WAGO – Environmental Product Declaration

Product Environmental Profile (PEP) / EPD Type III

2273 / PUSH WIRE® Splicing Connector Series

0,068
kg CO2 eq.
Climate change - total



PEP Registration **No.: WAGO-00002-V.01.01-EN**	Drafting rules: **"PCR-4-ed4-EN-2021 09 06" Supplemented by "PSR-0001-ed4-EN-2022 11 16"**
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Independent verification of the declaration and data in compliance with ISO 14025: 2006	
Internal: ☐	**External:** ☑
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain)	
PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500 :2022 The components of the present PEP may not be compared with components from any other program.	
Document complies with ISO 14025:2006 "Environmental labels and declarations. Type III environmental declarations"	

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1. General Information

Company information

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Standards and program operator

This document is a Type III environmental declaration developed in accordance with ISO 14025:2010 and EN 50693:2019 / NF E38-500:2022 and follows the requirements of the PEP ecopassport® program, which is operated by the Association P.E.P.

The environmental results presented in this declaration are valid within the scope, assumptions and methodological framework defined by the applicable PCR and PSR. Comparability with other environmental declarations is ensured only where the same functional unit, system boundaries, assumptions and data quality requirements are applied. PEPs from different programs or based on different PCRs are not directly comparable.

PCR / PSR reference

This report is based on the PCR-ed4-EN-2021 09 06 and PSR-0001-ed4-EN-2022 11 16 from the PEP ecopassport Program. Under the product families described in PSR0001-ed4-EN-2022 11 16, the family “power accessories” includes connectors and is relevant to this declaration.

Functional unit

The functional unit of this study is: The function of the product is to connect power transmission cables together, or to connect them to equipment, for one unit and its packaging, under operating conditions identical to those of the cable: 1 ampere (A) over 30 years, with a use rate of 70%, in accordance with the applicable standards.

Lifetime and use rate are as defined in the table given in Appendix 6.1. of the PSR-0001- ed4-EN-2022 11 16. The reference lifetime (RTL) is 30 years.

2. Product description

Product overview

A splicing connector is an electromechanical component used to establish an electrical connection between conductors.

The WAGO 2273 Series consists of compact push-wire splicing connectors designed for the connection of solid copper conductors with cross-sections ranging from 0.5 mm² to 2.5 mm². The connectors are suitable for installation in surface-mounted and flush-mounted junction boxes within building installations.

The electrical connection is established by inserting the stripped solid conductor directly into the contact point. The conductor's stiffness overcomes the clamping spring force, ensuring a secure and maintenance-free electrical contact. The contact surfaces are tin-plated to enhance corrosion resistance and long-term reliability.

Depending on the variant, the connectors provide two, three, four, five or up to eight connection points and are rated for a nominal voltage of 450 V and electrical currents of up to 24 A.

The products are supplied either in individual product packaging (boxes) or in bulk packaging (foil), depending on the distribution channel.

Product family covered

The reference product is defined as one unit of a WAGO 2273 splicing connector (type 2273-202) with two clamping units, including the associated product packaging and bulk packaging required for distribution, and is used to fulfil the functional unit.

This reference product serves as the basis for modelling the other splicing connectors covered by the homogeneous environmental family of the WAGO 2273 series.

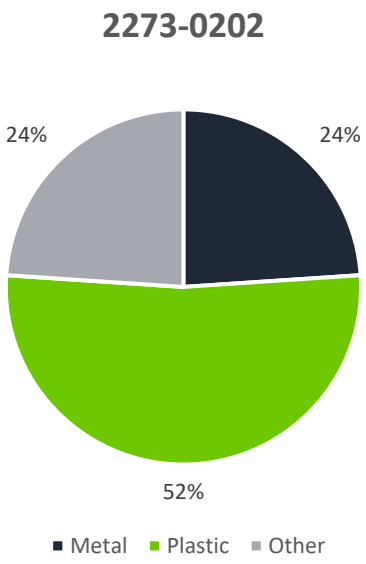
Within this product family, the splicing connector 2273-202 comprises two clamping units. For the remaining splicing connectors of the 2273 series, the last digit of the part number (i.e. 2, 3, 4, 5 or 8) indicates the number of clamping units.

Product series	Item number	Mass of declared unit (g)
WAGO 2273 splicing connectors	2273-202	1.002
	2273-203	1.314
	2273-204	1.647
	2273-205	1.969
	2273-208	2.570

3. Material composition

Reference product mass

Constituent Materials			
Reference product mass	**0.71E-03 kg**		
Packaging mass per declared unit	**2.92E-04 kg**		
Category PEP Material	**Materials**	**Mass (kg)**	**Percentage (%)**
Metal	Steel	1,30E-04	13,0%
Metal	Copper	1,10E-04	11,0%
Plastic	PC	4,70E-04	46,9%
Plastic	LDPE-Film	5,24E-05	5,2%
Other	Carton	2,40E-04	23,9%
Total Weight		**1,00E-03**	**100%**



Substance assessment

Declarations regarding compliance with RoHS and REACH can be accessed via the Environmental Product Compliance Search. The corresponding SCIP notification number, where applicable, is also available through this platform.

Compliance with substance restrictions and information obligations is governed by the WAGO Environmental Product Compliance Standard (EPC Standard). This standard defines the relevant substance bans and restrictions, associated information requirements, and take-back obligations, and contractually obliges suppliers to comply with these requirements.

4. Life cycle assessment (LCA)

LCA methodology

This LCA calculation was done in accordance with the requirements set in ISO 14044 and EN 15804, for which data was collected from the various production processes that fall within the system boundaries. The aim of this LCA study is to establish product environmental profiles of WAGO series 2273 splicing connectors and to compile LCA files with which new updated underlying cradle-to-grave profiles can be included in the PEP ecopassport Program. OpenLCA version 2.5.0 was used to calculate the environmental impacts produced during the life cycle of the reference product. Primary data on values of the materials used in manufacturing was provided by WAGO. For secondary data, the closest generic datasets from Ecoinvent 3.11 EN15804GD were selected, to model upstream and downstream processes that WAGO had no influence over and that have not been specifically inventoried.

4.1 Manufacturing (A1–A3)

The production and packaging processes for the WAGO 2273 series are carried out at one WAGO facilities in Germany.

Primary production data (including energy consumption, material losses, internal logistics and regranulation processes) were collected at facility and process level and allocated to the reference flow using physical allocation keys, primarily based on mass and production output of the respective processes.

All waste from A1–A3 is treated as waste or as a co-product, based on the EOL scenarios given PEP-PCR–ed4-EN-2021-09-06. There are no other co-products and no allocation has been applied.

Moreover, based on the company's energy supply, a common energy mix has been determined for all production facilities. Accordingly, production energy consumption has been calculated using the simple average electricity mix used at WAGO's production facilities in Germany. The average data refers to the 2024 calendar year.

4.2 Distribution (A4)

According to section 2.5.3 of PCR-ed4-EN-2021 09 06, the default international transport scenario was applied. Transport was modelled for one WAGO 2273 splicing connector with a mass of 1.00 g, including packaging. Transport processes were represented using appropriate datasets from the ecoinvent database.

4.3 Installation (A5)

The installation of the product is performed manually using standard hand tools. The installation process includes stripping the insulation from the conductors, opening the operating levers of the connector, inserting the conductors into the connection points, and closing the levers to establish the electrical and mechanical connection in accordance with the manufacturer's installation instructions.

No electrically powered tools or energy-consuming equipment are required for the installation. No additional materials or auxiliary components are used during installation, and no emissions occur as part of the installation activities. The installation process does not generate product-related waste.

Only packaging waste is generated during installation. The packaging consists of plastic film and cardboard materials, which are removed at the installation site. The transport and end-of-life treatment of the packaging waste are considered in accordance with the requirements of the PEP-PCR–ed4-EN-2021 09 06. Packaging waste transport is modelled as local transport, and end-of-life treatment follows the default scenarios defined in the applicable PCR and PSR documents.

4.4 Use (B1–B7)

For power connection accessories such as splicing connectors, the environmental impacts during the use stage are considered negligible, except for the energy losses occurring during operation.

In accordance with the PEP ecopassport PCR and EN 15804, the use stage is structured into modules B1 to B7. For the WAGO 2273 splicing connectors, only module B6 (energy use during operation) is relevant, while modules B1 (use), B2 (maintenance), B3 (repair), B4 (replacement), B5 (refurbishment) and B7 (operational water use) are considered not applicable, as the product is a passive component requiring no maintenance, replacement, auxiliary materials, or water during its lifetime.

The technical lifespan of the WAGO 2273 splicing connectors was assumed to be 30 years with a use rate of 70 %. The energy use in module B6 is represented by Joule losses occurring during operation. These losses were calculated in accordance with section 3.4.4.4 of PSR-0001-ed4-EN-2022-11-16, using primary data from WAGO and an electrical resistance of 480.381944 micro Ohms.

As this resistance value represents an average connector resistance, a fixed value was applied consistently for all variants of the 2273 series with different connector quantities. The calculated energy input for module B6 amounts to 318136 J of low-voltage electricity over the reference lifetime. A global electricity dataset from ecoinvent was selected, as the reference product is assumed to be used worldwide.

4.5 End-of-life (C1–C4)

The end-of-life phase includes modules C2 (transportation), C3 (waste treatment) and C4 (disposal). Module C1 (deinstallation) is not applicable and therefore excluded from the system boundary.

Transport at end of life is modelled as local transport for one WAGO 2273-202 splicing connector without packaging, in accordance with PCR-ed4-EN-2021 09 06. Waste treatment and disposal quantities for the different materials were calculated using the end-of-life parameters and formulas defined in the PCR.

4.6 Benefits beyond system boundaries (D)

Module D is modelled according to the EN 15804 substitution approach in accordance with PCR-ed4-EN-2021 09 06 and EN15804GD, applying the default end-of-life parameters defined in the PCR annex. Only material and energy flows originating from life cycle stages A4 to C4 are considered. Recycled wastes generated during the manufacturing stage (A1–A3) are treated as co-products and are therefore excluded from Module D.

At end of life, steel and copper are assumed to be recycled according to the PCR default material recovery rates. The recycled fractions substitute primary metal production on a mass-equivalent basis using U datasets, while the remaining fractions are disposed of according to the PCR defaults.

Plastics containing additives or fillers (e.g. glass fibres) are assumed to be partly sent to energy recovery and partly disposed of, following the PCR default parameters. Energy recovery substitutes conventional heat production. The recovered thermal energy is calculated using a Lower Heating Value (LHV, PCI) of 30.79 MJ/kg, and substituted heat is modelled using the Jakobsberg heat production process and to represent the substituted electricity, a global electricity production has been selected.

The resulting benefits and loads from material recycling and energy recovery are reported as net impacts in Module D.

5. Environmental impact indicators

This section presents the life-cycle impact assessment results per functional unit and per life cycle stage, calculated in accordance with the applicable PCR and PSR, using the software setup described in the following table:

Parameter	Description
LCA Software	openLCA (version 2.5)
LCA database	ecoinvent 3.11
EPD database add-on	EN 15804 add-on for ecoinvent (v3.11), developed by GreenDelta GmbH
Impact assessment method	EN 15804+A2 (EF 3.1)
Life cycle stages	A1–A3, A4, A5, B1–B7, C1–C4, D

Reference parameters for results

- 1 packaged unit for production, distribution, installation and end-of-life stages
- 1 packaged unit for benefits and loads beyond the system boundaries (Module D)
- 1 packaged unit and 1 A for the use stage

Geographical representativeness:

Primary production data used in this study are representative of WAGO's manufacturing facilities in Germany. Background data for upstream and downstream processes are based on internationally recognised datasets from the ecoinvent database and represent average conditions at European or global level, as appropriate.

Technological representativeness:

The life cycle inventory reflects the actual manufacturing technologies and processes used for the production of the declared product, including injection moulding, metal forming and assembly operations. Background processes represent average, state-of-the-art technologies as modelled in the applied database.

Applicable product standards

Applicable electrical product standards define the technical requirements of the product and its safe use. These standards do not influence the calculation of the environmental impact indicators, which are determined in accordance with the applicable PCR and PSR.

Use stage scaling rules

The use-stage impacts (Joule losses) depend on the applied current and shall be scaled by the user by multiplying the reported results by the square of the actual current. The PEP is valid within the maximum permissible current of the product.

Mandatory impact indicators

Common base of mandatory indicators								
Environmental impact indicators								
Impact category	**Unit**	**A1-3**	**A4**	**A5**	**B1-7**	**C1-4**	**Total**	**D**
Climate change - total	kg CO2 eq.	5,04E-03	2,90E-04	5,70E-04	6,13E-02	7,00E-04	6,79E-02	-3,70E-04
Climate change - fossil fuels	kg CO2 eq.	5,12E-03	2,90E-04	1,30E-04	6,08E-02	7,00E-04	6,70E-02	-3,80E-04
Climate change - biogenics	kg CO2 eq.	-9,13E-05	2,42E-07	4,30E-04	3,70E-04	7,84E-06	7,17E-04	9,93E-06
Climate change - land use and land use transformation	kg CO2 eq.	9,36E-06	6,09E-07	1,55E-07	1,30E-04	3,80E-07	1,40E-04	-4,31E-07
Ozone depletion	kg CFC-11 eq.	1,79E-10	4,38E-12	8,15E-13	4,30E-10	2,04E-12	6,17E-10	-3,03E-12
Acidification (AP)	mol H+ eq.	9,76E-05	4,27E-06	2,71E-07	3,20E-04	6,83E-07	4,23E-04	-4,82E-06
Freshwater eutrophication	kg P eq.	5,19E-07	2,52E-09	6,33E-10	3,30E-06	1,77E-09	3,82E-06	-3,84E-07
Marine aquatic eutrophication	kg N eq.	7,27E-06	1,08E-06	2,07E-07	5,58E-05	2,74E-07	6,46E-05	-2,81E-06
Terrestrial eutrophication	mol N eq.	9,30E-05	1,19E-05	1,01E-06	6,20E-04	2,84E-06	7,29E-04	-4,38E-05
Photochemical ozone formation	kg NMVOC eq.	3,20E-05	3,52E-06	4,57E-07	1,90E-04	9,27E-07	2,27E-04	-8,18E-06
Abiotic resource depletion - elements or resource depletion - metals and minerals	kg Sb eq.	1,14E-06	6,84E-10	1,60E-10	3,72E-07	4,80E-10	1,51E-06	-6,48E-08
Abiotic resource depletion - fossil fuels or resource depletion - fossils	MJ	8,94E-02	3,86E-03	7,30E-04	8,18E-01	1,77E-03	9,14E-01	-4,22E-03
Water requirement	m3 World eq.	2,88E-03	1,83E-05	8,86E-06	1,62E-02	5,00E-05	1,92E-02	-1,40E-04

Inventory flows indicator								
Resource use indicators								
Impact category	**Unit**	**A1-3**	**A4**	**A5**	**B1-7**	**C1-4**	**Total**	**D**
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	2,52E-02	4,87E-05	1,20E-05	1,29E-01	3,33E-05	1,54E-01	-1,97E-03
Use of renewable primary energy resources used as raw materials	MJ	-2,93E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,93E-03	0,00E+00
Total use of renewable primary energy resources	MJ	2,22E-02	4,87E-05	1,20E-05	1,29E-01	3,33E-05	1,51E-01	-1,97E-03
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	8,94E-02	3,86E-03	7,30E-04	8,18E-01	1,77E-03	9,14E-01	-4,22E-03
Use of non-renewable primary energy resources used as raw materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources	MJ	8,94E-02	3,86E-03	7,30E-04	8,18E-01	1,77E-03	9,14E-01	-4,22E-03
Indicators describing the use of secondary materials, water and energy resources (e.g. waste combustion)								
Use of secondary materials	kg	5,80E-04	3,01E-06	6,00E-07	1,87E-03	2,13E-06	2,46E-03	1,30E-04
Use of renewable secondary fuels	MJ	9,95E-05	3,47E-07	8,62E-08	9,80E-04	2,03E-07	1,08E-03	-2,91E-06
Use of non-renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m3	7,57E-05	4,54E-07	-8,85E-07	3,80E-04	2,23E-08	4,55E-04	-5,83E-06
Waste category indicators								
Hazardous waste disposed of	kg	1,29E-03	5,72E-06	1,75E-06	3,15E-03	1,13E-05	4,46E-03	-1,10E-04
Non-hazardous waste disposed of	kg	6,34E-03	3,63E-05	7,50E-04	6,33E-03	9,80E-04	1,44E-02	1,39E-03
Radioactive waste disposed of	kg	1,00E-07	6,92E-10	1,77E-10	2,09E-06	4,40E-10	2,19E-06	-4,81E-09
Output flow indicators								
Components for reuse	kg	-6,40E-23	-1,60E-24	-2,70E-25	-9,79E-22	-5,87E-26	-1,05E-21	9,24E-24
Materials for recycling	kg	2,50E-04	4,38E-06	4,84E-07	1,84E-03	1,49E-05	2,11E-03	-3,00E-05
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	MJ	1,36E-04	6,86E-07	1,84E-07	9,59E-04	1,78E-05	1,11E-03	-2,01E-06
Other indicators								
Biogenic carbon content of the product	kg C eq.	0,00E+00						
Biogenic carbon content of the associated packaging	kg C eq.	9,75E-05						

Optional impact indicators

Optional indicators								
Environmental impact indicators								
Impact category	**Unit**	**A1-3**	**A4**	**A5**	**B1-7**	**C1-4**	**Total**	**D**
Total use of primary energy during the life cycle	MJ	1,12E-01	3,91E-03	7,42E-04	9,47E-01	1,80E-03	1,07E+00	-6,19E-03
Emission of fine particles	Disease Incidence	3,95E-10	1,90E-11	4,97E-12	2,79E-09	1,29E-11	3,22E-09	-8,15E-11
Ionizing radiation, human health	kBq U235 eq.	1,40E-04	1,09E-06	2,79E-07	3,25E-03	6,92E-07	3,39E-03	-7,19E-06
Ecotoxicity (fresh water)	CTUe	1,65E-01	5,50E-04	1,01E-02	1,62E-01	2,30E-03	3,39E-01	-9,12E-02
Human toxicity, carcinogenic effects	CTUh	1,22E-11	6,85E-14	1,78E-14	1,06E-11	9,69E-14	2,29E-11	4,90E-13
Human toxicity, non-carcinogenic effects	CTUh	8,79E-10	1,95E-12	1,58E-12	5,95E-10	3,20E-12	1,48E-09	7,38E-11
Impacts related to land use/soil quality	Dimensionless	5,68E-02	1,87E-03	6,70E-04	1,42E-01	1,57E-03	2,03E-01	-6,38E-03

6. Additional environmental information

Manufacturing

WAGO is certified according to ISO 9001, ISO 14001 and ISO 50001. Further information and certificates can be found on our website: Certificates and Approvals | WAGO-Website.

Distribution

To minimize environmental impacts during distribution, WAGO continuously optimizes packaging and logistics processes. Packaging materials are selected based on recyclability and material efficiency, ensuring adequate product protection with minimal resource use. Transport packaging is designed to reduce volume and weight, thereby improving loading efficiency and reducing associated emissions. Logistics processes are regularly assessed to enable consolidated shipments and optimized transport routes in accordance with the PCR transport assumptions.

Installation and maintenance

Considering the wide variety of possible methods of installation for power connection accessories, the determination of the installation impact shall be carried out based on the hypotheses below to ensure comparability of the PEPs:

- The manual installation operations not requiring a power supply are not included within the scope of the study
- The screwing or crimping processes are excluded, because of their low impact, as described in Section 2.2.8 of the PEP-PCR-ed4-EN-2021 09 06.

Use phase benefits

During use, the product contributes to energy-efficient and reliable electrical installations. Its design ensures low contact resistance and robust operational safety, helping to reduce energy losses over the product lifetime. The product requires no energy during operation and has no active components. Its intuitive handling supports error-free installation, contributing to system reliability. Depending on the application, smart features such as clear actuation levers and transparent housing enable visual inspection and long-term functional assurance, supporting sustainable building operation.

End-of-life management

Deinstallation is outside the PEP scope; building deconstruction (C1) has not been inventoried and is declared "0" because it is a manual process for the product that requires no energy. In modeling the EoL, the quantities for waste treatment and disposal processes of different materials were calculated according to the parameters in the EoL formula in PCR–ed4 EN 2021 09 06, and background processes were represented using EN 15804 compliant datasets. Transport to disposal and recovery facilities was modeled using the local transport assumptions defined in the PCR; methods and flows were reported based on the PEP PCR parameters.

7. Extrapolation for other variants

When a product family is declared, multiplication factors are provided to estimate the environmental impacts of the individual variants. This PEP covers a homogeneous environmental family. All variants share identical manufacturing processes, assembly steps, energy use and packaging. Variants differ only in product mass and material grade (polycarbonate (PC) or polybutylene terephthalate (PBT), available as Standard and Green Range versions).

The material balance and environmental impacts were modelled using the reference product. Product-specific manufacturing parameters, including component weights and waste generation, are based on variant-specific primary data. Products manufactured at different WAGO locations in Germany are included. Waste generation is measured individually for each variant and is not derived by simple scaling from the reference product.

Based on the availability of high-quality, variant-specific primary data, the environmental impacts were calculated directly for each variant across all life cycle stages. The resulting per-variant and per-stage impact results form the basis for the extrapolation factors required by PCR section 4.1.5.

The results presented in this report refer to the product with code 2273-202, which is selected as the reference product for the WAGO 2273 series. Environmental impacts differ for splicing connectors with 3, 4, 5, and 8 clamping units.

The multiplication factor tables below allow the calculation of environmental impacts for other variants of the 2273 -series. These include products with codes 2273-203, 2273-204, 2273-205, 26 and 2273-208. By multiplying the impact results of the reference product (2273-202) with the corresponding factors, the environmental impacts of the other declared variants can be derived for all relevant environmental impact indicators.

Impact category	A1-3_Manufacturing Stage				A4_Distribution phases				A5_Installation phases				B6_Use stage				C1-4_End-of-life stages				Total				D_Benefits and loads			
	203	204	205	208	203	204	205	208	203	204	205	208	203	204	205	208	203	204	205	208	203	204	205	208	203	204	205	208
Climate change - total	1,38	1,78	2,19	3,32	1,31	1,66	1,97	2,59	1,05	1,12	1,19	1,33	1,00	1,00	1,00	1,00	1,37	1,77	2,17	2,83	1,03	1,07	1,11	1,20	1,51	2,05	2,57	3,81
Climate change - fossil fuels	1,37	1,76	2,16	3,27	1,31	1,66	1,97	2,59	1,31	1,62	1,92	2,46	1,00	1,00	1,00	1,00	1,36	1,76	2,14	2,79	1,03	1,07	1,11	1,20	1,50	2,05	2,58	3,82
Climate change - biogenics	0,82	0,77	0,74	0,40	1,31	1,64	1,96	2,56	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,49	2,03	2,53	3,63	1,03	1,04	1,05	1,11	1,54	2,09	2,63	3,96
Climate change - land use and land use transformation	1,22	1,44	1,67	2,47	1,31	1,64	1,96	2,56	1,07	1,15	1,22	1,36	1,00	1,00	1,00	1,00	1,41	1,85	2,27	3,06	1,02	1,03	1,05	1,11	1,55	2,09	2,64	4,01
Ozone depletion	1,32	1,68	2,05	2,78	1,31	1,64	1,96	2,56	1,07	1,15	1,23	1,37	1,00	1,00	1,00	1,00	1,41	1,84	2,26	3,03	1,10	1,21	1,32	1,54	1,54	2,09	2,63	3,97
Acidification (AP)	1,43	1,95	2,46	4,82	1,31	1,64	1,96	2,56	1,07	1,15	1,23	1,38	1,00	1,00	1,00	1,00	1,40	1,83	2,25	3,02	1,10	1,23	1,35	1,90	1,54	2,08	2,62	3,96
Freshwater eutrophication	1,44	1,89	2,36	4,43	1,31	1,64	1,96	2,56	1,07	1,15	1,22	1,36	1,00	1,00	1,00	1,00	1,42	1,86	2,29	3,10	1,06	1,12	1,19	1,47	1,55	2,09	2,64	4,01
Marine aquatic eutrophication	1,40	1,81	2,23	3,95	1,31	1,64	1,96	2,56	1,04	1,08	1,12	1,20	1,00	1,00	1,00	1,00	1,40	1,83	2,24	3,00	1,05	1,11	1,16	1,37	1,54	2,09	2,63	3,99
Terrestrial eutrophication	1,40	1,83	2,26	4,19	1,31	1,64	1,96	2,56	1,09	1,18	1,27	1,43	1,00	1,00	1,00	1,00	1,40	1,83	2,24	3,00	1,06	1,12	1,18	1,44	1,54	2,09	2,74	3,88
Photochemical ozone formation	1,41	1,83	2,26	4,06	1,31	1,64	1,96	2,56	1,06	1,13	1,19	1,31	1,00	1,00	1,00	1,00	1,40	1,83	2,25	3,02	1,06	1,13	1,20	1,47	1,54	2,09	2,63	3,98
Abiotic resource depletion - elements or resource depletion - metals and minerals	1,48	1,97	2,48	5,09	1,31	1,64	1,96	2,56	1,08	1,16	1,23	1,38	1,00	1,00	1,00	1,00	1,42	1,86	2,29	3,11	1,36	1,73	2,11	4,08	1,54	2,09	2,63	3,99
Abiotic resource depletion - fossil fuels or resource depletion - fossils	1,36	1,74	2,12	3,08	1,31	1,64	1,96	2,56	1,07	1,14	1,22	1,36	1,00	1,00	1,00	1,00	1,41	1,84	2,26	3,05	1,04	1,08	1,12	1,21	1,53	2,07	2,60	3,88
Water requirement	1,32	1,66	2,02	3,20	1,31	1,64	1,96	2,56	1,13	1,27	1,41	1,66	1,00	1,00	1,00	1,00	1,37	1,77	2,20	2,80	1,05	1,10	1,16	1,34	1,50	2,07	2,57	3,93
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	1,13	1,30	1,46	2,02	1,31	1,64	1,96	2,46	1,07	1,14	1,21	1,35	1,00	1,00	1,00	1,00	1,41	1,86	2,28	3,01	1,02	1,05	1,08	1,17	1,54	2,08	2,62	3,95
Use of renewable primary energy resources used as raw materials	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Total use of renewable primary energy resources	1,15	1,33	1,52	2,16	1,31	1,64	1,96	2,46	1,07	1,14	1,21	1,35	1,00	1,00	1,00	1,00	1,41	1,86	2,28	3,01	1,02	1,05	1,08	1,17	1,54	2,08	2,62	3,95
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	1,36	1,74	2,12	3,08	1,31	1,64	1,96	2,56	1,07	1,15	1,22	1,36	1,00	1,00	1,00	1,00	1,41	1,84	2,27	3,05	1,04	1,08	1,12	1,21	1,53	2,07	2,60	3,88
Use of non-renewable primary energy resources used as raw materials	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Total use of non-renewable primary energy resources	1,36	1,74	2,12	3,08	1,31	1,64	1,96	2,56	1,07	1,15	1,22	1,36	1,00	1,00	1,00	1,00	1,41	1,84	2,27	3,05	1,04	1,08	1,12	1,21	1,53	2,07	2,60	3,88
Use of secondary materials	1,28	1,53	1,83	2,59	1,31	1,64	1,96	2,56	1,08	1,17	1,26	1,42	1,00	1,00	1,00	1,00	1,44	1,90	2,34	3,25	1,07	1,13	1,20	1,38	1,54	2,08	2,62	3,77
Use of renewable secondary fuels	1,41	1,71	2,11	2,91	1,31	1,64	1,96	2,56	1,07	1,14	1,21	1,34	1,00	1,00	1,00	1,00	1,41	1,84	2,27	3,06	1,04	1,07	1,10	1,18	1,54	2,09	2,63	3,99
Use of non-renewable secondary fuels	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Net use of fresh water	1,32	1,72	2,11	3,43	1,31	1,64	1,96	2,56	1,03	1,06	1,09	1,15	1,00	1,00	1,00	1,00	2,05	3,20	4,16	7,31	1,05	1,12	1,19	1,41	1,50	2,04	2,54	3,65
Hazardous waste disposed of	1,46	1,92	2,40	3,78	1,31	1,64	1,96	2,56	1,18	1,37	1,56	1,91	1,00	1,00	1,00	1,00	1,38	1,77	2,17	2,84	1,13	1,27	1,41	1,81	1,55	2,09	2,64	3,82
Non-hazardous waste disposed of	1,40	1,81	2,24	3,55	1,31	1,64	1,96	2,56	1,05	1,12	1,17	1,27	1,00	1,00	1,00	1,00	1,38	1,78	2,17	2,87	1,20	1,42	1,63	2,27	1,45	1,99	2,44	3,31
Radioactive waste disposed of	1,39	1,79	2,20	3,42	1,31	1,64	1,96	2,56	1,07	1,14	1,20	1,33	1,00	1,00	1,00	1,00	1,41	1,85	2,28	3,07	1,02	1,04	1,06	1,11	1,55	2,09	2,64	4,02
Components for reuse	1,43	1,87	2,32	4,16	1,31	1,64	1,96	2,56	0,96	0,92	0,87	0,79	1,00	1,00	1,00	1,00	2,16	3,43	4,50	8,10	1,03	1,05	1,08	1,20	1,54	2,08	2,62	3,94
Materials for recycling	1,36	1,76	2,16	3,44	1,31	1,64	1,96	2,56	1,08	1,16	1,23	1,38	1,00	1,00	1,00	1,00	1,53	2,07	2,61	3,92	1,05	1,10	1,15	1,31	1,47	2,01	2,49	3,33
Materials for energy recovery	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Exported energy	1,35	1,71	2,05	3,24	1,31	1,64	1,96	2,56	1,07	1,14	1,21	1,33	1,00	1,00	1,00	1,00	1,54	2,09	2,63	3,99	1,03	1,06	1,08	1,17	1,56	2,10	2,66	4,09
Biogenic carbon content of the product	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Biogenic carbon content of the associated packaging	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Total use of primary energy during the life cycle	1,31	1,66	2,00	2,89	1,31	1,64	1,96	2,56	1,07	1,15	1,22	1,36	1,00	1,00	1,00	1,00	1,41	1,84	2,27	3,04	1,03	1,07	1,11	1,21	1,53	2,08	2,61	3,91
Emission of fine particles	1,41	1,83	2,27	3,98	1,31	1,64	1,96	2,56	1,07	1,15	1,22	1,36	1,00	1,00	1,00	1,00	1,41	1,86	2,28	3,09	1,05	1,11	1,17	1,38	1,54	2,08	2,62	3,95
Ionizing radiation, human health	1,43	1,79	2,21	3,57	1,31	1,64	1,96	2,56	1,07	1,14	1,20	1,33	1,00	1,00	1,00	1,00	1,41	1,85	2,28	3,08	1,02	1,03	1,05	1,11	1,55	2,09	2,64	4,02
Ecotoxicity (fresh water)	1,43	1,87	2,33	4,09	1,33	1,65	1,98	2,58	1,00	1,00	1,01	1,01	1,00	1,00	1,00	1,00	1,37	1,77	2,17	2,83	1,21	1,43	1,65	2,51	1,55	2,09	2,64	4,00
Human toxicity, carcinogenic effects	1,45	1,91	2,38	4,45	1,31	1,64	1,96	2,56	1,10	1,21	1,32	1,52	1,00	1,00	1,00	1,00	1,40	1,84	2,25	3,02	1,24	1,49	1,74	2,84	1,54	2,08	2,62	3,94
Human toxicity, non-carcinogenic effects	1,48	1,97	2,47	5,08	1,31	1,64	1,96	2,56	1,05	1,11	1,17	1,28	1,00	1,00	1,00	1,00	1,39	1,80	2,20	2,90	1,29	1,58	1,88	3,43	1,54	2,08	2,62	3,94
Impacts related to land use/soil quality	1,30	1,63	1,97	3,40	1,30	1,64	1,96	2,56	1,06	1,13	1,19	1,33	1,00	1,00	1,00	1,00	1,41	1,85	2,28	3,09	1,09	1,19	1,29	1,70	1,54	2,09	2,63	3,96

8. Disclaimer & references

Disclaimer

The Product Environmental Profile (PEP) contained herein are based on the information and data available at the time of publication.

The environmental information presented is the result of a life cycle assessment (LCA) carried out in accordance with ISO 14040, ISO 14044 and ISO 14025, as well as the applicable Product Category Rules (PCR) and Product Specific Rules (PSR). The data reflects average conditions and assumptions defined within the scope, system boundaries and scenarios of the study.

The declaring organisation makes no express or implied representation or warranty as to the accuracy, completeness or continued validity of the information provided. No guarantee is given that the results will remain unchanged over time, nor that they are representative of all possible applications, installation conditions, use scenarios or end-of-life treatments.

This EPD is intended for information purposes only. Comparisons with other environmental product declarations are only permissible if they are based on the same PCR, functional unit, system boundaries and methodological assumptions.

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The validity of this EPD is limited to the period defined by the applicable program operator and may require updating in case of significant changes in product design, manufacturing processes, supply chains, energy mixes or applicable standards.

References

- PEP Ecopassport Product Category Rules (PCR), ed4-EN-2021 09 06.
- PEP Ecopassport Product Specific Rules (PSR), PSR-0001-ed4-EN-2022 11 16.
- OpenLCA, version 2.5.0.
- Ecoinvent, version 3.11 (EN15804GD generic datasets).