Environmental Product Declaration

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

Swedish sawn dried timber of spruce or pine

from

Swedish Wood

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

General information

Programme information

Programme:	The International EPD® System
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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): *PCR 2019:14, v1.1. Construction products (EN 15804:A2). Sub-PCR-006, Wood and wood-based products for use in construction (EN 16485). UN CPC 311*
PCR review was conducted by: *The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: 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: *Martin Erlandsson, IVL Svenska miljöinstitutet.* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

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: Swedish wood
Contact: Patrice Godonou
Description of the organisation:
This environmental product declaration presents the average performance of sawn timber from Sweden by members of Swedish Wood. Swedish wood is a department within The Swedish Forest Industries Federation and supported by the Swedish sawmill and glulam industries. Swedish Wood spreads knowledge provides inspiration and encourages development relating to wood, wood products and wood construction.

Following companies has contributed with data and enabled this branch EPD: Bergkvist-Insjön plants, Derome, Hedins, Holmen, Ingarp, JGA, Martinsons, Moelven, NKL trä, Norrskog, Rödins trä, SCA, Setragroup, Stora Enso, Sveden trä, Södra skogsägarna plants and Vida plants.

Name and location of production site(s):
This study covers 58 % of the total sawn softwood timber in Sweden. Input are collected from 44 sawmills and cover the production of 10 190 000 m^3 sawn dried timber. Data to produce sawn wood is collected from a representative selection of sawmills in Sweden and weighted to an average.

Product information

Product name: Swedish sawn dried timber of spruce or pine.

Product description: Sawn dried timber is produced in Sweden by members of Swedish Wood. The sawn dried timber is used as raw material in planed wood production. The raw material which is used in production is Swedish logs. Dried sawn timber has an average density of 489 kg/m^3 and a moisture content of 16 %. Sawn dried timber of spruce has an average density of 469 kg/m^3 and 518 kg/m^3 for pine. The moisture content for the dried wood is about 12-18%. The sawn dried timber consists of 59 % spruce and 41 % pine.

UN CPC code: 311

LCA information

Functional unit / declared unit:
1 m^3 of Swedish sawn dried timber of spruce or pine with a moisture content of 16 %.

Conversion factor:
489 kg/m^3

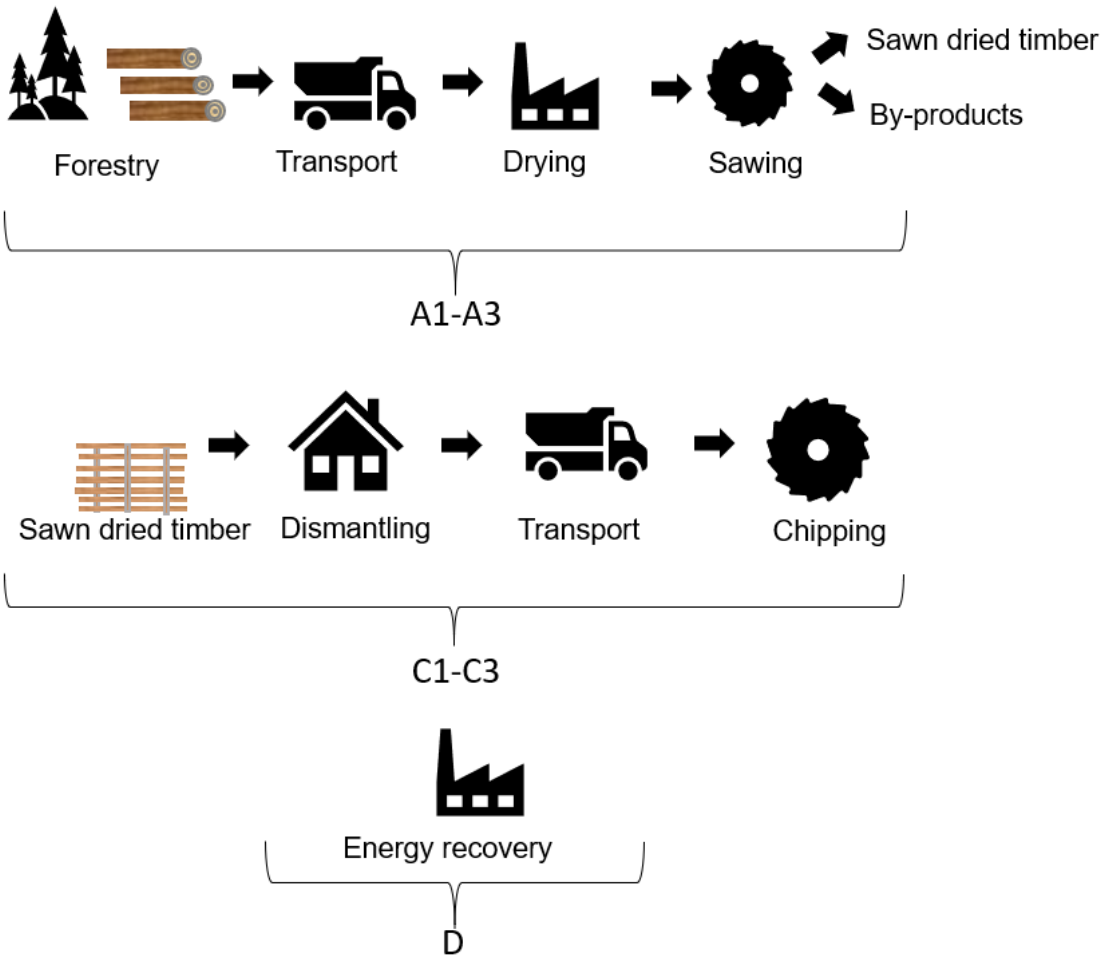
Time representativeness:
The data represents the year 2016

Database(s) and LCA software used: SimaPro 9.1.0.7 and Ecoinvent 3.6

Description of system boundaries:
The system boundaries are described in the system diagram and in the table in the section additional LCA information. The environmental Product Declaration (EPD) shows the environmental performance of the product through its life cycle stages from cradle to gate to end of life. The life cycle stages are

product stage (A1-A3), construction process stage (A4-A5), end-of-life stage (C1-C4) and Benefits and loads beyond the system boundary (D).

System diagram:



Allocations

According to EN 15804, all by-products must take their environmental responsibility upstream and inherent properties cannot be allocated away. Regarding the forestry is all environmental burdens allocated to the roundwood and nothing to forestry waste products (branches and tops). By product in the downstream process at the sawmill etc. that is sold as products is attributed to the forestry in accordance to EN 15804. Thus, mass allocation has been used to allocate the environmental burdens from forestry, including transports to the sawmill, between the sawn timber and by products.

At the sawmill economic allocation and energy allocation are used. The economic allocation is based on the relative revenues from the sawing and the sawn timber is applied for all activities in the sawmill. Here the overall environmental impact from the sawmill thus allocated to the sawn timber is 82 % and the 15 % to by- products such as sawdust and bark and 3 % is allocated to exported heat.

Included	Excluded
A1 Raw material supply • Raw material for construction of sawmill. • Raw material for the construction of vehicles for transport and work machines and road maintenance. • Extraction of timber-forestry including harvesting, thinning, planting, forest roads, etc. • Extraction of all other raw materials, energy and fuels required in production or in the production of materials consumed in production. • Production of electricity and district heating	**A1 Raw material supply** • Raw materials to produce chemicals consumed in smaller quantities are excluded. **A2 Transport** • Personnel transport outside the sawmill area is not included. **A3 Manufacturing** • Personnel space/office or purchase of tools or workwear are not included. **A4-A5 Transport to construction site and construction** **B1-B7 Use**
A2 Transport • Transport of timber to sawmills. • Transport of consumables to sawmills. • For timber transport, transportation of consumables to sawmills, waste transportation and internal work vehicles a fair share for the manufacture and maintenance of vehicles and infrastructure are included. • Internal transport and handling of work machined in the sawmill area. • Removal of produced waste.	
A3 Manufacturing • Production of sawed products including barking, sawing, drying and sorting as well as packaging.	
C1-C4 End of life stage • Dismantling of sawn dried timber. • Transport to incineration facility • Chipping	
D Benefits and loads beyond the system boundary • Energy recovery where 95% of the sawn dried timber is incinerated	

More information: Average transport distance from felling site to sawmill is 100 km and the raw logs have an average density of 882 kg/m^3. Timber trucks has a fuel consumption of 0.026 liters/tkm according to a report from Skogsforsk (including empty returns). The average share of HVO in diesel, which is purchased in Sweden, is about 20%. Thus, diesel consumption is assumed to be 0.0175 liters/tkm and HVO consumption is 0.0052 liters/tkm.

Diesel consumption for forwarders, including thinning (0.8 l /m3fub) and diesel consumption for harvesters, including thinning (1.06 l /m3fub). Diesel consumption for forest management including planting, soil preparation, clearing and fertilization (0.29 /m3fub). Forestry data for plant cultivation and building forest roads is from Ecoinvent.

All wood is assumed to be harvested sustainably and the wood in the studied system thus fulfills the criterium of biogenic carbon neutrality over its life cycle. Forestry takes approximately 100 years in Sweden from seed to harvest. Biogenic carbon storage in is 773kg CO_2/m^3 during the life cycle.

Module D consist of energy recovery which is most common way for waste treatment in Sweden. However, it is possible to reuse certain wooden goods. By reusing wooden goods, the GHG-GWP can be reduced by 28.1 kgCO_2/m^3

Additional LCA information

LCA practitioners: Anna Pantze, Ida Adolfsson and Ida Bohlin at Tyréns AB

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	SE	SE	ND	ND	ND	ND	ND	ND	ND	ND	ND	SE	SE	SE	SE	SE
Specific data used	>90%					ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Variation – products	0%					ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Variation – sites	-29 % to +12%					ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not declared

Variation – sites

The EPD is sector EPD which is based on 44 sawmills in Sweden. The variation between different sawmills depends on transport distance of the timber and use of fossils fuels in the sawmills. The sawmill with the lowest climate impact was 29 % lower than the average. The sawmill with the highest climate impact was 12 % higher than the average.

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Wood	489	100%	100%
TOTAL	489	100%	100%

Packaging materials	Weight, kg	Weight-% (versus the product)
Plastic	0.46	0.1%
Metal	0.03	0.01%
TOTAL	0.48	0.11%

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
Total	0	0	0%

Environmental Information

Potential environmental impact – 1 m^3 sawn dried timber

Results per functional unit											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot. A1-A3**	**C1**	**C2**	**C3**	**C4**	**Tot. C1-C4**	**D**
GWP-fossil	kg CO_2 eq.	1.63 E+01	7.44 E+00	4.92 E+00	2.87 E+01	2.45 E-01	6.66 E+00	9.49 E-01	0.00 E+00	7.86 E+00	-1.15 E+02
GWP-biogenic	kg CO_2 eq.	-8.76 E+02	1.35 E+00	1.02 E+02	-7.73 E+02	0.00 E+00	0.00 E+00	7.73 E+02	0.00 E+00	7.73 E+02	0.00 E+00
GWP-luluc	kg CO_2 eq.	1.95 E-01	3.91 E-03	3.50 E-04	1.99 E-01	1.93 E-05	2.74 E-03	7.48 E-05	0.00 E+00	2.83 E-03	-1.08 E+00
GWP-total	kg CO_2 eq.	-8.60 E+02	8.79 E+00	1.07 E+02	-7.44 E+02	2.45 E-01	6.67 E+00	7.74 E+02	0.00 E+00	7.81 E+02	-1.16 E+02
ODP	kg CFC 11 eq.	3.39 E-06	1.82 E-06	8.29 E-07	6.03 E-06	5.30 E-08	1.48 E-06	2.05 E-07	0.00 E+00	1.74 E-06	-7.40 E-06
AP	mol H^+ eq.	1.30 E-01	3.25 E-02	8.47 E-02	2.47 E-01	2.57 E-03	2.02 E-02	9.93 E-03	0.00 E+00	3.27 E-02	-3.84 E-01
EP-freshwater	kg PO_4^{3-} eq.	3.53 E-03	4.84 E-04	7.90 E-04	4.80 E-03	8.81 E-06	5.68 E-04	3.41 E-05	0.00 E+00	6.11 E-04	-1.87 E-02
EP-marine	kg N eq.	4.74 E-02	1.01 E-02	3.88 E-02	9.62 E-02	1.13 E-03	4.28 E-03	4.39 E-03	0.00 E+00	9.80 E-03	-2.03 E-01
EP-terrestrial	mol N eq.	5.30 E-01	1.12 E-01	4.22 E-01	1.06 E+00	1.24 E-02	4.68 E-02	4.81 E-02	0.00 E+00	1.07 E-01	-1.22 E+00
POCP	kg NMVOC eq.	1.49 E-01	3.55 E-02	1.10 E-01	2.95 E-01	3.42 E-03	1.78 E-02	1.32 E-02	0.00 E+00	3.45 E-02	-6.35 E-01
ADP-minerals&metals*	kg Sb eq.	7.76 E-04	5.38 E-05	8.67 E-06	8.39 E-04	3.76 E-07	2.15 E-04	1.46 E-06	0.00 E+00	2.17 E-04	-2.64 E-04
ADP-fossil*	MJ	4.69 E+02	1.23 E+02	5.31 E+01	6.45 E+02	3.38 E+00	9.99 E+01	1.31 E+01	0.00 E+00	1.16 E+02	-2.30 E+03
WDP	m^3	7.07 E+00	3.54 E-01	7.44 E-01	8.17 E+00	4.52 E-03	3.33 E-01	1.75 E-02	0.00 E+00	3.55 E-01	-2.61 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 – 1 m³ sawn dried timber

Results per functional unit										
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**C1**	**C2**	**C3**	**C4**	**Tot. C1-C4**
GWP-GHG[1]	kg CO_2 eq.	1.62 E+01	7.36 E+00	4.49 E+00	2.81 E+01	2.42 E-01	6.60 E+00	9.39 E-01	0.00 E+00	7.78 E+00
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017										

Use of resources – 1 m³ sawn dried timber

Results per functional unit											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot. A1-A3**	**C1**	**C2**	**C3**	**C4**	**Tot. C1-C4**	**D**
PERE	MJ	9.89 E+03	4.16 E+00	2.63 E+01	9.92 E+03	1.83 E-02	1.65 E+00	7.07 E-02	0.00 E+00	1.74 E+00	1.34 E+03
PREM	MJ	6.75 E+03	0.00 E+00	0.00 E+00	6.75 E+03	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
PERT	MJ	1.66 E+04	4.16 E+00	2.63 E+01	1.67 E+04	1.83 E-02	1.65 E+00	7.07 E-02	0.00 E+00	1.74 E+00	1.34 E+03
PENRE	MJ	4.83 E+02	1.30 E+02	5.39 E+01	6.67 E+02	3.58 E+00	1.0 6E+02	1.39 E+01	0.00 E+00	1.23 E+02	-2.33 E+03
PENRM	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
PENRT	MJ	4.83 E+02	1.30 E+02	5.39 E+01	6.67 E+02	3.58 E+00	1.06 E+02	1.39 E+01	0.00 E+00	1.23 E+02	-2.33 E+03
SM	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
RSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
NRSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
FW	m^3	0.00 E+00	0.00 E+00	2.13 E-01	2.13 E-01	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+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 equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production and output flows

Waste production – 1 m^3 sawn dried timber

Results per functional unit											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot. A1-A3**	**C1**	**C2**	**C3**	**C4**	**Tot. C1-C4**	**D**
Hazardous waste disposed	kg	7.34 E-04	2.70 E-04	8.21 E-02	8.31 E-02	9.19 E-06	2.60 E-04	3.56 E-05	0.00 E+00	3.05 E-04	-4.08 E-04
Non-hazardous waste disposed	kg	3.63 E+00	1.11 E+01	5.21 E+00	2.00 E+01	4.09 E-03	5.76 E+00	1.58 E-02	0.00 E+00	5.78 E+00	-8.25 E+00
Radioactive waste disposed	kg	5.38 E-03	8.94 E-04	0.00 E+00	6.27 E-03	2.34 E-05	6.73 E-04	9.07 E-05	0.00 E+00	7.87 E-04	-3.04 E-02

Output flows – 1 m^3 sawn dried timber

Results per functional unit											
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot. A1-A3**	**C1**	**C2**	**C3**	**C4**	**Tot. C1-C4**	**D**
Components for re-use	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Material for recycling	kg	0.00 E+00	0.00 E+00	2.97 E+00	2.97 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Materials for energy recovery	kg	0.00 E+00	0.00 E+00	1.98 E+00	1.98 E+00	0.00 E+00	0.00 E+00	4.89 E+02	0.00 E+00	4.89 E+02	0.00 E+00
Exported energy. electricity	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Exported energy. thermal	MJ	0.00 E+00	0.00 E+00	2.55 E+01	2.55 E+01	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00

Information on biogenic carbon content

Results per functional unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	**211**
Biogenic carbon content in packaging	kg C	0

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

Information related to Sector EPD

List of contributing manufacturers

Bergkvist-Insjön plants	NKL trä
Derome	Norrskog
Hedins	Rödins trä
Holmen	SCA
Ingarp	Setragroup
JGA	Stora Enso
Martinsons	Sveden trä
Moelven	Södra skogsägarna plants
Vida plants	

This study covers 58 % of the total sawn softwood timber in Sweden. Input are collected from 44 sawmills and cover the production of 10 190 000 m^3 sawn dried timber. Data to produce sawn wood is collected from a representative selection of sawmills in Sweden and weighted to an average. Due to this a sector EPD it is not possible to buy this sawn dried timber on the market. The main purpose with the EPD is to facilitate the development of more EPDs for different wood products.

Differences versus previous versions

The reason for updating the EPD is because a newer version of EN 15804 has been published. The calculation of A1 to A3 has been updated the year 2018s Greenhouse gas reduction mandate. The forestry has also been updated with newer data for forwarding, thinning and felling from Skogsforsk. More accurate diesel consumption for Swedish forestry and increased share of renewable fuels in diesel have reduced the GWP-GHG for A1-A3 by 10%.

Revision

The density of sawed timber has been updated. The density is adjusted regarded to the volume chance due to the swelling factor. Minor adjustments in carbon content, carbon storage and biogenic carbon as well as minor adjustments in the C and D module due to changed density.

References

Adolfsson, I., Lindbäck, E., Pantze, A. LCA Report - LCA rapport svensk sågad trävara, Tyréns, projekt 307612

General Programme Instructions of the International EPD® System. Version 3.01. PCR 2019:14. v1.1. Construction products.

Sub-PCR-006 Wood and wood-based products for use in construction (EN 16485). SS-EN 15804:2012+A2:2019

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