ENVIRONMENTAL PRODUCT DECLARATION

TURKEY EPD®
ENVIRONMENTAL PRODUCT DECLARATIONS

EPD®
THE INTERNATIONAL EPD® SYSTEM

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

GFRP Composite Poles

from

MİTAŞ Composites

MİTAŞ COMPOSITES

Programme:	EPD Turkey, a fully aligned regional programme www.epdturkey.org	The International EPD® System www.environdec.com
Programme operator:	EPD Turkey: SÜRATAM – Turkish Centre for Sustainable Production Research & Design Nef 09 B Blok No:7/15 34415 Kağıthane/Istanbul, TURKEY	EPD International AB
EPD registration number:	S-P-01917	
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Validity date:	20.09.2025	
Geographical scope:	Global	

Programme Information

Programme	EPD Turkey, a fully aligned regional programme SÜRATAM – Turkish Centre for Sustainable Production Research & Design Nef 09 B Blok No:7/15 34415 Kağıthane/Istanbul, TURKEY www.epdturkey.org info@epdturkey.org	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com

Product Category Rules (PCR): 2019:14 Version 1.0, 2019-12-20, Construction Products and CPC 54 Construction Services, EN 15804:2012 + A2:2019 Sustainability of Construction Works

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Independent third-party verification of the declaration and data, according to ISO 14025:2006:

EPD process certification EPD verification ✓

Third party verifier: Vladimír Kočí, PhD

Approved by: The International EPD® System

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

Yes No ✓

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

Company Information

Mitaş Composites Plastic Industry and Trade Inc. operates in its modern factory located in ASO 2nd Industrial Zone in Ankara, Turkey. Commissioned in 2018 by Mitaş Energy and incorporated in 2019 to provide services to all its customers by working on innovative composite products with its experienced staff in design, production and assembly, and its environmentally friendly technologies, R&D capability and quality laboratories.

Our production facility uses filament winding method up to 12 m length and 1000 mm dimensions in its high-quality and capacity computer-aided machines. Also, all the supporting operations from winding until the end product can be done by the CNC machines within the facility. The facility is capable of using not only glass but also advanced fibers like carbon and aramid together with polyester and epoxy resins. In the facility there is also a pultrusion line which enables to produce any kind of cross sections (I, U, L, O, etc.) up to 1000x300 mm continuously.

MİTAŞ Composites will continue to provide services to all its customers by working on innovative composite products with its experienced staff in design, production and assembly, environmentally friendly technology, R&D and quality laboratory.

The company has ISO 9001 Quality Management System, ISO 14001 Environmental Management System, ISO 45001 Occupational Health & Safety Management System Certifications.

Product Information

Product name	GFRP Composite Poles
Product identification	Glass fibre reinforced polyester resin matrix composite poles
UN CPC code	36310
Geographical scope	Global

Our products can be classfied as follows:

- GFRP Composite poles
- GFRP Composite tubes
- GFRP Composite pipes
- GFRP Composite masts
- GFRP Composite profiles

Products Content : %25-40 Polyester Resine, %50-70 Glass Fiber, %1-3 other chemicals.

LOW WEIGHT

ECO FRIENDLY

ELECTRICALLY NON-CONDUCTIVE

SLOW BURNING

HEIGHT MECHANICAL RESISTANCE

UV PROTECTION

WIDE RANGE OF COLORS

EASY TRANSPORT AND ASSEMBLY

*In the scope of this report, only the products composed of fiberglass fibres are considered.

Filament Winding

Filament winding is a method of controlled winding of the impregnated fibers on the desired pattern, angle and thickness over a rotating mold, which was coated with a release agent. After the product is cured on the mold, it is removed from the mold by a special machine. With this production method, it is possible to obtain very strong and high-quality products as the reinforcement ratio is high. In addition, products with properties such as UV resistance, hardness and fire resistance can be developed with glass fibre additions to the resin

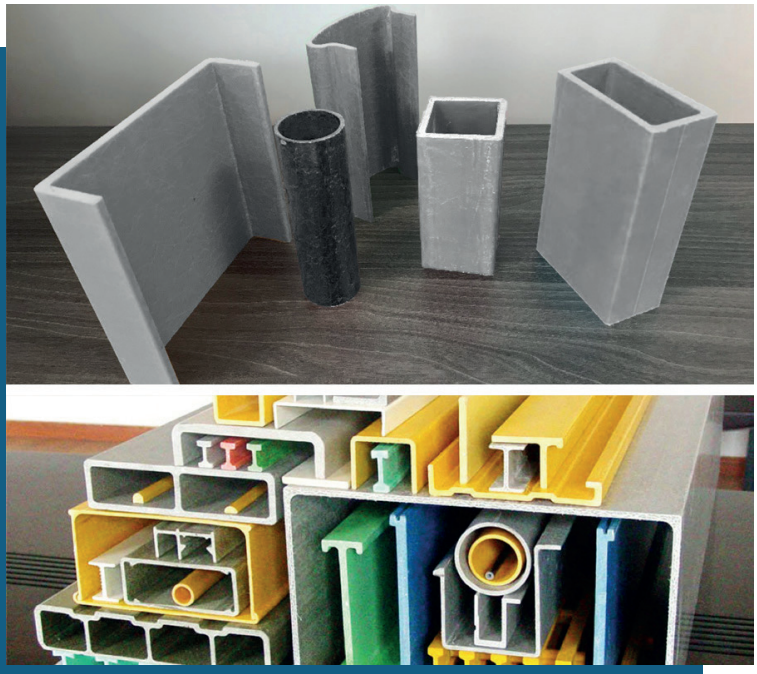
Composite products up to 12 m in length and 800 mm in diameter are possible to produce with filament winding method by its high-quality and capacity computer-aided machines. Not only glass but also advanced fibers like carbon and aramid together with polyester or epoxy resin as the matrix are used during the winding. Poles, pipes, towers, masts and special products manufactured using winding method by Mitaş Composite are compatible with the below properties. The values are minimum required. The tests are performed according to relevant EN ISO or ASTM standards.

Technical Properties

Properties	Unit	Test Method	Polyester & Glass Fiber
Mechanical			
Tensile Modulus- (longitudinal)	GPa	EN ISO 527-4	7
Tensile Strength- (longitudinal)	MPa	EN ISO 527-4	110
Bending Strength- (longitudinal)	MPa	EN ISO 14125	200
Bending Modulus- (longitudinal)	GPa	EN ISO 14125	11
Physical			
Barcol Hardness	-	ASTM D2583	45
Flammability			
Flammability Classification	-	UL 94	V0

Pultrusion

Profiles with any cross sections up to 1000 mm width and 200 mm height are possible with pultrusion method in any requested color. Standard profiles for linear pultrusion, which include L, U, Box, Pipe and sheet sections are compatible with the below properties. The properties are minimum required values for pultrusion profiles. The tests are performed according to EN ISO or ASTM standards.



Technical Properties

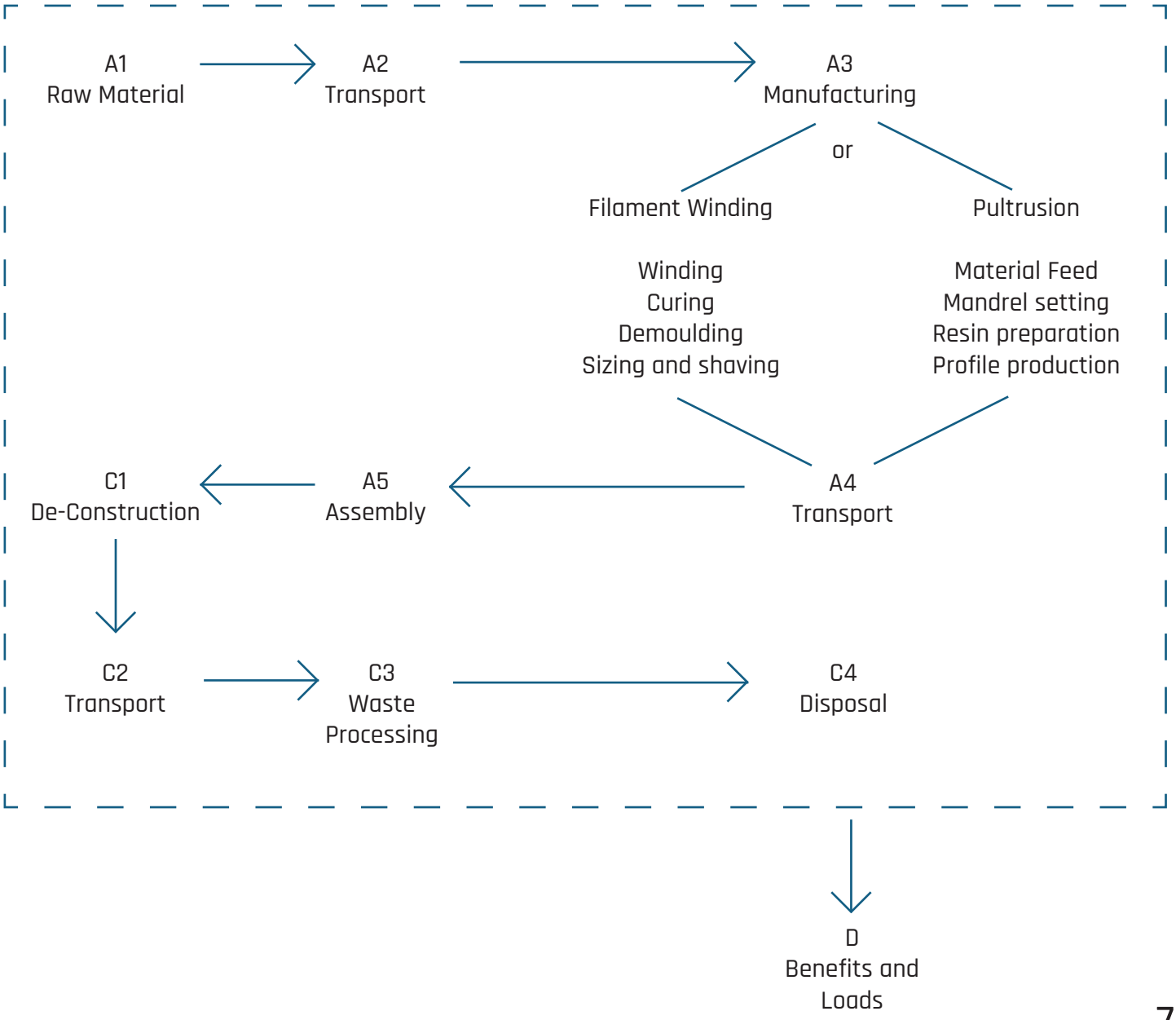
Properties	Unit	Test Method	E23	E17
Mechanical				
Modulus of Elasticity	GPa	Annex D, EN 13706-2	23	17
Tensile Modulus- (longitudinal)	GPa	EN ISO 527-4	17	23
Tensile Modulus- transverse	GPa	EN ISO 527-4	7	5
Tensile Strength- (longitudinal)	MPa	EN ISO 527-4	240	170
Tensile Strength- transverse	MPa	EN ISO 527-4	50	30
Bending Strength- (longitudinal)	MPa	EN ISO 14125	240	170
Bending Strength- transverse	MPa	EN ISO 14125	100	70
Shear Strength- (longitudial)	MPa	EN ISO 14130	25	15
Physical				
Barcol Hardness	-	ASTM D2583	45	45
Flammability				
Flammability Classification	-	UL 94	V0	V0

LCA Information

Declared unit	1 kg of glass fibre reinforced unsaturated polyester composite poles
Time Representativeness	2019
Database(s) and LCA Software Used	TLCID ver. 1.0 (Turkish Lifecycle Inventory Database), Ecoinvent 3.6, SimaPro 9.1

The inventory for the LCA study is based on the 2019 production figures for composite poles by Mitaş Composites production plants in Ankara, Turkey.

System Boundary



Description of System Boundary

This EPD's system boundary is cradle to gate with options, modules C1-C4 and module D. A4 Transport to site and A5 Assembly stages were added as optional.

Upstream	Core		Downstream												Other Environmental Information
Raw Material Supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction, demolition	Transport	Waste Processing	Disposal	Future reuse, recycling or energy recovery potentials
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Description of the system boundary (X = Included in LCA, MND= Module Not Declerated)

A1: Raw Material Supply
Production starts with raw materials. Raw material supply includes raw material extraction/preparation and pre-treatment processes before production.

A2: Transportation
Transport is relevant for delivery of raw materials and other materials to the plant and the transport of materials within the plant. Transport of raw materials to production site is taken as the weight average values for transport from raw materials supplier in 2019.

A3: Manufacturing
Composites poles can be produced with 2 production technology as filament winding and pultrusion. Both Manufacturings starts with the preparation of resin and fibres. In filament winding, production continues with winding to mould in filament winding. After the curing process, the product is separated from the mould and sized. In pultrusion, production continues with mandrel setting. After preparation resin mix, profile production is started. The final products are quality checked and packaged for delivery.

A4: Transport From the Gate to the Site
Transport of final product to construction site is taken as the weight average values for transport to customers in 2019.

A5: Assembly
This stage includes the installation of composite poles in the construction site. For installing 1 composite pole (average weight assumed as 40-50 kg), 20 minutes installation time is assumed by using a mobile crane with 92 kW engine. Also, while composite poles are installation, some auxiliary materials may be used such as metal plate, bolt or concrete. In this declaration, 1 kg auxiliary metals using is assumed for 1 composite pole.

C1 : Deconstruction and Demolition
For demolition 1 composite pole (average weight assumed as 40-50 kg), 20 minutes installation time is assumed by using a mobile crane with 92 kW engine.

C2 : Transport
This stage includes the transportation of the discarded conductors to final disposal. Average distance from demolition site to waste processing site for final disposal is assumed to be 100 km.

C3 : Waste Processing
If the wastes are going to landfill or to be incinerated, there is no need for any waste process.

C4 : Disposal
Disposal is the final stage of product life. Composite poles may dispose with any disposal scenario after construction and demolition as their final fate and modelled as such for this EPD. It is assumed that 25% of the wastes used as inert filler, 25% of the wastes sent to the incineration and rest of the wastes send to the landfill.

D : Benefits and Loads
In this stage, incineration and inert filler benefits were calculated specified in the disposal stage.

More Information

The results of the LCA with the indicators as per EPD requirement are given in the LCA result tables. All energy calculations were obtained using Cumulative Energy Demand (LHV) methodology, while fresh water use is calculated with selected inventory flows in SimaPro according to the PCR.

There are no co-products in the production. Hence, there is no need for co-product allocation.

Energy comsumptions and transports datasets were allocated based on the production figures in 2019 and weighted averaged of environmental impacts for the composite poles were presented.

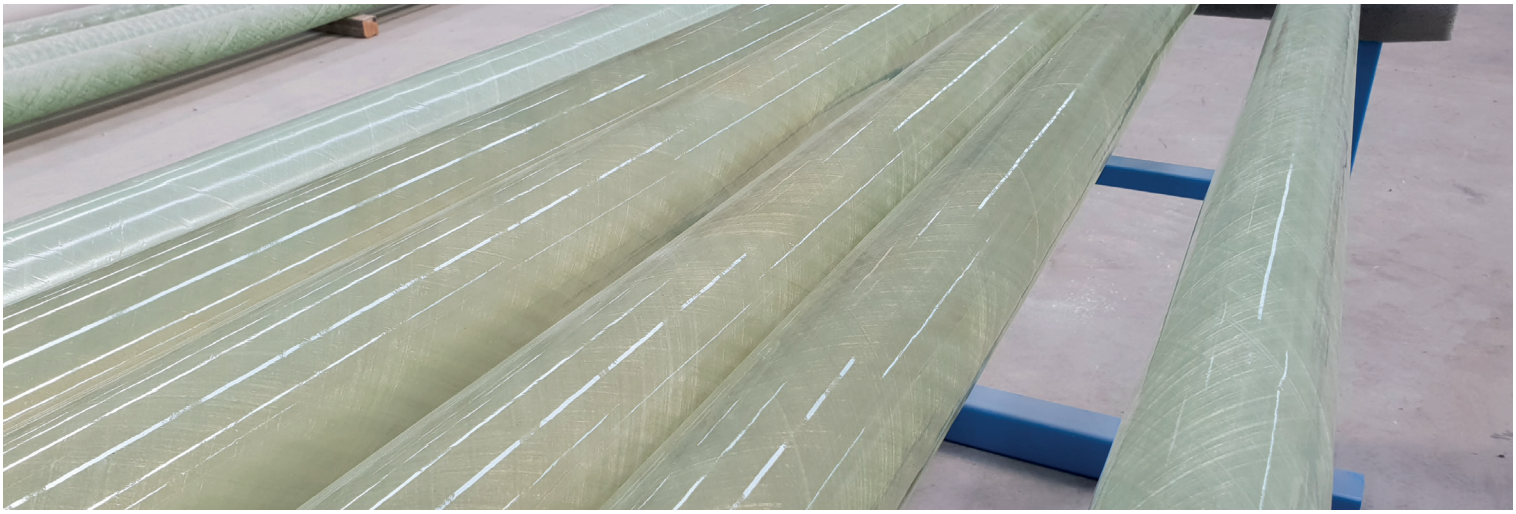
Accordingly, hazardous and non-hazardous waste amounts were also allocated from 2019 total waste arisings.

Composite utility poles are theoretically outlasting/lifetime products. However, when they are scrapped or discarded, it is disposed as per Waste Management Plan of Mitaş Composites in accordance with laws and regulations. In accordance with the Turkish Waste Regulation, solid wastes with code 07 02 14 are sent to a licensed waste disposal company by licensed vehicles and disposed properly. These wastes are disintegrated in RDF (refuse-derived fuel) units in the waste disposal company and blended with other wastes and sent to incineration in the cement plant as additional fuel.

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

LCA Results

Environmentals Impacts for 1 kg of GFRP Composite Poles Manufactured by Filament Winding									
Impact Category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP - Fossil	kg CO_2 eq	9.98	0.204	0.393	0.216	0.009	0	0.037	-0.009
GWP - Biogenic	kg CO_2 eq	-245E-3	132E-6	1.10E-3	650E-6	6.60E-6	0	103E-3	-7.47E-6
GWP - Luluc	kg CO_2 eq	106E-3	53.5E-6	3.22E-3	1.92E-3	2.65E-6	0	2.65E-6	-5.40E-6
GWP - Total	kg CO_2 eq	9.8	0.204	0.398	0.219	0.009	0	0.139	-0.009
ODP	kg CFC-11 eq	910E-9	47.6E-9	15.5E-9	8.20E-9	2.14E-9	0	1.80E-9	-1.82E-9
AP	mol H+ eq	40.6E-3	993E-6	2.29E-3	1.27E-3	38.2E-6	0	107E-6	-91.0E-6
EP - Freshwater	kg PO_4 eq	2.98E-3	12.6E-6	349E-6	196E-6	643E-9	0	3.62E-6	1.39E-6
EP - Marine	kg N eq	8.37E-3	305E-6	402E-6	218E-6	11.6E-6	0	180E-6	27.6E-6
EP - Terrestrial	mol N eq	83.8E-3	3.35E-3	3.66E-3	1.96E-3	127E-6	0	493E-6	304E-6
POCP	kg NMVOC	38.8E-3	1.01E-3	1.07E-3	547E-6	40.8E-6	0	150E-6	-85.0E-6
ADPE	kg Sb eq	326E-6	2.93E-6	1.01E-6	266E-9	155E-9	0	81.8E-9	-227E-9
ADPF	MJ	151	3.12	4.44	2.45	0.141	0	0.139	-0.133
WDP	m^3 depriv.	2.36	0.009	0.160	0.093	459E-6	0	0.003	-0.012
PM	disease inc.	258E-9	15.7E-9	11.5E-9	4.98E-9	822E-12	0	1.27E-9	-891E-12
IR	kBq U-235 eq	0.311	0.016	0.005	0.002	0.001	0	0.001	-0.001
ETP - FW	CTUe	125	2.36	4.00	1.49	0.113	0	0.590	-0.139
HTTP - C	CTUh	6.42E-9	56.4E-12	346E-12	28.1E-12	2.77E-12	0	65.2E-12	-6.82E-12
HTTP - NC	CTUh	164E-9	2.79E-9	6.21E-9	1.54E-9	128E-12	0	456E-12	-142E-12
SQP	Pt	41.3	3.08	1.12	0.596	0.162	0	0.244	-0.283
Acronyms	GWP-total: Climate change, GWP-fossil: Climate change- fossil, GWP-biogenic: Climate change - biogenic, GWP-luluc: Climate change - land use and transformation, ODP: Ozone layer depletion, AP: Acidification terrestrial and freshwater, EP-freshwater: Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical oxidation, ADPE: Abiotic depletion - elements, ADPF: Abiotic depletion - fossil resources, WDP: Water scarcity, 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, A1-A3: Sum of A1, A2, and A3, A4: Transport to Site, A5: Installation, C1: De-Construction, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary.								



Resource Use for 1 kg of GFRP Composite Poles Manufactured by Filament Winding									
Impact Category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	11.1	0.035	0.789	0.453	0.002	0	0.004	-0.003
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	11.1	0.035	0.789	0.453	0.002	0	0.004	-0.003
PENRE	MJ	151	3.12	4.44	2.45	0.141	0	0.139	-0.133
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	151	3.12	4.44	2.45	0.141	0	0.139	-0.133
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	53.9E-3	584E-6	1.79E-3	886E-6	29.4E-6	0	396E-6	-882E-6

Waste & Output Flows for 1 kg of GFRP Composite Poles Manufactured by Filament Winding									
Impact Category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	0.120	0	0	0	0	0	0	0
NHWD	kg	1.06	0	0	0	0	0	0	0
RWD	kg	0	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0.289	0	0	0	0	0	0	0
EE (Electrical)	MJ	0	0	0	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0	0	0	0
Acronyms	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, 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, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water, HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy, Thermal.								
Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A3: Sum of A1, A2, and A3, A4: Transport to Site, A5: Installation, C1: De-Construction, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary.								

Result per funtional declared unit		
Biogenic Carbon Content	Unit	A1-A3
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0.05
Note: It was assumed 50% of the wood packaging material is biogenic carbon.		

Environmentals Impacts for GFRP Composite Poles Manufactured by Pultrusion									
Impact Category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP - Fossil	kg CO_2 eq	9.62	0.030	0.393	0.216	0.009	0	0.039	-0.009
GWP - Biogenic	kg CO_2 eq	-45.1E-3	21.6E-6	1.10E-3	650E-6	6.60E-6	0	79.8E-3	-7.47E-6
GWP - Luluc	kg CO_2 eq	97.6E-3	8.68E-6	3.22E-3	1.92E-3	2.65E-6	0	2.20E-6	-5.40E-6
GWP - Total	kg CO_2 eq	9.67	0.030	0.398	0.219	0.009	0	0.119	-0.009
ODP	kg CFC-11 eq	877E-9	6.99E-9	15.5E-9	8.20E-9	2.14E-9	0	1.61E-9	-1.82E-9
AP	mol H+ eq	38.0E-3	125E-6	2.29E-3	1.27E-3	38.2E-6	0	95.4E-6	-91.0E-6
EP - Freshwater	kg PO_4 eq	2.86E-3	2.10E-6	349E-6	196E-6	643E-9	0	2.93E-6	1.39E-6
EP - Marine	kg N eq	7.77E-3	38.0E-6	402E-6	218E-6	11.6E-6	0	147E-6	27.6E-6
EP - Terrestrial	mol N eq	77.1E-3	415E-6	3.66E-3	1.96E-3	127E-6	0	444E-6	304E-6
POCP	kg NMVOC	35.8E-3	134E-6	1.07E-3	547E-6	40.8E-6	0	133E-6	-85.0E-6
ADPE	kg Sb eq	134E-6	507E-9	1.01E-6	266E-9	155E-9	0	68.6E-9	-227E-9
ADPF	MJ	146	0.462	4.44	2.45	0.141	0	0.124	-0.133
WDP	m^3 depriv.	2.23	0.002	0.160	0.093	459E-6	0	0.003	-0.012
PM	disease inc.	234E-9	2.69E-9	11.5E-9	4.98E-9	822E-12	0	1.14E-9	-891E-12
IR	kBq U-235 eq	0.283	0.002	0.005	0.002	0.001	0	0.001	-0.001
ETP - FW	CTUe	96.8	0.368	4.00	1.49	0.113	0	0.472	-0.139
HTTP - C	CTUh	5.79E-9	9.07E-12	346E-12	28.1E-12	2.77E-12	0	59.6E-12	-6.82E-12
HTTP - NC	CTUh	148E-9	419E-12	6.21E-9	1.54E-9	128E-12	0	374E-12	-142E-12
SQP	Pt	22.8	0.530	1.12	0.596	0.162	0	0.218	-0.283
Acronyms	GWP-total: Climate change, GWP-fossil: Climate change- fossil, GWP-biogenic: Climate change - biogenic, GWP-luluc: Climate change - land use and transformation, ODP: Ozone layer depletion, AP: Acidification terrestrial and freshwater, EP-freshwater: Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical oxidation, ADPE: Abiotic depletion - elements, ADPF: Abiotic depletion - fossil resources, WDP: Water scarcity, 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.								
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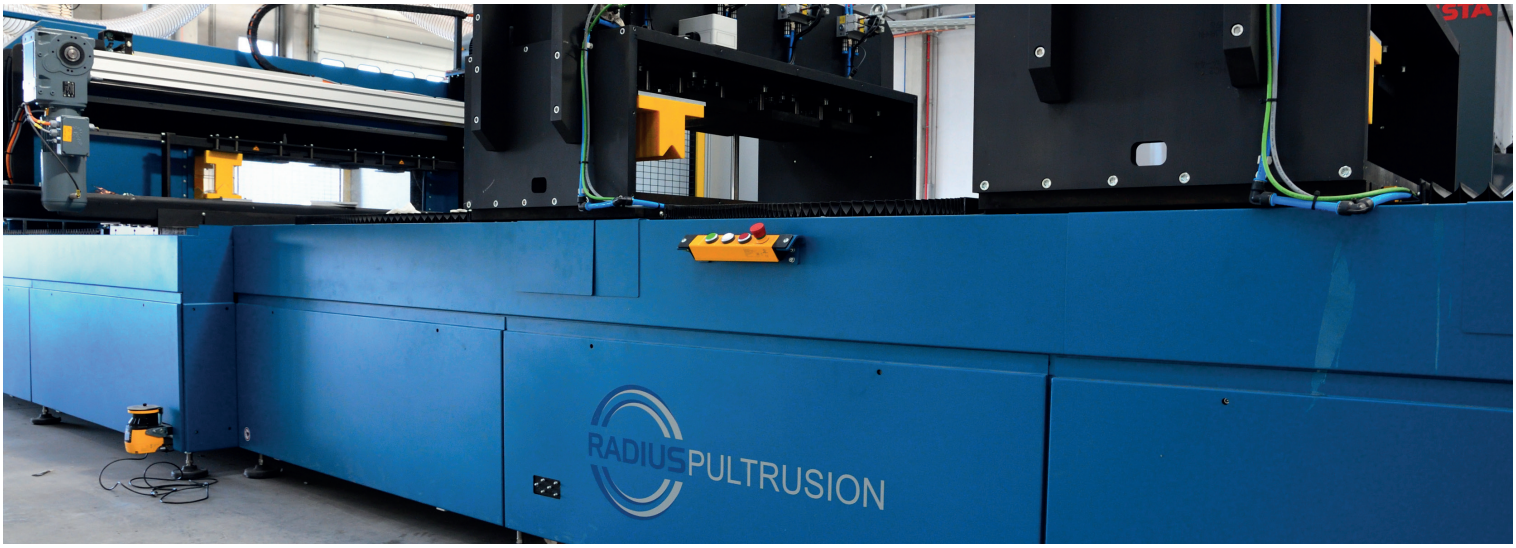

Resource Use for 1 kg of GFRP Composite Poles Manufactured by Pultrusion									
Impact Category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	8.28	0.006	0.789	0.453	0.002	0	0.003	-0.003
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	8.28	0.006	0.789	0.453	0.002	0	0.003	-0.003
PENRE	MJ	146	0.462	4.44	2.45	0.141	0	0.124	-0.133
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	146	0.462	4.44	2.45	0.141	0	0.124	-0.133
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	48.2E-3	96.3E-6	1.79E-3	886E-6	29.4E-6	0	354E-6	-882E-6

Waste & Output Flows for GFRP Composite Poles Manufactured by Pultrusion									
Impact Category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	0.120	0	0	0	0	0	0	0
NHWD	kg	1.06	0	0	0	0	0	0	0
RWD	kg	0	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0.289	0	0	0	0	0	0	0
EE (Electrical)	MJ	0	0	0	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0	0	0	0
Acronyms	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, 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, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water, HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy, Thermal.								
Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A3: Sum of A1, A2, and A3, A4: Transport to Site, A5: Installation, C1: De-Construction, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary.								

Result per funtional declared unit		
Biogenic Carbon Content	Unit	A1-A3
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0
Note: It was assumed 50% of the wood packaging material is biogenic carbon.		

References

/GPI/ General Programme Instructions of the International EPD® System. Version 3.0.

/ISO 9001:2015/ Quality management systems - Requirements

/ISO 14001/ Enviroment Management System- Requirements

/ISO 45001/ Occupational Health and Safety- Requirements

/ISO 14020:2000/ Environmental labels and declarations – General principles

/EN 15804:2012+A2:2019/ 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 for Construction Products and CPC 54 Construction Services/ Prepared by IVL Swedish Environmental Research Institute, Swedish Environmental Protection Agency, SP Trä, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB, The International EPD System, 2019:14 Version 1.1 DATE 2019-12-20

/The International EPD® System/ The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. www.environdec.com

/Ecoinvent / Ecoinvent Centre, www.ecoinvent.org

/SimaPro/ SimaPro LCA Software, Pré Consultants, the Netherlands, www.pre-sustainability.com

/TLCID/ Turkish Life Cycle Inventory Database, Turkish Center for Sustainable Production Research and Design (SURATAM), www.suratam.org

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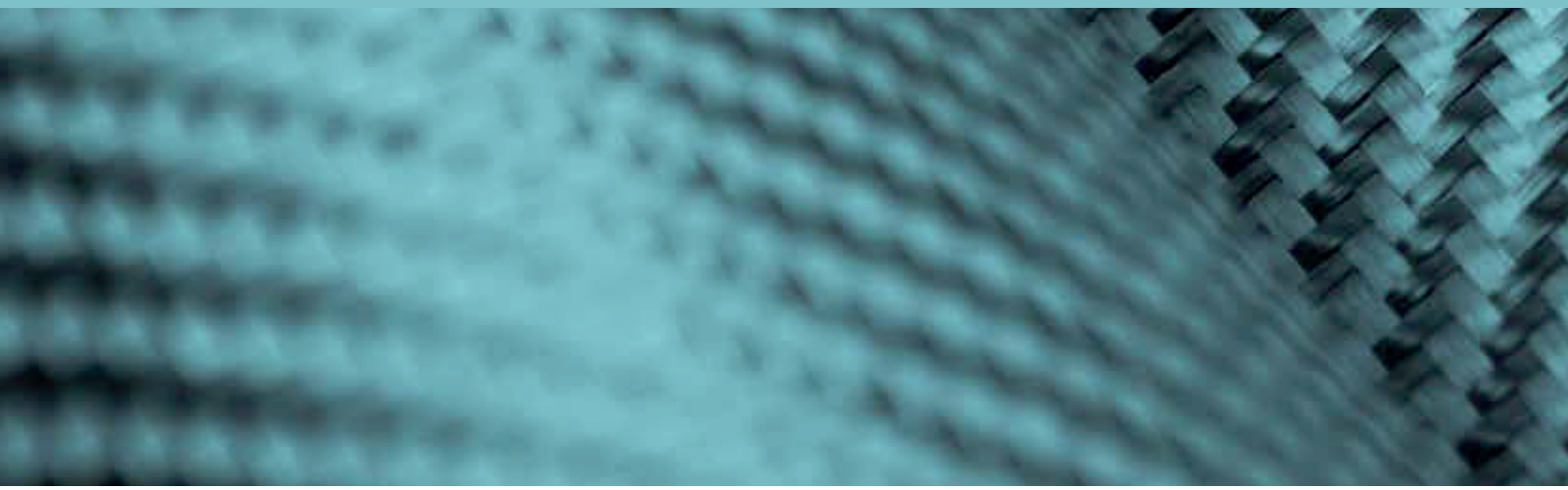

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