



Environmental Product Declaration for *Invernizzi* *Poplar Plywood*

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

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

Programme operator: **EPD International AB**

Registration number: **S-P-07773**

Publication date: **2023-05-26**

Valid until: **2027-12-20**



INVERNIZZI
Plywood Tradition

Summary



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General Information



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Product Category Rules (PCR)	CEN STANDARD EN 15804 SERVES AS THE CORE PRODUCT CATEGORY RULES (PCR) WOOD AND WOOD-BASED PRODUCTS FOR USE IN CONSTRUCTION. C-PCR-006 [TO PCR 2019:14]. VERSION: 2019-12-20 PRODUCT GROUP CLASSIFICATION: UN CPC 031, 311, 312, 313, 314, 315, 316, 319
LCA developed by	VALENTINA CASTELLANI, SUSTAINABILITY CONSULTANT
Third-party verification	INDEPENDENT THIRD-PARTY VERIFICATION OF THE DECLARATION AND DATA, ACCORDING TO ISO 14025:2006, VIA: X EPD VERIFICATION BY ACCREDITED CERTIFICATION BODY THIRD-PARTY VERIFICATION: IMQ IS AN APPROVED CERTIFICATION BODY ACCOUNTABLE FOR THE THIRD-PARTY VERIFICATION THE CERTIFICATION BODY IS ACCREDITED BY: ACCREDIA - ACCREDITATION NR. 010H REV. 01
Procedure for follow-up of data during EPD validity involves third party verifier	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

Company Information



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Invernizzi SpA is a leading **family-owned company** since four generations, firmly established on the domestic and the international market of wood processing and poplar plywood and poplar particleboard manufacturing.

It was first set up as a sawmill back in 1875 by Libero Invernizzi, then on January 15th 1940, Giuseppe Invernizzi founded in Gussola, Cremona, Italy, the company “Giuseppe Invernizzi e Figli” a small craftsmanship dedicated to wood processing. After World War II, Giuseppe’s children, Costantino and Alberto, further developed the company to include manufacturing of wooden packaging for local food products, such as cured meat, mustard and jam. It then started producing poplar plywood in the early Fifties, becoming one of the most important players on the Italian market. Then, in 1973, in Solarolo Rainerio, Cremona, Italy, the Invernizzi family founded IPAS S.R.L., a company specialized in manufacturing poplar particleboard panels. In 1996, Giorgio Invernizzi took over the management and with a far-sighted perspective joined the two companies, establishing the headquarters in Solarolo Rainerio, thus establishing the current INVERNIZZI S.p.A.

This brave choice resulted in a stronger competitive advantage and one of the first proofs of the integral and sustainable exploitation of a precious raw material such as poplar wood.

Despite the subsequent enlargements and the latest organizational and structural changes, the company is and wants to remain a family company.

Family Invernizzi has always been the propelling heart of the company, as its members passed over from father to son the skills, the motivation and the enthusiasm. Still today, the family and the company are intertwined.

Giorgio’s kids, Laura and Giuseppe, now represent the fourth generation of an industrial family proud of its history. Following their predecessors’ footsteps, they join their father as company leaders, bringing their own personal touch, ideas and skills.



Reliability, flexibility and dedication are the pillars of the Invernizzi brand name, whose **mission** currently is:

- Offering an exclusive product range;
- Promoting sustainability throughout the entire supply and production chain;
- Creating added value to the customer by means of a transparent customer-oriented organization;
- Supporting continuous improvement by spreading a culture of high-quality products all over the supply and production chain;
- Increasing competitiveness and revenues in a more and more demanding market.



Nowadays, the company headquarters and facilities are located in Solarolo Rainerio (Cremona), in Northern Italy – UE, over an area of more than 246.000 square meters of which more than 39.000 are indoor with 190 employees.

INVERNIZZI SPA is a market leader in the plywood sector, well-known all-over Europe and overseas for the high quality and technical performances of its products, which can also be PEFC, CARB phase 2, E1, NAF, CE 2+ and FSC® certified. These certifications and the best industrial practices, testified by the continuous investments in state of the art technology (new dryer to be fully operational shortly) witness the company’s engagement towards the creation of a strong and efficient industrial model, which is sustainable and future-oriented.

Further to that, INVERNIZZI SPA is in a process of substantial growth and aims at getting further international acknowledgment.

Company Information



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The company exports around 50% of its products in more than 18 countries. The main **end markets** for Invernizzi products are: automotive and recreational vehicles (RV), furniture, coffins, building and construction and wood product dealers.



One of the main reasons of the company's **competitive advantage** comes from the productive complementarity between the two production lines, since the company's manufacturing facilities are divided into two different sections, one dedicated to the plywood production and the other to the chipboard. Both are interconnected, as the sanding and trimming residues of plywood panels produced are milled and end up into the chipboard production line, thus creating a perfect synergy between the two production lines. This represents a virtuous example of **production circularity** in the INVERNIZZI world.



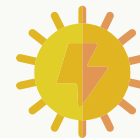
This "**green path**" towards efficiency and sustainability has always been at the heart of the company's industrial philosophy. It all started back in 2006 when INVERNIZZI SPA was among the first companies in Italy to set up a **cogeneration plant** in its premises by producing electrical energy through burning methane gas. This allowed the company to be self-sufficient in terms of energy. This project, through the exploitation of a renewable energy source, represents and confirms the company's commitment for the protection of the global environment.



Apart from that, the company never abandoned its original raw material, which is mainly **Italian poplar**, locally harvested, contributing to develop both its farming and industrial potential, promoting the local economy and the conservation of the local surrounding landscape.



Moreover, INVERNIZZI SPA is constantly working to produce **low-emitting plywood** panels by developing new bonding techniques, bio-based and made with natural ingredients. This represents a further step towards a responsible and sustainable production, which is closer to mankind and the environment.



The final step in this path is represented by the installation of **photovoltaic panels** on the shed of the new dryer, that came into operation in July 2022. The system contains 1090 panels which, together, will cut CO₂ emissions by as much as 250 kg.

Product Description



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INVERNIZZI poplar plywood is a natural product manufactured using dried poplar veneers in various thicknesses (at least 3 layers), which are overlapped with the vein of each layer running perpendicularly (crossed) to the ones above and below and glued together, then pressed, trimmed and sanded.

• TYPES OF BONDING

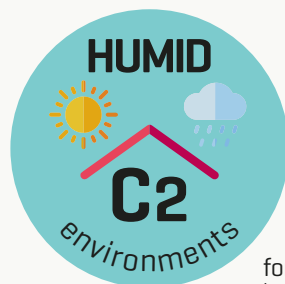
Invernizzi poplar plywood complies with the provisions of **UNI EN 636 Standard** as for the type of glue used during manufacturing and the products can be offered in two gluing classes, such as:

CLASS 1 – urea-based bonding for interior use only in **dry environments**

CLASS 2 – melamine-based bonding for use in **covered humid environments**



for **INTERIOR** use



for **EXTERIOR** use
in **COVERED/ROOFED**
environments

• CONTENT DECLARATION

The product contains poplar wood (moisture content: 9%) and glue, in different proportions according to the panel thickness.

	3 mm [minimum]	18 mm [reference]	40 mm [maximum]
Poplar Wood	77%	79%	84%
Glue	23%	21%	16%

Packaging materials: Paper and board 77,6%, Plastic 22,3%, Metal: 0,1%.

Weight of packaging: 0,9 kg.

- The product does not contain Asbestos.
- The product does not contain hazardous substances and substances of very high concern (SVHC) included in the REACH candidate list published by the European Chemical Agency. Detection rate below 100 ppm.
- In addition, the product does not contain: Mercury, Lead, Cadmium, Halogenated Flame Retardants (HFR), Perfluoroalkyl chemicals (PFAS), textiles and plastics. Detection rate below 100 ppm.
- The maximum formaldehyde content of the panel is 0.8 mg HCHO/100g (dry).

Product Description

▪ CERTIFICATIONS

Plywood panels are manufactured according to the formaldehyde emission control rules and, in this regard, they boast following internationally acknowledged certifications, such as:

Class E1 standard - its compliance provides that formaldehyde emissions of wood-based panels must not exceed 0,124 mg/m³.

CARB Phase 2 - (upon request) certificate issued by the California Air Resources Board aimed at putting a stricter limit than E1 standard to formaldehyde emissions of wood panels.

NAF - (upon request) non added formaldehyde - bio-based gluing process for wood panels.

With regards to its supply and production chain, INVERNIZZI poplar plywood also abides by the following international standards:

FSC® - issued by the Forest Stewardship Council, aimed at responsible and sustainable management of forest resources.

EU 995/2010 - EU Timber Regulation.

PEFC - stands for Program for the Endorsement of Forest Certification and is aimed at promoting a sustainable forest management.

CE/CE2+ markings - certificates for structural use with 2+ system (EN 13986:04 standard, wood panels for structural use).

Invernizzi's poplar plywood is also available in a fire retardant version, under the brand name **IGNIPASCOMP**, which allows CE marking under the B-s2, d0 fire reaction Euroclass according to EN 13501-1:2001.

STANDARD/CERTIFICATION	CONFORMITY
<i>Class E1 standard</i>	ALL PRODUCTS
<i>CARB Phase 2</i>	ON DEMAND
<i>NAF</i>	ON DEMAND
<i>FSC®</i>	ON DEMAND
<i>EU 995/2010</i>	ALL PRODUCTS
<i>PEFC</i>	ON DEMAND
<i>CE/CE2+</i>	ALL PRODUCTS



Available thicknesses range from 3 mm to 50 mm.
The reference thickness considered for the study is 18 mm.

Product Description



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• APPLICATIONS

Easily workable, characterized by low weight and white color, resistant and environmental friendly Invernizzi 100% poplar particleboard “Tuttopioppo” is extremely versatile and can be used in several applications, such as:

- **BUILDING AND CONSTRUCTION**
- **HIGH QUALITY FURNITURE**
- **DIY AND WOOD PRODUCT WHOLESALERS AND RETAILERS**
- **EXHIBITION STANDS AND THEATRES**
- **COFFINS**



LCA Information/1



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▪ DECLARED UNIT

1m³ of poplar plywood with thickness 18 mm.

▪ STUDY DEVELOPED

Study developed using Simapro 9.4 software and ecoinvent 3.8 library.

▪ CONSIDERED PARAMETERS

Parameters considered for the study: moisture content 9%, density 425 kg/m³.





▪ REFERENCE YEAR

2021

LCA Information/2

System Boundaries

Cradle to gate with modules C1-C4 and module D (A1-A3 + C + D).

A1 X	A2 X	A3 X	A4 X	A5 INA	B1 INA	B2 INA	B3 INA	B4 INA	B5 INA	B6 INA	B7 INA	C1 INA	C2 X	C3 X	C4 X	D X
Raw material supply	Transport of raw materials	Manufacturing	Transport to customer	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport to waste processing	Waste processing	Disposal	Reuse, recovery, recycling potential
																
PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE						END-OF-LIFE STAGE				RESOURCE RECOVERY STAGE	

Production Process A1-A3



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Invernizzi's production process originates from poplar logs coming from the surrounding fields of harvest and from other sources, mainly based in Northern Italy. The logs are **stored** in different lengths on the company courtyard, then they are **debarked** and enter the production process with the **peeling** phase.

There are three peeling machines, size 3300 mm, 2700 mm and 2000 mm working on three shifts from Monday to Friday.

The resulting veneers are then cut into shape and then enter the second production phase, the **drying**.

Once dried, the veneers are sorted out for the panels to be produced according to their thickness and enter the panel production phase of **gluing**. The glue mixture (mainly urea-based polymer + hardener) is spreaded over the veneers, which are then overlapped manually by operators in a perpendicular pattern.

The panels are then **pressed** at high temperature and then they are **squared** and **trimmed** to the final marketable dimensions.

The panels enter the finishing line through the **sanding** process. They are then **labelled** according to the desired quality, **packed and stored** into the loading warehouse, ready to be **shipped** to their final destinations.



Distribution Scenario A4



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Transport distances are calculated based on company statistics on location of final clients in the reference year (2021).

Transport by road is assumed for National and Continental transportation whereas sea transport (by container ship) is assumed for intercontinental transportation.

Details on the scenarios are provided below.

PARAMETER	 TRUCK	 SHIP
Vehicle type	TRUCK > 32t	CONTAINER SHIP
Fuel type	DIESEL	HEAVY FUEL OIL
Fuel consumption (Kg/tkm)	0,0196	0,0025
Gross vehicle weight (t)	29,96	n.a.
Average load factor (t/vehicle)	15,96	50 000
Bulk density of goods (kg/m ³)	425	425
Utilisatio ratio	< 1	< 1
Ecoinvent dataset	Transport, freight, lorry >32 metric ton, EURO5 {RER} transport, freight, lorry >32 metric ton, EURO5 Cut-off	Transport, freight, sea, container ship {GLO} transport, freight, sea, container ship Cut-off, U

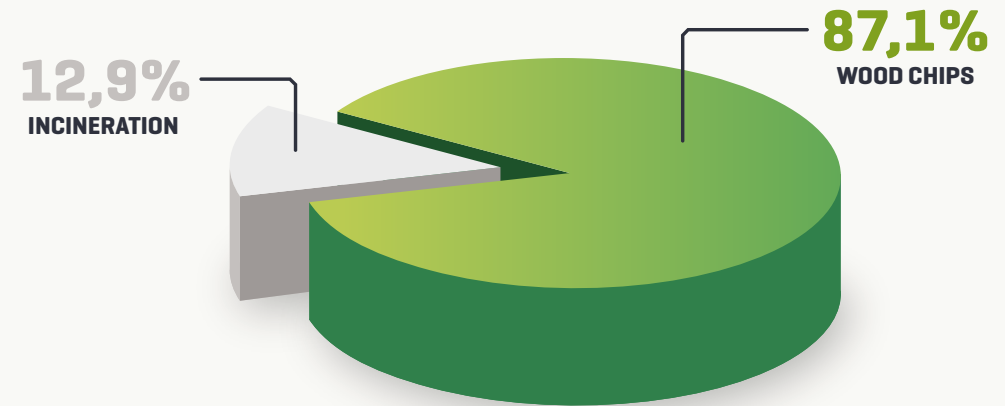
End of Life C2-C4 and Recovery D



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The End of life scenario includes the following assumptions:

- 87,1% of plywood is recycled into wood chips (source: ISPRA, 2022. Report on waste from economic activities);
- The remaining fraction (12,9%) is incinerated with energy recover (efficiency higher than 60%). The recovered energy is 33% electricity and 66% heat. The avoided products are electricity from the national grid and heat produced by a plant fuelled by natural gas (source: ISPRA, 2022. Report on waste from economic activities);
- Waste are transported for 100 km from the installation site to the waste processing facility.



Cut-Off and Allocation

▪ CUT-OFF

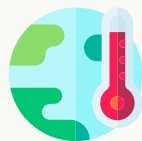
All input and output flows contributing to more than 1% by mass and 5% by energy to the system are included.

▪ ALLOCATION

As the difference in economic value of co-product is high (>25%), economic allocation is applied in the study.

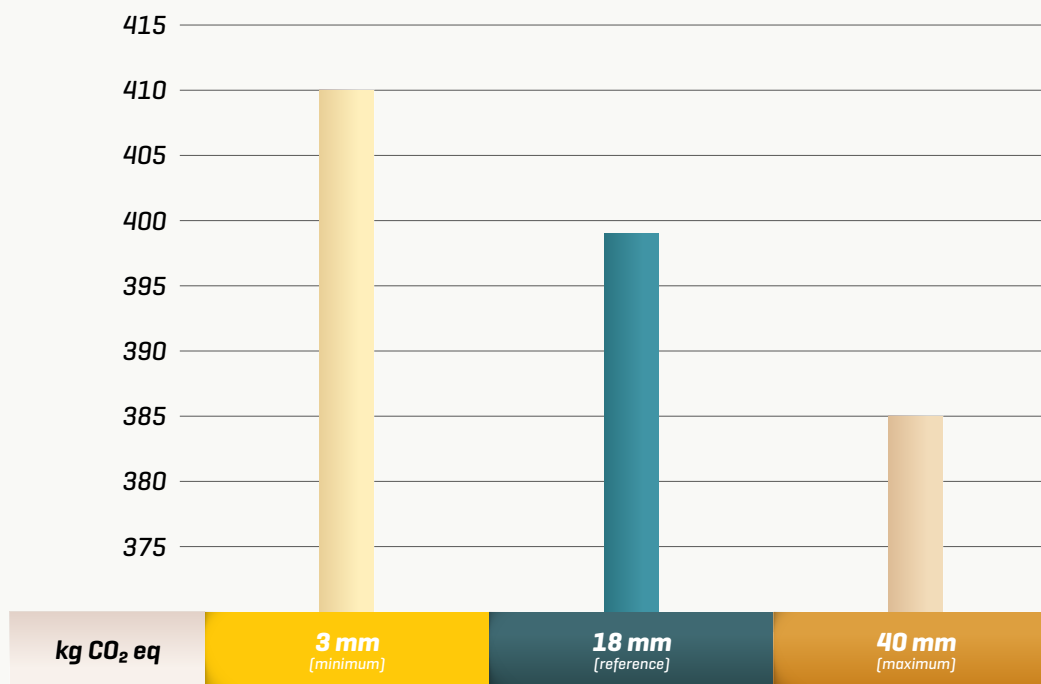
Environmental Performance

Climate Change



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CLIMATE CHANGE - TOTAL



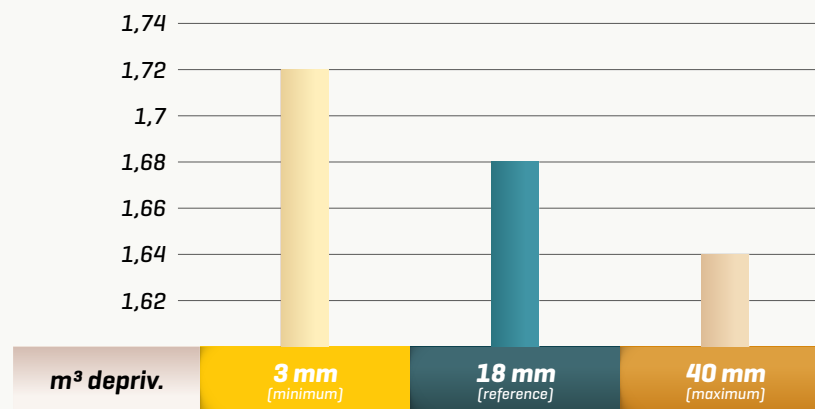
Environmental Performance

Resource Consumption

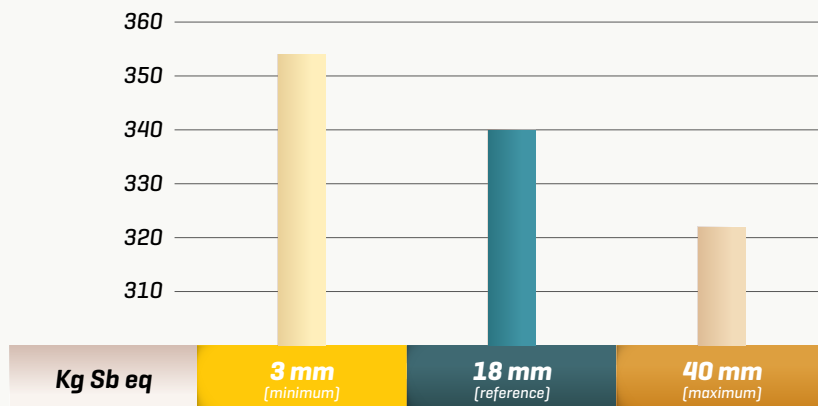


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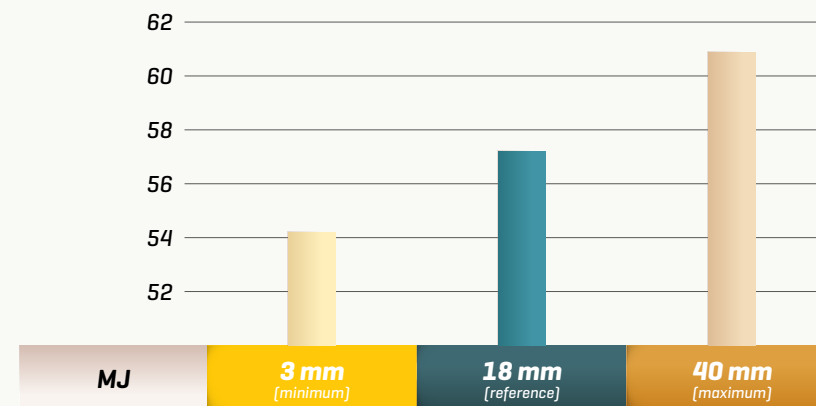
• WATER USE



• DEPLETION OF ABIOTIC RESOURCES minerals and metals



• DEPLETION OF ABIOTIC RESOURCES fossils



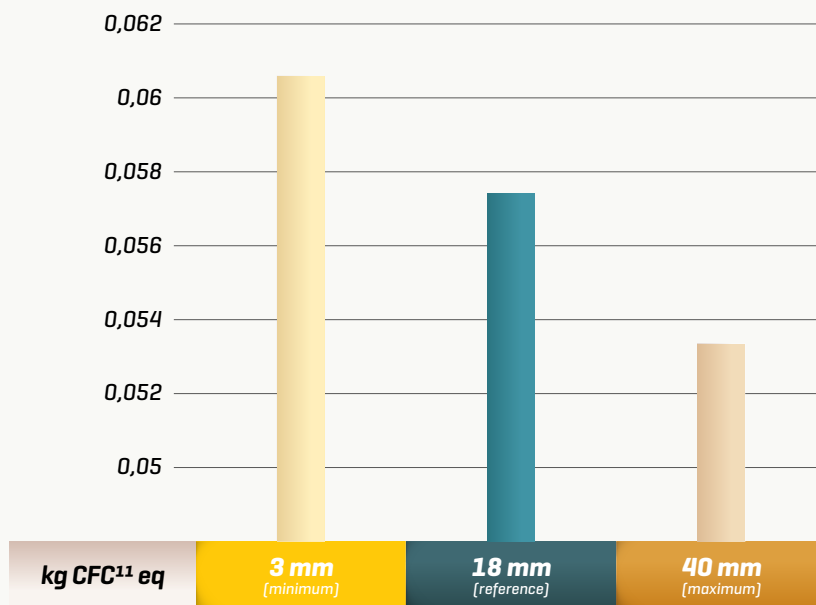
Environmental Performance

Air Quality

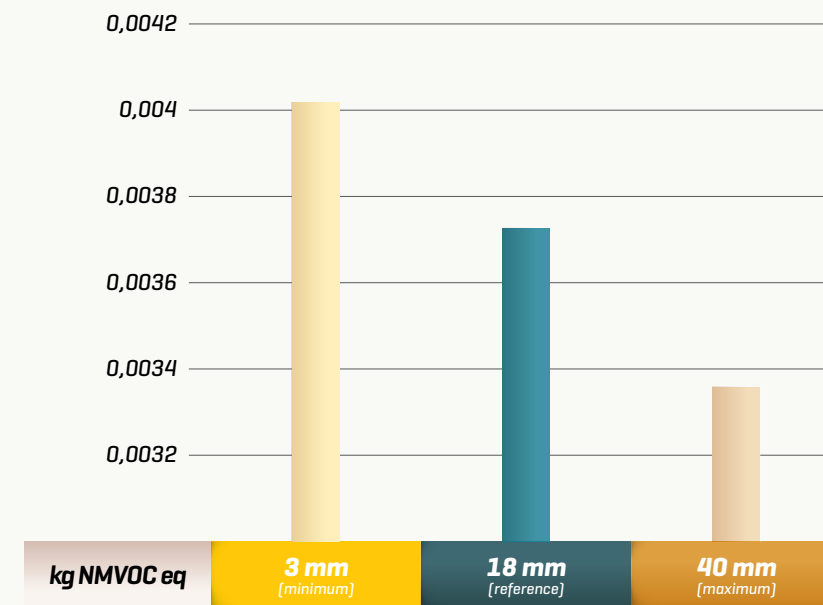


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. OZONE DEPLETION



. PHOTOCHEMICAL OZONE FORMATION



Environmental Performance

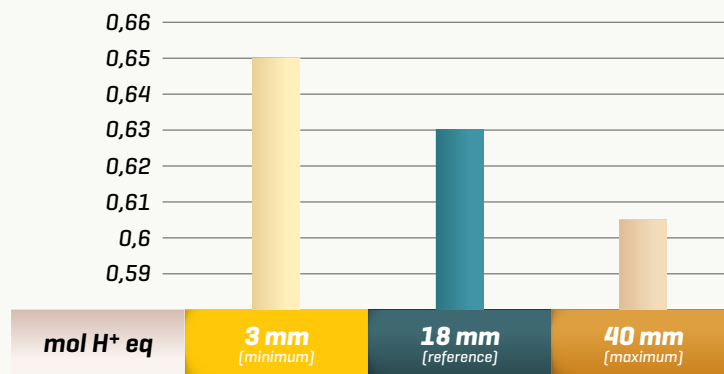
Water Quality



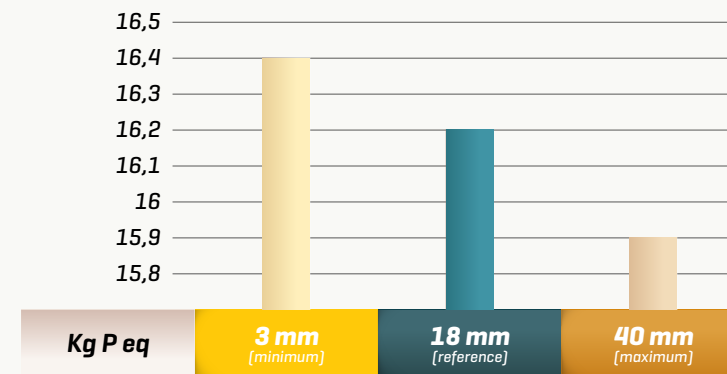
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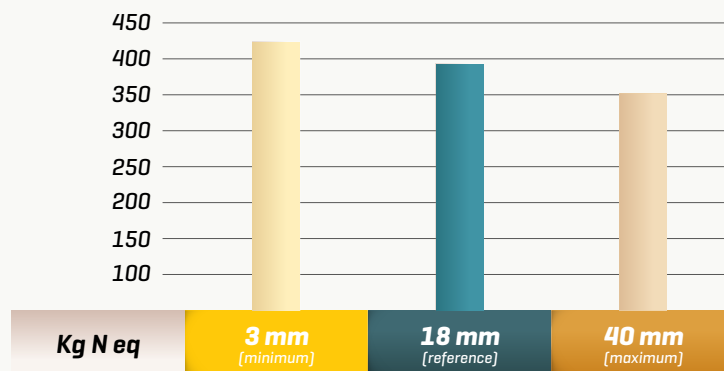
· ACIDIFICATION



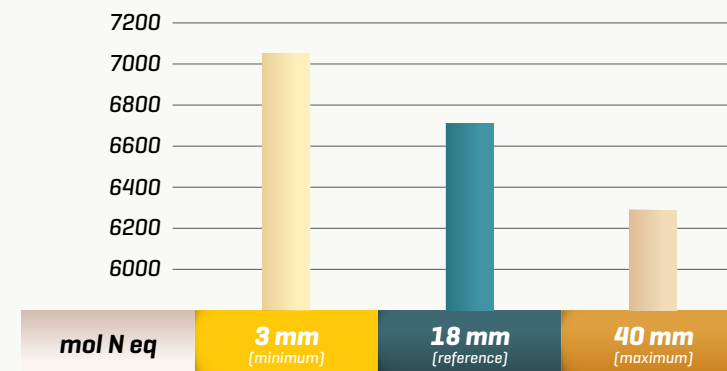
· EUTROPHICATION AQUATIC freshwater



· EUTROPHICATION AQUATIC marine



· EUTROPHICATION TERRESTRIAL



Environmental Performance

Table 1



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• POTENTIAL ENVIRONMENTAL IMPACT

INDICATOR	UNIT	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	Total Life Cycle	D
Climate change - Total	kg CO ₂ eq	-1,14E+03	3,71E+01	INA	INA	INA	3,86E+00	2,09E+03	0,00E+00	3,99E+02	-2,64E+01
Climate change - Fossil	kg CO ₂ eq	2,95E+02	3,70E+01	INA	INA	INA	3,86E+00	3,85E+00	0,00E+00	3,40E+02	-2,51E+01
Climate change - Biogenic	kg CO ₂ eq	-1,44E+03	3,52E-02	INA	INA	INA	3,93E-03	2,09E+03	0,00E+00	5,72E+01	-1,16E+00
Climate change - Land use and LU change	kg CO ₂ eq	1,66E+00	1,54E-02	INA	INA	INA	1,39E-03	7,17E-03	0,00E+00	1,68E+00	-1,15E-01
Ozone depletion	kg CFC ₁₁ eq	5,78E-05	8,65E-06	INA	INA	INA	9,21E-07	2,09E-07	0,00E+00	6,76E-05	-3,48E-06
Acidification	mol H ⁺ eq	1,58E+00	2,36E-01	INA	INA	INA	1,61E-02	2,50E-02	0,00E+00	1,86E+00	-8,66E-02
Eutrophication aquatic freshwater	kg P eq	5,14E-02	2,46E-03	INA	INA	INA	2,40E-04	3,28E-03	0,00E+00	5,74E-02	-6,59E-03
Eutrophication aquatic marine	kg N eq	5,35E-01	8,17E-02	INA	INA	INA	4,91E-03	7,54E-03	0,00E+00	6,30E-01	-1,74E-02
Eutrophication terrestrial	mol N eq	1,52E+01	8,95E-01	INA	INA	INA	5,37E-02	7,01E-02	0,00E+00	1,62E+01	-1,81E-01
Photochemical ozone formation	kg NMVOC eq	1,36E+00	2,54E-01	INA	INA	INA	1,73E-02	1,81E-02	0,00E+00	1,65E+00	-7,99E-02
Depletion of abiotic resources, minerals and metals*	kg Sb eq	3,59E-03	1,22E-04	INA	INA	INA	8,84E-06	1,03E-05	0,00E+00	3,73E-03	-1,19E-04
Depletion of abiotic resources, fossils*	MJ	6,01E+03	5,67E+02	INA	INA	INA	6,01E+01	6,99E+01	0,00E+00	6,71E+03	-4,18E+02
Water use*	m ³ depriv.	3,92E+02	1,84E+00	INA	INA	INA	2,07E-01	1,21E-01	0,00E+00	3,94E+02	-8,34E+00

* 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.

Results per declared unit (1m³ of plywood 18 mm)

Environmental Performance

Table 2



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• USE OF RESOURCES

INDICATOR	UNIT	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	Total Life Cycle	D
PERE	MJ	1,03E+04	8,06E+00	INA	INA	INA	7,65E-01	1,12E+01	0,00E+00	1,03E+04	-2,05E+03
PERM	MJ	1,38E+04	0,00E+00	INA	INA	INA	0,00E+00	0,00E+00	0,00E+00	1,38E+04	0,00E+00
PERT	MJ	2,41E+04	8,06E+00	INA	INA	INA	7,65E-01	1,12E+01	0,00E+00	2,41E+04	-2,05E+03
PENRE	MJ	6,01E+03	5,67E+02	INA	INA	INA	6,01E+01	6,99E+01	0,00E+00	6,70E+03	-4,18E+02
PENRM	MJ	8,60E+00	0,00E+00	INA	INA	INA	0,00E+00	0,00E+00	0,00E+00	8,60E+00	0,00E+00
PENRT	MJ	6,02E+03	5,67E+02	INA	INA	INA	6,01E+01	6,99E+01	0,00E+00	6,71E+03	-4,18E+02
SM	kg	0,00E+00	0,00E+00	INA	INA	INA	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	INA	INA	INA	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	INA	INA	INA	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m³	1,07E+01	7,51E-02	INA	INA	INA	8,00E-03	4,23E-02	0,00E+00	1,09E+01	-2,82E-01

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

Results per declared unit (1m³ of plywood 18 mm)

Environmental Performance

Table 3



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▀ VARIABILITY OF RESULTS DEPENDING ON PLYWOOD THICKNESS

INDICATOR	UNIT	3 mm (minimum)	Variation	18 mm (reference)	40 mm (maximum)	Variation
Climate change - Total	kg CO ₂ eq	4,10E+02	3%	3,99E+02	3,85E+02	-3%
Climate change - Fossil	kg CO ₂ eq	7,03E-05	4%	6,76E-05	6,43E-05	-5%
Climate change - Biogenic	kg CO ₂ eq	1,69E+00	3%	1,65E+00	1,60E+00	-3%
Climate change - Land use and LU change	kg CO ₂ eq	1,95E+00	5%	1,86E+00	1,74E+00	-6%
Ozone depletion	kg CFC ₁₁ eq	6,06E-02	6%	5,74E-02	5,33E-02	-7%
Acidification	mol H ⁺ eq	6,50E-01	3%	6,30E-01	6,05E-01	-4%
Eutrophication aquatic freshwater	kg P eq	1,64E+01	2%	1,62E+01	1,59E+01	-2%
Eutrophication aquatic marine	kg N eq	4,26E+02	8%	3,94E+02	3,53E+02	-10%
Eutrophication terrestrial	mol N eq	7,05E+03	5%	6,71E+03	6,29E+03	-6%
Photochemical ozone formation	kg NMVOC eq	4,02E-03	8%	3,73E-03	3,36E-03	-10%
Depletion of abiotic resources, minerals and metals*	kg Sb eq	3,54E+02	4%	3,40E+02	3,23E+02	-5%
Depletion of abiotic resources, fossils*	MJ	5,42E+01	-5%	5,72E+01	6,09E+01	6%
Water use*	m ³ depriv.	1,72E+00	2%	1,68E+00	1,64E+00	-3%

Results per 1m³ of plywood

Waste Production and Output Flows



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▪ WASTE PRODUCTION

INDICATOR	UNIT	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	Total Life Cycle	D
Hazardous waste disposed	kg	1,06E-02	1,43E-03	INA	INA	INA	1,45E-04	4,57E-05	0,00E+00	1,22E-02	-7,50E-04
Non-hazardous waste disposed	kg	4,10E+01	3,71E+01	INA	INA	INA	5,63E+00	1,36E+00	0,00E+00	8,50E+01	-1,30E+00
Radioactive waste disposed	kg	1,12E-02	3,83E-03	INA	INA	INA	4,07E-04	4,68E-04	0,00E+00	1,59E-02	-1,27E-03

▪ OUTPUT FLOWS

INDICATOR	UNIT	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	Total Life Cycle	D
Components for re-use	kg	0,00E+00	0,00E+00	INA	INA	INA	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	2,63E+01	0,00E+00	INA	INA	INA	1,00E+01	3,70E+02	0,00E+00	4,07E+02	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	INA	INA	INA	1,20E+00	5,47E+01	0,00E+00	5,59E+01	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	INA	INA	INA	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,86E+02
Exported energy, thermal	MJ	0,00E+00	0,00E+00	INA	INA	INA	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results per declared unit (1m³ of plywood 18 mm)

Carbon Sequestration



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The CO₂ sequestered during tree growth and stored until the end-of-life has been calculated according to the formula:

Mass of CO₂ sequestered per m³ of plywood = mass of dry timber x 0,5 x 44/12

The average density of Invernizzi poplar plywood is **425 kg/m³**, with a content of **335 kg** of poplar wood.

The CO₂ sequestered by 1m³ of Invernizzi poplar plywood is:



References

- General Programme Instructions of the International EPD® System. Version 4.0.
- PCR 2019:14 “Construction products” v. 1.2.4, based on ISO 14025:2006, ISO 14040:2006 and ISO 14044:2006
- C-PCR-006 “WOOD AND WOOD-BASED PRODUCTS FOR USE IN CONSTRUCTION”, v. 2019-12-20
- EN 15804:2012+A2:2019
- EN 16485:2014.

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