

Environmental Product Declaration

according to ISO 14025 and EN 15804



This declaration is for:
Vivecryn Eco

Provided by:
Vivechrom SA



program operator
Stichting MRPI®
publisher
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1.1.00238.2021
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COMPANY INFORMATION



Vivechrom SA
Thesi Vathi Pigadi
19600
Mandra Attica, Greece

<https://www.vivechrom.gr>

PRODUCT

Vivecryn Eco

DECLARED UNIT/FUNCTIONAL UNIT

All impacts are calculated using the declared unit "decoration of 1 m² of surface"

DESCRIPTION OF PRODUCT

Premium acrylic all weather exterior ecological wall paint.

VISUAL PRODUCT



MRPI® REGISTRATION

1.1.00238.2021

DATE OF ISSUE

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EXPIRY DATE

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MORE INFORMATION

<https://www.vivechrom.gr/en/products/vivecryn-eco>

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by **ing. Kamiel Jansen, Primum**.

The LCA study has been done by **Joanna Zhuravlova & Brienne Wiersema, Ecomatters**.

The certificate is based on an LCA-dossier according to ISO14025 and EN15804+A1. It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPDs of construction products may not be comparable if they do not comply with EN15804+A1. Declaration of SVHC that are listed on the 'Candidate List of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

PROGRAM OPERATOR

Stichting MRPI®
Kingsfordweg 151
1043GR
Amsterdam

ir. J-P den Hollander, Managing director MRPI®

DEMONSTRATION OF VERIFICATION

CEN standard EN15804 serves as the core PCR[a]

Independent verification of the declaration and data,
according to EN ISO 14025:2010:
internal: external: X

Third party verifier:

Kamiel Jansen, Primum

[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

This EPD is representative for the product paints belonging to the Vivecryn Eco product:

- Vivecryn Eco White
- Vivecryn Eco Base P (Light)
- Vivecryn Eco Base D (Medium)
- *Vivecryn Eco Base TR (Transparent)*

Vivecryn Eco is a 100% acrylic, premium all-weather ecological paint, for exterior walls providing ultimate long-lasting protection against sun, rain and snow. It is suitable for every kind of new or old surface such as plaster, concrete and wooden surfaces. It has excellent application properties, superior opacity and strong adhesion. It provides a water-resistant surface preventing stains development from moisture or rain while demonstrating high water vapour-permeability. It does not contribute to the growth and spread of fire. Vivecryn Eco is a certified cool paint characterized by high solar reflectance value (SR), high infrared emittance () and high reflectance index value (SRI).

Typical use: Suitable for exterior walls such as plaster, concrete and wooden surfaces.

Application: Applied with brush, roller or airless spray. Apply paint and let it dry at temperatures between 10°C to 35°C.

Pack size: The products are packed in a packaging with a capacity of 1L, 3L and 10L.

Production process and conditions of delivery:

During paint production, the raw materials are pre-weighed according to the percentage of each in the formulation. The pigment is then dispersed in a mixture of binder and solvent using a variety of machines. The amount and type of dispersion is product specific and depends on the type of finish required. Finally, tinter is added to correct the color, the paint is thinned to viscosity, filtered and filled into the appropriate packaging container. All paint containers are transported from the production sites to customers in Greece, Cyprus, Albania and Bulgaria.

COMPONENT (> 1%)	[kg / %]
Binder: Acrylic copolymer dispersion	Confidential
Solvent: Water	Confidential
Pigment: Lightfast pigments	Confidential
Filler	Confidential

(*) > 1% of total mass

SCOPE AND TYPE

The type of this EPD is Cradle-to-Gate with options. All major steps from the extraction of natural resources to the final disposal of the product are included in the environmental performance of the manufacturing phase, except those that are not relevant to the environmental performance of the product. This declaration does not imply an indicator result of zero. This EPD is representative for products produced in Elefsis, Greece and the application market is for Greece, Albania, Cyprus and Bulgaria

The software GaBi 10.0.0.92 Professional was used to perform the LCA. In the model the data used is sourced from the Ecoinvent 3.7 database and the Raw materials LCI database for the European Council of the Paint, Printing Ink and Artists' Colours Industry (CEPE).

The validity of this EPD is in correspondence with the specifications of the LCA project report.

All impacts associated with the upstream production of materials and energy are included in the system boundaries. Mining activities and controlled landfills are included in the product systems. Similarly, wastewater treatment activities are also considered within the technological systems. The emissions and resource extractions derived from these processes are considered elementary exchanges between the product systems and the environment.

PRODUCT STAGE	CONSTRUCTION					USE STAGE							END OF LIFE				BENEFITS AND
	PROCESS												STAGE				LOADS BEYOND THE
	STAGE																SYSTEM BOUNDARIES
Raw material supply	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Transport	X	X															
Manufacturing			X														
Transport gate to site				X													
Assembly					X												
Use						X											
Maintenance							X										
Repair								X									
Replacement									X								
Refurbishment										X							
Operational energy use											X						
Operational water use												X					
De-construction demolition													X				
Transport														X			
Waste processing															X		
Disposal																X	
Reuse-Recovery-Recycling-potential																	ND

X = Modules Assessed

ND = Not Declared



Figure: LCA process diagram according to EN 15804 (7.2.1)

REPRESENTATIVENESS

The representative product consists of a weighted average based on annual production volumes of the formulation and characteristics (i.e. packaging format) of the 4 products within Vivecryn Eco:

- *Vivecryn Eco White*
- Vivecryn Eco Base P (light)
- Vivecryn Eco Base D (medium)
- Vivecryn Eco Base TR (transparent)

This EPD is representative for products produced in Greece. The paint is produced at one production site: Elefsis, Greece.

VIVECRYL ECO

Density (kg/l) 1.450

Coverage (m²/l) 12

Number of Layers 2

Total product used (kg/m²) 0.242

A sensitivity analysis is performed to assess the representativeness of the representative product. The environmental impact results for the individual Vivecryn Eco products have maximum positive difference of 26% (Vivedur Eco White) when compared with the representative product, in the Acidification Potential (AP) impact category.

ENVIRONMENTAL IMPACT per functional unit or declared unit (indicators A1)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
ADPE	kg Sb. eq.	1.59 E-6	1.63 E-8	2.26 E-7	1.84 E-6	7.57 E-8	7.33 E-9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.28 E-9	0.00	4.76 E-9
ADPF	MJ	8.83 E+0	1.05 E-1	2.23 E+0	1.12 E+1	3.57 E-1	3.47 E-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.36 E-2	0.00	3.72 E-2
GWP	kg CO2 eq.	4.92 E-1	6.74 E-3	1.04 E-1	6.03 E-1	2.35 E-2	1.55 E-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.15 E-3	0.00	7.05 E-2
ODP	kg CFC 11 eq.	4.13 E-7	1.23 E-9	1.98 E-9	4.16 E-7	4.16 E-9	3.41 E-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.07 E-10	0.00	4.17 E-10
POCP	kg ethene eq.	3.10 E-4	2.77 E-6	4.05 E-5	3.54 E-4	9.05 E-6	2.41 E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.89 E-7	0.00	1.20 E-6
AP	kg SO2 eq.	5.60 E-3	2.65 E-5	3.54 E-4	5.98 E-3	9.22 E-5	2.18 E-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.36 E-6	0.00	1.23 E-5
EP	kg (PO4)3- eq.	7.12 E-4	7.89 E-6	6.92 E-5	7.89 E-4	2.75 E-5	3.40 E-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.48 E-6	0.00	1.30 E-5

ADPE = Abiotic Depletion Potential for non-fossil resources
 ADPF = Abiotic Depletion Potential for fossil resources
 GWP = Global Warming Potential
 ODP = Depletion potential of the stratospheric ozone layer
 POCP = Formation potential of tropospheric ozone photochemical oxidants
 AP = Acidification Potential of land and water
 EP = Eutrophication Potential
 ND = Not Declared

RESOURCE USE per functional unit or declared unit (A1 / A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
PERE	MJ	2.64 E-1	1.14 E-3	8.43 E-2	3.50 E-1	4.00 E-3	5.19 E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.16 E-4	0.00	4.12 E-4
PERM	MJ	3.49 E-4	6.37 E-10	8.86 E-3	9.21 E-3	2.68 E-9	2.83 E-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.04 E-10	0.00	7.31 E-10
PERT	MJ	2.65 E-1	1.14 E-3	9.32 E-2	3.59 E-1	4.00 E-3	5.19 E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.16 E-4	0.00	4.12 E-4
PENRE	MJ	9.42 E+0	1.06 E-1	2.37 E+0	1.19 E+1	3.62 E-1	3.52 E-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.42 E-2	0.00	3.77 E-2
PENRM	MJ	3.80 E-6	0.00	1.03 E-7	3.91 E-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	9.42 E+0	1.06 E-1	2.37 E+0	1.19 E+1	3.62 E-1	3.52 E-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.42 E-2	0.00	3.77 E-2
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	m3	1.29 E-5	8.93 E-4	4.14 E-5	9.47 E-4	1.22 E-5	3.96 E-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.89 E-5	0.00	3.36 E-3

PERE = Use of renewable energy excluding renewable primary energy resources
 PERM = Use of renewable energy resources used as raw materials
 PERT = Total use of renewable primary energy resources
 PENRE = Use of non-renewable primary energy resources excluding non-renewable 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 resources
 SM = Use of secondary materials
 RSF = Use of renewable secondary fuels
 NRSF = Use of non renewable secondary fuels
 FW = Use of net fresh water
 ND = Not Declared

OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 / A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
HWD	kg	0.00	0.00	5.20 E-4	5.20 E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	0.00	0.00	4.59 E-4	4.59 E-4	0.00	1.17 E-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.42 E-1
RWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ETE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

HWD = Hazardous Waste Disposed
 RWD = Radioactive Waste Disposed
 MFR = Materials for recycling
 EEE = Exported Electrical Energy
 ND = Not Declared
 NHWD = Non Hazardous Waste Disposed
 CRU = Components for reuse
 MER = Materials for energy recovery
 ETE = Exported Thermal Energy

CALCULATION RULES

Cut off criteria

The cut-off is not considered in any of the life cycle stages.

In the electricity for paint manufacturing process, transmission and transformation losses were not accounted for in case of renewable energy sources (wind energy). The reason for that exclusion is the fact that transformation and transmission losses account together for less than 1% of the energy input and it is not expected to influence the results significantly.

Data quality and data collection period

Specific data was collected from AkzoNobel through a questionnaire, including inquiries about paint characteristics, production information and end-of-life. The data collection period for specific data was the year 2020.

Transport data (for raw materials, paint and packaging materials), packaging materials use and packaging material end of life scenarios were covered with data generic values as described in the Product Environmental Footprint Category Rules - Decorative Paints document version 1.0 published by CEPE and reviewed in April 2018. Further data gaps (i.e. end-of-life transport data) were covered with data from internal AkzoNobel LCA studies concerning the same type of products (paints and coatings). Generic data (i.e. upstream acquisition and production of raw materials, energy generation, transport, waste treatment processes) was selected from Ecoinvent 3.7 database. In the case of missing data, a relevant proxy was searched and adjusted to the corresponding unit process.

Allocation procedure

To allocate the emissions and inputs to the manufactured products, the decision-hierarchy in ISO 14044 is used (ISO 2006). It is not possible to sub-divide the site data into a more detailed level or find physical causalities between inputs and outputs, thus allocation is done based on mass, considering the annual production of paint product for each site. The paint production is basically a process of mixing ingredients and, therefore, the environmental impact is fairly to be related to the mass of the products.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

A1. Raw materials supply

This module considers the extraction and processing of all raw materials and energy which occur upstream to the Vivecyl Wallpaints manufacturing process, as well as waste processing up to the end-of waste state.

A2. Transport of raw materials to manufacturer

This includes the transport distance of the raw materials to the manufacturing facility via road. Based on Product Environmental Footprint Category Rules - Decorative Paints the transport characteristics for this life cycle stage are the following:

Raw materials transport type	Truck 1
Distance (km)	460
Capacity	34-40 t ,60% payload
Bulk density of transported products	1441 kg/m3

A3. Manufacturing

This module covers the manufacturing of the Vivecryl Eco paint and includes all processes linked to production such as storing, mixing, packing and internal transportation. Use of electricity, fuels and auxiliary materials in paint production is taken into account as well.

Data regarding paint production was provided for the manufacturing site where the Vivecryl Eco paints are produced: Elefsis, Greece. Furthermore, the specific transportation distances and transportation modes for raw materials, paint packaging and transportation to customer were collected from the AkzoNobel logistics department. Primary data and site-specific data were retrieved. For electricity sources, Ecoinvent 3.7 dataset was used. For upstream (raw material processes) and downstream processes (application, use, and waste processing) generic data is used when no specific data is obtained.

The construction site data includes lighting, heating, offices, etc. The manufacture of production equipment and infrastructure is not included in the system boundary.

A4. Transport to Regional Distribution Centre and customer

All paint containers are transported from the production facility into a distribution centre and then finally to the customer. On average, the transport characteristics for this life cycle stage are the following:

Transport from factory to RDC	Transport from factory to RDC	Transport from RDC to customer
Vehicle type	Truck 1	Truck 2
Distance	350	370
Capacity utilisation	40-60 t, 60% payload	34-40 t ,60% payload
Bulk density of transported products	1441 kg/m3	1441 kg/m3

A5. Application and use

This module includes the environmental aspects and impacts associated with the application and of the paint. It is assumed that no energy is required during the application of this paint. The use of paintbrushes and other appliances used during application are not included. There are some raw materials added in the paint formulations which contain small amounts of solvents. The VOC emissions during application of paint are included in this module.

C2. Transport to incineration or landfill

This module includes one-way transportation distance of the demolition or sorting site to the dump site.

End-of-life transport type	Transport to waste processing
Vehicle type	Truck 34t-40t payload average fleet
Distance	100 km
Capacity utilisation	60%
Bulk density of transported products	1441 kg/m3

C3. Waste processing and C4. Disposal

The end of life stage is encompassed in these modules. It is assumed that paint is used as exterior paint. It is assumed that part of the paint is lost during application and the rest is applied.

Classification of paint, based on function	% Sold paint in walls > 100 years	% of sold paint to landfill	% of sold paint to incineration
Exterior, Trim and other paints	0,0%	88,0%	12,0%

ADDITIONAL INFORMATION ON ENVIRONMENTAL IMPACTS

LEED & BREEAM compliance.

The product has been tested by Eurofins regarding VOC and sVOC emissions and provided relevant attestations for LEED v4 and v4.1 as also relevant R compliance. The same Eurofins report confirms the compliance with the EUROFINS Air Comfort Gold Certification.

"Unspecified VOC" emissions

The CML-IA methods do not have characterization factors for the "unspecified VOC" emission flow in the Global Warming Potential environmental impact category. However, VOCs are known to have influence in this category. In order to include the impacts of the VOCs and align with current practice of AkzoNobel, it was decided to calculate the VOC impact on Global Warming Potential separately. The Global Warming Potential impact category has been modified, adding a generic factor of 4.23 kgCO₂-eq/kg VOC, which is in line with AkzoNobel characterisation factors for carbon reporting.

Environmental Impact	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	C2	C4
Global Warming potential (GWP 100 years)	[kg CO ₂ -Eq.]	4.92E-1	6.74E-3	1.04E-1	6.03E-1	2.35E-2	1.55E-1	2.15E-3	7.05E-2
GWP 100 years incl. VOC char. fact.	[kg CO ₂ -Eq.]	4.92E-1	6.74E-3	1.04E-1	6.03E-1	2.35E-2	1.59E-1	2.15E-3	7.05E-2



DECLARATION OF SVHC

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, or they do not exceed the threshold with the European Chemicals Agency.



REFERENCES

- EN 15804:2012+A1:2013 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products, of 11/2013.
- ISO 14040/14044 on Life Cycle Assessments
- Product Environmental Footprint Category Rules - Decorative Paints version 1.0, 2018. Developed by the Technical Secretariat Decorative Paints of the European Council of the Paint, Printing Ink and Artists' Colours Industry.
- Coenen, J., Personal communication with Job Coenen, Business Development Manager Sustainability, 2021.
- Thinkstep GaBi Software-System and Database for Life Cycle Engineering. Copyright 1992-2018 ThinkStep AG.
- Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <<http://link.springer.com/10.1007/s11367-016-1087-8>> [Accessed 20-10-2020]



REMARKS

None