SENTINEL HOLDING
INSTITUT

SHI PRODUCT PASSPORT

Find products. Certify buildings.

SHI Product Passport No.:

14326-10-1007

Castello

Product group: Floor coverings / Wall coverings - Laminate

Krono Original High Quality Made by Kronospan

Kronoflooring GmbH
Mühlbacher Straße 1
01561 Lampertswalde

Product qualities:

- SHI Product Assessment 2024
- QNG Qualitätssiegel Nachhaltiges Gebäude
- DGNB NEW CONSTRUCTION 2023.2
- DGNB NEW CONSTRUCTION 2023
- DGNB NEW CONSTRUCTION 2018
- BNB-BN NEUBAU V2015
- EU TAXONOMY
- BREEAM DE NEUBAU 2018
- LEED v4.1 (outside US)

CERTIFIED SUSTAINABLE PRODUCT – SHI PRODUCT PASSPORT – SENTINEL HOLDING INSTITUT – www.sentinel-holding.eu

Köttner

Helmut Köttner
Scientific Director
Freiburg, 17 August 2026

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Product:
Castello

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The SHI Database is the first and only database for construction products whose comprehensive processes and data accuracy are regularly verified by the independent auditing company SGS-TÜV Saar

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SHI Product Assessment 2024

Since 2008, Sentinel Holding Institut GmbH (SHI) has been establishing a unique standard for products that support healthy indoor air. Experts carry out independent product assessments based on clear and transparent criteria. In addition, the independent testing company SGS regularly audits the processes and data accuracy.

Criteria	Product category	Harmful substance limit	Assessment
SHI Product Assessment	Wood-based floor coverings	TVOC ≤ 300 µg/m^3 Formaldehyd ≤ 36 µg/m^3	Indoor Air Quality Certified
Valid untill: 05 February 2027			

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QNG - Qualitätssiegel Nachhaltiges Gebäude

The Qualitätssiegel Nachhaltiges Gebäude (Quality Seal for Sustainable Buildings), developed by the German Federal Ministry for Housing, Urban Development and Building (BMWSB), defines requirements for the ecological, socio-cultural, and economic quality of buildings. The Sentinel Holding Institut evaluates construction products in accordance with QNG requirements for certification and awards the QNG ready label. Compliance with the QNG standard is a prerequisite for eligibility for the KfW funding programme. For certain product groups, the QNG currently has no specific requirements defined. Although classified as not assessment-relevant, these products remain suitable for QNG-certified projects.

Criteria	Pos. / product group	Considered substances	QNG assessment
3.1.3 Schadstoffvermeidung in Baumaterialien	2.3 Multi-layer wood parquet, bamboo coverings, and floor coverings on wood-based panels	VOC / Emissions / hazardous substances	QNG ready
Verification: Blauer Engel Zertifikat vom 22.11.2021			

Criteria	Assessment
ANF2-WG1 Nachhaltige Materialgewinnung	May positively contribute to the overall building score
Verification: PEFC Zertifikat vom 23.08.2022	

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DGNB New Construction 2023.2

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact	47c Parkette, Laminatböden, MMF- und WPC-Bödenbeläge (innen)	VVOC, VOC, SVOC Emissionen und Gehalt an gefährlichen Stoffen	Quality level 3
Verification: Blauer Engel Zertifikat vom 22.11.2021			

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DGNB New Construction 2023

The DGNB System (German Sustainable Building Council) assesses the sustainability of various types of buildings. It can be applied to both large-scale private and commercial projects as well as smaller residential buildings. The 2023 version sets high standards for ecological, economic, socio-cultural, and functional aspects throughout the entire life cycle of a building.

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact, 03.05.2024 (3rd edition)	47c Wood-based materials in floor coverings	VVOCs, VOC, SVOC emissions and content of hazardous substances	Quality level 4
Verification: Blauer Engel Zertifikat vom 22.11.2021			

Criteria	Assessment
SOC1.2 Indoor air quality (*)	May positively contribute to the overall building score
Verification: SHI-Schadstoffgeprüft	

Criteria	Quality level
ENV1.3 Responsible resource extraction	May positively contribute to the overall building score
Verification: PEFC Zertifikat vom 23.08.2022	

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact, 29.05.2025 (4th edition)	47c Floor coverings for indoor use (with wooden components)	VVOCs, VOC, SVOC emissions and content of hazardous substances	Quality level 4
Verification: Blauer Engel Zertifikat vom 22.11.2021			

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DGNB New Construction 2018

The DGNB System (German Sustainable Building Council) assesses the sustainability of various types of buildings. It can be applied to both large-scale private and commercial projects as well as smaller residential buildings.

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact	47a Industrially manufactured products	Formaldehyde	Quality level 4
Verification: Blauer Engel Zertifikat vom 22.11.2021			

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BNB-BN Neubau V2015

The Bewertungssystem Nachhaltiges Bauen (Assessment System for Sustainable Building) is a tool for evaluating public office and administrative buildings, educational facilities, laboratory buildings, and outdoor areas in Germany. The BNB was developed by the former Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and is now overseen by the Federal Ministry for Housing, Urban Development and Building (BMWSB).

Criteria	Pos. / product type	Considered substance group	Quality level
1.1.6 Risiken für die lokale Umwelt	2b Wood-based floor coverings – also systems	VOC / hazardous substances	Quality level 5
Verification: TÜV PROFiCERT-product Interior PREMIUM Zertifikat vom 02.02.2024			

Criteria	Assessment
1.1.7 Nachhaltige Materialgewinnung	May positively contribute to the overall building score
Verification: PEFC Zertifikat vom 23.08.2022	

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Krono Original High Quality Made by Kronospan

EU taxonomy

The EU Taxonomy classifies economic activities and products according to their environmental impact. At the product level, the EU regulation defines clear requirements for harmful substances, formaldehyde and volatile organic compounds (VOCs). The Sentinel Holding Institut GmbH labels qualified products that meet this standard.

Criteria	Product type	Considered substances	Assessment
DNSH - Pollution prevention and control	Floor coverings (including associated adhesives and sealants)	Stoffe nach Anlage C, Formaldehyd, Karzinogene VOC Kategorie 1A/1B	compliant
Verification: TÜV PROFiCERT-product Interior PREMIUM vom 02.02.2024			

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BREEAM DE Neubau 2018

BREEAM (Building Research Establishment Environmental Assessment Methodology) is a UK-based building assessment system that evaluates the sustainability of new constructions, refurbishments, and conversions. Developed by the Building Research Establishment (BRE), the system aims to assess and improve the environmental, economic, and social performance of buildings.

Criteria	Product category	Considered substances	Quality level
Hea 02 Indoor Air Quality	Flooring materials (including floor levelling compounds and resin flooring)	Emissions: Formaldehyde, TVOC, TSVOC, carcinogens	Exemplary quality
Verification: TÜV PROFiCERT-product Interior PREMIUM Zertifikat Nr. 70 720 5789-1 vom 02.02.2024			

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LEED v4.1

LEED (Leadership in Energy and Environmental Design) is an internationally recognised building certification system developed by the U.S. Green Building Council. It is one of the most widely used sustainability standards for buildings worldwide and is particularly applied in internationally oriented projects. LEED assesses buildings holistically across categories such as energy efficiency, resource conservation, material selection, indoor environmental quality and site sustainability. Depending on the number of points achieved, projects are awarded one of the certification levels: LEED Certified, Silver, Gold or Platinum.

Criteria	Product category	Considered substances	Assessment
EQ Credit: Low-Emitting Materials	Bodenbeläge	Emissionen: Formaldehyd, VOC, Krebserregende Stoffe	compliant
Verification: TÜV PROFiCERT-product Interior PREMIUM Zertifikat Nr. 70 720 5789-1 vom 02.02.2024			

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Product labels

In the construction industry, high-quality materials are crucial for a building's indoor air quality and sustainability. Product labels and certificates offer guidance to meet these requirements. However, the evaluation criteria of these labels vary, and it is important to carefully assess them to ensure products align with the specific needs of a construction project.

The *Blue Angel* ("Blauer Engel") ecolabel, awarded by the German Federal Environment Agency, is one of the oldest and most widely used ecolabels in Germany. It exists in several variants for many different product groups. Since the test criteria, such as threshold values, differ between these variants, it is important to consider each one individually when assessing indoor air quality.

"TÜV PROFiCERT-product Interior" is a certification procedure developed for interior products. The certification is carried out according to strict TÜV health and quality criteria. The PREMIUM variant requires particularly low emission levels.

The PEFC label certifies wood and wood products from sustainably managed forests and requires, among other things, legal origin, protection of forest ecosystems, and social minimum standards in forestry. Environmental organisations consider PEFC's criteria to be less strict than those of FSC, particularly regarding the protection of sensitive forest areas. Health-related aspects of the final product are not part of the PEFC assessment.

This product is SHI Indoor Air Quality certified and recommended by Sentinel Holding Institut. Indoor-air-focused construction, renovation, and operation of buildings is made possible by transparent and verifiable criteria thanks to the Sentinel Holding concept.

Products bearing the Sentinel Holding Institute QNG-ready seal are suitable for projects aiming to achieve the "Qualitätssiegel Nachhaltiges Gebäude" (Quality Seal for Sustainable Buildings). QNG-ready products meet the requirements of QNG Appendix Document 3.1.3, "Avoidance of Harmful Substances in Building Materials." The KfW loan program Climate-Friendly New Construction with QNG may allow for additional funding.

Product:
Castello

SHI Product Passport no.:
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Legal notices

(*) These criteria apply to the construction project as a whole. While individual products can positively contribute to the overall building score through proper planning, the evaluation is always conducted at the building level. The information was provided entirely by the manufacturer.

Find our criteria here: https://www.sentinel-holding.eu/de/Themenwelten/Pr%C3%BCfkriterien%20f%C3%BCr%20Produkte

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www.sentinel-holding.eu

Preferred by Nature hereby certifies that

Kronoflooring GmbH Lampertswalde

Mühlbacher Straße 1
Lampertswalde
01561
Germany

conform with the following standards:

PEFC ST 2002:2020
PEFC ST 2001:2020

The certificate is valid from 24 May 2026 to 23 May 2031

Certificate version date: 15 May 2026

Certification scope

Certificate type: Single, Chain of Custody

Certificate registration code

PBN-PEFC-COC-054330

PEFC/01-44-49

Justinas Janulaitis
Management board member
Filosoofi 31, Tartu, Estonia

Specific information regarding products and/or sites is listed in the annex(es) of this certificate.

Annex A: Scope of Kronoflooring GmbH Lampertswalde
PEFC Chain of Custody Certificate, PBN-PEFC-COC-054330

Product code	Trade name	PEFC claims	CoC method
090304	Laminatboden	x% PEFC Certified	Physical separation; Percentage Method
090304	Parkett	x% PEFC Certified	Physical separation
090307	Sockelleisten	x% PEFC Certified	Physical separation
090307	Paneele/Kasetten	x% PEFC Certified	Percentage Method
050603	Dämmplatten	x% PEFC Certified	Physical separation

Annex B: Scope of Kronoflooring GmbH Lampertswalde
PEFC Chain of Custody Certificate, PBN-PEFC-COC-054330

No	Site name	Address	CoC method	Sub-code
1	Kronoflooring GmbH Lampertswalde	Mühlbacher Straße 1 Lampertswalde 01561 Germany	PEFC Physical separation; PEFC Percentage Method	---

CASTELLO

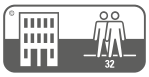
Technisches Datenblatt

Direktbeschichteter Laminatboden, Beanspruchungsklasse nach EN 13329: **23/32 - AC4**

DIMENSIONEN				
Format	Dicke (d)	8 ± 0,50 mm · dmax - dmin ≤ 0,50 mm		
	Länge	1288 ± 0,50 mm		
	Breite (b)	195± 0,10 mm · bmax - bmin ≤ 0,20 mm		
Profil	längs	twin clic	quer	twin clic
Fuge	längs	-	quer	-



Wohnbereich mit intensiver Nutzung



Gewerblicher Bereich mit normaler Nutzung



*

TOLERANZEN		
Rechtwinkligkeit	EN 13329	≤ 0,20 mm
Kantengeradheit	EN 13329	≤ 0,30 mm
Querwölbung	EN 13329	konkav: ≤ 0,15% · konvex: ≤ 0,20%
Längswölbung	EN 13329	konkav: ≤ 0,50% · konvex: ≤ 1,00%
Fugenöffnung	EN 13329	Mittelwert: ≤ 0,15 mm · Maximum: ≤ 0,20 mm
Höhenversatz	EN 13329	Mittelwert: ≤ 0,10 mm · Maximum: ≤ 0,15 mm
Riegelversatz		± 2 mm

PRÜFUNGEN			
Abriebbeanspruchung		EN 13329	AC4 (≥ 4000 Umdr.)
Stoßbeanspruchung		EN 13329	kleine Kugel ≥ 35 mm · große Kugel ≥ 750 mm
Fleckunempfindlichkeit	Gruppe 1 & 2	EN 13329	Grad 5
	Gruppe 3		≥ Grad 4
Stuhlrollenversuch		EN 13329	keine sichtbaren Veränderungen oder Schäden wie in EN 425:2002 definiert
Auswirkung eines Möbelfußes		EN 13329	keine sichtbare Veränderung bei Prüfung mit Fuß Typ 0
Dickenquellung		EN 13329	≤ 18%
Resteindruck		EN 13329	≤ 0,05 mm
Lichtechtheit		EN 13329	Graumaßstabsstufe ≥ 4 bei Typverfärbung 6 des Blaumaßstabes
Maßänderungen nach Änderungen der relativen Luftfeuchte		EN 13329	längs ≤ 0,9 mm · quer ≤ 0,9 mm
Verbindungsfestigkeit		EN 13329	längs ≥ 1 kN/m · quer ≥ 2 kN/m
Abhebefestikeit		EN 13329	≥ 1,25 N/mm²

UMWELTEIGENSCHAFTEN		
Formaldehydemission	EN 16516	class E1

PHYSIKALISCHE EIGENSCHAFTEN		
Brandverhalten	EN 13501-1	Cfl s1
Gleitwiderstand	EN 13893	Technische Klasse DS
Wärmedurchlasswiderstand	EN 12667	0,073 (m²K)/W ± 15%
Wärmeleitfähigkeit	EN 12664	0,110 W/(m*K) ± 15%

*Die Garantie gilt für den Wohnbereich gemäß Garantiebestimmungen. Nähere Garantiebedingungen unter www.krono-original.com

Das Datenblatt wird regelmäßig dem Stand der Technik angepasst.
Diese Ausgabe ersetzt alle früheren Ausgaben und die ohne Datum.
Die Gültigkeit beginnt mit der Erstellung. Stand 02/2024

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ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Laminate flooring (6-14mm)
Kronoflooring GmbH



EPD HUB, HUB-1164
Publishing date 22 February 2024, last updated on 22 February 2024, valid until 22 February 2029.

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Kronoflooring GmbH
Address	Mühlbacher Straße 1; 01561 Lampertswalde
Contact details	sustainability@kronospan.de
Website	www.krono-original.de

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Manufactured product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Daniel Grantham
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Laminate flooring (6 - 14mm)
Additional labels	-
Product reference	-
Place of production	Lampertswalde, Germany
Period for data	01.10.2020 - 30.09.2021
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	0 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	m2
Declared unit mass	7.516 kg
GWP-fossil, A1-A3 (kgCO2e)	5.11
GWP-total, A1-A3 (kgCO2e)	-5.98
Secondary material, inputs (%)	12.7
Secondary material, outputs (%)	100.0
Total energy use, A1-A3 (kWh)	62.1
Total water use, A1-A3 (m3e)	0.149

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Kronoflooring GmbH is the worldwide leading producer of high-quality laminate floorings and panels. We are represented in DIY stores, the specialist flooring trade as well as in specialist store segments with a wide range of wood-based material products for floors, walls and ceilings.

PRODUCT DESCRIPTION

Laminate flooring is a floor covering constructed in layers. Instead of real or solid wood, the individual laminate panels are made of a carrier HDF board (3). A thin decorative layer (2) and a robust seal (1) are applied to this and the counteracting layer (4) keeps the board in balance.



Further information can be found at www.krono-original.de.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	0	-
Minerals	0	-
Fossil materials	10 - 15	
Bio-based materials	80 - 85	
Moisture Content	5	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	2.864
Biogenic carbon content in packaging, kg C	0.168

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	m2
Mass per declared unit	7.516 kg
Functional unit	-
Reference service life	-

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

Raw material/energy supply (A1):

The timber supply for laminate flooring is a combination of small round wood not suitable for sawmills and sawmill residues in the form of wood chips. The chemical component is made of resin, wax, hardener, and urea.

The wasted materials are either burnt onsite in our biomass plant, or recycled for use in particleboard production.

Each pack of laminate flooring is packaged in a cardboard box and shrink wrapped and then stacked onto a wooden pallet. A top board made of HDF is used to protect the products, PET banding made from 100% post-consumer recycled plastic is used to strap the packs to the pallet and the entire pallet if stretch wrapped for further protection of the product.

Transportation to manufacturing site (A2):

- Transportation of the timber to the Lampertswalde site (considers both road and rail deliveries).
- Transportation of chemicals and packaging from manufacturer/supplier to the production site.
- Transportation of raw paper from manufacturer/supplier.

Manufacturing (A3):

The proper manufacturing of the boards and treatment of waste generated from the manufacturing process up to the end-of waste state during manufacturing is included in module A3.

All installation waste is modelled as leaving the system in A3. German Government figures have been used for determining the rates of recycling

TRANSPORT AND INSTALLATION (A4-A5)

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

Transport (A4):

This covers the 2397 km average distance travelled from site to customer, which is done by EURO 6 32t lorry.

Installation (A5):

Installation is done manually with no need for additional materials or energy.

Of the packaging materials:
- Wooden pallet assumed 21% are re-used and remaining 79% are then chipped either for recycling or for use as secondary fuel for energy recovery. The split has been attributed from national recycling figures published for 2020.

- Plastic (shrink wrap / stretch wrap / PET banding) assumed 60.4% recycled (from national recycling figures 2020) whilst the remaining amount is sent for energy recovery.

- Cardboard packaging assumed 89.4% recycled (from national recycling figures, 2020) and the remaining amount is assumed to be sent for energy recovery.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

Module C1:
Disassembly is done by hand at use-site, therefore creating no additional loads.

Module C2:
The material is transported to waste treatment site, which is assumed to be within 50km, of the local waste collection centre and treated as municipal wood waste.

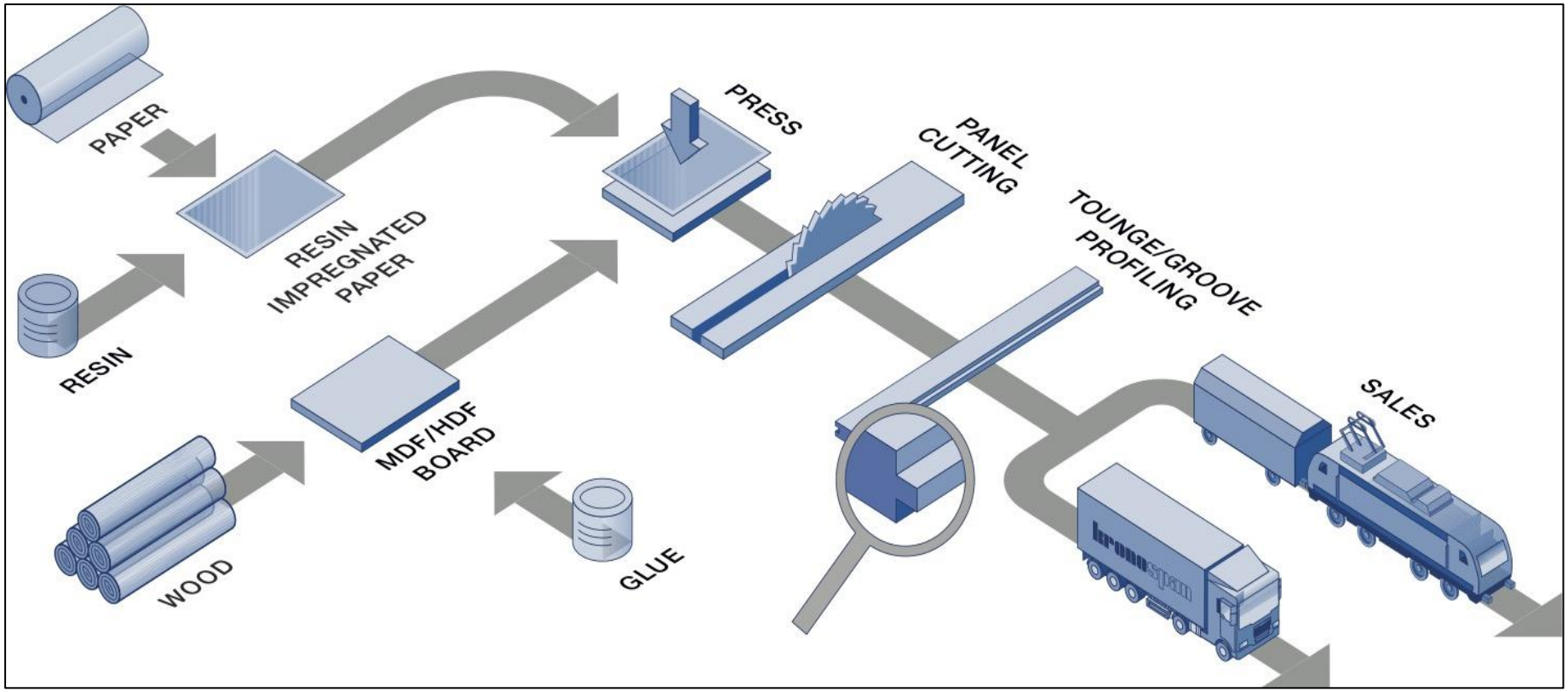
Module C3:
The scenario at the end of life assumes use as secondary fuel for energy recovery of the product. The end-of-waste status for the wood board is achieved at the waste treatment site.

Module C4:
Within the EoL scenario no disposal to landfill will occur, thus this module will show Zero values.

Module D:
The benefits for the secondary fuel will be calculated and shown in module D. The utilization of the boards in an incineration plant and the resulting energy is assigned to module D.

It is also assumed that the energy production from biomass meets an R1 value > 0.6. Energy produced in the form of electricity and thermal energy replaces thermal energy from natural gas (DE) and electrical energy (DE).

MANUFACTURING PROCESS



Water, water vapour and high pressure soften the wood chips. These are then pressed through a grinder which breaks up the wood fibres. The moist wood fibres are glued and transported to a drier. The glued and dried wood fibres are scattered onto a conveyor belt. The fibres bond with the glue at a compression temperature of 200 °C to form a homogeneous board. After pressing, the hot boards are cooled and then transported automatically to a storage area.

When impregnating the paper, rollers and doctor blades ensure the even or asymmetrical application of resin to one or both sides. The impregnated paper is then conveyed through a drying channel. Pre-arranged packages with abrasion proof overlay, decor paper, base board and counteracting paper are put into the press. Heat and pressure liquefy the resin in the press and bond the papers and base board together to form a solid unit.

Longitudinal and latitudinal saws cut the large format boards into individual panels along the markings on the decor paper. Tongue and groove profiles are cut into the edges of the panels.

The panels are stacked in boxes and wrapped in moisture-repellent foil which are then transported to customer by either road or rail.

LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, 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, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	No allocation
Manufacturing energy and waste	No allocation

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	0 %

This EPD is product and factory specific and does not contain average calculations.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent v3.8 and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	-7,73E+00	7,11E-02	1,67E+00	-5,98E+00	1,64E+00	6,30E-01	MND	MND	MND	MND	MND	MND	MND	MNR	6,53E-02	1,06E+01	0,00E+00	-4,65E-01
GWP – fossil	kg CO_2e	2,76E+00	7,11E-02	2,28E+00	5,11E+00	1,64E+00	1,77E-02	MND	MND	MND	MND	MND	MND	MND	MNR	6,53E-02	6,18E-02	0,00E+00	-4,62E-01
GWP – biogenic	kg CO_2e	-1,05E+01	0,00E+00	-6,12E-01	-1,11E+01	0,00E+00	6,12E-01	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	1,05E+01	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2e	1,42E-02	2,66E-05	3,17E-03	1,74E-02	6,37E-04	4,08E-06	MND	MND	MND	MND	MND	MND	MND	MNR	2,66E-05	1,40E-04	0,00E+00	-3,10E-03
Ozone depletion pot.	kg CFC_{-11}e	4,73E-07	1,65E-08	1,24E-07	6,13E-07	3,86E-07	9,03E-10	MND	MND	MND	MND	MND	MND	MND	MNR	1,44E-08	3,13E-09	0,00E+00	-2,26E-07
Acidification potential	mol H^+e	1,58E-02	2,83E-04	1,78E-02	3,39E-02	5,34E-03	9,34E-05	MND	MND	MND	MND	MND	MND	MND	MNR	2,70E-04	3,32E-04	0,00E+00	-1,52E-02
EP-freshwater[2)]	kg Pe	1,63E-04	5,88E-07	2,79E-04	4,42E-04	1,39E-05	1,47E-07	MND	MND	MND	MND	MND	MND	MND	MNR	5,50E-07	6,36E-06	0,00E+00	-4,30E-05
EP-marine	kg Ne	3,64E-03	7,94E-05	1,66E-03	5,38E-03	1,17E-03	4,00E-05	MND	MND	MND	MND	MND	MND	MND	MNR	7,88E-05	4,67E-05	0,00E+00	-4,67E-03
EP-terrestrial	mol Ne	4,14E-02	8,77E-04	6,91E-02	1,11E-01	1,30E-02	4,56E-04	MND	MND	MND	MND	MND	MND	MND	MNR	8,69E-04	5,27E-04	0,00E+00	-7,42E-02
POCP ("smog")[3)]	kg NMVOCe	1,13E-02	2,91E-04	3,74E-03	1,54E-02	5,05E-03	1,21E-04	MND	MND	MND	MND	MND	MND	MND	MNR	2,65E-04	1,48E-04	0,00E+00	-1,31E-02
ADP-minerals & metals[4)]	kg Sbe	4,11E-05	1,68E-07	5,04E-06	4,63E-05	3,99E-06	4,62E-08	MND	MND	MND	MND	MND	MND	MND	MNR	2,27E-07	1,71E-07	0,00E+00	-1,69E-06
ADP-fossil resources	MJ	6,22E+01	1,08E+00	3,39E+01	9,72E+01	2,57E+01	8,11E-02	MND	MND	MND	MND	MND	MND	MND	MNR	9,44E-01	1,29E+00	0,00E+00	-5,02E+00
Water use[5)]	m^3e depr.	5,83E+00	4,83E-03	5,31E-01	6,36E+00	1,15E-01	6,39E-03	MND	MND	MND	MND	MND	MND	MND	MNR	4,13E-03	3,46E-02	0,00E+00	-7,94E-01

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,36E-07	8,17E-09	1,17E-07	2,61E-07	1,86E-07	9,58E-10	MND	MND	MND	MND	MND	MND	MND	MNR	5,55E-09	1,25E-09	0,00E+00	-2,07E-07
Ionizing radiation[6)]	kBq U235e	2,06E-01	5,15E-03	3,36E-01	5,47E-01	1,23E-01	7,91E-04	MND	MND	MND	MND	MND	MND	MND	MNR	4,39E-03	3,42E-02	0,00E+00	-2,52E-02
Ecotoxicity (freshwater)	CTUe	9,61E+01	9,69E-01	1,93E+01	1,16E+02	2,28E+01	1,32E-01	MND	MND	MND	MND	MND	MND	MND	MNR	8,70E-01	7,78E-01	0,00E+00	-1,40E+02
Human toxicity, cancer	CTUh	3,11E-09	2,38E-11	1,09E-09	4,22E-09	5,59E-10	7,42E-11	MND	MND	MND	MND	MND	MND	MND	MNR	2,44E-11	3,81E-11	0,00E+00	-1,95E-09
Human tox. non-cancer	CTUh	5,48E-08	9,52E-10	2,21E-08	7,78E-08	2,20E-08	3,26E-10	MND	MND	MND	MND	MND	MND	MND	MNR	8,10E-10	7,72E-10	0,00E+00	-7,19E-08
SQP[7)]	-	4,18E+02	1,24E+00	3,81E+01	4,57E+02	2,95E+01	6,12E-02	MND	MND	MND	MND	MND	MND	MND	MNR	6,54E-01	1,99E-01	0,00E+00	-2,98E+02

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	7,61E+01	1,22E-02	7,15E+00	8,33E+01	2,89E-01	7,48E-03	MND	MND	MND	MND	MND	MND	MND	MNR	1,11E-02	2,23E-01	0,00E+00	-6,92E+01
Renew. PER as material	MJ	7,08E+01	0,00E+00	5,02E+00	7,58E+01	0,00E+00	-5,02E+00	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	-7,08E+01	0,00E+00	0,00E+00
Total use of renew. PER	MJ	1,47E+02	1,22E-02	1,22E+01	1,59E+02	2,89E-01	-5,01E+00	MND	MND	MND	MND	MND	MND	MND	MNR	1,11E-02	-7,06E+01	0,00E+00	-6,92E+01
Non-re. PER as energy	MJ	5,47E+01	1,08E+00	3,31E+01	8,89E+01	2,57E+01	8,11E-02	MND	MND	MND	MND	MND	MND	MND	MNR	9,44E-01	1,28E+00	0,00E+00	-4,86E+00
Non-re. PER as material	MJ	7,62E+00	0,00E+00	7,95E-01	8,41E+00	0,00E+00	-7,95E-01	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	-7,62E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	6,23E+01	1,08E+00	3,39E+01	9,73E+01	2,57E+01	-7,14E-01	MND	MND	MND	MND	MND	MND	MND	MNR	9,44E-01	-6,33E+00	0,00E+00	-4,86E+00
Secondary materials	kg	9,53E-01	3,00E-04	1,10E-01	1,06E+00	7,12E-03	1,40E-04	MND	MND	MND	MND	MND	MND	MND	MNR	3,11E-04	4,85E-04	0,00E+00	4,65E-02
Renew. secondary fuels	MJ	4,74E-03	3,02E-06	5,15E+01	5,15E+01	7,18E-05	7,04E-07	MND	MND	MND	MND	MND	MND	MND	MNR	4,03E-06	7,78E-07	0,00E+00	-1,27E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,35E-01	1,40E-04	1,34E-02	1,49E-01	3,32E-03	1,45E-04	MND	MND	MND	MND	MND	MND	MND	MNR	1,12E-04	1,08E-03	0,00E+00	1,03E-03

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1,22E-01	1,43E-03	1,42E-01	2,65E-01	3,38E-02	5,53E-04	MND	MND	MND	MND	MND	MND	MND	MNR	1,36E-03	5,29E-03	0,00E+00	-1,52E-02
Non-hazardous waste	kg	2,71E+00	2,35E-02	1,28E+01	1,55E+01	5,55E-01	2,37E-01	MND	MND	MND	MND	MND	MND	MND	MNR	2,17E-02	2,88E-01	0,00E+00	-7,75E+00
Radioactive waste	kg	1,07E-04	7,24E-06	1,11E-04	2,25E-04	1,73E-04	3,94E-07	MND	MND	MND	MND	MND	MND	MND	MNR	6,24E-06	9,25E-06	0,00E+00	-2,32E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	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	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,69E-02	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,87E-01	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	7,52E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,43E+00	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	2,70E+00	7,04E-02	2,28E+00	5,04E+00	1,62E+00	1,76E-02	MND	MND	MND	MND	MND	MND	MND	MNR	6,46E-02	6,12E-02	0,00E+00	-4,48E-01
Ozone depletion Pot.	kg CFC_{-11}e	4,06E-07	1,30E-08	1,08E-07	5,27E-07	3,05E-07	7,51E-10	MND	MND	MND	MND	MND	MND	MND	MNR	1,14E-08	2,71E-09	0,00E+00	-1,89E-07
Acidification	kg SO_2e	1,20E-02	2,22E-04	1,08E-02	2,31E-02	4,33E-03	6,51E-05	MND	MND	MND	MND	MND	MND	MND	MNR	2,10E-04	2,80E-04	0,00E+00	-9,67E-03
Eutrophication	kg PO_4^3e	6,64E-03	5,01E-05	1,16E-02	1,83E-02	9,47E-04	7,57E-05	MND	MND	MND	MND	MND	MND	MND	MNR	4,83E-05	2,23E-04	0,00E+00	-4,26E-03
POCP (“smog”)	kg C_2H_4e	1,17E-03	9,01E-06	2,67E-04	1,45E-03	2,00E-04	2,68E-06	MND	MND	MND	MND	MND	MND	MND	MNR	8,55E-06	1,21E-05	0,00E+00	-6,14E-04
ADP-elements	kg Sbe	4,08E-05	1,63E-07	4,89E-06	4,58E-05	3,88E-06	4,36E-08	MND	MND	MND	MND	MND	MND	MND	MNR	2,22E-07	1,70E-07	0,00E+00	-1,63E-06
ADP-fossil	MJ	6,23E+01	1,08E+00	3,39E+01	9,73E+01	2,57E+01	8,11E-02	MND	MND	MND	MND	MND	MND	MND	MNR	9,44E-01	1,28E+00	0,00E+00	-5,02E+00

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

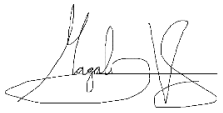
I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited
22.02.2024



VERIFIED ISO 14025