



Environmental product information for LEED v4.1[®] building certification

**Structural finger jointed solid timber according to EN 15497
GLT[®] – Girder longitudinally tensiletested
according to ETA-13/0644, issued on 01.04.2019**

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This document aims at the identification of linkages between environmental product information covered by EPDs and the requirements of the LEED v4.1® building certification. It provides an overview of product related features based on the LEED v4.1 credit library [www.usgbc.org/credits, accessed on 05/2022, LEED BD+C: New Construction v4.1]

.product description

Structural finger jointed solid timber and GLT® – Girders Longitudinally Tensiletested from HASSLACHER Group are industrially manufactured products for loadbearing structures. They consist of kiln-dried, finger-jointed planks and squared timber made of softwood, which are graded visually or mechanically according to their strength. PUR adhesives are used for bonding. Structural finger jointed solid timber is produced with a maximum wood moisture content of 18 %.

.application

Structural finger jointed solid timber is used as a loadbearing element in building and bridge construction.

.technical data

Structural data for structural finger jointed solid softwood timber according to *EN 15497* and GLT® – Girder Longitudinally Tensiletested according to *ETA-13/0644* are given. The products are being delivered to the market with the appropriate CE mark and Declaration of Performance.

Name	Value	Unit
Wood species according to <i>EN 1912</i> and letter codes, if any, in accordance with <i>EN 13556</i>	PCAB (Norway spruce) ABAL (Silver fir) PNSY (Scots pine)	
Mean humidity acc. to <i>EN 13183-1</i>	Approx. 15	%
Use of wood preservatives (the test rating of the wood preservative according to <i>DIN 68800-3</i> must be stated) ¹⁾	Iv, P and W	-
Characteristic value of bending strength parallel to grain acc. to <i>EN 338</i> and <i>ETA-13/0644</i>	24 24 * k _{pl}	N/mm ²
Characteristic value of compressive strength perpendicular to grain acc. to <i>EN 338</i>	2.5	N/mm ²
Characteristic value of tensile strength parallel to grain acc. to <i>EN 338</i> and <i>ETA-13/0644</i>	14 14 * k _{pl}	N/mm ²
Characteristic value of tensile strength perpendicular to grain acc. to <i>EN 338</i>	0.4	N/mm ²
Mean characteristic value of modulus of elasticity parallel to grain acc. to <i>EN 338</i> and <i>ETA-13/0644</i>	11.000 11.600	N/mm ²
Characteristic value of shear strength acc. to <i>EN 338</i>	4.0	N/mm ²
Mean characteristic value of shear modulus acc. to <i>EN 338</i>	690	N/mm ²
Dimensional deviation acc. to <i>EN 336</i>	Dimensional tolerance class 2 Width and height (< 100 mm): +/- 1 mm; Width and height (> 100 mm): +/- 1.5 mm	mm
Surface quality	Visual quality, industrial quality	-
Thermal conductivity (perpendicular to grain) acc. to <i>ISO 10456</i>	0.12	W/(mK)
Specific heat capacity acc. to <i>ISO 10456</i>	1600	J/(kgK)
Water vapour diffusion resistance factor acc. to <i>ISO 10456</i>	μ = 50 (dry) to 20 (wet)	-

¹⁾ According to *DIN 68800-1*, wood preservative treatment is only permissible if structural measures have been exhausted and is therefore unusual.

.environmental product declaration

Owner of the declaration	HASSLACHER Holding GmbH
Programme holder & publisher	Institut Bauen und Umwelt e.V. (IBU)
ECO-EPD at ECO platform	yes
Author of the LCA	Daxner & Merl GmbH
Software & database	GaBi software-system and database for life cycle engineering GaBi 10, database 2020.2 [see documentation]
Third-party verification	Completed; Type III declaration in compliance with <i>ISO 14025</i>
External verifier	Matthias Klingler
Declaration number	EPD-HAS-20210170-IBD1-EN (Solid structural timber Structural finger jointed solid timber for loadbearing purposes according to EN 15497 GLT® – Girder longitudinally tensiletested according to ETA-13/0644, issued on 01.04.2019)
Issue date	10.09.2021
Valid to	02.08.2026
Declaration type	Manufacturer's declaration of an average product according to <i>EN 15804</i>
EPD specifications	The EPD was created according to the specifications of <i>EN 15804+A2</i>
Declared unit	1 m ³ HASSLACHER solid structural timber with an average density of 470 kg/m ³ at 15 % moisture at delivery, manufactured by the HASSLACHER group at the production site in Preding (Austria).
Conversion factor [mass/declared unit]	HASSLACHER solid structural timber: 470
Reference period	Structural finger jointed solid timber corresponds to glued laminated timber (glulam) lamellas in its components and production. Glued laminated timber has been used for over 100 years. In addition to inhouse and external monitoring, structural finger jointed solid timber from HASSLACHER PREDING Holzindustrie GmbH is also subjected to a proof loading procedure for online quality assurance of the finger joints and the product. When used as intended, no end to its durability is known or to be expected. The service life of structural finger jointed solid timber is therefore the same as the service life of the building when used as intended.
End of life scenario	The product reaches the end of its waste status after removal from the building, transport to processing and chipping of the product. For the end of life of the HASSLACHER solid wood products, energy recovery as secondary fuel in a biomass power plant is assumed. As the main sales market for HASSLACHER products is concentrated in the European region, plant-specific characteristic values correspond to a European average scenario (EU28). The scenario considers a reprocessing rate of 100 % for the solid wood products after removal from the building. This assumption has to be adjusted accordingly when applying the results in the building context. At the end-of-life of the product, the equilibrium moisture is comparable to the moisture content at delivery. This value can vary depending on the storage of the product before energy recovery.

.results of the LCA – environmental impacts acc. to EN 15804+A2

Declared unit: 1m ³ solid structural timber (470 kg/m ³)							
Declared life cycle stage		Product stage		End of life stage			Benefits and loads beyond the system boundary
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -eq.]	-6.96E+02	0.00E+00	1.42E+00	7.59E+02	0.00E+00	-4.19E+02
GWP-fossil	[kg CO ₂ -eq.]	5.67E+01	0.00E+00	1.41E+00	3.4E+00	0.00E+00	-4.08E+02
GWP-biogenic	[kg CO ₂ -eq.]	-7.53E+02	0.00E+00	-1.67E-03	7.56E+02	0.00E+00	-1.08E+01
GWP-luluc	[kg CO ₂ -eq.]	4.63E-01	0.00E+00	1.15E-02	5.29E-03	0.00E+00	-3.19E-01
ODP	[kg CFC11-eq.]	1.34E-06	0.00E+00	2.77E-16	8.95E-14	0.00E+00	-5.32E-12
AP	[mol H ⁺ - eq.]	4.55E-01	0.00E+00	4.66E-03	7.78E-03	0.00E+00	3.05E-01
EP-freshwater ¹	[kg P- eq.]	1.81E-03	0.00E+00	4.17E-06	1.00E-05	0.00E+00	-6.05E-04
EP-marine	[kg N- eq.]	1.94E-01	0.00E+00	2.14E-03	1.85E-03	0.00E+00	5.77E-02
EP-terrestrial	[mol N- eq.]	1.93E+00	0.00E+00	2.39E-02	1.94E-02	0.00E+00	6.98E-01
POCP	[kg NMVOC-eq.]	5.23E-01	0.00E+00	4.20E-03	5.01E-03	0.00E+00	2.62E-01
ADPE	[kg Sb-eq.]	2.53E-05	0.00E+00	1.25E-07	1.10E-06	0.00E+00	-7.47E-05
ADPF	[MJ]	7.46E+02	0.00E+00	1.87E+01	6.65E+01	0.00E+00	-7.17E+03
WDP	[m ³ World- eq. deprived]	1.06E+01	0.00E+00	1.30E-02	6.00E-01	0.00E+00	-1.05E+01

Caption

GWP – total = Global warming potential – total; GWP-fossil - Global warming potential - fossil fuels; GWP-biogenic - Global warming potential – biogenic; GWP-luluc - GWP from land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential; accumulated exceedance; EP-freshwater - Eutrophication, fraction of nutrients reaching freshwater end compartment; EP-marine - Eutrophication, fraction of nutrients reaching marine end compartment; EP-terrestrial - Eutrophication, accumulated exceedance; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE - Abiotic depletion potential for non-fossil resources; ADPF - Abiotic depletion potential for fossil resources; WDP - Water (user) deprivation potential, deprivation-weighted water consumption (WDP)

¹ Disclaimer: This indicator has been calculated as [kg P-equiv.] according to the characterization model of the JRC and Environmental Footprint Initiative.

.results of the LCA – resource use acc. to EN 15804+A2

Declared unit: 1m ³ solid structural timber (470 kg/m ³)							
Declared life cycle stage		Product stage		End of life stage			Benefits and loads beyond the system boundary
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	2.00E+03	0.00E+00	1.08E+00	7.68E+03	0.00E+00	-1.83E+03
PERM	[MJ]	7.65E+03	0.00E+00	0.00E+00	-7.65E+03	0.00E+00	0.00E+00
PERT	[MJ]	9.65E+03	0.00E+00	1.08E+00	3.06E+01	0.00E+00	-1.83E+03
PENRE	[MJ]	7.13E+02	0.00E+00	1.88E+01	6.65E+01	0.00E+00	-7.17E+03
PENRM	[MJ]	3.37E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	7.47E+02	0.00E+00	1.88E+01	6.65E+01	0.00E+00	-7.17E+03
SM	[kg]	1.22E-01	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	7.65E+03
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	8.10E-01	0.00E+00	1.23E-03	2.98E-02	0.00E+00	-1.20E+00

Caption

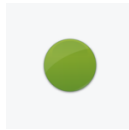
PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable 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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

.results of the LCA – output flows acc. to EN 15804+A2

Declared unit: 1m ³ solid structural timber (470 kg/m ³)							
Declared life cycle stage		Product stage		End of life stage			Benefits and loads beyond the system boundary
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	2.00E-06	0.00E+00	9.90E-10	1.76E-08	0.00E+00	-1.61E-06
NHWD	[kg]	1.80E+00	0.00E+00	2.95E-03	4.72E-02	0.00E+00	2.72E-01
RWD	[kg]	1.61E-02	0.00E+00	3.41E-05	9.90E-03	0.00E+00	-5.89E-01
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	4.70E+02	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Caption

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy, electric energy, EET = Exported energy, thermal energy

.LEED v4.1 credits with regard to environmental product information

LEED BD+C: New Construction v4.1 - LEED v4.1
Construction and Demolition Waste Management
Materials and Resources
Possible 2 Points

Intent

To reduce construction and demolition waste disposed of in landfills and incineration facilities through waste prevention and by reusing, recovering, and recycling materials, and conserving resources for future generations. To delay the need for new landfill facilities that are often located in frontline communities and create green jobs and materials markets for building construction services.

Option 1: Diversion

HASSLACHER solid structural timber represents a suitable target for diversion of resources from landfill. Applying re-use and recycling according to chapter 2.14.

Option 2. Waste Prevention

HASSLACHER solid structural timber including packaging materials can be separately collected and re-used or recycled.

Sections 2.8 and 2.9 of the environmental product declaration of HASSLACHER solid structural timber present details for the product's construction phase. In addition, section 2.14 indicates details for the product's re-use phase. Referring information are compliant with the intent to promote resource efficiency via the effective and appropriate management of construction waste. Aspects described in the EPD should be considered:

EPD | chapter 2.8 | product processing/installation

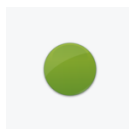
Structural finger jointed solid timber can be processed with suitable tools commonly used in solid timber processing. On request, products can also be processed on both sides in the factory. Occupational safety instructions must also be observed during processing/assembly.

EPD | chapter 2.9 | packaging

Polyethylene, solid timber, paper and cardboard as well as small amounts of other plastics are used.

EPD | chapter 2.14 | re-use phase

In the case of selective deconstruction, structural finger jointed solid timber can be reused or reutilised without any problems after the end of the utilisation phase in the sense of cascading utilisation ("reuse"). If it is not possible to reuse or reutilise structural finger jointed solid timber, it can be thermally recycled to generate process heat and electricity due to its high calorific value of approx. 19 MJ/kg.



LEED BD+C: New Construction v4.1 - LEED v4.1
Building Life-Cycle Impact Reduction
Materials and Resources
Possible 5 Points

Intent

To encourage adaptive reuse and optimize the environmental performance of products and materials.

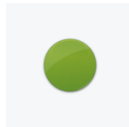
Option 1. Building and material reuse

According to Option 1, Path 1 HASSLACHER products can be included in the calculation of the percentage of existing building structural elements reused or salvaged. Building materials such as structural elements (walls-, ceilings-, roofs- and envelope constructions) or installed interior elements shall explicitly be included in the calculation.

Attention: Reuse materials contributing toward this credit may not contribute toward MR credit-Sourcing of Raw Materials!

Option 2. Whole-building life-cycle assessment

The environmental product declaration presents product specific values, which can directly be used for the life cycle assessment of the whole project. Given results are compliant with *ISO 14044* (and *EN 15804*) and report all listed impact categories.



LEED BD+C: New Construction v4.1 - LEED v4.1
Environmental Product Declarations
Materials and Resources
Possible 2 Points

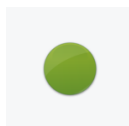
Intent

To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products from manufacturers who have verified improved environmental life-cycle impacts.

Option 1. environmental product declaration

HASSLACHER solid structural timber meets the following disclosure criteria:

- Environmental product declaration which complies with *ISO 14025*, *14040*, *14044* and *EN 15804+A2* with a cradle-to-gate scope with modules (Module A1-A3, Modules C1-C4 and Module D declared).
- Product-specific Type III EPD - Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator are valued as one whole product for purposes of credit achievement calculation.



LEED BD+C: New Construction v4.1 - LEED v4.1
Sourcing of Raw Materials
Materials and Resources
Possible 2 Points

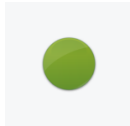
Intent

To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts. To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.

Product information for HASSLACHER solid structural timber within this credit:

Responsible sourcing of raw materials		Description
Wood products certified by Forest Stewardship Council or USGBC-approved equivalent	yes	Programme for the Endorsement of Forest Certification Schemes (PEFC) Certificate Number HFA-COC-0209 (Multisite) Date of first issuance: 21.06.2001 Date of issuance: 01.12.2021 Valid to: 30.06.2025
Recycled content element		No secondary wood is used to produce HASSLACHER solid structural timber.

The production of HASSLACHER solid structural timber takes place in Preding, Austria.



LEED BD+C: New Construction v4.1 - LEED v4.1
Material Ingredients
Materials and Resources
Possible 2 Points

Intent

To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.

Product information for HASSLACHER solid structural timber within this credit:

Option 2.

Material ingredient optimization

International Alternative Compliance Path – REACH Optimization	All ingredients comply with REACH requirements (date 19.01.2021), no other cancerogenic, mutagenic, reprotoxic (CMR) substances of category 1A or 1B that are on the ECHA candidate list, above 0.1 % by mass, see EPD section 2.5
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Download area for product data sheets: www.hasslacher.com/downloads

Additional useful information regarding this credit, see EPD chapter 2.11 and 7:

Environmental protection: According to the current state of knowledge, hazards to water, air and soil cannot arise if the products are used as intended.

Health protection: According to the current state of knowledge, no health hazards or impairments are to be expected.

With regard to formaldehyde, structural finger jointed solid timber is low in emissions due to its low adhesive content, its structure and its form of use. Structural finger jointed solid timber bonded using PUR adhesives has formaldehyde emission values that meet *EN 15497* in the range of natural wood, around 0.004 ml/m³.

MDI emissions are not measurable in structural timber bonded using PUR adhesives within the detection limit of 0.05 µg/m³. Due to the high reactivity of MDI with water (air and wood moisture), it can be assumed that structural finger jointed solid timber bonded in this way shows an emission of MDI in the range of the zero value a short time after manufacture.

According to the Holz Forschung Austria VOC emission test report acc. to *EN 16516* (number: 1414/2021 HC, 28.06.2021) the product fulfils the following standards and labels:

- the *AgBB* (Committee for health-related evaluation of building products) schema



LEED BD+C: New Construction v4.1 - LEED v4.1
 Low-Emitting Materials
 Indoor Environmental Quality
 Possible 3 Points

Intent

To reduce concentrations of chemical contaminants that can damage air quality and the environment, and to protect the health, productivity, and comfort of installers and building occupants.

Product information for HASSLACHER solid structural timber within this credit:

Item	Value	Unit
Test Institute	Holzforschung Austria – Österreichische Gesellschaft für Holzforschung	-
Report no.	1414/2021 HC	-
Test method	Measurement of the emissions of a sample with respect to VOC, formaldehyde and short-chain carbonyl compounds according to <i>EN 16516</i>	-
Relevant regulation	<i>AgBB, EN 16516</i>	-
Requirements met	yes	-
TVOC (C6 C16) (substance spec.) [28 days]	127	µg/m ³
TVOC (Toluene eq.) [28 days]	120	µg/m ³
R (dimensionless) [28 days]	0.09	-
Formaldehyde [28 days]	3.6	µg/m ³
TVOC (C6 C16) (substance spec.) [3 days]	268	µg/m ³
TVOC (Toluene eq.) [3 days]	243	µg/m ³
Formaldehyde [3 days]	8.6	µg/m ³

According to the Holz Forschung Austria VOC emission test report acc. to *EN 16516* (number: 1414/2021 HC, 28.06.2021) the product fulfils the following standards and labels:

- the *AgBB* (Committee for health-related evaluation of building products) schema

EPD chapter 2.11 Environment and health during use: With regard to formaldehyde, structural finger jointed solid timber is low in emissions due to its low adhesive content, its structure and its form of use. Structural finger jointed solid timber bonded using PUR adhesives has formaldehyde emission values that meet *EN 15497* in the range of natural wood, around 0.004 ml/m³.

MDI emissions are not measurable in structural timber bonded using PUR adhesives within the detection limit of 0.05 µg/m³. Due to the high reactivity of MDI with water (air and wood moisture), it can be assumed that structural finger jointed solid timber bonded in this way shows an emission of MDI in the range of the zero value a short time after manufacture.

For further information see LEED credit Material Ingredients, Materials and Resources.

Disclaimer: The content of, and results shown in this fact sheet are based on data and information submitted by the client. Therefore, Daxner & Merl GmbH makes no representation or warranty in regard of the correctness or completeness of the content of this document or the results shown.

.References

AgBB, board for the health evaluation of building products, German Federal Environmental Agency, Wörlitzer Platz 1, 06844 Dessau-Roßlau.

DIN 68800-1:2019-06, Wood preservation – Part 1: General. Wood preservation – Part 2: Preventive constructional measures in buildings.

DIN 68800-2:2012-02, Wood preservation – Part 2: Preventive constructional measures in buildings.

DIN 68800-3:2020-03, Wood preservation – Part 3: Preventive protection of wood with wood preservatives.

ECHA Candidate List: List of substances of very high concern considered for approval (status 19.01.2021) according to Article 59 para. 10 of the REACH Regulation. European Chemicals Agency.

EN 336: ÖNORM EN 336:2013-11-15, Structural timber – Sizes, permitted deviations.

EN 338: ÖNORM EN 338:2016-06-01, Structural timber – Strength classes.

EN 1912: ÖNORM EN 1912:2013-10-15, Structural timber – Strength classes – Assignment of visual grades and species.

EN 13183-1: ÖNORM EN 13183-1:2004-02-01, Moisture content of a piece of sawn timber – Part 1: Determination by oven dry method.

EN 13556: ÖNORM EN 13556:2003-09-01, Round and sawn timber. Nomenclature of timbers used in Europe.

EN 15497: ÖNORM EN 15497:2014-10-15, Structural finger jointed solid timber – Performance requirements and minimum production requirements.

EN 15804: DIN EN 15804:2012+A2:2019, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

EN 16516: DIN EN 16516:2020-10, Construction products: Assessment of release of dangerous substances – Determination of emissions into indoor air.

EPD 2021: EPD-HAS-20210170-IBD1-EN, Solid structural timber, Structural finger jointed solid timber for loadbearing purposes according to EN 15497, GLT® – Girder longitudinally tensiletested according to ETA-13/0644, issued on 01.04.2019, HASSLACHER Holding GmbH. Institut Bauen und Umwelt e.V. (IBU).

ETA-13/0644: ETA-13/0644 from 01.04.2019, European Technical Assessment for strength graded finger-jointed structural timber GLT®.

GaBi: GaBi 10, Software-System and Database for Life Cycle Engineering. DB 2020.2. Stuttgart, Echterdingen: Sphera, 1992-2020. Available at: <https://gabi.sphera.com/support/gabi>.

Holz Forschung Austria: Holz Forschung Austria, VOC emission test report acc. to EN 16516 (28.06.2021), number: 1414/2021 HC.

ISO 10456: ÖNORM EN ISO 10456:2010-02-15, Building materials and products Hygrothermal properties Tabulated design values and procedures for determining declared and design thermal values.

ISO 14025: DIN EN ISO 14025:2011-10, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO 14040:2006-07, Environmental management – Life cycle assessment – Principles and framework.

ISO 14044: DIN EN ISO 14044:2006-10: Environmental Management – Life Cycle Assessment – Requirements and Guidelines.

PEFC-certificate: Programme for the Endorsement of Forest Certification Schemes (PEFC). Certificate No.: [HFA-COC-0209](#) (Multisite). Date of first issuance: 21.06.2001; Date of issuance: 01.07.2020; Valid to: 30.06.2025.

U.S. Green Building Council, 2018. LEED v4.1 for Building Design and Construction.