

ALUMINIUM SYSTEMS

Environmental Product Declaration Of Thermal Break Coated Aluminium Profiles

In accordance with **ISO 14025** and **EN 15804:2012+A2:2019**

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ECO PLATFORM EPD VERIFIED

EPD®
THE INTERNATIONAL EPD® SYSTEM

Programme Related Information

Programme:	The International EPD System
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EPD based on Product Category Rules (PCR):	The CEN standard EN 15804 serves as the core Product Category Rules PCR 2019:14, version v.1.11 'Construction products'
PCR review was conducted by:	The Technical Committee of the International EPD System
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Third Party Verifier:	Business Quality Verification P.C 144 Septemvriou 3rd Str. Athens, Greece www.bqv.gr info@bqv.gr Accredited by Hellenic Accreditation System E.SY.D., Accreditation No. 1218
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CPC Code:	41532, bars, rods, and profiles of aluminium

The EPD owner has the sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

EUROPA PROFIL ALUMINIUM S.A., a company of the Tzirakian Group, is one of the strongest aluminium extrusion industries in Greece. Founded in 1974 and with continuous strategic investments in mechanical equipment and technology and with the appropriate human capital, today is one of the largest and most recognized aluminium companies, both in the domestic as well as in the international market. Its subsidiary is "PROFIL ACCESSORIES S.A.", which produces and trades shutters and insect screens **Europa** as well as components for **Europa architectural systems**, a variety of mechanisms, of various domestic and foreign suppliers.



Products and applications

Aiming to be the most reliable and preferred partner for its customers, **Europa** operates on two levels: On the one hand, it produces innovative products of high quality and performance, develops and offers an expanded range of aluminium profile options, with a wide variety of designs and high production capabilities covering every possible need and customer requirement and on the other hand, the company provides comprehensive professional support services, which ensure customer service of unparalleled efficiency at every stage of cooperation.

In particular, Europa specializes in the production of:

- Aluminium Architectural Systems: Opening, Folding, Sliding, Roll Systems, Screen Systems, Special Constructions etc.
- Outdoor Systems: Shading Systems, Aluminium Pergola Systems, Security Doors, Aluminium Panels, Glass Railing Systems etc.
- Industrial Applications: Custom made profiles and Standard Profiles.

Our values

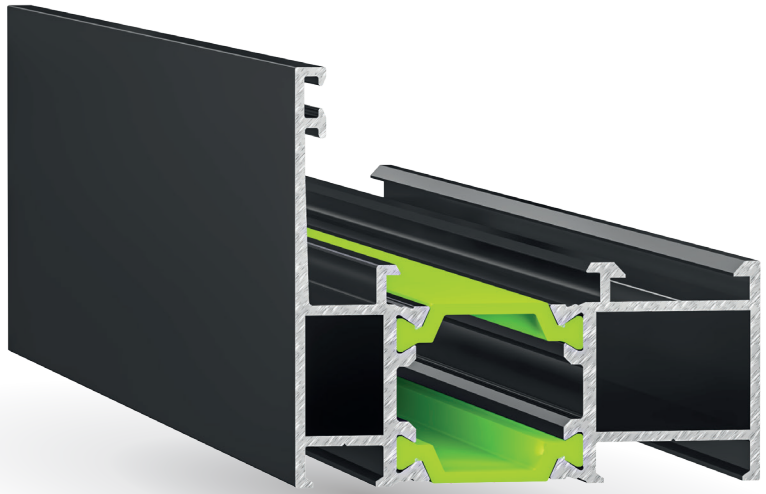
With an emphasis on "Superior Quality Products & Services / Certified Production Processes & Products / Anthropocentric Philosophy", **Europa** produces innovative aluminium systems of top quality, technology and aesthetics.

Integrity, Reliability, Flexibility, Teamwork and Sense of Responsibility are the core values that run through the operation and the whole range of **Europa** activities.

Starting from these values and equipped with the know-how of almost half a century of operations, we work methodically with the aim of fulfilling our commitments to our employees, customers and partners, society as a whole and the environment.

Product Description: **Thermal Break Coated Aluminium Profiles**

This is a specific EPD and covers one aluminium extrusion product group manufactured by **Europa** in the form of rod, bar and tube with standard and custom-made profiles.



Applications

Aluminium profiles are used in multiple sectors:

• Building and construction (windows, doors, curtain walls, roller shutters, insect screens, partition walls, façade systems, atriums and skylight windows, louvres shading systems, pergolas, security doors, railing systems, aluminium panels).
Tailored and finished products are applied in projects of residential, commercial, hotel, healthcare and educational sector as well as public works.

• Industrial applications (flatbars, symmetrical and asymmetrical angles, T-profiles, U-profiles, Z-profiles, rectangular tubes, tubes, square and round bars, rectangular and square tubes with radios).
Tailored and finished products are applied in transportation, robotics and various applications.

• Mounting systems for photovoltaic panels

Technical Specifications

Property	Value	
Density (g/cm^3)	2,50 - 2,70	Scientific and Technical Sources
Melting Range (°C)	585 - 650	Scientific and Technical Sources
Thermal Conductivity (W/m*K)	200 - 220	Scientific and Technical Sources
Thermal Expansion (10^{-6}/K)	23,2 - 23,4	Scientific and Technical Sources
Tensile Strength (MPa)	Min 190	EN 755-2
Elongation A50 (mm)	Min 6 %	EN 755-2

Technical data is representative of **6000 series aluminium alloys** (6xxx alloy, tempers T1-T6), which is the principal production at **Europa.**

Component	Thermal Break Coated Aluminium Profile
Aluminium Profile	> 85 %
↳ Aluminium (Al)	95-99 %
↳ Magnesium (Mg)	0,35-0,9 %
↳ Silicon (Si)	0,2-0,6 %
↳ Others	< 1 %
Coating (Powder)	< 5 %
Thermal Break (Polyamide)	< 10 %

Note: All the above is percentage weight by weight (w/w)

Composition

This EPD covers one product group. According to the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation, the product does not contain any substance included in the Candidate List of Substances of Very High Concern (SVHCs) for authorization with concentrations higher than 0.1% weight by weight (w/w).

Packaging

Aluminium profiles are packaged using cardboard box, plastic wrap and stretch film wrap. Packaging materials are included in the scope of this EPD.

Declared unit
1 kg of thermal break coated aluminium profiles.

Goal and Scope
This EPD assesses the environmental impacts of the production of 1 kg of Aluminium Profile from Cradle to gate with modules C and D.

System Boundary
The type of EPD is cradle to gate with modules C1–C4 and module D (A1–A3, C and D).

Allocations
Wherever possible allocation was avoided. Allocation based on physical properties (mass) was applied to the electricity, water, and wastes. Mass allocation applied to all inputs and outputs of coating and thermal break stage, since in these stages there are two products generated in each stage. In coating stage, coated and thermal break coated aluminium profile are produced, while in thermal break stage, thermal break mill finished and thermal break coated aluminium profile are produced. Also, mass allocation is applied in packaging materials used for the final products.

Assumptions
Module A2: a EURO4 lorry 16-32 metric ton was utilized for road transportation and a bulk carrier for dry goods for sea transportation.

Module C1: the specific diesel consumption for a building demolition is considered as 0,239 MJ/kg product of material according to JRC TECHNICAL REPORT "Model for Life Cycle Assessment (LCA) of buildings".

Module C2: a conservative assumption of 100 km by lorry 16-32 metric ton was used.

Module C3 and C4: The scenarios included are currently in use and are representative for one of the most probable alternatives.

According to the European Aluminium Association 90% of the aluminium for building applications is being recycled and transformed to secondary aluminium billets while the rest 10% is disposed/landfilled. Polyamide and powder integrated in the final products is assumed to be 100% disposed after product's life cycle.

Cut-off Rules

The cut-off criteria adopted is as stated in "EN 15804:2012+A2:2019". Where there is insufficient data for a unit process, the cut-off criteria are 1% of the total mass of input of that process. The total of neglected input flows per module is a maximum of 5% of energy usage and mass. The cut-off rules were applied for some chemical substances used on coating stage and some wastes generated from aluminium treatment, since they contribute less than 1% by mass.

Data Quality

ISO 14044 was applied in terms of data collection and quality requirements. The impact of the production of raw materials recovered from Ecoinvent database v.3.7.1. The data concerning the modules A2 (Transportation) and A3 (Product manufacturing) were provided by **Europa** and concerns the full year 2020. These data were the quantities of all input and output materials extracted from the company's ERP system, the consumed utilities (energy, water) and the distances and means of transport for each input stream. Regarding electricity mix, the latest (2020) national residual electricity mix as published in DAPEEP SA was utilized. The emission factor for natural gas is provided from National Inventory Report of 2020 for Greece. The end-of-life are based on the most representative scenarios for this product. Background data for this stage are retrieved from Ecoinvent v.3.7.1.

Time Representativeness

Data for year 2020 is used.

Software Used

Software OpenLCA v.1.10.3 was used.

Geographical Scope

Worldwide

A1: Raw Material Supply

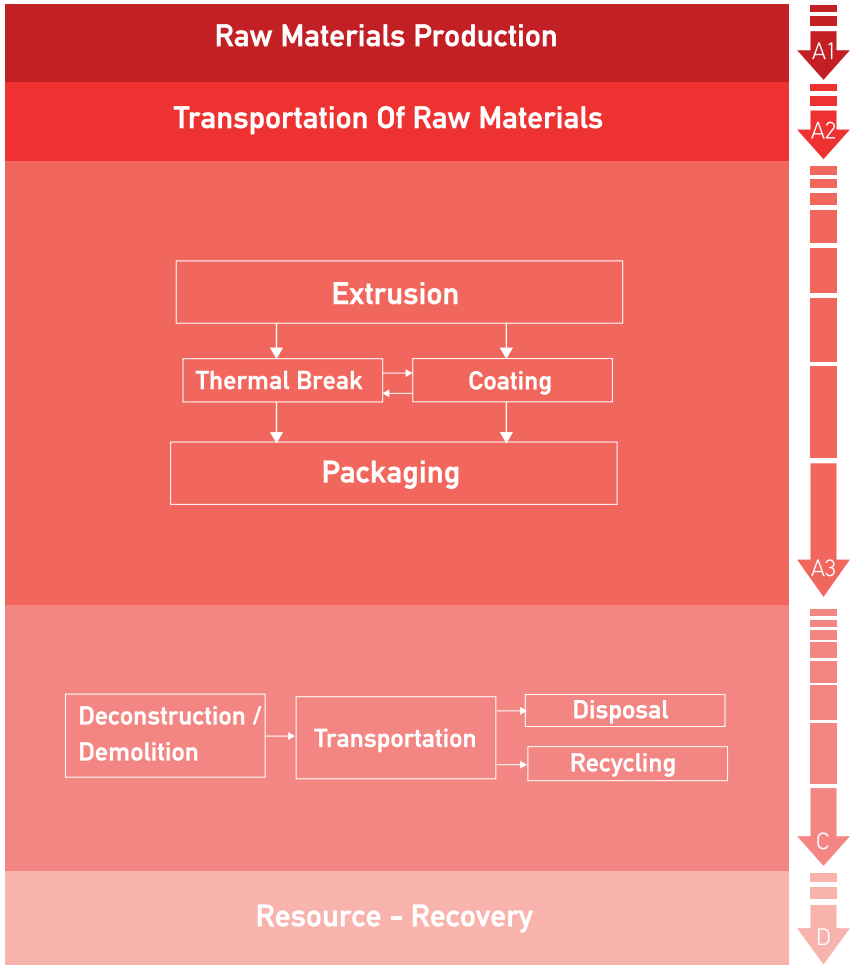
The production starts with the material supply. This module includes the mining and pretreatment processes before production (processing of raw materials, generation of electricity and fuels required for the manufacturing, recycling process of secondary materials). Aluminium ingot, primary and secondary, is the main raw material charged in the **extrusion line**. Concerning the **thermal breaking stage**, the main raw material used is polyamide along with the mill finished profiles. Moreover, the usage of powder and chemicals is required regarding the **coating** of profiles.

A2: Raw Material Transportation

Transport is relevant for delivery of raw materials from the supplier to the gate of manufacturing plant. Aluminium billets, coating powders, polyamides and other raw materials are transported both from Greece and other countries via truck and vessel.

A3: Manufacturing

The manufacturing process starts with the **extrusion**, in which aluminium ingots are forced to flow through a shaped opening in the die in order to be moulded into aluminium profiles. Mill finished material emerges as an elongated piece with the same profile as the die opening. Afterwards, mill finished profiles become **thermally broken** with the addition of polyamide, whereas mill finished and thermal break aluminium profiles undergo a coating process. Alternatively, at first mill finished aluminium profiles undergo a **coating process** and then become **thermally broken** with the addition of polyamide.



C1: Deconstruction and Demolition

This module refers to the impact arising from the diesel consumption of the heavy vehicles during demolition process.

C2: Waste Transport

This module includes the transportation of the discarded product either to the recycling site or to landfills for final disposal.

C3: Waste Processing

This module involves the impact arising from the waste processing of the product at the end-of-life stage intended for reuse, recycling, and recovery. 90% of the aluminium of the product is recycled, by remelting process, to produce secondary aluminium billets.

C4: Final Disposal

Disposal is the final stage of product life. 10% of the aluminium of the products and the whole amount of polyamide and coating powder will be landfilled.

D: Allocation by Reuse, Recovery or Recycling

Module D embodies avoided burdens related to the potential reuse and/or recycling of the product after its end-of-life stage.

X = Included, MND = Module Not Declared

	Product Stage			Construction Stage		Use Stage							End of Life Stage				Resource Recovery Stage
	Raw Materials Supply	**Transport**	**Manufacturing**	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	**De-construction and demolition**	**Transport**	**Waste processing for reuse, recovery and/or recycling**	**Disposal**	**Reuse-Recovery-Recycling-potential**
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module Declared	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	EU 27	EU 27	GR										EU 27	EU 27	EU 27	EU 27	EU 27
Specific data used	>90%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - Products	Not relevant		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - Sites	Not relevant		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Environmental Impacts

Environmental Impacts	Unit	A1-A3	C1	C2	C3	C4	D
GWP - Total[1]	kg CO2 eq	4,87E+00	2,19E-02	1,65E-02	5,65E-01	6,63E-02	-3,81E+00
GWP - Fossil	kg CO2 eq	4,81E+00	2,19E-02	1,65E-02	5,59E-01	6,63E-02	-3,71E+00
GWP - Biogenic	kg CO2 eq	2,08E-02	3,59E-06	5,55E-06	5,53E-03	1,55E-05	-1,35E-02
GWP - Luluc	kg CO2 eq	4,32E-02	1,74E-06	5,58E-06	4,55E-04	6,78E-06	-8,27E-02
GWP - GHG	kg CO2 eq	4,67E+00	7,18E-04	1,63E-02	5,54E-01	6,22E-02	-3,62E+00
ODP	kg CFC-11 eq	2,71E-07	4,72E-09	3,77E-09	4,30E-08	2,01E-09	-2,67E-07
AP	mol H+ eq	3,19E-02	2,28E-04	8,25E-05	3,44E-03	7,07E-05	-2,99E-02
EP - Freshwater	kg PO4-3 eq	7,42E-03	2,02E-06	3,42E-06	1,81E-03	4,51E-06	-3,32E-03
EP - Freshwater[2]	kg P eq	2,42E-03	6,60E-07	1,11E-06	5,89E-04	1,47E-06	-1,08E-03
EP - Marine	kg N eq	5,42E-03	1,01E-04	2,88E-05	6,46E-04	3,27E-04	-3,76E-03
EP - Terrestrial	mol N eq	4,81E-02	1,11E-03	3,14E-04	7,78E-03	2,39E-04	-3,79E-02
POCP	kg NMVOC eq	1,5E-02	3,04E-04	8,95E-05	2,00E-03	7,87E-05	-1,30E-02
ADPe	kg Sb eq	6,63E-05	8,83E-09	5,98E-08	1,50E-04	2,31E-08	8,55E-05
ADPf	MJ	5,93E+01	3,00E-01	2,51E-01	6,43E+00	1,59E-01	-3,47E+01
WDP[3]	m3 eq	3,45E+00	2,16E-02	1,17E-03	5,22E-01	3,90E-03	-2,80E+00

[1] This indicator includes all greenhouse gases included in **GWP-total** but excludes **biogenic** carbon dioxide emissions and uptake and biogenic carbon stored in the product with characterization factors (CFs) based on **IPCC (2013)**.

[2] Eutrophication aquatic freshwater shall be given in both **kg PO4-3 eq** and **kg P eq**.

[3] 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 experience with the indicator.

Resource Use

Resource Use	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	1,8E+01	1,56E-03	3,38E-03	9,63E-01	4,29E-03	-2,86E+01
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,8E+01	1,56E-03	3,38E-03	9,63E-01	4,29E-03	-2,86E+01
PENRE	MJ	5,93E+01	3,00E-01	2,51E-01	6,43E+00	1,59E-01	-3,47E+01
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	5,93E+01	3,00E-01	2,51E-01	6,43E+00	1,59E-01	-3,47E+01
SM	KG	2,7E-01	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	M3	8,03E-02	1,67E-05	2,71E-05	1,21E-02	9,07E-05	-6,52E-02

EUROPA ALUMINIUM SYSTEMS

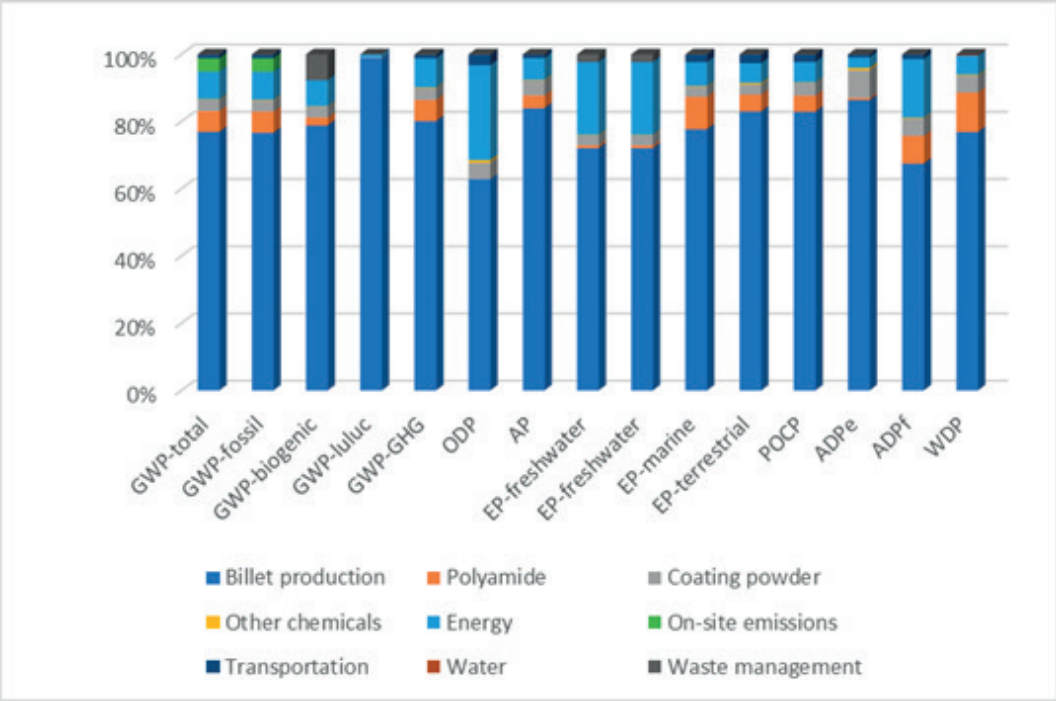
Output Flows and Waste Categories

Output Flows and Waste Categories	Unit	A1-A3	C1	C2	C3	C4	D
HWD	KG	2,4E-03	8,10E-07	6,54E-07	6,32E-03	6,88E-07	3,92E-03
NHWD	KG	1,22E+00	3,69E-04	1,20E-02	1,73E-01	2,56E-01	-1,43E+00
RWD	KG	1,69E-04	2,09E-06	1,72E-06	2,08E-05	9,15E-07	-1,66E-04
CRU	KG	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	KG	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	KG	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Additional Impacts

Additional Impacts	Unit	A1-A3	C1	C2	C3	C4	D
PM	Disease incidence	8,95E-07	6,05E-09	1,19E-09	3,06E-08	3,83E-09	-5,19E-07
IRP	kBq U235 eq	1,19E+00	1,37E-03	1,31E-03	5,51E-02	8,52E-04	-5,58E-01
ETP-FW	CTUe	3,08E+02	1,67E-01	1,85E-01	5,58E+01	5,22E+01	-1,15E+02
HTP-c	CTUh	2,46E-08	8,39E-12	6,81E-12	1,08E-09	1,29E-10	-1,56E-08
HTP-nc	CTUh	3,84E-07	1,22E-10	1,95E-10	4,07E-08	5,02E-10	-1,99E-07
SQP	dimensionless	2,43E+01	3,61E-02	1,68E-01	1,90E+00	8,03E-02	-3,10E+00

Interpretation of the results was carried out in the form of a dominance analysis on the core environmental impacts.



As far as the GWP impact indicator is concerned, it is presented that billet production contributes the most for the production of thermal break coated aluminium profiles, accounting for about 77%. Impacts for energy sources production (LNG and mainly electricity) contributes 8,32%. Impacts from coating powder and other chemicals used for the coating process production contribute 3,53%, while the corresponding contribution for polyamide production accounts for 6,15%. On site emissions from natural gas combustion contribute 3,93%. Other factors such as transportation, water production and waste management are of minor significance, marginally exceeding 1%.

Additional Information

The EPD does not give information on release of dangerous substances to soil, water and indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.

List of abbreviations

GWP - Total	Global Warming Potential total
GWP-Fossil	Global Warming Potential fossil
GWP-Biogenic	Global Warming Potential biogenic
GWP-Luluc	Global Warming Potential land use and land use change
ODP	Ozone Depletion Potential
AP	Acidification Potential
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 photochemical oxidants
ADPe	Abiotic depletion potential for non-fossil resources
ADPf	Abiotic depletion potential for fossil resources
WDP	Water use
PERE	Use of renewable primary energy excluding 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 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 resources
SM	Use of secondary material
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water
HWD	Hazardous waste disposed
NHWD	Non-hazardous waste disposed
RWD	Radioactive waste disposed
CRU	Components for re-use
MFR	Materials for recycling
MER	Materials for energy recovery
EE	Exported Energy
PM	Particulate matter emissions
IRP	Lonizing radiation, human health
ETP-FW	Ecotoxicity, freshwater
HTP-c	Human toxicity, cancer
HTP-nc	Human toxicity, non-cancer
SQP	Land use related impacts/Soil quality

Version History:

2022-06-27/ EPD Version 001: Original version of EPD

2026-03-18/ EPD Version 002: Indicators of Modules A1-A3, C3, C4 & D have been updated due to a significant increase of recycled raw material (aluminium).

References

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Ecoinvent / Ecoinvent Centre, www.Eco-invent.org

Residual Energy Mix 2020 *from Renewable Energy Sources Operator & Guarantees of Origin (DAPEEP SA)*

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National Inventory Report for Greece 2021

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