Environmental Product Declaration

Jansen Viss HI TVS 50x120, transom 50x80 - English EPD

Jansen AG NL/BE

Publisher:	Jansen AG NL/BE
Program operator:	Jansen AG NL/BE
Calculation number:	EPD-NIBE-20230309-35842
Generation on:	05-04-2023
Issue date:	05-04-2023
Valid until:	05-04-2028
Status:	verified

R<THiNK

1 General information

1.1 PRODUCT

Jansen Viss HI TVS 50x120, transom 50x80 - English EPD

1.2 VALIDITY

Issue date 05-04-2023

Valid until: 05-04-2028

1.3 OWNER OF THE DECLARATION

Manufacturer: Jansen AG NL/BE

Address: Ettensebaan 31, 4813 AH Breda

E-mail: info.netherlands@jansen.com:

Website: www.jansenstaal.nl

Production location: Jansen AG

Address production location: Industriestrasse 34, 9463 Oberriet

1.4 VERIFICATION OF THE DECLARATION

CEN standard EN 15804 serves as the core PCR. In compliance with ISO 14040:2006 and 14044:2006.

Independent verification of the declaration according to EN ISO 14025:2011-10.

☐ Internal ☑ External

Kamiel Jansen, Review by Aveco de Bondt

1.5 THIS DECLARATION IS BASED ON THE PRODUCT CATEGORY RULES

NMD Determination method Environmental performance Construction works v1.1 March 2022

1.6 PURPOSE AND TARGET GROUPS

The purpose of this LCA is to compile environmental data of materials and products used in the built environment. So that the environmental data can be used in calculations of buildings and / or civil works. The purpose of this report is to draw up a review dossier with the results of 'set 1' and 'set 2' for the product as mentioned in the NMD Determination method Environmental performance Construction works v1.1 March 2022. This document defines a standardized method for a LCA in the Netherlands, of a product used in the build environment, in addition to EN 15084+A2.The review dossier is in accordance with EN15804+A2, ISO14040 and ISO14044.

The target groups of this LCA study are: Users of the NMD or programs that use this database, such as BREEAM-NL, GPR gebouw and GPR bouwbesluit, MRPI freetool, DuboCalc, etc..

1.7 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPDs programs may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

1.8 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'Jansen Viss HI TVS 50x120, transom 50x80 - English EPD' with the calculation identifier EPD-NIBE-20230309-35842.

2 Product

2.1 PRODUCT DESCRIPTION

The Jansen VISS TVS HI is an insulated curtain wall element consisting of steel profiles, finished with aluminum cover profiles. The individual parts for this curtain wall element are supplied by the Jansen company and can then be cut to size so that curtain walls with different dimensions can be made.

2.2 REFERENCE SERVICE LIFE

RSL PRODUCT

SBR Levensdurengids [SBR 2011].

USED RSL (YR) IN THIS LCA CALCULATION:

75

RSL PARTS

Equal to product.

2.3 DESCRIPTION PRODUCTION PROCESS

(Switzerland) The raw materials (steel, aluminum and various types of plastics) are delivered to Jansen's factory in Oberriet in Switzerland. The steel supplied as steel coil is cut to a standard size in the factory and then bent to the correct profiles. The steel parts are now taken to an external party for a final treatment, where these parts are returned to Jansen AG in Oberriet after being sprayed and powder coated and are also ready for transport. Other raw materials such as stainless steel, aluminum and plastic are supplied by the suppliers in custom/standard lengths.

(Netherlands) The supplied steel profiles, pressure caps are cut to size. Holes are then pre-drilled for mounting and the T-connections. After this everything is blasted, zinc plated and finally treated with primer and powder coated. The T-connectors are then placed and the frame is pushed together using the T-connectors. Subsequently, the final assembly takes place, whereby insulation knobs and stainless steel supporting anchors are placed. In addition, rubbers are custom-made and placed using a vulcanizing adhesive tape, and glazing rubbers are also placed in the clamping strip. Finally, the glazing bars are sawn afterwards and placed. Everything is then packed so that it is ready for transport to the construction site.

2.4 CONSTRUCTION DESCRIPTION

On the construction site, the mullions and transoms are pushed together. These are then placed as an intermediate element or they are placed against an adjustable frame (time required approx. 15 minutes). The frame is then completely mounted in the adjustable frame (time required approx. 30 minutes). Finally, the glass and the polyethylene foam tape are placed (time required approx. 4 minutes).

3 Calculation rules

3.1 FUNCTIONAL / DECLARED UNIT

1m2 frame (exterior)

Declared unit: square meter (m2)

Collection of non-structural outer walls, which form the boundary of the building, calculated from the top of the foundation structures to the top of the roof structures. (NL-SFB 21.1 NMD). In this case, a curtain wall with a grid of 1800mm x 3600mm, without intermediate posts and/or intermediate beams, has been assumed, which meets the requirements of the bouwbesluit. One mullion and one transom of this segment of a curtain wall is included. Finishes and maintenance must be included. The quantities have been calculated back to 1 m². Fasteners, glazing, jamb stud, hinges and locks, sound absorbing window vent, sill or water barrier are not included.

3.2 CONVERSION FACTORS

Description	Value	Unit
Declared unit	1	m2
Weight per declared unit	6.363	kg
Conversion factor to 1 kg	0.157159	m2

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options, modules C1-C4 and module D LCA. The life cycle stages included are as shown below:

(X = module included, ND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	ND	ND	ND	ND	X	X	X	X	X

The modules of the EN15804 contain the following:

Module A1 = Raw material supply	Module B5 = Refurbishment
Module A2 = Transport	Module B6 = Operational energy use
Module A3 = Manufacturing	Module B7 = Operational water use
Module A4 = Transport	Module C1 = De-construction / Demolition
Module A5 = Construction - Installation process	Module C2 = Transport
Module B1 = Use	Module C3 = Waste Processing
Module B2 = Maintenance	Module C4 = Disposal
Module B3 = Repair	Module D = Benefits and loads beyond the product system boundaries
Module B4 = Replacement	

3.4 REPRESENTATIVENESS

The input data are representative for Jansen Viss TVS HI, a product of ODS. The data are representative for The Netherlands. The data is directly provided from the production facility and therefore specific for ODS. All background data is based on the EcoInvent 3.5 Database.

This EPD can only be compared with the EPD of other products when they are conducted following the same version of the Dutch Determination Method.

3.5 CUT-OFF CRITERIA

In the Life cycle assessment the following cut-off criteria are applied:

PRODUCT STAGE (A1-A3)

The production stage consists of the extraction of raw materials, transportation of the raw materials, processing the raw materials into materials and the production of the product. The required energy for production, external treatments, ancillary materials, packaging material and production emissions are included.

CONSTRUCTION PROCESS STAGE (A4-A5)

This stage consists the transport of the product from production plant to the construction site.

It also includes the loss of material during construction. The additional needed production, transport and end-of-life of the lost material during construction is included.

The end-of-life of packaging material up to the end-of-waste state or disposal of final residues is also included.

3 Calculation rules

The installation of the product including manufacture, transportation and end-of-life of ancillary materials and any energy or water use required for installation or operation of the construction site are taken into account.

USE STAGE (B1-B3)

This stage consists of the impacts arising from components of the building and construction works during their use.

The stage also covers the combination of all planned technical and associated administrative maintenance actions during the service life to maintain the product installed in a building, in a construction works or its parts in a state in which it can perform its required functional and technical performance, as well as preserve the aesthetic qualities of the product. This will include preventative and regular maintenance activities.

Product replacement (B4) and renovation (B5) only apply when the product is considered in a lifespan (of a building, work , etc.). Operational water and energy use are not considered.

END OF LIFE STAGE (C1-C4)

When the end of the life stage of the building is reached, the de-construction/demolition begins. This EPD includes de-construction/demolition (C1), the necessary transport (C2) from the demolition site to the sorting location and distance to final disposal. The end of life stage includes the final disposal to landfill (C4), incineration (C3) and needed recycling processes up to the end-of-waste point (C3). Loads and benefits of recycling, re-use and exported energy are part of module D.

The default end-of-life scenarios of the annex (March 2022) to the NMD Determination method v1.1 have been used for the various materials in the product.

BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

This stage contains the potential loads and benefits of recycling and re-use of raw materials/products. The loads contain the needed recycling processes from end-of-waste-point up to the point-of-equivalence of the substituted primary raw material and a load for secondary material that will be lost at the end-of-life stage.

The loads and benefits of recycling and reuse are included in this module. The benefits are calculated based on the primary content and the primary equivalent.

In addition, the benefits of energy recovery are granted at this stage. The amount of avoided energy is based on the Lower Heating Values of the materials and the efficiencies of the incinerators as mentioned in the NMD Determination method v1.1 or EcoInvent 3.6 (2019).

3.6 ALLOCATION

n/a no allocation applies.

The quantity is specifically determined for all parts of the product. In addition, all energy consumption has been quantified. It is improbable that significant inputs have been disregarded, resulting in a 100% coverage of the mass and energy balance.

3.7 REFERENCE TIME PERIOD

All gathered information is relevant for the year 2020.

4 Scenarios and additional technical information

4.1 TRANSPORT TO CONSTRUCTION SITE (A4)

For the transport from production place to assembly/user, the following scenario is assumed for module A4 of this EPD.

	Value and unit
Vehicle type used for transport	Lorry (Truck), unspecified (default) | market group for (GLO)
Fuel type and consumption of vehicle	not available
Distance	150 km
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.2 ASSEMBLY (A5)

The following information describes the scenarios for flows entering the system and flows leaving the system at module A5.

FLOWS ENTERING THE SYSTEM

For flows entering the system at A5 the following scenario is assumed for module A5.

	Value	Unit
Energy consumption for installation/assembly		
Electricity (NL) - low voltage (max 1kV)	0.0007	kWh

FLOWS LEAVING THE SYSTEM

The following output flows leaving the system at module A5 are assumed.

Description	Value	Unit
Output materials as result of loss during construction	3	%
Output materials as result of waste processing of materials used for installation/assembly at the building site	0.000	kg
Output materials as result of waste processing of used packaging	0.089	kg

4.3 USE STAGE (B1)

No significant environment impact in the use stage modules, because there is no (significant) emission to air, soil or water.

4 Scenarios and additional technical information

4.4 MAINTENANCE (B2)

No maintenance is needed to fulfil the requirements as stated in the applicable functional unit (chapter 3.1) and to achieve the stated reference service life (2.3).

4.5 REPAIR (B3)

No repairs are needed to fulfil the requirements as stated in the applicable functional unit (chapter 3.1) and to achieve the stated reference service life (chapter 2.3).

4.6 DE-CONSTRUCTION, DEMOLITION (C1)

No inputs are needed for the product at the de-construction / demolition phase

4.7 TRANSPORT END-OF-LIFE (C2)

The following distances and transport conveyance are assumed for transportation during end of life for the different types of waste processing.

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
aluminium, wrought alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 3)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Steel coil | cold rolled, galvanised and coated | Steel federation NL	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
finishes (adhered to wood, plastic, metal) (NMD ID 2)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
plastics, via residue (NMD ID 43)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Metals, others (i.a. fasteners, fittings) (NMD ID 50)		0	100	150	50	0

4 Scenarios and additional technical information

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
	Lorry (Truck), unspecified (default) | market group for (GLO)					
Zinc layer coil | Steel federation NL	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Organic coating coil | Steel federation NL	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0

The transport conveyance(s) used in the scenario(s) for transport during end of life has the following characteristics.

	Value and unit
Vehicle type used for transport	Lorry (Truck), unspecified (default) | market group for (GLO)
Fuel type and consumption of vehicle	not available
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.8 END OF LIFE (C3, C4)

The scenario(s) assumed for end of life of the product are given in the following tables.
First the assumed percentages per type of waste processing are displayed, followed by the assumed amounts.

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
aluminium, wrought alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 3)	NL	0	3	3	94	0
Steel coil | cold rolled, galvanised and coated | Steel federation NL	NL	0	5	0	95	0
finishes (adhered to wood, plastic, metal) (NMD ID 2)	NL	0	0	100	0	0
elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	NL	0	10	85	5	0

4 Scenarios and additional technical information

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	NL	0	10	85	5	0
plastics, via residue (NMD ID 43)	NL	0	20	80	0	0
Metals, others (i.a. fasteners, fittings) (NMD ID 50)	NL	0	5	5	90	0
Zinc layer coil | Steel federation NL	NL	0	5	0	95	0
Organic coating coil | Steel federation NL	NL	0	5	0	95	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
aluminium, wrought alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 3)	0.000	0.018	0.018	0.563	0.000
Steel coil | cold rolled, galvanised and coated | Steel federation NL	0.000	0.253	0.000	4.815	0.000
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.000	0.001	0.000	0.000
elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	0.000	0.049	0.415	0.024	0.000
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.000	0.002	0.017	0.001	0.000
plastics, via residue (NMD ID 43)	0.000	0.004	0.002	0.000	0.000
Metals, others (i.a. fasteners, fittings) (NMD ID 50)	0.000	0.002	0.001	0.043	0.000
Zinc layer coil | Steel federation NL	0.000	0.004	0.000	0.075	0.000
Organic coating coil | Steel federation NL	0.000	0.002	0.000	0.029	0.000
Total	**0.000**	**0.335**	**0.453**	**5.550**	**0.000**

4.9 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The presented Benefits and loads beyond the system boundary in this EPD are based on the following calculated Net output flows in kilograms and Energy recovery displayed in MJ Lower Heating Value.

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
aluminium, wrought alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 3)	0.419	0.000
Steel coil | cold rolled, galvanised and coated | Steel federation NL	4.485	0.000
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.000
Total	**4.967**	**12.662**

4 Scenarios and additional technical information

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	0.024	11.278
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.001	0.866
plastics, via residue (NMD ID 43)	0.000	0.517
Metals, others (i.a. fasteners, fittings) (NMD ID 50)	0.037	0.000
Total	**4.967**	**12.662**

5 Results

For the impact assessment, the characterization factors of the LCIA method Bepalingsmethode 'set 1', 'set2' & param (NMD 3.4) v1.00 are used. Long-term emissions (>100 years) are not considered in the impact assessment. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
AP	mol H+ eqv.	8.94E-2	1.18E-3	1.58E-2	7.57E-4	3.35E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.00E-4	2.41E-3	2.35E-5	-5.49E-2
GWP-total	kg CO2 eqv.	2.09E+1	1.52E-1	2.93E+0	1.31E-1	9.57E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.17E-2	1.79E+0	1.03E-2	-1.34E+1
GWP-b	kg CO2 eqv.	-1.06E-2	6.58E-4	-5.61E-2	6.03E-5	9.22E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.38E-5	-6.73E-3	-2.08E-6	9.81E-2
GWP-f	kg CO2 eqv.	2.08E+1	1.51E-1	2.97E+0	1.31E-1	8.62E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.16E-2	1.80E+0	1.03E-2	-1.35E+1
GWP-luluc	kg CO2 eqv.	8.29E-2	1.47E-4	1.04E-2	4.79E-5	2.88E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.89E-5	2.55E-4	1.58E-6	-7.01E-2
EP-m	kg N eqv.	1.37E-2	4.15E-4	3.29E-3	2.67E-4	5.62E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.06E-4	5.36E-4	8.80E-6	-8.46E-3
EP-fw	kg P eqv.	8.60E-4	5.12E-6	2.40E-4	1.32E-6	3.27E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.21E-7	4.40E-5	6.08E-8	-4.39E-4
EP-T	mol N eqv.	1.64E-1	4.60E-3	3.96E-2	2.94E-3	6.68E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.16E-3	6.22E-3	8.09E-5	-8.63E-2
ODP	kg CFC 11 eqv.	1.00E-6	2.40E-8	3.55E-7	2.88E-8	4.60E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.14E-8	3.67E-8	8.47E-10	-4.34E-7
POCP		5.12E-2	1.26E-3	1.13E-2	8.40E-4	2.04E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.32E-4	1.67E-3	2.53E-5	-3.19E-2

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

5 Results

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
	kg NMVOC eqv.													
ADP-f	MJ	2.18E+2	2.24E+0	5.12E+1	1.97E+0	8.44E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.79E-1	3.42E+0	6.40E-2	-1.15E+2
ADP-mm	kg Sb-eqv.	5.50E-4	1.90E-6	6.68E-4	3.31E-6	2.40E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.31E-6	5.62E-6	1.36E-8	1.97E-3
WDP	m3 world eqv.	4.21E+0	1.66E-2	6.02E-1	7.05E-3	1.53E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.79E-3	8.10E-2	2.69E-3	-1.60E+0

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15084+A2

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
ETP-fw	CTUe	3.47E+2	2.29E+0	9.03E+1	1.76E+0	1.42E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.95E-1	1.27E+1	1.12E+1	-2.46E+2
PM	disease incidence	7.37E-7	1.19E-8	1.36E-7	1.17E-8	2.83E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.65E-9	2.93E-8	4.19E-10	-4.43E-7
HTP-c	CTUh	4.76E-8	1.25E-10	2.38E-9	5.70E-11	1.76E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.25E-11	3.53E-10	1.60E-12	-2.80E-8
HTP-nc	CTUh	2.97E-7	2.55E-9	1.22E-7	1.92E-9	1.27E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.60E-10	1.18E-8	4.75E-11	3.35E-7
IR	kBq U235 eqv.	6.40E-1	1.17E-2	3.58E-1	8.25E-3	3.14E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.26E-3	1.46E-2	2.53E-4	-2.49E-1
SQP	Pt	4.24E+1	1.65E+0	3.27E+1	1.71E+0	2.52E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.76E-1	4.74E+0	1.30E-1	-1.52E+1

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

5 Results

CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	AAcidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

5 Results

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A1

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
ADPE	Kg Sb	5.50E-4	1.90E-6	6.68E-4	3.31E-6	2.40E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.31E-6	5.62E-6	1.36E-8	1.97E-3
GWP	Kg CO2 Equiv.	2.03E+1	1.50E-1	2.93E+0	1.30E-1	8.44E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.12E-2	1.79E+0	9.06E-3	-1.31E+1
ODP	Kg CFC-11 Equiv.	1.08E-6	2.06E-8	3.50E-7	2.30E-8	4.77E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.09E-9	3.25E-8	6.77E-10	-4.90E-7
POCP	Kg Ethene Equiv.	1.09E-2	1.02E-4	1.72E-3	7.81E-5	3.99E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.09E-5	1.67E-4	3.53E-6	-7.00E-3
AP	Kg SO2 Equiv.	6.99E-2	8.89E-4	1.25E-2	5.69E-4	2.62E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.25E-4	1.93E-3	1.81E-5	-4.37E-2
EP	Kg PO43- Equiv.	8.29E-3	1.71E-4	2.17E-3	1.12E-4	3.33E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.42E-5	3.63E-4	4.06E-6	-4.33E-3

ADPE=Depletion of abiotic resources-elements | **GWP**=Global warming | **ODP**=Ozone layer depletion | **POCP**=Photochemical oxidants creation | **AP**=Acidification of soil and water | **EP**=Eutrophication

NATIONAL ANNEX NMD

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
ADPF	Kg Sb	1.32E-1	1.04E-3	2.19E-2	9.52E-4	4.80E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.77E-4	1.64E-3	3.13E-5	-7.81E-2
HTP	kg 1.4 DB	1.63E+1	6.44E-2	9.42E-1	5.45E-2	5.43E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.16E-2	2.18E-1	1.41E-3	-9.95E+0
FAETP	kg 1.4 DB	1.02E-1	1.20E-3	3.63E-2	1.59E-3	4.81E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.30E-4	6.03E-3	6.04E-4	-4.01E-2
MAETP	kg 1.4 DB	4.97E+2	4.51E+0	9.75E+1	5.73E+0	1.97E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.26E+0	2.02E+1	6.47E-1	-2.85E+2
TETP	kg 1.4 DB	3.34E-2	3.12E-4	2.81E-2	1.93E-4	1.78E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.62E-5	7.98E-4	4.07E-6	9.51E-2

ADPF=Depletion of abiotic resources-fossil fuels | **HTP**=Human toxicity | **FAETP**=Ecotoxicity. fresh water | **MAETP**=Ecotoxicity. marine water (MAETP) | **TETP**=Ecotoxicity. terrestric

5 Results

5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
PERE	MJ	2.79E+1	1.49E-1	1.17E+1	2.47E-2	1.23E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.75E-3	4.19E-1	1.88E-3	-1.86E+1
PERM	MJ	0.00E+0	0.00E+0	7.83E-1	0.00E+0	2.35E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	2.79E+1	1.49E-1	1.25E+1	2.47E-2	1.25E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.75E-3	4.19E-1	1.88E-3	-1.86E+1
PENRE	MJ	2.34E+2	2.37E+0	5.51E+1	2.09E+0	9.03E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.27E-1	3.60E+0	6.81E-2	-6.27E+1
PENRM	MJ	1.49E+1	0.00E+0	1.68E+0	0.00E+0	4.99E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-8.14E-1
PENRT	MJ	2.49E+2	2.37E+0	5.68E+1	2.09E+0	9.52E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.27E-1	3.60E+0	6.81E-2	-6.35E+1
SM	Kg	4.79E-1	0.00E+0	1.42E-2	0.00E+0	1.48E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	M3	2.35E-1	8.43E-4	5.37E-2	2.40E-4	9.01E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.49E-5	3.10E-3	6.53E-5	-9.01E-2

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
HWD	Kg	1.08E-3	4.70E-6	5.88E-4	4.99E-6	1.58E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.97E-6	3.72E-3	5.96E-8	4.68E-3
NHWD	Kg	2.87E+0	6.00E-2	9.04E-1	1.25E-1	1.41E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.94E-2	1.34E-1	3.35E-1	-1.10E+0
RWD	Kg	6.80E-4	1.40E-5	2.82E-4	1.29E-5	3.06E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.12E-6	1.74E-5	3.84E-7	-2.01E-4

HWD=hazardous waste disposed | **NHWD**=non hazardous waste disposed | **RWD**=radioactive waste disposed

5 Results

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
CRU	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	1.62E-1	0.00E+0	1.73E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.52E+0	0.00E+0	0.00E+0
MER	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EE	MJ	0.00E+0	0.00E+0	1.21E-1	0.00E+0	7.46E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.37E+0
EET	MJ	0.00E+0	0.00E+0	7.62E-2	0.00E+0	4.72E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.66E+0
EEE	MJ	0.00E+0	0.00E+0	4.43E-2	0.00E+0	2.74E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.71E+0

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EE**=Exported energy | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

5 Results

5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER SQUARE METER

BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per square meter:

Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0	kg C

5 Results

5.4 ENVIRONMENTAL COST INDICATOR NL PER SQUARE METER

Using the environmental cost indicator (ECI) method, which is presented in the NMD Determination Method (2020), the results are aggregated to the single-point score. The ECI is a relevant valuation method, especially in the Dutch construction sector. In the Netherlands, it is a prerequisite for public tenders. The aim of the indicator is to show the shadow price for environmental impacts of a product or project. The application of single-point scores is an additional assessment tool for eco-balance results. However, it must be pointed out that weightings are always based on a value maintenance and not on a scientific basis (EN 14040). The ECI results are shown in the following table.

Module EN15804	ECI NL	Share in total (%)
A1 Raw Materials Supply	€ 2.94	171,1 %
A2 Transport	€ 0.02	1,1 %
A3 Manufacturing	€ 0.32	18,7 %
A4 Transport from the gate to the site	€ 0.02	0,9 %
A5 Construction - Installation process	€ 0.11	6,3 %
B1 Use	€ 0.00	0,0 %
B2 Maintenance	€ 0.00	0,0 %
B3 Repair	€ 0.00	0,0 %
C1 De-construction / demolition	€ 0.00	0,0 %
C2 Transport	€ 0.01	0,4 %
C3 Waste processing	€ 0.12	7,2 %
C4 Disposal	€ 0.00	0,0 %
D Benefits and loads beyond the product system boundary	€ -1.81	-105,7 %
ECI NL per functional unit	**€ 1.72**	

6 References

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+A1
EN 15804+A1: 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

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

NMD-verification protocol
NMD-verification protocol version 1.0, July 2020, foundation NMD

NMD Determination method
NMD Determination method Environmental performance Construction works v1.1 March 2022, foundation NMD

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