
Environmental Product Declaration



ECONO-MONO®



ASTM INTERNATIONAL

According to
ISO 21930
ISO 14025

1. General Information

Manufacturer Name:	FORTA – 100 Forta Drive Grove City, PA 16127-6399 USA
Program Operator:	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2959, USA
Declaration Number:	EPD 763
Reference PCR:	ISO 21930: 2017
Date of Issuance:	August 5, 2024
End of Validity:	August 5, 2029
Product Name:	ECONO-MONO [®]
EPD Owner:	FORTA
Declared Unit:	1 kg of ECONO-MONO [®]
EPD Scope:	Cradle-to-gate (A1, A2, and A3)
Prepared By:	WAP Sustainability Consulting
Verification:	ISO 21930 serves as the core PCR. Independent verification of the declaration according to ISO 14025 and ISO 21930. <input type="checkbox"/> internal <input checked="" type="checkbox"/> external
LCA Reviewer and EPD Verifier:	Timothy S. Brooke ASTM International 

2. Product Information

2.1 Company Description

FORTA is a Grove City, PA., based company that supplies high quality synthetic reinforcement fibers to the global construction market. These fibers aim to reduce project costs by simultaneously extending the life of the concrete and shortening the construction time. These reinforcement fibers are tested through research and development.

2.2 Product Description

The declared product is ECONO-MONO (shown in Figure 1), is an easy to finish micro synthetic fiber, made of 100% virgin homopolymer polypropylene monofilament. This economy-grade fiber functions as a plastic shrinkage reinforcement intended to reduce the formation of shrinkage cracks prior to initial set and to reduce settlement shrinkage. ECONO-MONO is non-corrosive, non-magnetic, chemically inert, and 100% acid and alkali proof.[®]



Figure 1: ECONO-MONO[®] product visual representation.

2.2 Technical Data

Table 1 provides physical property data for ECONO-MONO[®].

Table 1: Technical Data	
Property	Value
Materials	Polypropylene
Appearance	White fibers
Specific Gravity	0.91

3. LCA Calculation Rules

3.1 Declared Unit

The declared unit is 1 kg of ECONO-MONO[®] produced at FORTA's manufacturing facility.

3.2 System Boundary

The system boundary for this study is limited to a cradle-to-gate focus. (see also Table 4):

- **A1 Raw material supply:** Extraction, handling, and processing of input materials.
- **A2 Transportation:** Transportation of all input materials from the suppliers to the gate of the manufacturing facility.
- **A3 Manufacturing:** The preparation processes of FORTA's manufacturing facility. This phase also includes the operations of the manufacturing facility and all process emissions that occur at the production facility.

3.3 Estimates and Assumptions

All significant foreground data was gathered from the manufacturer based on measured values.

3.4 Cut-off Criteria

The cut-off criteria for all activity stage flows considered within the system boundary conform with ISO 21930: 2017 Section 7.1.8. Specifically, the cut-off criteria were applied as follows:

- All inputs and outputs for which data are available are included in the calculated effects and no collected core process data are excluded.
- A one percent cut-off is considered for renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process. The sum of the total neglected flows does not exceed 5% of all energy consumption and mass of inputs.
- All flows known to contribute a significant impact or to uncertainty are included.
- The cut-off rules are not applied to hazardous and toxic material flows – all of which are included in the life cycle inventory.

No material or energy input or output was knowingly excluded from the system boundary.

3.5 Background Data and 3.6 Data Quality

Data was gathered for the primary material and energy inputs used in production for calendar year 2022. Table 3 describes each LCI data source for raw materials (A1), transportation (A2) and the core manufacture process (A3). Table 3 also includes a data quality assessment on the basis of the technological, temporal, and geographical representativeness.

Table 2: Secondary Data Sources and Data Quality Assessment

A1: Raw Material Inputs

Inputs	LCI Data Source	Geography	Year	Data Quality Assessment
Polypropylene	Ecoinvent 3.9.1: Polypropylene, granulate {GLO} market for polypropylene, granulate Cut-off, U	Global	2022	Technology: good Time: very good Data is <5 years old Geography: good

A2: Transportation

Inputs	LCI Data Source	Geography	Year	Data Quality Assessment
Trucking	USLCI: Transport, combination truck, average fuel mix/US	US	2018	Technology: very good Time: good Data is <10 years old Geography: very good
Rail	USLCI: Transport, train, diesel powered/US	US	2018	Technology: very good Time: good Data is <10 years old Geography: very good

A3: Manufacturing

Energy	LCI Data Source	Geography	Year	Data Quality Assessment
Electricity	Ecoinvent 3.9.1: Electricity, high voltage {NPCC, US only} market for electricity, high voltage Cut-off, U	Global	2022	Technology: very good Time: very good Data is <5 years old Geography: very good
Natural Gas	USLCI: Natural gas, combusted in industrial boiler/US	Global	2018	Technology: very good Time: good Data is <10 years old Geography: good.
Cardboard Sheets	USLCI: Corrugated board box {US} market for corrugated board box Cut-off, U	US	2022	Technology: very good Time: very good Data is <5 years old Geography: very good.
Pallets	USLCI: Dry rough lumber, at kiln, US SE NREL /US Packaging	US	2018	Technology: very good Time: good Data is <10 years old Geography: very good.
Water	Ecoinvent 3.9.1: Tap water {GLO} market group for tap water Cut-off, U	Global	2014	Technology: very good Time: good Data is <10 years old

				Geography: good.
Wastewater	Ecoinvent 3.9.1: Wastewater, average {RoW} market for wastewater, average Cut- off, U	Global	2022	Technology: very good Time: very good Data is <5 years old Geography: good.

3.7 Period under Review

Data was gathered for the primary material and energy inputs used in the production for calendar year 2022.

3.8 Allocation

FORTA produces multiple products. Since the primary data for manufacturing was only available on a facility level, the environmental load among the products produced is allocated according to its mass. For waste that is recycled, the 'recycled content approach' was chosen. The recycling of waste generated by the product system is cut off.

3.9 Comparability

This LCA was created using industry average data for upstream materials. Data variation can result from differences in supplier locations, manufacturing processes, manufacturing efficiency and fuel types used.

4. LCA Results

Life cycle impact assessment (LCIA) is the phase in which the set of results of the inventory analysis – the inventory flow table – is further processed and interpreted in terms of environmental impacts and resource use inventory metrics. Tables 4 and 5 below summarize the LCA results for the cradle-to-gate (A1-A3) product system.

Table 3: Description of the System Boundary (x: included in LCA; mnd: module not declared; mnr: module not reported)

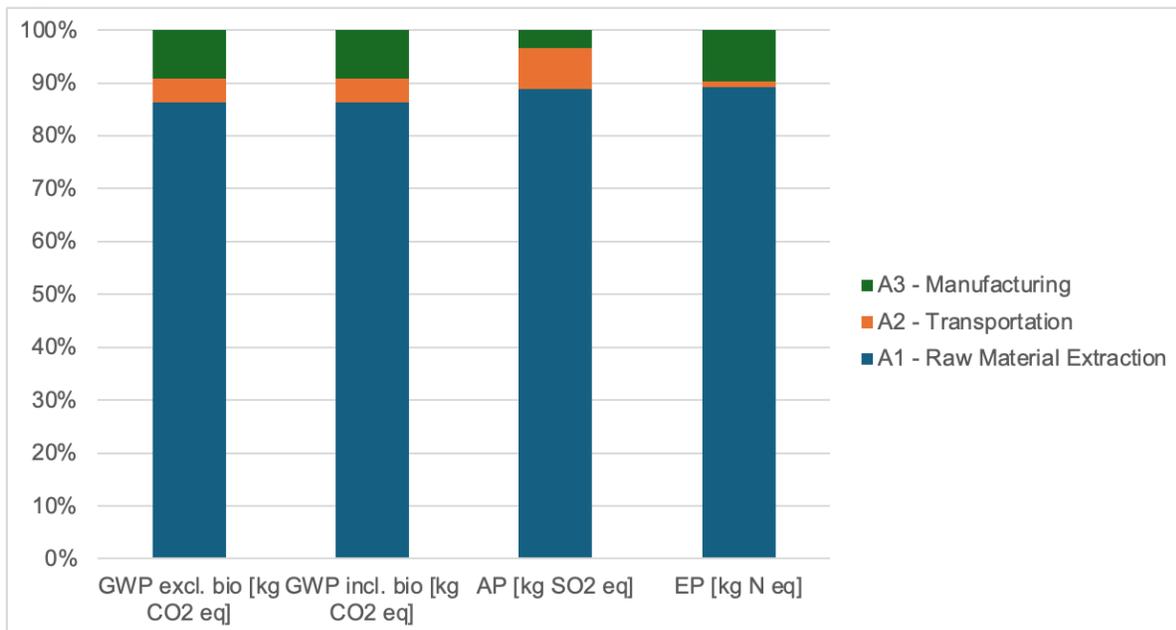
Product			Construction Installation		Use							End-of-Life				Benefits Beyond the System Boundary			
Raw Material Supply	Transport	Manufacturing	Transport	Construction / Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Use	Energy Use	Water Use	De-Construction/ Demolition	Transport	Waste Processing	Disposal	Reuse	Recovery	Recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D	D	D
x	x	x	mnd	mnd	mnd	mnd	mnr	mnr	mnr	mnd	mnd		mnd	mnd	mnd	mnd	mnd	mnd	mnd

Table 4: LCA Results per 1kg ECONO-MONO				
Impact Category	A1-A3	A1	A2	A3
IPCC AR5				
GWP excl. bio [kg CO ₂ eq]	2.94E+00	2.54E+00	1.33E-01	2.68E-01
TRACI LCIA Impacts (North America)				
AP [kg SO ₂ eq]	1.02E-02	9.03E-03	7.86E-04	3.40E-04
EP [kg N eq]	4.09E-03	3.65E-03	4.02E-05	3.99E-04
ODP [kg CFC 11 eq]	1.41E-08	5.02E-12	1.49E-09	1.56E-08
SFP [kg O ₃ eq]	1.20E-01	2.15E-02	6.01E-03	1.48E-01
CML LCIA Impacts (Europe, Rest of World)				
ADPF [MJ]	8.43E+04	9.89E-06	0.00E+00	4.07E+00
Resource Use Indicators				
RPR _E [MJ]	2.33E+00	1.01E+00	0.00E+00	1.32E+00
RPR _M [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E [MJ]	1.00E+02	8.91E+01	1.80E+00	9.56E+00
NRPR _M [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM [kg]	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
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m ³]	9.73E+00	3.10E+00	0.00E+00	6.63E+00
Output Flows and Waste Categories				
HWD [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HLRW [kg]	1.03E-08	4.03E-09	0.00E+00	6.32E-09
ILLRW [kg]	2.23E-08	7.10E-10	0.00E+00	2.16E-08
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	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
EEE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

5. Interpretation

Figure 2 shows the relative contribution to the cumulative impacts of the A1 through A3 phases of the cradle-to-gate life cycle. The largest contributor across all key impact categories is the A1 – Raw Materials and Upstream Production impact category. This category is driven primarily by the polypropylene material inputs. A2 – Transportation and A3 – Manufacturing are not contribution largely to impacts.

Figure 2. Contribution analysis for ECONO-MONO[®].



6. References

1. ASTM 2020 - ASTM Program Operator for Product Category Rules (PCR) and Environmental Product Declarations (EPDs) General Program Instructions v8, April 29th.
2. WAP Sustainability Consulting: 2023 - A Cradle-to-Gate Life Cycle Assessment of ECONO-MONO[®] Manufactured by FORTA.
3. ISO 21930: 2017 Building construction – Sustainability in building construction – Environmental declaration of building products.
4. ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.
5. ISO 14044:2006/AMD 1:2017/ AMD 2:2020 - Environmental management - Life cycle assessment - Requirements and guidelines.
6. 14040:2006/AMD 1:2020 - Environmental management - Life cycle assessment - Principles and framework.