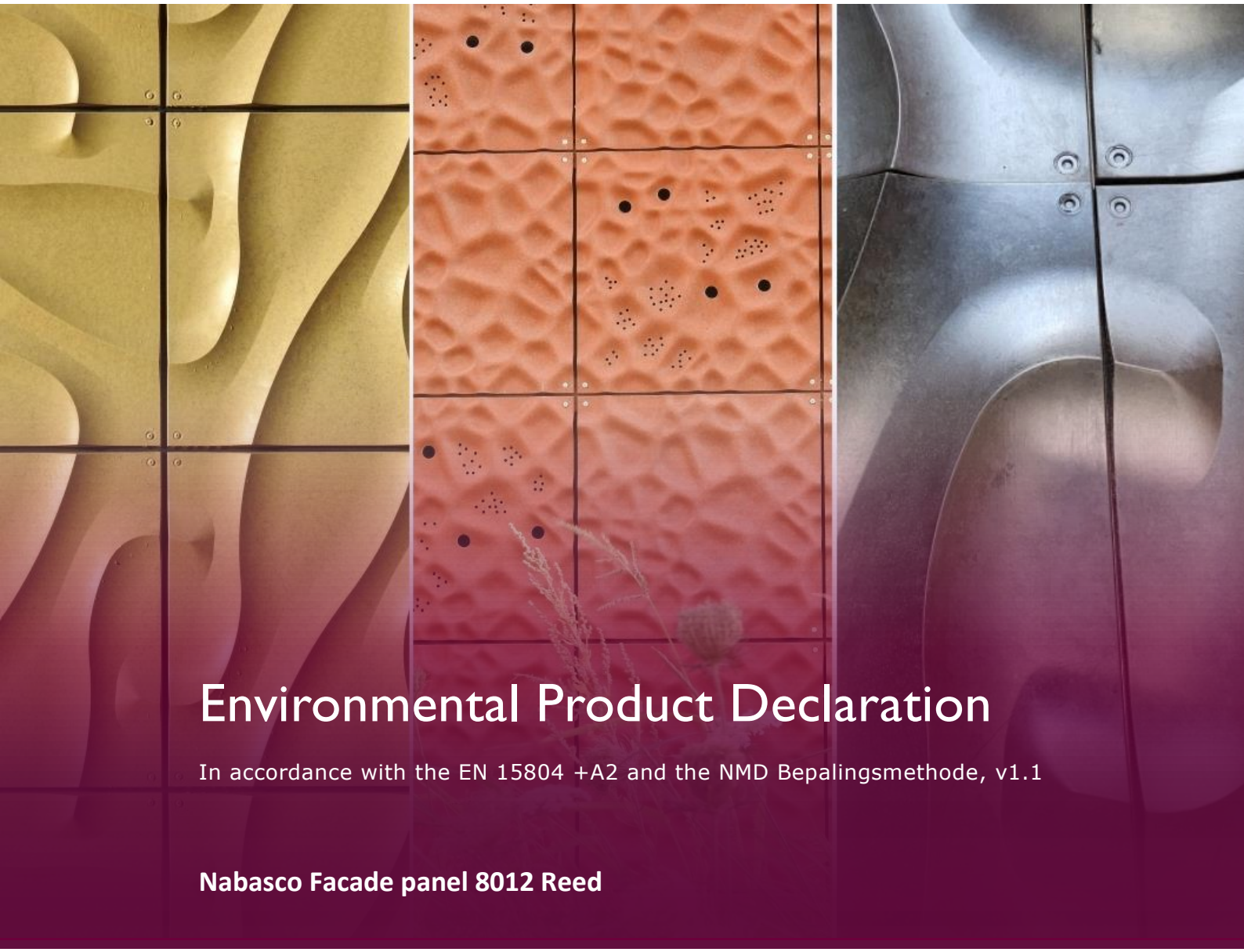
Agrodome
Advies & Ontwikkeling



Environmental Product Declaration

In accordance with the EN 15804 +A2 and the NMD Bepalingsmethode, v1.1

Nabasco Facade panel 8012 Reed

Scope of the declaration

Type of the EPD is Cradle to grave, including modules A-D

According to the EN 15804 +A2 and the NMD Bepalingsmethode, version 1.1

The LCA was carried out by Agrodome B.V. (NL)

Based on production data from NPSP B.V.

Release date: 28 November 2024

Validity: 5 years

Functional unit: 1 m^2

npsp
nabasco

Goal and target group

Goal

The declaration covers the environmental effects throughout the lifetime of the products: Nabasco Facade panel 8012 Reed of NPSP B.V.

Target audience

The EPD can be used for building or building part level assessments by designers, architects, constructors, developers etc. The EPD is made business-to-business communication and can be used for business-to-consumer communication purposes. The background EPD report is third party verified.

Product description

The product is a bio-composite panel composed of biobased/renewable materials. Nabasco Facade panel 8012 Reed is a through and through coloured Facade product, specifically developed for exterior wall cladding and building finishes. This EPD involves uncolored, natural panels.

Function of the product

A facade panel is part of the facade without a structural or load-bearing function and serves as an exterior finish. A Facade panel's function is to form a separation between interior and exterior space, as well as to provide weather resistance, aesthetic finish, and protection of the building's interior layers, including load bearing construction and insulation layers.

Composition Nabasco Facade panels (in weight %)

Material	Nabasco 8012 Reed
Bio fibres	11,5%
Fillers	48,1%
Resins	31,4%
Others	8,9%

Table 1: Composition Nabasco Facade panels

Technical data Nabasco Facade panels

Property	Nabasco 8012 Reed
Volumic weight (kg/m^3)	1789,11 kg/m^3
Standard product dimensions (m^2)	0,35 m^2
Weight per product (kg)	3,8 kg
Length (m)	0,595 m
Width (m)	0,595 m
Thickness (m)	0,006 m
Biobased content	24,3%

Table 2: Technical data Nabasco Facade panels

Biogenic carbon storage

Biogenic carbon storage during the lifetime of the product is

Nabasco 8012 Reed: 1,05 kg C/FU, corresponding to 3,85 kg CO_2/FU

Biogenic content in Nabasco Facade panels, per FU (1 m²)

Biogenic carbon	Share biogenic carbon per FU Nabasco 8012 Reed
Biogenic carbon in product	1,05 kg C
Biogenic carbon in packaging	0,20 kg C

Table 3: Biogenic content in Nabasco Facade panels, per FU (1 m²)

LCA calculation rules

Functional unit

Nabasco Facade panel 8012 Reed is a single panel, excluding support structure or fasteners, with standard outer dimensions of approx. 595 x 595 mm, thickness 6 mm, average weight 3.8 kg, not coloured and unprocessed, with a lifespan of at least 50 years, produced according to the manufacturer's internal guidelines, made from various raw materials including bio-based raw materials, density 1789 kg/m³, expressed in 1 m².

Name	Nabasco Façade 8012 Reed
Declared unit	1,00 m²
Weight	10,7 kg/FU

Table 4: Functional unit Nabasco Facade panels

Reference Service Life

The lifespan of a Nabasco Facade panel, as declared by the manufacturer, is at least 50 years when correctly applied.

Comparability

A comparison or evaluation of EPD data is only possible if all datasets have been made in accordance with EN 15804 and the same product-related standard properties and modules have been taken into account.

System boundaries

The LCA study was created for 'Cradle to Grave A1-D' according to the modules below. All declared values relate to the specified functional unit. The functional unit of the European standard EN 15804 +A2 and the NMD - Bepalingsmethode 'Milieuprestatie Bouwwerken' are identical.
The environmental performance of building materials is categorized in four modules corresponding to different lifecycle phases in the building material; Modules A (production of materials and construction), B (use phase), C (end-of-life phase of the building) and D (loads and benefits outside the system boundary); see Figure 1.

Product stage			Construction installation stage		Use stage							End of life stage					Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal		Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒	☒		☒

Figure 1: Calculated modules Nabasco Facade panels

For this LCA study, all modules A1-3, A4, A5, B, C and D have been examined, except B6 and B7.

Allocations

There are no allocations of co-products.

Assumptions, omissions and deviations

Maintenance Nabasco panels

The panels have a lifespan of 50 years when correctly applied. Based on the information from the manufacturer, it is assumed that no maintenance is needed during the lifetime of the product.

Excluded processes

Given the variation in fastening methods, no processes are included for on-site assembly.

Production process and Flowchart

The flowchart below shows the production process of Nabasco Facade panels. This flowchart lists the entire production process starting with the operations on the production site.

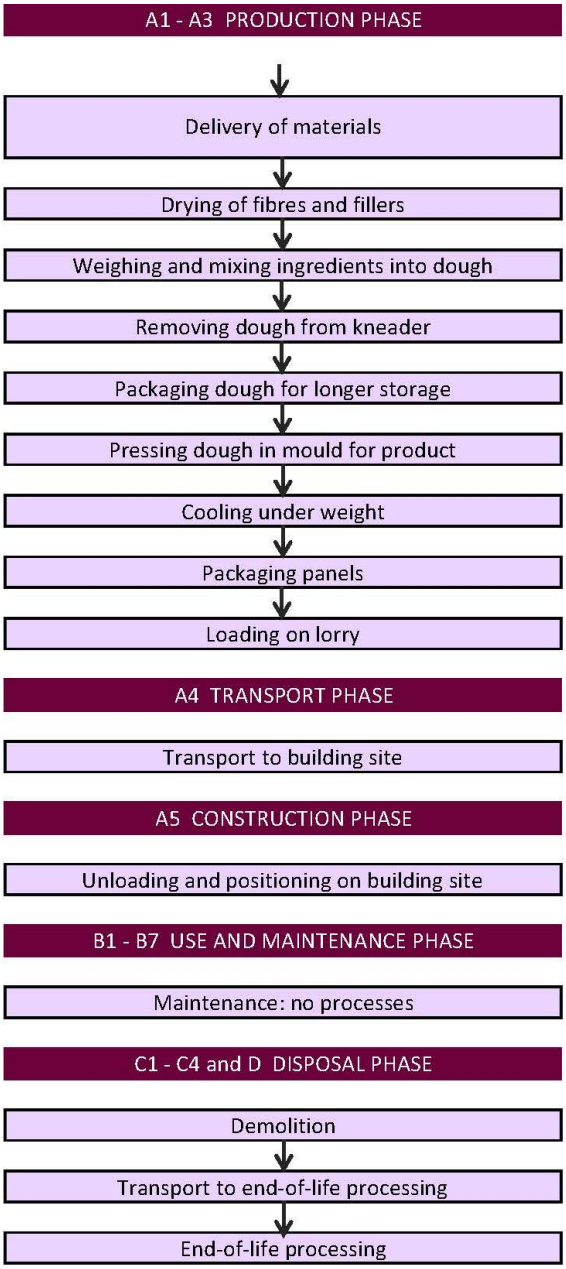


Figure 1: Flowchart Nabasco Facade panels

Explanation Flowcharts and Life Cycle per phase

Production phase (A1-3)

The fibres and filling materials are dried for 2 hours at 110 °C in a ventilated electric oven. The exact amount of raw materials required is weighed out, and the fibres, filling materials, additives and resins are mixed in an electric kneader for 30 minutes. In the process, hardly any loss of certain raw materials occurs. The dough is removed from the kneader, which takes about 20 minutes. The dough is packed in HDPE bags for longer storage (if not used immediately). The dough is then pressed in a mould into a product, with a curing cycle of 6 minutes per product at 140 °C and 90 bar pressure, using electricity. The product is left to cool. After cooling, the product is packed on Euro-pallets with wrapping film and loaded onto trucks.

Construction process phase (A4-5)

Transport to the building site (A4)

Transport from the production site to the customers takes place with fully loaded trucks; where necessary, delivery addresses are combined into one trip. The transporter receives all information in advance regarding loading and delivery addresses so that he can ensure that the truck can pick up goods for other customers; this avoids driving empty trucks. The default value from the bepalingsmethode is used for the transport distance.

Processing and construction on the construction site (A5)

The customer takes care of installing the panels. On the building site, the panels are fixed to the sub-frame with 4 M6 screws per panel. The sub-frame and screws are beyond the scope of this LCA. Since the panels are pressed to size in a mould, unique for each project, 0% loss has been taken into account. Assembly takes place in a controlled environment; after installation, the risk of damage is virtually zero. Breakage hardly occurs either, because even if panels fall, they are not prone to breakage.

The packaging materials used to move the panels are disposed of separately. In line with the NMD Bepalingsmethode (determination method), the following waste scenarios and processes were taken into account for the calculations:

- pallets and wooden blocks: 10% landfill, 85% incineration, 5% recycling
- wrapping foil: 10% landfill, 85% incineration, 5% recycling

Use phase (B1-7)

No emissions occur in the use phase. There is no need for additional maintenance during the use phase.

End-of-life phase (C1-4)

Disassembly and demolition (C1)

Disassembly and demolition takes place manually, there is no industrial process.

Transport (C2)

Transport phase assumptions: the default value according to the Bepalingsmethode 1.1 is used. This is 50 km to the sorting location and 100 km from demolition or sorting location to processing location.

Selection of the means of transport according to the Bepalingsmethode version 1.1 (Chapter 2.6.3.7, p. 20).

Waste treatment (C3-C4)

For waste processing, the distribution below and the scenarios chosen have been taken into account:

- Panels: 80% incineration and 20% landfill

Benefits and burdens outside the system boundary (D)

The benefits and burdens outside the system boundary relate to combustion in which energy use is avoided. Recycling and reuse are also part of the benefits and burdens outside the system boundary. The efficiency of heat and electricity recovery from waste material is 31% for heat and 18% for electricity, according to the fixed values in the NMD Bepalingsmethode.

LCA-results Nabasco Facade panels

Nabasco Facade panel 8012 Reed

EN 15804 +A2, Basic environmental impact indicators Nabasco Facade panel 8012 Reed per FU (m^2)

Potential Environmental Impacts	Production	Construction process stage		Use stage					End-of-life stage				D Reuse, recovery, recycling
	A1 Raw material A2 Transport A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
CC total (kg CO2 eq)	1,05E+01	2,33E-01	7,76E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,12E-01	4,88E+00	8,06E-01	-1,51E+00
CC fossil (kg CO2 eq)	1,41E+01	2,33E-01	2,51E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,12E-01	1,80E+00	3,63E-02	-1,50E+00
CC biogenic (kg CO2 eq)	-4,60E+00	0,00E+00	7,51E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,08E+00	7,70E-01	0,00E+00
CC luluc (kg CO2 eq)	1,02E+00	8,54E-05	1,85E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,76E-05	1,51E-04	1,10E-05	-4,68E-03
ODP (kg CFC 11 eq)	2,25E-06	5,15E-08	6,35E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,67E-08	6,12E-08	6,91E-09	-2,61E-07
AP (mol H+ eq)	5,90E-02	1,35E-03	1,31E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,23E-03	3,23E-03	1,94E-04	-1,40E-02
EP – freshwater (kg P eq)	7,43E-04	2,35E-06	1,04E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,13E-06	6,42E-06	4,64E-07	-4,26E-05
EP – marine (kg N eq)	1,98E-02	4,76E-04	6,11E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,33E-04	1,36E-03	1,28E-04	-4,11E-03
EP – terrestrial (mol N eq)	1,32E-01	5,25E-03	6,84E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,77E-03	1,55E-02	7,17E-04	-6,62E-02
POCP (kg NMVOC eq)	7,70E-02	1,50E-03	1,80E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,36E-03	4,07E-03	2,57E-04	-1,20E-02
ADP Elements (kg Sb eq)	8,70E-05	5,91E-06	3,18E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,36E-06	2,46E-06	2,39E-07	-6,25E-06
ADP fossil fuels (MJ)	3,18E+02	3,52E+00	5,47E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,19E+00	1,92E+00	5,29E-01	-2,33E+01
WDP (m^3 water eq deprived)	3,44E+01	1,26E-02	1,87E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,14E-02	1,11E-01	2,27E-02	-1,24E-01

CC total = Climate Change total; CC fossil = Climate Change fossil; CC biogenic= Climate Change biogenic; CC-luluc = Climate Change land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential for Soil and Water; EP = Eutrophication Potential; POCP = Photochemical Ozone Creation; ADPE = Abiotic Depletion Potential – Elements; ADPF = Abiotic Depletion Potential – Fossil Fuels; WDP = water use (Water (user) deprivation potential, deprivation-weighted water consumption)

Table 5: EN 15804 +A2, Basic environmental impact indicators, Nabasco Facade panel 8012 Reed, per FU (m^2)

Additional environmental impact indicators EN 15804 +A2 Nabasco Facade panel 8012 Reed per FU (m^2)

Potential Environmental Impacts	A1 t/m A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D
PM (disease incidence)	5,24E-07	2,09E-08	1,09E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,90E-08	2,56E-08	3,67E-09	-1,81E-07
IRHH (kg U235 eq)	3,72E-01	1,47E-02	1,65E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,34E-02	6,90E-03	2,07E-03	-2,64E-02
ETF (CTUe)	9,82E+02	3,14E+00	1,12E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,85E+00	2,36E+01	6,11E-01	-1,29E+02
HTCE (CTUh)	2,37E-08	1,02E-10	1,16E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,24E-11	2,67E-09	1,46E-11	-1,53E-09
HTnCE (CTUh)	3,33E-07	3,43E-09	4,10E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,11E-09	1,41E-08	5,71E-10	-5,42E-08
Land Use Related impacts (dimensionless)	1,66E+02	3,05E+00	4,16E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,77E+00	6,00E-01	1,25E+00	-5,02E+02
PERE (MJ, net calorific value)	-8,48E+01	4,40E-02	2,42E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,00E-02	1,62E-01	9,31E-03	-1,05E+02
PERM (MJ, net calorific value)	1,20E+02	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	0,00E+00
PERT (MJ, net calorific value)	3,54E+01	4,40E-02	2,42E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,00E-02	1,62E-01	9,31E-03	-1,05E+02
PENRE (MJ, net calorific value)	3,03E+02	3,73E+00	5,87E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,39E+00	2,05E+00	5,62E-01	-2,56E+01
PENRM (MJ, net calorific value)	3,29E+01	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	0,00E+00
PENRT (MJ, net calorific value)	3,36E+02	3,73E+00	5,87E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,39E+00	2,05E+00	5,62E-01	-2,56E+01
SM (kg)	1,27E+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	0,00E+00	0,00E+00
RSF (MJ, net calorific value)	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	0,00E+00	0,00E+00
NRSF (MJ, net calorific value)	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	0,00E+00	0,00E+00
FW (m^3 water eq)	7,97E-01	4,28E-04	2,07E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,89E-04	6,40E-03	5,52E-04	-2,36E-03

PM = Particulate Matter; IRHH = Ionizing Radiation – human health effects; ETF = Ecotoxicity – freshwater; HTCE = Human Toxicity – cancer effects; HTnCE = Human Toxicity – non cancer effects; 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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

Table 6: Additional environmental impact indicators EN 15804 +A2, Nabasco Facade panel 8012 Reed, per FU (m^2)

Other environmental information Nabasco 8012 Facade panel Reed per FU (m^2)

Potential Environmental Impacts	A1 t/m A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D
Hazardous waste disposed (kg/FU)	6,35E-04	8,91E-06	1,43E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,09E-06	4,37E-06	8,13E-07	-4,05E-05
Non-hazardous waste disposed (kg)	1,42E+00	2,23E-01	4,97E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,02E-01	7,76E-02	2,11E+00	-1,96E-01
Radioactive waste disposed (kg)	2,98E-04	2,31E-05	2,03E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,10E-05	6,44E-06	3,14E-06	-4,00E-05
Components for reuse (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	0,00E+00	0,00E+00
Materials for recycling (kg)	0,00E+00	0,00E+00	2,34E-02	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	0,00E+00	0,00E+00
Exported energy Heat (MJ)	6,33E-01	0,00E+00	1,03E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,11E+01	0,00E+00	0,00E+00
Exported energy Energy (MJ)	1,09E+00	0,00E+00	1,78E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,63E+01	0,00E+00	0,00E+00

Table 7: Other environmental information, Nabasco 8012 Facade panel Reed, per FU (m^2)

Representativeness of the production process

Purchase of raw materials

The main raw materials have a fixed production location, and are therefore linked to a specific geographical location.

Data quality

For the collection of the process and product data, information is used provided by the manufacturer, NPSP B.V. These data were discussed and checked with NPSP in 2024 and are completely up-to-date.

Energy consumption of equipment and equipment required to manufacture the product under investigation are based on consumption figures for 2024.

For the materials a choice was made from the available data in the Ecoinvent database, version 3.6, and the NMD database version 3.8, based on the main ingredients. With the exception of the manufacturing phase, standard values have been used where appropriate in accordance with Ecoinvent 3.6. or NMD. This applies in particular to transport distances, processing in the waste phase and the choice of means of transport. Return transports loaded/unloaded are as per the manufacturer's instructions. In the final processing phase, the transports were calculated according to the Bepalingsmethode version 1.1.

Production processes can change over time. The information used in this LCA of the production process of the product is based on measurements and observations from 2024 (energy, waste percentages, quantities net, production volume).

Accountability

The LCA study was conducted by Agrodome B.V. in 2024.

The data provided by NPSP have been extensively discussed with Agrodome B.V. A company visit took place on 13 June 2024.

The final version of the LCA study has been submitted to SGS Search Consultancy for external peer review.

The LCA is carried out according to the most recent versions of EN 15804 +A2 in compliance with the standards from the ISO 14000 series: 14025, 14040 and 14044. The LCA report has been tested against the Bepalingsmethode 'Milieuprestatie Bouwwerken', version 1.1 March 2022, including Amendment 4.

When calculating the environmental impact categories, SimaPro, version 9.5.0.2 and environmental data from the NMD-basic processes database, version 3.8 and in some cases, namely where no NMD-data were available, the Ecoinvent database, version 3.6.

When making calculations in SimaPro, the long-term effects (emissions that can occur after 100 years) are not taken into account, in accordance with the Bepalingsmethode version 1.1. The effects of capital goods and infrastructural processes are included.

Referenties

ISO 14040
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044
ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006

ISO 14025
ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804+A2
EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

Nationale Milieudatabase
Bepalingsmethode 'Milieuprestatie Bouwwerken' versie 1.1, maart 2022

Dora Vancso, Sissy Verspeek, Caroline van der Laan, Fred van der Burgh, 2024
Background report EPD, Nabasco Facade panel 8012 Reed, Nabasco Facade panel 8012 Fire, Nabasco Facade panel 8040.
Agrodome B.V., Wageningen, the Netherlands

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Declaration Agrodome B.V.

SGS has reviewed the LCA background report Nabasco Façade panel 8012 Reed, Nabasco Façade panel 8012 Fire, Nabasco Façade panel 8040, 2024, according to the Bepalingsmethode 'Milieuprestatie Bouwwerken' versie 1.1. as an external reviewer. This EPD is the summary of that LCA background report, to be used for external communication.
The LCA background report is approved by Martijn van Hövell, SGS, 29 October 2024.