



Environmental Product Declaration (EPD)

EPD of multiple products, based on the average results of the product group

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

Glass Reinforced Plastic (GRP) Tanks

Programme:	“National programme of environmental labelling“ - CZ EPD Database in the Czech Republic - Ekoznačka.cz
Programme operator:	Ministry of the Environment of the Czech Republic
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EPD owner:	ACO Industries Tábor s.r.o.
Author:	Envitrail s.r.o.
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Envitrail



General information

Programme information

Accountabilities for PCR, LCA and independent, third-party verification:

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Life Cycle Assessment (LCA)

LCA accountability: Mgr. Kateřina Lorencová. EnviTrail s.r.o., lorencova@envitrail.com, Ing. Miroslava Česká, <https://envitrail.com/>

Third-party verification

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

EPD verification by individual verifier

Third-party verifier: Jan Weinzettel. Ph.D., weinzettel@seznam.cz

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.

Statement on the requirements for comparability of EPDs. adapted from ISO 14025:

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, 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. For further information about comparability, see EN 15804 and ISO 14025.

Company information

EPD owner: ACO Industries Tábor s.r.o.

Průmyslová 1158, 391 01 Sezimovo Ústí, Česká republika

Contact:

Klára Kalinová, email: kkalinova@aco.cz, +420 737 263 251

Description of the organisation:

ACO Industries Tábor s.r.o. is part of the ACO Group headquartered in Rendsburg/Büdelsdorf, Germany, which has been a family-owned business since its foundation in 1946. The group employs more than 5,400 people in production and sales units worldwide.

ACO Group specialises in the development and production of drainage technologies and water treatment solutions.

ACO Industries Tábor s.r.o. serves as the Competence Center for wastewater treatment technologies, primarily stormwater runoff, but also wastewater containing FOG (fat-oil-grease) and light liquids. The purpose of these technologies is to treat water to a quality that allows its safe return to the natural environment through infiltration, retention (e.g. in fire tanks or retention ponds), discharge into watercourses, or reuse (e.g. for irrigation or toilet flushing).

Production is carried out using several technologies, including plastic rotational moulding, polyethylene welding, and fiberglass winding. The portfolio is developed and manufactured in accordance with European and international standards and is subject to testing by accredited European institutes.

More at: www.discover.aco, www.aco.com

Product-related or management system-related certifications:

Product quality is ensured by an effective quality management system in accordance with ČSN EN ISO 9001. In addition, the GRP product portfolio complies with applicable product-specific standards, technical specifications, and regulatory requirements relevant to its intended applications.

Product information

Product name: ACO Dividing Shaft, ACO Merging Shaft, ACO Sampling Shaft, ACO Sludge Trap, ACO Stormsed, ACO Stormsed Vortex, ACO Oleopator, ACO Oleosmart, ACO Stormclean, ACO Lipumax, ACO Powerlift, ACO Firefighting Tank, ACO Storage and Retention Tank

Product description:

The GRP (Glass Reinforced Plastic) tanks are manufactured from glass-fibre reinforced polyester resin composite material. They form the structural body of various ACO surface water and wastewater treatment systems, including grease separators, light liquid separators, sludge traps, sampling shafts, dividing and merging shafts, sedimentation devices, stormwater treatment units, pumping stations, storage and retention tanks, including associated system components.

The tanks are designed mostly for underground installation and are used in applications requiring treatment of contaminated stormwater or wastewater, such as transport infrastructure, parking areas, industrial sites, and logistics facilities. Depending on the system type, the units provide sedimentation, separation of hydrocarbons, sampling and flow distribution, or storage, retention and reuse of the treated waters within drainage systems.

The product range includes tanks in various nominal sizes and configurations, including vertical and horizontal versions, depending on hydraulic capacity and installation requirements.

GRP material combines low weight with high structural stability, corrosion resistance, and fatigue resistance. The non-porous material structure ensures long service life and stable mechanical properties even under exposure to environmental influences such as weather, UV radiation, groundwater, and chemical stress. In addition, the low weight of GRP tanks simplifies transportation, handling, and installation, often eliminating the need for heavy machinery on site.

Name and location of production site:

ACO Industries Tábor s.r.o., Průmyslová 1158, 391 01 Sezimovo Ústí, Česká republika

Manufacture process:

Glass fibre is carefully wound onto a robust metal mould, both in the form of rovings and fabrics. These layers of glass fibre are then thoroughly saturated with initiated polyester resin. In the next step, after the individual parts have hardened, holes are cut out. In the final step, the individual parts are joined together using manual lamination.

LCA information

Declared unit for average product based on mass¹: 1 kg of average GRP (Glass Reinforced Plastic) tank

Table 1: Declared unit and conversion factors

	Value	Unit
Declared unit	1	kg
Conversion factor to volume ($\rho=1850 \text{ kg/m}^3$)	0.00054	m^3

Reference service life:

The reference service life of the average fibreglass tank GRP is assumed to be 50 years.

Time representativeness:

Primary production data represent specific values of a product group for the period from January 2024 to December 2024. Secondary and background data are based on the ecoinvent 3.11 cut-off database.

Geographical representativeness:

The geographical scope of the study focuses on the Czech Republic, with priority given to national and European processes.

Database(s) and LCA software used:

OpenLCA ver. 2.4 software, database ecoinvent version 3.11, cutoff.

Methodology LCIA:

Environmental Footprint 3.1. EN 15804 [8]

¹ Average product is defined as the average of all the products included in this EPD produced in 2024, weighted by their mass.

Cutoff rules:

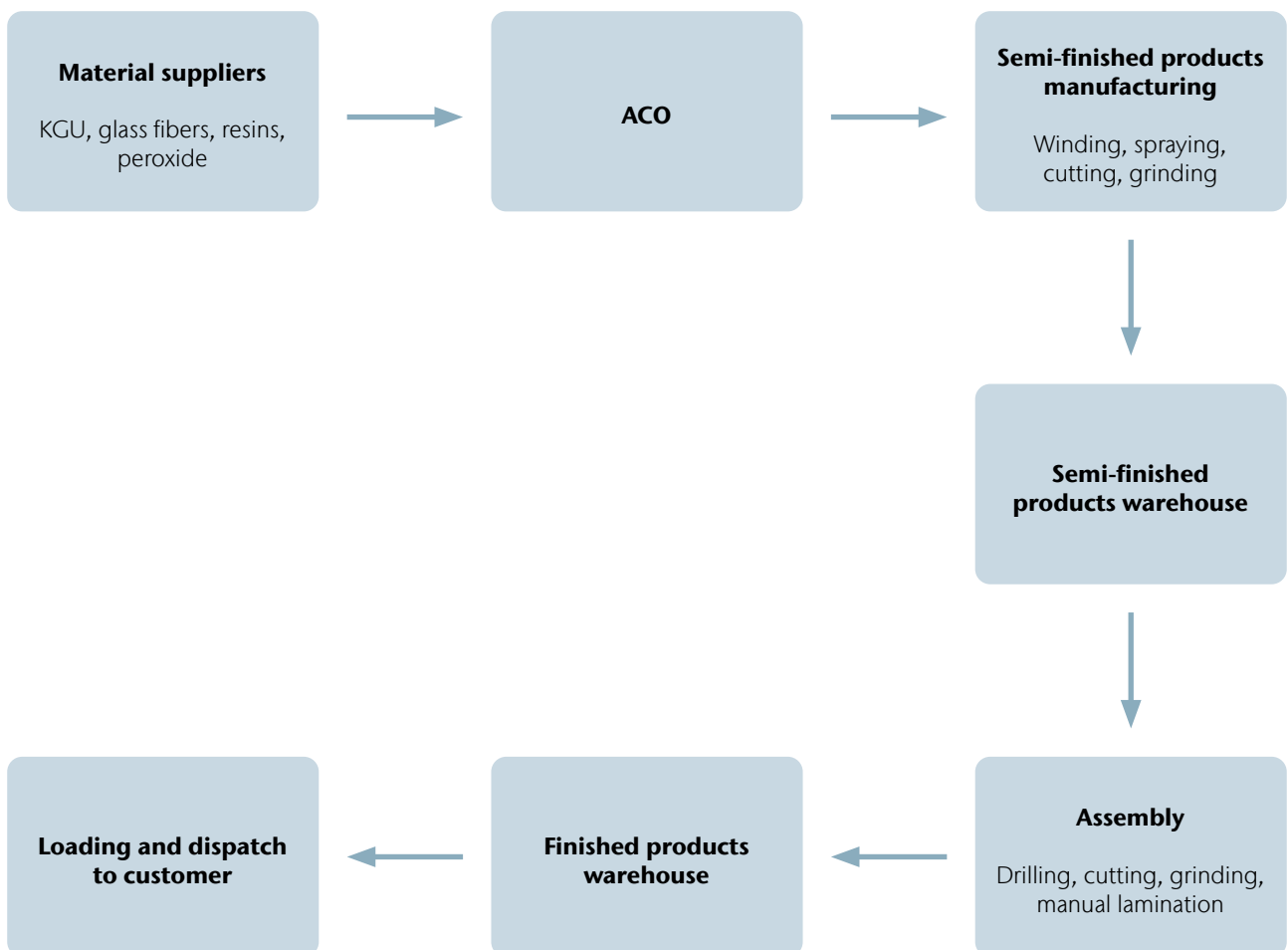
All inputs and outputs of unit processes are included in the calculation. Environmental impacts related to infrastructure and capital goods are not considered, except for processes included in selected datasets in the database.

Allocation:

For input materials, energy consumption, and output flows, mass allocation was performed from annual data on total production per declared unit. The ecoinvent database system model for secondary flow allocation uses the selected “polluter pays principle” (PPP).

Description of system boundary:

Cradle-to-gate (A1-A3) with options, modules C1-C4 and module D and additional modules A4-A5.



Declared modules:

Construction works assessment information

Construction works life cycle information																Supplementary information beyond construction works life cycle
A1-A3			A4-A5		B1-B7							C1-C4				D
Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacturing	Transport	Construction and installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operation energy use	Operation water use	Deconstruction & demolition	Transport	Waste processing	Disposal	Reuse, recovery, recycling potential
x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x

*ND = Not Declared, used for voluntary parameters that are not quantified because of a lack of data.

X = included module

The product stage includes the following modules:

- **A1 (Raw material supply)** – Primary data for a fibreglass tank GRP were collected by ACO Industries Tábor s.r.o. Module A1 includes the production, supply chain of input materials and the primary packaging of input materials. Detailed information is shown in Table 2.
- **A2 (Transport)** – Module A2 includes the transport of raw materials to the production site. Materials are transported by lorry 7.5-16 t and LCV (Light Commercial Vehicle).
- **A3 (Manufacturing)** – This module includes the manufacture of products, auxiliary materials, and packaging. The processing of any waste arising from this stage is also included. The module includes the waste processing of primary packaging material.

The specific electricity mix (high voltage) for the production site of ACO Industries, Tábor s.r.o., was used (based on the supplier's invoice and ERU background data) [9], with an emission factor of 0.625 kg CO₂-eq/kWh. The electric mix comprises 53.60% fossil (47.5% lignite, 5.86% natural gas), 40.95% nuclear, and 5.58% renewable sources.

The construction process phase includes modules:

The construction phase is a scenario based on the weight of a representative product Sludge – trap H DN 400/50000, which is a median of the fibreglass tank product group.

- **A4 (Transport)** – Module A4 includes the transport of the product to the customer. It is based on the average delivery distance (1194 km) from the production site (Tábor) to customers within Europe, derived from sales records of all ACO Industries, Tábor GRP products. The time period of data collection is 01/2024-12/2024. Given the weight of the representative product Sludge – trap H DN 400/50000 (2.43 tons), which is the median of the fibreglass tank product group, the average product is transported by lorry 7.5–16 tons (EURO 6) with a load capacity of 3.29 tons. The vehicle capacity was adjusted according to the weight of the representative product. Transport capability is 1.96 tkm. Only fibreglass tanks are transported by vehicle to the installation site.
- **A5 (Construction and Installation processes)** – This module includes the installation of a product. The product is installed below the surface using an excavator. Packaging materials (pallets) are assumed to be reused 5 times before entering the waste state

The end-of-life stage includes modules:

The EoL phase is a scenario, as, based on an assumed reference service life of 50 years, a disposal for this product group has not yet occurred (2025).

- **C1 (Deconstruction & demolition)** – The fibreglass tank's deconstruction is carried out by mechanical labour with an excavator.
- **C2 (Transport)** – For module C2 (transport), the average transport distance is assumed to be the same as for module A4, due to the company's plan to build a fibreglass crusher at the production site.
- **C3 (Waste treatment)** – Waste processing was modelled as mechanical recovery of fibreglass. An alternative process would be the landfilling of inert waste, which has a minor impact, so the presumed resulting error is minimal. The amount of recycled fibreglass serves as background data for calculating the benefits in Module D.
- **C4 (Disposal)** – The expected amount of the product sent to landfill is zero.

The benefits and loads beyond the product system – Module D:

The potential benefits and costs of waste utilisation are assessed in Module D. Recyclable waste from Modules A3, A5 and C3 is used for the calculation of the benefits (i.e. avoiding the production of primary materials).

Submodule D1 calculates the benefits of using waste as a secondary raw material instead of a primary raw material. This module was calculated for fibreglass from the product (module C3), cardboard and plastic waste from module A3.

For fibreglass, its use as a filler in concrete is assumed, i.e., as a substitute for sand. Assuming that 0.00054 m³ of crushed fibreglass replaces the same volume of sand (average $\rho=1550 \text{ kg/m}^3$) with an average content of 70% in the concrete, then 1 kg of crushed fibreglass ($\rho=1850 \text{ kg/m}^3$) replaces approximately 0.84 kg of sand.

For cardboard and plastics, the change in quality is determined by the ratio between primary and secondary materials based on the economic ratio specified in the ecoinvent 3.11 database [6]. The benefits of recycling cardboard packaging will prevent the production of 0.0007 kg of cardboard boxes. The benefits of recycling plastic packaging prevent the production of 0.0031 kg of polyethylene granulate.

When a waste is incinerated for energy recovery (submodule D3), heat and electricity are produced, which are assumed to replace the energy mix in the Czech Republic and the thermal energy produced from natural gas (the baseline process for heat in the Czech Republic in the ecoinvent database). This module was calculated for the incineration of waste wood pallets from modules A3 and A5.

Modules that were not included (not declared):

- **B1-B7 (Use phase)** – Not declared due to the various possibilities of use, depending on consumer behaviour.

Content information

Table 2: Material distribution of input materials in the average fibreglass tank

Material distribution	Amount %	Origin
Glass fibre	44.0%	Czech Republic, France
Polyester resin	41.3%	Italy, Finland, Czech Republic
Glass wool mat	11.9%	Czech Republic
Organic chemicals	2.7%	Czech Republic

Substances listed as substances of very high concern (SVHC substances) subject to authorization by the European Chemicals Agency are not contained in the product in declarable quantities.

Biogenic carbon content

The calculation of biogenic carbon content and conversion to carbon dioxide was performed in accordance with EN 16449 [5] and is based on the distribution of organic components per declared unit of the final product. The resulting biogenic carbon content for the average fibreglass tank GRP and in the packaging material is shown in Table 3.

Table 3: Biogenic carbon content

Biogenic carbon content	kg C/1 kg
Biogenic carbon content in the product	0
Biogenic carbon content in packaging materials	0.0021

Note: 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

Results of the environmental performance indicators – GRP

Table 4: Core environmental impact indicators according to EN 15804 (EF 3.1)

Indicator	Reference unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
AP	mol H ⁺ -Eq	1.77E-02	9.40E-04	2.81E-06	ND	2.77E-06	9.40E-04	4.58E-05	0	-6.44E-05
GWP-total	kg CO ₂ -Eq	3.95E+00	4.63E-01	6.13E-04	ND	3.17E-04	4.63E-01	1.75E-02	0	-1.60E-02
GWP-fossil	kg CO ₂ -Eq	3.94E+00	4.63E-01	3.20E-04	ND	3.17E-04	4.63E-01	1.76E-02	0	-1.70E-02
GWP-biogenic	kg CO ₂ -Eq	8.62E-03	2.12E-04	2.93E-04	ND	1.08E-07	2.12E-04	-1.50E-05	0	9.69E-04
GWP-luluc	kg CO ₂ -Eq	2.54E-03	1.45E-04	3.65E-08	ND	3.56E-08	1.45E-04	4.15E-06	0	-2.05E-05
ADP-fossil*	MJ, net calorific value	1.94E+01	9.49E-01	2.60E-04	ND	2.38E-04	9.49E-01	3.80E-02	0	-3.33E-02
EP-fw	kg P-Eq	6.95E+01	6.53E+00	4.13E-03	ND	4.11E-03	6.53E+00	3.37E-01	0	-3.95E-01
EP-marine	kg N-Eq	1.16E-03	3.11E-05	1.61E-08	ND	1.47E-08	3.11E-05	6.22E-06	0	-9.66E-06
EP-terrestrial	mol N-Eq	3.78E-03	2.22E-04	1.30E-06	ND	1.28E-06	2.22E-04	1.47E-05	0	-1.66E-05
ADP-elements*	kg Sb-Eq	4.12E-02	2.40E-03	1.42E-05	ND	1.40E-05	2.40E-03	1.47E-04	0	-1.65E-04
ODP	kg CFC-11-Eq	7.56E-08	3.80E-09	9.98E-13	ND	6.09E-13	3.80E-09	5.42E-11	0	-2.81E-12
POCP	kg NMVOC-Eq	1.88E-08	7.20E-11	4.82E-14	ND	4.24E-14	7.20E-11	9.99E-13	0	-9.54E-11
WDP*	m ³ world eq. deprived	3.97E-01	9.50E-03	2.82E-06	ND	2.79E-06	9.50E-03	8.11E-03	0	-7.47E-07
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-elements = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential. deprivation-weighted water consumption									

***Disclaimer:** 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.

General disclaimer: The estimated impact results are only relative statements. which do not indicate the endpoints of the impact categories. exceeding threshold values. safety margins and/or risks. It is not recommended to use the results of modules A1-A3 without taking into account the results of module C.

Additional mandatory and voluntary impact category indicators:

Table 5: Additional mandatory and voluntary impact category indicators according to EN 15804 (EF 3.1)

Fiberglass tank										
Indicator	Reference unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential (GWP-GHG)	kg CO ₂ -Eq	3.95E+00	4.63E-01	3.20E-04	ND	3.17E-04	4.63E-01	1.76E-02	0	-1.70E-02

GWP-GHG: This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Resource use indicators:

Table 6: Resource use parameters for fibreglass tank

Fiberglass tank										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	2.21E-01	1.19E-01	1.49E-03	ND	0	1.19E-01	1.10E-02	0	-3.33E-03
PERM	MJ	4.28E+00	0	0	ND	0	0	0	0	-1.55E-01
PERT	MJ	3.23E+00	1.19E-01	3.99E-05	ND	3.92E-05	1.19E-01	1.10E-02	0	-1.58E-01
PENRE	MJ	1.63E+01	6.53E+00	1.56E-01	ND	0	6.53E+00	3.37E-01	0	-1.21E-01
PENRM	MJ	3.46E+01	0	0	ND	0	0	0	0	-1.91E+00
PENRT	MJ	5.08E+01	6.53E+00	4.13E-03	ND	4.11E-03	6.53E+00	3.37E-01	0	-2.04E+00
SM	kg	0	0	0	ND	0	0	0	0	0
RSF	MJ	0	0	0	ND	0	0	0	0	0
NRSF	MJ	0	0	0	ND	0	0	0	0	0
FW	m ³	1.62E-02	7.70E-04	3.19E-07	ND	2.79E-07	7.70E-04	6.48E-05	0	-4.49E-02

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

Table 7: Waste indicators for fibreglass tank

Fiberglass tank										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	8.11E-02	5.93E-03	6.74E-06	ND	5.62E-06	5.93E-03	9.20E-04	0	-7.05E-03
Non-hazardous waste disposed	kg	3.19E+00	7.32E-02	2.49E-04	ND	4.55E-05	7.32E-02	1.88E-03	0	-1.02E-01
Radioactive waste disposed	kg	9.03E-05	2.36E-06	6.97E-10	ND	6.90E-10	2.36E-06	1.93E-06	0	-2.94E-06

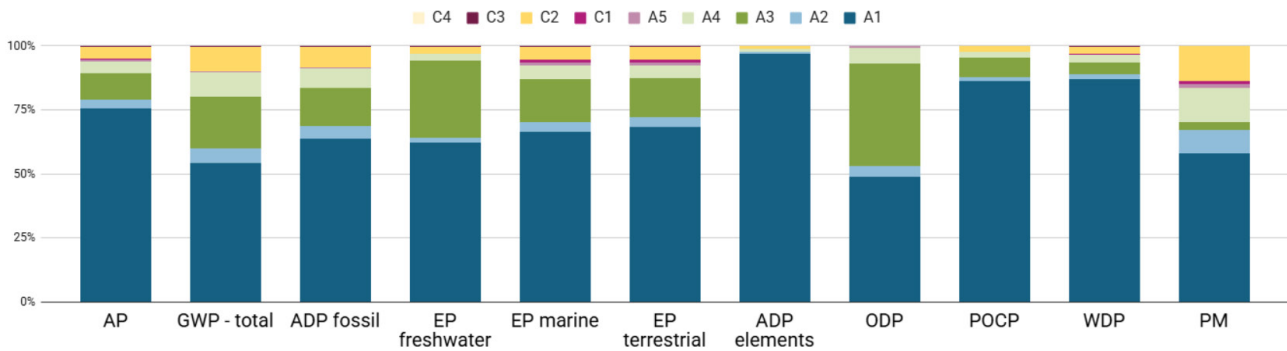
Output flow indicators

Table 8: Output flow indicators for fibreglass tank

Fiberglass tank										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Components for re-use	kg	2.13E-02	0	0	ND	0	0	0	0	0
Material for recycling	kg	8.31E-03	0	0	ND	0	0	1.00E+00	0	0
Materials for energy recovery	kg	0	0	0	ND	0	0	0	0	0
Exported energy, electricity	MJ	2.73E-02	0	4.47E-04	ND	0	0	0	0	0
Exported energy, thermal	MJ	4.91E-02	0	8.04E-04	ND	0	0	0	0	0

LCA Interpretation

Contribution of life cycle phases on the environmental impacts



Graph 1: Contribution of life cycle phases of GRP fibreglass tank on the environmental impacts

Based on normalised and weighted results according to the EF ver. 3.1, the three most relevant impact categories (hotspots) are Material resources: metals/minerals (ADP-elements). Climate change and Energy resources: fossil fuels (ADP-fossil).

The production phase (modules A1-A3) has the highest environmental impacts in all impact categories throughout the life cycle of the average GRP fibreglass tank. In module A1, the impacts associated with glass fibre production are the most significant, while in module A3, emissions associated with the combustion of natural gas and the combustion of styrene and acetone.

Environmental impact indicators

Acidification (AP)

Acidification is the process of increasing the acidity of soils, air, or water caused by an elevated concentration of hydrogen ions. An indicator of the impact category of acidification is accumulated exceedance (AE). The result is expressed in mol H⁺ eq.

Climate change (GWP)

Climate change is divided into three parts: biogenic, fossil, land use, and land use transformation. An indicator called global warming potential (GWP100) is used to measure the amount of greenhouse gases contributing to global warming. The results are quantified in kilograms of CO₂ eq.

Ozone depletion (ODP)

Ozone layer depletion is the result of emissions of ozone-depleting substances, such as long-lived chlorine and bromine-containing gases (e.g., CFCs, HCFCs, Halons). It is quantified in kg CFC-11 eq., with the ozone depletion potential as its indicator.

Water use (WDP)

Water deprivation potential quantifies the potential of water deprivation to humans or ecosystems. It is quantified in m³ world eq. and helps evaluate the risks associated with water scarcity.

Photochemical oxidant formation (POCP)

The impact category photochemical oxidation formation aggregates substances that contribute to the formation of tropospheric ozone. The category indicator is tropospheric ozone concentration increase expressed in kg NMVOC eq.

Resources use. minerals and metals (ADP)

Resource scarcity and limitations for current and future generations include depletion of abiotic resources - elements (ADPe), quantified in kg Sb eq., and depletion of abiotic resources - fossil fuels (ADPf), quantified in MJ.

Eutrophication (EP)

Eutrophication enriches the environment with nutrients, impacting land, water, and seas, leading to excess plankton and algae growth, harming the water quality. It is categorised into terrestrial (accumulated exceedance expressed in mol N eq.), freshwater (nutrient fraction reaching freshwater end expressed in kg P eq.), and marine impacts (nutrient fraction reaching marine end expressed in kg N eq.)



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References

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- [2] ISO 14044:2006 Environmental management - Life Cycle Assessment – Requirements and guidelines
- [3] ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- [4] EN 15804+A2:2020 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- [5] EN 16449:2014 Wood and wood-based products – Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
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