

Environmental Product Declaration

Specific EPD

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

REair PhotoCoat

REair s.r.l



Programme

EPD Square | www.epdsquare.com

Programme operator

EPD Square, s.r.o.

EPD Registration number

SQ 00-020

Publication date

19.12.2024

Valid until

18.12.2029

General information

Product

REair PhotoCoat

Program operator

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Email: info@epdsquare.com

Registration number

SQ 00-020

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Owner of the declaration

REair s.r.l

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20121, Milan

Italy

Contact person: Roberto Mandelli

Email: direzione@reair.it

Manufacturer

REair s.r.l

Via Montenapoleone, 10

20121, Milan

Italy

Email: info@reair.it

Place of production

Urgnano (BG), Malnate

Italy

Product Category Rules (PCR)

The CEN standard EN 15804 serves as the core PCR. In addition, EPD Square PCR v1.0, 2024 is used.

Declared unit

1 kg

Mass per DU

1 kg

UN CPC code

35110 – Paints and varnishes and related products

Geographical scope

Italy

Year of study

2023

Comparability

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in the context of the building.

EPD author

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Verification type

Independent verification of the declaration and data, according to ISO14025:2006

Internal: ☐

External: ☒

Verified by

prof. Ing. Silvia Vilčeková, PhD.



*The owner of the declaration shall be liable for the underlying information and evidence.
EPD Square shall not be liable with respect to manufacturer, life cycle assessment data and evidence.*

System boundaries

This EPD is based on system boundary cradle to gate (A1-A3) with modules C1-C4, module D.

Modules declared and geographical scope

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Geography	IT	IT	IT	-	-	-	-	-	-	-	-	-	IT	IT	IT	IT	IT

MND = Modules not declared.

Description of Organization

REair is an Italian clean-tech start-up, specialized in the development and the manufacturing of cutting-edge technologies and advanced solutions tailored for air purification, pollutant reduction, surface sanitization, and the enhancement of Indoor Air Quality (IAQ). REair developed transparent photocatalytic coatings with both outdoor and indoor applications. The company offers innovative and patented solutions for surface treatment (active surface coatings) according to detailed working protocols, that guarantee effective, long-lasting and natural indoor and outdoor solutions without chemical solvents with a prevention approach in the protection of people's health.

REair solutions are based on the principle of photocatalysis, a natural process of strong, rapid and effective oxidative degradation of pollutants and microorganisms spread in the environment, obtained with a process that is activated thanks to the combined action of sunlight (or artificial light) and of the air. The company is registered with the innovative start-up status in the Milan (Italy) Chamber of Commerce.

For more information please visit: <https://www.reair.it/en/>

Product information

Product name

REair PhotoCoat

Product description

REair PhotoCoat is used for outdoor applications and the improvement of outdoor air quality thanks to its depolluting properties due to photocatalytic processes. Further, it possesses self cleaning and hydrophobic performances. The product is currently manufactured in Italy.

Product application

The product REair PhotoCoat can be applied to porous external walls (vertical and horizontal surfaces). Further, it can be applied in outdoor infrastructures, building elements, building facades, on these types of materials: painted and decorated surfaces, silicate mineral plaster, finishes for ETICS systems, bricks, clinker, terracotta materials, concrete and cement mortars, natural and reconstructed stones porous substrates in general.

Geographical scope

Italy

Product contents information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Photopure 19 non-ionic tenside	0.025	0	0
Tegodisper 752W (Carboylic acid copolymer salt in water) - butyl acrylate	0.0025	0	0
Hydroproof H242 (emulsione silossanica funzionale)	0.0025	0	0
Deionised water	0.970	0	0
TOTAL	1	0	0

Manufacturing process

Life cycle assessment

Cut-off criteria

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

Allocation, estimations, and assumptions

Allocation is based on annual production rate and made with high accuracy and precision. The values for 1 kg of the products which are used within this study are calculated by considering the total product weight per annual production. In the production plant, several kinds of products are produced; since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the produced products output fixed to 1 kg and the corresponding amount of product is used in the calculations.

Database(s) and LCA software

This EPD has been created using primary data provided by manufacturer and secondary data drawn from both Ecoinvent 3.10. The software Simapro 9.5.0.2 was used for the LCA model. Characterisation factors are based on Environmental Footprint 3.1 (EF 3.1).

LCA scenario and additional technical information

Manufacturing energy scenario

Electricity data source and quality	Ecoinvent 3.10 Dataset (electricity, low voltage, residual mix - IT - electricity, low voltage)
Electricity CO2e / kWh	0.621
Energy data source and quality	Ecoinvent 3.10 Dataset (market for electricity, low voltage - IT - electricity, low voltage)
Heating CO2e / kWh	0.355

Use Phase (B1-B7)

The modules for use phase (B1-B7) are not included in the LCA.

End of Life (C1, C2, C3, C4)

Demolition of REair PhotoCoat takes place with the whole demolition of the building/construction. Thus, it is assumed that energy used for the demolition of the product has minor significance and the environmental impact of this module is set to be zero. At the end of life, in the demolition phase 100% of the waste is assumed to be collected as mixed construction waste. Transportation distance to the closest disposal area is estimated as 50 km by a 16-32 tonne lorry which is the most common transportation method. It is assumed that the product is landfilled.

	Value	Unit
Collected separately	1	kg
Reuse	0	kg
Recycling	0	kg
Energy recovery	0	kg
To landfill	1	kg

LCA results

Core environmental impact indicators – EN 15804+A2, PEF 3.1

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	5.4E-02	0.0E+00	9.8E-03	0.0E+00	1.7E-02	0.0E+00
GWP-fossil	kg CO2 eq.	5.4E-02	0.0E+00	9.8E-03	0.0E+00	1.7E-02	0.0E+00
GWP-biogenic	kg CO2 eq.	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
GWP-LULUC	kg CO2 eq.	2.7E-04	0.0E+00	3.9E-06	0.0E+00	1.3E-06	0.0E+00
ODP	kg CFC11 eq.	1.4E-06	0.0E+00	1.4E-10	0.0E+00	4.4E-11	0.0E+00
AP	mol H ⁺ eq.	2.6E-04	0.0E+00	3.3E-05	0.0E+00	7.9E-06	0.0E+00
EP-freshwater	kg P eq.	1.1E-05	0.0E+00	7.7E-07	0.0E+00	1.3E-07	0.0E+00
EP-marine	kg N eq.	5.7E-05	0.0E+00	1.1E-05	0.0E+00	2.1E-06	0.0E+00
EP-terrestrial	mol N eq.	6.0E-04	0.0E+00	1.2E-04	0.0E+00	2.3E-05	0.0E+00
POCP	kg NMVOC eq.	2.3E-04	0.0E+00	4.5E-05	0.0E+00	1.0E-05	0.0E+00
ADP-M&M	kg Sb eq.	3.7E-07	0.0E+00	3.1E-08	0.0E+00	3.6E-09	0.0E+00
ADP-fossil	MJ	8.0E-01	0.0E+00	1.4E-01	0.0E+00	4.1E-02	0.0E+00
WDP	m ³	2.6E-01	0.0E+00	6.2E-04	0.0E+00	-1.5E-03	0.0E+00

GWP-total: Global Warming Potential; **GWP-fossil:** Global Warming Potential fossil fuels; **GWP-biogenic:** Global Warming Potential biogenic; **GWP-LULUC:** Global Warming Potential land use and land use change; **ODP:** Depletion potential of the stratospheric ozone layer; **AP:** Acidification potential, Accumulated Exceedance; **EP-freshwater:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional requirements" for indicator given as PO4 eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption

Additional (optional) environmental impact indicators – EN 15804+A2, PEF 3.1

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PM	Disease incidence	3.9E-09	0.0E+00	7.8E-10	0.0E+00	1.1E-10	0.0E+00
IRP	kBq U235 eq.	2.5E-03	0.0E+00	1.1E-04	0.0E+00	2.3E-05	0.0E+00
ETP-fw	CTUe	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
HTP-c	CTUh	1.5E-10	0.0E+00	5.1E-11	0.0E+00	3.1E-11	0.0E+00
HTP-nc	CTUh	3.3E-09	0.0E+00	8.5E-11	0.0E+00	9.2E-11	0.0E+00
SQP	Dimensionless	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

PM: Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **ETP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality

Use of Natural Resources

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
RPEE	MJ	3,13E-02	0.0E+00	9,15E-04	0.0E+00	2,71E-04	0.0E+00
RPEM	MJ	2,03E-02	0.0E+00	8,87E-04	0.0E+00	1,91E-04	0.0E+00
TPE	MJ	5.2E-02	0.0E+00	1.8E-03	0.0E+00	4.6E-04	0.0E+00
NRPE	MJ	4,85E-02	0.0E+00	1,77E-03	0.0E+00	5,63E-04	0.0E+00
NRPM	MJ	4,85E-02	0.0E+00	1,44E-01	0.0E+00	-4,85E-02	0.0E+00
TRPE	MJ	8.5E-01	0.0E+00	1.5E-01	0.0E+00	4.4E-02	0.0E+00
SM	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NRSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
W	m³	2.6E-01	0.0E+00	6.2E-04	0.0E+00	9.3E-05	0.0E+00

RPEE: Renewable primary energy resources used as energy carrier; **RPEM:** Renewable primary energy resources used as raw materials; **TPE:** Total use of renewable primary energy resources; **NRPE:** Non-renewable primary energy resources used as energy carrier; **NRPM:** Non-renewable primary energy resources used as materials; **TRPE:** 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; **W:** Use of net fresh water

End of life – Waste

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
HW	KG	5.1E-06	0.0E+00	9.4E-07	0.00E+00	4E-07	0.00E+00
NHW	KG	2.3E-02	0.0E+00	6.5E-03	0.00E+00	1E-02	0.00E+00
RW	KG	7.6E-07	0.0E+00	2.8E-08	0.00E+00	6E-09	0.00E+00

HW: Hazardous waste disposed; NHW: Non-hazardous waste disposed; RW: Radioactive waste disposed

End of life – Output flows

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
CR	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MR	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MER	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ETE	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Information describing biogenic carbon content at factory gate

Biogenic carbon content	Value	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in the accompanying packaging	0	kg C

Specific data (GWP-GHG) and data variation for A1-A3

Specific data and data variation	
Specific data	<60%
Variation - product	Not relevant
Variation - site	Not relevant

Hazardous substances

☒ The product does not contain any REACH SVHC substances in amounts greater than 0.1 %.

Contact information

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Bibliography

ISO 14020:2000

Environmental labels and declarations – General principles

ISO 14025:2010

Environmental labels and declarations - Type III environmental declarations - Principles and procedures

ISO 14040:2006

Environmental management. Life cycle assessment. Principles and frameworks

ISO 14044:2006

Environmental management - Life cycle assessment - Requirements and guidelines

EN 15804:2012+A2:2019

Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products

ISO 21930:2007

Sustainability in building construction - Environmental declaration of building products

EPD Square PCR v.1.0, 2024

EPD Square, General Programme Instructions v.1, 2024

Ecoinvent database v3.10 (2024)

Capolongo S., Brambilla A., Dolcini M., Monticelli C., Zanelli A., Vertua C., Gallo Stampino P., REAIR Sustainability Profile. ESG and LCA analysis for REAIR Products (2024), Politecnico di Milano, Dipartimento di Architettura, Ingegneria delle Costruzioni e Ambiente Costruito

Dolcini M, Brambilla A, Gola M, Capolongo S. Health and well-being key performance indicators in corporate sustainability disclosure. A review of sustainability reports from a sample of major European companies. *Acta Biomedica Atenei Parmensis*. 2023;94(S3):e2023132. doi:10.23750/abm.v94iS3.14334

Gabathuler, Heinz, 'LCA History: Centrum Voor Milieukunde Leiden (CML) The CML Story', *International Journal*, 2.1 (2006), 127–32

Monticelli C., *Life-Cycle Design in architettura* (2013) Progettazione e valutazione di impatto ambientale dalla materia all'edificio, Maggioli Editore.

NSF International, 'Product Category Rule for Environmental Product Declarations: Fenestration Assemblies', 2023

Wu, Fan, Zheng Zhou, and Andrea L. Hicks, 'Life Cycle Impact of Titanium Dioxide Nanoparticle Synthesis through Physical, Chemical, and Biological Routes', *Environmental Science and Technology*, 53.8 (2019), 4078–87 <https://doi.org/10.1021/acs.est.8b06800>

Annex

Environmental impacts – EN 15804+A1, CML/ISO 21930

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP	kg CO ₂ eq.	5.4E-02	0.0E+00	9.7E-03	0.0E+00	1.7E-02	0.0E+00
ODP	kg CFC11 eq.	1.9E-06	0.0E+00	1.1E-10	0.0E+00	3.5E-11	0.0E+00
AP	kg SO ₂ eq.	2.1E-04	0.0E+00	2.5E-05	0.0E+00	6.3E-06	0.0E+00
EP	kg PO ₄ eq.	6.0E-05	0.0E+00	7.0E-06	0.0E+00	1.7E-04	0.0E+00
POCP	kg C ₂ H ₄ eq.	2.0E-05	0.0E+00	1.5E-06	0.0E+00	5.0E-07	0.0E+00
ADP-M&M	kg Sb eq.	3.7E-07	0.0E+00	3.1E-08	0.0E+00	3.6E-09	0.0E+00
ADP-fossil	MJ	7.5E-01	0.0E+00	1.4E-01	0.0E+00	3.7E-02	0.0E+00

GWP: Global Warming Potential; **ODP:** Depletion potential of the stratospheric ozone layer; **AP:** Acidification potential, Accumulated Exceedance; **EP:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional requirements" for indicator given as PO₄ eq.; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources

Environmental impacts – GWP-GHG

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP - GHG	kg CO ₂ e	5.4E-02	0.0E+00	9.8E-03	0.0E+00	1.7E-02	0.0E+00

GWP- GHG Global Warming Potential, greenhouse gases