ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH ISO 14025 AND EN 15804:2012+A2:2019/AC:2021

SmartEPD-2024-014-0089-01

Stongard MR

STONHARD

SMART EPD CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION

Date of Issue: Feb 28, 2024

Expiration: Feb 28, 2029

Last updated: Feb 28, 2024

General Information

Stonhard

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Product Name:	Stongard MR
Declared Unit:	1 kg of applied product
Declaration Number:	SmartEPD-2024-014-0089-01
Date of Issue:	February 28, 2024
Expiration:	February 28, 2029
Last updated:	February 28, 2024
EPD Scope:	Cradle to gate with other options A1 - A3, A5
Market(s) of Applicability:	

Reference Standards

Standard(s):	ISO 14025 and EN 15804:2012+A2:2019/AC:2021
Core PCR:	EPD International AB EPD International PCR for Construction Products v1.3.2 v.1.3.2, ISO 21930:2017 Date of issue: December 08, 2023
Sub-category PCR:	EPD International AB PCR 2019:14-c-PCR-017 Technical-Chemical Products for Construction Sector) (adopted from EPD Norway 2022-07-08) v.3.0 Date of issue: October 17, 2023 Valid until: July 01, 2024
Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Amy Torri | amy@parqhq.com
EPD Program Operator:	Smart EPD | info@smartepd.com | www.smartepd.com 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA

Verification:

Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071 : External

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

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Limitations, Liability, and Ownership

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.

The EPD owner has sole ownership, liability, and responsibility for the EPD.

Organization Information

Stonhard is the unprecedented leader in manufacturing and installing high performance floors. Our seamless, long lasting, easy to clean systems are engineered for both industrial and commercial markets. We also bring the same performance to our wall and lining systems. Joining form and function, our floors are the dependable go-to choice for tough manufacturing environments, while still honoring innovative design for commercial environments. Epoxy, urethane and fast-track methyl methacrylate resin-based systems deliver a broad range of options for every market and application.

Stonhard manufactures and installs products throughout the world with headquarters in Maple Shade, New Jersey. Stonhard is an ISO-9001 registered company.

Further information can be found at: https://www.stonhard.com/about-us/who-we-are/

Product Description

Stongard MR is a fluid applied flooring system which falls under the MasterFormat classification 09 67 00.00 Finishes: Fluid-Applied Flooring. It consists of 3-layers: a primer (Primer 150), a polyurethane elastomeric membrane (Stonproof ME7) and a top coat (Stonkote HT4).

Individual component descriptions:

Primer 150 is a two-component, epoxy based primer. It is applied to a properly prepared substrate prior to the application of the appropriate Stonhard overlayment. The use of Primer 150 ensures a secure bond between the substrate and the overlayment, as well as provide protection from moisture that is present in green concrete.

Stonproof ME7 is a two-component polyurethane elastomeric membrane used for positive-side waterproofing applications.

Stonkote HT4 is a two-component, 100% solids, epoxy coating. It is specifically formulated to provide outstanding protection from a wide range of chemicals while increasing abrasion resistance and cleanability. Stonkote HT4 is easily applied and hardens to an attractive gloss finish.

Further information can be found at: https://www.stonhard.com/products/stongard/

Product Information

Declared Unit:	1 kg of applied product

Mass: 1 kg

Product Specificity:

✗ Product Average

✓ Product Specific

Averaging:

Averaging was not conducted for this EPD.

Plants

Alghero, Italy
Alghero, Province of Sassari, Italy

Product Specifications

Product Classification Codes: UNCPC - 379

Material Composition

Material/Component Category	Origin	% Mass
Primer 150 Amine	EU	10.8
Primer 150 Resin	EU	19
Stonproof ME7 Iso	EU	12.3
Stonproof ME7 Polyol	EU	38.5
Stonkote HT4 Amine	EU	5.3
Stonkote GS4 Resin	EU	14.1

Packaging Material	Origin	kg Mass
LDPE	EU	0.008
PE	EU	0.025
Cardboard	EU	0.098
Pallet	EU	0.055

Biogenic Carbon Content	kg C per kg of applied product
Biogenic carbon content in product	0.0693
Biogenic carbon content in accompanying packaging	0.0075

Hazardous Materials
1,3- benzenedimethanamine reaction products with styrene (CAS 404362-22-7)
1,6 hexandiol glycidyl ether (CAS 16096-31-4)
2-piperazin-1-ylethylamine (CAS 140-31-8)
3-Aminomethyl-3,5,5- trimethylcyclohexylamin e (CAS 2855-13-2)
4-nonylphenol, branched (CAS 84852-15-3)
4,4'-methylenediphenyl diisocyanate (CAS 101-68-8)
Anhydrous aluminum silicate (CAS 66402-68-4)
Benzyl alcohol (CAS 100-51-6)
Carbomocyclic alkylated mixtures of poly-azaalkanes, hydrogenated (CAS 1173092-74-4)
Carbon black (CAS 1333-86-4)
Castor oil (CAS 8001-79-4)
Diethylenetriamine (CAS 111-40-0)
Diphenylmethane-2,4'- diisocyanate (CAS 5873-54-1)
Dipropylene glycol dibenzoate (CAS 27138-31-4)
Isodecyl benzoate (CAS 131298-44-7)
Limestone (CAS 1317-65-3)
Naphtha (petroleum), heavy alkylate (CAS 64741-65-7)
Phenol, polymer with formaldehyde, glycidyl ether (CAS 28064-14-4)
Polyoxypropylenediamine (CAS 9046-10-0)
Reaction product: bisphenol-A-(epichlorhydrin) epoxy resin (number average molecular weight <= 700) (CAS 25068-38-6)
Talc (CAS 14807-96-6)
Titanium dioxide (CAS 13463-67-7)
Trimethyl-1,3- pentanediol, dii (CAS 6846-50-0)
Zeolites (CAS 1318-02-01)

EPD Data Specificity

Primary Data Year: 2022-2023

Manufacturing Specificity:

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

Software and LCI Data Sources

LCA Software:	openLCA v. 2.0
LCI Foreground Database(s):	Ecoinvent v. 3.9.1
LCI Background Database(s):	Ecoinvent v. 3.9.1

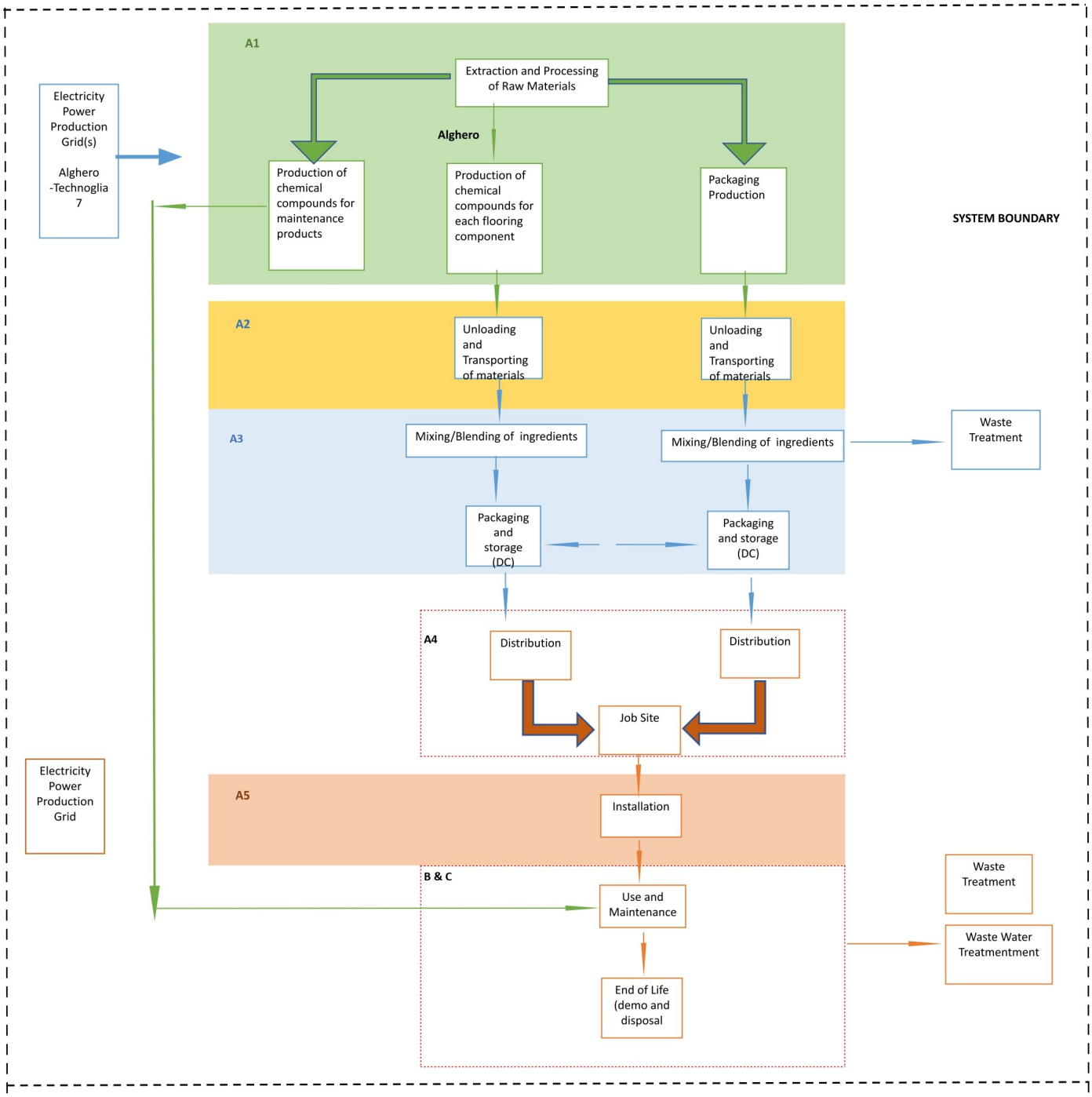
Renewable Electricity

Renewable electricity is used:	No

System Boundary

Production	A1	Raw material supply	EU 27	✓
	A2	Transport	EU 27	✓
	A3	Manufacturing	ITA	✓
Construction	A4	Transport to site	ND	ND
	A5	Assembly / Install	ITA	✓
Use	B1	Use	ND	ND
	B2	Maintenance	ND	ND
	B3	Repair	ND	ND
	B4	Replacement	ND	ND
	B5	Refurbishment	ND	ND
	B6	Operational Energy Use	ND	ND
	B7	Operational Water Use	ND	ND
End of Life	C1	Deconstruction	ND	ND
	C2	Transport	ND	ND
	C3	Waste Processing	ND	ND
	C4	Disposal	ND	ND
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	ND	ND

Product Flow Diagram



Life Cycle Module Descriptions

The upstream phase includes raw materials and packaging production which are required for Stongard MR (phase A1). All materials are transported to the production site (Alghero, IT) where they are being used (phase A2). The components (resins, amines and aggregates) of the different layers are produced by mixing and blending the raw materials and packaging into standard units (phase A3). The components are used at the building sites to install the flooring system (phase A5). Here, reactions occur between the amines and the resins and solid layers are formed.

LCA Discussion

Allocation Procedure

Electricity, water and diesel were estimated based on mass allocation following a top-down approach based on the products manufactured in Alghero in the reference period. The cut-off approach was selected for the background LCA data.

Cut-off Procedure

A cut-off of 1% was applied to all raw materials, packaging materials, energy, water and waste flow. The impact of infrastructure and capital goods corresponding to the core process was excluded from this EPD.

Data Quality Discussion

Precision: The inventory data used in this study were either directly measured, calculated, or estimated based on primary data sources, ensuring high precision. Background data from ecoinvent v3.9.1 database also has documented precision to the extent available.

Completeness: Each product system's mass balance and inventory completeness were thoroughly checked. Some exclusions were made in line with the PCR requirements. However, no data was intentionally omitted.

Consistency: Primary data were collected with a similar level of detail, while background data came from the ecoinvent v3.9.1 database. The modeling approach and other methodological choices were applied consistently throughout the model.

Reproducibility: This study ensures reproducibility by providing comprehensive disclosure of input-output data, dataset choices, and modeling approaches. A knowledgeable third party should be able to approximate the results using the same data and modeling methods.

Representativeness:

Temporal: Primary data were collected for either the one-year period of October 2022 to September 2023 (for the majority of products) to ensure the representativeness of post-consumer content. Secondary data from the ecoinvent v3.9.1 database is typically representative of recent years.

Geographical: Primary data represent Stonhard's production facilities in Alghero, Italy. The use of country-specific data ensures high geographical representativeness, and proxy data were only used when country-specific data were unavailable.

Technological: Both primary and secondary data were tailored to the specific technologies studied, ensuring high technological representativeness.

Results

Environmental Impact Assessment Results

EF 3.1

per 1 kg of applied product.

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

Impact Category	Unit	A1A2A3	A5
GWP-total	kg CO2 eq	3.14e+0	2.93e-1
GWP-fossil	kg CO2 eq	3.22e+0	1.20e-1
GWP-biogenic	kg CO2 eq	-2.90e-1	2.86e-2
GWP-luluc	kg CO2 eq	2.09e-1	1.34e-5
ODP	kg CFC 11 eq	2.32e-7	1.93e-9
AP	mol H+ eq	1.50e-2	2.99e-4
EP-freshwater	kg P eq	8.57e-4	1.44e-5
EP-marine	kg N eq	4.97e-3	1.59e-4
EP-terrestrial	mol N eq	3.41e-2	6.79e-4
POCP	kg NMVOC eq	1.20e-2	2.96e-4
ADP-minerals&metals	kg Sb eq	2.58e-5	5.48e-7
ADP-fossil	MJ	6.01e+1	1.21e+0
WDP	m3	1.76e+0	1.53e-2

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.

The GWP-GHG of electricity used is 0.603 kgCO2e/kWh corresponding to the residual electricity grid mix in Italy from ecoinvent 3.9.1.

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 Indicators

per 1 kg of applied product.

Indicator	Unit	A1A2A3	A5
PERE	MJ, net calorific value	1.02e+1	8.39e-2
PERM	MJ, net calorific value	0	0
PERT	MJ, net calorific value	1.02e+1	8.39e-2
PENRE	MJ, net calorific value	5.60e+1	1.16e+0
PENRM	MJ, net calorific value	4.38e+0	4.90e-2
PENRT	MJ, net calorific value	6.03e+1	1.21e+0
SM	kg	9.40e-2	1.05e-2
RSF	MJ, net calorific value	6.48e-2	6.02e-3
NRSF	MJ, net calorific value	1.76e-1	8.80e-3
RE	MJ	1.02e+1	8.39e-2
FW	m3	4.62e-2	6.98e-4

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

per 1 kg of applied product.

Indicator	Unit	A1A2A3	A5
HWD	kg	2.26e-1	2.06e-3
NHWD	kg	3.44e-1	4.26e-2
RWD	kg	5.68e-5	1.77e-6
CRU	kg	0	0
MFR	kg	1.30e-1	1.02e-2
MER	kg	0	0
EEE	MJ	0	0
EET	MJ	0	0

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.

Carbon Emissions and Removals

per 1 kg of applied product.

Indicator	Unit	A1A2A3	A5
No data found			

Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Scenarios

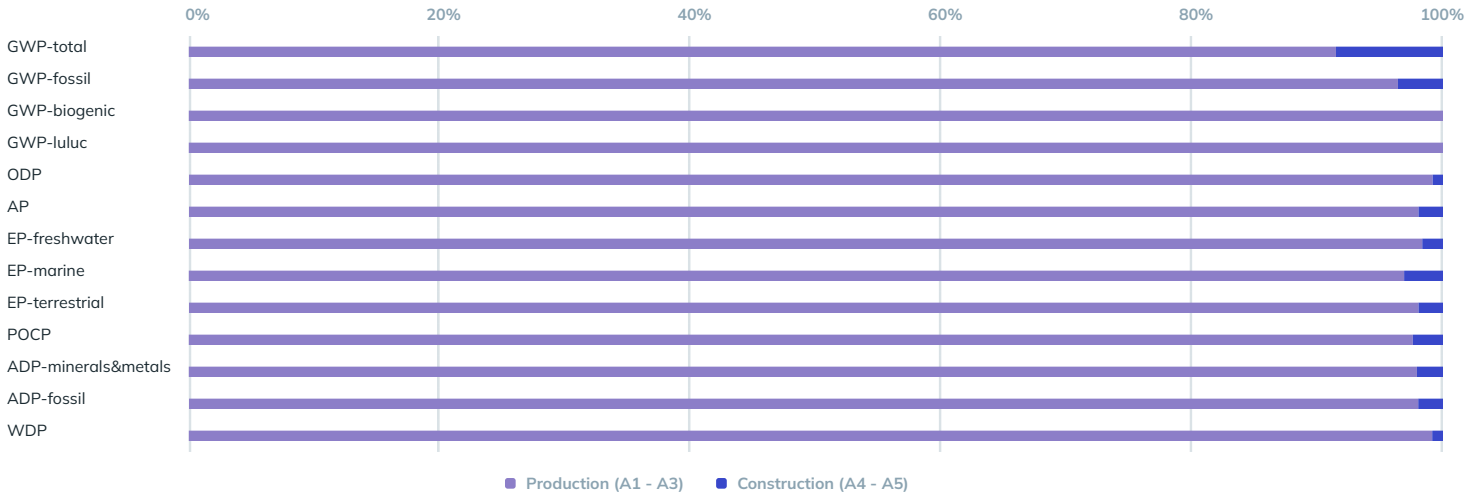
Installation in to the building/construction site (A5)

A5 Module

Electricity Consumption: 0.12 kWh

Interpretation

The main EPD results are given in the EPD report. A1 process accounted for as much as 2.51 kgCO2e/kg of Stongard MR product, while the Primer 150 components accounted for nearly 0.87 kgCO2e/kg of Stongard MR product. Overall the A1-A3 GWP100-Total was 3.14 kgCO2e/kg of Stongard MR product. The A5 impact was very low compared to the manufacturing impact. Although C3 and C4 phases corresponding to the waste processing and disposal, respectively, are out of the boundaries of this LCA, it is investigated the amount of biogenic carbon that would be released during these phases. Under the reality of taking the product mixed with other building and construction materials (such as concrete), which is the classic use of this product, it is assumed that the product will end-up landfilled in a sanitary landfill stick together to large concrete chunks without the possibility of separation and specific recovery or treatment of MR. Since the biogenic content of Stongard MR is mixed with physically stable constituents and resins, which indeed allow lifespans accordingly long for the building and construction sector (>50-100 years), it is not expected a release of biogenic carbon under landfilling conditions, less within a period of 100 years since product manufacturing, which would account within the global warming potential at 100 years (GWP100) indicator. Biogenic carbon content of this product is expected to behave as biomass captured within fossil amber resins, which remain sequestered during long periods of time, frequently millions of years. Thus, the biogenic carbon released during phases C3 and C4 is expected to be extremely low, potentially zero if the product is considered a waste after more than 100 years since manufacturing.



Dataset Information

Dataset name	Information module	Dataset source	Amount (if relevant)	Unit
electricity, low voltage, residual mix	A1	ecoinvent 3.9.1	confidential	kWh

Other Environmental Impacts

Impact Category	Indicator	Unit	A1A2A3	A5
GWP-GHG	ND	kg CO2 eq	3.43e+0	2.64e-1

Abbreviations:

GWP-IOBC/GWP-GHG = Climate change indicator with instantanious oxidation of biogenic carbon. The GWP-IOBC indicator has zero contribution to GWP from biogenic carbon temporary stored in products and packaging. The GWP-IOBC indicator, also called GWP-GHG, is identical to GWP-total except that the characterization factor (CF) for biogenic CO2 is set to zero.

References

[1] ISO 14040:2006, “Environmental management - Life cycle assessment - Principles and framework”.

[2] ISO 14044:2006, “Environmental management - Life cycle assessment - Requirements and guidelines”.

[3] EN15804:2019. Sustainability of Construction Products.

[4] NSF International, Product Category Rule for Environmental Product Declarations for Resinous Floor Coatings, December 2018.

[6] ISO 14025:2006, “Environmental labels and declarations - Type III environmental declarations - Principles and procedures”.

[7] ecoinvent v3.9.1, December 2022,

https://ecoinvent.org/the-ecoinvent-database/data-releases/ecoinvent-3-9-1/

[8] Weidema B. P., C. Bauer, R. Hischier, et al. Overview and methodology. Data quality guideline for the ecoinvent database version 3. Ecoinvent Report 1(v3), St. Gallen: The ecoinvent Centre (2013).

https://ecoinvent.org/wp-content/uploads/2021/09/dataqualityguideline_ecoinvent_3_20130506.pdf

[9] NPCR 009 Part B for Technical - Chemical products for building and construction industry

[10] Construction Products Product Category Rule (PCR) 2019:14 v1.3.2