Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Woodsafe Exterior WFX

from

Woodsafe Timber Protection AB

Fågelbacken, Hubbo Jädra 7–9, 725 95 Västerås, Sweden

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General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): *PCR 2019:14 Construction products (EN 15804:A2) (1.11)* *PCR 2019:14-c-PCR-006 c-PCR-006 Wood and wood-based products for use in construction (EN 16485) (2019-12-20)* General Programme Instructions of the International EPD® System. Version 3.01
PCR review was conducted by: *Claudia A. Peña, University of Concepción, Chile.* *The review panel may be contacted via the Secretariat www.environdec.com/contact.*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: *David Althoff Palm, Ramboll Sweden AB* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

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EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Woodsafe Timber Protection AB
Contact: Thomas Bengtsson
Description of the organisation:
Woodsafe Timber protection is the leading manufacturer in Europe for fire-impregnated wood products. Woodsafe refines the fire repellent properties in wood products for interior and exterior use, they offer their services to the construction industry. Woodsafe provides two different fire impregnation solutions, Woodsafe PRO and Woodsafe Exterior WFX.

Product-related or management system-related certifications:
Woodsafe Timber Protection AB is certified according to ISO 9001:2015 and ISO 14001:2015

Name and location of production site(s):
Fågelbacken, Hubbo Jädra 7-9
725 95 Västerås
Sweden

Product information

Product name: Woodsafe Exterior WFX

Product description:
The fire-protected wood product in this EPD consists of a heat modified pine/spruce impregnated with Woodsafe Exterior WFX, with a density of 525 kg/m^3 and a moisture content of 8 %.

Woodsafe Exterior WFX is developed for use in exterior and humid settings without the need for surface treatment. Common areas of use for Exterior WFX are facade cladding, balconies, canopies, and underground installation. The composition of the fire protection agent consists of a complex formula which is hardened to a very stable waterproof polymer that does not dissolve by precipitation. Fixation takes place in the woods cell structure in a specially developed drying process. In the process, the Exterior WFX is hardened to a polymerized state (waterproof fire protection treatment). When wood treated with Woodsafe Exterior WFX comes in contact with fire the combustion on the contact surface will be significantly reduced as the fire protection agents reacts with the heat generated. The chain reaction that starts in the fire protection agents forms water that lowers the temperature of the contact surface and reduces pyrolysis gases that arise when wood is heated. The result is that the wood charred (like wet wood) or burns slowly in a controlled manner. Woodsafe Exterior WFX is mainly applied to heat modified wood, the heat treatment is carried out by the Wood supplier before the wood products arrives at Woodsafe.

Woodsafe timber protection AB do not produce the raw wood product but impregnates other companies wood products. Woodsafe collaborates with various suppliers in the wood industry. The wood supplier delivers wood to Woodsafe for impregnation according to relevant fire class. Woodsafe impregnates several different wood types, including spruce, pine, cedar, frake, accoya, poplar, oak, ash and plywood products. Woodsafe produce about 13 099 m^3 of fire protected wood annually. The share of the total annual production which consists of heat-treated spruce/pine impregnated with Woodsafe Exterior WFX is about 39%

The wood is delivered to Woodsafe with a certain moisture content, at Woodsafe the fire impregnating agent is added to the wood which is then dried so the finished product has approximately the same moisture content as before the impregnation process. The fire protection chemicals are delivered from

Koppers (USA). The fire impregnating agent is applied through a computer-controlled vacuum pressure impregnation process and is hardened in special drying chambers for long time performance. The hardening process uses heat from Woodsafes own biofuel plant and electricity for operating motors and fans consists of 100 % hydropower. The process is third party certified according to ISO 9001: 2015 by RISE. Since 2009, the products are CE certified according to CPR305 / 2011 (CPD 89/106).

The environmental impact from the planed wood product in the EPD originates from the sector EPD (S-P-02657) and is a mean value of the environmental impact from a standalone planing mill and a combination plant (sawmill and planing mill). The climate impact (fossil) from the planed wood product is 39,2 kg CO_2e/m^3. Wood production data and transport distances from wood suppliers to Woodsafes production site are significant for the results. The results in this EPD present an average for an heat modified pine/spruce, impregnated with Woodsafe Exterior WFX. This means that specific wood production data and transport distances from specific suppliers will influence and can alter the results.

UN CPC code: 31

LCA information

Functional unit / declared unit:
1 m^3 fire-protected and heat modified planed wood product of pine/spruce with a moisture content of 8 %.

Conversion factor: 525 kg/m^3

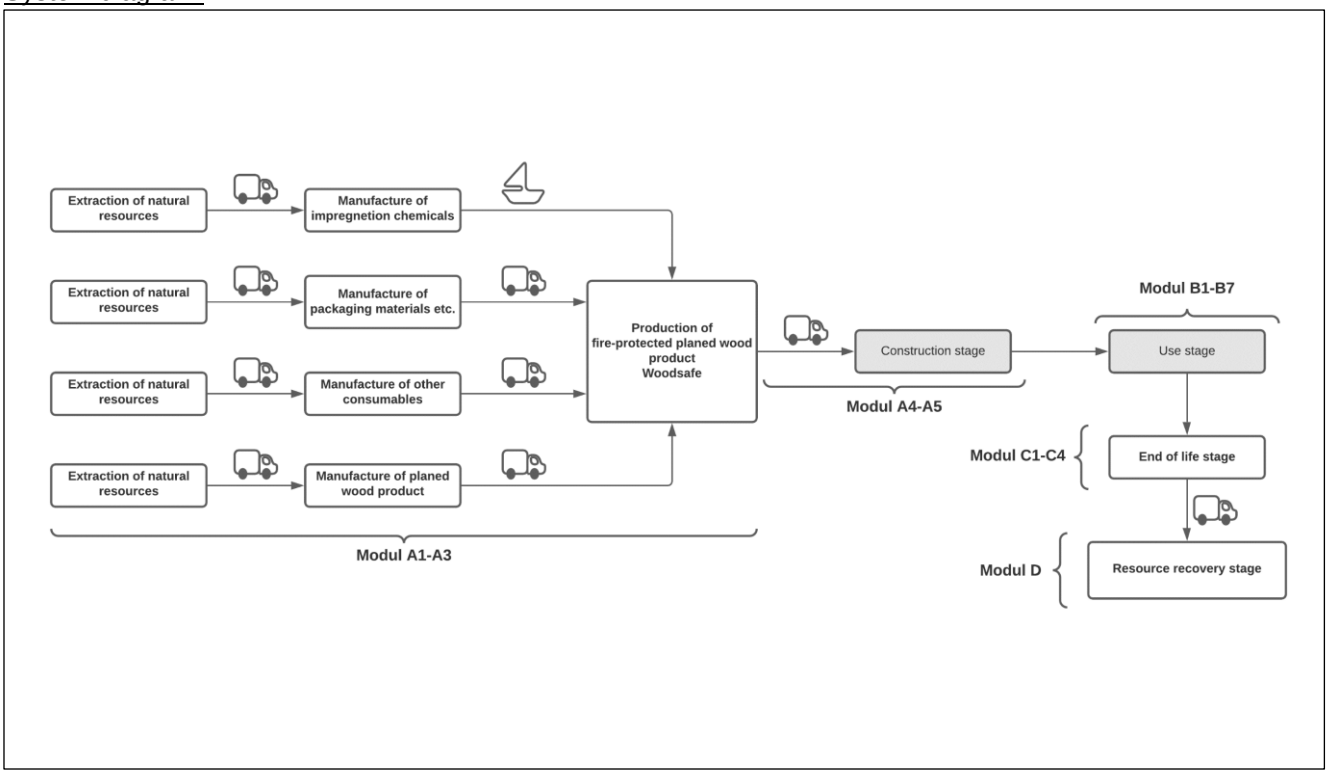
Time representativeness: The data represents the year 2019 and 2020

Geographical scope: Sweden

Database(s) and LCA software used:
The LCA software is SimPro 9.2.0.2 and the database is EcoInvent 3.7. When modeling in Simapro, Ecoinvent data (updated December 2020) has been used for generic data.

Description of system boundaries:
Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D)

System diagram:



*Grayed-out boxes (Modules A4-A5 and B1-B7) are not included in EPD

Included	Excluded
Production (A1-A3) • Production of all consumed raw materials and goods, including waste/spill material from production process, packaging etc. • Energy and fuels • Transports of raw material and consumed goods to production site. • Production processes. • Transport to recipient and disposal of hazardous waste from production stage. • Transport to recipient of recyclable waste and spill material derived from the production stage.	
	Construction (A4-A5)
	Use (B1-B7)
End-of-life (C1-C4) • Demolition/dismantling, waste processing and transport to facility for energy recovery ,reuse or landfill	**End-of-life (C1-C4)** • Environmental impact from incineration for energy recovery at CHP plant.
Benefits and loads beyond the system boundary (D) • Energy recovery of the wood product in CHP plants produces district heating and electricity and thus replaces Swedish medium district heating (mixed combustion of wood products and waste) and Swedish electricity mix.	

More information:
LCA practitioners: Anna Pantze, Emanuel Lindbäck and Ida Adolfsson at Tyréns Sverige AB

Allocations:
The use of energy, consumables, waste, etc. has been allocated equally between the total volume of fire protected wood produced at Woodsafes production site. According to information from Woodsafe, there is no noticeable difference in resource and material use when impregnating with Woodsafe Exterior WFX and PRO or when impregnating different types of wood.

Assumptions:

- The environmental impact from the planed wood product is based on data from sector EPD from Swedish wood (SP-02206). A mean value from wood products produced at plants with both sawmill and planers within the same production site (combination plant) and production sites with only planing (standalone planing mill) has been used.
- The transport of the wood product to Woodsafes production site has been calculated from the mean distance from Woodsafes two biggest suppliers of heat modified wood (396 km).
- Dicyandiamide, polymer with formaldehyde has been modelled as Melamine, polymer with formaldehyde.
- In modul C the average transport distance for the wood product to the CHP plant for energy recovery has been assumed to 30 km.
- Trucks for all transports (A1-A3 and C1-C4) have been assumed to EURO6.
- At the end-of-life stage it is assumed that 93 % of the fire-protected wood product is incinerated for energy recovery at CHP plant. 6,6 % of the wood is assumed to be reused and the remaining proportion (0,4 %) is assumed to be placed on a landfill.
- When calculating module D, it is assumed that 93 % of the wood is treated in a CHP plant with an efficiency of 80%. It is also assumed that 14% of the inherent energy provides electricity and 86% of the energy provides district heating.

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

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	SE/ US	SE/ US	SE	ND	ND	ND	ND	ND	ND	ND	ND	ND	SE	SE	SE	SE	SE
Specific data used	77 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	12 %*					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-

*Specific values for climate impact for only the impregnation is presented in chapter- Other results

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Wood	481	0 %	100 %
Koppers Exterior Fire-X	43,8	0 %	0 %
TOTAL	525	0 %	91,6 %
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Plastic	0,435	< 0,1 %	
Wood	2,84	< 0,1 %	
TOTAL	3,28	< 0,1 %	

The products do not contain any substances of very high concern (SVHC) according to REACH.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per 1 m^3 fire-protected and heat modified planed wood product of pine/spruce with a moisture content of 8 %

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO_2 eq.	2,45 E+02	2,68 E-01	2,56 E+00	1,04 E+00	0,00 E+00	-1,07 E+02
GWP-biogenic	kg CO_2 eq.	-8,12 E+02	0,00 E+00	0,00 E+00	8,12 E+02	0,00 E+00	0,00 E+00
GWP-luluc	kg CO_2 eq.	1,26 E+00	2,13 E-05	8,78 E-04	8,24 E-05	0,00 E+00	-1,09 E+00
GWP-total	kg CO_2 eq.	-5,66 E+02	2,68 E-01	2,56 E+00	8,13 E+02	0,00 E+00	-1,09 E+02
ODP	kg CFC 11 eq.	3,58 E-05	5,78 E-08	5,82 E-07	2,24 E-07	0,00 E+00	-1,48 E-07
AP	mol H^+ eq.	2,09 E+00	2,79 E-03	7,13 E-03	1,08 E-02	0,00 E+00	-3,47 E-01
EP-freshwater	kg PO_4^{3-} eq.	2,50 E-01	2,48 E-05	5,37 E-04	9,62 E-05	0,00 E+00	-4,11 E-02
EP-freshwater	kg P eq.	8,13 E-02	8,09 E-06	1,75 E-04	3,13 E-05	0,00 E+00	-1,34 E-02
EP-marine	kg N eq.	2,99 E-01	1,24 E-03	1,48 E-03	4,80 E-03	0,00 E+00	-1,95 E-01
EP-terrestrial	mol N eq.	3,83 E+00	1,36 E-02	1,61 E-02	5,25 E-02	0,00 E+00	-1,16 E+00
POCP	kg NMVOC eq.	1,17 E+00	3,73 E-03	6,18 E-03	1,44 E-02	0,00 E+00	-6,17 E-01
ADP-minerals&metals*	kg Sb eq.	3,87 E-03	1,08 E-07	9,41 E-06	4,19 E-07	0,00 E+00	-3,34 E-04
ADP-fossil*	MJ	4,76 E+03	3,68 E+00	3,88 E+01	1,43 E+01	0,00 E+00	-2,18 E+03
WDP	m^3	3,01 E+02	4,72 E-03	1,08 E-01	1,83 E-02	0,00 E+00	-2,52 E+01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

** 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.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per 1 m^3 fire-protected and heat modified planed wood product of pine/spruce with a moisture content of 8 %							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	2,42E+02	2,65E-01	2,54E+00	1,03E+00	0,00E+00	-1,08E+02
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017							

Use of resources

Results per 1 m^3 fire-protected and heat modified planed wood product of pine/spruce with a moisture content of 8 %							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1,19E+03	1,91E-02	5,31E-01	7,38E-02	0,00E+00	-6,75E+02
PERM	MJ	8,51E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	9,69E+03	1,91E-02	5,31E-01	7,38E-02	0,00E+00	-6,75E+02
PENRE	MJ	5,03E+03	3,91E+00	4,12E+01	1,51E+01	0,00E+00	-2,20E+03
PENRM	MJ.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	5,03E+03	3,91E+00	4,12E+01	1,51E+01	0,00E+00	-2,20E+03
SM	kg	0,00E+00	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	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	1,79E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
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						

[1] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production and output flows

Waste production

Results per 1 m³ fire-protected and heat modified planed wood product of pine/spruce with a moisture content of 8 %

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	0,00E+00	3,46E+00	0,00E+00	4,88E+02	2,10E+00	0,00E+00
Radioactive waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flows

Results per 1 m³ fire-protected and heat modified planed wood product of pine/spruce with a moisture content of 8 %

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	3,46E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,10E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	4,88E+02	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Information on biogenic carbon content

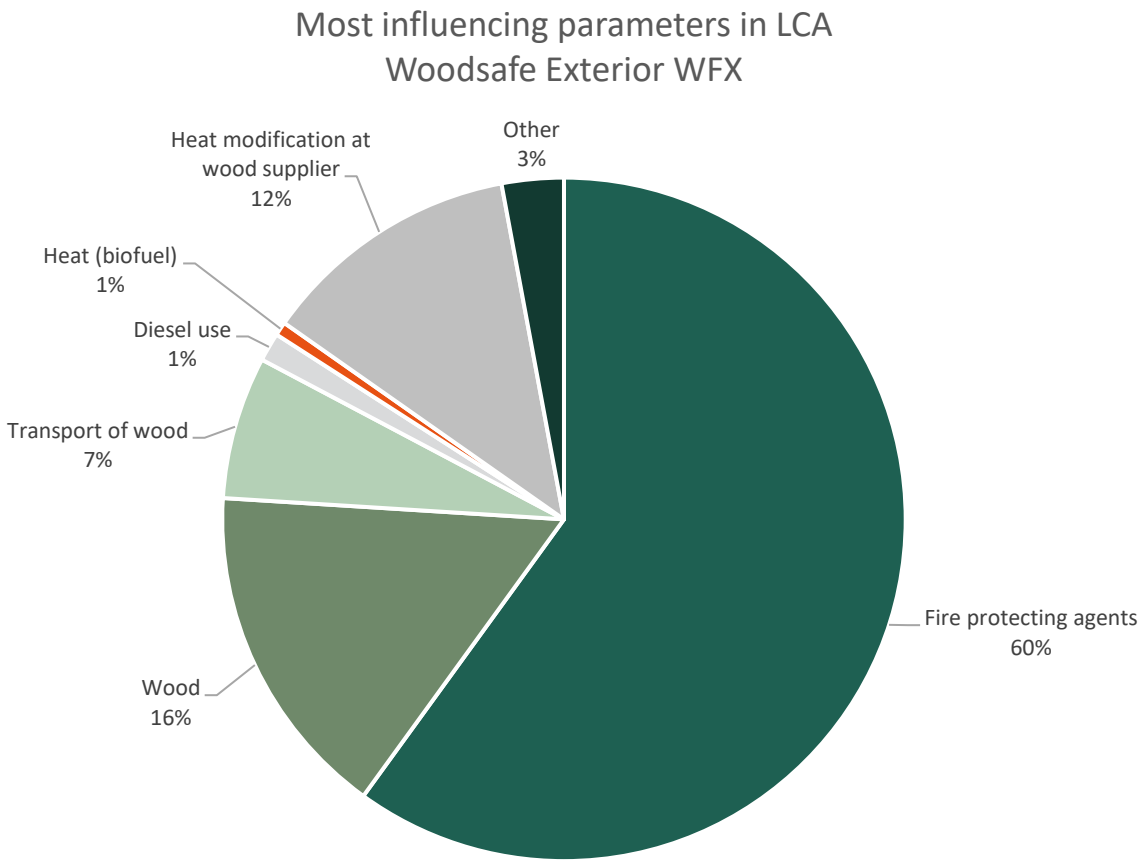
Results per 1 m³ fire-protected and heat modified planed wood product of pine/spruce with a moisture content of 8 %

BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	221,5
Biogenic carbon content in packaging	kg C	1,2

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Additional information

The figure below illustrates the most influencing parameters in the LCA, reported in percent GWP fossil.



Other results

This section reports the fossil climate impact of the impregnation process for a number of fire-protected wood products. The production of wood, the transport of the wood product to Woodsafes production site and any other possible pretreatment of the wood are not included in the results. The information enables for a general analysis of the potential climate impact from the impregnation itself without adding the climate impact from the wood products. The amount of fire protection agents varies with different types of wood. It is possible to combine these results with EPDs for different wood products and adding the transports of the wood product from production site to impregnation site in Västerås. The result only refers to the climate impact from the impregnation process with fire protection agent: Woodsafe Exterior WFX.

Type of Wood	**Density of wood kg/m^3**	**Amount of fire protection agents kg/m^3**	**GWP-fossil only for the impregnation with Woodsafe Exterior WFX kg CO_2e/m^3**
Ceder panel (Red western cedar)	425	48,2	8,30E+01
Heat-treated Frake panel	535,5	42,7	1,73E+02
Accoya	565	46,2	1,55E+02
Pine termowood	525	42,3	1,66E+02
Spruce termowood	450	39,4	1,54E+02
Nobel wood	480	20,2	1,43E+02
Oak panel	673,5	48,2	7,91E+01

References

Adolfsson, Lindbäck, E., Pantze, A. Livscykelanalys (LCA) Woodsafe Timber Protection AB. Tyréns Sverige AB, projekt 318346.

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General Programme Instructions of the International EPD® System. Version 3.01.

Product Category Rules PCR 2019:14. Construction products, Version 1.11.

PCR 2019:14-c-PCR-006 c-PCR-006 Wood and wood-based products for use in construction (EN 16485) (2019-12-20).

SS-EN 16485:2014 - Trävaror - Miljödeklarationer - Produktspecifika regler för trä och träbaserade byggprodukt

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