Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804

Galvanized and painted steel balcony with wood decking

Registration number:	EPD-Kiwa-EE-161562-EN
Issue date:	11-04-2024
Valid until:	11-04-2029
Declaration owner:	RT Metals
Publisher:	Kiwa-Ecobility Experts
Program operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

Galvanized and painted steel balcony with wood decking

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-161562-EN

1.3 VALIDITY

Issue date: 11-04-2024

Valid until: 11-04-2029

1.4 PROGRAM OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
DE

Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)

Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Manufacturer: RT Metals

Address: Laboratorijas iela 20-1, LV-3402 Liepāja, LV

E-mail: ah@rtmetals.lv

Website: www.rtmetals.lv

Production location: SIA LSEZ "RT metāls"

Address production location: Laboratorijas iela 20 - 1, LV-3402 Liepāja, LV

1.6 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

Lucas Pedro Berman, Senda

1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The programme operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

1.8 PRODUCT CATEGORY RULES

Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14);

PCR B – Product Category Rules for steel construction products, Requirements on the Environmental Product Declarations for steel construction products; version 2020-03-13 (draft).

1.9 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804. For the evaluation of the comparability, the following aspects have to be considered in particular:

1 General information

PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPDs programs may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

1.10 CALCULATION BASIS

LCA method R<THiNK: Ecobility Experts | EN15804+A2

LCA software*: Simapro 9.1

Characterization method: EN 15804 +A2 Method v1.0

LCA database profiles: EcoInvent version 3.6

Version database: v3.16 (2024-02-12)

** Used for calculating the characterized results of the Environmental profiles within R<THiNK.*

1.11 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'Galvanized and painted steel balcony with wood decking' with the calculation identifier ReTHiNK-61562.

2 Product

2.1 PRODUCT DESCRIPTION

· Company description

SIA LSEZ RT Metals was founded in 1999 and since then has grown to employ more than 130 people. The main areas of our activity include various elements of building load-bearing structures: columns, beams, bracings, trusses, welded profiles of complicated cross-section, as well as various auxiliary instalments, such as bridge elements, carports, balconies, terraces, etc.

· Product description

LSEZ SIA "RT Metāls" produces a complete pre-assembled balcony ready for installation. Balcony dimensions mainly varies from 1400-1800 mm in width and 2000-5000 mm in length, with steel frame height varying from 160 to 200 mm. All balconies are designed and customized to customer needs, including various drainage, decking or bottom plate and bracket designs.

Balcony steel parts are hot dip galvanized for high corrosion protection and painted (paint type and layer depends on customer's requirements) Calculated balcony decking material is an average result from three most used types - Wimex nordic deck, Thermory wood or Cumaru hardwood. Impact is an average result of all allocated deck types.

Balcony bottom cover plate design and material comes in various variations, from which three most popular variations are pre-galvanized and painted steel plate, Rockpanel cladding panel or "Swisspearl Group AG" (previously Cembrit) natural hardened fibre cement panel. Factory averaged data from 2022 is allocated and Impact is an average result of all allocated plate types.

Balconies are designed with in-built galvanized steel drain plates with fall, bolted to c-profiles, as well as EPDM shock absorbing tape. Balcony railings are not included in this EPD, however various types of railings are provided to customers with a separate EPD.

· Types of balcony top decking:

Cumaru is the common name for lumber produced from *Dipteryx odorata*, a heavy, hard wood with a yellow-to-brownish colour and high mechanical resistance. Cumaru occurs naturally throughout the Brazilian Amazon, as well as in northern countries of South America and in Central America.

Thermory timber boards with thermal modification treatment. No chemicals are used in the process or added to the products during thermal modification treatment. Dark colour and biological durability are achieved through prolonged presence of the products to elevated temperatures. Product manufacturing location is based in Estonia.

WPC (Wood Polymer Composite) is composite material made from polyethylene (PE/HDPE), mixed with a certain proportion of wood powder, and other additives. Due to the fact that the boards are sanded, they are more resistant to scratches and more like wooden boards, but without its disadvantages. The boards contain more than 50% chopped oak wood, which gives these boards higher strength.

Balconies are bundled with steel tape, PE foam, and transported on re-usable custom-built pallets from reusable wood. When possible, packaging wood is used multiple times or recycled. In addition HDPE cushioning material is used for better transportation. In addition, four PET lifting slings are provided for easier montage.

This EPD is an average EPD and covers an averaged 3000 x 1600 x 180 mm (4.8 m2) balcony. Variations include allocated three various types of wood decking (Wimex, Thermory, Cumaru) as well as allocated bottom plate variations (Zinc sheet, Rockpanel, Cembrit). The environmental performance of the products included varies of 17.54%. Averaged result is then recalculated data of 1m2 of balcony.

Declared product component table

Material	Weight kg/m2	% Unit
Steel materials	69.54 - 83.42	67.26 - 68.35%
Wood decking	17.73	14.29 - 17.43%
Bottom plates	8.40 - 15.70	8.26 - 12.66%
Zinc coating	2.91 - 3.75	2.86 - 3.02%
Spacers	2.13	1.72 - 2.09%
Paint	0.41 - 0.53	0.40 - 0.43%
Welding wire	0.29 - 0.37	0.29 - 0.30%
Primer	0.26 - 0.33	0.26 - 0.27%
EPDM	0.29	0.06 - 0.07%

2 Product

GWP calculation results of balcony variations

Variations	Height (mm)	kg/m2	GWP kgCO2/m2	Difference
Zinc	160	109.25	125.96	0%
	180	121.62	141.59	12.41%
	200	124.25	144.90	15.04%
Rockpanel	160	101.95	121.27	-3.72%
	180	114.32	136.92	8.70%
	200	116.95	140.28	11.37%
Cembrit	160	105.43	128.35	1.90%
	180	116.80	143.39	13.84%
	200	120.43	146.99	16.70%

Declared unit - averaged product - 1 m2 of steel balcony with wood decking

Lenght (mm)	Width (mm)	Height (mm)	kg/m2	GWP kgCO2/m2
3000	1600	180	114.56	135.68

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The product is prefabricated steel balcony with wooden deck for outside environment and altogether with various out of scope railings are intended to be used as part of commercial, residential or public building.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

The reference service life is set at 50 years. According to ISO 15686-1 (Building and construction asset service life planning) and set requirement by national legislation.

USED RSL (YR) IN THIS LCA CALCULATION:

50

2 Product

2.4 TECHNICAL DATA

Regulation (EU) No. 305/2011 is used to describe the declared performances. The harmonized standard for steel structures is EN 1090-1.

The main technical data and declared characteristics are developed in accordance with the relevant harmonized product standard. Performance data of the products in accordance with the Declaration of Performance.

The hot dip galvanized coating is applied according to the requirements of EN ISO 1461. The life of the coating varies depending on the exposure conditions and, for most situations, can be estimated using EN ISO 14713-1.

The LCA declaration covers the product groups based on the average operational data. The compositions are shown in the next section.

The product is manufactured according to EN 1090-2, EXC 3, and is CE- marked with reference service life is 50 years.

Technical Parameters:

- *Steel material: S235-S355 (according to EN 10025)*
- *Execution Class (EN 1090): Up to EXC 4*
- *Standard: EN 1090-2*
- *Dimensions:*
  Lenght: 2000-5000 mm;
  Width: 1400-1800 mm;
  Height: 160-200 mm.

2.5 SUBSTANCES OF VERY HIGH CONCERN

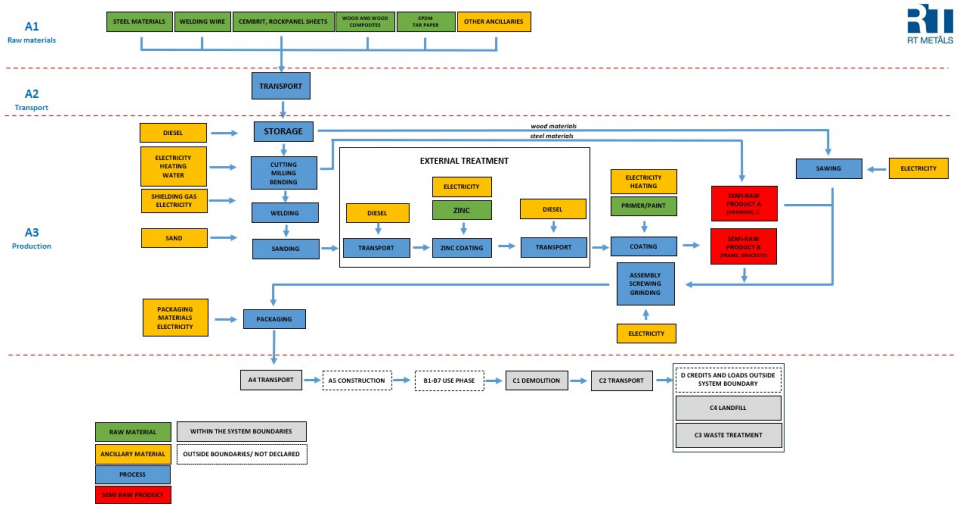
The product does not contain any substances listed in the “Candidate List of Substances” of Very High Concern (SHVC) for authorization" exceeding 0,1% of the weight of the product.

2.6 DESCRIPTION PRODUCTION PROCESS

The product for residential, commercial or public buildings are made according to the developed drawings. The manufacturing contains the following processes:

- Extraction and delivery of raw materials;
- Cutting;
- Assembling;
- Welding;
- Sand blasting and coating;
- Balcony decking assembly;
- Storage;
- Transportation (delivery of finished products).

Overview of the production route of galvanized and painted steel balcony with wood decking (A1-A4, C1-C4, D)



3 Calculation rules

3.1 DECLARED UNIT

1 m2 of steel balcony with wood decking

One square meter balcony produced by LSEZ SIA “RT Metāls”. An average of all variations has been calculated for a 3000 x 1600 mm (4.8 m2) balcony with a steel frame height of 160, 180 and 200 mm. An average of three most used Balcony decking material and Balcony bottom covers, as described in product description, are taken into account. Results are recalculated to 1 m2 average balcony. Balcony railings are not included.

reference_unit: square meter (m2)

3.2 CONVERSION FACTORS

Description	Value	Unit
reference_unit	1	m2
weight_per_reference_unit	114.175	kg
Conversion factor to 1 kg	0.008758	m2

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

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

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

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	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 LCA represents an average of three variation of wood decking (Wimex nordic deck, Thermory wood or Cumaru hardwood) and averaged bottom plate variations for an average size of 3000 x 1600 mm, 4.8 m2 balcony. Three different balconies with frame height of 160, 180 and 200 mm are most common, however various different balconies can be made by specific design. The data are representative for European Union. This EPD represents 2022 production allocation, including allocated deck and bottom plate types. The environmental performance difference between product variations is up to 17.54%.

3 Calculation rules

3.5 CUT-OFF CRITERIA

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. Additionally used materials are EPDM shock absorbing tape, tar paper, as well as various montage screws, that consists of relatively small amounts and are not included in calculations.

The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

Disclaimer: The manufacture of equipment used in production, buildings or any other capital goods, as well as other non-product related inputs, such as transport of personnel to the plant or within the plant, research, development activities and long term emissions was not taken into account.

Construction process stage (A4-A5)

Modules A4-A5 are not declared in this EPD. This stage would include road transport from manufacturing site in Liepaja, Latvia to the terminal located in Klaipeda, Lithuania, continued by maritime freight ship to Karlshamn, Denmark and further to various construction sited in Denmark by truck.

Product installation process is done by electric handtools or mobile crane depending on a specific construction site and building level.

Use stage (B1-B3)

This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied.

End of life stage (C1-C4)

C1 concerns the deconstruction of a steel structure and includes energy in the form of diesel fuel used by building machines.

The energy use for demolition is based on a general value provided in the IVL report NR U 5176 (Erlandsson & Petersson 2015). In this study a general value of 1.1 kWh/Ton for a steel construction and 2.0 kWh/Ton additional for crane use when the building is higher than 6 meters is given for the demolition of a steel frame, which equals 0.312 liter diesel/kg

At the End-of-life, C2 - C4 and D, it is assumed that recyclable materials (steel and wood) are separated after deconstruction. A waste scenarios according to the Dutch National Environmental Database (NMD) is applied: Steel, construction profiles, where 94% of steel material is recycled, 5% is reused and 1% landfilled; Wood 'clean', beams, planks, where 80% of wood is incinerated, 10 % recycled and rest of material re-used/landfilled.

All end-of-life products are assumed to be sent to the closest facilities (C2).

Benefits and Loads beyond the system boundary (Module 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.

Disclaimer: The scenarios included are currently in use and are representative for one of the most likely scenario alternatives 100% scenarios can be given

3.6 ALLOCATION

Since the production process for all LSEZ SIA "RT Metāls" balcony steel parts at the manufacturing site is quite similar, the energy consumption, ancillary materials, and production waste were appropriated according to the annual use of steel raw materials and then declared per 1 m2 of the product. The balcony assembly stage impact at manufacturing site is allocated per product and then calculated per 1 m2 of product. The total annual production data and semi-finished product production data is recorded to a high standard of accuracy and precision.

3.7 DATA COLLECTION & REFERENCE TIME PERIOD

All process-specific data was collected for the production year 2022. The quantities of raw and auxiliary materials, their suppliers and locations as well as energy consumption, have been recorded and averaged over the entire operating year of 2022.

3.8 ESTIMATES AND ASSUMPTIONS

An assumption of EURO4 lorry (>32 metric ton) was used for road transportation for all steel and wood materials due to their high volume and mass.

3 Calculation rules

The production waste is collected separately. As the product is marketed internationally, no country-specific waste scenario can be considered. Therefore, the waste scenarios of NMD (2022) were adopted.

3.9 DATA QUALITY

All installed raw materials of the product were analyzed, and the masses were determined following the allocation and cut-off requirements. In addition, only the production-related energy consumption (excluding the administration and social areas) is considered and the energy consumption was averaged over the annual production volume.

The data quality of the background data is considered good. All site-specific data is collected from the year 2022. Secondary data was taken from the available specific EPDs and Ecoinvent 3.6 database. The database is regularly checked and thus complies with the requirements of ISO 14040/44 (background data is not older than 10 years). The background data meets the requirements of EN 15804.

The assessment considers all available data from the production process, including all raw materials and auxiliary materials used as well as the energy consumption. For some materials previously published EPDs have been utilized.

The general rule has been followed that specific data from specific production processes or average data derived from specific processes must be given priority when calculating an EPD or Life Cycle Assessment. Data for processes that the manufacturer can not influence or choose, were backed up with generic data.

3.10 GUARANTEES OF ORIGIN

The electricity mix was chosen according to the Ecoinvent 3.6 energy grid mix in Latvia (reference year 2019). LCA is using “local based approach” therefore no guarantees of origin needs to be taken into account. No CO2 certificates were counted.

4 Scenarios and additional technical information

4.1 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)	0.024	l

4.2 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, construction profiles (NMD ID 70)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
finishes (adhered to wood, plastic, metal) (NMD ID 2)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Zinc / zinc coating galvanised steel (i.a. profiles, sheets, zinc coating) (NMD ID 75)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
wood 'clean', via residue (NMD ID 35) | (u=10%) corr. acc. EN16449	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
wood 'clean', beams, planks (NMD ID 34) | (u=10%) corr. acc. EN16449 - Benefit incineration for LV	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
wood 'contaminated', via residue (NMD ID 37) | (u=10%, glue=2%) corr. acc. EN16449	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
debris, mixed via residue (NMD ID 61)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
rock wool (insulation) (NMD ID 78)		0	100	150	50	0

4 Scenarios and additional technical information

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
	Lorry (Truck), unspecified (default) | market group for (GLO)					

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

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

4.3 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, construction profiles (NMD ID 70)	NL	0	1	0	94	5
finishes (adhered to wood, plastic, metal) (NMD ID 2)	NL	0	0	100	0	0
Zinc / zinc coating galvanised steel (i.a. profiles, sheets, zinc coating) (NMD ID 75)	NL	0	5	0	95	0
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	NL	0	10	85	5	0
wood 'clean', via residue (NMD ID 35) | (u=10%) corr. acc. EN16449	NL	0	10	85	5	0
wood 'clean', beams, planks (NMD ID 34) | (u=10%) corr. acc. EN16449 - Benefit incineration for LV	NL	0	5	80	10	5
wood 'contaminated', via residue (NMD ID 37) | (u=10%, glue=2%) corr. acc. EN16449	NL	0	10	90	0	0
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	NL	0	5	0	95	0

4 Scenarios and additional technical information

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
debris, mixed via residue (NMD ID 61)	NL	0	90	10	0	0
rock wool (insulation) (NMD ID 78)	NL	0	85	5	10	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
Steel, construction profiles (NMD ID 70)	0.000	0.642	0.000	60.370	3.211
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.000	0.807	0.000	0.000
Zinc / zinc coating galvanised steel (i.a. profiles, sheets, zinc coating) (NMD ID 75)	0.000	0.180	0.000	3.418	0.000
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.000	0.029	0.246	0.015	0.000
wood 'clean', via residue (NMD ID 35) | (u=10%) corr. acc. EN16449	0.000	0.213	1.810	0.106	0.000
wood 'clean', beams, planks (NMD ID 34) | (u=10%) corr. acc. EN16449 - Benefit incineration for LV	0.000	0.596	9.543	1.193	0.596
wood 'contaminated', via residue (NMD ID 37) | (u=10%, glue=2%) corr. acc. EN16449	0.000	0.580	5.221	0.000	0.000
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	0.000	1.014	0.000	19.264	0.000
debris, mixed via residue (NMD ID 61)	0.000	0.334	0.037	0.000	0.000
rock wool (insulation) (NMD ID 78)	0.000	4.036	0.237	0.475	0.000
Total	**0.000**	**7.624**	**17.903**	**84.841**	**3.808**

4.4 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, construction profiles (NMD ID 70)	31.300	0.000
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.277
Zinc / zinc coating galvanised steel (i.a. profiles, sheets, zinc coating) (NMD ID 75)	3.418	0.000
Total	**51.095**	**214.275**

4 Scenarios and additional technical information

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.015	10.469
wood 'clean', via residue (NMD ID 35) | (u=10%) corr. acc. EN16449	0.106	25.329
wood 'clean', beams, planks (NMD ID 34) | (u=10%) corr. acc. EN16449 - Benefit incineration for LV	1.789	133.507
wood 'contaminated', via residue (NMD ID 37) | (u=10%, glue=2%) corr. acc. EN16449	-1.740	44.693
Galvanised steel (i.a. profiles, sheets) (NMD ID 75)	15.733	0.000
debris, mixed via residue (NMD ID 61)	0.000	0.000
rock wool (insulation) (NMD ID 78)	0.475	0.000
Total	**51.095**	**214.275**

5 Results

For the impact assessment, the characterization factors of the LCIA method EN 15804 +A2 Method v1.0 are used. Long-term emissions (>100 years) are not considered in the impact assessment. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	C1	C2	C3	C4	D
AP	mol H+ eqv.	8.86E-1	9.23E-2	1.44E-1	8.33E-4	6.02E-3	5.79E-3	4.78E-4	-3.87E-1
GWP-total	kg CO2 eqv.	1.47E+2	1.10E+1	2.16E+1	7.97E-2	1.04E+0	3.37E+1	2.46E+0	-8.14E+1
GWP-b	kg CO2 eqv.	-2.67E+1	6.81E-3	-2.03E-2	2.22E-5	4.79E-4	3.08E+1	2.41E+0	9.00E-2
GWP-f	kg CO2 eqv.	1.74E+2	1.10E+1	2.16E+1	7.97E-2	1.04E+0	2.89E+0	5.74E-2	-8.14E+1
GWP-luluc	kg CO2 eqv.	2.09E-1	4.03E-3	5.14E-2	6.28E-6	3.80E-4	1.24E-4	1.86E-5	5.43E-3
EP-m	kg N eqv.	1.56E-1	2.76E-2	3.07E-2	3.68E-4	2.12E-3	2.61E-3	2.04E-4	-7.61E-2
EP-fw	kg P eqv.	6.97E-3	8.08E-5	6.93E-4	2.90E-7	1.05E-5	6.52E-6	8.68E-7	-3.61E-3
EP-T	mol N eqv.	2.15E+0	3.05E-1	3.78E-1	4.04E-3	2.34E-2	2.99E-2	1.81E-3	-8.95E-1
ODP	kg CFC 11 eqv.	9.23E-6	2.54E-6	2.50E-6	1.72E-8	2.29E-7	4.29E-8	1.95E-8	-3.55E-6
POCP	kg NMVOC eqv.	7.17E-1	8.61E-2	1.02E-1	1.11E-3	6.68E-3	7.80E-3	5.56E-4	-4.58E-1
ADP-f	MJ	1.96E+3	1.68E+2	3.31E+2	1.10E+0	1.57E+1	2.51E+0	1.39E+0	-6.20E+2
ADP-mm	kg Sb-eqv.	2.80E-1	1.76E-4	2.53E-4	1.22E-7	2.63E-5	2.01E-6	3.59E-7	-2.64E-1
WDP	m3 world eqv.	1.04E+2	5.19E-1	2.09E+1	1.47E-3	5.60E-2	1.00E-1	5.08E-2	-2.11E+1

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

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ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15084+A2

Abbreviation	Unit	A1	A2	A3	C1	C2	C3	C4	D
ETP-fw	CTUe	5.72E+3	1.31E+2	3.47E+2	6.61E-1	1.40E+1	1.37E+1	2.14E+0	-4.76E+3
PM	disease incidence	1.09E-5	9.27E-7	2.44E-6	2.21E-8	9.34E-8	4.64E-8	9.26E-9	-4.67E-6
HTP-c	CTUh	6.76E-7	3.75E-9	6.58E-8	2.31E-11	4.53E-10	2.63E-8	3.33E-11	-8.52E-8
HTP-nc	CTUh	9.15E-6	1.45E-7	1.92E-6	5.68E-10	1.53E-8	2.74E-8	1.80E-9	1.09E-5
IR	kBq U235 eqv.	4.30E+0	7.30E-1	1.30E+0	4.70E-3	6.56E-2	8.52E-3	5.89E-3	-2.48E-1
SQP	Pt	1.95E+3	1.74E+2	1.20E+3	1.40E-1	1.36E+1	8.55E-1	3.11E+0	-7.83E+2

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

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

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

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ILCD classification	Indicator	Disclaimer
	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 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	MJ	2.85E+2	2.04E+0	2.12E+2	5.93E-3	1.96E-1	1.66E-1	3.36E-2	-1.30E+2
PERM	MJ	2.32E+2	0.00E+0	9.99E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	5.18E+2	2.04E+0	3.12E+2	5.93E-3	1.96E-1	1.66E-1	3.36E-2	-1.30E+2
PENRE	MJ	2.03E+3	1.78E+2	3.24E+2	1.16E+0	1.66E+1	2.69E+0	1.48E+0	-7.23E+2
PENRM	MJ	2.73E+1	0.00E+0	2.64E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.35E+1
PENRT	MJ	2.06E+3	1.78E+2	3.50E+2	1.16E+0	1.66E+1	2.69E+0	1.48E+0	-6.50E+2
SM	Kg	3.42E+1	0.00E+0	3.30E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.24E-4
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
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
FW	M3	1.50E+0	1.83E-2	1.78E-1	5.64E-5	1.91E-3	9.72E-3	1.54E-3	-5.37E-1

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

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OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	C1	C2	C3	C4	D
HWD	Kg	3.32E-1	3.82E-4	8.28E-2	2.99E-6	3.97E-5	1.00E-5	1.76E-6	-4.23E-2
NHWD	Kg	3.27E+1	1.30E+1	9.88E+0	1.30E-3	9.93E-1	1.80E-1	7.63E+0	-8.16E+0
RWD	Kg	7.69E-3	1.14E-3	1.66E-3	7.61E-6	1.03E-4	8.83E-6	8.93E-6	-6.67E-4

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

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	C1	C2	C3	C4	D
CRU	Kg	0.00E+0	0.00E+0	1.24E+0	0.00E+0	0.00E+0	3.81E+0	0.00E+0	0.00E+0
MFR	Kg	4.18E+0	0.00E+0	7.64E+0	0.00E+0	0.00E+0	8.48E+1	0.00E+0	0.00E+0
MER	Kg	9.14E-2	0.00E+0	2.62E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	-5.48E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.63E+1
EEE	MJ	0.00E+0	0.00E+0	-3.18E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-9.49E+0

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

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5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER SQUARE METER

BIOGENIC CARBON CONTENT

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

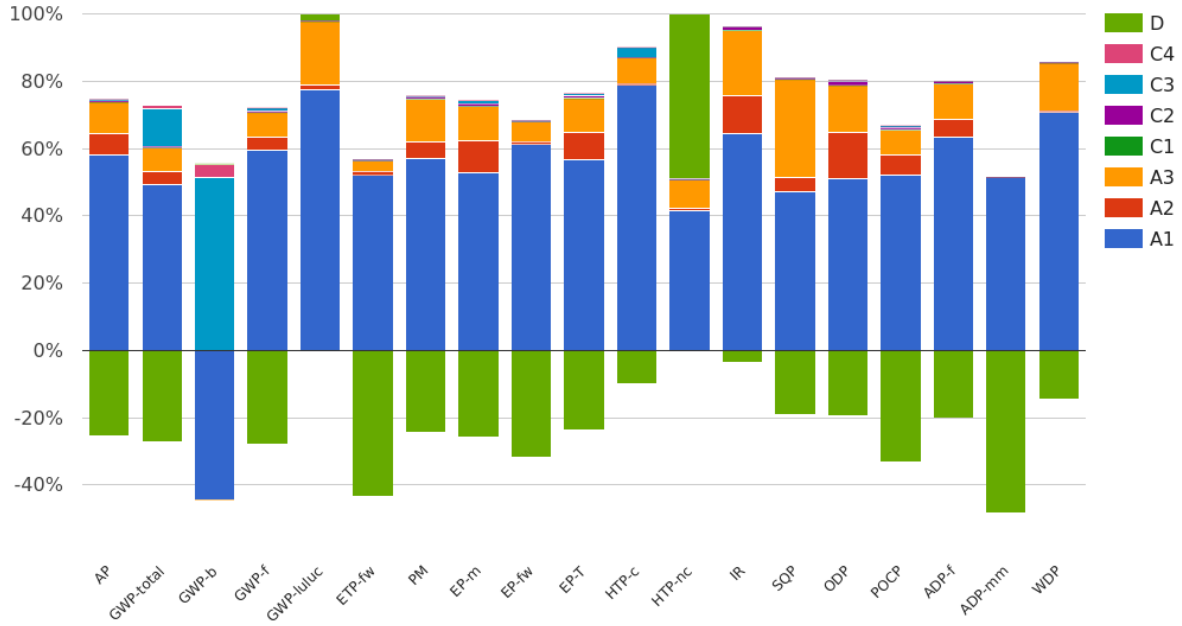
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	8.131	kg C
Biogenic carbon content in accompanying packaging	1.089	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of uptake of carbon dioxide is account in module A1 by the main parts of the product. 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.

Uptake Biogenic Carbon dioxide	Amount	Unit
product	29.81	kg CO2 (biogenic)
Packaging	3.992	kg CO2 (biogenic)

6 Interpretation of results



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8 Contact information

Publisher	Operator	Owner of declaration
Kiwa-Ecobility Experts Wattstraße 11-13 13355 Berlin, DE	**Kiwa-Ecobility Experts** Wattstraße 11-13 13355 Berlin, DE	**RT Metals** Laboratorijas iela 20-1 LV-3402 Liepāja, LV
E-mail: DE.Ecobility.Experts@kiwa.com	**E-mail:** DE.Ecobility.Experts@kiwa.com	**E-mail:** ah@rtmetals.lv
Website: https://www.kiwa.com/de/en/themes/ecobility-experts/ecobility-experts-epd-program/	**Website:** https://www.kiwa.com/de/en/themes/ecobility-experts/ecobility-experts-epd-program/	**Website:** www.rtmetals.lv

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