

Environmental Product Declaration



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

Particle Board, PB (Cowie)

from

Norbord Europe Ltd



Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-01856
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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
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
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Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR):

Product Category Rules (PCR): Construction products and construction services. PCR 2019:14 Version 1.2.5 (IEPDS, 2022)

SUB-PCR to PCR 2012:01: Wood and wood-based products for use in construction. PCR 2012:01-SUB-PCR-E (IEPDS, 2018)

PCR review was conducted by: *Claudia A. Peña, info@environdec.com*

Life Cycle Assessment (LCA)

LCA accountability: *Sphera Solutions, Inc.*

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☒ EPD verification by individual verifier

Third-party verifier: *Jane Anderson, ConstructionLCA Ltd*



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.

This EPD is for Particle Board (PB) only.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Norbord Europe Ltd

Contact: alan.kirkpatrick@westfraser.com

Description of the organisation: Norbord is the UK's largest manufacturer of wood panel boards and have supplied the construction industry for over five decades. Norbord places customers, standards of excellence, control of costs, safety and environmental concerns at the heart of its business. This EPD analyses the Particle Boards (PB) products CaberFloor (P1/2/3/4/5) and are manufactured to the highest standards. This is backed up by a support team which assists customers with product and technical assistance. Norbord supplies more than 70 key items across our three product ranges and is committed to quality and customer service.

Product-related or management system-related certifications: These products conform to the BS EN 5268 standard for structural timber design and hold certifications from the Forestry Stewardship Council (FSC), the British Board of Agrément (BBA) and the Conformité Européen (CE) mark (British Board of Agreement, 2015; BM Trada, 2015; Trada, 2007). These products are also UKCA certified

Name and location of production site(s):

Norbord Europe Ltd, Station Rd, Cowie, Stirlingshire, FK7 7BQ, Scotland

Product information

Product name: Particle Board (PB), engineered wood-based panel products

Product description: Particleboard is a high-strength, composite panel made up to 70% recycled raw materials. The product is stable, durable and easy to lay/use. Particleboard is most widely used in flooring applications but can also be used for non-load-bearing wall panelling and partitioning, and false ceilings.

UN CPC code: 31431 Particleboard (PB)

Product identification: This EPD relates to PB products (CaberFloor (P1/2/3/5) made by Norbord Europe Ltd at their production sites in Cowie, UK which are supplied to global customers. The calculations within the product group use the typical material composition of Norbord PB as given below:

Table 1: Typical material composition of Norbord PB

Component	Composition
Roundwood and wood chips	~83%
Epoxy Resin	~7%
Wax	~1%
Water	~7%
Others (green dye, eMDI and ammonium nitrate)	<1%

Technical data

The key technical characteristics of Norbord particleboard are provided below.

Table 2: Key technical characteristics of Norbord PB

Technical Properties	Unit	Specification	Relevant EN Standard
Internal Bond Strength (IB)	MPa	0.20-0.45	EN 312
Modulus of Rupture (MoR)	MPa	8.5-16	EN 312
Modulus of Elasticity (MoE)	MPa	2100-2550	EN 312
Thickness swelling (24 hr immersion)	%	10-16	EN 312
Moisture Content	%	5-8	EN 312
Internal Bond Strength (IB) (after cyclic test) ^a	MPa	0.20-0.22	EN 312
Thickness swelling (after cyclic test) ^a	%	10-11	EN 312
Formaldehyde Class E1	mg/100g	<8	EN 13986

^a for technical class P5 only.

LCA information

Functional unit / declared unit: The declared unit for particleboard reported in this EPD is 1 m³ of wood-based panel products with an apparent density of 660 kg/m³. To convert from 1 m³ to 1 kg particleboard, the results in this EPD should be divided by the apparent density of 660 kg/m³.

Time representativeness: All primary data were collected for the year 2020. All secondary data come from the GaBi 2021 databases and are representative of the years 2017-2020.

Database(s) and LCA software used: GaBi 2021 database and GaBi 10 Software are used

Description of system boundaries: The scope of this EPD covers the PB production process and upstream burdens associated with production and transport of raw materials and generation of energy. It also accounts for the burdens associated with distributing the finished product out to customers by truck (485 km), packaging treatment and incineration as waste treatment. These activities relate to modules A1-A5, according to EN 15804+A2, as shown in Table 3 below. No reference service life is reported, as the use-stage modules (B1-B5) have not been declared. Also, no wastage has been modelled in the EPD.

In the end-of-life stage a manual dismantling (module C1) and transport to the waste treatment facility (module C2) has been accounted for (100 km). Module C3 contains environmental loads related to the thermal treatment of the product. It is also assumed that the energy production from incineration meets an R1 value > 0.6. Energy produced in the form of electricity and thermal energy replaces thermal energy from natural gas (EU-28) and electrical energy (EU-28). For calculating the credits, for the substitution of thermal energy and electricity, European scenario datasets have been used. Module D contains credits for substitution of thermal energy and electricity by energy generation from thermal

treatment of product (Module C3) and packaging (Module A5). The EPD type is “cradle-to-gate with options”.

System diagram:

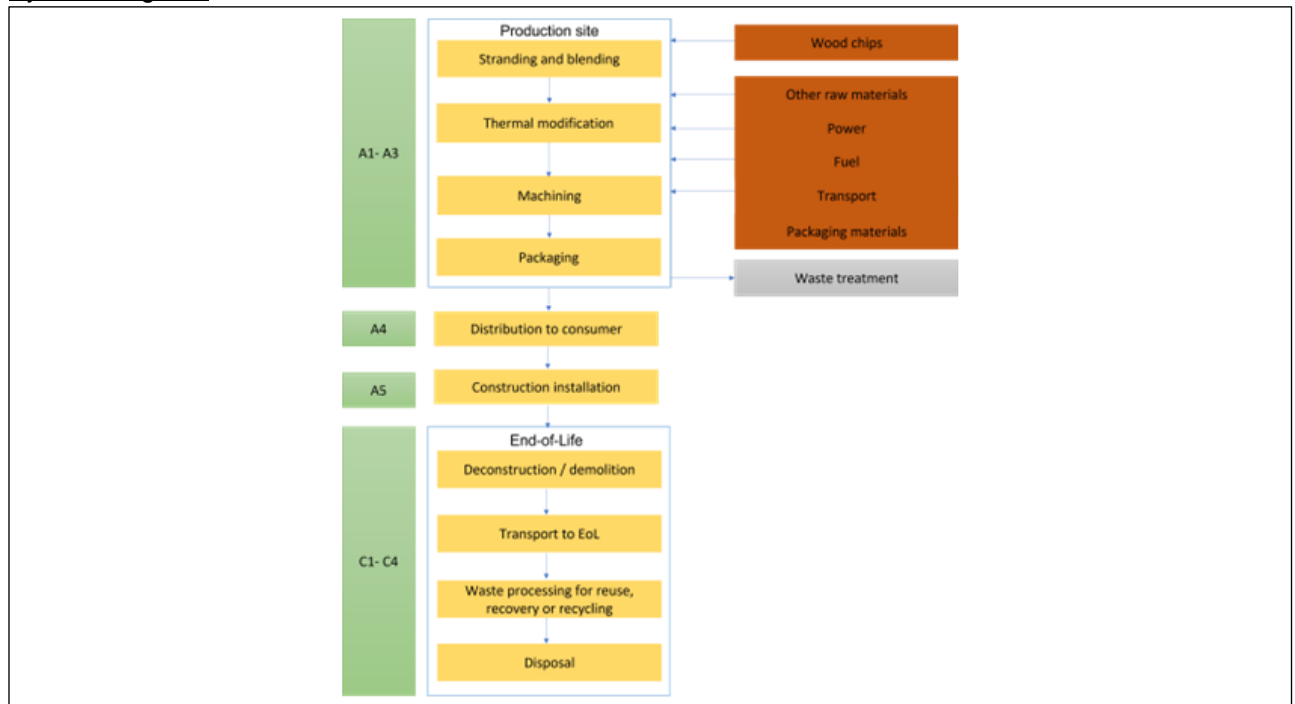


Figure 1: Process flow diagram showing the production and distribution of Norbord PB

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

	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	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU-28	GLO	GB	GLO	EU-28	ND	ND	ND	ND	ND	ND	ND	-	GLO	EU-28	EU-28	EU-28
Specific data used	>90%			-	-	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-
Variation – products	Not relevant			-	-	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-
Variation – sites	Not relevant			-	-	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-

Input information (Cowie)

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Round wood and wood chips (including materials used for Biomass)	695.83	0%	100%
Epoxy resin	47.8	0%	0%
eMDI	0.4	0%	0%
Wax	4.7	0%	0%
Ammonium nitrate	1.7	0%	0%
Green Dye	0.27	0%	0%
TOTAL	750.7	0%	0%
Packaging materials	Weight, kg	Weight-% (versus the product)	
Cardboard	0.94	0.1%	
Plastic	0.18	0.02%	
Battens – wood	5.17	0.7%	
Strapping - metal	0.00	0.0%	
TOTAL	6.29	0.8%	

Results of the environmental performance indicators

For construction services, the total value of A1-A3 shall be replaced with the total value of A1-A5.

Mandatory impact category indicators according to EN 15804

LCA results per 1m ³ PB board (660kg/m ³) at Cowie												
Indicator	Unit	A1	A2	A3	Tot. A1- A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1.40E+02	5.15E+01	1.28E+02	3.20E+02	2.16E+01	1.62E+01	0.00E+00	4.47E+00	2.69E+01	0.00E+00	-3.78E+02
GWP-biogenic	kg CO ₂ eq.	-1.27E+03	1.26E+00	2.59E+02	-1.01E+03	5.55E-01	8.70E+00	0.00E+00	1.15E-01	1.01E+03	0.00E+00	-1.91E+00
GWP-luluc	kg CO ₂ eq.	2.15E-01	7.17E-03	1.01E-02	2.32E-01	3.16E-03	6.56E-04	0.00E+00	6.53E-04	1.49E-02	0.00E+00	-2.66E-01
GWP-total	kg CO ₂ eq.	-1.13E+03	5.28E+01	3.88E+02	-6.87E+02	2.22E+01	2.49E+01	0.00E+00	4.59E+00	1.04E+03	0.00E+00	-3.80E+02
ODP	kg CFC 11 eq.	1.59E-12	8.55E-15	3.44E-13	1.94E-12	3.67E-15	8.24E-15	0.00E+00	7.59E-16	2.03E-13	0.00E+00	-4.40E-12
AP	mol H ⁺ eq.	7.23E-01	1.43E-01	3.19E-01	1.18E+00	1.82E-02	1.36E-02	0.00E+00	3.77E-03	6.67E-01	0.00E+00	-4.99E-01
EP-freshwater	kg P eq.	3.56E-04	1.65E-05	2.90E-05	4.02E-04	7.05E-06	1.30E-06	0.00E+00	1.46E-06	3.06E-05	0.00E+00	-5.04E-04
EP-marine	kg N eq.	1.94E-01	4.02E-02	9.73E-02	3.31E-01	5.91E-03	4.93E-03	0.00E+00	1.22E-03	3.16E-01	0.00E+00	-1.41E-01
EP-terrestrial	mol N eq.	3.18E+00	4.44E-01	1.08E+00	4.69E+00	6.61E-02	6.48E-02	0.00E+00	1.37E-02	3.66E+00	0.00E+00	-1.51E+00
POCP	kg NMV OC eq.	5.55E-01	1.13E-01	3.02E-01	9.70E-01	1.67E-02	1.29E-02	0.00E+00	3.44E-03	8.14E-01	0.00E+00	-3.96E-01
ADP-minerals&metals*	kg Sb eq.	4.06E-05	1.86E-06	4.06E-06	4.65E-05	7.89E-07	1.19E-07	0.00E+00	1.63E-07	3.44E-06	0.00E+00	-6.37E-05
ADP-fossil*	MJ	3.15E+03	7.06E+02	2.22E+03	6.07E+03	2.98E+02	1.33E+01	0.00E+00	6.17E+01	4.03E+02	0.00E+00	-6.56E+03
WDP	m ³	3.32E+00	5.90E-02	2.14E+00	5.52E+00	2.43E-02	5.14E+00	0.00E+00	5.03E-03	1.34E+02	0.00E+00	-2.96E+01
Acronyms	<p>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</p>											

* 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.

Additional mandatory and voluntary impact category indicators

LCA results per 1m ³ PB board (660kg/m ³) at Cowie												
Indicator	Unit	A1	A2	A3	Tot. A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	- 1.13 E+0 3	5.28E +01	3.88E +02	2.22E +01	2.49E +01	- 6.40E +02	0.00E +00	4.59E +00	1.04E +03	0.00E +00	- 3.80E +02

Disclaimers shall be added, if required by EN 15804.

Resource use indicators

LCA results per 1m ³ PB board (660kg/m ³) at Cowie												
Indicator	Unit	A1	A2	A3	Tot. A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4.17E +03	1.63E +01	5.36E +01	4.24E +03	7.20E +00	8.23E +01	0.00E +00	1.49 E+0 0	9.71 E+03	0.00E +00	- 1.51E +03
PERM	MJ	9.65E +03	0.00E +00	7.98E +01	9.73E +03	0.00E +00	- 7.98E +01	0.00E +00	0.00 E+0 0	- 9.65 E+03	0.00E +00	0.00E +00
PERT	MJ	1.38E +04	1.63E +01	1.33E +02	1.40E +04	7.20E +00	2.55E +00	0.00E +00	1.49 E+0 0	6.39 E+01	0.00E +00	- 1.51E +03
PENRE	MJ	2.03E +03	7.07E +02	2.21E +03	4.95E +03	2.99E +02	2.09E +01	0.00E +00	6.18 E+0 1	1.52 E+03	0.00E +00	- 6.57E +03
PENRM	MJ.	1.12E +03	0.00E +00	7.55E +00	1.13E +03	0.00E +00	- 7.55E +00	0.00E +00	0.00 E+0 0	- 1.12 E+03	0.00E +00	0.00E +00
PENRT	MJ	3.15E +03	7.07E +02	2.22E +03	6.08E +03	2.99E +02	1.33E +01	0.00E +00	6.18 E+0 1	4.03 E+02	0.00E +00	- 6.57E +03
SM	kg	0.00E +00	0.00E +00	4.87E +02	4.87E +02	0.00E +00	0.00E +00	0.00E +00	0.00 E+0 0	0.00 E+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	0.00E +00	0.00 E+0 0	0.00 E+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	0.00E +00	0.00 E+0 0	0.00 E+00	0.00E +00	0.00E +00
FW	m ³	6.43E- 01	4.30E- 03	3.23E- 01	9.70E- 01	1.83E- 03	1.21E- 01	0.00E +00	3.77 E-04	3.16 E+00	0.00E +00	- 1.48E +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 indicators

LCA results per 1m ³ PB board (660kg/m ³) at Cowie												
Indicator	Unit	A1	A2	A3	Tot. A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1.15E-06	7.43E-09	2.69E-07	1.42E-06	3.18E-09	2.39E-09	0.00E+00	6.58E-10	8.35E-08	0.00E+00	-1.48E-06
Non-hazardous waste disposed	kg	1.50E+00	2.15E-02	6.50E+00	8.02E+00	8.03E-03	1.16E+00	0.00E+00	1.66E-03	9.76E+00	0.00E+00	-3.11E+00
Radioactive waste disposed	kg	5.45E-02	8.26E-04	3.72E-02	9.25E-02	3.50E-04	6.36E-04	0.00E+00	7.24E-05	1.75E-02	0.00E+00	-4.87E-01

Output flow indicators

LCA results per 1m ³ PB board (660kg/m ³) at Cowie												
Indicator	Unit	A1	A2	A3	Tot. A1-A3	A4	A5	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	4.47E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	7.63E+01	0.00E+00	0.00E+00	1.58E+03	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	7.81E+01	0.00E+00	0.00E+00	2.81E+03	0.00E+00	0.00E+00

The result tables shall only contain values or the letters "ND" (Not Declared). It is not possible to specify ND for mandatory indicators. ND shall only be used for voluntary parameters that are not quantified because no data is available.

Information on biogenic carbon content

LCA results per 1m ³ PB board (660kg/m ³) at Cowie		
BIOTENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	2.76E+02
Biogenic carbon content in packaging	kg C	2.38E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

Differences versus previous versions

PCR: This EPD have changed the PCR reference from PCR 2012:01 Construction products and construction services, Version 2.3 to Product Category Rules (PCR): Construction products and construction services. PCR 2019:14 Version 1.2.5.

EN standards: This EPD have changed the reference from EN15804 to EN15804:2012+A2:2019. With this change, module C1-C4 and D have been added.

LCA data: Background data for LCA modelling have been updated GaBi 2021 database.

Data update: All primary data were collected for year 2020.

References

EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

EN312:2010. Particleboards- Specifications.

EN 13986: 2004 Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking.

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

ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

PCR 2019:14. Construction products and construction services. Version 1.2.5

SUB-PCR to PCR 2012:01: Wood and wood-based products for use in construction. PCR 2012:01-SUB-PCR-E. International EPD System, 2018

