Polisan
HOME COSMETICS

Environmental Product Declaration

In Accordance with ISO14025 and EN15804 A2 for Perla Silicone Exterior Paint

CPC Code	3511 Paints and Varnishes and Related Products
Declaration Number	S-P-00741
EPD Publication Date	21.09.2015
EPD Revision Date	24.02.2020
EPD Validity Date	23.02.2025
Market Coverage	Worldwide

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Programme Related 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	
PCR Review Conducted by	Chair: Claudia A. Peña, Technical Committee of the International EPD® System - info@environdec.com	
Independent Verification	☑ EPD verification ☐ EPD process certification	
Approved and Verified by	Mr. Vladimir Koci, LCA Studio PhD, Šárecká 5, 16000 Prague 6, Czech Republic www.lcastudio.cz Approved by: The International EPD® System	
EPD Prepared by	Metsims Sustainability Consulting	www.metsims.com
Calculation Procedure	SimaPro 9.0 Software (Metsims Sustainability Consulting)	
System Boundaries	☐ Cradle to gate ☑ Cradle to gate with options ☐ Cradle to grave	
Procedure for follow up of data during EPD validity involves third party verifier	☐ Yes ☑ No	

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The Company

The Polisan brand is widely known in glue and paint sectors. The name is derived from polyvinyl acetate (PVA) glue and the word “sanayi” (Turkish for industry).

The founders of the company, the Bitlis family, started commercial operations in the 1920s as a merchandising firm until the establishment of a fabric painting and knitting business called Sark Mensucat. In 1964, they entered the chemicals industry with the foundation of Polisan Chemical, which produced emulsifier resins. In 1985, paint production had begun under the Polisan brand.

Polisan Kansai Boya’s most recent paint production and warehouse facility investment, which started in 2016 on 142,000 square meter land in the Gebze Chemicals Specialized Organized Industrial Zone, was completed in June 2018. Having started with a paint production capacity of 10,000 tons/year in 1985, Polisan Kansai Boya now has a capacity of 180,000 tons/year in 3 shifts at the former paint facility, which has now been relocated. Built to International Standards, the fully automated new facility has tripled the annual production capacity, rising it to 180,000 tons/year in a single shift. With the flexibility of working 3 shifts a day, without requiring additional investment spending, the annual production capacity of the new facility can rise to as high as 540,000 tons, which almost matches the size of Turkey’s total decorative market. The new facility was designed in order to receive a “Green Building Certificate” in an attempt to lead the transformation of the market in terms of sustainability and has become the 23rd production facility within Turkey to receive a LEED certification. This fully-automated facility is positioned as a regional production hub by Polisan’s Japanese partner Kansai Paint. Thereby, Polisan Kansai Boya is one step closer to its goal of becoming a global brand.

Polisan has ISO 9001, ISO 10001, ISO 14001, ISO 18001, ISO 50001 and ISO 27001 standards certifications.

Statement

This study is conducted according to the guidelines of ISO 14040/44 and the requirements given in the Product Category Rules (PCR) document for Construction Products and CPC 54 Construction Services (Version 1.0, 2019 12 20) with reference to EN 15804 A2 and the general program guidelines by The International EPD System.

The inventory for the LCA study is based on the 2019 production figures for Perla Silicone exterior paints from Polisan's main production plant in Gebze Chemicals Specialized Organized Industrial Zone which is in Kocaeli, Turkey.

This LCA was modelled with SimaPro LCA package using the latest version of the Ecoinvent database and impact factors.

Product Specifications

Composition	%
Additives	1 - 10
Pigments	1 - 10
Fillers	40 - 50
Solvents / Waters	30 - 40
Binders	10 - 20

Paint is composed of pigments, solvents, resins, and various additives. The pigments give the paint colour; solvents make it easier to apply; resins help it dry; and additives serve as everything from fillers to incan protective agents. Hundreds of different pigments, both natural and synthetic, exist. Packaging is composed of polypropylene buckets. Distribution packaging includes eur-flat pallets, polyethylene packaging films and core board as corner braces.

Colour	Consult color catalogue
Solid, % (weight)	65.46
Density (g/cm³, 25 °C)	1.55
Viscosity (cPs, 23 °C)	14000 - 18000
pH (25 °C)	8 - 9
Coverage (m² / L)	8 - 10 per single coat
VOC*	30 mg / L per single coat

*VOC values are calculated theoretically

Composition of the Perla Silicone provided on above table. Cadmium Sulphide, used as pigments, is identified according to the procedure described in Article 59(1) of the REACH Regulation which establishes the Candidate List for Substances of Very High Concern but its use is very small (less than 0.04%). The amount of Cadmium Sulphide is lower than danger level.

Production Process

Raw materials and water are fed and mixed within a high speed mixer. During dispersion process, pigments and fillers are mixed within a mixer. After preparing a homogenous mix during dispersion process, binders, anti foaming agents, antibacterial agents, antifreezing agents are added into the mixture and the production is completed after a final mix.

After quality control, the products are transfered into a kettle for colouring or storage tank to be filled. The products that are transfered into the kettle are coloured with suitable colouring pigments. At the end of the colouring process the products are brought to packaging process and transfered to dispatch.

Interior paint products (Elegans Extra Semi Matte and Perla Semi Matte) are produced under the standard of TS 5808 - Paints and varnishes – Water based coating materials and coating systems for use in interior walls and ceilings and exterior paint products (Exelans Flat and Perla Silicone) are produced under the standard of TS 7847 – Paints and plasters – Coating materials and coating systems for exterior masonry and concrete.

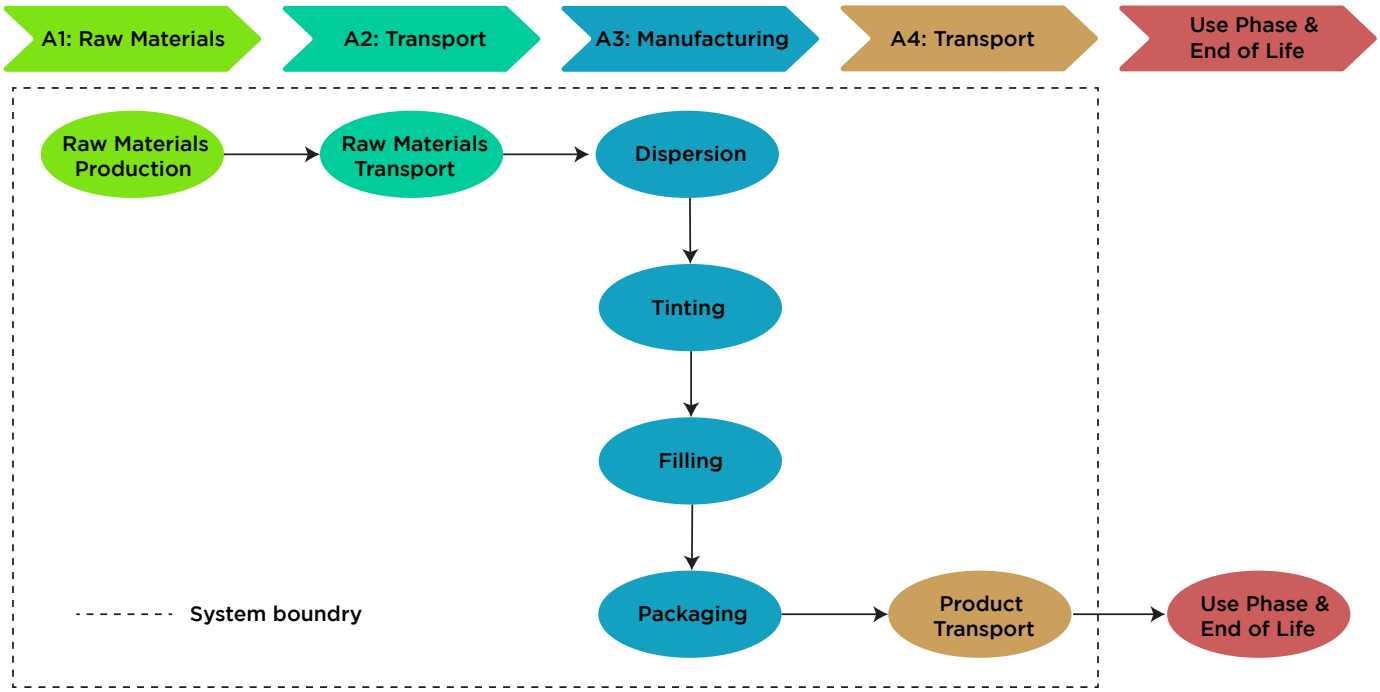
System Boundary

The system boundary covers the production of raw materials, all relevant transport down to factory gate, manufacturing by Polisan (cradle to gate) and distribution to Polisan's vendors. The review framework comprises the following details:

- Raw materials acquisition and transport,
- Further processing of raw materials for paint products,
- Production operations includes dispersion, storage, tinting, filling the paints into the cans,
- Energy and water consumption, waste management,
- Packaging of the product final for delivery,
- Distribution to vendors

The system boundary of the LCA study conducted on the interior and exterior paint products is shown in below by the dotted lines including packaging of the final product for delivery and landfilling as disposal. Due to same manufacturing process, the system boundary depicted below is relevant for each product group.

System boundary of the LCA study conducted on Interior Paint Products



LCA Results

Upstream Processes (A1: Raw Material Supply)
In this EPD, production starts with raw materials, transported locally and from other parts of the world. (A1).

Core Processes (A2: Transportation and A3: Manufacturing)
Transport is relevant for delivery of raw materials to the plant and internal transport. (A2).
Production stages start with dispersion of raw materials followed by storage tank, tinting, filling into the cans and packaging for final delivery. Electric energy is consumed during the manufacturing of paint products (A3).

Downstream Processes (A4: Transport)
Downstream processes include product transport to Polisan's various vendors located in Turkey. A distance average was taken from the locations of the shipments made in 2019.

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

Product Stage			Construction Process		Use Stage							End of Life				Benefits and Loads Beyond the System Boundary
Raw Material Supply	Transport	Manufacturing	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-construction	Transport	Waste processing	Disposal	Reuse - Recycling Recovery
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

LCA Calculation Rules

Functional Unit/Declared Unit
The declared unit is the production of 1 kg of Perla Silicone Exterior Paint (1.55 kg/L, 8-10 m2/L for single coat).

Goal and Scope
This EPD evaluates the environmental impacts of 1 kg of exterior paint products from cradle to gate with product transport.

System Boundaries
The system boundary covers A1 – A3 product stages referred as 'Raw material supply', 'Transport' and 'Manufacturing' and A4 as 'Transport', repsenting product transport.

Estimates and Assumptions
There are no additional product scenarios developed for this EPD.

Cut- Off Rules
All raw materials that are constituent of the paint products are included in this study. Therefore, cut-off criteria were not applied.

Background Data
Ecoinvent version 3.5 database were used as generic background data source.

Data Quality
Raw materials, electricity and water use were collected from Polisan.

Period Under Rewiew
All primary data collected from Polisan's plant is for the period year of 2019. Primary datasets were produced in SimaPro using these data. Necessary background data (secondary data) relevant to life cycle stages were taken from the Ecoinvent database.

Allocations
There are no co-products in the production of interior paint products. Hence, there is no need for co-product allocation. Polisan sources raw materials from different locations across the world and by different means of transport (truck and ship). For this reason, transport is allocated according to tonnages for almost all raw materials bought by Polisan.

Comparability
A comparison or an evaluation of EPD data is only possible where EN 15804 A2 has been followed, and the same building context and product-specific characteristics of performance are taken into account and the same stages have been included in the system boundary. According to EN 15804 A2, EPD of construction products may not be comparable if they do not comply with this standard.

Resource Use

Indicators for the Life Cycle Inventory Analysis as per EN 15804

The results of the LCA with the indicators as per EPD requirement are given in the following tables for product manufacture (A1, A2, A3) and product transport (A4). The system boundaries in tabular form for all modules are shown in the table above. 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.

Results of the LCA - Resource use for 1 kg of Exterior Paint (Perla Silicone)

Resource	Unit	A1. Raw Materials	A2. Transport	A3. Manufacturing	A4. Transport	TOTAL
PERE	MJ	1.51	0.013	0.023	0.017	1.57
PERM	MJ	0	0	0.262	0	0.262
PERT	MJ	1.51	0.013	0.285	0.017	1.83
PENRE	MJ	22.37	0.942	0.205	1.35	24.87
PENRM	MJ	0	0	2.78	0	2.78
PENRT	MJ	22.37	0.942	2.99	1.35	27.65
SM	kg	0	0	0	0	0
RSF	MJ	0	0	0	0	0
NRSF	MJ	0	0	0	0	0
FW	m^3	0.012	$1.59x10^{-04}$	$3.97x10^{-04}$	$2.32x10^{-04}$	0.012

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

Waste & Output Flows

Results of the LCA - Waste and output flows for 1 kg of Exterior Paint (Perla Silicone)

Flow	Unit	A1. Raw Materials	A2. Transport	A3. Manufacturing	A4. Transport	TOTAL
HWD	kg	ND	ND	0.113	ND	0.113
NHWD	kg	ND	ND	0.026	ND	0.026
RWD	kg	ND	ND	0	ND	0
CRU	kg	0	0	0	0	0
MFR	kg	0	0	0	0	0
MER	kg	0	0	0	0	0
EE (Electrical)	MJ	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0

***ND =** Not Declared

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

Environmental Impacts

Results of the LCA - Environmental impacts for 1 kg of Exterior Paint (Perla Silicone)

Impact Category	Unit	A1. Raw Materials	A2. Transport	A3. Manufacturing	A4. Transport	TOTAL
GWP-total	kg CO_2 eq	1.63	0.063	0.127	0.090	1.91
GWP-fossil	kg CO_2 eq	1.62	0.063	0.127	0.090	1.90
GWP-biogenic	kg CO_2 eq	0.009	$1.68x10^{-05}$	$2.87x10^{-04}$	$2.17x10^{-05}$	0.009
GWP-luluc	kg CO_2 eq	0.001	$2.04x10^{-05}$	$1.48x10^{-04}$	$2.78x10^{-05}$	0.001
ODP	kg CFC-11 eq	$1.71x10^{-07}$	$1.12x10^{-08}$	$3.37x10^{-09}$	$1.61x10^{-08}$	$2.02x10^{-07}$
AP	mol H+ eq	0.011	$3.50x10^{-04}$	$5.65x10^{-04}$	$3.69x10^{-04}$	0.012
EP-freshwater	kg PO_4 eq	0.002	$1.55x10^{-05}$	$1.11x10^{-04}$	$2.10x10^{-05}$	0.002
EP-freshwater	kg P eq	$5.09x10^{-04}$	$5.11x10^{-06}$	$3.65x10^{-05}$	$6.94x10^{-06}$	$5.58x10^{-04}$
EP-marine	kg N eq	0.001	$9.07x10^{-05}$	$1.04x10^{-04}$	$1.06x10^{-04}$	0.002
EP-terrestrial	mol N eq	0.014	0.001	0.001	0.001	0.017
POCP	kg NMVOC	0.007	$2.95x10^{-04}$	$4.14x10^{-04}$	$3.55x10^{-04}$	0.008
ADPE	kg Sb eq	$6.10x10^{-06}$	$1.74x10^{-07}$	$6.14x10^{-08}$	$2.64x10^{-07}$	$6.60x10^{-06}$
ADPF	MJ	22.37	0.942	2.99	1.35	27.65
WDP	m^3 depriv.	0.848	0.006	0.036	0.009	0.899
PM	disease inc.	$6.73x10^{-08}$	$4.20x10^{-09}$	$5.44x10^{-09}$	$6.22x10^{-09}$	$8.31x10^{-08}$
IR	kBq U-235 eq	0.108	0.005	0.005	0.007	0.125
ETP-fw	CTUe	3.31	0.143	0.061	0.217	3.73
HTP-c	CTUh	$8.34x10^{-08}$	$4.63x10^{-10}$	$1.41x10^{-09}$	$6.69x10^{-10}$	$8.59x10^{-08}$
HTP-nc	CTUh	$1.86x10^{-07}$	$8.72x10^{-09}$	$6.23x10^{-09}$	$1.31x10^{-08}$	$2.15x10^{-07}$
SQP	Pt	12.21	0.893	3.17	1.35	17.63

Environmental Impacts

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

Eutrophication-freshwater is provided both in P and PO_4 units.

References

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

/ISO 9001/ DIN EN ISO 9001:2008, Quality Management System - Requirements

/ISO 14001/ DIN EN ISO 14001: 2004, Environmental Management System - Requirements

/OHSAS 18001/ DIN EN ISO 18001:2007, Safety Management System-Requirements

/EN 15804/ EN 15804:2012+A2:2019, Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

/TS 5808/ Standard of Paints and varnishes – Water based coating materials and coating systems for use in interior walls and ceilings

/TS 7847/ Standard of Paints and plasters – Coating materials and coating systems for exterior masonry and concrete.

/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 (ISO 14040:2006) 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 2.0, DATE 2019-12-20

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/Ecoinvent/ Ecoinvent Centre, www.Eco-invent.org

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