



Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 AND ISO 21930:2017

Program Operator: Smart EPD®

www.smartepd.com



SmartEPD-2026-120-0773-01

Ductilcrete®

Date of Issue

Mar 05, 2026

Expiration date

Mar 05, 2031

Last updated

Mar 05, 2026



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General Information

Chryso Saint-Gobain

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🌐 chrysoinc.com



Product Name:	Ductilcrete®
Declared Unit:	1 kg
Declaration Number:	SmartEPD-2026-120-0773-01
Date of Issue:	March 05, 2026
Expiration:	March 05, 2031
Last updated:	March 05, 2026
EPD Scope:	Cradle to gate A1 - A3
Market(s) of Applicability:	North America

General Organization Information

Chryso, part of Saint-Gobain Construction Chemicals, is a global leader in sustainable construction solutions. With a team of 3,000 experts worldwide, we develop cutting-edge admixtures, additives, and AI-driven technologies to tackle the toughest challenges in the concrete and cement industry. From scientists to commercial teams, we deliver tailored solutions and foster long-lasting relationships that catalyze innovation and success. Our solutions not only enhance our customers' competitive edge but also significantly reduce their carbon footprint and improve material performance, helping to build a better future, for both people and the planet. Adfil NV, a leading international player in high performance concrete reinforcing fibers, help reduce the carbon footprint of reinforced concrete, improve the lead times and productivity of construction projects, and increase the lifetime of the concrete.

Further information can be found at: www.chrysoinc.com

Limitations, Liability and Ownership

This EPD was not written to support comparative assertions. Even for similar products, differences in declared unit, use and end-of-life stage assumptions, and data quality may produce incomparable results. It is not recommended to compare EPDs with another organization, as there may be differences in methodology, assumptions, allocation methods, data quality such as variability in data sets, and results of variability in assessment software tools used. Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s): ISO 14025 and ISO 21930:2017

Core PCR:

Smart EPD® Part A Product Category Rules for Building and Construction Products and Services, 1000, v1.2

Date of issue: March 14, 2025

Valid until: March 14, 2030

Sub-category PCR review panel:

 Contact Smart EPD for more information.

General Program Instructions:

 Smart EPD General Program Instructions v.2.0, March 2025

Verification Information

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Verification:

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External

Independent external verification of EPD, according to ISO 14025 and reference PCR(s):

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External

Product Information

Declared Unit:

1 kg

Mass:

1 kg

Product Specificity:

✓ Product Average

✗ Product Specific

Variation in GWP Result (Products):

0% to +1%

Variation in GWP Result (Facilities):

0% to 0%

Product Description

Synthetic fibers are used as secondary reinforcement in concrete matrices and are added at a rate of 0.5-1 kg/m³ of concrete depending on the application. Typical application areas are foundations, floor slabs and precast concrete elements. The construction fibers are embedded in the concrete for the entire lifetime of the concrete structure.

Products included:

Ductilcrete®

Further information can be found at: <https://adfil.com/synthetic-macro-fibres>

Product Specifications

Product Classification Codes: EC3 - Concrete

Material Composition

Material/Component Category	Origin	% Mass
Proprietary	None	None

Packaging Material	Origin	kg Mass
Proprietary	None	None

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specifity

Primary Data Year: 2023

Manufacturing Specificity:

- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

Averaging was conducted.

System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	ND
	A5	Assembly / Install	ND

Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	ND
	C2	Transport	ND
	C3	Waste Processing	ND
	C4	Disposal	ND
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	ND

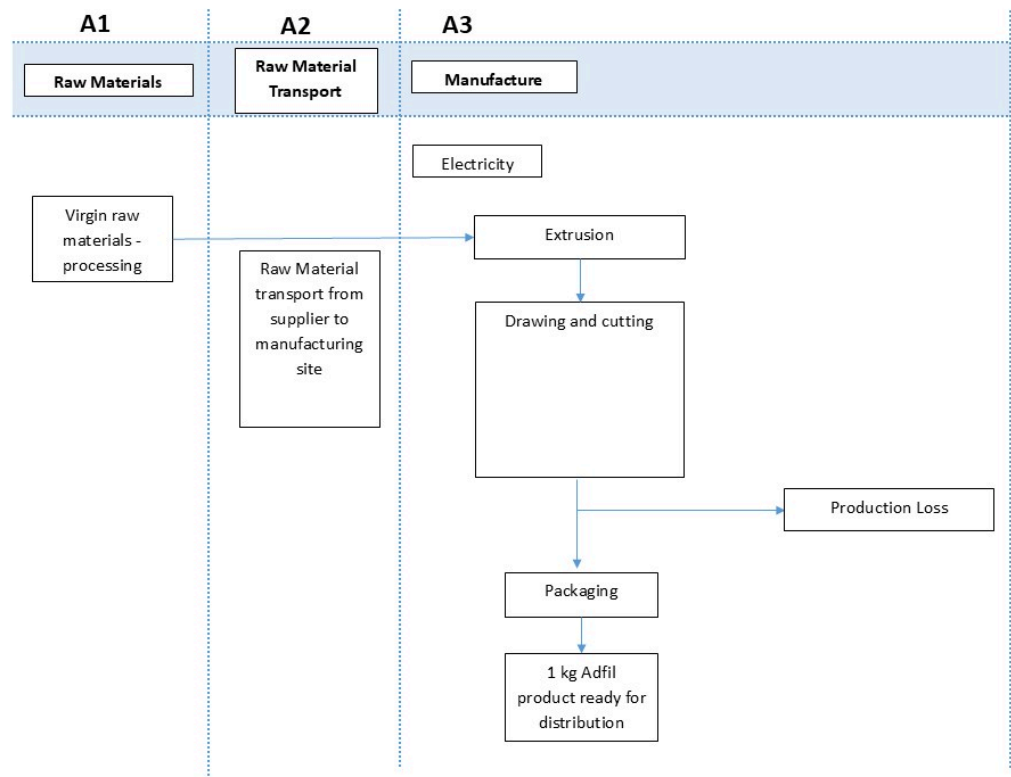
Note:

ND = Module not declared

Plants

 Adfil Construction Fibers Industriestraat 39, 9240 Zele, Belgium

Product Flow Diagram



Software And Database

LCA Software:	☰ GaBi v. 10.9.1.10
LCI Foreground Database(s):	☰ GaBi Professional Database v. 2025.1 📍 Europe ☰ Ecoinvent v. 3.9.1 📍 Europe
LCI Background Database(s):	☰ GaBi Professional Database v. 2025.1 📍 Europe ☰ Ecoinvent v. 3.9.1 📍 Europe

A foreground LCI database is the database used to model the primary, site-specific data collected for this EPD. A background LCI database is the database used to model generic or non-specific data.

Data Quality

Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty. The data sources used are complete and representative of Europe in terms of the geographic and technological coverage and are less than ten years old. Any deviations from these initial data quality requirements for secondary data are documented in the report. The results of an LCA are only as good as the quality of input data used. Important data quality factors include precision (measured, calculated, or estimated), completeness, consistency, and reproducibility. The data used for primary data are based on direct information sources from the Chryso facility. The energy and water usage data were

collected directly from the utility meters, and the allocation was based on the analysis of experts at the plant. Therefore, the precision for primary data is considered high; however, the uncertainty of the primary data has not been quantified.

Secondary data sets were used for raw materials extraction and processing, transportation, and energy production flows. Primary data was collected from the Chryso experts as tracked by automated systems and records. Since most of the data is annually reported, the consistency is considered high. Secondary data was consistently modeled using primarily the Sphera LCA FE database with inputs from the USLCI and Ecoinvent v3.9 when data was not available in the Sphera LCA FE database. Proxies were only identified and used if secondary data was not available. This methodology provides consistency throughout the model. The representativeness of the datasets is chosen to be representative of Europe, average technologies of the major producers and distributors of recent and modern timeframes. Most of the secondary data sets have some uncertainty information documented and varies per model. Uncertainty for primary data was not quantified. However, the collected data and allocation methodologies were judged by the operations personnel to be accurate, so the uncertainty is considered low. Overall, the primary data from the manufacturing location is of very high quality, being directly tracked and measured by facility personnel. Therefore, the secondary data is likely to have a higher degree of uncertainty than the primary production data. This is considered when interpreting the results of this life cycle assessment.

Data Sources

Material/Process Category	Module	Material/Process Name	Inventory Dataset Name	Dataset Geographic Region	Reporting Period/Year Dataset Represents	Reference	Amount (if relevant)	Unit
Raw Materials	A1	Polypropylene (PP)	polypropylene production, granulate	Europe	2022	Ecoinvent	ND	ND
Raw Materials	A1	HDPE	polyethylene production, high density, granulate	Europe	2022	Ecoinvent	ND	ND
Manufacturing	A3	Electricity	electricity, high voltage, production mix	Belgium	2022	Ecoinvent	ND	ND

Life Cycle Module Description

Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site and packaging. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

A1. Raw materials supply

All materials needed for production as well as packaging is taken into account.

A2. Transport of raw materials to manufacturer

The transportation of the suppliers to Adfil N.V. is done by truck.

A3. Manufacturing

The production process begins with extrusion, during which the required plastics are combined and processed. After extrusion, the hardened material is cut to the desired dimensions. The products then undergo a quality control process to check for production defects. After production, the various products are packaged in paper bags. Throughout the entire manufacturing process, only electricity is used as the energy source. The process results in a production loss of 4.49%. During production, only electricity consumption occurs. The specified electricity consumption covers the electricity usage of all machines and equipment.

LCA Discussion

Allocation Procedure

Allocation was conducted based on the production mass data provided by the facility as a percentage of the overall production mass. Since the plant does not have submetering, there is no way to determine exact consumption for specific product lines. Mass allocation is the most accurate and representative way to allocate energy and water usage data. No waste flows during production have been allocated as co-products. However, there are additional products produced at this location that were excluded from the study. Allocation was conducted based on the production mass data provided by the facility after exclusion of the out-of-scope product information.

Cut-off Procedure

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible. For Hazardous Substances – as defined by the U.S. Occupational Health and Safety Act the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No known flows were deliberately excluded. Capital items for the production processes (machines, buildings, etc.) were not taken into consideration.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results: ✗ No

Results

Environmental Impact Assessment Results

IPCC AR6 GWP 100, TRACI 2.2, EF3.1

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Method	Indicator	A1 - A3
GWP-total (incl biogenic)	IPCC AR6 GWP 100	ND	2.34e+0
GWP-fossil	IPCC AR6 GWP 100	ND	2.36e+0
GWP-biogenic	IPCC AR6 GWP 100	ND	-1.43e-2
ODP	TRACI 2.2	ND	2.46e-8
AP	TRACI 2.2	ND	6.80e-3
EP-freshwater	TRACI 2.2	ND	1.36e-4
EP-marine	TRACI 2.2	ND	2.79e-3
POCP	TRACI 2.2	ND	1.06e-1
ADP-fossil	EF3.1	ND	7.53e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Global Warming Potential or Climate Change is an indicator aimed at including in a single value the added effect of all the substances contributing to the greenhouse effect.

Global Warming Potential (GWP-Total) includes biogenic carbon, fossil carbon, land use and land use change. To calculate GWP-Total within the above table, the equation below is used:

$$\text{GWP-total} = \text{GWP-biogenic} + \text{GWP-fossil} + \text{GWP-luluc}$$

- GWP-total or GWPtrtotal (including biogenic) is the sum of GWP-biogenic, GWP-fossil and GWP-luluc
- GWP-biogenic only includes biogenic carbon which is carbon that is stored in bio-sourced materials, like plants, trees, and soil. This excludes fossil.
- GWP-fossil or GWPtrtotal (excluding biogenic) only includes fossil carbon which is the carbon dioxide emitted when fossil fuels like coal, oil, or natural gas are combusted. This excludes biogenic.
- GWP-luluc only includes the greenhouse gas emissions that arise in connection with changes in the specified carbon stock as a result of land use and land use change, such as deforestation.

Depending on the required or optional standards, GWP can be reported with different methods and indicators including United States Environmental Tool for Reduction and Assessment of Chemicals and Other Environmental Impacts (TRACI 2.1, TRACI 2.2, etc.), Intergovernmental Panel on Climate Change (IPCC) Assessment Report (AR 5, AR 6, etc.), Environmental Footprint (EF 3.0, 3.1), and/or EN 15804.

GWP can be reported on a time frame such as GWP 100 for 100-year time horizon.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and

specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicator

Indicator	Unit	A1 - A3
RPRE	MJ	1.93e+0
RPRM	MJ	1.09e+0
RPRT	MJ	3.01e+0
NRPRE	MJ	8.94e+1
NRPRM	MJ	0
NRPRT	MJ	8.94e+1
ADP-fossil	MJ	4.33e+0
SM	kg	0
RSF	MJ	0
NRSF	MJ	0
FW	m3	2.64e-2
RE	MJ	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

Indicator	Unit	A1 - A3
HWD	kg	2.78e-11
NHWD	kg	1.41e-4
RWD	kg	1.23e-6
HLRW	kg	1.26e-9
ILLRW	kg	1.22e-6
CRU	kg	0
MFR	kg	0
MER	kg	0
MNER	kg	0
EEE	MJ	0
EET	MJ	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

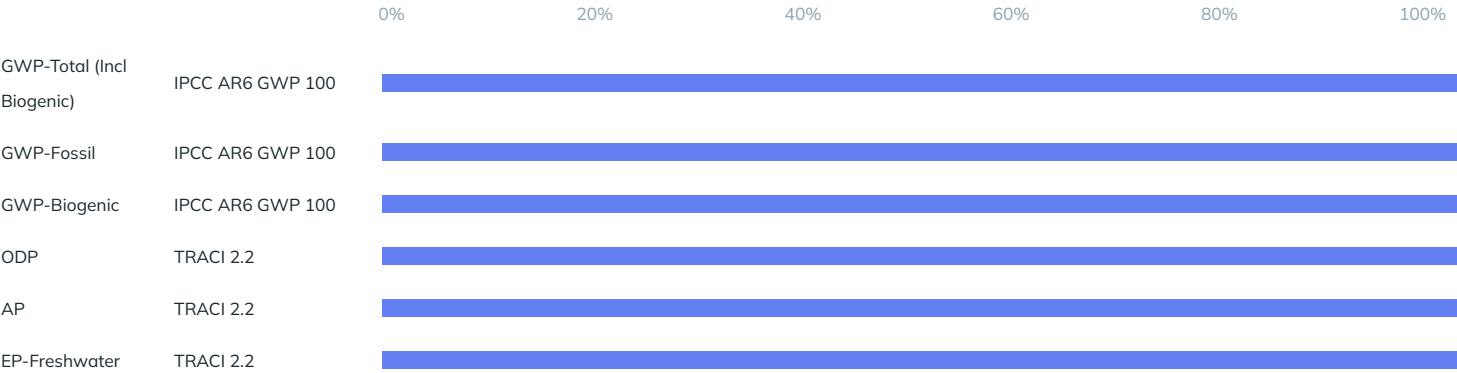
HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Interpretation

Polypropylene production is the dominant contributor to the global warming potential (GWP), due to its crude-oil-based production and associated carbon-intensive processes. Polypropylene, HDPE, and electricity consumption contribute more than 10% each to the GWP. In contrast, all other raw materials and manufacturing processes contribute less than 10% to GWP for Ductilcrete®.

Electricity, natural gas, and packaging drive the modest impacts in Module A3 but remain minor relative to the polypropylene granulate used in Module A1.

Given this imbalance in contribution, Saint-Gobain Construction Chemicals should prioritize supplier collaboration and engagement specifically on polypropylene feedstocks. Improving data quality, pushing for lower-carbon PP sources, transitioning to alternative chemistries where feasible, or encouraging supplier-level decarbonization (e.g., renewable energy, energy efficiency, or lower-impact crude oil inputs) would yield the most meaningful reductions in the product’s overall GWP.



EP-Marine	TRACI 2.2	
POCP	TRACI 2.2	
ADP-Fossil	EF3.1	

Production (A1 - A3)

References

- Smart EPD® Part A Product Category Rules for Building and Construction Products and Services, 1000, v1.2
- ISO 14040: 2006 Series – Environmental Management-Life Cycle Assessment
- ISO 21930:2017– Sustainability in building construction – Environmental declaration of building products
- Sphera Managed LCA Content Databases. <https://lcadatabase.sphera.com/>
- US LCI Database. <https://www.nrel.gov/lci/>
- Ecoinvent Database. <http://ecoinvent.org/>
- Chryso Saint-Gobain Website. www.chrysoinc.com