Environmental Product Declaration

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

Omega-Bolt® Auracore

from

DSI Merol Underground Sp. z o.o. (a Sandvik company)

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of a single product
EPD registration number:	EPD-IES-0025638:001
Version date:	2025-08-26
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EPD type	Single product EPD

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

Accountabilities for PCR, LCA and independent, third-party verification
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 (EN 15804+A2) (2.0.1) UN CPC code: 412 Products of iron or steel
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: *Anna Banach, Paulina Harazin, Bureau Veritas Polska*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Agnieszka Pikus, Greenwise Agnieszka Pikus Approved by: The International EPD® System
OR
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 registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same 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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; 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:
DSI Merol Underground Sp. z o.o. (a Sandvik company)

Contact:
Tomasz Krasowski
QM ISO Representative
tomaszkrasowski@sandvik.com

Description of the organisation:

Sandvik Ground Support is a global business with a local presence in all key mining territories across APAC, EMEA, North America, and LATAM.

We deliver comprehensive solutions for mining, excavation, rock processing, and metal cutting, driven by innovation, digitalization, and sustainable engineering. Our portfolio includes advanced ground support products that meet stringent technical standards for both soft- and hard-rock mining applications. These solutions incorporate cutting-edge technologies like connectivity and digital twins to boost operational efficiency and drive global cost savings.

Our products and services prioritize safety and efficiency, supported by a resilient global supply chain and a team of experienced specialists. As a major supplier of ground control solutions for the mining and tunneling industry, we offer a comprehensive product portfolio and hold a strong market position.

Product-related or management system-related certifications:
ISO 9001
ISO 14001
ISO 45001
ISO 50001

Name and location of production site(s):

DSI Merol Underground Sp. z o.o. (a Sandvik company)
ul. Przemysłowa 30
37-450 Stalowa Wola

Product information

Product name: Omega-Bolt® Auracore

Product identification: Omega-Bolt® Auracore is an inflatable, friction rock bolt used for ground support in underground excavation, such as mines and tunnels.

Product description:

Omega-Bolt® Auracore consists of a round tube made of highly ductile steel, which is longitudinally folded to create a new profile. The internal part has the shape of an Ω, while the external part has a round shape. The new profile has a smaller diameter than the original tube.

At the two ends of the profile section, two steel ferrules are welded to seal off the inner space created into the new profile. In one of the two ferrules, there is a small diameter inlet hole, reaching the above-mentioned inner space.



Omega-Bolt® Auracore is easy to install into a pre-drilled hole. After installation, using a special tool, high-pressure water can be injected into the sealed inner space. Such pressure is able to deform the omega-shaped profile and expand it toward its original, larger diameter round shape. This mechanism of modifying shape is also known as “hydroforming”. The same internal water pressure creates a strong frictional bond between the steel and the surrounding rock, and the steel also follows the geometrical irregularities present in the hoe (mechanical interlock).
Omega-Bolt® Auracore is used in mining, mainly metal mining and in production drifts and in tunneling, mainly associated with so-called NATM (New Austrian Tunneling System) where rock bolts are an essential tool to secure rock stability immediately after excavation.

Manufacturing processes:
The Omega-Bolt® Auracore production begins with steel coil preparation, followed by cutting and machining operations. The steel is then cold-formed through tube forming, including straightening, profiling, welding, and cutting to length. The formed profile undergoes additional machining and cold working with hydraulic presses to shape the ends, after which all components are industrially washed and degreased. During assembly, endcup, profile, and ferrule elements are joined together and welded to create the final structure. After quality confirmation, the product is packed and prepared for shipment.

UN CPC code: 412 Products of iron and steel

Geographical scope:

Modules A1-A2: EUR
Module A3: PL
Module A5: GLO
Module C: GLO

LCA information

Declared unit: 1 ton of Omega-Bolt® Auracore

Time representativeness: 2024-01-01 to 2024-12-31

Database(s) and LCA software used: openLCA 2.4. with Ecoinvent 3.11 database. “EN 15804 reference package” based on EF 3.1 has been used for impact calculations.

Description of system boundaries:

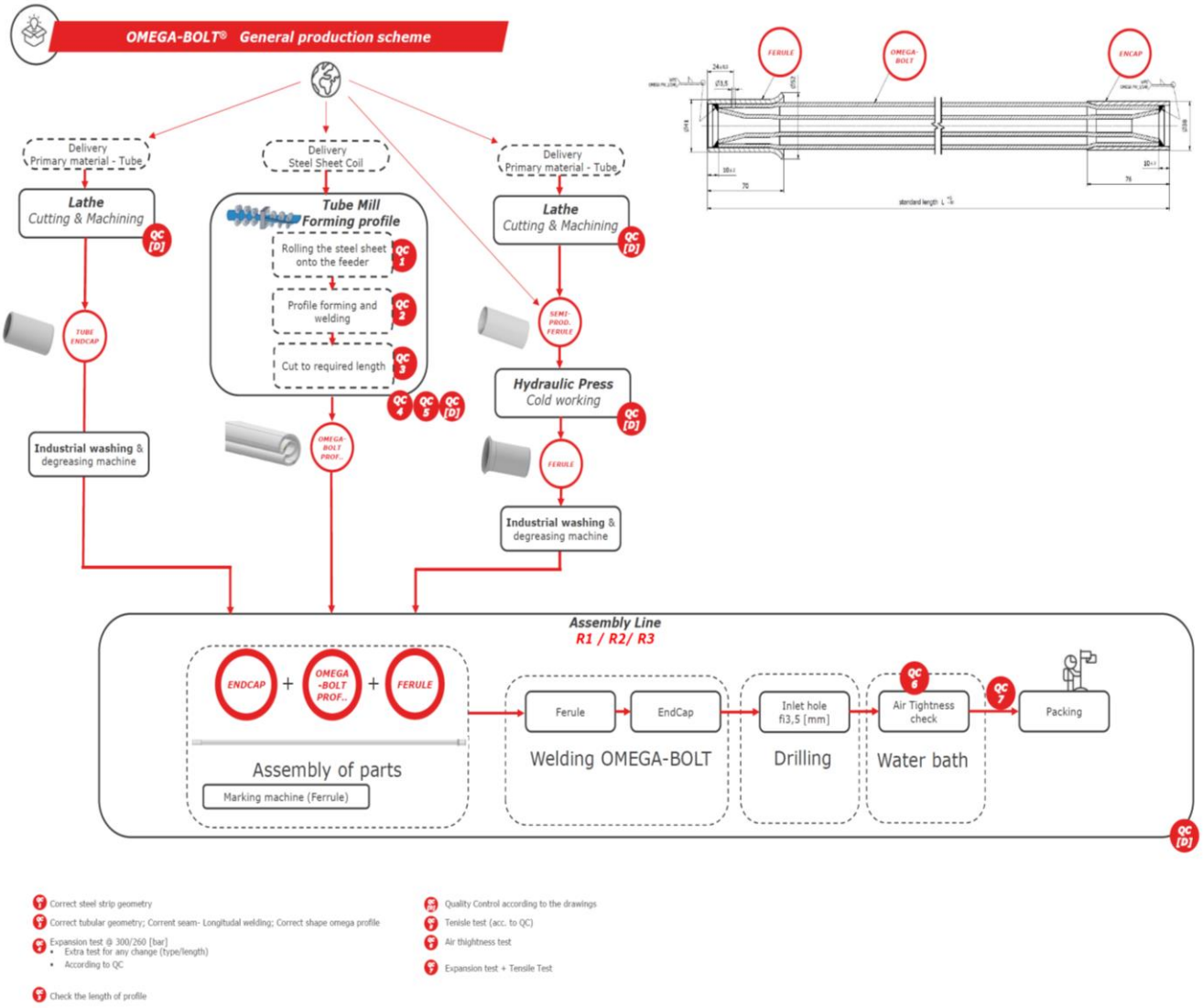
Cradle to gate with options, modules C1-C4, module D and optional modules (A5)

Data quality assessment: Considering the results from the quantitative DQR, it can be said that the data quality for the Life Cycle Inventory to develop the LCA model is Good.

This EPD has been prepared for a single product.

The average result was calculated as follows: the value of raw material, media consumption divided by production volume and multiplied by the product's share in total production.

System diagram:



Information about scenarios

A1-A3 Manufacturing stage

Raw materials were modelled using primary data from the manufacturer, specifying the product composition and material type.

For the Omega-Bolt® Auracore production, the primary raw material is XCarb recycled and renewably produced hot rolled coils. The environmental results from ArcelorMittal's Environmental Product Declaration (EPD) were directly incorporated into the calculations, ensuring high-quality and verified environmental data.

Transport of raw materials was calculated based on distance and transport mode information from the manufacturer.

Transport mode	Transport dataset
Road	transport, freight, lorry >32 metric ton, EURO6 | transport, freight, lorry >32 metric ton, EURO6 | Cutoff, U - RER

Manufacturing activities take place in Poland. Primary data was used to model energy (electricity and heat).

In the manufacturing process, DSI consumes electricity purchased from the grid and its own energy generated from photovoltaic panels.
The climate impact of electricity for location based on residual mix dataset is as follows:

Manufacturing location	Electricity dataset	GWP-GHG impact (kg CO2e/kWh)
Poland	electricity, medium voltage, residual mix | electricity, medium voltage | Cutoff, U - PL	1,05
Electricity PV	electricity production, photovoltaic, 570kWp open ground installation, multi-Si | electricity, low voltage | Cutoff, U - RoW	0,08

The shares of residual mix dataset in Ecoinvent have been calculated based on statistics from AIB from year 2024. The source of the electricity dataset is as follows: hard coal 70,07%, gas 17,39%, solar 8,04%, nuclear 1,63%, fossil unspecified 1,44%, biomass 0,77%, hydro 0,35%, oil 0,14%, wind 0,13%, lignite 0,03%.

In the production of Omega-Bolt® Auracore, additional auxiliary materials are used alongside primary production processes. Specifically, oils and coolants play a critical role in the manufacturing operations. These materials are essential for ensuring optimal machining conditions, equipment performance and product quality.

C1-C4 End of life stage

The end-of-life scenario considers the homogenous deconstruction of the end product. Referring energy demand is considered to be negligible, resulting in a declaration of '0' in module C1.
Since DSI products are sold worldwide, the distance to the disposal/waste management site in C2 module was assumed to be 100 km.
In stage C3 activities related to steel recycling are included. A recycling rate of 85% (according to the World Steel Association, 2021) has been assumed for the product. Therefore, 85% of steel in the product is processed to be recycled.
Module C4 includes 15% of waste landfilling.

D Benefits and loads outside of system boundary

Module D considers the benefits of recycled steel.

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

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	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	X*	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EUR	EUR	PL	-	EUR	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products GWP-GHG	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Only to balance out the biogenic carbon content

Excluded processes:

- Production of spare parts (e.g. refractories, machinery tires, conveyer belts) and all material needed for maintenance operations during manufacturing.
- Infrastructure and capital goods, transportation of employees, as determined in PCR

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Steel Coil	967,32	26,80	0,00
Ferrule	33,02	0,00	0,00
Endcup	9,93	0,00	0,00
TOTAL	**1010,27**	**-**	**0,00**
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Wooden pallet	5,84	0,58%	0,47
Foil	0,05	0,00%	0,00
Metal packaging	0,30	0,03%	0,00
TOTAL	**6,19**	**-**	**0,47**

Dangerous substances from the candidate list of SVHC for Authorisation
There are no dangerous substances used from the candidate list of SVHC.

Processes contributing more than 10% to GWP-GHG are declared below.

Steel coil: 69,65% contribution to GWP-GHG modules A1-A3

Type of source	EPD
Source	Supplier
Data category	Primary
Reference year	<5 years old

The GWP-GHG intensity of the Steel Coil is declared as 6,00E+02 kg CO2e/ton.

Electricity: 12,77% contribution to GWP-GHG modules A1-A3

Type of source	Dataset
Source	Ecoinvent 3.11 database
Data category	Representative
Dataset	electricity, medium voltage, residual mix | electricity, medium voltage | Cutoff, U - PL
Reference year	2024

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The use of the results of modules A1-A3 without considering the results of module C is discouraged.

Mandatory impact category indicators according to EN 15804

Results per declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	8,60E+02	1,14E-01	0,00E+00	1,05E+01	1,94E+01	9,48E-01	-1,29E+03
GWP-biogenic	kg CO_2 eq.	9,80E-01	1,04E-01	0,00E+00	1,78E-03	4,04E-02	3,00E-04	-2,55E-01
GWP-luluc	kg CO_2 eq.	6,12E-01	2,73E-05	0,00E+00	3,71E-03	2,29E-02	5,40E-04	-3,53E-01
GWP-total	kg CO_2 eq.	8,61E+02	2,19E-01	0,00E+00	1,05E+01	1,95E+01	9,49E-01	-1,29E+03
ODP	kg CFC 11 eq.	2,71E-06	1,03E-09	0,00E+00	2,18E-07	2,61E-07	2,64E-08	-6,10E-06
AP	mol H^+ eq.	3,16E+00	5,50E-04	0,00E+00	2,47E-02	2,31E-01	6,64E-03	-4,39E+00
EP-freshwater	kg P eq.	1,12E-01	3,42E-05	0,00E+00	7,40E-04	1,25E-02	8,30E-05	-5,98E-01
EP-marine	kg N eq.	6,50E-01	9,10E-04	0,00E+00	6,48E-03	5,11E-02	2,55E-03	-1,06E+00
EP-terrestrial	mol N eq.	6,93E+00	2,61E-03	0,00E+00	7,01E-02	5,78E-01	2,79E-02	-1,14E+01
POCP	kg NMVOC eq.	0,00E+00	7,60E-04	0,00E+00	4,29E-02	1,71E-01	1,01E-02	-3,97E+00
ADP-minerals&metals*	kg Sb eq.	1,29E-03	2,09E-07	0,00E+00	3,00E-05	1,38E-03	1,42E-06	-1,21E-03
ADP-fossil*	MJ	9,51E+03	8,68E-01	0,00E+00	1,57E+02	2,60E+02	2,32E+01	-1,31E+04
WDP*	m^3	2,40E+02	9,85E-02	0,00E+00	7,89E-01	4,64E+00	1,02E+00	-3,40E+02
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 of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG*	kg CO_2 eq.	8,61E+02	1,14E-01	0,00E+00	1,05E+01	1,94E+01	9,49E-01	-1,29E+03
**This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.*								

Resource use indicators

Results per declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1,93E+04	2,25E-02	0,00E+00	2,49E+00	4,84E+01	2,17E-01	-4,93E+02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,93E+04	2,25E-02	0,00E+00	2,49E+00	4,84E+01	2,17E-01	-4,93E+02
PENRE	MJ	9,53E+03	8,69E-01	0,00E+00	1,57E+02	2,60E+02	2,32E+01	-1,31E+04
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	9,53E+03	8,69E-01	0,00E+00	1,57E+02	2,60E+02	2,32E+01	-1,31E+04
SM	kg	0,00E+00	0,00E+00	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	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	1,06E+01	-6,33E-03	0,00E+00	2,28E-02	1,37E-01	2,40E-02	-7,41E+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 indicators

Results per declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1,92E-02	6,33E-06	0,00E+00	1,08E-03	2,14E-03	1,50E-04	-1,39E-01
Non-hazardous waste disposed	kg	2,63E+02	2,04E+00	0,00E+00	1,51E+01	4,63E+01	1,52E+02	-1,19E+03
Radioactive waste disposed	kg	4,26E-02	3,38E-07	0,00E+00	4,72E-05	5,70E-04	3,39E-06	-9,31E-03

Output flow indicators

Results per declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**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	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	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	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	0,00E+00

Abbreviations

EPD	Environmental Product Declaration
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
LCIA	Life Cycle Impact Assessment
GWP	Global Warming Potential
GHG	Greenhouse Gases
CO_2eq	Carbon Dioxide Equivalent
GPI	General Program Information
SVHC	Substances of Very High Concern

References

1) ISO 14040:2006 Environmental management – Life cycle assessment – Principles and Framework
2) ISO 14044:2006 Environmental management - Life cycle assessment - Principles and guidelines
3) ISO 14025:2006, Environmental labels and declarations – Type III Environmental declarations - Principles and procedures
4) EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
5) General Programme Instructions of the International EPD® System. Version 4.0.
6) General Programme Instructions of the International EPD® System. Version 5.0.1.
7) PCR 2019:14 Construction products (EN 15804+A2) (2.0.1)
8) Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <http://link.springer.com/10.1007/s11367-016- 1087-8>
9) PEF Method Annex C https://eplca.jrc.ec.europa.eu/permalink/Annex_C_V2.1_May2020.xlsx
10) European Commission (2024). *EU Construction & Demolition Waste Management Protocol including guidelines for pre-demolition and pre-renovation audits of construction works: updated edition 2024*, Publications Office of the European Union.
11) Bureau Veritas Polska Sp. z o.o. LCA report DSI Version 1 2025

Version history

Original Version of the EPD

EPD®

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