



**KLH**<sup>®</sup>

# Environmental Product Declaration



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

## **KLH<sup>®</sup> - CLT (Cross Laminated Timber)**

from

**KLH Massivholz GmbH**

Programme:	The International EPD <sup>®</sup> System, <a href="http://www.environdec.com">www.environdec.com</a>
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](http://www.environdec.com)*



## General Information

### Programme information

<b>Programme:</b>	The International EPD® System
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a>
<b>E-mail:</b>	<a href="mailto:info@environdec.com">info@environdec.com</a>

<b>Accountabilities for PCR, LCA and independent, third-party verification</b>
<b>Product Category Rules (PCR)</b>
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <Construction products, PCR 2019:14, version 1.2.5 and UN CPC code: 314 – Boards and panels Wood and Wood-based products for use in construction, C-PCR-006 (to PCR 2019:14), version 2019-12-20 and UN CPC 031, 311, 312, 313, 314, 315, 316, 319
PCR review was conducted by: <i>The Technical Committee of the International EPD® System contacted via <a href="mailto:info@environdec.com">info@environdec.com</a></i>
<b>Life Cycle Assessment (LCA)</b>
LCA accountability: <IBO – Österreichisches Institut für Bauen und Ökologie GmbH >
<b>Third-party verification</b>
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:  <input checked="" type="checkbox"/> EPD verification by individual verifier  Third-party verifier: <Angela Schindler, Umweltberatung>  Approved by: The International EPD® System
<b>OR</b>
Procedure for follow-up of data during EPD validity involves third party verifier:  <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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:

KLH Massivholz GmbH, Gewerbestraße 4, A – 8842 Teufenbach-Katsch, E-Mail [office@klh.at](mailto:office@klh.at),  
[www.klh.at](http://www.klh.at), Tel +43 3588 8835  
Contact: DI Andreas Wabl

### Description of the organisation:

KLH is one of the global leaders in the production of cross-laminated timber (KLH® - CLT), having pioneered the product in collaboration with the Technical University of Graz in 1996. Since 1999, when the first production facility in Teufenbach-Katsch, Styria, was put into operation, production capabilities and plant expansion have been continuously improved. The newest cutting-edge production plant in Bad St. Leonhard, Carinthia, was launched in 2021.

KLH® solid timber boards are widely used around the world as wall, ceiling, and roof elements in structural timber construction. KLH Massivholz is fully owned by Johann Offner Unternehmensgruppe, a traditional family business with over 250 years of history.

### Product-related or management system-related certifications:

ISO 9001- and 14001-certificate

### Name and location of production site(s):

KLH Massivholz GmbH  
Gewerbestrasse 4  
A-8842 Teufenbach-Katsch

KLH Massivholz Wiesenau GmbH  
Wiesenau 2  
A-9462 Bad St. Leonhard

## Product information

### Product name:

KLH® - CLT (Cross Laminated Timber)

### Product identification:

KLH® - CLT (Cross-Laminated Timber) are panel-shaped wood-based materials manufactured according to ETA 06/0138 (European Technical Assessment)/.

### Product description:

KLH® - CLT consist of softwood boards or rod-glued boards or wood-based panels that are glued together to form cross-laminated timber (solid panel-shaped timber construction elements). Generally, the softwood boards of the successive individual layers are arranged perpendicularly (angle of 90°) to each other. During the production process, small amounts of glue are added to make panels from crosswise arranged boards, which are then finished as required. Depending on the surface type, a corresponding surface is produced using various processes. Board thicknesses up to and including 500 mm can be produced. KLH® - CLT (cross-laminated timber) has an average moisture content of 12 % (+/-2 %).

Application / intended use:

KLH® - CLT is ideally suited for load-bearing, bracing and non-load-bearing wall, ceiling and roof elements. They are used in the construction of single-family houses, multi-storey residential buildings, public buildings, administrative buildings, industrial and commercial buildings, conversions and extensions as well as in bridge construction.

The dimensioning and execution are carried out according to the static, structural-physical and legal requirements. For this reason, KLH® - CLT are manufactured exclusively on a project-specific and made-to-order basis.

When used correctly no limit is either known or expected from its service life stability. The service life that can be expected from KLH® - CLT on correct use thus equals that of the service life of the building in which it is used.

UN CPC code:

31421 Other plywood, veneered panels and similar laminated wood, of coniferous wood

HS code: 44188200 Cross-laminated timber "CLT or X-lam"

Geographical scope:

KLH produces KLH® - CLT at two factory sites in Austria and delivers the products all over the world. In 2021, approx. 96 % of the wood for KLH® - CLT came from Austrian sawmills and their surrounding forests.



Approach to chemicals (hazardous substances)

No dangerous substances from the candidate list of SVHC for Authorisation are present in concentrations greater than 0.1% by weight in the product.

**LCA information**

It is the declaration of a product from two factories of one producer.

Functional unit / declared unit:

1 m<sup>3</sup> of KLH® - CLT (with an average density of 470 kg/m<sup>3</sup> and a moisture content of 12 % (+/- 2 %)).

Reference service life:

The RSL is understood as the period of time until the CLT is replaced, rebuild, renovated or restored. If properly installed, the service lifetime of the CLT is equal to the lifetime of the building. Wood products can reach a service life of over 100 years in service classes 1 and 2. The reference service life of 100 years corresponds to the specifications of the service life catalogue of Bau-EPD GmbH, Austria for the preparation of EPDs /Bau EPD GmbH 2015/ for glulam.



Time representativeness:

The data for the KLH® - CLT are collected from the two factory sites in Teufenbach-Katsch and Wiesenau (Bad St. Leonhard). The production data for “Katsch” are mainly from 2020. The “Wiesenau” plant was newly built and the utilisation was very low at the beginning, the last 3 months of the declared data from August to October 2021 were considered more representative and extrapolated to 1 year.

Database(s) and LCA software used:

Data from /ecoinvent v3.8 (2021)/ for generic data and the Software SimaPro (Version 9.3.0.3 Multi user) has been used.

Description of system boundaries:

Cradle to gate with options and module D (A + C + D)

More information:

Standards /EN 15804/, /EN 16485/ and /PCR 2019:14/ from The International EPD® System provide the core product category rules for the assessment.

Target group: business-to-business & business-to-consumer

Cut-off rule:

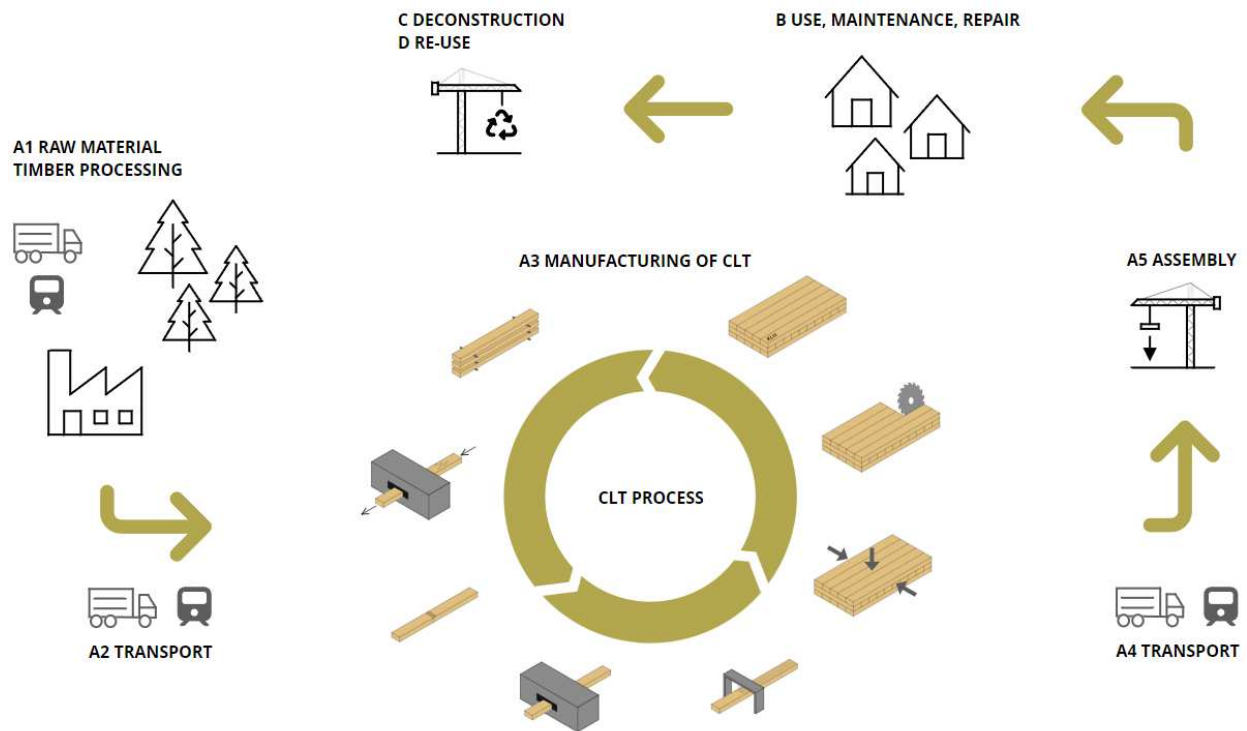
1 %. This rule is based on the assumption that the input flows do not have a major impact on the environmental impacts as a whole.

Allocation:

The allocation is performed according to EN15804. Physical, economic and energy allocations have been used.

Data quality:

Specific LCA data for the manufacturing of the KLH® - CLT at the Teufenbach-Katsch plant are from 2020. The Wiesenau plant was newly built. For this site the CLT figures from August – October 2021 were stable and scaled up to one year. The impact results are based on the average weighted by the annual production volume of both plants. Specific electricity consumption for the main sawmill is from 2021. The upstream data is based on /ecoinvent v3.8/, where no data is older than 10 years. The deviation of the results from both plants is for the most indicators and life stages clearly below 10 %.



Product stage (A1-A3):

These stages cover upstream processes such as the extraction and processing of sawn raw softwood boards mainly from Austria, the production of glue, auxiliary and packaging materials. A declared ecological electricity mix was taken into account for the main sawmill.

All information on truck transport from the origin of these materials to the two KLH factory sites, including intra-plant transport was included.

The production of KLH® - CLT and by-products includes all incoming and outgoing material and energy flows. Site-specific ecological mixes were declared and balanced for electricity consumption.

Construction process (A4-A5):

The majority of the KLH® - CLT panels are delivered to the customer by truck. The distance taken into account was 582 km, averaged over the domestic and international quantities. According to the manufacturer, there is no waste during installation due to the complete prefabrication. Diesel consumption for crane and lifting platform were estimated and included. Resulting packaging waste is sent for thermal waste treatment.

Use stage (B1-B7):

A declaration over the entire life cycle according to the PCR of construction products is not permissible if no functional unit has been defined. Since no environmental impacts are to be expected during the use of the product and no harmful substances are released into the air, water or soil, no impacts would occur in the use phase. Therefore, the declaration of the use phase was waived.

End of life stage (C1-C4):

It was assumed that the energy required to remove the elements at the end of life corresponds to that required to install them.

**Scenario 1** in C3 assumes 100 % incineration with energy recovery. An average transport distance to the waste incineration plant of 50 km is assumed in C2.

The products can theoretically be dismantled non-destructively. A confirmation from the manufacturer was submitted that 100 % reuse is possible. Therefore complete reuse is accounted for in **scenario 2**. It lies in the future and requires planning for the deconstruction of fasteners, connections and for material separation, some of which is already being implemented.

It was assumed that the panels are taken to a recycling plant. For this purpose, the distance of 50 km is assumed in C2.

#### Resource recovery (D):

##### Scenario 1 Thermal recovery:

Energy recovery for electricity is accounted for with an efficiency of 11.61 % and for heat with an efficiency of 29.34 % /CEWEP 2012/. Collection and recovery without losses during shredding was assumed. The net flows in Module D therefore also correspond to the quantities consumed.

It is assumed that all CO<sub>2</sub> absorbed during the growth phase of the wood is re-emitted in the disposal phase according to /EN 16485/. Thus, there is no benefit in module D either. In the following product system, the CO<sub>2</sub> must again be included negatively according to /EN 16485/.

In Scenario 2 Reuse, the 100 % reuse benefits the complete creation of 1 m<sup>3</sup> KLH® - CLT in the subsequent system. The CO<sub>2</sub> is also re-emitted in disposal C3 according to /EN 16485/. In addition, however, in Module D, the CO<sub>2</sub> is also shown as a credit.

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

Stages	Production			Con- struction process		Use							End of life				Resource recovery
	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	
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
Geography	AT(96 %) and EU	EU	AT	GLO	EU	-	-	-	-	-	-	-	EU 27	GLO	RER	-	RER
Specific data used	> 90 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	6,9 %					-	-	-	-	-	-	-	-	-	-	-	-

## Content Information

Average content for both sites

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% dry mass and kg C/kg per produkt
Sawn wood board from softwood (u=12 %)	466	0	88 resp. 0,5
Glue	4,0	0	0
TOTAL	470	0	88 resp. 0,5
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Polyethylene	1,1	0,2	0
Polyester	0,17	0,002	0
TOTAL	1,27	0,23	0



## Environmental Information | Production / Construction

The impact categories and associated indicators, methods and characterisation factors of EN 15804:2012+A2:2019 of 2020-02-15 (EF 3.0) were used

### Potential environmental impact - 1m<sup>3</sup> KLH® - CLT

Indicator		Unit	A1-A3	A4	A5
Global warming potential (GWP)	fossil	kg CO <sub>2</sub> eq.	8,53E+01	4,55E+01	1,30E+01
	biogenic	kg CO <sub>2</sub> eq.	-7,62E+02	0,00E+00	0,00E+00
	land use and land use change	kg CO <sub>2</sub> eq.	2,09E+00	1,79E-02	9,46E-04
	total	kg CO <sub>2</sub> eq.	-6,75E+02	4,55E+01	1,30E+01
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	1,57E-05	1,05E-05	1,99E-06
Acidification potential (AP)		mol H <sup>+</sup> eq.	6,75E-01	1,85E-01	9,70E-02
Eutrophication potential (EP)	freshwater	kg P eq.	2,72E-02	2,93E-03	2,94E-04
	marine	kg N eq.	2,49E-01	5,56E-02	4,30E-02
	terrestrial	mol N eq.	2,70E+00	6,07E-01	4,71E-01
Formation potential of tropospheric ozone (POCP)		kg NMVOC eq.	1,23E+00	1,86E-01	1,29E-01
Abiotic depletion potential*	for non-fossil resources (ADPE)	kg Sb eq.	5,23E-04	1,58E-04	4,94E-06
	fossil resources (ADPF)	MJ	1,41E+03	6,87E+02	1,28E+02
Water (user) deprivation potential (WDP)*		m <sup>3</sup>	3,28E+01	1,99E+00	1,92E-01

### Use of resources - 1m<sup>3</sup> KLH® - CLT

Parameter		Unit	A1-A3	A4	A5
Primary energy resources – renewable	used as energy carrier (PERE)	MJ	4,28E+02	9,31E+00	7,04E-01
	used as raw material (PERM)	MJ	7,90E+03	0,00E+00	0,00E+00
	total (PERT)	MJ	8,33E+03	9,31E+00	7,04E-01
Primary energy resources - non-renewable	used as energy carrier (PENRE)	MJ	1,27E+03	6,87E+02	1,78E+02
	used as raw (PENRM)	MJ	1,28E+02	0,00E+00	-5,04E+01
	total (PENRT)	MJ	1,40E+03	6,87E+02	1,28E+02
Use of secondary material (SM)		kg	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels (RSF)		MJ	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels (NRSF)		MJ	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water (FW)		m <sup>3</sup>	-1,79E-01	-1,74E-03	-4,35E-03

### Waste production - 1m<sup>3</sup> KLH® - CLT

Parameter	Unit	A1-A3	A4	A5
Hazardous waste disposed (HWD)	kg	5,19E-03	1,80E-03	3,53E-04
Non-hazardous waste disposed (NHWD)	kg	3,84E+01	3,54E+01	2,35E-01
Radioactive waste disposed (RWD)	kg	1,51E-02	9,26E-03	1,76E-03

### Output flows - 1m<sup>3</sup> KLH® - CLT

Parameter	Unit	A1-A3	A4	A5
Components for re-use (CRU)	kg	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity (EEE)	MJ	0,00E+00	0,00E+00	5,85E+00
Exported energy, thermal (EET)	MJ	0,00E+00	0,00E+00	1,48E+01

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

## Environmental Information | End of Life “Incineration”

### Potential environmental impact - 1m<sup>3</sup> KLH® - CLT

Indicator		Unit	C1	C2	C3	C4	D
Global warming potential (GWP)	fossil	kg CO <sub>2</sub> eq.	9,42E+00	3,97E+00	1,36E+01	0,00E+00	-2,65E+02
	biogenic	kg CO <sub>2</sub> eq.	0,00E+00	0,00E+00	7,62E+02	0,00E+00	0,00E+00
	land use and land use change	kg CO <sub>2</sub> eq.	9,40E-04	1,23E-03	1,75E-03	0,00E+00	-2,50E-01
	total	kg CO <sub>2</sub> eq.	9,42E+00	3,97E+00	7,76E+02	0,00E+00	-2,65E+02
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	2,01E-06	8,94E-07	5,83E-07	0,00E+00	-3,00E-05
Acidification potential (AP)		mol H <sup>+</sup> eq.	9,78E-02	1,63E-02	1,52E-01	0,00E+00	-6,44E-01
Eutrophication potential (EP)	freshwater	kg P eq	2,92E-04	3,07E-04	2,86E-03	0,00E+00	-1,05E-01
	marine	kg N eq	4,33E-02	4,68E-03	7,79E-02	0,00E+00	-1,27E-01
	terrestrial	mol N eq	4,75E-01	5,14E-02	8,17E-01	0,00E+00	-1,17E+00
Formation potential of tropospheric ozone (POCP)		kg NMVOC eq.	1,31E-01	1,57E-02	2,12E-01	0,00E+00	-3,53E-01
Abiotic depletion potential*	for non-fossil resources (ADPE)	kg Sb eq.	4,84E-06	1,17E-05	1,75E-05	0,00E+00	-2,63E-04
	fossil resources (ADPF)	MJ	1,29E+02	5,96E+01	4,68E+01	0,00E+00	-4,93E+03
Water (user) deprivation potential (WDP)*		m <sup>3</sup>	1,84E-01	3,84E-01	1,12E+00	0,00E+00	-2,40E+01

### Use of resources - 1m<sup>3</sup> KLH® - CLT

Parameter		Unit	C1	C2	C3	C4	D
Primary energy resources - renewable	used as energy carrier (PERE)	MJ	7,01E-01	7,14E-01	7,90E+03	0,00E+00	-3,95E+02
	used as raw material (PERM)	MJ	0,00E+00	0,00E+00	-7,90E+03	0,00E+00	0,00E+00
	total (PERT)	MJ	7,01E-01	7,14E-01	2,11E+00	0,00E+00	-3,95E+02
Primary energy resources - non-renewable	used as energy carrier (PENRE)	MJ	1,29E+02	5,96E+01	1,25E+02	0,00E+00	-4,92E+03
	used as raw (PENRM)	MJ	0,00E+00	0,00E+00	-7,77E+01	0,00E+00	0,00E+00
	total (PENRT)	MJ	1,29E+02	5,96E+01	4,68E+01	0,00E+00	-4,92E+03
Use of secondary material (SM)		kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels (RSF)		MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels (NRSF)		MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water (FW)		m <sup>3</sup> .	-2,44E-03	5,59E-03	-6,63E-04	0,00E+00	-5,42E-01

### Waste production - 1m<sup>3</sup> KLH® - CLT

Parameter	Unit	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	3,54E-04	3,66E-05	1,35E-04	0,00E+00	-4,37E-03
Non-hazardous waste disposed (NHWD)	kg	1,76E-01	2,81E+00	5,21E+00	0,00E+00	-8,26E+00
Radioactive waste disposed (RWD)	kg	1,78E-03	8,00E-04	2,15E-04	0,00E+00	-3,19E-02

### Output flows - 1m<sup>3</sup> KLH® - CLT

Parameter	Unit	C1	C2	C3	C4	D
Components for re-use (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity (EEE)	MJ	0,00E+00	0,00E+00	9,26E+02	0,00E+00	0,00E+00
Exported energy, thermal (EET)	MJ	0,00E+00	0,00E+00	2,34E+03	0,00E+00	0,00E+00

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

## Environmental Information | End of Life “Re-use”

### Potential environmental impact - 1m<sup>3</sup> KLH® - CLT

Indicator		Unit	C1	C2	C3	C4	D
Global warming potential (GWP)	fossil	kg CO <sub>2</sub> eq.	9,42E+00	3,97E+00	0,00E+00	0,00E+00	-8,76E+01
	biogenic	kg CO <sub>2</sub> eq.	0,00E+00	0,00E+00	7,62E+02	0,00E+00	-7,62E+02*)
	land use and land use change	kg CO <sub>2</sub> eq.	9,40E-04	1,23E-03	0,00E+00	0,00E+00	-2,09E+00
	total	kg CO <sub>2</sub> eq.	9,42E+00	3,97E+00	7,62E+02	0,00E+00	-8,52E+02*)
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	2,01E-06	8,94E-07	0,00E+00	0,00E+00	-1,59E-05
Acidification potential (AP)		mol H <sup>+</sup> eq.	9,78E-02	1,63E-02	0,00E+00	0,00E+00	-6,90E-01
Eutrophication potential (EP)	freshwater	kg P eq.	2,92E-04	3,07E-04	0,00E+00	0,00E+00	-2,81E-02
	marine	kg N eq.	4,33E-02	4,68E-03	0,00E+00	0,00E+00	-2,52E-01
	terrestrial	mol N eq.	4,75E-01	5,14E-02	0,00E+00	0,00E+00	-2,75E+00
Formation potential of tropospheric ozone (POCP)		kg NMVOC eq.	1,31E-01	1,57E-02	0,00E+00	0,00E+00	-1,24E+00
Abiotic depletion potential*	for non-fossil resources (ADPE)	kg Sb eq.	4,84E-06	1,17E-05	0,00E+00	0,00E+00	-5,42E-04
	fossil resources (ADPF)	MJ	1,29E+02	5,96E+01	0,00E+00	0,00E+03	-1,45E+03
Water (user) deprivation potential (WDP)*		m <sup>3</sup>	1,84E-01	3,84E-01	0,00E+00	0,00E+00	-3,31E+01

\*) The CO<sub>2</sub> stored in the end product CLT was included as a credit.

### Use of resources - 1m<sup>3</sup> KLH® - CLT

Parameter		Unit	C1	C2	C3	C4	D
Primary energy resources - renewable	used as energy carrier (PERE)	MJ	7,01E-01	7,14E-01	7,90E+03	0,00E+00	-5,16E+02
	used as raw material (PERM)	MJ	0,00E+00	0,00E+00	-7,90E+03	0,00E+00	-7,90E+03
	total (PERT)	MJ	7,01E-01	7,14E-01	0,00E+00	0,00E+00	-8,42E+03
Primary energy resources - non-renewable	used as energy carrier (PENRE)	MJ	1,29E+02	5,96E+01	7,77E+01	0,00E+00	-1,31E+03
	used as raw (PENRM)	MJ	0,00E+00	0,00E+00	-7,77E+01	0,00E+00	-7,77E+01
	total (PENRT)	MJ	1,29E+02	5,96E+01	0,00E+00	0,00E+00	-1,39E+03
Use of secondary material (SM)		kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels (RSF)		MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels (NRSF)		MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water (FW)		m <sup>3</sup>	-2,44E-03	5,59E-03	0,00E+00	0,00E+00	1,78E-010

### Waste production - 1m<sup>3</sup> KLH® - CLT

Parameter	Unit	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	3,54E-04	3,66E-05	0,00E+00	0,00E+00	-5,25E-03
Non-hazardous waste disposed (NHWD)	kg	1,76E-01	2,81E+00	0,00E+00	0,00E+00	-3,89E+01
Radioactive waste disposed (RWD)	kg	1,78E-03	8,00E-04	0,00E+00	0,00E+00	-1,53E-02

### Output flows - 1m<sup>3</sup> KLH® - CLT

Parameter	Unit	C1	C2	C3	C4	D
Components for re-use (CRU)	kg	0,00E+00	0,00E+00	4,70E+02	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal (EET)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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

## Other environmental performance indicators

Information about additional environmental impact indicators for each module is declared in the background report “Hintergrundbericht (Projektbericht) für eine Umweltproduktdeklaration für das Produkt KLH® - CLT (Kreuzlagenholz) der Firma KLH Massivholz GmbH aus den Werken Teufenbach-Katsch und Wiesenau“ from 29.6.2023 Version 1.0 ” and available on request:

Parameter	Particulate matter emissions (PM)	Ionising radiation, human health ***	Ecotoxicity (freshwater) **	Human toxicity, cancer effects **	Human toxicity, non-cancer effects **	Land use related impacts / soil quality **
Unit	disease inc.	kBq U-235 eq	CTUe	CTUh	CTUh	Pt

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

\*\*\* This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

## Additional Required Impact Indicator Acc. /PCR 2019:14/

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<sub>2</sub> is set to zero. The GWP-GHG indicator creates comparability with climate declarations and carbon footprints according to ISO 14067 and is thereby useful in various regulative contexts (e.g., national regulations on climate declarations).

### Production / construction / use stages

Indicator	Unit	A1-A3	A4	A5
GWP-GHG	kg CO <sub>2</sub> eq.	8,53E+01	4,55E+01	1,30E+01

### End of Life “Incineration”

Indicator	Unit	C1	C2	C3	C4	D
GWP-GHG	kg CO <sub>2</sub> eq.	9,42E+00	3,97E+00	1,36E+01	0,00E+00	-2,65E+02

### End of Life “Re-use”

Indicator	Unit	C1	C2	C3	C4	D
GWP-GHG	kg CO <sub>2</sub> eq.	9,42E+00	3,97E+00	0,00E+00	0,00E+00	-8,97E+01

## Additional Social and Economic Information

KLH Massivholz is a company that places a strong emphasis on environmental responsibility, both internally and externally. Quality, environmental protection and energy efficiency are inseparably linked. That is why KLH has established an environmental management system in accordance with EN ISO 14001 and integrated it into its quality management.

KLH is committed to

- source raw materials from sustainably managed forests to conserve resources
- environmentally friendly use of technologies and manufacturing processes
- minimize CO<sub>2</sub> emissions through efficient procurement and sales logistics
- increase energy efficiency by using by-products for our own energy supply
- actively avoid and minimize waste
- reduce pollutants and emissions

Overall, KLH's commitment to sustainability goes beyond the manufacturing process. Commitment to the protection of soil, water and air and the primacy of environmental responsibility. KLH Massivholz strives to offer its customers high-quality products and services that reflect this dedication to the environment.

Project specific environmental impact of KLH® - CLT constructions can be estimated with the KLHdesigner co2 application <https://www.klhdesigner.at/co2/>



co2

## Differences Versus Previous Versions

2023-06-29 Version 1

2023-08-25 Version 1.1

**Editorial change:** Corrected spelling mistakes. Uniform formatting of the headings. Upper and lower case was corrected.

2023-10-11 Version 1.2

**Editorial change:** Error in module A5 for PENRE on page 9/15, typo on page 14

## References

General Programme Instructions of the International EPD® System. Version 4.0.  
PCR 2019:14. Construction Products. Version 1.2.5

c-PCR 2019:14. WOOD AND WOOD-BASED PRODUCTS FOR USE IN  
CONSTRUCTION (EN 16485:2014)- Version 2019-12-20

PCR 2012:01-SUB-PCR-E. WOOD AND WOOD-BASED PRODUCTS FOR USE IN  
CONSTRUCTION (EN 16485:2014)- Version 2.24

CEWEP 2012. Dr.-Ing. Dieter O.Reimann, CEWEP Energy Report III, Dezember 2012

Bau EPD GmbH 2015. Bau EPD GmbH: Nutzungsdauerkatalog der Bau-EPD GmbH für die Erstellung  
von EPDs, Version 0.02 vom 10.8.2015

## Standards

EN 15804:2012+A2:2019/AC:2021. Sustainability of construction works - Environmental product  
declarations - Core rules for the product category of construction products CEWEP Energy Report III

EN 16485:2014 Round and sawn timber. Environmental product declarations. Product category rules  
for wood and wood-based products for use in construction

EN 16449:2014 Wood and wood-based products. Calculation of the biogenic carbon content of wood  
and conversion to carbon dioxide

EN 15942:2012 Sustainability of construction works - Environmental product declarations -  
Communication format business-to-business

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

ISO 14044:2006 Environmental management. Life Cycle Assessment. Requirements and guidelines.

ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental  
product declarations of construction products and services

## Tools and database

Software SimaPro (Version 9.3.0.3 Multi user), PRè Consultance B.V.  
Ecoinvent 3.8 (2021) database. <http://www.ecoinvent.org>

## EPD owner

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