Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Hot-dip Galvanized Steel Wire

EPD of multiple products, based on the average results of the product group

from

BMS Birleşik Metal Sanayi Ve Ticaret A.Ş.

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Licensee:	EPD Turkey – Licensed Partner of The International EPD® System
Type of EPD:	Cradle-to-gate with options (A1–A3, C1–C4, D)
EPD registration number:	EPD-IES-00 0026324
Version date:	2025-10-17
Validity date:	2030-10-16
	An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

General Information

Programme Information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products, Version 2.0.1 (2025-06-05), valid until 2030-04-07.
PCR review was conducted by: Rob Rouwette (chair), Noa Meron (co-chair), and The Technical Committee of the International EPD System. **A full list of members is available on www.environdec.com. The review panel may be contacted via support@environdec.com.**

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: Vijay Thakur Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: BMS Birleşik Metal Sanayi Ve Ticaret A.Ş.
Address: Organize Sanayi Bölgesi Mah. 5. Cad. No:16 Dilovası/KOCAELİ
Contact: Ünal Burak Şahin – Quality Assurance Manager - E-mail: burak.sahin@bmsgrup.com
Address and contact information of the LCA practitioner commissioned by the EPD owner, if applicable: Sürdürülebilir Teknoloji Mühendislik ve Danışmanlık A.Ş. Çifte Havuzlar Mah. Eski Londra Asfaltı Cad. Kuluçka Merkezi A1 Blok No:151/1C İç Kapı No: B34 Esenler / İstanbul, Türkiye
Contact person: Samet Can Topkaya
LCA report reference: Life Cycle Assessment Report for *Hot-Dip Galvanized Steel Wire*, Version 1.0, September 2025
Description of the organisation: BMS Wire is a leading manufacturer of hot-dip galvanized steel wire in Türkiye, serving the construction, reinforcement, agriculture and industrial sectors. The company specializes in producing wires with high corrosion resistance, in compliance with international standards (TS EN 10244-2, TS EN 10257-1).

Product-related or management system-related certifications: TSE Certificate of Conformity – TS EN 10257-1:2012 (Steel wire products) – valid until 20.12.2025
TSE Certificate of Conformity – TS EN 10244-2:2023 (Zinc or zinc-alloy coated steel wire and wire products) – valid until 20.12.2025
ISO 9001:2015 – Quality Management System
ISO 14001:2015 – Environmental Management System
ISO 45001:2018 – Occupational Health and Safety Management
ISO 50001:2018 – Energy Management System

Product information

Product name: Hot-Dip Galvanized Steel Wire

Product identification: Produced according to customer specifications and relevant standards for galvanized steel wire (e.g., TS EN 10244-2:2023 for zinc or zinc-alloy coated steel wire, TS EN 10257-1:2012 for steel wire products, and internal BMS Wire specifications).

Product description: Hot-dip galvanized steel wire is manufactured by drawing low-, medium-, or high-carbon steel wire rod to the desired diameter (0.80–10 mm), followed by surface preparation, fluxing, and immersion in molten zinc. The zinc coating, applied in a range of 40–600 g/m², provides enhanced corrosion resistance.

The product is widely used in:

- Energy
- Automotive
- Agriculture
- Environmental Protection and Security Systems
- Construction
- Industrial Applications

Technical properties:

- Diameter range: 0.80–10.00 mm
- Tensile strength: 350–2000 MPa
- Zinc coating: 40–600 g/m²

Manufacturing process:

- Wire drawing
- Pickling (HCl)
- Fluxing (NH_4Cl, $ZnCl_2$)
- Hot-dip galvanizing (zinc bath)
- Cooling, coiling, spooling, packaging

Expected service life:
Depends on coating thickness and exposure conditions. Typical lifespan ranges from 20–50 years in outdoor applications.

Range of products / Product variations

Environmental impacts can vary with zinc coating mass.
Based on sensitivity modelling, total GWP for 1,000 kg of galvanized steel wire varies by –7.6 % to –0.5 % around the declared case (6 % Zn = 60 kg per declared unit), when only the zinc coating mass is varied while all other parameters remain constant.
The declared results correspond to the representative average product within the production range (zinc coating 40–600 g/m²).

UN CPC code: 412 – Basic iron and steel
Other codes for product classification:

- NACE Rev. 2: 24.10 (Manufacture of basic iron and steel)
- CPA: 24.10.3 (Bars and rods, hot-rolled, in irregularly wound coils, of iron or steel)
- UNSPSC: 30102207 (Steel wire)

Name and location of production site(s): BMS Wire Sanayi ve Ticaret A.Ş.
Organize Sanayi Bölgesi Mah. 5. Cad. No:16
Dilovası, Kocaeli, Türkiye

In case of EPDs owned by a trader, the location of the final process in direct control of the trader Not applicable – EPD owner is manufacturer
Name of manufacturer(s) (if EPD of goods) or service provider(s) (if EPD of services), if different from the EPD owner. BMS Wire Sanayi ve Ticaret A.Ş.
References to any relevant websites for more information or explanatory materials, if applicable.

www.bmswire.com.tr

Content Declaration

- The mass (weight) of one unit of product, as purchased or per declared unit: **1 000 kg galvanized steel wire (declared unit).**

- Content of the product in the form of a list of materials and substances, and their mass: **Content of the product (average composition):**

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Steel wire rod	940	86	0
Zinc coating	60	0	0
TOTAL	1000	86	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Wooden pallet	1.43 E-02	1.43 E-03	0
Cardboard	5.45 E-04	5.45 E-05	0
Plastic film	5.90 E-05	5.90 E-06	0
Steel hoop	3.91 E-03	3.91 E-04	0
TOTAL	1.88 E-02	1.88 E-03	0

Biogenic carbon refers to the wooden pallet and cardboard components and is balanced within Modules A1–A3, in accordance with PCR 2019:14 v2.0.1 Annex 2.
Biogenic carbon content has been calculated assuming 50 % of dry mass as carbon (IPCC 2006; EN 15804 +A2), with 10 % moisture content for wood-based materials.
The total biogenic carbon uptake from packaging materials equals 6.80E−03 t C (≈ 2.49E−02 t CO_2) per declared unit.
The declared total recycled steel content (pre- and post-consumer scrap) of the steel input is 8.60 E−01 (≈ 86 %) of total steel mass, corresponding to 8.60E+02 kg per declared unit.
Based on verified EPDs of Turkish EAF-based steel producers (Diler Demir Çelik, Kaptan Demir Çelik, İçdaş Çelik Enerji Tersane ve Ulaşım Sanayi A.Ş.), this recycled content predominantly consists of post-consumer scrap (≈ 90 %) and a minor share of pre-consumer scrap (≈ 1.5 %).
This split has been applied in the A1 inventory modelling in accordance with PCR 2019:14 v2.0.1 Section 4.6.4 and EN 15804 +A2:2019 §6.3.4, recognising that post-consumer scrap represents material recovered from previous product systems, while pre-consumer scrap arises from manufacturing losses within the same production chain.
Recycling benefits are accounted for only in Module D using the net-scrap approach, in line with EN 15804 +A2:2019 §6.2.7 and PCR 2019:14 v2.0.1 §6.4.4.

Hazardous substances from the candidate list of SVHC	EC No.	CAS No.	Mass-% per product or declared unit
None of the substances on the Candidate List of SVHC are present above 0.1% w/w	-	-	0 %

LCA information

Declared unit: 1 000 kg of hot-dip galvanized steel wire
Functional unit: Not applicable (mass-based declaration)
Reference service life: Not applicable
Temporal representativeness: Primary data represent 2024; background datasets 2018–2023 (ecoinvent v3.10).
Geographical representativeness: Türkiye (production site); background datasets with TR/RER/GLO/RoW coverage.
Technological representativeness: Industrial continuous hot-dip galvanizing process.
Modelling approach: Attributional LCA according to ISO 14040/44, EN 15804 +A2 and PCR 2019:14 v2.0.1 (Table 4 default scenarios applied for C1–C4).
Database & software: ecoinvent v3.10 (Cut-off, S); SimaPro 10.1.0.4.
EPD/LCA tool: Not applicable (original modelling in SimaPro).
Type of EPD: Cradle-to-gate with options (A1–A3, C1–C4, D).
Modules A4–B7: ND (Not Declared).

A1 – Raw material supply
Production of steel wire rod (supplier mix ≈ 86 % EAF, 4 % BOF) and zinc ingot.
Covers extraction, smelting, casting, rolling, energy, emissions, and waste.

A2 – Transport
Combined sea + road transport of wire rod, zinc and auxiliaries to the BMS Wire plant (Kocaeli).
Weighted by country of origin and mode share.

A3 – Manufacturing
Wire drawing → pickling (HCl) → fluxing ($NH_4Cl/ZnCl_2$) → hot-dip galvanizing → cooling/coiling → packaging.
Inputs: **electricity (Turkish residual grid mix 2024; 0.90 kg CO_2e/kWh)**, natural gas, water, chemicals, packaging.
The residual grid mix was calculated from TEİAŞ (2023), EPİAŞ (2024) and IEA (2024) data, excluding certified renewable electricity and guarantees of origin, and cross-checked with ecoinvent v3.10 datasets.
Outputs: galvanized wire, air emissions, wastewater, zinc dross, steel scrap, sludge.
Packaging production and internal scrap handling included.

C1 – Deconstruction / Demolition
Modelled according to PCR 2019:14 v2.0.1, Table 4 default scenario.
Energy use: 3.96 MJ per declared unit (diesel, mechanical dismantling).
No additional emissions declared.

C2 – Transport to waste processing
PCR Table 4 default transport scenario applied:
• 80 km to recycling and 130 km to landfill/incineration, by road (EURO 5 lorry).

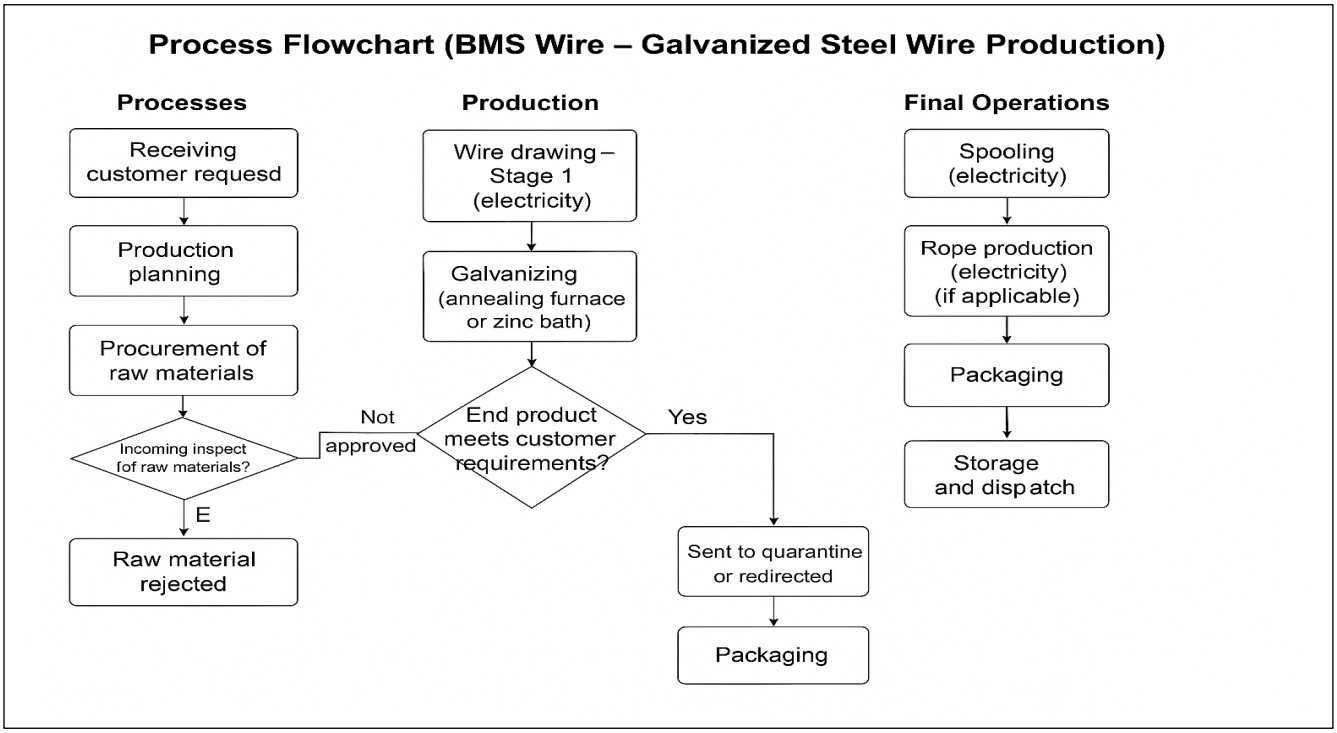
C3 – Waste processing
Modelled in line with PCR 2019:14 v2.0.1 Table 4.
• Steel recycling rate: 85 % (≈ 850 kg).
• Zinc recovery: ≈ 100 % of zinc content (≈ 9.35 kg Zn per DU).
Sorting, shredding, and melting included.

C4 – Disposal
Default scenario per PCR 2019:14 v2.0.1 Table 4.
• 15 % (≈ 150 kg) of total product mass assumed to be inert residues (slag, dross, galvanizing waste) disposed in controlled landfill.

Module D – Benefits and loads beyond the system boundary
Substitution benefits modelled per EN 15804 +A2 (avoided-burden method).
Credits include melting/refining up to functional equivalence.
Applied for secondary materials recovered after C3:
• 850 kg steel scrap, 9.35 kg zinc recovered (≈ 100 % of zinc content).
Credits calculated on a net scrap basis = (EoL scrap + A3 scrap) – (A1 scrap input).
For this product: net scrap = 18.7 kg per DU.
All recycling benefits reported in Module D only (no double counting with A3).

Summary
Modules C1–C4 modelled strictly according to PCR 2019:14 v2.0.1 default scenarios (Table 4).
Key assumptions:
• Steel recycling = 85 % of product mass
• Zinc recovery = 100 % of zinc coating
• Residual 15 % inert residues → landfill
• **Electricity = 0.90 kg CO_2e/kWh (residual mix 2024, cross-checked with ecoinvent v3.10)**
• **Characterisation factors = EF 3.1 (EN 15804 +A2 adapted, SimaPro 10.1.0.4)**
All data and scenarios comply with EN 15804 +A2:2019/AC:2021 and PCR 2019:14 v2.0.1.

Process flow diagram:
Process flow diagram of the product system, divided into the life-cycle stages and modules (or other division of the product life cycle, if defined in the PCR), showing the main processes included and the system boundary of the LCA. The diagram shall make it clear when the end-of-waste state is reached for main input flows of reused/recycled materials and recovered energy, and for output flows of reused/recycled materials and recovered energy exiting the end-of-life stage.



More information:

Allocation procedures

No allocation was applied. All input and output flows were measured directly from the 2024 operational data of BMS Wire. Internal process scrap generated during production is accounted for as a physical output in Module A3. Environmental benefits from recycling this scrap are reported only in Module D, in accordance with PCR 2019:14 v2.0.1 (Section 4.6.4) and EN 15804 +A2 s6.4.3, thereby avoiding double counting between manufacturing and end-of-life stages.

Recycled material inputs

Recycled material inputs (mainly post-consumer scrap from suppliers) contribute **less than 10 %** to the total **GWP-GHG** results of Modules A1–A3. Therefore, no separate declaration of recycled content intensity is required under the PCR.

Data quality assessment

Primary (site-specific) data represent the reference year **2024**, covering more than **99 %** of total mass and energy inputs. Secondary datasets were taken from **ecoinvent v3.10 (Cut-off, S)** with reference years 2018–2022, considered valid for 2024 reporting. Geographical coverage includes **Türkiye (TR)**, **Europe (RER)**, **Global (GLO)** and **Rest of World (RoW)**. All datasets meet the data-quality requirements of EN 15804 +A2 s6.3.8.

Summary of data quality assessment (in accordance with EN 15941 s7.3.3):
Primary (site-specific) data represent the reference year 2024, covering more than 99 % of total mass and energy inputs. Secondary datasets were taken from ecoinvent v3.10 (Cut-off, S) with reference years 2018–2022, considered valid for 2024 reporting. Geographical coverage includes Türkiye (TR),

Europe (RER), Global (GLO) and Rest of World (RoW). All datasets meet the data-quality requirements of EN 15804 +A2 s6.3.8.

Infrastructure and capital goods

Infrastructure (buildings, machinery, vehicles) and other long-term capital goods are **excluded** from the system boundaries in accordance with **PCR Section 4.3.6**, as their contribution to overall environmental impacts is negligible.

Electricity and energy data

Electricity used in **Module A3** was modelled with the **Turkish residual grid mix (2024)**, excluding certified renewable electricity and imports covered by guarantees of origin.
The residual mix was derived by subtracting renewable generation (hydropower, wind, solar, geothermal, and other certified renewable sources) from the national consumption mix and normalising the remaining fossil-based shares to 100 %.
The **applied climate-impact factor (GWP–GHG, EF 3.1)** for the residual electricity mix is **0.90 kg CO_2e/kWh**, calculated from **TEİAŞ (2023), EPİAŞ (2024)** and **IEA (2024)** data and verified against **ecoinvent v3.10 (Cut-off, S)** datasets.
This value has been consistently applied in the **LCA model** and the **EPD results**.
For **Modules C3–C4 and D**, electricity consumption has been modelled using the **national consumption mix (including renewables)**, with an average emission factor of **0.44 kg CO_2e/kWh**, as allowed by **PCR 2019:14 v2.0.1 (Section 4.7.2.3)**.
Thermal energy (natural gas) was modelled using **Turkish industrial heat** datasets consistent with **ecoinvent v3.10 Cut-off, S**.

Scenario descriptions (downstream stages)
• **C1 – De-installation / Demolition:**
3.96 MJ diesel per declared unit, representing mechanical removal at end of use (PCR 2019:14 Table 4.7).
• **C2 – Transport to waste processing:**
Average 80 km to landfill and 130 km to incineration, modelled with a 16–32 t EURO 5 lorry at 50 % load factor, as required by PCR 2019:14 v2.0.1.
• **C3 – Waste processing:**
About 85 % of product mass (≈ 850 kg) is collected, sorted and recycled as secondary steel and zinc. Default energy inputs from PCR Table 4.7 were applied — **1.87 kWh electricity (Turkish national grid)** and **28.15 MJ diesel** per declared unit — representing sorting and fragmentation operations.
• **C4 – Disposal:**
The remaining 15 % (150 kg) of product mass is disposed of in controlled landfill, modelled with **1.6 kWh diesel per tonne** for compaction.
No incineration or energy recovery is applied in the declared scenario.

• **End-of-life sensitivity scenarios:**

Additional **100 % recycling sensitivity scenario** was modelled in SimaPro for sensitivity analysis, as required by **PCR 2019:14 v2.0.1 Section 4.7.3.5**.
The declared scenario applies **85 % recycling and 15 % landfill (no incineration)**.

Scenario	Description	Assumptions
100% Recycling	All product mass is collected and recycled as secondary steel and zinc.	No landfilling or incineration occurs. Full credit for secondary material substitution is accounted in Module D.
100% Landfill	A fraction of the product mass is disposed of in controlled landfill sites..	Non-recovered materials (e.g. coatings, residues) are landfilled in accordance with PCR 2019:14 default assumptions. No material or energy recovery is considered in this case..

This additional scenario is provided for informational purposes only and is not included in the declared EPD results, but demonstrates the potential variability in end-of-life assumptions.

In addition to the reference end-of-life scenario (85 % recycling and 15 % landfilling), two sensitivity scenarios were modelled to assess the influence of end-of-life assumptions:
• **100 % Recycling scenario** – all product mass is collected and recycled as secondary steel and zinc, with no landfilling or incineration. Full substitution benefits are accounted for in Module D.
• **100 % Landfilling scenario** – all product mass is disposed of in controlled landfill sites without material recovery. No substitution benefits are considered in Module D.

Both scenarios were developed in accordance with PCR 2019:14 v2.0.1 Section 4.7.3.5 and EN 15804 +A2 Section 6.4.3 to ensure transparency and to evaluate the sensitivity of results to end-of-life assumptions.

- **Module D – Beyond the system boundary:**

Environmental credits for substitution of primary steel and zinc are calculated using the net scrap approach, in line with EN 15804 +A2 s6.2.7 and PCR 2019:14 v2.0.1 Section 4.7.3.5.
Only the net amount of scrap generated beyond the system boundary (after subtracting the recycled content already used in A1) is credited as avoided primary production.
Burdens up to the point of functional equivalence (melting and refining) are included before substitution occurs.
The benefits and loads from recovered materials are included exclusively in Module D.

Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Distribution/ installation stage		Use stage							End-of-life stage				Beyond product life cycle
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	TR										GLO	GLO	GLO	GLO	GLO
Share of primary data	15,94 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%					-	-	-	-	-	-	-	-	-	-	-	-

Source of data and share of primary data

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1–A3
Steel production	Collected data	Ecoinvent v3.10 (dataset), consumption amounts from BMS Wire	2024	Secondary data	0.00 %
Chemicals – HCl	Collected data	Ecoinvent v3.10 (dataset), consumption amounts from BMS Wire	2024	Secondary data	0.00 %
Zinc production	Database	Ecoinvent v3.10 (dataset)	2024	Secondary data	0.00 %
Electricity	Collected data	BMS site data + TR residual mix (TEİAŞ/EPİAŞ/IEA)	2024	Primary data	12.47 %
Process heat (natural gas)	Collected data	Ecoinvent v3.10 (dataset), consumption amounts from BMS Wire	2024	Secondary data	0.00 %
Transport	Collected data	BMS site ton·km + ecoinvent v3.10 (EURO 5 lorry; sea freight)	2024	Primary data	3.53 %
Packaging film	Database	Ecoinvent v3.10 (dataset)	2024	Secondary data	0.00 %
Total share of primary data, of GWP-GHG results for A1–A3					15.94 %

Note: Only electricity and transport are classified as site-specific (primary) data. All other flows use generic emission factors (ecoinvent v3.10) and are therefore classified as secondary, in accordance with *PCR 2019:14 v2.0.1 s4.7.3.2* and *EN 15941 s7.3.3*.

The share of primary data in the LCA model (Table 3.3 of the LCA report) is 15.9 %, consisting of electricity and transport only.

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1,31E+03	3,97E-01	1,57E+01	5,96E+01	1,55E+00	-6,36E+01
GWP-biogenic	kg CO_2 eq.	1,36E+01	4,34E-05	3,49E-04	2,45E-02	8,63E-03	-1,05E+00
GWP- GWP- luluc	kg CO_2 eq.	1,55E+00	3,45E-05	6,21E-03	1,94E-02	3,68E-04	-1,19E-01
GWP-total	kg CO_2 eq.	1,32E+03	3,97E-01	1,57E+01	5,97E+01	1,56E+00	-6,48E+01
ODP	kg CFC 11 eq.	2,69E-05	6,07E-09	2,19E-07	8,83E-07	4,78E-08	-5,30E-07
AP	mol H^+ eq.	7,30E+00	3,58E-03	5,22E-02	5,26E-01	1,70E-02	-4,02E-01
EP-freshwater	kg P eq.	6,54E-01	1,16E-05	1,23E-03	3,78E-03	2,52E-03	-4,45E-02
EP-marine	kg N eq.	1,63E+00	1,66E-03	1,69E-02	2,39E-01	4,33E-03	-9,47E-02
EP-terrestrial	mol N eq.	1,71E+01	1,82E-02	1,84E-01	2,61E+00	4,65E-02	-9,91E-01
POCP	kg NMVOC eq.	5,33E+00	5,42E-03	7,26E-02	7,78E-01	1,69E-02	-2,93E-01
ADP-minerals&metals*	kg Sb eq.	9,87E-02	1,42E-07	5,02E-05	3,47E-05	2,89E-06	-1,44E-02
ADP-fossil*	MJ	1,74E+04	5,19E+00	2,19E+02	7,77E+02	3,56E+01	-7,74E+02
WDP*	m^3	5,69E+02	1,12E-02	9,92E-01	2,52E+00	-1,96E+01	-3,38E+01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

* *Disclaimer: 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.*

Note:
The results of the end-of-life stages (C1–C4) should be considered when using or interpreting the results of the product stage (Module A1–A3), as end-of-life processes such as recycling, landfilling and incineration may significantly influence the overall environmental performance of the product system.

Note on biogenic carbon (packaging):
The product itself contains no biogenic carbon. Packaging contains 6.8 kg biogenic carbon (C) per declared unit (1000 kg), corresponding to 24.9 kg CO_2 (0.0249 t CO_2).

Any biogenic carbon leaving the system in Module A5 is balanced by the corresponding biogenic carbon input in Modules A1–A3, in accordance with EN 15804+A2 s6.3.5.2 and PCR 2019:14 v2.0.1 s4.7.4.1.

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	1,36E+03	4,07E-01	1,61E+01	6,12E+01	1,63E+00	-6,68E+01
Particulate matter emissions (PM)	Disease incidence	8,60E-05	1,02E-07	1,24E-06	1,45E-05	2,64E-07	-4,82E-06
Ionizing radiation, human health (IRP)	kBq U235 eq.	1,75E+02	2,33E-03	1,80E-01	6,56E-01	4,71E-02	-6,90E+00
Eco-toxicity - freshwater (ETP-fw)	CTUe	4,89E+04	9,03E-01	7,32E+01	1,56E+02	2,85E+02	-6,09E+03
Human toxicity, cancer effect (HTP-c)	CTUh	4,82E-05	1,55E-09	8,11E-08	2,26E-07	8,71E-09	-4,22E-06
Human toxicity, non-cancer effects (HTP-nc)	CTUh	5,53E-05	2,18E-09	1,79E-07	3,40E-07	4,62E-08	-4,64E-06
Land use related impacts/Soil quality (SQP)	dimensionless	5,20E+03	3,62E-01	1,31E+02	7,07E+01	8,58E+01	-3,09E+02

Disclaimers (in accordance with EN 15804 +A2:2019, Annex C):

- *IRP: The results of this environmental impact indicator shall be used with caution as the uncertainties on these results are high or as there is limited experience with the indicator.*
- *ETP-fw, HTP-c, HTP-nc, SQP: The results of these environmental impact indicators shall be used with care because of the high level of uncertainty in the modelling, especially related to long-term emissions, toxicity factors, and soil quality assessment.*

Resource use indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1,59E+03	2,58E-02	2,12E+00	1,22E+01	5,65E-01	-8,41E+01
PERM	MJ	2,09E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,59E+03	2,58E-02	2,12E+00	1,22E+01	5,65E-01	-8,41E+01
PENRE	MJ	1,76E+04	5,20E+00	2,20E+02	7,79E+02	3,57E+01	-7,86E+02
PENRM	MJ	2,50E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,76E+04	5,20E+00	2,20E+02	7,79E+02	3,57E+01	-7,86E+02
SM	kg	8.60E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	1,76E+01	3,71E-04	2,93E-02	7,82E-02	-4,22E-01	-1,08E+00
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

Note on resource use indicators (PCR 2019:14 v2.0.1, Section 4.7.2.2):
Resource use indicators have been calculated using Option 1 – the Cumulative Energy Demand (LHV) method, as implemented in SimaPro 10.1.0.4 with ecoinvent v3.10 datasets (Cumulative Energy Demand v1.01 method).

Waste indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	6,58E-01	3,59E-05	1,51E-03	5,17E-03	2,38E-04	-8,72E-02
Non-hazardous waste disposed	kg	1,23E+02	3,19E-03	1,03E+01	5,65E-01	1,50E+02	-5,59E+00
Radioactive waste disposed	kg	4,50E-02	5,70E-07	4,42E-05	1,61E-04	1,15E-05	-1,76E-03

** Waste indicators (A1–A3) are reported using EDIP 2003 waste categories. For end-of-life (C4), disposal amounts are declared according to the updated scenario (150 kg landfilling of inert/non-hazardous waste, no incineration), as EDIP characterization tends to under-represent absolute disposal quantities.

Output flow indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	3,85E+01	0,00E+00	0,00E+00	8,50E+02	0,00E+00	0,00E+00
Materials for energy recovery	kg	1,79E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Additional LCA results (other environmental performance results) of the product(s)

End-of-life sensitivity scenario (100 % recycling)
In line with PCR 2019:14 v2.0.1 (Section 4.7.3.5), an additional 100 % recycling sensitivity scenario was modelled for Modules C1–C4 and D to assess the influence of end-of-life assumptions.
The declared scenario applies 85 % recycling and 15 % landfill (no incineration), while the 100 % recycling case represents the maximum recovery potential.
The results of this sensitivity scenario are provided below for informational purposes only and are not included in the declared EPD results.

Results per functional or declared unit
(Modules C1–C4 and D – 100 % recycling scenario)

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1,31E+03	3,97E-01	1,57E+01	0,00E+00	6,95E+01	-3,20E+02
GWP-biogenic	kg CO_2 eq.	1,36E+01	4,34E-05	3,49E-04	0,00E+00	2,61E-02	-1,28E+00
GWP- GWP- luluc	kg CO_2 eq.	1,55E+00	3,45E-05	6,21E-03	0,00E+00	2,08E-02	-2,43E-01
GWP-total	kg CO_2 eq.	1,32E+03	3,97E-01	1,57E+01	0,00E+00	6,95E+01	-3,22E+02
ODP	kg CFC 11 eq.	2,69E-05	6,07E-09	2,19E-07	0,00E+00	1,03E-06	-1,76E-06
AP	mol H^+ eq.	7,30E+00	3,58E-03	5,22E-02	0,00E+00	6,13E-01	-1,48E+00
EP-freshwater	kg P eq.	6,54E-01	1,16E-05	1,23E-03	0,00E+00	4,24E-03	-1,49E-01

EP-marine	kg N eq.	1,63E+00	1,66E-03	1,69E-02	0,00E+00	2,79E-01	-3,37E-01
EP-terrestrial	mol N eq.	1,71E+01	1,82E-02	1,84E-01	0,00E+00	3,05E+00	-3,49E+00
POCP	kg NMVOC eq.	5,33E+00	5,42E-03	7,26E-02	0,00E+00	9,08E-01	-1,13E+00
ADP-minerals&metals*	kg Sb eq.	9,87E-02	1,42E-07	5,02E-05	0,00E+00	4,05E-05	-1,61E-02
ADP-fossil*	MJ	1,74E+04	5,19E+00	2,19E+02	0,00E+00	9,06E+02	-3,39E+03
WDP*	m^3	5,69E+02	1,12E-02	9,92E-01	0,00E+00	2,86E+00	-8,23E+01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

These additional end-of-life scenario results are provided for informational purposes only, in accordance with PCR 2019:14 v2.0.1 (Section 4.7.3.5) and EN 15804 +A2:2019 §6.4.3. They are not included in the declared EPD results and shall not be used for comparison with other EPDs.

Resource use indicators (Modules C1–C4 & D, 100 % recycling scenario)

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1,59E+03	2,58E-02	2,12E+00	0,00E+00	1,35E+01	-2,71E+02
PERM	MJ	2,09E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,59E+03	2,58E-02	2,12E+00	0,00E+00	1,35E+01	-2,71E+02
PENRE	MJ	1,76E+04	5,20E+00	2,20E+02	0,00E+00	9,07E+02	-3,45E+03
PENRM	MJ	2,50E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,76E+04	5,20E+00	2,20E+02	0,00E+00	9,07E+02	-3,45E+03
SM	kg	8.6E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	1,76E+01	3,71E-04	2,93E-02	0,00E+00	8,96E-02	-2,91E+00
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

Waste flows – Results per functional or declared unit (100 % recycling scenario)

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	6,58E-01	3,59E-05	1,51E-03	0,00E+00	6,04E-03	-1,06E-01
Non-hazardous waste disposed	kg	1,23E+02	3,19E-03	1,03E+01	0,00E+00	6,55E-01	-2,90E+01
Radioactive waste disposed	kg	4,50E-02	5,70E-07	4,42E-05	0,00E+00	1,88E-04	-3,65E-03

Output flows – Results per functional or declared unit (100 % recycling scenario)

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	3,85E+01	0,00E+00	0,00E+00	0,00E+00	1,00E+03	0,00E+00
Materials for energy recovery	kg	1,79E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

These additional end-of-life scenario results are provided for informational purposes only, in accordance with PCR 2019:14 v2.0.1 (Section 4.7.3.5) and EN 15804 +A2:2019 §6.4.3. They are not included in the declared EPD results and shall not be used for comparison with other EPDs.

End-of-life sensitivity scenario (100 % landfill)

In accordance with PCR 2019:14 v2.0.1 (Section 4.7.3.5), an additional 100 % landfill sensitivity scenario was modelled for Modules C1–C4 and D to evaluate the maximum impact of non-recycling end-of-life management.
The declared scenario applies 85 % recycling and 15 % landfill (no incineration), while the 100 % landfill case represents the worst-case disposal scenario with no material recovery.
The results of this sensitivity scenario are provided below for informational purposes only and are not included in the declared EPD results.

Results per functional or declared unit
(Modules C1–C4 and D – 100 % landfill scenario)

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1,31E+03	3,97E-01	1,57E+01	0,00E+00	8,46E+01	-2,40E+01
GWP-biogenic	kg CO_2 eq.	1,36E+01	4,34E-05	3,49E-04	0,00E+00	1,00E-01	-1,02E+00
GWP- GWP- luluc	kg CO_2 eq.	1,55E+00	3,45E-05	6,21E-03	0,00E+00	5,04E-02	-9,95E-02
GWP-total	kg CO_2 eq.	1,32E+03	3,97E-01	1,57E+01	0,00E+00	8,48E+01	-2,51E+01
ODP	kg CFC 11 eq.	2,69E-05	6,07E-09	2,19E-07	0,00E+00	1,40E-06	-3,40E-07
AP	mol H^+ eq.	7,30E+00	3,58E-03	5,22E-02	0,00E+00	6,96E-01	-2,36E-01
EP-freshwater	kg P eq.	6,54E-01	1,16E-05	1,23E-03	0,00E+00	4,50E-03	-2,83E-02
EP-marine	kg N eq.	1,63E+00	1,66E-03	1,69E-02	0,00E+00	3,13E-01	-5,72E-02
EP-terrestrial	mol N eq.	1,71E+01	1,82E-02	1,84E-01	0,00E+00	3,42E+00	-6,05E-01
POCP	kg NMVOC eq.	5,33E+00	5,42E-03	7,26E-02	0,00E+00	1,04E+00	-1,64E-01
ADP-minerals&metals*	kg Sb eq.	9,87E-02	1,42E-07	5,02E-05	0,00E+00	7,12E-05	-1,41E-02
ADP-fossil*	MJ	1,74E+04	5,19E+00	2,19E+02	0,00E+00	1,19E+03	-3,70E+02
WDP*	m^3	5,69E+02	1,12E-02	9,92E-01	0,00E+00	9,91E+00	-2,63E+01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

These additional end-of-life scenario results are provided for informational purposes only, in accordance with PCR 2019:14 v2.0.1 (Section 4.7.3.5) and EN 15804 +A2:2019 §6.4.3. They are not included in the declared EPD results and shall not be used for comparison with other EPDs.

Resource use indicators (Modules C1–C4 & D – 100 % landfill scenario)

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1,59E+03	2,58E-02	2,12E+00	0,00E+00	1,21E+01	-5,53E+01
PERM	MJ	2,09E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,59E+03	2,58E-02	2,12E+00	0,00E+00	1,21E+01	-5,53E+01
PENRE	MJ	1,76E+04	5,20E+00	2,20E+02	0,00E+00	1,19E+03	-3,76E+02
PENRM	MJ	2,50E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,76E+04	5,20E+00	2,20E+02	0,00E+00	1,19E+03	-3,76E+02
SM	kg	8.6E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	1,76E+01	3,71E-04	2,93E-02	0,00E+00	2,57E-01	-8,01E-01

Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste flows – Results per functional or declared unit (100 % landfill scenario)

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	6,58E-01	3,59E-05	1,51E-03	0,00E+00	8,06E-03	-8,44E-02
Non-hazardous waste disposed	kg	1,23E+02	3,19E-03	1,03E+01	0,00E+00	1,01E+03	-1,98E+00
Radioactive waste disposed	kg	4,50E-02	5,70E-07	4,42E-05	0,00E+00	1,63E-04	-1,47E-03

Output flows – Results per functional or declared unit (100 % landfill scenario)

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	3,85E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	1,79E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

These additional end-of-life scenario results are provided for informational purposes only, in accordance with PCR 2019:14 v2.0.1 (Section 4.7.3.5) and EN 15804 +A2:2019 §6.4.3. They are not included in the declared EPD results and shall not be used for comparison with other EPDs.

Additional Environmental Information

High WDP values are mainly due to upstream steel production datasets from ecoinvent, which carry regionally high AWARE characterization factors. These values do not represent site-specific water use at BMS Wire.

Additional Social And Economic Information

No additional social and economic information has been declared.

Abbreviations

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
SVHC	Substances of Very High Concern
ND	Not Declared

References

a) General Programme Instructions of the International EPD® System. Version 5.0, 2021.
b) PCR 2019:14 Construction products, Version 2.0.1, *valid from 2023-09-12 (currently valid)*, including UN CPC 412 and 429.
c) EN 15804:2012+A2:2019/AC:2021 — Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
d) ISO 14025:2006 — Environmental labels and declarations – Type III environmental declarations – Principles and procedures.
e) ISO 14040:2006 and ISO 14044:2006 — Environmental management – Life cycle assessment – Principles, framework, requirements and guidelines.
f) ISO 14067:2018 — Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification.
g) Ecoinvent Database v3.10, 2024 — International LCI database used for secondary data.
h) SimaPro 10.1.0.4 software — LCA modelling software used for calculations.
i) European Commission – Joint Research Centre (JRC). *ILCD Handbook: Recommendations for Life Cycle Impact Assessment in the European context – based on existing environmental impact assessment models and factors.* First edition, 2011.
j) European Commission – JRC Technical Report. *Characterisation factors of the ILCD recommended life cycle impact assessment methods (version 2.0)*, 2018.
k) European Commission – JRC Technical Reports. *Modelling of End-of-Life treatment of building materials in LCA*, year/version.
l) European Commission. *Product Environmental Footprint (PEF) methodology – Circular Footprint Formula, Annex 2 V2.1 (May 2020), Section C criteria.*
COMMISSION RECOMMENDATION (EU) 2021/2279 of 15 December 2021 on the use of Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organisations.

Version History

Original version of the EPD

EPD
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