

Environmental Product Declaration

ComFlor 210+

Dutch Engineering Raadgevend Ingenieursbureau B.V.

Publisher:	Dutch Engineering Raadgevend Ingenieursbureau B.V.
Programme operator:	Stichting NMD
Calculation number:	ReTHiNK-69436
Generation on:	26-02-2025
Issue date:	26-02-2025
Valid until:	26-02-2030
Status:	verified

R<THiNK



1 General information

1.1 PRODUCT

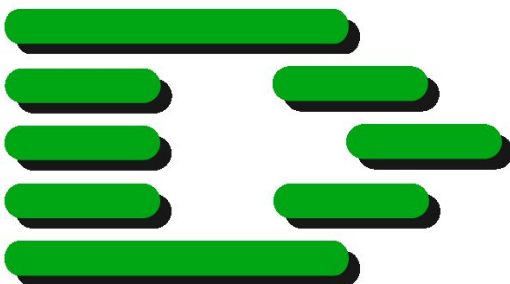
ComFlor 210+

1.2 VALIDITY

Issue date: 26-02-2025

Valid until: 26-02-2030

1.3 OWNER OF THE DECLARATION



DUTCH ENGINEERING

Manufacturer: Dutch Engineering Raadgevend Ingenieursbureau B.V.

Address: Energieweg 46, 2382 NL Zoeterwoude

E-mail: info@dutchengineering.nl

Website: www.dutchengineering.nl

Production location: Dutch Engineering

Address production location: Energieweg 46, 2382NL Zoeterwoude

1.4 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. The EN 15804:2012+A2:2019 serves as the core PCR.

Internal External

A handwritten signature in black ink, appearing to read 'P. van den Heuvel'.

Pien van den Heuvel , So. Sustainability

1.5 PRODUCT CATEGORY RULES

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

1.6 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+A2. 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 EPD program operators 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).

1.7 CALCULATION BASIS

LCA method R<THiNK: NMD Determination method v 1.2 | set1+2

LCA software*: Simapro 9.1.1

1 General information

Characterization method: Bepalingsmethode 'set 1', 'set2' & param (NMD 3.4) v1.00

LCA database profiles: EcoInvent version 3.6

Version database: v3.17 (2024-05-22)

** Simapro is used for calculating the characterized results of the Environmental profiles within R<THINK.*

1.8 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'ComFlor 210+' with the calculation identifier ReTHiNK-69436.

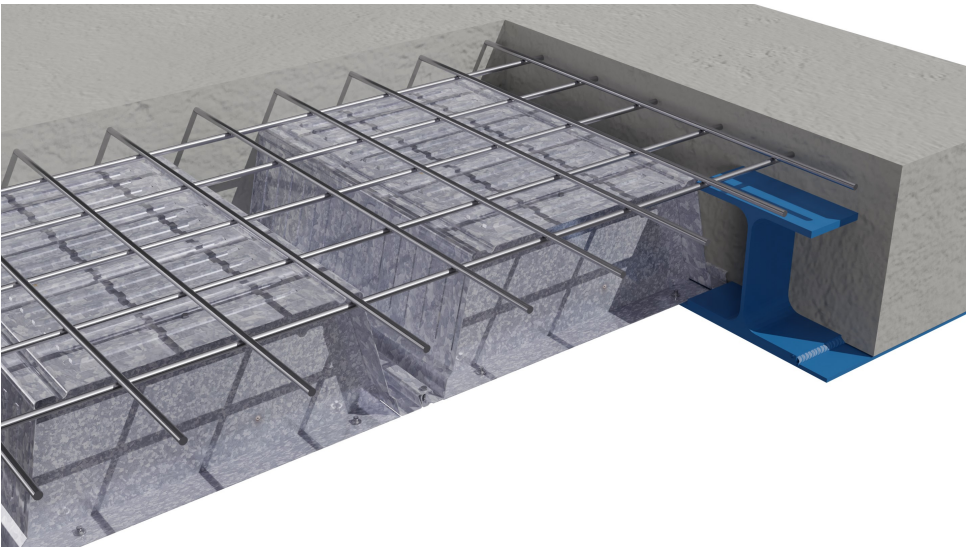
2 Product

2.1 PRODUCT DESCRIPTION

The ComFlor floor system comprises profiled steel decking that forms composite floor slabs with an in-situ reinforced concrete topping. The steel decking serves as permanent formwork for the concrete and provides tensile resistance due to the shear bond between the deck and concrete. Once the concrete has cured, the two materials act together compositely.

This EPD covers ComFlor 210+ profiled steel decking, roll-formed from galvanized steel grade S350GD+Z coils supplied by Salzgitter Flachstahl GmbH. It includes the steel decking; the concrete and reinforcement bars (rebars) are excluded.

The thickness of the steel decking is scalable. Three thickness options are available: 1.0 mm (13.2 kg/m²), 1.25 mm (16.5 kg/m²), and 1.5 mm (19.8 kg/m²). The base thickness for this EPD is 1.25 mm.



2.2 REFERENCE SERVICE LIFE

RSL PRODUCT

A reference service life of 100 years is considered in accordance with the EN16757 Annex AA and the SBR. Scenario 2 Structural concrete or concrete elements for buildings (interior) (e.g. Floor elements) is considered to be representative.

USED RSL (YR) IN THIS LCA CALCULATION:

100

RSL PARTS

No deviation reference service life is applicable for one of the raw materials / components.

2.3 TECHNICAL DATA

- Profile height 210 mm
- Length – up to 12.0 m
- Width – 0.6 m
- Nominal thickness steel deck – 1.25 mm
- Steel coil area 1017 mm²/m
- Steel grade S350GD+Z according to EN 10346 with minimum yield strength of 350 N/mm²
- Weight per square meter – 16.2 kg/m²
- Minimal composite floor thickness 270 mm
- Maximum composite floor thickness 350 mm

2.4 SUBSTANCES OF VERY HIGH CONCERN

The product does not contain any substances listed in the “Candidate List of Substances” of Very High Concern (SVHC) for authorization” exceeding 0.1% of the weight of the product.

2.5 DESCRIPTION PRODUCTION PROCESS

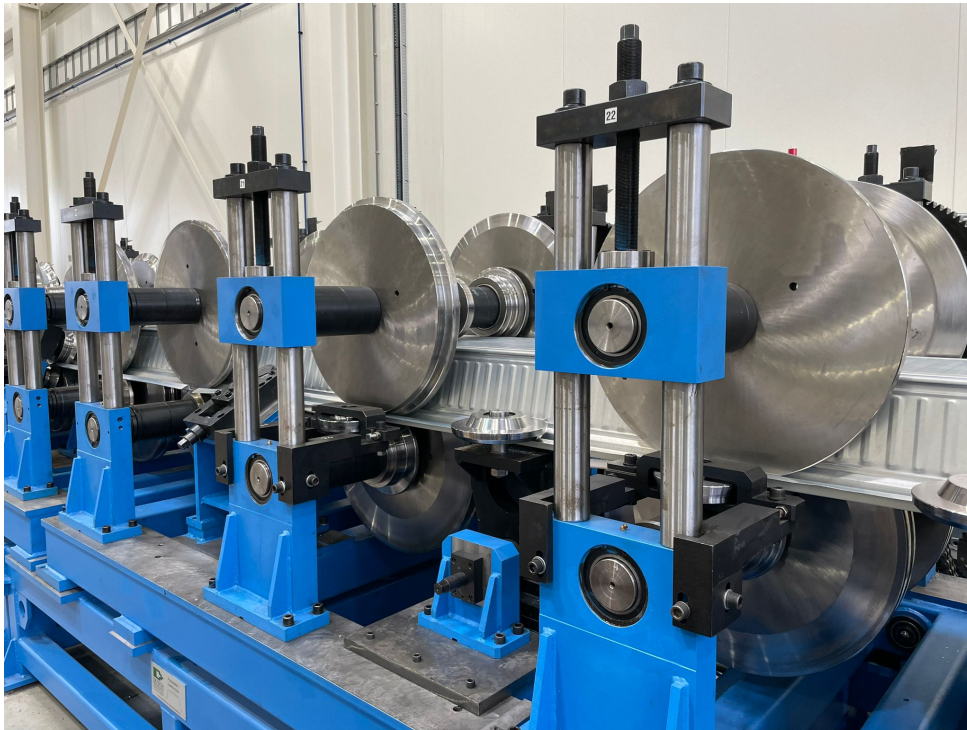
The raw material, selected galvanized or coated steel coils, is uncoiled using a machine called a decoiler at the beginning of the production line.

During the roll forming process, the steel sheet is passed through a series of rollers specially designed to create the desired profile or shape on the steel sheet. Embossed patterns are added during rolling. The profiled shape and embossments can vary depending on the design requirements of the steel deck, such as trapezoidal or re-entrant shapes.

2 Product

After roll forming, the continuous sheet of profiled steel is sheared into individual deck panels of the required length. Precision cutting ensures that each sheet meets the specified dimensions.

Once the steel deck sheets are cut into individual lengths, they are stacked, bundled, and packaged for shipping to construction sites.



This EPD includes the crane handling, end diaphragms and all the required fasteners

2.6 CONSTRUCTION DESCRIPTION

The steel decking is transported to the site in bundles of up to 20 sheets, with a maximum of approximately 16 bundles on one truck. These bundles are then crane-lifted into the floor construction level and manually installed onto the supporting beam structure. End diaphragms or end closures are used to close off the profile ends. The steel decking and end diaphragms are secured to the support structure using powder-actuated shot-firing pins. The side laps of the decking are interconnected using self-drilling fasteners spaced every 350 mm.

3 Calculation rules

3.1 FUNCTIONAL UNIT

1 m2 ComFlor 210+

The ComFlor floor system comprises profiled steel decking (with a thickness of 1.25 mm and a weight of 16.2 kg/m²) that creates a composite floor slab with an in-situ reinforced concrete topping. The steel decking acts as permanent formwork for the concrete and provides tensile resistance due to the shear bond between the deck and concrete. This EPD covers ComFlor 210+ profiled steel decking, roll-formed from galvanized steel coils material grade S350GD+Z supplied by Salzgitter Flachstahl GmbH. It only includes the steel decking; the concrete and reinforcement bars (rebars) are excluded.

The EPD includes the end diaphragms, crane handling, and all required fasteners for the construction phase.

Under normal conditions, the steel deck would not need to be replaced over the life of the building and structure. The thickness of the steel decking is scalable, with three options available: 1.0 mm (12.8 kg/m²), 1.25 mm (16.2 kg/m²), and 1.5 mm (19.5 kg/m²). The base thickness for this LCA/EPD is 1.25 mm.

Reference unit: square meter (m²)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	m ²
Weight per reference unit	16.970	kg
Conversion factor to 1 kg	0.058928	m ²

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options, modules C1-C4 and module D EPD. 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

This EPD is representative for ComFlor 210+, a product of Dutch Engineering Raadgevend Ingenieursbureau B.V.. The results of this EPD are representative for Netherlands.

3.5 CUT-OFF CRITERIA

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

3 Calculation rules

PRODUCT STAGE (A1-A3)

All input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. production waste) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

CONSTRUCTION PROCESS STAGE (A4-A5)

All input flows (e.g. transportation to the construction site, additional raw material use for construction, installation energy (use)of energy use for assembly , etc.) and output flows (e.g. construction waste, packaging waste, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

USE STAGE (B1-B7)

All (known) input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. emissions to soil, air and water, construction waste, packaging waste, end-of-life waste, etc.) related to the building fabric are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

END OF LIFE STAGE (C1-C4)

All input flows (e.g. energy use for demolition or disassembly, transport to waste processing, etc.) and output flows (e.g. end-of-life waste processing of the product, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

All benefits and loads beyond the system boundary resulting from reusable products, recyclable materials and/or useful energy carriers leaving the product system are considered in this LCA.

3.6 ALLOCATION

Allocation has not been applied in this LCA.

3.7 DATA COLLECTION & REFERENCE PERIOD

Up until 2023, Dutch Engineering was a trading company only. Over the years, they sold the rolled sheet profile ComFlor 210, which was purchased from TATA UK. In 2022-2023,

they developed an updated profile with better performance, the ComFlor 210+. They built their own production facility to roll sheet coils into profiled steel plates. In 2024, they started delivering their first profiles from this production line, replacing the ComFlor 210 with the updated ComFlor 210+.

Ample data is available on the sales of the ComFlor 210 before the production of the ComFlor210+. So the sales data of the ComFlor 210 from 2018 to 2022 are used as a basis to determine the average raw materials, production waste, and energy usage. The energy usage of the roll forming production line is conservatively based on the design speed, value and power requirements of the new machinery.

3.8 ESTIMATES AND ASSUMPTIONS

Assumptions energy use on construction site

The impact of the product is assessed as follows: lifting from the trailer to floor level and then manually lowering them individually onto the support beam structure. It is estimated that it takes 3 hours of onsite crane usage per 1000 m². A Liebherr 280EC-H16 Litronic crane with a capacity of 110 kW was used as a reference.

Consumption per functional unit of 1 m² meter is 0.33 kWh.

Assumptions energy use for demolition

The energy assumption for demolition is assumed to be identical but reversed compared to the process of construction.

Consumption per functional unit of 1 m² meter is 0.33 kWh.

3.9 DATA QUALITY

Data on raw materials, energy use, and waste are based on the average sales data of the ComFlor 210 steel deck from 2018 to 2022, as well as the design speed values and power requirements of the new roll forming machine. Background data is sourced from EPDs and EcoInvent 3.6. Foreground data is less than 5 years old, and background data is less than 10 years old. The data quality is considered to be good.

3.10 POWER MIX

The electricity is generated using solar panels installed on the roof of the production facility. 100% of the electricity used is sourced from renewable energy. The energy production sheets are available.

3 Calculation rules

3.9 SCALING

The thickness dimension, measured in millimeters, can be scaled to match the available thickness options for the ComFlor 210+. The base thickness is 1.25 mm

The available thicknesses are 1.0 mm, 1.1 mm, 1.25 mm, and 1.50 mm.

Parameter	Value
Scaling type	Linear
Description dimension	Thickness
Dimension	1.250
Scalable dimension	1.250
Unit dimension	mm

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
<i>Energy consumption for installation/assembly</i>		
Diesel, burned in machine (incl. emissions)	0.026	l
Wire drawing, steel processing (EU) (only process)	0.045	kg
<i>Materials used for installation/assembly</i>		
'0233-fab&Staal, staalplaat, verzinkt (o.b.v. 98,6% Steel, unalloyed {GLO} market for Cut-off, U + Sheet rolling; 0,06 m2 Zinc coat, coils)	0.04545	kg

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	0.045	kg
Output materials as result of waste processing of used packaging	0.078	kg

4 Scenarios and additional technical information

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.

4.4 MAINTENANCE (B2)

For maintenance no input or output flows are modeled.

4.5 REPAIR (B3)

Repairs are not applicable within the functional unit and to achieve the reference service life.

4.6 DE-CONSTRUCTION, DEMOLITION (C1)

The following information describes the scenario for demolition at end of life.

Description	Amount	Unit
Diesel, burned in machine (incl. emissions)	0.026	l

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]
Steel coil cold rolled, galvanised and coated Steel federation NL	Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	0
Zinc layer 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.

4 Scenarios and additional technical information

	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 [%]
Steel coil cold rolled, galvanised and coated Steel federation NL	NL	0	5	0	95	0
Zinc layer 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]
Steel coil cold rolled, galvanised and coated Steel federation NL	0.000	0.825	0.000	15.675	0.000
Zinc layer coil Steel federation NL	0.000	0.024	0.000	0.447	0.000
Total	0.000	0.848	0.000	16.122	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]
Steel coil cold rolled, galvanised and coated Steel federation NL	14.603	0.000
Zinc layer coil Steel federation NL	0.447	0.000
Total	15.049	0.000

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 Results

5.1 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER (FIXED PART)

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	4.21E+0	3.03E-2	-3.46E-2	4.20E+0	1.11E-2	4.85E-1	0.00E+0	0.00E+0	0.00E+0	8.53E-2	3.33E-3	1.14E-2	1.27E-4	-5.74E-1
GWP-f	kg CO ₂ eq.	4.18E+0	3.03E-2	9.33E-2	4.30E+0	1.11E-2	3.55E-1	0.00E+0	0.00E+0	0.00E+0	8.52E-2	3.33E-3	1.20E-2	1.28E-4	-5.75E-1
GWP-b	kg CO ₂ eq.	1.70E-2	1.40E-5	-1.28E-1	-1.11E-1	5.12E-6	1.30E-1	0.00E+0	0.00E+0	0.00E+0	2.37E-5	1.54E-6	-6.12E-4	-1.67E-6	1.74E-3
GWP-luluc	kg CO ₂ eq.	8.60E-3	1.11E-5	2.05E-4	8.82E-3	4.07E-6	7.10E-4	0.00E+0	0.00E+0	0.00E+0	6.72E-6	1.22E-6	1.37E-5	5.64E-8	-1.03E-3
ODP	kg CFC 11 eq.	2.98E-7	6.69E-9	1.18E-8	3.16E-7	2.45E-9	3.76E-8	0.00E+0	0.00E+0	0.00E+0	1.84E-8	7.35E-10	1.63E-9	5.24E-11	-3.07E-8
AP	mol H ⁺ eq.	3.27E-2	1.76E-4	5.88E-4	3.35E-2	6.44E-5	3.46E-3	0.00E+0	0.00E+0	0.00E+0	8.91E-4	1.93E-5	1.28E-4	1.22E-6	-7.35E-3
EP-fw	kg P eq.	8.55E-4	3.06E-7	6.18E-6	8.61E-4	1.12E-7	3.42E-5	0.00E+0	0.00E+0	0.00E+0	3.10E-7	3.36E-8	3.51E-6	2.29E-9	-4.99E-4
EP-m	kg N eq.	4.61E-3	6.20E-5	1.05E-4	4.77E-3	2.27E-5	7.11E-4	0.00E+0	0.00E+0	0.00E+0	3.94E-4	6.81E-6	2.88E-5	4.02E-7	-1.54E-3
EP-T	mol N eq.	6.09E-2	6.83E-4	1.14E-3	6.27E-2	2.50E-4	1.18E-2	0.00E+0	0.00E+0	0.00E+0	4.32E-3	7.50E-5	3.37E-4	4.42E-6	-2.20E-2
POCP	kg NMVOC eq.	1.44E-2	1.95E-4	3.33E-4	1.49E-2	7.14E-5	2.31E-3	0.00E+0	0.00E+0	0.00E+0	1.19E-3	2.14E-5	9.02E-5	1.29E-6	-4.87E-3
	kg Sb-eq.	3.32E-3	7.68E-7	1.39E-5	3.34E-3	2.81E-7	2.47E-4	0.00E+0	0.00E+0	0.00E+0	1.31E-7	8.44E-8	2.06E-7	1.43E-10	-2.24E-3

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratospheric ozone layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP minerals&metals) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) depreciation potential, deprivation-weighted water consumption (WDP)

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
ADP-mm															
ADP-f	MJ	5.30E+1	4.57E-1	1.27E+0	5.48E+1	1.67E-1	4.30E+0	0.00E+0	0.00E+0	0.00E+0	1.17E+0	5.02E-2	1.63E-1	3.58E-3	-5.58E+0
WDP	m3 world eq.	4.50E-1	1.64E-3	2.72E-2	4.78E-1	5.99E-4	8.25E-2	0.00E+0	0.00E+0	0.00E+0	1.57E-3	1.80E-4	1.90E-3	1.66E-4	1.28E-2

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratospheric ozone layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP minerals&metals) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) depreciation potential, deprivation-weighted water consumption (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
PM	disease incidence	1.91E-7	2.73E-9	8.38E-9	2.02E-7	9.99E-10	4.61E-8	0.00E+0	0.00E+0	0.00E+0	2.36E-8	3.00E-10	1.68E-9	2.30E-11	-5.47E-8
IR	kBq U235 eq.	1.14E-1	1.92E-3	4.68E-3	1.20E-1	7.01E-4	1.25E-2	0.00E+0	0.00E+0	0.00E+0	5.03E-3	2.10E-4	7.37E-4	1.47E-5	-8.13E-3
ETP-fw	CTUe	3.20E+2	4.08E-1	2.78E+0	3.24E+2	1.49E-1	1.53E+1	0.00E+0	0.00E+0	0.00E+0	7.07E-1	4.48E-2	3.85E-1	2.00E-3	-1.91E+2
HTP-c	CTUh	3.88E-9	1.32E-11	7.02E-11	3.97E-9	4.84E-12	7.44E-10	0.00E+0	0.00E+0	0.00E+0	2.47E-11	1.45E-12	1.19E-11	5.05E-14	-6.12E-10
HTP-nc	CTUh	4.46E-7	4.46E-10	4.86E-9	4.51E-7	1.63E-10	1.92E-8	0.00E+0	0.00E+0	0.00E+0	6.07E-10	4.90E-11	5.18E-10	1.59E-12	-7.30E-8
SQP	Pt	9.89E+0	3.97E-1	2.04E+1	3.07E+1	1.45E-1	1.60E+0	0.00E+0	0.00E+0	0.00E+0	1.50E-1	4.36E-2	3.04E-1	7.57E-3	-7.20E+0

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality index (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	Acidification 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
ILCD type / level 3	Potential Human exposure efficiency relative to U235 (IRP)	1
	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

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
ADPE	kg Sb eq.	3.32E-3	7.68E-7	1.39E-5	3.34E-3	2.81E-7	2.47E-4	0.00E+0	0.00E+0	0.00E+0	1.31E-7	8.44E-8	2.06E-7	1.43E-10	-2.24E-3
GWP	kg CO ₂ eq.	4.10E+0	3.01E-2	9.19E-2	4.22E+0	1.10E-2	3.47E-1	0.00E+0	0.00E+0	0.00E+0	8.44E-2	3.30E-3	1.18E-2	1.26E-4	-5.60E-1
ODP	kg CFC11 eq.	2.80E-7	5.33E-9	1.00E-8	2.95E-7	1.95E-9	3.30E-8	0.00E+0	0.00E+0	0.00E+0	1.46E-8	5.86E-10	1.40E-9	4.16E-11	-2.68E-8
POCP	kg ethene eq.	1.65E-3	1.81E-5	4.95E-5	1.72E-3	6.64E-6	3.07E-4	0.00E+0	0.00E+0	0.00E+0	8.59E-5	1.99E-6	9.29E-6	1.33E-7	-5.46E-4
AP	kg SO ₂ eq.	2.68E-2	1.32E-4	4.85E-4	2.74E-2	4.84E-5	2.47E-3	0.00E+0	0.00E+0	0.00E+0	6.36E-4	1.45E-5	1.02E-4	9.28E-7	-5.57E-3
EP	Kg PO ₄ ³⁻ eq.	4.54E-3	2.60E-5	6.65E-5	4.63E-3	9.51E-6	4.72E-4	0.00E+0	0.00E+0	0.00E+0	1.45E-4	2.85E-6	2.19E-5	1.75E-7	-2.21E-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

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
ADPF	kg Sb eq.	2.90E-2	2.21E-4	6.40E-4	2.98E-2	8.09E-5	2.34E-3	0.00E+0	0.00E+0	0.00E+0	5.56E-4	2.43E-5	7.72E-5	1.71E-6	-3.39E-3
HTP	kg 1,4 DB eq.	9.01E-1	1.27E-2	3.23E-2	9.46E-1	4.63E-3	1.34E-1	0.00E+0	0.00E+0	0.00E+0	3.12E-2	1.39E-3	1.13E-2	5.12E-5	-2.54E-1
FAETP		4.18E-2	3.70E-4	1.10E-3	4.33E-2	1.35E-4	4.42E-3	0.00E+0	0.00E+0	0.00E+0	4.35E-4	4.06E-5	1.58E-4	1.27E-6	-8.21E-3

ADPF=Depletion of abiotic resources-fossil fuels | **HTP**=Human toxicity | **FAETP**=Ecotoxicity, fresh water | **MAETP**=Ecotoxicity, marine water | **TETP**=Ecotoxicity, terrestrial

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
	kg 1,4 DB eq.														
MAETP	kg 1,4 DB eq.	1.68E+2	1.33E+0	3.75E+0	1.73E+2	4.87E-1	1.01E+1	0.00E+0	0.00E+0	0.00E+0	1.51E+0	1.46E-1	9.51E-1	4.38E-3	-3.29E+1
TETP	kg 1,4 DB eq.	6.61E-2	4.47E-5	6.95E-4	6.68E-2	1.64E-5	2.83E-3	0.00E+0	0.00E+0	0.00E+0	5.14E-5	4.91E-6	3.69E-5	1.52E-7	-5.24E-3

ADPF=Depletion of abiotic resources-fossil fuels | **HTP**=Human toxicity | **FAETP**=Ecotoxicity, fresh water | **MAETP**=Ecotoxicity, marine water | **TETP**=Ecotoxicity, terrestrial

5.2 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER (SCALABLE PART)

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	4.74E+1	1.07E+0	2.09E-1	4.87E+1	3.34E-1	1.49E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.17E-1	4.01E-1	4.44E-3	-2.90E+1
GWP-f	kg CO ₂ eq.	4.74E+1	1.06E+0	2.06E-1	4.87E+1	3.34E-1	1.50E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.17E-1	4.22E-1	4.50E-3	-2.93E+1
GWP-b	kg CO ₂ eq.	-3.50E-2	4.91E-4	2.76E-3	-3.17E-2	1.54E-4	-1.69E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.40E-5	-2.15E-2	-5.86E-5	3.42E-1
		1.28E-2	3.90E-4	2.42E-4	1.35E-2	1.22E-4	4.20E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.28E-5	4.81E-4	1.98E-6	1.08E-2

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratospheric ozone layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP minerals&metals) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprivation potential, deprivation-weighted water consumption (WDP)

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
GWP-luluc	kg CO ₂ eq.														
ODP	kg CFC 11 eq.	9.12E-7	2.35E-7	1.12E-8	1.16E-6	7.37E-8	3.95E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.58E-8	5.72E-8	1.84E-9	-1.14E-7
AP	mol H ⁺ eq.	1.49E-1	6.17E-3	8.35E-4	1.56E-1	1.94E-3	4.92E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.78E-4	4.50E-3	4.27E-5	-7.92E-2
EP-fw	kg P eq.	1.93E-3	1.07E-5	1.47E-5	1.96E-3	3.37E-6	6.28E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.18E-6	1.23E-4	8.05E-8	-6.20E-4
EP-m	kg N eq.	2.63E-2	2.18E-3	1.49E-4	2.87E-2	6.83E-4	9.23E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.39E-4	1.01E-3	1.41E-5	-1.53E-2
EP-T	mol N eq.	3.29E-1	2.40E-2	2.30E-3	3.55E-1	7.53E-3	1.14E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.63E-3	1.18E-2	1.55E-4	-1.41E-1
POCP	kg NMVOC eq.	9.34E-2	6.85E-3	4.82E-4	1.01E-1	2.15E-3	3.22E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.52E-4	3.17E-3	4.53E-5	-5.77E-2
ADP-mm	kg Sb-eq.	1.36E-5	2.70E-5	5.84E-7	4.12E-5	8.46E-6	1.79E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.96E-6	7.23E-6	5.03E-9	7.82E-6
ADP-f	MJ	3.79E+2	1.61E+1	2.29E+0	3.98E+2	5.04E+0	1.24E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.76E+0	5.73E+0	1.26E-1	-1.80E+2
WDP	m ³ world eq.	6.82E+0	5.74E-2	3.55E-2	6.91E+0	1.80E-2	2.11E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.31E-3	6.66E-2	5.83E-3	-3.51E+0

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratospheric ozone layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP minerals&metals) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) depreciation potential, deprivation-weighted water consumption (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
PM	disease incidence	1.02E-6	9.58E-8	6.94E-9	1.13E-6	3.00E-8	3.70E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.05E-8	5.91E-8	8.08E-10	-5.12E-7
IR	kBq U235 eq.	8.32E-1	6.73E-2	8.12E-3	9.07E-1	2.11E-2	2.89E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.39E-3	2.59E-2	5.15E-4	-1.24E-1
ETP-fw	CTUe	6.54E+2	1.43E+1	2.23E+0	6.71E+2	4.49E+0	2.09E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.57E+0	1.35E+1	7.01E-2	-4.74E+2
HTP-c	CTUh	1.04E-7	4.64E-10	4.78E-10	1.05E-7	1.46E-10	3.19E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.10E-11	4.19E-10	1.77E-12	-5.91E-8
HTP-nc	CTUh	3.02E-7	1.57E-8	1.80E-8	3.36E-7	4.91E-9	1.04E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.72E-9	1.82E-8	5.59E-11	1.50E-6
SQP	Pt	8.41E+1	1.39E+1	8.48E-1	9.89E+1	4.37E+0	3.48E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.53E+0	1.07E+1	2.66E-1	-2.65E+1

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality index (SQP)

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	Acidification 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
ILCD type / level 3	Potential Human exposure efficiency relative to U235 (IRP)	1
	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2

5 Results

ILCD classification	Indicator	Disclaimer
	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.

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A1

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
ADPE	kg Sb eq.	1.38E-5	2.70E-5	5.84E-7	4.13E-5	8.46E-6	1.80E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.96E-6	7.23E-6	5.03E-9	7.67E-6
GWP	kg CO ₂ eq.	4.61E+1	1.06E+0	2.02E-1	4.73E+1	3.31E-1	1.45E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.16E-1	4.15E-1	4.41E-3	-2.83E+1
ODP	kg CFC 11 eq.	1.39E-6	1.87E-7	1.28E-8	1.59E-6	5.88E-8	5.17E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.06E-8	4.92E-8	1.46E-9	-3.78E-7
POCP	kg ethene eq.	2.08E-2	6.37E-4	8.00E-5	2.15E-2	2.00E-4	6.67E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.99E-5	3.26E-4	4.67E-6	-1.42E-2
AP	kg SO ₂ eq.	1.06E-1	4.64E-3	5.96E-4	1.12E-1	1.46E-3	3.54E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.10E-4	3.59E-3	3.26E-5	-5.74E-2
EP	Kg PO43- eq.	1.67E-2	9.12E-4	1.18E-4	1.77E-2	2.86E-4	5.68E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.00E-4	7.70E-4	6.13E-6	-6.91E-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

5 Results

NATIONAL ANNEX NMD

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
ADPF	kg Sb eq.	2.65E-1	7.76E-3	1.27E-3	2.74E-1	2.44E-3	8.44E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.52E-4	2.71E-3	6.00E-5	-1.54E-1
HTP	kg 1,4 DB eq.	8.75E+0	4.44E-1	5.81E-2	9.25E+0	1.39E-1	2.96E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.88E-2	3.97E-1	1.80E-3	-3.95E+0
FAETP	kg 1,4 DB eq.	1.29E-1	1.30E-2	1.17E-3	1.43E-1	4.07E-3	4.64E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.42E-3	5.55E-3	4.47E-5	-3.30E-2
MAETP	kg 1,4 DB eq.	4.36E+2	4.67E+1	4.24E+0	4.87E+2	1.46E+1	1.62E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.13E+0	3.34E+1	1.54E-1	-9.97E+1
TETP	kg 1,4 DB eq.	4.40E-2	1.57E-3	3.79E-3	4.94E-2	4.93E-4	1.44E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.73E-4	1.29E-3	5.32E-6	3.42E-1

ADPF=Depletion of abiotic resources-fossil fuels | HTP=Human toxicity | FAETP=Ecotoxicity, fresh water | MAETP=Ecotoxicity, marine water | TETP=Ecotoxicity, terrestrial

5 Results

5.3 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER (FIXED PART)

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
PERE	MJ	4.53E+0	5.72E-3	2.26E+0	6.80E+0	2.10E-3	2.90E-1	0.00E+0	0.00E+0	0.00E+0	6.35E-3	6.29E-4	2.39E-2	9.15E-5	-1.04E+0
PERM	MJ	0.00E+0	0.00E+0	1.08E+0	1.08E+0	0.00E+0	3.23E-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	4.53E+0	5.72E-3	3.34E+0	7.88E+0	2.10E-3	3.22E-1	0.00E+0	0.00E+0	0.00E+0	6.35E-3	6.29E-4	2.39E-2	9.15E-5	-1.04E+0
PENRE	MJ	5.85E+1	4.85E-1	1.37E+0	6.03E+1	1.78E-1	4.63E+0	0.00E+0	0.00E+0	0.00E+0	1.25E+0	5.33E-2	1.74E-1	3.82E-3	-5.52E-1
PENRM	MJ	0.00E+0	0.00E+0	4.00E-2	4.00E-2	0.00E+0	1.20E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ	5.85E+1	4.85E-1	1.41E+0	6.04E+1	1.78E-1	4.63E+0	0.00E+0	0.00E+0	0.00E+0	1.25E+0	5.33E-2	1.74E-1	3.82E-3	-5.52E-1
SM	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	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	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	0.00E+0
FW	m ³	6.60E-2	5.57E-5	1.36E-3	6.74E-2	2.04E-5	3.86E-3	0.00E+0	0.00E+0	0.00E+0	6.04E-5	6.12E-6	5.18E-5	3.85E-6	-2.48E-4

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

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
HWD	Kg	1.55E-3	1.16E-6	2.33E-5	1.58E-3	4.24E-7	7.78E-5	0.00E+0	0.00E+0	0.00E+0	3.20E-6	1.27E-7	1.97E-7	2.54E-9	-7.91E-6
NHWD	Kg	2.59E-1	2.90E-2	1.24E-2	3.00E-1	1.06E-2	5.32E-2	0.00E+0	0.00E+0	0.00E+0	1.39E-3	3.19E-3	4.75E-3	2.35E-2	-8.19E-3
RWD	Kg	1.20E-4	3.00E-6	6.10E-6	1.29E-4	1.10E-6	1.60E-5	0.00E+0	0.00E+0	0.00E+0	8.15E-6	3.30E-7	9.42E-7	2.34E-8	3.72E-8

HWD=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed

5 Results

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1- 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	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	4.47E-3	4.47E-3	0.00E+0	6.25E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.47E-1	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	0.00E+0
EE	MJ	0.00E+0	0.00E+0	-1.69E-1	-1.69E-1	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	-4.83E-1
EET	MJ	0.00E+0	0.00E+0	-1.07E-1	-1.07E-1	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	-3.06E-1
EEE	MJ	0.00E+0	0.00E+0	-6.21E-2	-6.21E-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	0.00E+0	-1.78E-1

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

5.4 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER (SCALABLE PART)

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1- A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
PERE	MJ	1.96E+1	2.01E-1	2.06E-1	2.00E+1	6.31E-2	6.27E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.21E-2	8.38E-1	3.21E-3	0.00E+0
PERM	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	0.00E+0
PERT	MJ	1.96E+1	2.01E-1	2.06E-1	2.00E+1	6.31E-2	6.27E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.21E-2	8.38E-1	3.21E-3	0.00E+0
PENRE	MJ	4.56E+2	1.70E+1	4.81E+0	4.78E+2	5.35E+0	1.47E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.87E+0	6.10E+0	1.34E-1	0.00E+0
PENRM	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	0.00E+0
PENRT	MJ	4.56E+2	1.70E+1	4.81E+0	4.78E+2	5.35E+0	1.47E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.87E+0	6.10E+0	1.34E-1	0.00E+0
SM	Kg	1.07E+0	0.00E+0	1.07E-2	1.08E+0	0.00E+0	3.25E-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

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

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
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	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	0.00E+0
FW	m ³	3.17E-1	1.96E-3	3.21E-3	3.22E-1	6.14E-4	9.75E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.15E-4	1.82E-3	1.35E-4	0.00E+0

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

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
HWD	Kg	1.85E-3	4.07E-5	1.90E-5	1.91E-3	1.28E-5	5.80E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.47E-6	6.93E-6	8.91E-8	0.00E+0
NHWD	Kg	4.00E+0	1.02E+0	6.12E-2	5.08E+0	3.20E-1	1.95E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.12E-1	1.67E-1	8.25E-1	0.00E+0
RWD	Kg	8.81E-4	1.05E-4	1.03E-5	9.97E-4	3.31E-5	3.23E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.16E-5	3.31E-5	8.22E-7	0.00E+0

HWD=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-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	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	1.57E-1	1.57E-1	0.00E+0	4.75E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.57E+1	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	0.00E+0
EE	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	0.00E+0
EET	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	0.00E+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

Abbr.	Unit	A1	A2	A3	A1- A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
EEE	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	0.00E+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

5.5 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	0.035	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of carbon dioxide uptake is taken into account. Related uptake and release of carbon dioxide in downstream processes are not taken into account in this number although they do appear in the presented results. One kilogram of biogenic Carbon content is equivalent to 44/12 kg of biogenic carbon dioxide uptake.

Uptake Biogenic Carbon dioxide	Amount	Unit
Packaging	0.1283	kg CO2 (biogenic)

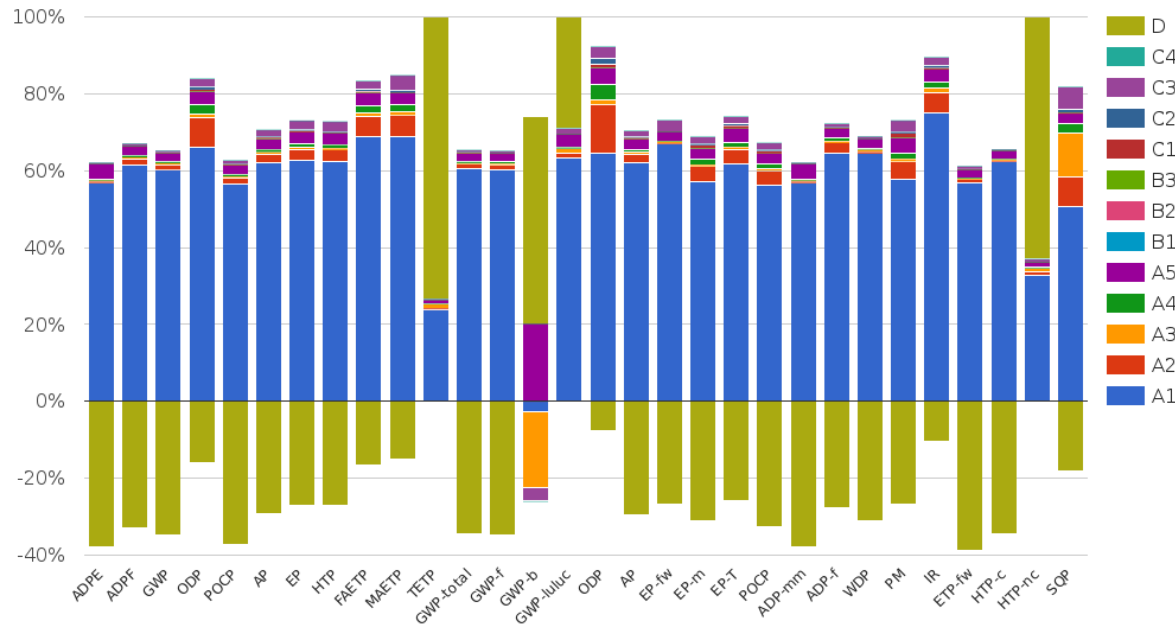
5 Results

5.6 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 2010	Share in total (%)
A1 Raw Materials Supply	€ 4.27	167,8 %
A2 Transport	€ 0.13	5,1 %
A3 Manufacturing	€ 0.03	1,2 %
A4 Transport from the gate to the site	€ 0.04	1,6 %
A5 Construction - Installation process	€ 0.17	6,6 %
B1 Use	€ 0.00	0,0 %
B2 Maintenance	€ 0.00	0,0 %
B3 Repair	€ 0.00	0,0 %
C1 De-construction / demolition	€ 0.01	0,4 %
C2 Transport	€ 0.01	0,6 %
C3 Waste processing	€ 0.08	3,3 %
C4 Disposal	€ 0.00	0,0 %
D Benefits and loads beyond the product system boundary	€ -2.21	-86,7 %
ECI NL 2010 per functional unit	€ 2.54	

6 Interpretation of results



When analyzing the contribution of each separate environmental effect, two phases stand out due to their considerable impact on all environmental effects. These two phases are phase A1 and Module D. The significant impacts in these phases are logical since the majority of the inputs consist of metals, with steel being by far the largest input. It is known that metals, including steel, typically have high impacts in phase A1.

In Module D, part of these impacts is mitigated through the recycling of materials, which explains the negative value in Module D for the majority of the environmental effects. However, there are exceptions, such as the environmental effects TETP and human toxicity effects, where positive values exist in Module D. These positive values are caused by the default waste recycling scenario of the NMD for steel products. In this default scenario, there are negative values for some environmental effects, mainly toxicity, which when used as a benefit result in a positive value (burden).

7 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

EN 10346

EN 10346 -2015/10:Continuously hot-dip coated steel flat products for cold forming – technical delivery conditions

NEN-EN 16757

NEN-EN 16757 2022/10: Sustainability of construction works - Environmental product declarations – Product Category Rules for concrete and concrete elements

SBR-publicatie 624: Levensduur van bouwproducten - Methode voor referentie waarden

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

8 Contact information

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