Environmental Product Declaration

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

EPD of multiple products, based on Representative-Case results

Nichiha EX series Fibre Cement Panels Manufactured Kinuura Plant

from

Nichiha Corporation

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

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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

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)
PCR review was conducted by: *<The technical Committee of the International EPD System>*
Life Cycle Assessment (LCA)
LCA accountability: *The Technical Committee of the International EPD System. See www.environdec.com 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." on the front page of the EPD.*
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: *Mamoru Yanagisawa, EPA*  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 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:
Nichia Corporation
2-18-19 Nishiki, Naka-ku, Nagoya, Aichi, Japan

Contact:
Hidehito Hiramatsu
h-hiramatsu@nichiha.co.jp

Description of the organisation:
Nichiha was founded in 1956 in Japan, operates globally with 13 plants and over 2,900 employees. We offer products, including EX series fibre cement panels, that provide the unique state-of-the-art technology with the limitless design possibilities. Nichiha Matex is a major subsidiary of Nichiha and its Kinuura Plant is located in Aichi Prefecture, Japan.

Product-related or management system-related certifications:
JIS Q 9001: 2015, JIS Q 14001:2015
Name and location of production site(s):
Nichiha. Kinuura Plant
2-10, Sunosakicho, Handa, Aichi, Japan

Product information

Product name: Nichiha EX series1820 Simple, Designer, Wood, Stone, Tile/Brick
The product codes end in xxxxBX, PX
Product identification: JIS A 5422:2019/AMENDMENT 1:2024 Fibre reinforced cement sidings
EX series
Product description: Nichiha EX Series panels are fibre cement sheets that are used for exterior and interior wall material. The panels have been pre-finished using a durable multi-layered paint process to simulate a range of textured finishes.
https://www.nichiha.co.jp/global/products/product_lineup/
UN CPC code: 37570
Geographical scope: Product is manufactured in Japan and sold internationally.

LCA information

Functional unit / declared unit:
Declared unit (DC): 1 square meter, 16mm thickness.
This is multiproduct EPD calculated representative case using the product with the highest production volume. The results for 18mm and 21mm thickness could be linearly scaled with conversion factors showed below.

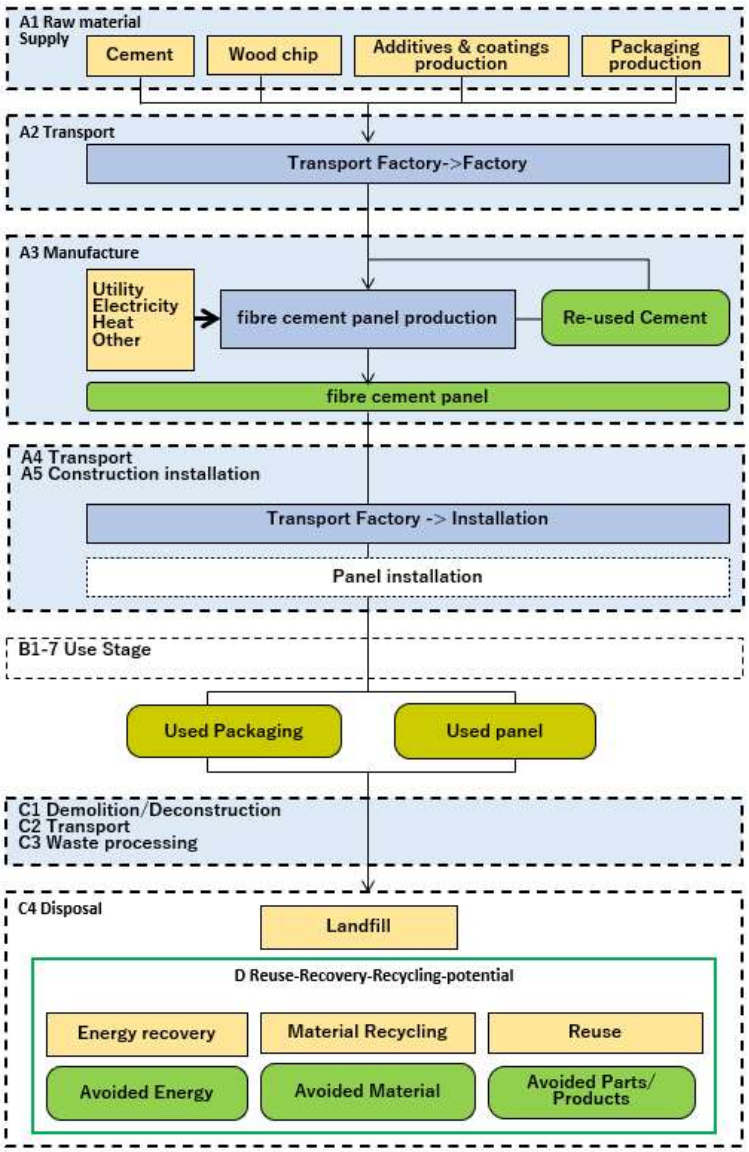
scaled with conversion factors showed below. Thickness(mm)	Conversion Factor
16mm	1
18mm	1.125
25mm	1.563

Reference service life: Not applicable
Time representativeness: Manufacturing data is referred to Fy 2023.
Database(s) and LCA software used: Ecoinvent 3.10 and SimaPro 9.6.0.1

Description of system boundaries:

- A1: Includes the raw material supply
- A2: External transport of raw materials
- A3: Electricity and fuels such as natural gas at manufacturing processes
- A4: Transportation from production plant the installation site, packaging weight is considered
- C1: Disassembling of the product during the demolition of the building
- C2: Includes the transport of the dismantled sheets to disposal facility
- C3: Waste processing for recycling or incineration of the product
- C4: Waste processing for landfilling
- D: Considers the benefits of recycling

System diagram:



More information:

https://www.nichiha.co.jp/global/

Cut-off rules;
Auxiliary materials which mass contribution on the total mass of raw materials used is less than 0.5%

Distribution scenario:
Data regarding distances between Japan and other countries are sourced from the CERDI database, which provides average distances between respective national ports.
The distance from the country's port to the construction site is set at 73.7 km, based on data from the ecoinvent database for cement tiles.

The End-of-Life scenario;
Recycling/Landfill/Incineration rates were based on the average values for the CFF, as no information was available for the recycling rates, a conservative approach was chosen (recycling rates =0%) as detailed in the PCR

Date quality assessment:
Manufacturing date has been collected from Kinuura Plant in Fy 2023.

Climate impacts of the energy sources behind the electricity grids:
0.68kg-CO_2 eq./kWh.
The composition of grid electricity, as documented in ecoinvent 3.10, is as follows: 32.0% coal, 2.1% oil, 44.1% liquefied natural gas (LNG), 3.3% other fossil fuels, 2.0% biomass, 4.6% nuclear, 10.6% hydropower, 0.3% geothermal, and 1.0% wind power.

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

X:Declared module. ND:Not declared module

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg	
Cementitious material	1.48E+01	35%	0%	1.13E-02
Wood material	3.54E+00	0%	14%	5.12E-01
Organic admixture	6.62E-02	77%	82%	5.41E-02
Inorganic admixture	2.33E+00	0%	0%	2.44E-03
Pigment	5.06E-01	0%	30%	1.53E-01
TOTAL	2.12E+01	24%	3%	7.33E-01
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**	
Wood Pallet	3.11E-01	1.5%	5.69E-02	
PE	8.45E-02	0.4%	3.72E-03	
other	2.51E-01	1.2%	4.04E-02	
TOTAL	6.47E-01	3.0%	1.01E-01	

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1.55E+01	2.52E+00	0.00E+00	2.63E-01	6.17E+00	6.26E-02	-3.35E-04
GWP-biogenic	kg CO_2 eq.	2.85E-02	5.92E-04	0.00E+00	4.23E-05	7.53E-04	1.53E-05	-1.09E-06
GWP-luluc	kg CO_2 eq.	8.72E-01	2.30E-03	0.00E+00	1.07E-04	1.00E-03	3.22E-05	-1.50E-06
GWP-total	kg CO_2 eq.	1.64E+01	2.52E+00	0.00E+00	2.63E-01	6.17E+00	6.27E-02	-3.37E-04
ODP	kg CFC 11 eq.	1.95E-07	3.80E-08	0.00E+00	3.83E-09	5.86E-09	1.81E-09	-3.73E-12
AP	mol H^+ eq.	6.10E-02	4.12E-02	0.00E+00	1.20E-03	3.62E-03	4.44E-04	-2.43E-06
EP-freshwater	kg P eq.	5.58E-03	2.00E-04	0.00E+00	2.11E-05	5.45E-04	5.20E-06	-9.22E-08
EP-marine	kg N eq.	1.69E-02	1.08E-02	0.00E+00	4.49E-04	1.95E-03	1.69E-04	-8.68E-07
EP-terrestrial	mol N eq.	1.39E-01	1.19E-01	0.00E+00	4.90E-03	1.67E-02	1.85E-03	-9.49E-06
POCP	kg NMVOC eq.	4.86E-02	3.47E-02	0.00E+00	1.69E-03	4.36E-03	6.61E-04	-2.89E-06
ADP-minerals&metals*	kg Sb eq.	5.88E-05	9.89E-06	0.00E+00	8.23E-07	8.94E-07	9.78E-08	-6.39E-10
ADP-fossil*	MJ	1.64E+02	3.30E+01	0.00E+00	3.75E+00	3.88E+00	1.54E+00	-4.26E-03
WDP*	m^3	3.33E+00	1.34E-01	0.00E+00	1.79E-02	4.66E-01	6.71E-02	-4.43E-05
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.*

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	1.64E+01	2.52E+00	0.00E+00	2.63E-01	6.17E+00	6.27E-02	-3.37E-04
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017								

Resource use indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	4.58E+01	8.66E+01	0.00E+00	5.11E-02	1.33E-01	1.44E-02	-4.63E-02
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	4.58E+01	8.66E+01	0.00E+00	5.11E-02	1.33E-01	1.44E-02	-4.63E-02
PENRE	MJ	1.64E+02	3.30E+01	0.00E+00	3.75E+00	3.88E+00	1.54E+00	-4.26E-03
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.64E+02	3.30E+01	0.00E+00	3.75E+00	3.88E+00	1.54E+00	-4.26E-03
SM	kg	5.20E+00	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	0.00E+00
NRSF	MJ	7.91E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	3.33E+00	1.34E-01	0.00E+00	1.79E-02	4.66E-01	6.71E-02	-4.43E-05
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] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Waste indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**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	0.00E+00
Non-hazardous waste disposed	kg	7.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+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	0.00E+00

*Waste disposal volume in A1-A3 was allocated in proportion to production output.

Output flow indicators（Iwaki Plant:T-CO2 calculation)

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**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	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	5.35E-03
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
Exported energy, electricity	MJ	0.00E+00	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	0.00E+00

References

General Programme Instructions of the International EPD® System. Version 4.0.
PCR 2019:14. Construction products (EN 15804:A2). Version 1.3.4
Other references
Product Environmental Footprint Category Rules Guidance- Annex C Version 2.1
Analysis of the global warming potential for wood waste recycling systems
The CERDI-seadistance database Version1.0
Ecoinvent database Version 3.10

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