

# Environmental Product Declaration



In accordance with 14025, ISO 21930 and EN 15804

## Keycoat K149, K124

Programme:	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
EPD registration number:	S-P-04458
Publication date:	2021-08-19
Valid until:	2026-07-23



## MANUFACTURER INFORMATION

<b>Manufacturer</b>	Armourcoat Ltd
<b>Address</b>	Unit 2/3 Morewood Close, Sevenoaks TN13 2HU
<b>Contact details</b>	technical@armourcoat.co.uk
<b>Website</b>	www.armourcoat.com

## PRODUCT IDENTIFICATION

<b>Product name</b>	Keycoat K149
<b>Additional label(s)</b>	Keycoat K149 Keycoat K124
<b>Product number / reference</b>	K149, K124
<b>Place(s) of production</b>	England UK
<b>CPC code</b>	37530

## EPD INFORMATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

<b>EPD program operator</b>	The international EPD System
<b>EPD standards</b>	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
<b>Product category rules</b>	The CEN standard EN 15804 serves as the core Product category rules (PCR) PCR 2019:14. Construction Products. Version 1.1. Sub-PCR-A Mortars applied to a surface.
<b>EPD author</b>	Duncan Mackellar - Armourcoat Ltd
<b>EPD verification</b>	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification
<b>Verification date</b>	23/07/2021
<b>EPD verifier</b>	Dr Andrew Norton - Renuables Ltd
<b>EPD number</b>	S-P-04458
<b>Publishing date</b>	19/08/2021
<b>EPD valid until</b>	23/07/2026

## GOAL AND SCOPE

This life cycle analysis has been conducted in order to produce and publish an EPD for communication of the products environmental impacts to Architects, designers and developers within the construction sector.

## PRODUCT DESCRIPTION

Armourcoat K124 Keycoat and K149 Fine Keycoats are natural mineral materials composed of hydrated lime, marble and cement and combined with additives to control working characteristics and adhesion. They are designed to bond well to the substrate and provide a strong mechanical key for the subsequent layers of Armourcoat plaster. Armourcoat Keycoat will also provide a limited suction for the subsequent layers of plaster which ensures consistent and reliable application.

K149 Keycoat has a granulometry up to 0.5mm

K124 Keycoat has a granulometry up to 0.8mm

## PRODUCT APPLICATION

Armourcoat K149 / K124 Keycoat is mixed with clean water and applied to the substrate as a preparation layer for the polished plaster. For poor or uneven surfaces a second layer of Keycoat can be applied if required. The Keycoat is left with textured surface and left to dry overnight prior to the application of the polished plaster.

## TECHNICAL SPECIFICATIONS

Armourcoat K149 Fine Keycoats is designed to bond to the Armourcoat K40 primer and give a strong mechanical key to the subsequent layers of plaster. Armourcoat K149 Fine Keycoat will also provide a limited and controlled suction for the plaster application. Armourcoat Keycoat is a natural mineral material with low organic content and zero VOC and is an ideal background for the subsequent application of polished plaster finishes.

Pack size:

Armourcoat Keycoat is supplied in 25kg Paper sacks.

Coverage rates: Armourcoat K149 Keycoat 0.5-1kg/m<sup>2</sup> depending upon coat thickness and number of coats. Armourcoat K124 Keycoat 0.8 -1.0 kg/m<sup>2</sup>

Water Demand: 25kg of Keycoat will require 10 - 10.5 litres of water

Shelf Life:

Under normal storage conditions - 12 months

Full pallets with original shrink wrap - up to 24 months

## PRODUCT STANDARDS

Independent tests were carried out in the UK for classification of reaction to fire performance in accordance with EN13501-1: 2018. A2- S1- D0

Keycoat is a powdered product and when mixed with clean water will have zero VOCs and no off gas.

## PHYSICAL PROPERTIES OF THE PRODUCT

- natural mineral materials
- powder products unaffected by frost
- provide good mechanical key for Armourcoat Polished Plaster finishes
- can be used to level minor surface irregularities (up to 2 - 3mm maximum)
- completely non-combustible as supplied or when applied
- contain no VOCs

## ADDITIONAL TECHNICAL INFORMATION

Further information can be found at [www.armourcoat.com](http://www.armourcoat.com)

<https://armourcoat.com/en/technical/pds/PDS005>

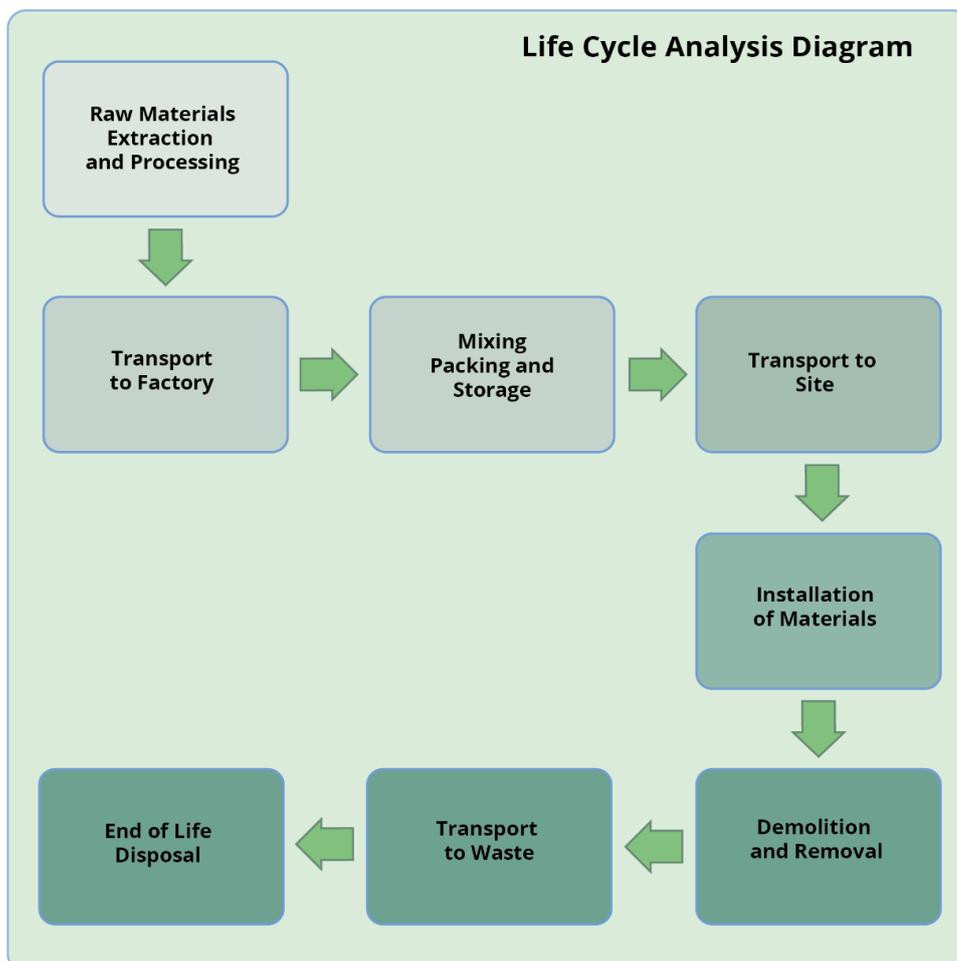
## PRODUCT RAW MATERIAL COMPOSITION

The exact composition of the product is deemed commercially sensitive information so no details are provided here.

## SUBSTANCES, REACH - VERY HIGH CONCERN

Armourcoat Keycoat does not contain any REACH substances of very high concern (SVHC)

## PRODUCT LIFE-CYCLE



## **MANUFACTURING AND PACKAGING (A1-A3)**

Armourcoat Keycoat is a natural mineral materials composed of hydrated lime, crushed marble and cement combined with a special additives to control working characteristics. The ingredients are carefully weighed and sieved. They are then blended in a U trough ribbon blender in our factory in the UK. The Keycoat is filled into paper sacks to 25 kg +/-100g. . Every batch is subject to a complete Quality control check and residual samples retained for a minimum of 2 years from date of manufacture. Materials are then stored in our warehouse ready for transportation to site. Armourcoat Keycoat contains small amounts of natural plant based additives to control the working characteristics. These materials contains no pollutants, VOCs or Formaldehyde and when mixed and applied provides a thin durable stone surface that can be applied onto a wide range of substrates.

## **TRANSPORT AND INSTALLATION (A4-A5)**

Keycoat is blended in our factory in the UK and either transported to site by road for UK projects or transported by road to port and then by sea to our agents around the world. Transportation impacts occurred from final products delivery to construction site (A4) to cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. The transportation distance is defined according to RTS PCR. Average distance of transportation from production plant to building site is assumed as 100 km and the transportation method is assumed to be lorry.

## **PRODUCT USE AND MAINTENANCE (B1-B7)**

Armourcoat Keycoat forms a thin inert stone layer to the wall or ceiling surface and as there are no requirements for energy or water during the lifetime of the product, the specific air, soil and water impacts are negligible and as a result this EPD does not cover the use phase.

## **PRODUCT END OF LIFE (C1-C4, D)**

The consumption of energy and natural resources is negligible for the removal of the plasterboard so the impacts of demolition are assumed zero. (C1)

It is assumed that the waste will be transported to the nearest construction waste treatment plant. This is assumed to be 50km. (C2)

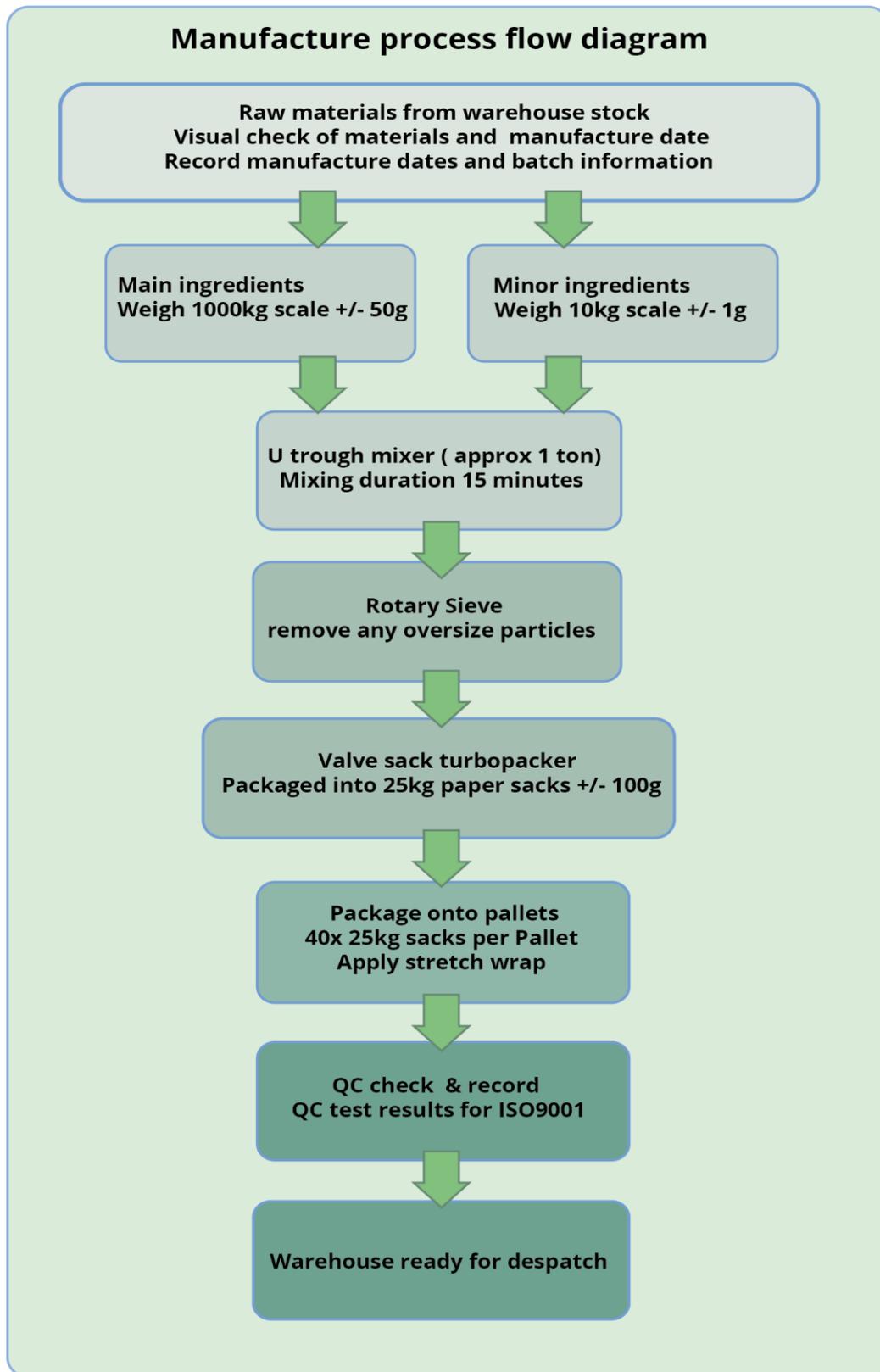
There is no waste processing for reuse, recovery or recycling. ( C3)

Keycoat combined with polished plaster forms a thin inert stone skin onto the substrate to which it is applied. Due to the durable nature of the material it is impractical to remove it from the substrate and therefore it is assumed that it will be disposed of at end of life with the other inert mineral construction waste.

Plasterboard is the most commonly used substrate for both commercial and residential projects and it is therefore assumed that it is likely to be treated as gypsum waste along this the plasterboard substrate. (C4)

There are no benefits and loads beyond the system boundaries. (D)

MANUFACTURING PROCESS



### LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2020-2021
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### DECLARED AND FUNCTIONAL UNIT

Declared unit	1kg of Keycoat Plaster
Mass per declared unit	1kg
Functional unit	1Kg

### BIOGENIC CARBON CONTENT

#### Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0.0023
Biogenic carbon content in packaging, kg C	0.0025

### SYSTEM BOUNDARY

This EPD covers the cradle to gate with options scope with following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), A5 (Assembly) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included. Some modules have nil entries because there is no impact.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
<b>Geography</b> , by two-letter ISO country code or regions. The International EPD System only.																		
EU	EU	EU	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

## CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 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.

The LCA boundaries of Polished plaster/ Keycoat include the following life cycle stages.

(A1) Raw material extraction / mining and processing

(A2) Transportation of raw materials to Armourcoat factory.

(A3) Manufacture of the product to include sieving of raw materials, blending and packing into paper sacks.

Internal handling, washing of machinery and disposal of manufacturing scrap materials and raw material packaging.

Consumption of energy for all stages of manufacture, use of water and treatment of waste are included in the manufacturing process.

Packaging, pallets and pallet wrapping of the materials and storage are also included in the manufacturing.

(A4-A5) Distribution of the materials to construction site for application and Mixing and application of the materials on site are included in Construction.

(C1-C4,D) End of life treatment includes, transport of construction waste and disposal of the Keycoat with the plasterboard onto which it has been applied as well as packaging waste.

All ingredients in section A1-A3 have been included with the exception of starch which has an addition level of 0.03%.

No allowance has been made for the manufacture of the manufacturing machinery.

## ALLOCATION, ESTIMATES AND ASSUMPTIONS

Raw material data was obtained from the One Click LCA database. ( Ecoinvent 3.6)

The crushed marble use in the product is waste material from the marble slab production industry. The slab cutting waste is collected and crushed for reuse rather than returned for landfill and therefore no allocation was made for the primary mining process.

All manufacturing energy was measured in the Armourcoat Factory for the specific machinery and the power usage calculated from this information.

No allocation of resources or energy was allocated to the manufacture of the manufacturing plant and equipment.

The factory and warehouse are unheated and lighting is all LED and therefore energy consumption is considered negligible.

The majority of wooden pallets are reused from the raw materials and the remaining pallets are recycled.

Site mixing of the material has been allocated but general site lighting or heating has not been included in the allocation.

The Keycoat and polished plaster finish layer is expected to last for the lifetime of the building.

Plasterboard is the most common substrate and as the material cannot readily be removed from the plasterboard the disposal criteria has been based on the disposal of plasterboard which

contains calcium sulphate.

Module C1

Since the consumption of energy and natural resources is negligible for disassembling of the end-of-life product, the impacts of demolition are assumed zero (C1).

Module C2

All of the product is assumed to be sent to the closest facilities such as recycling and landfill. Transportation distance to the closest disposal area is assumed to be 50 km and the transportation method is assumed as lorry which is the most common.

Module A2, A4 & C2

Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by the transportation company to serve the needs of other clients.

Module C4

All of the plaster waste is gathered as a part of the plasterboard and is generally not separated from it at the end of life. It is assumed that the Keycoat and Polished plaster waste is treated along with the plasterboard. Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 -standard.

**AVERAGES AND VARIABILITY**

The product is made in a single factory on the same manufacturing equipment and therefore there were no averages or variability in the data collected for this Life Cycle analysis.

Data specificity and GWP-GHG variability for GWP-GHG for A1-A3.

<b>Supply-chain specific data for GWP-GHG</b>	Actual %
<b>Variation in GWP-GHG between products</b>	N/A
<b>Variation in GWP-GHG between sites</b>	N/A

**ENVIRONMENTAL IMPACT DATA for – Results for 1kg of Keycoat**

Note: ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930 are presented in annex.

**CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF**

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP – total	kg CO2e	4.04E-1	3.75E-2	3.98E-5	4.41E-1	5.18E-2	-1.02E-1	MND	2.77E-8	4.55E-3	1.32E-7	7.58E-3	-1.06E-7
GWP – fossil	kg CO2e	4.03E-1	3.73E-2	6.99E-3	4.47E-1	5.23E-2	-1.04E-1	MND	2.69E-8	4.54E-3	1.3E-7	5.27E-3	-1.05E-7
GWP – biogenic	kg CO2e	8.57E-4	9.59E-5	-7E-3	-6.05E-3	2.4E-5	2.51E-3	MND	8.22E-10	3.3E-6	1.46E-9	2.31E-3	-8.52E-10
GWP – LULUC	kg CO2e	9.97E-5	2.37E-5	5.24E-5	1.76E-4	2.92E-5	1.2E-5	MND	5.36E-11	1.37E-6	7.89E-11	1.56E-6	-5.06E-11
Ozone depletion pot.	kg CFC11e	2.31E-8	7.42E-9	6.62E-10	3.12E-8	1.13E-8	1.09E-9	MND	2.54E-15	1.07E-9	3.46E-14	2.17E-9	-3.27E-14
Acidification potential	mol H+e	9.41E-4	2.17E-4	4.35E-5	1.2E-3	3.33E-4	3.64E-5	MND	1.76E-10	1.91E-5	3.22E-7	5E-5	-8.99E-10
EP-freshwater <sup>2)</sup>	kg Pe	4.93E-6	7.85E-7	1.24E-6	6.96E-6	6.15E-7	2.81E-7	MND	2.49E-12	3.7E-8	3.46E-12	6.36E-8	-1.84E-12
EP-marine	kg Ne	1.96E-4	7.11E-5	1.03E-5	2.77E-4	1.21E-4	7.57E-6	MND	2.2E-11	5.75E-6	3.33E-10	1.72E-5	-3.05E-10
EP-terrestrial	mol Ne	2.26E-3	7.86E-4	1.01E-4	3.14E-3	1.34E-3	8.83E-5	MND	2.63E-10	6.35E-5	3.7E-9	1.9E-4	-3.36E-9
POCP (“smog”)	kg NMVOCe	7.32E-4	2.3E-4	3.04E-5	9.92E-4	3.7E-4	2.28E-5	MND	7.09E-11	2.04E-5	2.09E-8	5.51E-5	-9.69E-10
ADP-minerals & metals	kg Sbe	1.86E-6	5.17E-7	7.31E-8	2.45E-6	2.56E-6	3.37E-8	MND	2.89E-13	7.75E-8	1.22E-12	4.81E-8	-1.13E-12
ADP-fossil resources	MJ	4.25E0	5.68E-1	1.49E-1	4.97E0	7.81E-1	2.34E-1	MND	5.1E-7	7.07E-2	2.85E-6	1.47E-1	-2.48E-6
Water use <sup>1)</sup>	m3e depr.	7.75E-2	3.56E-3	1.07E-2	9.18E-2	3.2E-3	6.14E-4	MND	2.05E-6	2.63E-4	1.15E-7	6.81E-3	-1.11E-7

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e.

**ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF**

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Particulate matter	Incidence	5.85E-9	3.15E-9	7.26E-10	9.72E-9	3.98E-9	1.71E-10	MND	8.07E-16	4.11E-10	2.61E-13	9.72E-10	-1.72E-14
Ionizing radiation <sup>3)</sup>	kBq U235e	1.01E-2	2.73E-3	8.65E-4	1.37E-2	3.41E-3	3.75E-3	MND	3.99E-9	3.09E-4	1.19E-8	6.04E-4	-9.71E-9
Ecotoxicity (freshwater)	CTUe	3.76E0	4.91E-1	5.51E-1	4.8E0	6.9E-1	1.21E-1	MND	4.06E-7	5.4E-2	3.52E-6	9.29E-2	-1.78E-6
Human toxicity, cancer	CTUh	5.29E-11	2.04E-11	4.68E-12	7.8E-11	3.4E-11	2.14E-12	MND	1.71E-17	1.38E-12	3.19E-16	2.2E-12	-6.48E-17
Human tox. non-	CTUh	3.16E-9	5.74E-10	1.57E-10	3.89E-9	8.43E-10	7.77E-11	MND	3.97E-16	6.4E-11	1.58E-14	6.79E-11	-1.35E-15
SQP	-	2.27E-1	6.53E-1	1.71E-2	8.97E-1	4.09E-1	3.66E-2	MND	3.63E-8	1.07E-1	8.9E-6	2.5E-1	-8.85E-6

4) SQP = Land use related impacts/soil quality.5) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

**USE OF NATURAL RESOURCES**

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Renew. PER as energy	MJ	3.2E-1	2.21E-2	1.28E-1	4.7E-1	1.66E-2	3.66E-2	MND	8.09E-8	8.9E-4	9.87E-8	1.19E-3	-4.09E-8
Renew. PER as material	MJ	0E0	0E0	8.5E-2	8.5E-2	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	3.2E-1	2.21E-2	2.13E-1	5.55E-1	1.66E-2	3.66E-2	MND	8.09E-8	8.9E-4	9.87E-8	1.19E-3	-4.09E-8
Non-re. PER as energy	MJ	2.5E0	5.68E-1	1.13E-1	3.18E0	7.81E-1	2.34E-1	MND	5.1E-7	7.07E-2	2.85E-6	1.47E-1	-2.48E-6
Non-re. PER as material	MJ	1.76E0	0E0	3.58E-2	1.79E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	4.25E0	5.68E-1	1.49E-1	4.97E0	7.81E-1	2.34E-1	MND	5.1E-7	7.07E-2	2.85E-6	1.47E-1	-2.48E-6
Secondary materials	kg	5.79E-4	0E0	5.57E-5	6.35E-4	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	3.06E-3	1.47E-4	1.73E-4	3.37E-3	1.42E-4	6.25E-5	MND	1.03E-7	1.47E-5	3E-9	1.61E-4	-2.8E-9

6) PER = Primary energy resources

**END OF LIFE - WASTE**

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Hazardous waste	Kg	6.04E-3	1.24E-3	4.03E-4	7.68E-3	1.11E-3	6.57E-4	MND	2.7E-9	6.87E-5	0E0	1.37E-4	-4.34E-9
Non-hazardous waste	Kg	2.08E-1	6.72E-2	1.52E-2	2.91E-1	4.83E-2	3.95E-2	MND	1.12E-7	7.6E-3	0E0	1E0	-1E-5
Radioactive waste	Kg	1.15E-5	3.71E-6	6.18E-7	1.58E-5	5.2E-6	1.8E-6	MND	3.05E-12	4.85E-7	0E0	9.74E-7	-1.49E-11

**END OF LIFE - OUTPUT FLOWS**

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Components for re-use	Kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Materials for energy rec	Kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0

**ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM**

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG	kg CO <sub>2</sub> e	4.03E-1	3.73E-2	6.99E-3	4.47E-1	5.23E-2	-1.04E-1	MND	2.69E-8	4.54E-3	1.3E-7	5.27E-3	-1.05E-7

8) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013) This indicator is almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

**Additional Information**

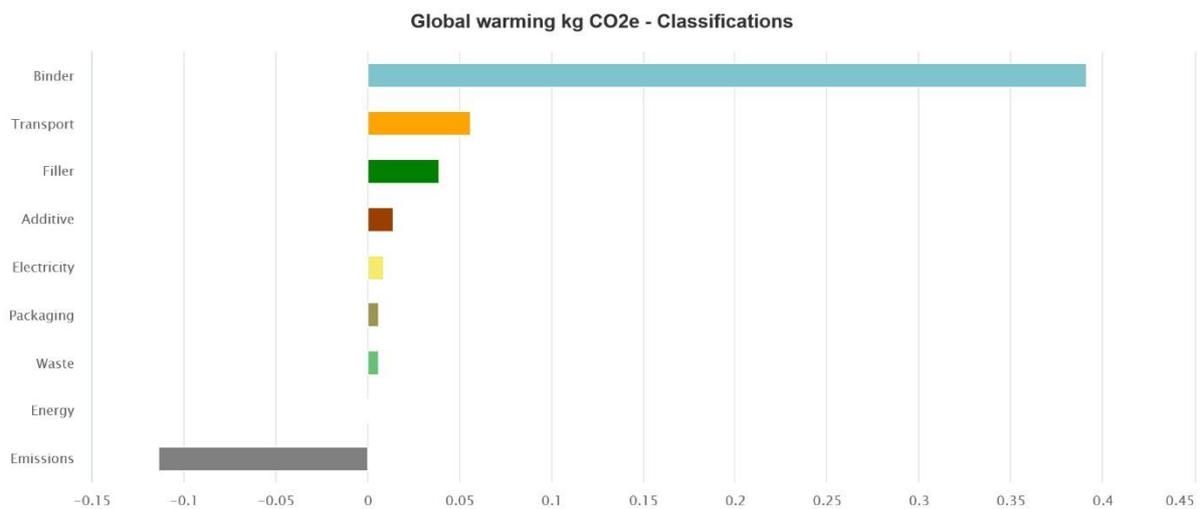
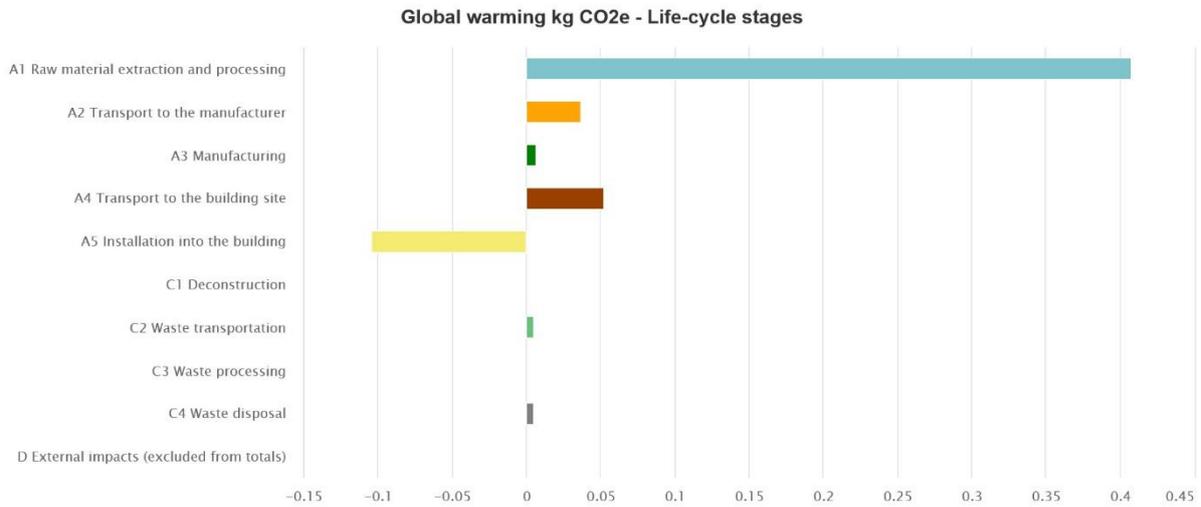
**Core environmental impact EN15804 +A2 (All categories Cradle to grave)**

The GWP total is 0.41 kg CO<sub>2</sub>e.

The coverage rate is 0.5 – 1kg/m<sup>2</sup>.

The GWP total/m<sup>2</sup> is 0.2- 0.41 kg CO<sub>2</sub>e.

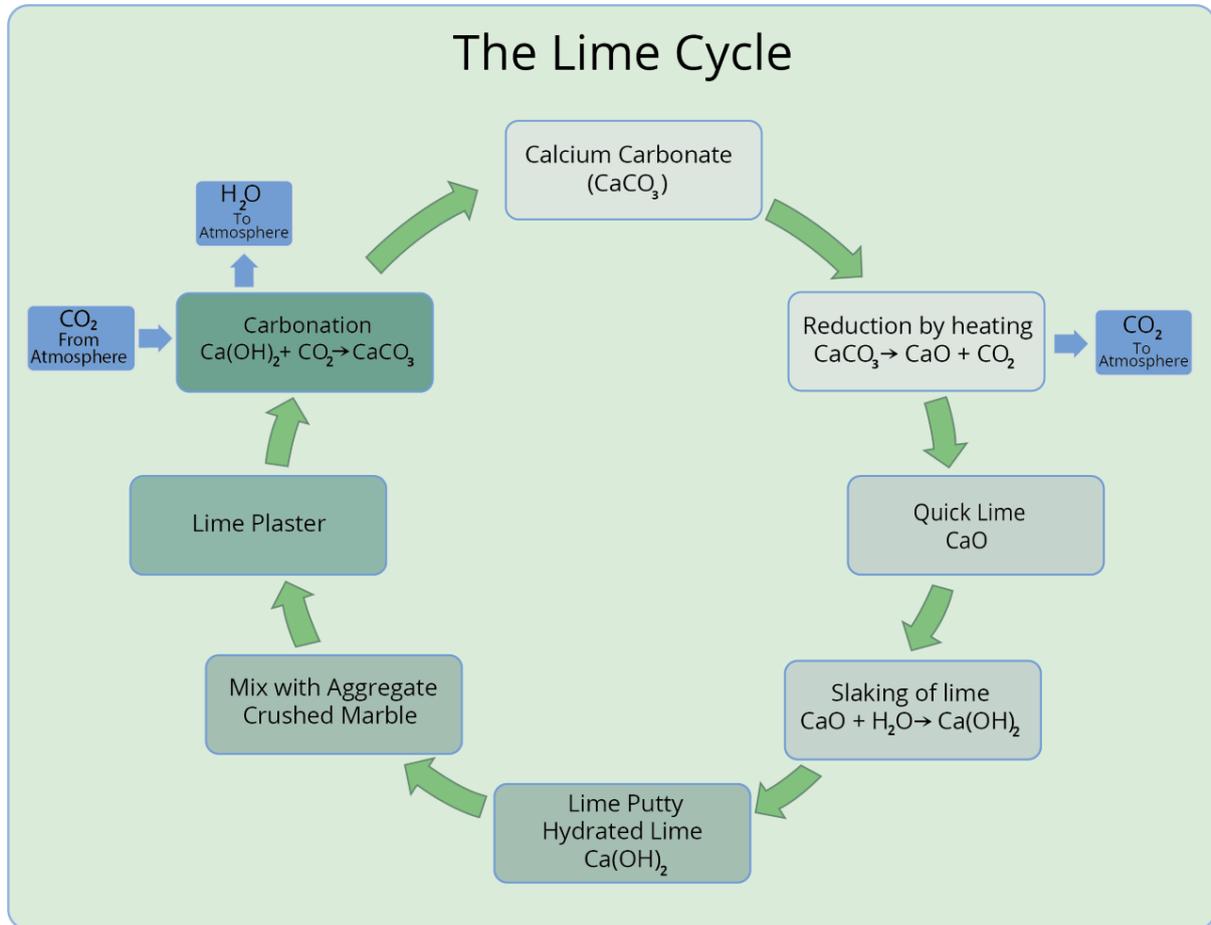
CHART



The raw material extraction and processing (A1) account for 79% of the total GWP.

The next largest contributor is from the (A2) transportation to the site of manufacturing 7% and (A4) transport to the construction site 10% .

The highest contributing material in A1 is the hydrated lime , however once mixed with water and installed (A5) the lime will harden by carbonation and reabsorb the CO2 that was emitted during the initial manufacture process . This is the reason for a negative impact in A5. This is a process known as the lime cycle.



## LIME CYCLE

Chalk, limestone and marble are all forms of Calcium Carbonate. When limestone or chalk is burnt in a kiln, Carbon dioxide is released into the atmosphere, and you are left with Calcium Oxide which is commonly known as Quicklime.

Quicklime is then slaked with water to form lime putty or Hydrated lime and when exposed to the air lime naturally harden by absorbing Carbon dioxide from the atmosphere and over time turns back into limestone.

## SCENARIO DOCUMENTATION

### Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Market for electricity, medium voltage (Reference product: electricity, medium voltage) Ecoinvent 3.6, year: 2019
Electricity CO <sub>2</sub> e / kWh	0.37
District heating data source and quality	none
District heating CO <sub>2</sub> e / kWh	none

### Transport scenario documentation (A4)

Scenario parameter	Value
Specific transport CO <sub>2</sub> e emissions, kg CO <sub>2</sub> e / tkm	0.132
Average transport distance, km	100
Capacity utilization (including empty return) %	100
Bulk density of transported products	1300
Volume capacity utilization factor	50

### End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	1
Collection process – kg collected with mixed waste	1
Recovery process – kg for re-use	0
Recovery process – kg for recycling	0
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	1
Scenario assumptions e.g. transportation	Transportation

## BIBLIOGRAPHY

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.  
 Ecoinvent database v3.6 (2019) and One Click LCA database.  
 EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.  
 EPD. General Programme Instructions of the international EPD® system. Version 4.0  
 K149 LCA background report 17.06.202

## ABOUT THE MANUFACTURER

Armourcoat Ltd is a Manufacturer and supplier of performance coatings and decorative surface finishes. Armourcoat Ltd was incorporated in the UK in 1986 as a specialist manufacturer of ultra-hard plasters and renders for Squash and Rackets courts. In 1990 Armourcoat diversified into a range of decorative plasters and paints and has become the leading company worldwide for specialist decorative plasters and coatings. Armourcoat has offices in the UK and USA and has agents and distributors in over 40 countries around the world. Armourcoat manufactures its products in the UK to ISO9001.

## EPD AUTHOR AND CONTRIBUTORS

<b>Manufacturer</b>	Armourcoat Ltd
<b>EPD author</b>	Duncan Mackellar - Armourcoat Ltd
<b>EPD verifier</b>	Dr Andrew Norton - Renuables Ltd
<b>EPD program operator</b>	The International EPD System
<b>Background data EPD</b>	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
<b>LCA software</b>	The LCA and EPD have been created using One Click LCA EPD Generator

## VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with EN 15804, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The background report (project report) for this EPD

## VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
EPD verification started on	28/06/2021
EPD verification completed on	23/07/2021
Approver of the EPD verifier	The International EPD System

Author & tool verification	Answer
EPD author	Duncan Mackellar - Armourcoat Ltd
EPD author training completion	04/02/2021
EPD Generator module	One Click LCA
Independent software verifier	The International EPD System
Software verification date	17 January 2021

**VERIFICATION AND REGISTRATION (ENVIRONDEC)**

PCR	PCR 2019:14 Construction products, version 1.11. Sub-PCR-A Mortars Applied to a Surface.
PCR review was conducted by:	The Technical Committee of the International EPD® System. See <a href="http://www.environdec.com/TC">www.environdec.com/TC</a> for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat <a href="http://www.environdec.com/contact">www.environdec.com/contact</a> .
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification
Third party verifier	Dr Andrew Norton - Renuables Ltd
Approved by	The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up during EPD validity involves third party verifier	<input type="checkbox"/> yes <input checked="" type="checkbox"/> no



THE INTERNATIONAL EPD® SYSTEM

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**ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930**

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO2e	3.95E-1	3.69E-2	6.84E-3	4.39E-1	5.18E-2	-1.04E-1	MND	2.64E-8	4.5E-3	1.28E-7	5.17E-3	-1.03E-7
Ozone depletion Pot.	kg CFC11e	2.06E-8	6.03E-9	6.62E-10	2.73E-8	9.04E-9	1.19E-9	MND	2.96E-15	8.49E-10	2.8E-14	1.72E-9	-2.61E-14
Acidification	kg SO2e	7.39E-4	1.36E-4	3.52E-5	9.1E-4	1.15E-4	4.91E-5	MND	1.49E-10	9.25E-6	4.42E-7	2.08E-5	-7.16E-9
Eutrophication	kg PO4 3e	2.11E-4	4.14E-5	1.85E-5	2.71E-4	2.74E-5	9E-6	MND	8.14E-11	1.87E-6	1.54E-10	4.03E-6	-1.46E-10
POCP ("smog")	kg C2H4e	6.55E-5	6.23E-6	2.48E-6	7.42E-5	8.3E-6	1.25E-6	MND	6.72E-12	5.86E-7	1.18E-8	1.53E-6	-2.7E-11
ADP-elements	kg Sbe	1.86E-6	5.17E-7	7.31E-8	2.45E-6	2.56E-6	3.37E-8	MND	2.89E-13	7.75E-8	1.22E-12	4.81E-8	-1.13E-12
ADP-fossil	MJ	4.25E0	5.68E-1	1.49E-1	4.97E0	7.81E-1	2.34E-1	MND	5.1E-7	7.07E-2	2.85E-6	1.47E-1	-2.48E-6

