KURTOĞLU® ALUMINIUM

ENVIRONMENTAL PRODUCT DECLARATION

PROGRAMME
The International EPD® System
www.environdec.com

LOCAL OPERATOR
EPD Turkey

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In accordance with ISO14025 and EN15804+A2:2019/AC:2021 for

Anodized Aluminum Profile

Manufactured by Kurtoğlu Aluminium

EPD® THE INTERNATIONAL EPD® SYSTEM

EPD® TÜRKİYE ENVIRONMENTAL PRODUCT DECLARATION

ECO PLATFORM EPD VERIFIED

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www environdec.com.


KURTOĞLU
ALUMINIUM

Take a Step for Sustainability, Transform the World.

Our company carries a great responsibility in terms of the environment and sustainability. Therefore, we take pride in having earned the Product Environmental Declaration (EPD) certification. The EPD certification documents the environmental impacts of our products and guides us in measuring and continuously improving our environmental performance.

The EPD certification of our company documents the environmental performance of our products. This certification showcases our commitment to environmentally friendly production and sustainability to our customers, business partners, and the community. We will continue to fulfill our environmental responsibilities and play a pioneering role in the industry through innovation.

Programme Information

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ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)
Product Category Rules (PCR): 2019:14 Version 1.2.5, Construction Products and,
EN 15804:2012 + A2:2019/AC:2021 Sustainability of Construction Works

PCR review was conducted by
The Technical Committee of the International EPD® System.

Review chair
Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact/

Independent third-party verification of the declaration and data, according to ISO 14025:2006,
via: EPD verification by individual verifier

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Approved by
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Procedure for follow-up of data during EPD validity involves third party verifier

YES ☐ NO ☑ **LCA accountability** : Metsims Sustainability Consulting

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 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.

About the Kurtoglu Aluminium

Our company started its operations with copper and lead casting in the 1960s, and in 1980, we started to serve in the Aluminum Sector with aluminum extrusion press that has 1200 ton capacity. KURTOGLU Aluminum located in Corlu, approximately 100 km away from Istanbul and operates in 31.000 m² indoor area. With our latest investments, our company has become a modern integrated facility.

- Annual production capacity ~ 34.000 tons,
- Approximately ~ 500 qualified employees,
- ISO 9001:2015 Quality System.
- Qualicoat Seaside Certificate,
- Qualanod Certificate,
- CE Certificate

The main production features of our Company are described as follows:

- Molding Room (Wire Erosion, Treatment Center),
- Aluminum Extrusion Presses, (800 tons, 1460 tons, 1880 tons, 1460/1880 tons, 2100 tons and 2600 tons),
- Anodic Oxidation Facility (75.000 amps - 412.500 m² / month)
- Electrostatic Powder Paint Facility (750.000 m² / month)
- Mechanical Processing Section (CNC Treatment Center)

Kurtoğlu Aluminyum exports its products to; U.S. America, Switzerland, Germany, Austria, Belgium, Sweden, Albania, England, Greece, Bulgaria, Cyprus, Serbia, Montenegro, Hungary, Georgia, Croatia, Turkmenistan, Kyrgyzstan, Azerbaijan, Moldova, Ukraine, Macedonia, Kosovo, Romania, Belarus, Czech Republic, Libya, Iraq, Algeria, Tunisia, Qatar, Nigeria, Israel, Ghana, Gabon, France, India, Saudi Arabia, Burkina Faso, Ethiopia, Egypt, Ivory Coast, Morocco, Poland, The Netherlands, Russia, Madagascar, Niger, Tanzania, Mozambique, Norway, Lebanon, Mayotte, Palestine, Senegal, Somali, Benin, Canada, Panama.

KURTOĞLU ALUMINUM continues to operate based on the principle of providing services to its customers with zero fault...

About The Product

The product UN CPC code is 41532 (Bars, rods and profiles, of aluminium) according to Central Product Classification (CPC) Version 2.1.

Extrusion Line

Extrusion lines are all equipped with the most advanced technology in order to produce high-quality profile. We produce standard profiles, as well as general and special-purpose profiles for the automotive, advertising, furniture, heating, cooling, transportation and construction sectors.

Extrusion

- Materials with a small cross-section/length ratio is small, in other words, materials shaped with a length greater than their width are defined as a "profile."
- The process for obtaining a profile by drawing the raw material through a mold under the application of force is called "extrusion."
- Extrusion is also a cross-sectional reduction process.
- The cross-section of an aluminum billet is converted into the aluminum profile's cross-section.
- Thus, the closer the billet's cross-section is to the profile's cross-section, the easier the process is to perform.
- This requires not only the design of profile molds but also the selection of the correct and suitable extruders.
- Consequently, smaller billets and extruders with the appropriate power are required for the production of thinner and smaller profiles, while larger molds, billets and extruders are necessary for larger profiles.
- The billets are heated up to 420-470 degrees Celsius during the extrusion process. The molds must be at least 450 degrees.
- The temperature of the profiles is more than 500 degrees when they are extruded.
- The profile is cooled, tensioning is applied and then they are cut to the desired length.
- An artificial ageing process is used to ensure that the profiles exhibit the desired properties and they attain their required mechanical values.
- The values of profile size tolerances are specified in various standards.
- Production of sizes other than those specified in the standards is based upon an agreement between the manufacturer and the client.
- However, it should be noted that producing profiles with smaller tolerances will lead to higher costs.

Anodic Oxidation

Anodic oxidation is one of the most important surface processes in aluminum products.

- With this process, aluminum is electrochemically coated with oxide (around 5 - 25 microns) in order to improve its capacity to endure atmospheric conditions and to create a more decorative appearance.
- The post-coating coloring process is made using electrolytic or immersion techniques. (Shades of bronze, brown, black, yellow, blue,green, andred).
- Upon customers request, satin, sand blasted and bright effects can also be created on aluminum prior to anodic oxidation process.
- Anodic oxidation is an environment-friendly surface processing method that is being used with decorative or industrial purposes for over 70 years.
- Anodic oxidation creates a hard and abrasion-resistant layer, thus improves aluminum's quality.
- Our anodising pruducts have QUALANOD certification.
- The facilities have 5 anodic oxidation pools of 15.000 amps and 2 electrolytic coloring pools of 8.000 amps. Annual capacity of the facilities is 12.000 tons.

Max Profile Size: 7500 mm (including hook indentation) Layer Thickness: 5 - 25 microns
Mid-Hook Indentation: Upon demand End-Hook Indentation: On each end of the profile (max. 50 mm)

System Boundaries & Description

A1 - Raw Material Supply

This stage includes raw material/s extraction and pre-treatments before its use in manufacturing. Kurtoğlu Aluminum supplies primary aluminum billets which are produced by renewable energy such as hydro, hydrothermal, and solar from Russia and Türkiye. In addition to primary aluminum, Kurtoğlu Aluminum recycle its own aluminum waste via third party recyclers and feed into its production line by 20%.

A2 - Transport

Transport information of the raw materials are provided by the manufacturer. Locally supplied steel is transported via trucks and other supplies come through sea and train transport.

A3 - Manufacturing

This step covers extrusion of aluminum profiles, anodic oxidation and product packaging. Manufacturing process includes energy consumption, water usage, chemical use, packaging materials and waste management of the production.

C1 - Deconstruction / Demolition

During the deconstruction of aluminum profiles electricity is used. According to "Model for Life Cycle Assessment (LCA) of buildings" by Joint Research Centre (JRC), 0.239 MJ energy used at deconstruction of metal frames.

C2 - Waste Transport

This step includes the transport of materials after they reach their end-of-life. The average distance was assumed 100 km by truck from demolition site to a waste or recycling area.

C3 - Waste Processing

According to International Aluminium Institute, 76% of aluminum is recycled in global scale. This step includes recycling process of aluminum after its use.

C4 - Disposal

In global scale, 76% of aluminum is recycled. 24% of aluminum remains after recycling and it is considered as landfilled.

D - Benefits

76% of recycled aluminum is included to benefits.

System Boundaries & Description

LCA Information

Functional Unit: 1 kg of anodized aluminum profile.
Time Representativeness: 2022
Database(s) and LCA Software: Ecoinvent 3.9.1 and SimaPro 9.5
System Boundaries: Cradle to gate with module C1–C4, module D

	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	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	RU, TR	RU, TR	TR	-	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific Data Used	> 90%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – Products	< 10%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – Sites	0%				-	-	-	-	-	-	-	-	-	-	-	-	-

Allocations

Water consumption, energy consumption and raw material transportation were weighted according to 2022 production figures. In addition, hazardous and non-hazardous waste amounts were also allocated from the 2022 total waste generation. There is no co-product allocation.

Cut-Off Criteria

1% cut-off is applied. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

REACH Regulation

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

LCA Modelling, Calculation and Data Quality

The results of the LCA with the indicators as per EPD requirement are given in the LCA result tables. EN15804 method is followed. All energy calculations were obtained using Cumulative Energy Demand, Low Heating Values (LHV) methodology, while fresh water use is calculated within selected inventory flows in SimaPro according to the PCR. Corresponding regional egional energy datasets were used for all energy related activities. Data quality assessment scheme is given in the table below.

LCA Stages	Data Type
Raw Material Supply	Generic database, plant spesific data
Raw Material Transport	Generic database, plant spesific data
Manufacturing	Generic database, plant spesific data
Demolition	Generic database, scenario and generic data
Waste Transport	Generic database, scenario and generic data
Waste Processing	Generic database, scenario and generic data
Disposal	Generic database, scenario and generic data
Benefits and Loads	Generic database, scenario and generic data

Content Declarations
Product Composition

Product composition of the investigated product is shown in the table below.

Product Components	Weight kg	Post Consumer Recycled Material Weight %	Biogenic Material Weight % and kg C/kg
Aluminium	>99%	20%	0%
Others	<1%	0%	0%
Sum	1	20%	0%

Packing

Packaging Materials	Weight kg	Weight-% (versus the product)	Weight Biogenic Carbon kg C/kg
PE Film	1.62	<0.01%	7.11E-03
Paper & Board	0.72	<0.01%	0
Wood	$12.9x10^{-3}$	<0.01%	5.68E-05
Metal nail	$32.3x10^{-3}$	<0.01%	0
Sum	2.38	<0.01%	7.17E-03

LCA Results

Indicators According to EN 15804							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP Fossil	kg CO_2 eq.	6.07	48.0 x10^{-3}	29.1 x10^{-3}	0.37	28.4 x10^{-3}	-4.16
GWP Biogenic	kg CO_2 eq.	-45.3 x10^{-3}	0.31 x10^{-3}	56.2 x10^{-6}	1.15 x10^{-3}	0.41 x10^{-3}	-0.10
GWP Luluc	kg CO_2 eq.	0.52	97.5 x10^{-6}	14.5 x10^{-6}	0.20 x10^{-3}	14.4 x10^{-6}	-0.49
GWP Total	kg CO_2 eq.	6.54	48.4 x10^{-3}	29.1 x10^{-3}	0.38	28.9 x10^{-3}	-4.75
ODP	kg CFC 11 eq.	0.16 x10^{-6}	0.30 x10^{-9}	0.44 x10^{-9}	8.41 x10^{-9}	0.18 x10^{-9}	-0.13 x10^{-6}
AP	mol H^+ eq.	32.9 x10^{-3}	0.23 x10^{-3}	68.9 x10^{-6}	0.81 x10^{-3}	0.11 x10^{-3}	-24.8 x10^{-3}
EP Freshwater	kg P eq.	2.00 x10^{-3}	21.2 x10^{-6}	2.28 x10^{-6}	63.3 x10^{-6}	15.6 x10^{-6}	-1.19 x10^{-3}
EP Marine	kg N eq.	4.50 x10^{-3}	45.7 x10^{-6}	16.4 x10^{-6}	0.18 x10^{-3}	30.9 x10^{-6}	-3.11 x10^{-3}
EP Terrestrial	mol N eq.	44.6 x10^{-3}	0.46 x10^{-3}	0.17 x10^{-3}	1.92 x10^{-3}	0.34 x10^{-3}	-31.0 x10^{-3}
POCP	kg NMVOC eq.	20.5 x10^{-3}	0.14 x10^{-3}	89.4 x10^{-6}	0.95 x10^{-3}	0.10 x10^{-3}	-15.1 x10^{-3}
ADP Minerals & Metals **	kg Sb eq.	13.9 x10^{-6}	42.6 x10^{-9}	89.5 x10^{-9}	0.45 x10^{-6}	66.7 x10^{-9}	-5.89 x10^{-6}
ADP Fossil **	MJ	62.3	0.61	0.39	4.92	0.22	-38.2
WDP **	m^3	5.73	8.17 x10^{-3}	1.67 x10^{-3}	25.0 x10^{-3}	4.92 x10^{-3}	-4.82
PM	disease inc.	0.43 x10^{-6}	1.92 x10^{-9}	1.47 x10^{-9}	44.7 x10^{-9}	1.23 x10^{-9}	-0.32 x10^{-6}
IR	kBq U-235 eq	0.21	6.69 x10^{-3}	0.34 x10^{-3}	12.0 x10^{-3}	0.61 x10^{-3}	-0.17
ETP - FW	CTUe	19.9	79.9 x10^{-3}	0.24	0.52	0.32	-15.7
HTTP - C	CTUh	22.8 x10^{-9}	10.6 x10^{-12}	11.7 x10^{-12}	0.37 x10^{-9}	44.3 x10^{-12}	-21.0 x10^{-9}
HTTP - NC	CTUh	0.31 x10^{-6}	0.41 x10^{-9}	0.35 x10^{-9}	2.62 x10^{-9}	1.08 x10^{-9}	-0.28 x10^{-6}
SQP	Pt	17.9	89.7 x10^{-3}	0.20	0.42	0.26	-0.37
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, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, ETP-FW: Ecotoxicity freshwater, HTP-c: Cancer human health effects, HTP-nc: Non-cancer human health effects, SQP: Land use related impacts, soil quality.						
Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A4: Transport, A5: Installation, C1: Deconstruction / demolition, C2: Transport, C3: Waste Processing, C4: Disposal, D: Future reuse. recycling or energy recovery potentials						

Disclamier-1: 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. *

***Disclaimer-2: 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.*

Impact Category Indicators							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO_2 eq.	6.37	47.1 x10^{-3}	28.5 x10^{-3}	0.36	28.0 x10^{-3}	-4.47
GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology * The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013							

Resource Use Indicators							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	59.0	73.8 x10^{-3}	5.30 x10^{-3}	0.16	11.1 x10^{-3}	-52.6
PERM	MJ	0	0	0	0	0	0
PERT	MJ	59.0	73.8 x10^{-3}	5.30 x10^{-3}	0.16	11.1 x10^{-3}	-52.6
PENRE	MJ	62.^{3}	0.61	0.39	4.92	0.22	-38.2
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	62.^{3}	0.61	0.39	4.92	0.22	-38.2
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	42.4 x10^{-3}	0.19 x10^{-3}	65.7 x10^{-6}	0.73 x10^{-3}	0.18 x10^{-3}	-35.4 x10^{-3}
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						

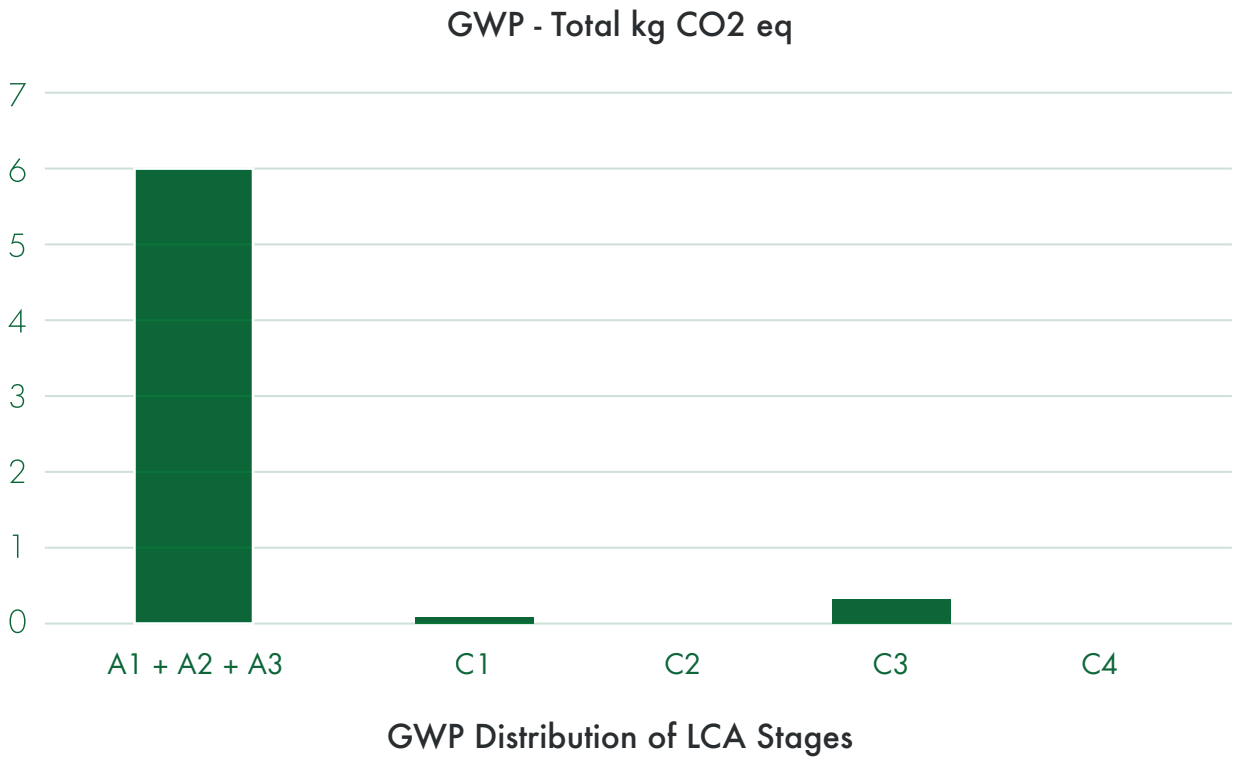
Waste Indicators							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous Waste Disposed	MJ	8.11 x10^{-3}	0	0	0	0	0
Non Hazardous Waste Disposed	MJ	0.26	0.76	0	0	0.24	0
Radioactive Waste Disposed	MJ	0	0	0	0	0	0

Output Flow Indicators							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Components for Reuse	kg	0	0	0	0	0	0
Material for Recycling	kg	0.20	0.76	0	0	0	0
Materials for Energy Recovery	kg	0	0	0	0	0	0
Exported Energy, Electricity	MJ	0	0	0	0	0	0
Exported Energy, Thermal	MJ	0	0	0	0	0	0

Interpretation

According to the LCA study, the raw material supply is the most dominant stage among all life cycle stages. 84% of the global climate change impact category is caused by this phase. The environmental impacts of this stage vary greatly depending on the raw material route. Kurtoğlu Aluminum purchases aluminum from different suppliers, and the weighted average of the purchasing data is used in the LCA modelling.

After raw material production, the manufacturing stage has the second most significant impact. In production, electricity and natural gas are used which increases environmental impact. The third hotspot is waste processing. Energy consumption during remelting increases the environmental impacts.



GWP Distribution of LCA Stages

References

GPI/ General Programme Instructions of the International EPD® System. Version 4.0. EN ISO 9001/ Quality Management Systems - Requirements EN ISO 14001/ Environmental Management Systems - Requirements

EN ISO 50001/ Energy Management Systems - Requirements ISO 14020:2000/ Environmental Labels and Declarations — General principles

EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

ISO 14025/ DIN EN ISO 14025:2009-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures

ISO 14040/44/ DIN EN ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006) PCR 2019:14 Construction products (EN 15804:A2) (1.2.5) prepared by IVL Swedish Environmental Research Institute, EPD International Secretariat, date 2022-11-01.

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