



Environmental Product Declaration for

Invernizzi IGNIPAS

Fire Retardant Poplar Particleboard

(thickness range 10 to 40 mm)

EPD of multiple products, based on a representative product.

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

EPD in accordance with ISO 14025:2006 and EN 15804:2021

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INVERNIZZI
Plywood Tradition

Summary



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<i>General Information</i>	3
<i>Company Information</i>	4
<i>Product Description</i>	6
<i>LCA Information/1</i>	9
<i>LCA Information/2 - System Boundaries</i>	10
<i>Production Process A1-A3</i>	11
<i>Distribution Scenario A4</i>	12
<i>End of Life C2-C4 and Recovery D</i>	13
<i>Cut-off and Allocation</i>	13
<i>Environmental Performance</i>	
<i>Climate Change</i>	14
<i>Resource Consumption</i>	15
<i>Air Quality</i>	16
<i>Water Quality</i>	17
<i>Tables</i>	18
<i>Waste Production and Output Flows</i>	21
<i>Carbon Sequestration</i>	22
<i>References</i>	23

General Information



INVERNIZZI
Plywood Tradition

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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 PCR 2019:14, VERSION 1.3.3. PCR MODERATOR: MARTIN ERLANDSSON, IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE, MARTIN.ERLANDSSON@IVL.SE
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Procedure for follow-up of data during EPD validity involves third party verifier	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
CPC Code	314 "BOARDS AND PANELS"

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.



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.



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.



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.



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.

Product Description



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IGNIPAS Fire Retardant Poplar Chipboard panels by INVERNIZZI are produced using the parts of the poplar stem that, due to their structure or shape, do not adapt to the peeling for plywood production (e.g., twigs, trimmings, etc.) and from recycling of waste material from plywood processing. The product is classified according to the UNI EN 13501-1 standard and therefore complies with the fire reaction Euroclass B-s2, d0. **The available thicknesses range from 10 to 40 mm.**

▪ TYPES OF BONDING

INVERNIZZI 100% poplar particleboard “Ignipas” complies with the provisions of **UNI EN 312 Standard** and is classified as follows:

P2 – boards for **interior fitments** (including furniture) for **use in dry conditions.**



for **INTERIOR** use

▪ CONTENT DECLARATION

The product contains poplar wood (moisture content: 6%) and glue, in different proportions according to the panel thickness.

	10 mm [minimum]	18 mm [reference]	40 mm [maximum]
<i>Poplar Wood</i>	69%	70%	72%
<i>Glue</i>	17%	17%	16%
<i>Salt</i>	14%	13%	12%

Packaging materials: Paper and board 40,0%, Plastic 51,9%, Metal: 8,1%.

Weight of packaging: 1 kg.

- The product does not contain Asbestos.
- 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 5.1 mg HCHO/100g (dry).

Product Description

▪ CERTIFICATIONS

Particleboard 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.

With regards to its supply and production chain, INVERNIZZI 100% poplar particleboard "Ignipas" 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 marking - certificates for structural use with 2+ system EN 13986:04 standard, wood panels for structural use.

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

Available thicknesses range from 10 mm to 40 mm.
The reference thickness considered for the study is 18 mm.



Product Description



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▪ APPLICATIONS

Fire Retardant Poplar Particleboard Ignipas is extremely versatile and can be used in several applications, such as:

- **BUILDING AND CONSTRUCTION**
- **HIGH QUALITY FURNITURE**
- **DOORS**
- **EXHIBITION STANDS**



LCA Information / 1



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▪ DECLARED UNIT

1m³ of Ignipas particleboard with thickness 18 mm.

▪ STUDY DEVELOPED

Study developed using Simapro 9.5 software and ecoinvent 3.9,1 library.

▪ MODELLING OF ELECTRICICTY

The GWP-GHG of the italian residual mix used in the study is 0.605 kgCO₂eq/kWh.

▪ CONSIDERED PARAMETERS

Parameters considered for the study: moisture content 9%, density 611 kg/m³.

▪ REFERENCE YEAR

2022

▪ IMPACT ASSESSMENT METHOD

EN 15804 reference package based on EF 3.1 has been used.

LCA Information/2

System Boundaries



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Cradle to gate with options (A1-A4), modules C1-C4, module D.

Stage	PRODUCT			CONSTRUCTION PROCESS		USE							END-OF-LIFE				RESOURCE RECOVERY
	<i>Raw material supply</i>	<i>Transport of raw materials</i>	<i>Manufacturing</i>	<i>Transport to customer</i>	<i>Construction-Installation process</i>	<i>Use</i>	<i>Maintenance</i>	<i>Repair</i>	<i>Replacement</i>	<i>Refurbishment</i>	<i>Operational energy use</i>	<i>Operational water use</i>	<i>Deconstruction/demolition</i>	<i>Transport to waste processing</i>	<i>Waste processing</i>	<i>Disposal</i>	<i>Reuse, recovery, recycling potential</i>
<i>Module</i>	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
<i>Modules Declared</i>	X	X	X	X	INA	INA	INA	INA	INA	INA	INA	INA	X	X	X	X	X
<i>Geography</i>	EU 27			World	-	-							-	EU 27			EU 27
<i>Specific data Used</i>	>90%			-	-	-							-	-			-
<i>Variation Products</i>	<±10%			-	-	-							-	-			-
<i>Variation Sites</i>	Not relevant			-	-	-							-	-			-

Production Process A1-A3



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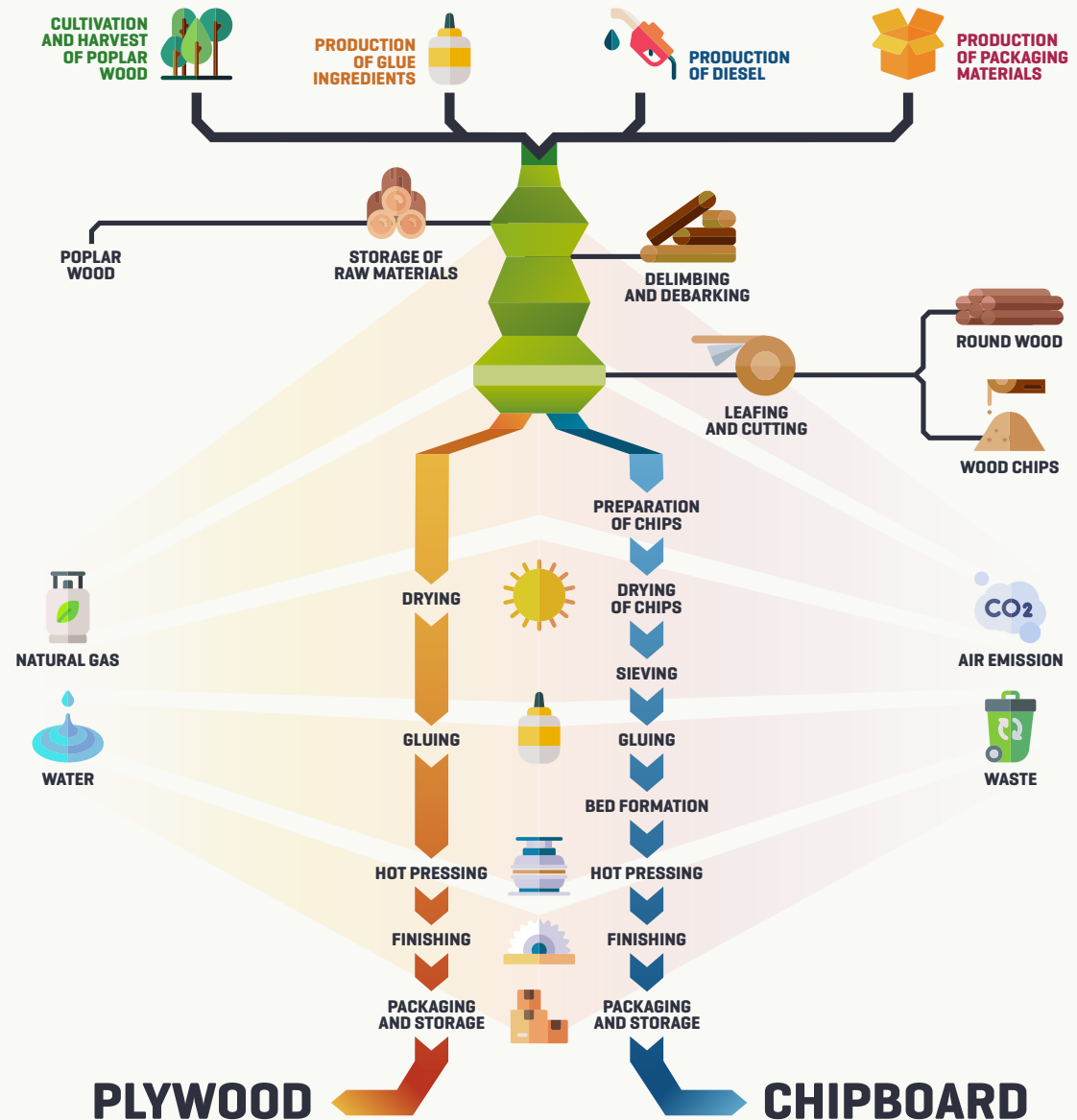
Invernizzi “**Ignipas**” **particleboard** panels are produced exclusively with residues of virgin poplar wood that is processed inside the company for plywood production, thus following a **circular production pattern**.

Poplar branches, barks and cuts-off of poplar veneers are collected and transported to a grinding machine equipped with sieves to collect particles in **different granulometry**.

The resulting grinded particles, also called chips, are then **dried** in dedicated silos. Subsequently, the chips in different sizes are collected separately and transported via conveyors to the **gluing basin**, where they are mixed with a **urea based resin**. Before getting to the press, all the chips are spreaded in a **forming bed**, where the outer sides are composed of smaller chips and the inner of thicker ones. The forming bed accounts for the whole length of the press, i.e. 11,16 meters, it then enters the **press chamber**.

The **high pressing temperature** and the applied pressure allow the forming bed to reach the desired thickness of the finished panels. The resulting full board is then **cut** directly at the press output according to the specified lengths, which can be 4180 mm, 3720 mm and 2790 mm.

The panels enter the finishing line to be **squared and sanded**. The last phase of the production line is the **quality selection**. The panels are then **labelled, 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
<i>Vehicle type</i>	TRUCK > 32t	CONTAINER SHIP
<i>Fuel type</i>	DIESEL	HEAVY FUEL OIL
<i>Fuel consumption (Kg/tkm)</i>	0,0196	0,0025
<i>Gross vehicle weight (t)</i>	29,96	n.a.
<i>Average load factor (t/vehicle)</i>	15,96	50 000
<i>Bulk density of goods (kg/m³)</i>	425	425
<i>Utilisatio ratio</i>	< 1	< 1
<i>Ecoinvent dataset</i>	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

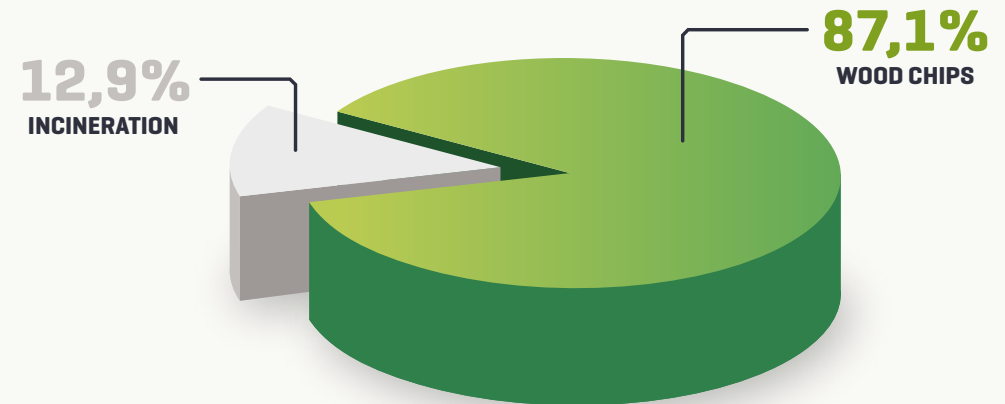
End of Life C2-C4 and Recovery D



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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, Exclusions 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.

▪ Exclusions

- packaging of input materials and auxiliary materials;
- dye used in the glue mix;
- energy use for miter saw.

▪ ALLOCATION

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

Environmental Performance

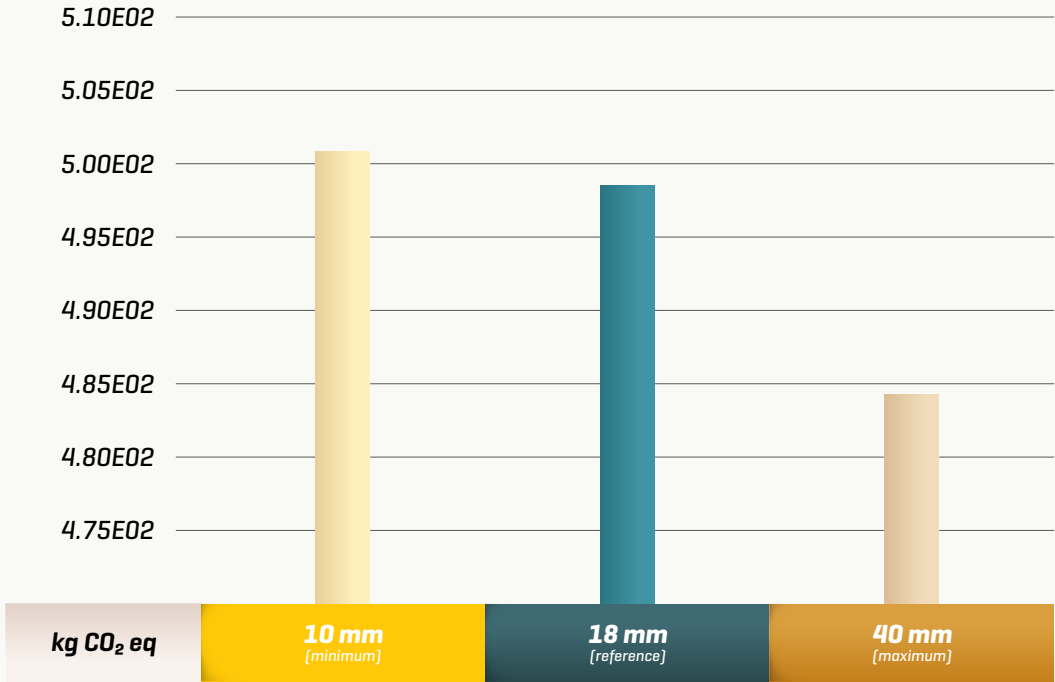


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Climate Change

CLIMATE CHANGE - TOTAL



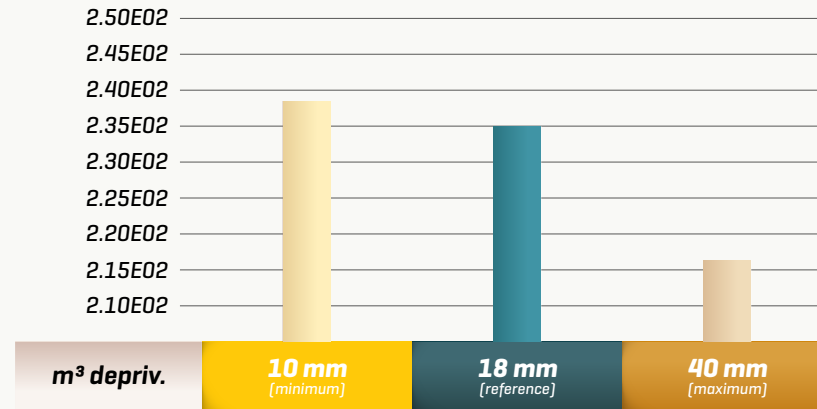
Environmental Performance

Resource Consumption

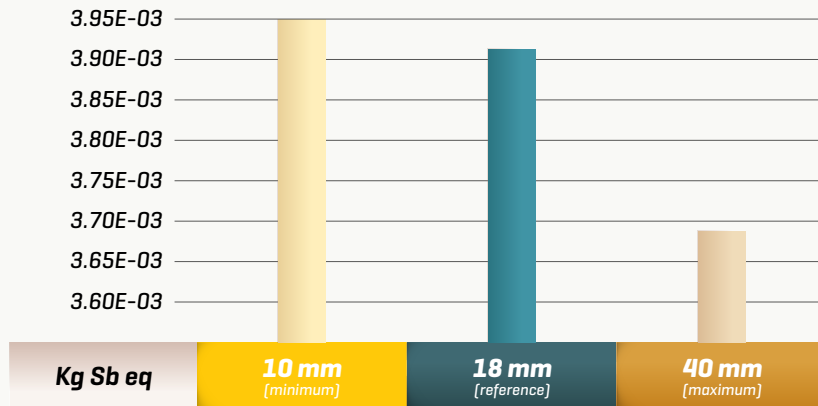


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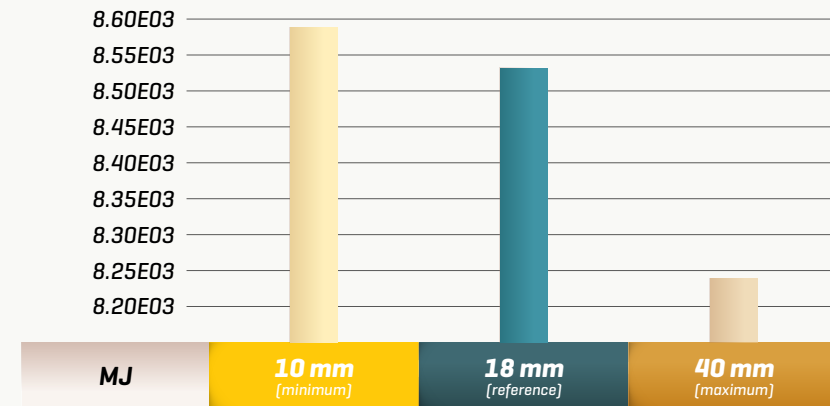
· WATER USE



· DEPLETION OF ABIOTIC RESOURCES minerals and metals



· DEPLETION OF ABIOTIC RESOURCES fossils



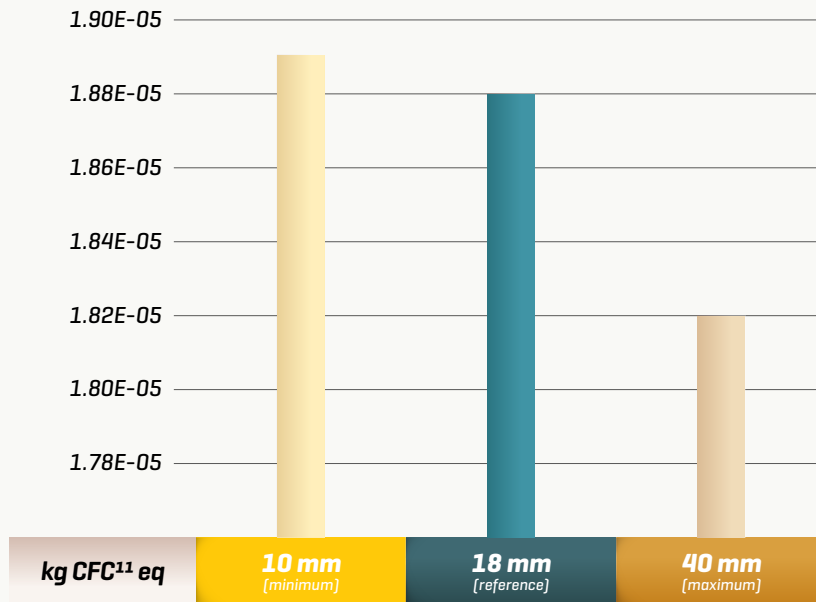
Environmental Performance

Air Quality

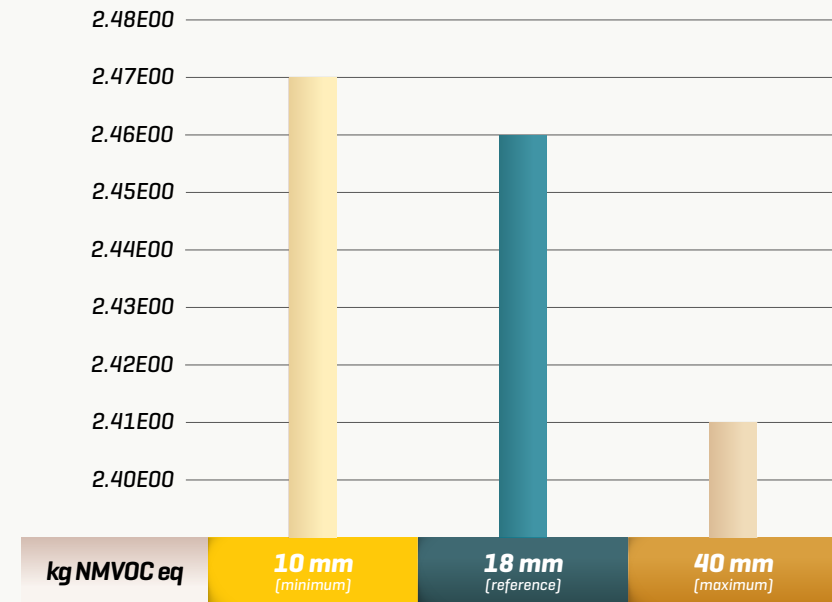


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• OZONE DEPLETION



• PHOTOCHEMICAL OZONE FORMATION



Environmental Performance

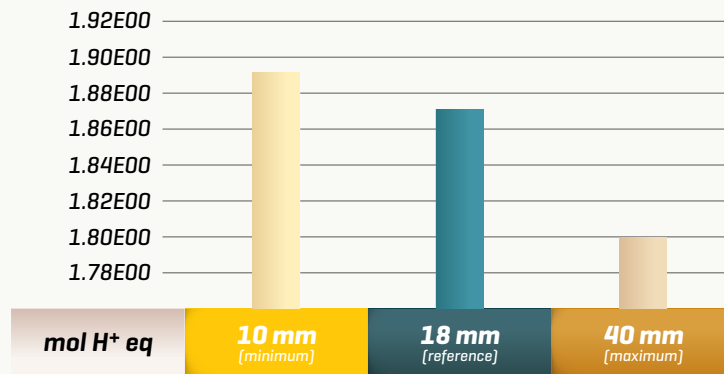
Water Quality



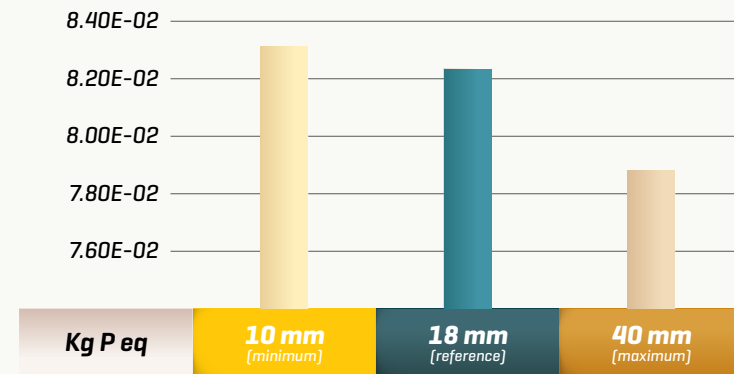
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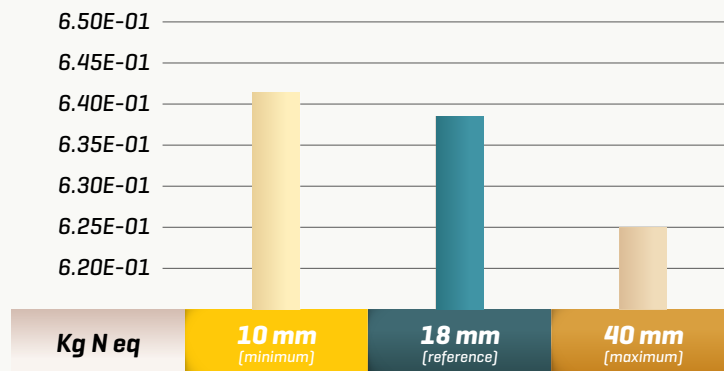
· ACIDIFICATION



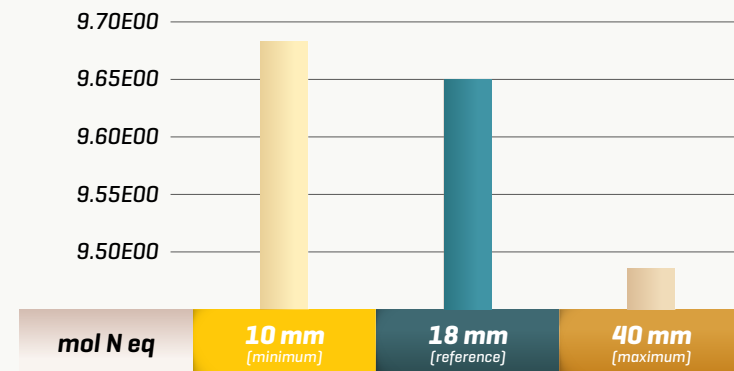
· EUTROPHICATION AQUATIC freshwater



· EUTROPHICATION AQUATIC marine



· EUTROPHICATION TERRESTRIAL



Environmental Performance

Table 1

POTENTIAL ENVIRONMENTAL IMPACT

INDICATOR	UNIT	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Climate change - Total	kg CO ₂ eq	-1.26E02	6.03E01	INA	INA	INA	6.35E00	1.50E03	0.00E+00	-3.82E01
Climate change - Fossil	kg CO ₂ eq	4.24E02	6.03E01	INA	INA	INA	6.34E00	6.00E00	0.00E+00	-3.66E01
Climate change - Biogenic	kg CO ₂ eq	-5.52E02	4.96E-02	INA	INA	INA	4.88E-03	1.50E03	0.00E+00	-1.40E00
Climate change - Land use and LU change	kg CO ₂ eq	1.45E00	2.97E-02	INA	INA	INA	2.98E-03	9.98E-03	0.00E+00	-1.79E-01
Ozone depletion	kg CFC ₁₁ eq	1.72E-05	1.32E-06	INA	INA	INA	1.39E-07	1.06E-07	0.00E+00	-1.17E-06
Acidification	mol H ⁺ eq	1.51E00	3.04E-01	INA	INA	INA	2.14E-02	4.17E-02	0.00E+00	-1.09E-01
Eutrophication aquatic freshwater	kg P eq	7.31E-02	4.31E-03	INA	INA	INA	4.52E-04	4.39E-03	0.00E+00	-9.26E-03
Eutrophication aquatic marine	kg N eq	4.99E-01	1.17E-01	INA	INA	INA	7.39E-03	1.53E-02	0.00E+00	-2.40E-02
Eutrophication terrestrial	mol N eq	8.17E00	1.25E00	INA	INA	INA	7.81E-02	1.45E-01	0.00E+00	-2.52E-01
Photochemical ozone formation	kg NMVOC eq	1.96E00	4.31E-01	INA	INA	INA	3.32E-02	3.92E-02	0.00E+00	-1.45E-01
Depletion of abiotic resources, minerals and metals*	kg Sb eq	3.69E-03	1.86E-04	INA	INA	INA	1.71E-05	1.22E-05	0.00E+00	-1.89E-04
Depletion of abiotic resources, fossils*	MJ	7.47E03	8.68E02	INA	INA	INA	9.28E01	1.05E02	0.00E+00	-5.87E02
Water use*	m ³ depriv.	2.32E02	3.76E00	INA	INA	INA	4.43E-01	-6.80E-01	0.00E+00	-1.09E01
GWP-GHG	kg CO ₂ eq	4.26E02	6.03E01	INA	INA	INA	6.35E00	6.03E00	0.00E+00	-3.70E01

* 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.

Using the results of modules A1-A3 without considering the results of module C is discouraged.

Results per declared unit (1m³ of particleboard 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	D
PERE	MJ	2.25E02	1.36E01	INA	INA	INA	1.36E00	1.70E01	0.00E00	-2.95E03
PERM	MJ	1.23E04	0.00E00	INA	INA	INA	0.00E00	0.00E00	0.00E00	0.00E00
PERT	MJ	1.25E04	1.36E01	INA	INA	INA	1.36E00	1.70E01	0.00E00	-2.95E03
PENRE	MJ	7.46E03	8.68E02	INA	INA	INA	9.28E01	1.05E02	0.00E00	-5.87E02
PENRM	MJ	8.60E00	0.00E00	INA	INA	INA	0.00E00	0.00E00	0.00E00	0.00E00
PENRT	MJ	7.47E03	8.68E02	INA	INA	INA	9.28E01	1.05E02	0.00E00	-5.87E02
SM	kg	0.00E00	0.00E00	INA	INA	INA	0.00E00	0.00E00	0.00E00	0.00E00
RSF	MJ	0.00E00	0.00E00	INA	INA	INA	0.00E00	0.00E00	0.00E00	0.00E00
NRSF	MJ	0.00E00	0.00E00	INA	INA	INA	0.00E00	0.00E00	0.00E00	0.00E00
FW	m ³	6.63E00	1.12E-01	INA	INA	INA	1.26E-02	3.77E-02	0.00E00	-3.76E-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 particleboard 18 mm)

Environmental Performance

Table 3



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▀ VARIABILITY OF RESULTS DEPENDING ON PARTICLEBOARD THICKNESS

INDICATOR	UNIT	10 mm <small>[minimum]</small>	Variation	18 mm <small>[reference]</small>	40 mm <small>[maximum]</small>	Variation
<i>Climate change - Total</i>	kg CO ₂ eq	5.01E02	1%	4.98E02	4.84E02	-3%
<i>Climate change - Fossil</i>	kg CO ₂ eq	4.99E02	1%	4.97E02	4.82E02	-3%
<i>Climate change - Biogenic</i>	kg CO ₂ eq	4.24E-01	1%	4.21E-01	4.06E-01	-4%
<i>Climate change - Land use and LU change</i>	kg CO ₂ eq	1.50E00	1%	1.49E00	1.45E00	-3%
<i>Ozone depletion</i>	kg CFC ₁₁ eq	1.89E-05	1%	1.88E-05	1.82E-05	-3%
<i>Acidification</i>	mol H ⁺ eq	1.89E00	1%	1.87E00	1.80E00	-4%
<i>Eutrophication aquatic freshwater</i>	kg P eq	8.30E-02	1%	8.23E-02	7.87E-02	-4%
<i>Eutrophication aquatic marine</i>	kg N eq	6.41E-01	0%	6.38E-01	6.25E-01	-2%
<i>Eutrophication terrestrial</i>	mol N eq	9.68E00	0%	9.65E00	9.48E00	-2%
<i>Photochemical ozone formation</i>	kg NMVOC eq	2.47E00	0%	2.46E00	2.41E00	-2%
<i>Depletion of abiotic resources, minerals and metals*</i>	kg Sb eq	3.95E-03	1%	3.91E-03	3.69E-03	-6%
<i>Depletion of abiotic resources, fossils*</i>	MJ	8.59E03	1%	8.53E03	8.24E03	-3%
<i>Water use*</i>	m ³ depriv.	2.38E02	1%	2.35E02	2.21E02	-6%
<i>GWP-GHG</i>	kg CO ₂ eq	5.03E02	1%	5.00E02	4.85E02	-3%

Results per 1m³ of particleboard

Waste Production and Output Flows



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▪ WASTE PRODUCTION

INDICATOR	UNIT	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
<i>Hazardous waste disposed</i>	kg	3.42E-02	5.45E-03	INA	INA	INA	5.77E-04	2.11E-04	0.00E00	-2.40E-03
<i>Non-hazardous waste disposed</i>	kg	8.61E01	5.42E01	INA	INA	INA	8.14E00	2.95E00	0.00E00	-2.33E00
<i>Radioactive waste disposed</i>	kg	4.88E-03	2.89E-04	INA	INA	INA	2.83E-05	6.28E-04	0.00E00	-1.26E-03

▪ OUTPUT FLOWS

INDICATOR	UNIT	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
<i>Components for re-use</i>	kg	0.00E00	0.00E00	INA	INA	INA	0.00E00	0.00E00	0.00E00	0.00E00
<i>Material for recycling</i>	kg	5.40E00	0.00E00	INA	INA	INA	0.00E00	5.32E02	0.00E00	0.00E00
<i>Materials for energy recovery</i>	kg	0.00E00	0.00E00	INA	INA	INA	0.00E00	7.86E01	0.00E00	0.00E00
<i>Exported energy, electricity</i>	MJ	0.00E00	0.00E00	INA	INA	INA	0.00E00	0.00E00	0.00E00	1.37E02
<i>Exported energy, thermal</i>	MJ	0.00E00	0.00E00	INA	INA	INA	0.00E00	0.00E00	0.00E00	2.74E02

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

Carbon Sequestration



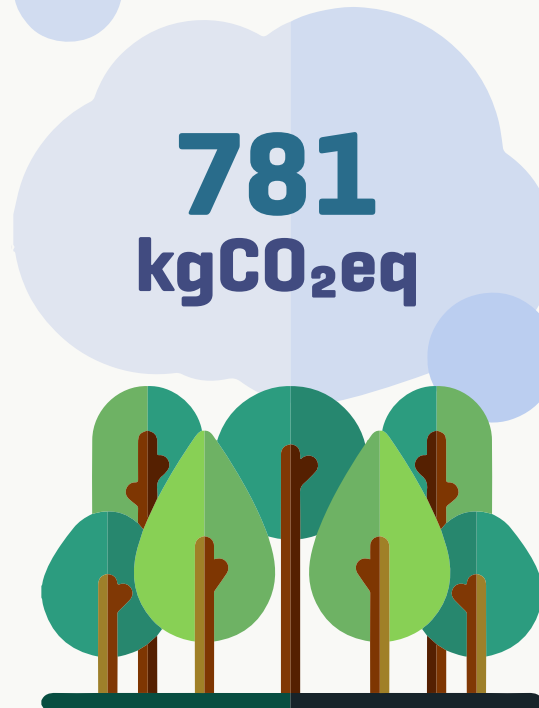
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The CO₂ sequestered during tree growth and stored until the end-of-life has been calculated according to the formula:

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

The average density of Invernizzi poplar particleboard “Ignipas” is **611 kg/m³**, with a content of **426 kg** of poplar wood.

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



References



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- *PCR 2019:14 “Construction products” v. 1.3.2, 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 15804:2021.*
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- *Life Cycle Assessment (LCA) di pannelli in truciolare di pioppo ignifugo (Ignipas e Ignipas E05) prodotti dall'azienda Invernizzi S.p.A., LCA report v.02, pubblicato il 22/03/2024*

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