Environmental Product Declaration

ComFlor 75, ComFlor 95 and ComFlor 210+; ZM 140 with Colorcoat (ei 3.9.1)

Dutch Engineering raadgevend ingenieursbureau B.V.

Publisher:	Dutch Engineering raadgevend ingenieursbureau B.V.
Programme operator:	Stichting NMD
Calculation number:	ReTHiNK-130017
Generation on:	17-12-2025
Issue date:	17-12-2025
Valid until:	17-12-2030
Status:	verified

R<THiNK

1 General information

1.1 PRODUCT

ComFlor 75, ComFlor 95 and ComFlor 210+; ZM 140 with Colorcoat (ei 3.9.1)

1.2 VALIDITY

Issue date: 17-12-2025
Valid until: 17-12-2030

1.3 OWNER OF THE DECLARATION

Declaration owner: 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 (ei3.9.1)

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+A2:2019 serves as the core PCR.

☐ Internal ☒ External

Pien van den Heuvel , So. Sustainability

1.5 PRODUCT CATEGORY RULES

EN15804+A2:2019

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+A2:2019. 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+A2:2019 and ISO 14025.

1.7 CALCULATION BASIS

LCA method R<THINK: NMD Determination method v 1.2 | Set 2
LCA software*: Simapro 9.6
Characterization method: RETHINK characterization method (see references for more details)

1 General information

LCA database profiles: ecoinvent (for version see references)

Version database: v3.20b (2025-11-18)

** 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 75, ComFlor 95 and ComFlor 210+; ZM 140 with Colorcoat (ei 3.9.1)' with the calculation identifier ReTHiNK-130017.

2 Product

2.1 PRODUCT DESCRIPTION

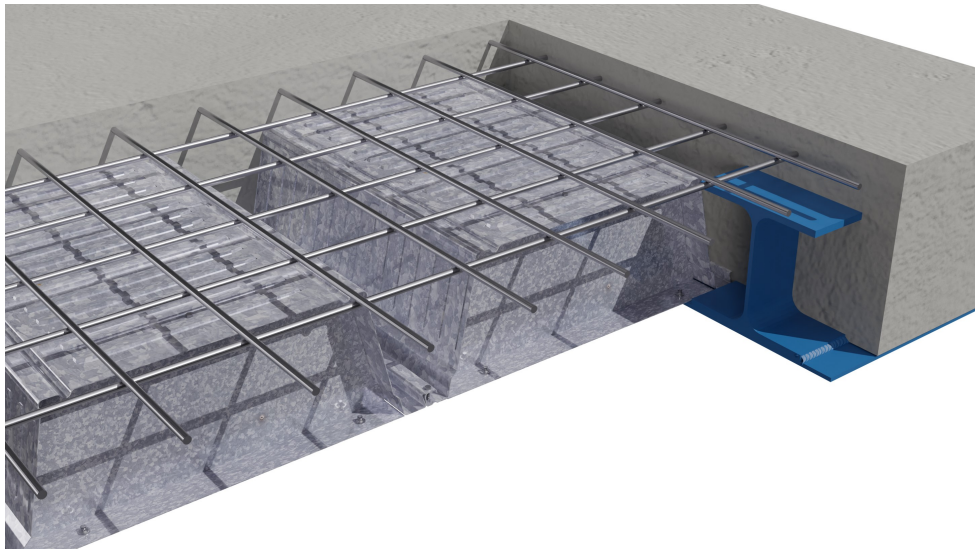
The ComFlor floor system consists of profiled steel decking that, together with an in-situ reinforced concrete topping, forms a composite floor slab. The steel decking acts as permanent formwork for the concrete and provides tensile resistance through the shear bond between the deck and concrete. Once the concrete has cured, the two materials act together as a composite element.

This EPD covers the ComFlor 75, ComFlor 95, and ComFlor 210+ profiled steel decks, all roll-formed from steel coils of grade S350GD+Z, galvanized with a zinc–aluminium–magnesium alloy (93.5% zinc, 3% aluminium, 3% magnesium) with a single-sided Colorcoat finish, supplied by Tata Steel IJmuiden. Only the steel decking is included in the scope; the concrete topping and reinforcement bars (rebars) are excluded. End diaphragms for the different floor systems are provided in a separate EPD. The EPD also covers crane handling, and all required fasteners for the construction phase.

The mass of the steel decking is scalable. For calculation purposes, a reference mass of **10 kg/m²** is used, enabling proportional scaling to different thicknesses. The following thickness and mass options are available:

- **ComFlor 75**:
  - 0.9 mm (10.3 kg/m²)
  - 1.0 mm (11.4 kg/m²)
  - 1.2 mm (13.6 kg/m²)
- **ComFlor 95**:
  - 0.9 mm (12.0 kg/m²)
  - 1.0 mm (13.3 kg/m²)
  - 1.2 mm (16.0 kg/m²)
- **ComFlor 210+**:
  - 1.0 mm (13.3 kg/m²)
  - 1.25 mm (16.6 kg/m²)
  - 1.5 mm (19.9 kg/m²)

For this EPD, the declared unit is 1 m² of profiled steel decking, based on a ComFlor profiled sheet with a reference mass of 10 kg/m².



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 varies from 0.9 up to 1.5 mm ComFlor type dependent
- Steel coil width ComFlor 75 875mm ; ComFlor 95 960 mm; ComFlor 210+ 1017 mm
- Steel grade S350GD+Z according to EN 10346 with minimum yield strength of 350 N/mm2

2 Product

- Profiled steel decking is galvanized with a zinc–aluminium–magnesium alloy of 140 gr/m2 (ZM140) with a single-sided Colorcoat finish
- Normalized reference mass per square meter: 10 kg/m2. Mass scalable per ComFlor type and thickness
- 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.

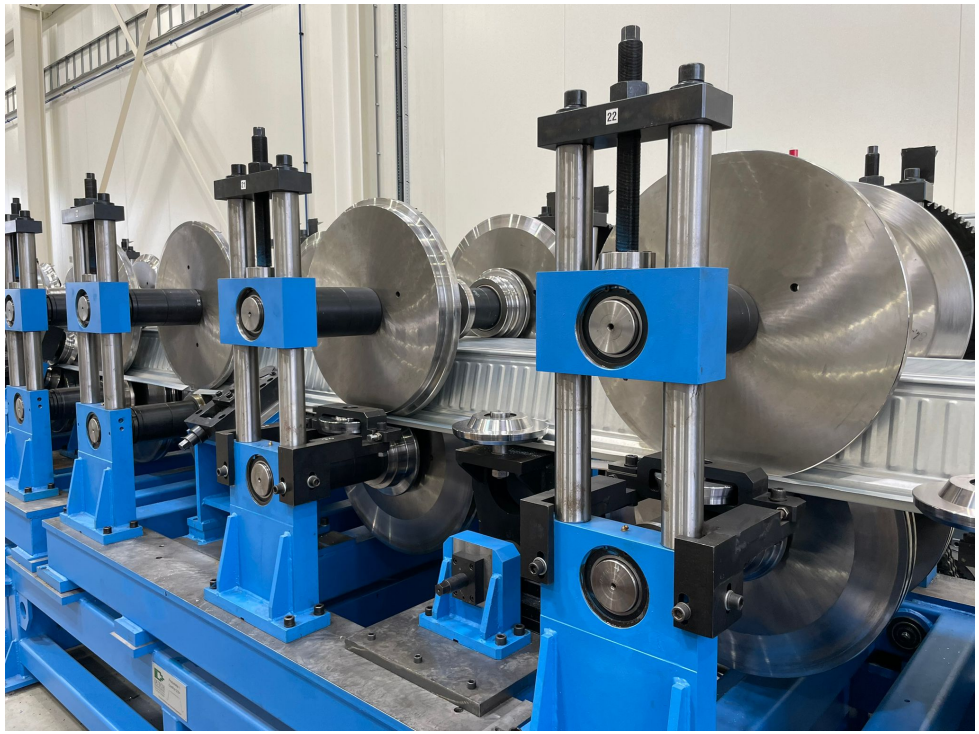
2.5 DESCRIPTION PRODUCTION PROCESS

The raw material, selected galvanized 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.

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.



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.

This EPD includes the crane handling and all the required fasteners. End diaphragms for the different floor systems are provided in a separate EPDs.

3 Calculation rules

3.1 FUNCTIONAL UNIT

1 m2 ComFlor 75, ComFlor 95 or ComFlor 210+

The ComFlor floor system consists of profiled steel decking which, together with an in-situ reinforced concrete topping, forms a composite floor slab. The steel decking serves as permanent formwork for the concrete and provides tensile resistance through the shear bond between the deck and the concrete. This EPD covers three profiled steel decking types: ComFlor 75, ComFlor 95, and ComFlor 210+. The decking is roll-formed from steel coils of material grade S350GD+Z, galvanized with a zinc–aluminium–magnesium alloy (93.5% zinc, 3% aluminium, and 3% magnesium) with a single-sided Colorcoat finish, supplied by Tata Steel IJmuiden. The scope only includes the steel decking; the concrete and reinforcement bars (rebars) are excluded. End diaphragms for the different floors are provided in an separate EPD. The EPD does, however, cover crane handling, and all required fasteners during the construction phase. Under normal conditions, the steel decking is not expected to be replaced during the building's service life. The mass per square meter of the decking is scalable and is normalised to a reference mass of 10 kg/m² for ease of calculation. The following options are available for the different ComFlor types:

- ComFlor 75: thickness 0.9 mm (10.3 kg/m²), 1.0 mm (11.4 kg/m²), 1.2 mm (13.7 kg/m²)
- ComFlor 95: thickness 0.9 mm (11.3 kg/m²), 1.0 mm (12.5 kg/m²), 1.2 mm (15.1 kg/m²)
- ComFlor 210+: thickness 1.0 mm (13.3 kg/m²), 1.25 mm (16.6 kg/m²), 1.5 mm (19.9 kg/m²)

Reference unit: square meter (m2)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	m2
Weight per reference unit	10.346	kg
Conversion factor to 1 kg	0.096660	m2

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 EN 15804 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 75, ComFlor 95 and ComFlor 210+; ZM 140 with Colorcoat (ei 3.9.1), 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 operated solely as a trading company. During this period, they sold the rolled sheet profiles ComFlor 75, 95, and 210, which were sourced from TATA UK. In 2022–2023, they developed an improved profile with enhanced performance, the ComFlor 210+. To support this, they established their own production facility to roll sheet coils into the ComFlor 75, 95, and 210+ profiled steel decks. In 2024, they began delivering the first profiles produced on this new production line. From 2024 onwards, the ComFlor 210 was fully replaced by the ComFlor 210+.

Extensive sales data is available for ComFlor 75, 95, and 210 prior to in-house production, and two years of production data are available since the facility became operational. A combination of recent sales data and pre-production sales records from 2020 to 2022 has therefore been used as the basis for determining average raw material use, production waste, and energy consumption. The energy consumption of the roll-forming line has been conservatively estimated based on the design speed, rated capacity, 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 m^2. 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 m^2 meter is 0.33 kWh.

3.9 DATA QUALITY

Data on raw materials, energy use, and production waste are derived from a combination of historical sales records of ComFlor 75, 95, and 210+ from 2020–2022, and two years of operational data since the start of in-house production in 2024. Energy consumption for the roll-forming line has been conservatively estimated based on the design speed, rated capacity, and power requirements of the new machinery. Background data is sourced from relevant EPDs and EcoInvent 3.6. Foreground data is less than 5 years old, and background data is less than 10 years old. Overall, the data quality is considered good.

3 Calculation rules

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

Parameter	Value
Scaling type	Linear
Description dimension	mass per square meter
Dimension	10.000
Scalable dimension	10.000
Unit dimension	kg/m2

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	(ei3.9.1) 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		
(ei3.9.1) Diesel, burned in machine (incl. emissions)	0.026	l

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	0.078	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)

For maintenance no input or output flows are modelled.

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
(ei3.9.1) 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	(ei3.6) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	50
(ei3.9.1) Zinc / zinc coating galvanised steel (i.a. profiles, sheets, zinc coating) (NMD ID 75)	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	50
(ei3.9.1) Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	50
(ei3.9.1) steel, fasteners (NMD ID 69)	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	50
Organic coating coil | Steel federation NL	(ei3.6) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	50

4 Scenarios and additional technical information

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	(ei3.6) 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

	Value and unit
Vehicle type used for transport	(ei3.9.1) 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
(ei3.9.1) Zinc / zinc coating galvanised steel (i.a. profiles, sheets, zinc coating) (NMD ID 75)	NL	0	5	0	95	0
(ei3.9.1) Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	NL	0	5	0	95	0
(ei3.9.1) steel, fasteners (NMD ID 69)	NL	0	1	0	99	0
Organic coating coil | Steel federation NL	NL	0	5	0	95	0

4 Scenarios and additional technical information

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	0.500	0.000	9.500	0.000
(ei3.9.1) Zinc / zinc coating galvanised steel (i.a. profiles, sheets, zinc coating) (NMD ID 75)	0.000	0.012	0.000	0.221	0.000
(ei3.9.1) Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	0.000	0.002	0.000	0.036	0.000
(ei3.9.1) steel, fasteners (NMD ID 69)	0.000	0.000	0.000	0.007	0.000
Organic coating coil | Steel federation NL	0.000	0.003	0.000	0.064	0.000
Total	**0.000**	**0.517**	**0.000**	**9.829**	**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	8.850	0.000
(ei3.9.1) Zinc / zinc coating galvanised steel (i.a. profiles, sheets, zinc coating) (NMD ID 75)	0.221	0.000
(ei3.9.1) Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	0.029	0.000
(ei3.9.1) steel, fasteners (NMD ID 69)	0.006	0.000
Organic coating coil | Steel federation NL	0.064	0.000
Total	**9.170**	**0.000**

5 Results

For the impact assessment long-term emissions (>100 years) are not considered. 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 EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	3.13E+0	1.53E-2	-7.89E-3	3.14E+0	9.47E-3	3.30E-1	0.00E+0	0.00E+0	0.00E+0	9.24E-2	2.65E-3	1.52E-1	1.63E-4	-6.38E-1
GWP-f	kg CO_2 eq.	3.11E+0	1.53E-2	1.20E-1	3.24E+0	9.44E-3	2.01E-1	0.00E+0	0.00E+0	0.00E+0	9.24E-2	2.64E-3	1.52E-1	1.63E-4	-6.31E-1
GWP-b	kg CO_2 eq.	5.39E-4	4.98E-6	-1.28E-1	-1.28E-1	3.07E-6	1.29E-1	0.00E+0	0.00E+0	0.00E+0	1.28E-5	8.98E-7	4.20E-5	-2.63E-8	-4.72E-3
GWP-luluc	kg CO_2 eq.	2.10E-2	5.45E-5	4.51E-4	2.15E-2	3.36E-5	6.65E-4	0.00E+0	0.00E+0	0.00E+0	1.04E-5	7.89E-6	4.24E-6	4.31E-8	-2.23E-3
ODP	kg CFC 11 eq.	2.11E-7	2.72E-10	5.27E-9	2.16E-7	1.68E-10	8.22E-9	0.00E+0	0.00E+0	0.00E+0	1.47E-9	1.44E-10	1.71E-9	1.17E-11	-1.12E-8
AP	mol H+ eq.	2.05E-2	7.32E-5	6.89E-4	2.13E-2	4.52E-5	1.53E-3	0.00E+0	0.00E+0	0.00E+0	8.56E-4	1.31E-5	5.58E-5	1.12E-6	-5.95E-3
EP-fw	kg P eq.	4.40E-4	1.52E-7	1.00E-5	4.50E-4	9.39E-8	1.39E-5	0.00E+0	0.00E+0	0.00E+0	3.34E-7	2.64E-8	2.42E-7	1.55E-9	-5.87E-5
EP-m	kg N eq.	3.09E-3	2.78E-5	1.21E-4	3.24E-3	1.72E-5	5.09E-4	0.00E+0	0.00E+0	0.00E+0	3.96E-4	4.92E-6	1.71E-5	4.53E-7	-1.37E-3
EP-T	mol N eq.	4.23E-2	2.97E-4	1.33E-3	4.40E-2	1.83E-4	5.80E-3	0.00E+0	0.00E+0	0.00E+0	4.31E-3	5.28E-5	1.89E-4	4.92E-6	-1.56E-2
POCP	kg NMVOC eq.	1.19E-2	1.01E-4	5.16E-4	1.25E-2	6.25E-5	1.70E-3	0.00E+0	0.00E+0	0.00E+0	1.28E-3	1.74E-5	5.01E-5	1.78E-6	-4.29E-3
ADP-mm	kg Sb-eq.	1.54E-3	4.79E-8	1.52E-5	1.56E-3	2.96E-8	4.69E-5	0.00E+0	0.00E+0	0.00E+0	3.22E-8	1.89E-8	1.81E-8	3.72E-10	-3.43E-4
ADP-f	MJ	4.04E+1	2.19E-1	1.60E+0	4.22E+1	1.35E-1	2.53E+0	0.00E+0	0.00E+0	0.00E+0	1.21E+0	3.82E-2	9.99E-2	3.82E-3	-9.37E+0
WDP	m3 world eq.	6.27E-1	1.20E-3	4.76E-2	6.76E-1	7.38E-4	2.55E-2	0.00E+0	0.00E+0	0.00E+0	2.61E-3	1.95E-4	6.09E-2	3.94E-5	-6.73E-1

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 stratosperic ozon 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 mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
PM	disease incidence	2.84E-7	1.51E-9	1.18E-8	2.98E-7	9.32E-10	3.32E-8	0.00E+0	0.00E+0	0.00E+0	2.39E-8	2.57E-10	4.53E-10	2.62E-11	-3.23E-8
IR	kBq U235 eq.	7.25E-2	8.54E-5	2.82E-3	7.54E-2	5.27E-5	2.58E-3	0.00E+0	0.00E+0	0.00E+0	2.47E-4	4.23E-5	3.77E-4	6.83E-6	-6.20E-2
ETP-fw	CTUe	1.60E+2	1.62E-1	1.53E+0	1.62E+2	9.97E-2	5.59E+0	0.00E+0	0.00E+0	0.00E+0	5.78E-1	2.93E-2	1.84E+0	1.16E-1	-9.59E+1
HTP-c	CTUh	4.25E-9	8.10E-12	9.39E-11	4.35E-9	5.00E-12	1.86E-10	0.00E+0	0.00E+0	0.00E+0	2.83E-11	1.35E-12	1.51E-10	1.57E-13	-3.10E-9
HTP-nc	CTUh	2.21E-7	1.76E-10	4.22E-9	2.26E-7	1.09E-10	7.10E-9	0.00E+0	0.00E+0	0.00E+0	1.97E-10	3.19E-11	9.94E-10	1.15E-11	-9.77E-8
SQP	Pt	8.02E+0	1.73E-1	1.46E+1	2.28E+1	1.07E-1	8.00E-1	0.00E+0	0.00E+0	0.00E+0	8.15E-2	3.07E-2	5.51E-2	8.93E-3	-6.89E+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)

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
	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

5 Results

ILCD classification	Indicator	Disclaimer
	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.

5.2 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER (SCALABLE PART)

CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	2.87E+1	7.49E-2	1.21E-1	2.89E+1	2.24E-1	8.89E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.09E-2	2.43E-1	2.69E-3	-1.75E+1
GWP-f	kg CO_2 eq.	2.88E+1	7.47E-2	1.19E-1	2.89E+1	2.23E-1	8.90E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.09E-2	2.56E-1	2.73E-3	-1.78E+1
GWP-b	kg CO_2 eq.	-2.12E-2	2.43E-5	1.67E-3	-1.95E-2	7.25E-5	-1.03E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.86E-5	-1.30E-2	-3.54E-5	2.07E-1
GWP-luluc	kg CO_2 eq.	7.77E-3	2.66E-4	1.47E-4	8.18E-3	7.94E-4	2.77E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.60E-5	2.92E-4	1.20E-6	6.58E-3
ODP	kg CFC 11 eq.	5.53E-7	1.33E-9	5.39E-9	5.60E-7	3.96E-9	1.85E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.56E-8	3.47E-8	1.11E-9	-6.90E-8
AP	mol H+ eq.	9.03E-2	3.57E-4	4.72E-4	9.11E-2	1.07E-3	2.87E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.11E-4	2.73E-3	2.59E-5	-4.80E-2
EP-fw	kg P eq.	1.17E-3	7.43E-7	8.84E-6	1.18E-3	2.21E-6	3.79E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.15E-7	7.47E-5	4.88E-8	-3.76E-4
EP-m	kg N eq.	1.60E-2	1.36E-4	7.88E-5	1.62E-2	4.05E-4	5.23E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.45E-4	6.12E-4	8.55E-6	-9.26E-3
EP-T	mol N eq.	1.99E-1	1.45E-3	1.26E-3	2.02E-1	4.32E-3	6.48E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.60E-3	7.17E-3	9.42E-5	-8.57E-2
POCP		5.66E-2	4.95E-4	2.55E-4	5.73E-2	1.48E-3	1.85E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.56E-4	1.92E-3	2.74E-5	-3.50E-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 stratosperic ozon 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 mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication 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
	kg NMVOC eq.														
ADP-mm	kg Sb-eq.	8.26E-6	2.34E-7	1.93E-7	8.69E-6	6.97E-7	4.65E-7	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.80E-6	4.38E-6	3.05E-9	4.75E-6
ADP-f	MJ	2.30E+2	1.07E+0	1.30E+0	2.32E+2	3.19E+0	7.24E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.07E+0	3.47E+0	7.62E-2	-1.09E+2
WDP	m3 world eq.	4.13E+0	5.84E-3	2.12E-2	4.16E+0	1.74E-2	1.27E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.82E-3	4.04E-2	3.53E-3	-2.13E+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 stratosperic ozon 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 mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
PM	disease incidence	6.21E-7	7.37E-9	3.70E-9	6.32E-7	2.20E-8	2.10E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.37E-9	3.58E-8	4.90E-10	-3.10E-7
IR	kBq U235 eq.	5.04E-1	4.17E-4	4.52E-3	5.09E-1	1.24E-3	1.59E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.48E-3	1.57E-2	3.12E-4	-7.53E-2
ETP-fw	CTUe	3.97E+2	7.89E-1	1.28E+0	3.99E+2	2.35E+0	1.24E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.53E-1	8.19E+0	4.25E-2	-2.88E+2
HTP-c	CTUh	6.32E-8	3.95E-11	2.87E-10	6.35E-8	1.18E-10	1.93E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.09E-11	2.54E-10	1.07E-12	-3.58E-8
HTP-nc	CTUh	1.83E-7	8.59E-10	1.10E-8	1.95E-7	2.56E-9	6.01E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.04E-9	1.10E-8	3.39E-11	9.30E-7
SQP	Pt	5.10E+1	8.44E-1	4.38E-1	5.22E+1	2.52E+0	1.87E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.27E-1	6.47E+0	1.61E-1	-1.61E+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)

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
	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

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	3.11E+0	3.10E-3	3.42E+0	6.53E+0	1.91E-3	2.04E-1	0.00E+0	0.00E+0	0.00E+0	6.88E-3	5.29E-4	0.00E+0	2.33E-4	-1.90E+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	3.11E+0	3.10E-3	4.49E+0	7.61E+0	1.91E-3	2.37E-1	0.00E+0	0.00E+0	0.00E+0	6.88E-3	5.29E-4	0.00E+0	2.33E-4	-1.90E+0
PENRE	MJ	4.41E+1	2.19E-1	1.60E+0	4.59E+1	1.35E-1	2.64E+0	0.00E+0	0.00E+0	0.00E+0	1.21E+0	3.87E-2	0.00E+0	3.86E-3	-9.36E+0
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	4.41E+1	2.19E-1	1.64E+0	4.59E+1	1.35E-1	2.64E+0	0.00E+0	0.00E+0	0.00E+0	1.21E+0	3.87E-2	0.00E+0	3.86E-3	-9.36E+0
SM	Kg	1.04E-2	0.00E+0	1.04E-4	1.05E-2	0.00E+0	3.15E-4	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	4.08E-2	5.29E-5	1.90E-3	4.28E-2	3.27E-5	1.43E-3	0.00E+0	0.00E+0	0.00E+0	9.50E-5	8.37E-6	0.00E+0	4.69E-6	-1.99E-2

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	7.60E-4	1.40E-6	1.14E-2	1.22E-2	8.62E-7	3.74E-4	0.00E+0	0.00E+0	0.00E+0	8.14E-6	2.16E-7	0.00E+0	1.57E-8	-2.09E-3
NHWD	Kg	2.29E-1	1.45E-2	1.51E-2	2.59E-1	8.93E-3	8.92E-2	0.00E+0	0.00E+0	0.00E+0	1.73E-3	2.51E-3	0.00E+0	1.70E-2	-8.21E-2
RWD	Kg	7.52E-5	5.01E-8	2.29E-6	7.76E-5	3.09E-8	2.50E-6	0.00E+0	0.00E+0	0.00E+0	1.33E-7	5.45E-8	0.00E+0	5.95E-9	-3.77E-5

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	2.64E-3	2.64E-3	0.00E+0	1.20E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.64E-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
EET	MJ	0.00E+0	0.00E+0	1.52E-1	1.52E-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	3.07E-1
EEE	MJ	0.00E+0	0.00E+0	8.85E-2	8.85E-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 | **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	1.19E+1	1.51E-2	1.24E-1	1.20E+1	4.51E-2	3.77E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.34E-2	5.08E-1	1.95E-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	1.19E+1	1.51E-2	1.24E-1	1.20E+1	4.51E-2	3.77E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.34E-2	5.08E-1	1.95E-3	0.00E+0
PENRE	MJ	2.76E+2	1.07E+0	2.82E+0	2.80E+2	3.19E+0	8.66E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.13E+0	3.70E+0	8.12E-2	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	2.76E+2	1.07E+0	2.82E+0	2.80E+2	3.19E+0	8.66E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.13E+0	3.70E+0	8.12E-2	0.00E+0
SM	Kg	6.50E-1	0.00E+0	6.50E-3	6.56E-1	0.00E+0	1.97E-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	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

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
FW	m³	1.92E-1	2.58E-4	1.94E-3	1.94E-1	7.71E-4	5.89E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.30E-4	1.10E-3	8.18E-5	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	1.12E-3	6.82E-6	1.13E-5	1.14E-3	2.03E-5	3.50E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.71E-6	4.20E-6	5.38E-8	0.00E+0
NHWD	Kg	2.42E+0	7.07E-2	3.16E-2	2.53E+0	2.11E-1	1.02E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.78E-2	1.01E-1	5.00E-1	0.00E+0
RWD	Kg	5.34E-4	2.45E-7	5.62E-6	5.40E-4	7.30E-7	1.70E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.02E-6	2.00E-5	4.98E-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	9.50E-2	9.50E-2	0.00E+0	2.88E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.50E+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	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
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 | **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)

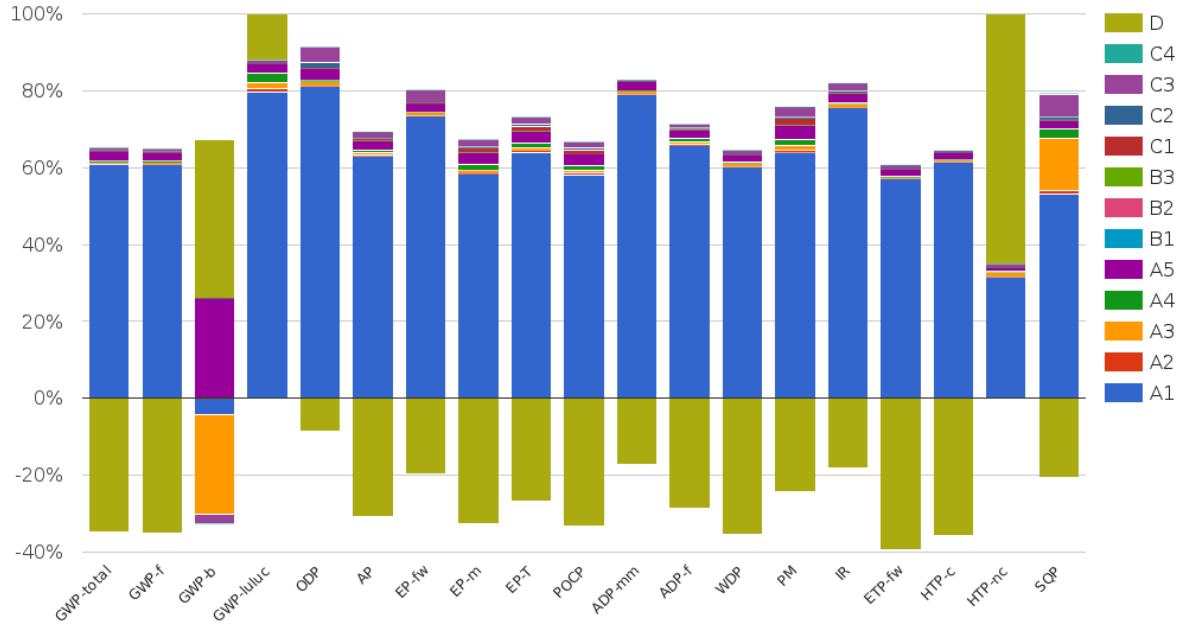
5 Results

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 2024	Share in total (%)
A1 Raw Materials Supply	€ 4.83	173,9 %
A2 Transport	€ 0.02	0,7 %
A3 Manufacturing	€ 0.03	1,1 %
A4 Transport from the gate to the site	€ 0.05	1,7 %
A5 Construction - Installation process	€ 0.20	7,1 %
B1 Use	€ 0.00	0,0 %
B2 Maintenance	€ 0.00	0,0 %
B3 Repair	€ 0.00	0,0 %
C1 De-construction / demolition	€ 0.03	1,1 %
C2 Transport	€ 0.02	0,5 %
C3 Waste processing	€ 0.08	2,9 %
C4 Disposal	€ 0.00	0,0 %
D Benefits and loads beyond the product system boundary	€ -2.47	-89,0 %
ECI NL 2024 per functional unit	**€ 2.78**	

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-verificatie protocol
Toetsingsprotocol versie 2.0 juli 2025

NMD Bepalingsmethode
Bepalingsmethode Milieuprestatie Bouwwerken, Berekeningswijze voor het bepalen van de milieuprestatie van bouwwerken gedurende hun gehele levensduur, gebaseerd op de EN 15804+A2, versie 1.2, January 2025

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