

ACO. we care for water

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

ACO Therm® 3.0 Standard

ACO GmbH



EPD HUB, HUB-4492

Published on 21.11.2025

Last updated on 21.11.2025

Valid until 20.11.2030

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

GENERAL INFORMATION

MANUFACTURER

Manufacturer	ACO GmbH
Address	Am Ahlmannkai, 24103 Büdelsdorf, Germany
Contact details	info@aco.com
Website	www.aco.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025 EN 17213 Windows and doors
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, B2, and modules C1-C4, D
EPD author	Bartsch Martin, ACO GmbH
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☒ External verification
EPD verifier	Vera Durão, as an authorised verifier acting for EPD Hub Limited

products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	ACO Therm® 3.0 Standard
Additional labels	-
Product reference	-
Place(s) of raw material origin	Germany
Place of production	Beton- und Kunststoffe Fleuren GmbH, Industriering 22, 26169 Friesoythe, Germany
Place(s) of installation and use	Germany, Austria
Period for data	01/01/2024-31/12/2024, calendar year 2024
Averaging in EPD	No grouping
Variation in GWP-fossil for A1-A3 (%)	-
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	7,71

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m ² three paned PVC window ACO Therm 3.0 Standard
Declared unit mass	50,1 kg
Mass of Packaging	13,2 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	97,2
GWP-total, A1-A3 (kgCO ₂ e)	74,9
Secondary material, inputs (%)	35,6
Secondary material, outputs (%)	34,8
Total energy use, A1-A3 (kWh)	241
Net freshwater use, A1-A3 (m ³)	0,75

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

ACO is one of the world's leading water technology companies, particularly for rainwater and wastewater management. Our mission is "ACO. we care for water." Care in this sense means to be protective and attentive and is deeply anchored in the ACO WaterCycle. This cycle describes the collection, transportation, purification, storage and finally the reuse of this vital resource. Using innovative separation and filter technologies, ACO prevents the contamination of water from fats, fuels, heavy metals and microplastics. In all our products and systems, durability, reusability and a low carbon footprint are of great importance. Responsibility for people, the environment and the world of tomorrow is in ACO's DNA. For generations this belief has shaped the values at our locally rooted but globally active family corporation. Founded in Schleswig-Holstein in 1946, ACO is represented in over 50 countries around the world and is known for proximity to regional markets and business partnerships.

ACO is a WaterTech company that takes a holistic approach to rainwater and wastewater management. Based on our global drainage expertise, which protects people from water, we increasingly see our mission as also protecting water from people. With the ACO WaterCycle, we supply systems with which water can be collected and routed, cleaned, stored and ultimately reused. In this way, ACO contributes to the preservation of clean groundwater as a vital resource and makes a contribution to the world of tomorrow. In addition to surface water management, ACO GmbH is also actively engaged in protecting buildings and infrastructure from water ingress, particularly in the area of basement protection. This includes solutions that safeguard people and property from

flooding and backflow events, while also ensuring that water is responsibly managed and kept from being contaminated or wasted. include:

- ACO backflow protection systems, which prevent wastewater from re-entering buildings during heavy rainfall or sewer overload.
 - wells with integrated drainage, designed to resist water pressure and prevent flooding.
 - ACO door and wall penetration seals, which provide watertight barriers at critical entry points.
- These systems reflect ACO's dual commitment: to protect people from water and to protect water from people—ensuring safety, sustainability, and resilience in the built environment.

PRODUCT DESCRIPTION

The declared product consists of single-sash tilt-and-turn windows with dimensions of 1 x 1 m and triple-glazed insulating glass. The windows are made from PVC frame profiles with transparent glass filling. The seals are made of soft PVC, and the fittings are predominantly made of steel. A reference service life of 40 years is assumed for the window.

For placing on the market in the EU/EFTA (excluding Switzerland), Regulation (EU) No. 305/2011 - /Construction Products Regulation/ applies. The products require a declaration of performance in accordance with the harmonized product standard /DIN EN 14351-1/ and CE marking. The respective national regulations apply for use.

Properties according to DIN EN 14351-1:

- Glass construction 4/14/4/14/4 mm
- Thermal transmittance glass U_g according to DIN EN 674, DIN EN 675: 0.6 W/(m²K)

- Total energy transmittance g: 53 %
- Thermal transmittance window U_w according to DIN EN 674, DIN EN 675: 0.83 W/(m²K)
- Watertightness according to DIN EN 1027, DIN EN 12208: class 7A
- wind load resistance according to EN 12210: B4/C4
- airtightness according to EN 12207: class 4

Further information can be found at:
www.aco.com

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	4	EU
Minerals	43	EU
Fossil materials	37	EU
Bio-based materials	16	EU

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0,2
Biogenic carbon content in packaging, kg C	6,31

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m ² three paned PVC window ACO Therm 3.0 Standard
Mass per declared unit	50,1 kg
Functional unit	1 m ² three paned PVC window ACO Therm 3.0 Standard for ventilation, insulation U-Value: 0,89 W/m ² K , natural light intake, over 40 years
Reference service life	40

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
x	x	x	x	x	ND	x	ND	ND	ND	ND	ND	x	x	x	x	x	
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery
																	Recycling

Modules not declared = ND. Modules not relevant = NR

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

The manufacturing process of the ACO Basement window includes the production and supply of raw materials as well as their processing either in a precast concrete facility or directly on-site using in-situ concrete. The process begins with the fabrication of PVC

profiles, where PVC granules are mixed with additives and pigments to achieve the required mechanical, thermal, and color properties. (81% PVC, 8.1% filler chalk, 4.9 % Impact modifiers, 2.8 % Calcium-zinc stabilizers, 3.2 % Pigment titanium oxide (TiO₂))

Unlike conventional windows, no steel reinforcement is used in the profiles, which reduces material complexity and environmental impact.

The raw materials as the new PVC and the recycled PVC are transported 240 km to the site of the extrusion.

The PVC profiles are extruded in a continuous process, during which the sealing gaskets are simultaneously co-extruded directly into the profile. This in-line co-extrusion ensures a permanent bond between the gasket and the frame, improving durability and reducing the need for additional assembly steps.

The extruded profiles then are transported in reusable palettes 32 km to the manufacture of windows.

The profiles are then joined using mirror welding technology to form the window frame. After welding, the corners are cleaned and a triple-glazed insulating glass unit (typically filled with krypton gas, U-value < 0.5 W/m²K) is mounted with glazing brackets into the frame.

To ensure structural stability during transport and concrete casting, a wooden cross brace is inserted into the window frame. This temporary stiffening element prevents deformation and is removed after installation.

After quality inspection, the windows are prepared for distribution. Units are placed on wooden pallets, protected with corner pads, and secured using plastic straps. Then the windows are transported in mid 564 km to two storage sites at ACO.

PVC production scraps are re-melted and reintegrated into the manufacturing process. Mixed plastic and other non-recyclable waste are sent to local waste management facilities within a 50 km radius. Metal waste is sorted for recycling, while non-recyclable plastics are incinerated. Wastewater from the production process is treated at a local wastewater treatment plant. The production line primarily uses electricity, with supplementary use of diesel and natural gas for thermal processes.

The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), and its use is ensured throughout the validity period of this EPD.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

First the transport distance is calculated from window manufacturer to the storage location in Bavaria and Austria (564 km).

Distance of transport to construction site has been estimated based on average distances for transports from ACO site Reith in Bavaria Germany (288)km. calculated from 47% short distances, 19% middle distances and 35 % long distances. So in addition it will be 852 km. The transportation is mostly by lorry. Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. To be conservative, empty returns are included in this study as implemented through an average load factor in the Ecoinvent transport datapoints. Transportation does not cause losses as product is packaged properly.

The basement window unit is designed to be cast directly into concrete, either in a factory setting or on-site within the formwork of the basement wall. This integrated installation method eliminates the need for additional mounting materials and reduces transport and handling emissions.

No ancillary material is required. This module also considers environmental impacts from installation process are due to generation of waste packaging materials (A5). This study assumed the loads of preprocessing of packaging waste, namely wooden pallet and the wooden cross brace chipped to be used

as secondary fuel, PE and paper sorted for recycling. Such waste processing facilities are widespread throughout Germany so distances in the groups are between 50 and 250 km

PRODUCT USE AND MAINTENANCE (B1-B7)

Maintenance (B2): the maintenance depends greatly on the user. For this study, basing on the company's experience it was considered that the window is cleaned once a year with soap water, with an average consumption of 5 liter of water and 20 gr of sulfonated soap per time. During the 40 years of reference life service, according to the manufacturer's experience and the guaranteed quality over the product, repair, replacement and refurbishment are not common and hence considered negligible.

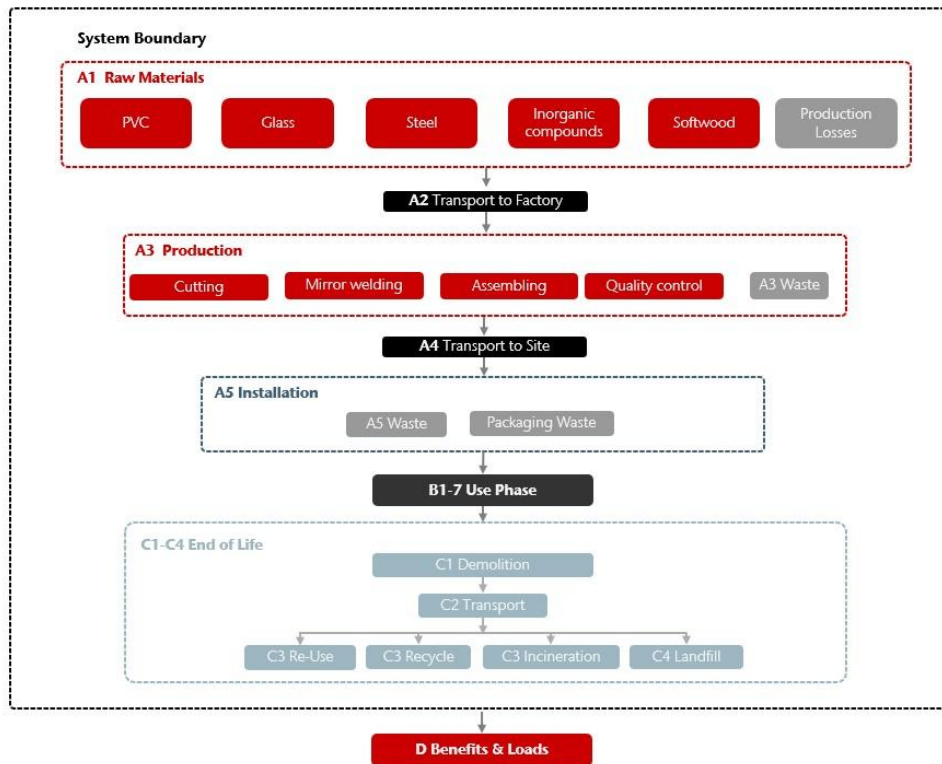
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

This study considers that the window at its EoL is dismantled manually and separately from other construction waste, hence no energy nor material is required. Per Annex B, EN 17213, 25% non glass and 70% glass are rejected and sent directly to landfill. The remaining 75% of non glass and 30% glass are sorted and sent to a local treatment facility for processing. This share of metals, glass and 45% of PVC frame are recycled, while the other 55% of PVC and other plastics are incinerated with energy recovery. Module D claims the benefits of avoided production of metal, glass and plastic through recycling, avoided production of heat and electricity through wood and plastic incineration. It also takes into account the loads of incineration and recycling activities. Such waste processing facilities are widespread throughout Germany so distances in the groups are between 50 and 250 km.

SYSTEM DIAGRAM

Life-cycle diagram for ACO Therm 3.0



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

All industrial processes from raw material acquisition and pre-processing, production, product distribution, installation, use of the product and end-of-life management are included. The production of capital equipment, construction activities, and infrastructure, personnel-related activities, energy and water use related to company management and sales activities are excluded.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator,

with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging material	No allocation
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

All estimations and assumptions regarding the cut-off criteria and the allocation are declared in the part "Cut-off Criteria except the estimations/assumptions below: - Module A2, A4 and C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. It may vary but as the role of transportation emission in total results is small, the variety in load is assumed to be negligible. Empty returns are considered in the ecoinvent database.- Module A4: Transportation does not cause losses as products are packaged properly. Also, volume capacity utilization factor is assumed to be 1 for the nested packaged products. Additionally, transportation distances are assumed based on data from the manufacturer.- Module A5: Packaging waste is declared as installation waste.-

Module C2: Transportation distance to waste handling facility is estimated as 30 km and the transportation method is assumed as lorry. -
Module C3, C4, D: Part of the product is sent for recycling.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	-

There is no average result considered in this study since this EPD refers to one specific product produced in one production plant.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

A5 packaging scenario source: EUROSTAT.
Module C-D scenario: Window (EN 17213)

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	8,69E+01	8,49E-01	-1,29E+01	7,49E+01	5,79E+00	2,39E+01	ND	1,12E+00	ND	ND	ND	ND	ND	0,00E+00	7,96E-01	1,95E+01	5,74E-01	-2,49E+01
GWP – fossil	kg CO ₂ e	8,60E+01	8,48E-01	1,03E+01	9,72E+01	5,79E+00	6,96E-01	ND	1,13E+00	ND	ND	ND	ND	ND	0,00E+00	7,95E-01	1,97E+01	5,75E-01	-1,89E+01
GWP – biogenic	kg CO ₂ e	7,34E-01	1,82E-04	-2,32E+01	-2,24E+01	1,31E-03	2,32E+01	ND	-7,46E-03	ND	ND	ND	ND	ND	0,00E+00	1,80E-04	-1,45E-01	-1,46E-03	-5,99E+00
GWP – LULUC	kg CO ₂ e	1,12E-01	3,64E-04	2,17E-02	1,34E-01	2,59E-03	6,86E-04	ND	9,79E-04	ND	ND	ND	ND	ND	0,00E+00	3,56E-04	3,38E-03	1,63E-04	-7,45E-03
Ozone depletion pot.	kg CFC-11e	5,51E-06	1,36E-08	1,45E-07	5,67E-06	8,55E-08	7,47E-09	ND	2,89E-08	ND	ND	ND	ND	ND	0,00E+00	1,17E-08	9,22E-08	6,75E-09	-1,50E-07
Acidification potential	mol H ⁺ e	5,45E-01	3,11E-03	3,35E-02	5,81E-01	1,97E-02	2,53E-03	ND	8,27E-03	ND	ND	ND	ND	ND	0,00E+00	2,71E-03	1,70E-02	1,84E-03	-1,27E-01
EP-freshwater ²⁾	kg Pe	2,71E-02	6,42E-05	3,66E-03	3,09E-02	4,51E-04	1,20E-04	ND	4,78E-04	ND	ND	ND	ND	ND	0,00E+00	6,19E-05	1,06E-03	2,62E-05	-6,34E-03
EP-marine	kg Ne	1,03E-01	1,08E-03	9,66E-03	1,13E-01	6,48E-03	2,68E-03	ND	3,88E-03	ND	ND	ND	ND	ND	0,00E+00	8,91E-04	6,21E-03	2,68E-03	-1,87E-02
EP-terrestrial	mol Ne	1,11E+00	1,17E-02	1,00E-01	1,22E+00	7,06E-02	1,03E-02	ND	1,29E-02	ND	ND	ND	ND	ND	0,00E+00	9,70E-03	4,75E-02	7,56E-03	-2,05E-01
POCP (“smog”) ³⁾	kg NMVOCe	3,54E-01	4,64E-03	3,94E-02	3,98E-01	2,91E-02	3,38E-03	ND	5,24E-03	ND	ND	ND	ND	ND	0,00E+00	4,00E-03	1,52E-02	2,69E-03	-6,47E-02
ADP-minerals & metals ⁴⁾	kg Sbe	8,69E-04	2,44E-06	2,35E-05	8,94E-04	1,61E-05	1,28E-06	ND	1,34E-05	ND	ND	ND	ND	ND	0,00E+00	2,22E-06	3,02E-05	5,94E-07	-9,39E-05
ADP-fossil resources	MJ	1,20E+03	1,23E+01	1,48E+02	1,36E+03	8,40E+01	6,45E+00	ND	3,42E+01	ND	ND	ND	ND	ND	0,00E+00	1,15E+01	3,58E+01	5,78E+00	-2,55E+02
Water use ⁵⁾	m ³ e depr.	2,46E+01	6,10E-02	2,54E+00	2,72E+01	4,15E-01	1,77E-01	ND	2,37E-01	ND	ND	ND	ND	ND	0,00E+00	5,70E-02	2,34E+01	2,78E-02	-7,04E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	6,36E-06	8,43E-08	3,60E-07	6,80E-06	5,80E-07	4,46E-08	ND	9,03E-08	ND	ND	ND	ND	ND	0,00E+00	7,96E-08	2,21E-07	4,19E-08	-2,16E-06
Ionizing radiation ⁶⁾	kBq U235e	8,74E+00	1,19E-02	8,90E-01	9,64E+00	7,32E-02	1,70E-02	ND	6,05E-02	ND	ND	ND	ND	ND	0,00E+00	1,01E-02	1,42E-01	5,31E-03	-2,31E+00
Ecotoxicity (freshwater)	CTUe	4,81E+02	1,71E+00	2,73E+01	5,10E+02	1,19E+01	2,22E+00	ND	1,09E+01	ND	ND	ND	ND	ND	0,00E+00	1,63E+00	9,89E+02	4,82E+02	-2,50E+02
Human toxicity, cancer	CTUh	5,06E-08	1,58E-10	1,06E-08	6,14E-08	9,55E-10	2,31E-10	ND	1,36E-09	ND	ND	ND	ND	ND	0,00E+00	1,31E-10	6,93E-09	7,55E-11	-4,72E-08
Human tox. non-cancer	CTUh	7,75E-07	8,09E-09	9,70E-08	8,81E-07	5,44E-08	1,24E-08	ND	4,82E-08	ND	ND	ND	ND	ND	0,00E+00	7,47E-09	1,04E-07	3,46E-09	-1,80E-07
SQP ⁷⁾	-	3,30E+02	1,16E+01	2,21E+03	2,56E+03	8,46E+01	6,08E+00	ND	4,60E+00	ND	ND	ND	ND	ND	0,00E+00	1,16E+01	2,46E+01	1,35E+01	-1,01E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy ⁸⁾	MJ	1,17E+02	1,79E-01	2,15E+02	3,32E+02	1,15E+00	-1,91E+02	ND	1,03E+00	ND	ND	ND	ND	ND	0,00E+00	1,58E-01	3,46E+00	8,53E-02	1,95E+01
Renew. PER as material	MJ	0,00E+00	0,00E+00	1,92E+02	1,92E+02	0,00E+00	-1,92E+02	ND	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,24E+01
Total use of renew. PER	MJ	1,17E+02	1,79E-01	4,07E+02	5,24E+02	1,15E+00	-3,83E+02	ND	1,03E+00	ND	ND	ND	ND	ND	0,00E+00	1,58E-01	3,46E+00	8,53E-02	7,19E+01
Non-re. PER as energy	MJ	4,02E+02	1,23E+01	1,19E+02	5,33E+02	8,40E+01	-1,64E+00	ND	1,69E+01	ND	ND	ND	ND	ND	0,00E+00	1,15E+01	-4,86E+02	-1,14E+02	-3,03E+02
Non-re. PER as material	MJ	8,00E+02	0,00E+00	-4,75E+00	7,95E+02	0,00E+00	-1,09E+01	ND	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-5,77E+02	-2,07E+02	3,87E+01
Total use of non-re. PER	MJ	1,20E+03	1,23E+01	1,14E+02	1,33E+03	8,40E+01	-1,25E+01	ND	1,69E+01	ND	ND	ND	ND	ND	0,00E+00	1,15E+01	-1,06E+03	-3,21E+02	-2,64E+02
Secondary materials	kg	1,78E+01	5,30E-03	3,37E-01	1,82E+01	3,58E-02	4,54E-03	ND	9,32E-03	ND	ND	ND	ND	ND	0,00E+00	4,91E-03	3,60E-02	2,10E-03	7,94E+00
Renew. secondary fuels	MJ	3,67E-02	6,68E-05	2,65E+00	2,69E+00	4,54E-04	4,64E-05	ND	1,43E-04	ND	ND	ND	ND	ND	0,00E+00	6,24E-05	3,17E-03	3,94E-05	4,26E-02
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m ³	6,40E-01	1,80E-03	1,05E-01	7,46E-01	1,24E-02	-1,66E-02	ND	5,01E-03	ND	ND	ND	ND	ND	0,00E+00	1,71E-03	5,41E-01	-8,60E-02	-1,86E-01

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	8,11E+00	2,01E-02	9,51E-01	9,08E+00	1,42E-01	4,29E-02	ND	8,39E-02	ND	ND	ND	ND	ND	0,00E+00	1,96E-02	5,52E+00	1,03E-02	-2,17E+00
Non-hazardous waste	kg	5,30E+02	3,82E-01	2,68E+01	5,57E+02	2,63E+00	2,93E+01	ND	1,55E+02	ND	ND	ND	ND	ND	0,00E+00	3,62E-01	2,80E+01	1,16E+02	-2,75E+01
Radioactive waste	kg	2,26E-03	2,94E-06	2,55E-04	2,52E-03	1,79E-05	4,24E-06	ND	1,55E-05	ND	ND	ND	ND	ND	0,00E+00	2,46E-06	3,62E-05	1,30E-06	-5,95E-04

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	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	ND	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	4,25E-01	4,25E-01	0,00E+00	4,30E+00	ND	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	1,74E+01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,19E+01	ND	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	7,37E+01	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	9,22E+00	ND	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	3,10E+01	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,27E+01	ND	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	4,26E+01	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ e	8,65E+01	8,44E-01	1,02E+01	9,75E+01	5,76E+00	9,79E-01	ND	1,13E+00	ND	ND	ND	ND	ND	0,00E+00	7,91E-01	1,98E+01	5,60E-01	-1,87E+01
Ozone depletion Pot.	kg CFC ₁₁ e	5,40E-06	1,08E-08	1,18E-07	5,53E-06	6,82E-08	6,01E-09	ND	2,54E-08	ND	ND	ND	ND	ND	0,00E+00	9,37E-09	8,74E-08	5,40E-09	-1,26E-07
Acidification	kg SO ₂ e	4,49E-01	2,35E-03	2,62E-02	4,77E-01	1,51E-02	1,88E-03	ND	7,00E-03	ND	ND	ND	ND	ND	0,00E+00	2,07E-03	1,34E-02	1,36E-03	-1,07E-01
Eutrophication	kg PO ₄ ³ e	6,87E-02	5,78E-04	9,34E-02	1,63E-01	3,67E-03	6,77E-04	ND	2,55E-03	ND	ND	ND	ND	ND	0,00E+00	5,05E-04	2,78E-03	6,70E-04	-5,72E-03
POCP (“smog”)	kg C ₂ H ₄ e	2,88E-02	2,07E-04	3,26E-03	3,22E-02	1,34E-03	2,13E-04	ND	4,29E-04	ND	ND	ND	ND	ND	0,00E+00	1,85E-04	1,33E-03	1,63E-04	-7,13E-03
ADP-elements	kg Sbe	7,74E-04	2,38E-06	2,31E-05	7,99E-04	1,57E-05	1,23E-06	ND	1,22E-05	ND	ND	ND	ND	ND	0,00E+00	2,16E-06	2,19E-05	5,77E-07	-4,70E-05
ADP-fossil	MJ	1,06E+03	1,21E+01	1,31E+02	1,20E+03	8,28E+01	6,17E+00	ND	3,32E+01	ND	ND	ND	ND	ND	0,00E+00	1,14E+01	3,35E+01	5,69E+00	-1,92E+02

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG ⁹⁾	kg CO ₂ e	8,62E+01	8,49E-01	1,03E+01	9,73E+01	5,79E+00	6,97E-01	ND	1,13E+00	ND	ND	ND	ND	ND	0,00E+00	7,96E-01	1,97E+01	5,75E-01	-1,89E+01

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH₄ fossil, CH₄ biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO₂ is set to zero.

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

1. Electricity, medium voltage, residual mix, Germany, Ecoinvent, 0.80 kgCO₂e/kWh
2. Market for diesel, burned in diesel-electric generating set, 10MW, World, Ecoinvent, 0.0950 kgCO₂e/MJ
3. Heat production, natural gas, at boiler condensing modulating >100kW, Albania, Ecoinvent, 0.0721 kgCO₂e/MJ

9. Treatment of waste polyethylene, municipal incineration, Ecoinvent, 0.074 kg
10. Treatment of waste polyethylene, sanitary landfill, Ecoinvent, 0.046 kg
11. Treatment of metal scrap, mixed, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 0.049 kg
12. Treatment of scrap steel, inert material landfill, Ecoinvent, 0.011 kg

Transport scenario documentation - A4 (Transport resources)

1. Market for transport, freight, lorry >32 metric ton, EURO5, 564 km
2. Market for transport, freight, lorry >32 metric ton, EURO5, 288 km

Use stages scenario documentation - B2 (Maintenance data source)

1. Market group for tap water, Ecoinvent, 150.0 kg
2. Market for alkylbenzene sulfonate, linear, petrochemical, Ecoinvent, 0.6 kg
3. Treatment of wastewater, average, wastewater treatment, Ecoinvent, 0.151 m³

Transport scenario documentation A4

Scenario parameter	Value
Capacity utilization (including empty return) %	75
Bulk density of transported products	0,00E+00
Volume capacity utilization factor	<1

Use stages scenario documentation - B2 Maintenance

Scenario information	Value
Maintenance process / Description or source where description can be found	Window maintenance. Maintenance manual available as download.
Maintenance cycle / Number per RSL or year (Not applicable if only B2 is declared)	1

Installation scenario documentation - A5 (Installation waste)

1. Treatment of waste wood, post-consumer, sorting and shredding, Ecoinvent, Materials for recycling, 4.17 kg
2. Treatment of waste wood, untreated, municipal incineration, Ecoinvent, 3.906 kg
3. Exported Energy: Electricity, Ecoinvent, 8.72 MJ
4. Exported Energy: Electricity, Ecoinvent, 0.5 MJ
5. Exported Energy: Thermal, Ecoinvent, 11.98 MJ
6. Exported Energy: Thermal, Ecoinvent, 0.69 MJ
7. Treatment of waste wood, untreated, sanitary landfill, Ecoinvent, 4.9476 kg
8. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 0.08 kg

End of life scenario documentation - C1-C4 (Data source)

1. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 7.7 kg
2. Treatment of waste polyvinylchloride, municipal incineration, Ecoinvent, 8.8 kg
3. Exported Energy: Electricity, Ecoinvent, 30.29 MJ
4. Exported Energy: Electricity, Ecoinvent, 0.72 MJ
5. Exported Energy: Thermal, Ecoinvent, 41.65 MJ
6. Exported Energy: Thermal, Ecoinvent, 0.99 MJ
7. Treatment of waste polyvinylchloride, sanitary landfill, Ecoinvent, 5.5 kg
8. Treatment of waste plastic, mixture, municipal

- incineration, Ecoinvent, 0.15 kg
9. Treatment of waste glass sheet, sorting plant, Ecoinvent, Materials for recycling, 7.614 kg
 10. Treatment of waste glass, sanitary landfill, Ecoinvent, 17.77 kg
 11. Sorting and pressing of iron scrap, Ecoinvent, Materials for recycling, 2.1 kg
 12. Treatment of scrap steel, inert material landfill, Ecoinvent, 0.11 kg

Scenario information	Value
Scenario assumptions e.g. transportation	50-500 km

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez

Tool verification validity: 27 March 2025 - 26 March 2028

Vera Durão, as an authorised verifier acting for EPD Hub Limited

21.11.205

