+00	-2.05E-01
EP-terrestrial	mol N eq.	9.86E+00	1.78E+00	1.53E-03	0.00E+00	0.00E+00	2.06E-02	2.49E+00	0.00E+00	- 1.65E+00
POCP	kg NMVOC eq.	2.35E+00	4.34E-01	3.29E-04	0.00E+00	0.00E+00	4.51E-03	5.30E-01	0.00E+00	-4.37E-01
ADP-minerals&metals*	kg Sb eq.	1.47E-03	5.22E-06	3.11E-08	0.00E+00	0.00E+00	4.43E-07	1.30E-06	0.00E+00	-3.35E-05
ADP-fossil*	MJ	9.97E+03	8.85E+02	4.01E+00	0.00E+00	0.00E+00	5.77E+01	2.42E+02	0.00E+00	- 2.10E+03
WDP*	m ³	3.46E+02	6.55E-01	2.47E-02	0.00E+00	0.00E+00	4.92E-02	9.35E+01	0.00E+00	- 3.76E+01
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.

Additional mandatory impact category indicator

Results per functional or declared unit										
Indicator	Unit	A1-A3 Total	A4	A5	B	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq.	5.13E+02	6.62E+01	5.19E-01	0.00E+00	0.00E+00	4.32E+00	1.08E+02	0.00E+00	- 9.00E+01

Use of resources

Results per functional or declared unit										
Indicator	Unit	A1-A3 Total	A4	A5	B	C1	C2	C3	C4	D
PERE	MJ	1.72E+04	4.04E+01	2.93E-01	0.00E+00	0.00E+00	4.00E+00	5.09E+01	0.00E+00	- 4.43E+03
PERM	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	0.00E+00
PERT	MJ	1.72E+04	4.04E+01	2.93E-01	0.00E+00	0.00E+00	4.00E+00	5.09E+01	0.00E+00	- 4.43E+03
PENRE	MJ	9.98E+03	8.88E+02	4.03E+00	0.00E+00	0.00E+00	5.79E+01	2.42E+02	0.00E+00	- 2.10E+03
PENRM	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	0.00E+00
PENRT	MJ	9.98E+03	8.88E+02	4.03E+00	0.00E+00	0.00E+00	5.79E+01	2.42E+02	0.00E+00	- 2.10E+03
SM	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	0.00E+00
RSF	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	0.00E+00
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	0.00E+00
FW	m ³	8.49E+00	4.90E-02	8.21E-04	0.00E+00	0.00E+00	4.62E-03	2.24E+00	0.00E+00	- 2.67E+00

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 production and output flows

Waste production

Results per functional or declared unit										
Indicator	Unit	A1-A3 Total	A4	A5	B	C1	C2	C3	C4	D
Hazardous waste disposed	kg	4.47E-06	3.70E-09	2.78E-11	0.00E+00	0.00E+00	3.06E-10	2.29E-08	0.00E+00	-4.54E-07
Non-hazardous waste disposed	kg	5.27E+00	1.04E-01	2.08E-02	0.00E+00	0.00E+00	9.44E-03	6.17E+00	0.00E+00	-5.03E+00
Radioactive waste disposed	kg	7.08E-02	1.21E-03	1.08E-05	0.00E+00	0.00E+00	1.07E-04	1.78E-02	0.00E+00	-5.07E-01

Output flows

Results per functional or declared unit										
Indicator	Unit	A1-A3 Total	A4	A5	B	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	0.00E+00
Material for recycling	kg	9.20E-01	0.00E+00	3.49E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.14E+02	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	6.89E+02	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	6.73E+03	0.00E+00	0.00E+00

References

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c-PCR Wood and wood-based products for use in construction (EN16485:2004), C-PCR-006 (to PCR 2019:14), Version: 2019-12-20, Valid until 2024-12-20

The International EPD system, <https://www.environdec.com>

ISO (2006a). ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO (2006b). ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework.

ISO (2006c). ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines.

Gabi database. GaBi LCA Databases 2022 Edition.

Gabi LCA software. The Gabi LCA software and corresponding database are provided by Sphera in Leinfelden-Echterdingen, Germany. Gabi version 10.6 was used.

LCA database published by the ecoinvent association originally known as the ecoinvent Centre, the Swiss Centre for Life Cycle Inventories. Since June 2013 ecoinvent is a not-for-profit association founded by institutes of the ETH Domain and the Swiss Federal Offices. The version 3.7.1 was used.

GPI (2021), General Programme Instructions for the International EPD System version 4.0.

Sphera. The provider of the Gabi LCA software and database.

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