Environmental Product Declaration

In accordance with 14025, ISO 21930 and EN 15804

SPATULATA P80, P70

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-04460
Publication date:	2021-08-19
Valid until:	2026-07-23

MANUFACTURER INFORMATION

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

PRODUCT IDENTIFICATION

Product name	Spatulata P80
Additional label(s)	Spatulata P80, Spatulata P70
Product number / reference	P80, P70
Place(s) of production	England UK
CPC code	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.

EPD program operator	The International EPD system
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the is used. PCR 2019:14. Construction Products. Version 1.1. Sub-PCR-A Mortars applied to a surface
EPD author	Duncan Mackellar, Armourcoat Ltd
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	21/07/2021
EPD verifier	Dr Andrew Norton - Renuables Ltd
EPD number	S-P-04460
Publishing date	19/08/2021
EPD valid until	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 Spatulata P80 and P70 are both a ready mixed superfine marble stucco paste that is trowel applied in a series of fine layers to create a highly polished decorative surface. Armourcoat Spatulata P80/P70 is made from a combination of ultra fine lime putty, finely milled marble powder and special additives formulated to give outstanding workability and surface polish. Armourcoat Spatulata P80/P70 is made from almost entirely natural mineral materials and is exceptionally hard due to the quality and fineness of the slaked lime and marble used in its manufacture. Armourcoat Spatulata can be tinted to almost any colour of the spectrum.
Both P80 and P70 are made from the same ingredients but the P80 is our premium product as the lime undergoes a longer ageing period and is then milled to below 30 microns as part of the manufacture process.

PRODUCT APPLICATION

Armourcoat Spatulata plaster is hand applied by stainless steel trowel in 3 - 5 fine coats and is intended for professional use.
Armourcoat Spatulata plaster is applied to a thickness of no more than 0.5-0.7mm and when completed will have a highly polished and glossy surface.
See product data sheets full application details. www.armourcoat.com/technical

TECHNICAL SPECIFICATIONS

Premixed paste ready for application to create hard glossy surface
Non Newtonian thixotropic paste Viscosity 85000cP +/- 20000cP
specific density 1.6 kg/L +/- 0.1kg/L
completely non-combustible as supplied or when applied.
The product finish is applied in multiple layers to a thickness of no more than 0.5-0.7mm.
The coverage rate of Armourcoat Spatulata will vary depending upon the application procedure and the number of coats applied. Coverage will vary from 0.7kg - 1kg/m^2.
Each 24kg unit will cover 24- 34 m^2 depending upon the application process.

PRODUCT STANDARDS

Manufactured in accordance with ISO 9001
European fire certification A2-S1-D0 to EN13501
American fire rating ASTM E84 - Class 1
UK Fire rating Class '0' according to BS476 part 6 & 7
Resistance to Mould & Mildew
ASTM D 3273 10/10/10 Standard Test Method for Resistance to Growth of Mould on the Surface of Interior Coatings in an Environmental Chamber
ASTM D 3274 10/10/10 Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal)Growth or Soil and Dirt Accumulation
Rating system: 1 is very poor. 10 is no growth
Testing was carried out by an accredited American test laboratory

Pencil Hardness - 5H
Armourcoat Spatulata P80 was tested to 5H in accordance with ASTM D 3363 using a set of Berol turquoise hardness pencils.

Shore D Hardness - 74
A test panel of Armourcoat Spatulata P80 on 6mm MDF was tested for hardness using an Sauter HBD100-0 Shore Durometer D.
An average of 5 readings was taken. Tests were carried out at 23C and 35% RH.

VOC Testing
A sample of Armourcoat Spatulata P80 was tested for VOC by an accredited American testing laboratory following procedures outlined in ASTM D3960 Standard Practise for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings. A second sample of Spatulata P80 was tested for VOC content by an accredited European laboratory following procedures outlined inISO 11890-2 "Paints and varnishes. Determination of volatile organic compound (VOC) content". Test Method VOC (grams/litre) VOC (Lbs/Gal) ASTM D3960680.6ISO 11890-248PDS002

PHYSICAL PROPERTIES OF THE PRODUCT

Natural mineral material
Environmentally friendly
Wide colour range for interior use
Good workability in a wide range of site conditions
Good water vapour permeability
Excellent fire resistance
provides a hard and durable polished surface for interior and exterior use
non Newtonian thixotropic paste Viscosity 85000cP +/- 20000cP
specific density 1.6 kg/L +/- 0.1kg/L
completely non-combustible as supplied or when applied

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.armourcoat.com

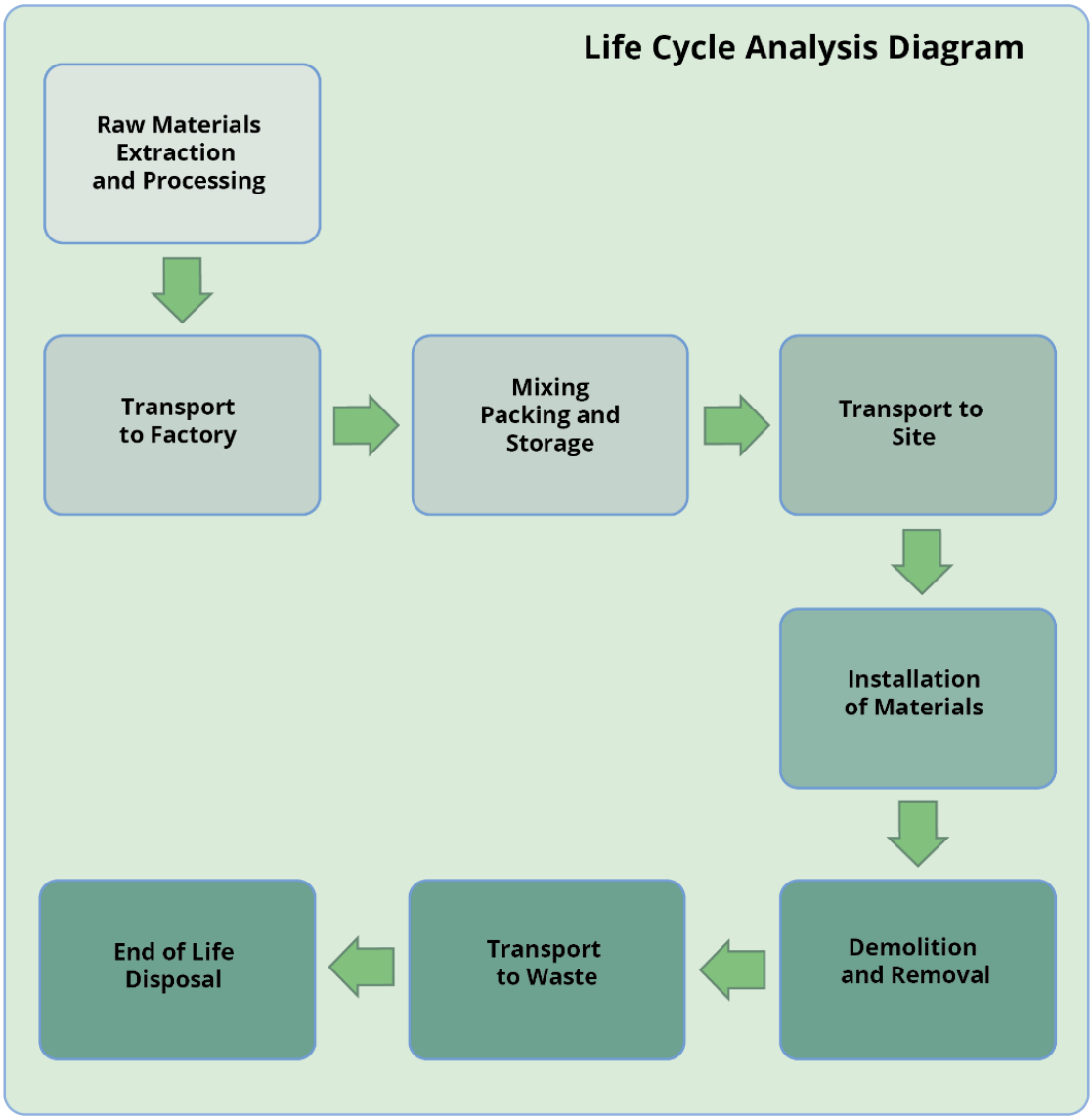
PRODUCT RAW MATERIAL COMPOSITION

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

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances.

PRODUCT LIFE-CYCLE



MANUFACTURING AND PACKAGING (A1-A3)

Armourcoat Spatulata is a natural lime stucco plaster (Venetian Plaster) made from slaked Lime putty and fine marble powder which will trowel to a glossy surface.
The raw materials are carefully weighed and mixed with clean water in a high shear mixer. The material is mixed to a smooth homogeneous paste and the viscosity checked and adjusted if necessary at the end of the mixing process. Every batch is subject to a complete Quality control check and residual samples retained for a minimum of 2 years from date of manufacture. The material is then packed into 24kg units using a vacuum packing dispenser.
Finished product is packed onto a Euro pallet and stretch wrapped ready for warehouse storage.
Materials are pigments ready for use on site.
All pigments used to colour the material are APEO free and zero VOC.
Armourcoat Spatulata polished plasters are a natural mineral product that provided a durable and long lasting decorative finish which avoids the environmental impact associated with paints and other synthetic wall coatings.
Armourcoat Spatulata polished plasters are packaged in 24kg plastic pails that can be cleaned and recycled as plastic waste.

TRANSPORT AND INSTALLATION (A4-A5)

Armourcoat Spatulata polished plasters are manufactured in our Factory in the UK and transported by road for projects in the UK.
Armourcoat products are shipped by sea for overseas projects.
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)

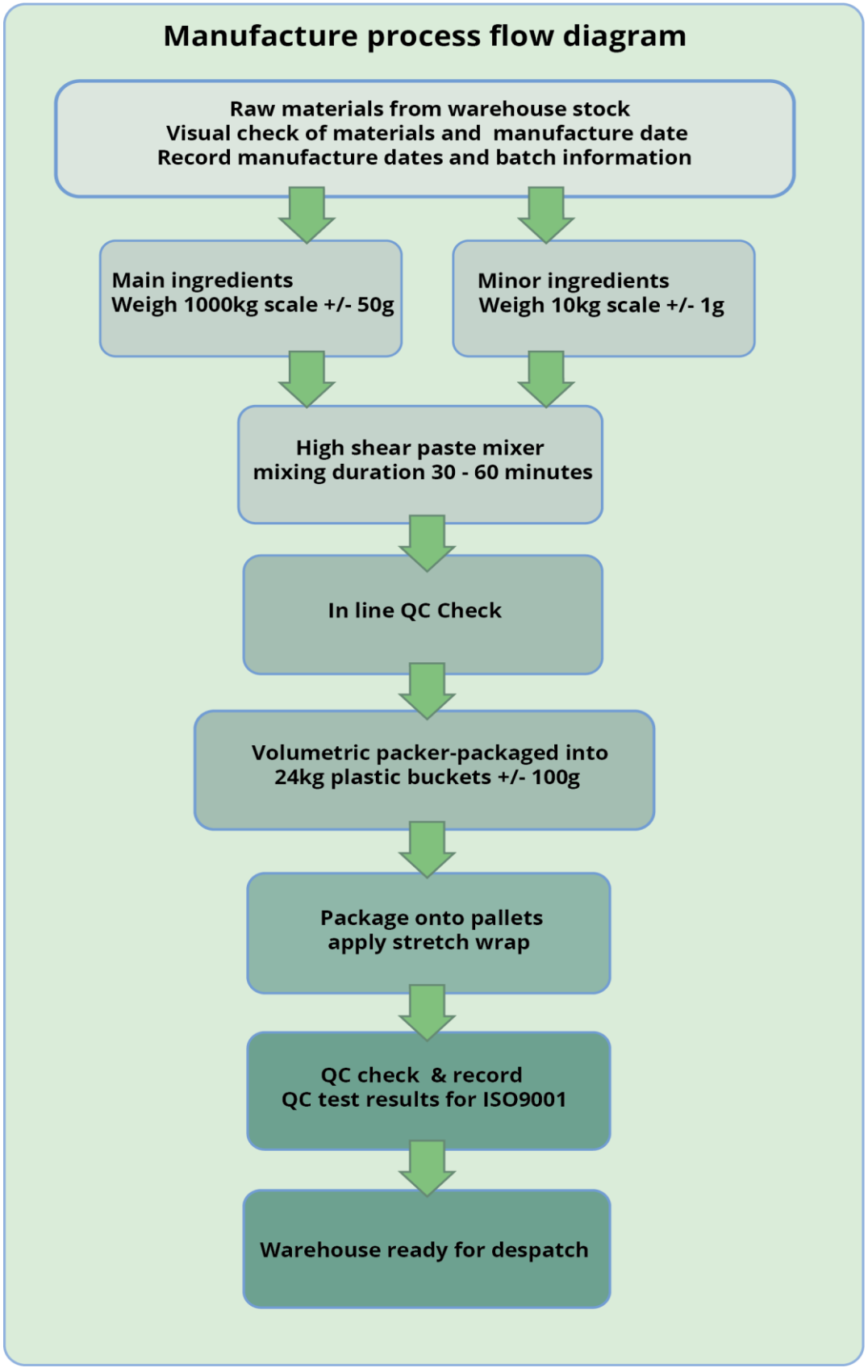
Spatulata can be repaired if damage occurs and can be cleaned with the Armourcoat soap solution diluted 1:3 with water.
Spatulata forms a thin inert stone decorative layer to the wall or ceiling surface and as there are no requirements for energy or water during the lifetime of the product, the specific air, soil and water impacts are negligible.

PRODUCT END OF LIFE (C1-C4, D)

Armourcoat Spatulata polished plasters 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.
The material is supplied to site as a ready-mixed paste product. The water content evaporates off during the application and the residual mass per 1kg of declared unit is 0.68kg.
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 and this is assumed to be 50km (C2).

There is no waste processing for reuse , recovery or recycling (C3).
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 (C5)

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2020-2021

DECLARED AND FUNCTIONAL UNIT

Declared unit	1kg
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	0.0031
Biogenic carbon content in packaging, kg C	0

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.

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**
Geography, by two-letter ISO country code or regions. The International EPD System only.																		
UK	**UK**	**UK**	**UK**	**UK**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**UK**	**UK**	**UK**	**UK**	**UK**		
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 Armourcoat Spatulata polished plasters include the following life cycle stages.
Raw material extraction / mining and processing along with transport of raw materials to Armourcoat factory (A1).
Section A3 covers the following:
Manufacture of the product to include blending and packing into plastic buckets.
Internal handling, washing of machinery and disposal of manufacturing scrap materials and raw Material packaging:
Consumption of energy for all stages of manufacture along with use of water and treatment of all waste.
Packaging, pallets and pallet wrapping of the finished materials and storage in warehouse.
Distribution of the materials to construction site for application and application of the materials on site are included in Construction A4-A5.
End of life treatment includes transport of construction waste and disposal of the Armourcoat Spatulata polished plasters with the plasterboard onto which it has been applied.
All ingredients in section A1-A3 have been included with the exception of starch which have and addition level below 0.06%.
No allowance has been made for the manufacture of the manufacturing machinery.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.
In this study, as per EN 15804, allocation is conducted in the following order;
1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

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 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 being used and the remaining pallets are recycled.
The material is delivered to site ready for use and therefore no Site mixing of the material is required. No general site lighting or heating has been included in the allocation as the building sites are generally unheated.
There is no waste allocation for site as any unused buckets of material are collected and returned to stock and any part buckets are offered to the client to be retained for any subsequent repairs or touch up.
Due to the high pH of the material from the lime putty , the product will not go off or go mouldy and provided it is kept sealed in the original bucket it will remain usable for repairs for many years to come.
Armourcoat Spatulata polished plasters provides a strong durable layer that can be cleaned with a soapy water and repaired if damaged. It is expected that the material can 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 sulfate.

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 end-of-life 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 Armourcoat Spatulata polished plasters 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 key difference between the P80 and P70 is the ageing and milling of the lime putty.
the calculation have been based on the P80 which has this additional process but the affect on the GWP of the product from this additional process if less than 0.5%
Data specificity and GWP-GHG variability for GWP-GHG for A1-A3.

Supply-chain specific data for GWP-GHG	Actual %
Variation in GWP-GHG between products	< 2 %
Variation in GWP-GHG between sites	N/A

ENVIRONMENTAL IMPACT DATA - Results for 1kg of Spatulata P80, P70

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	3.06E-1	1.75E-2	1.04E-1	4.27E-1	9.31E-3	-1.06E-1	MND	3.51E-8	0E0	2.77E-8	6.69E-3	-2.77E-8
GWP – fossil	kg CO2e	3.08E-1	1.75E-2	1.05E-1	4.3E-1	9.39E-3	-1.07E-1	MND	3.43E-8	0E0	2.69E-8	6.68E-3	-2.69E-8
GWP – biogenic	kg CO2e	-1.69E-3	1.12E-5	-1.43E-3	-3.12E-3	6.82E-6	2.92E-6	MND	7E-10	0E0	8.22E-10	7.1E-6	-8.22E-10
GWP – LULUC	kg CO2e	1.28E-4	5.69E-6	7.64E-5	2.1E-4	2.83E-6	2.12E-7	MND	5.66E-11	0E0	5.36E-11	1.06E-6	-5.36E-11
Ozone depletion pot.	kg CFC11e	3.45E-8	4.05E-9	6.2E-9	4.47E-8	2.21E-9	1.43E-10	MND	3.04E-15	0E0	2.54E-15	1.47E-9	-2.54E-15
Acidification potential	mol H+e	8.16E-4	7.25E-5	4.1E-4	1.3E-3	3.94E-5	3.6E-6	MND	2E-10	0E0	1.76E-10	3.4E-5	-1.76E-10
EP-freshwater[2)]	kg Pe	5.55E-6	1.44E-7	3.52E-6	9.21E-6	7.64E-8	7.3E-9	MND	2.81E-12	0E0	2.49E-12	4.33E-8	-2.49E-12
EP-marine	kg Ne	1.47E-4	2.17E-5	6.54E-5	2.35E-4	1.19E-5	1.19E-6	MND	3.19E-11	0E0	2.2E-11	1.17E-5	-2.2E-11
EP-terrestrial	mol Ne	1.68E-3	2.4E-4	7.45E-4	2.67E-3	1.31E-4	1.32E-5	MND	3.7E-10	0E0	2.63E-10	1.29E-4	-2.63E-10
POCP (“smog”)	kg NMVOCe	6.06E-4	7.55E-5	3E-4	9.82E-4	4.22E-5	1E-2	MND	1.16E-10	0E0	7.09E-11	3.74E-5	-7.09E-11
ADP-minerals & metals	kg Sbe	2.39E-6	3.78E-7	8.63E-7	3.63E-6	1.6E-7	6.3E-9	MND	1.01E-12	0E0	2.89E-13	3.27E-8	-2.89E-13
ADP-fossil resources	MJ	4.13E0	2.68E-1	3.23E0	7.62E0	1.46E-1	1.05E-2	MND	5.86E-7	0E0	5.1E-7	1E-1	-5.1E-7
Water use[1)]	m3e depr.	1.06E-1	9.38E-4	5.41E-2	1.61E-1	5.43E-4	3.75E-4	MND	2.06E-6	0E0	2.05E-6	4.63E-3	-2.05E-6

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	5.61E-9	1.42E-9	2.68E-9	9.71E-9	8.49E-10	7.04E-11	MND	1.68E-15	0E0	8.07E-16	6.61E-10	-8.07E-16
Ionizing radiation[3)]	kBq U235e	1.02E-2	1.17E-3	7.92E-3	1.93E-2	6.38E-4	4.22E-5	MND	4.05E-9	0E0	3.99E-9	4.11E-4	-3.99E-9
Ecotoxicity (freshwater)	CTUe	6.9E0	2.06E-1	7.68E-1	7.88E0	1.12E-1	7.65E-3	MND	6.25E-7	0E0	4.06E-7	6.32E-2	-4.06E-7
Human toxicity, cancer	CTUh	7.54E-11	5.59E-12	2.65E-11	1.08E-10	2.85E-12	2.6E-13	MND	9.37E-17	0E0	1.71E-17	1.5E-12	-1.71E-17
Human tox. non-cancer	CTUh	6.3E-9	2.39E-10	7.19E-10	7.26E-9	1.32E-10	6.58E-12	MND	2.09E-15	0E0	3.97E-16	4.61E-11	-3.97E-16
SQP	-	2E-1	3.24E-1	4.58E-2	5.7E-1	2.2E-1	3.27E-2	MND	5.17E-8	0E0	3.63E-8	1.7E-1	-3.63E-8

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	3.72E-1	3.56E-3	1.64E-1	5.39E-1	1.84E-3	1.64E-4	MND	7.95E-8	0E0	8.09E-8	8.09E-4	-8.09E-8
Renew. PER as material	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	3.72E-1	3.56E-3	1.64E-1	5.39E-1	1.84E-3	1.64E-4	MND	7.95E-8	0E0	8.09E-8	8.09E-4	-8.09E-8
Non-re. PER as energy	MJ	2.62E0	2.68E-1	1.64E0	4.53E0	1.46E-1	1.05E-2	MND	5.86E-7	0E0	5.1E-7	1E-1	-5.1E-7
Non-re. PER as material	MJ	1.51E0	0E0	1.59E0	3.1E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	4.13E0	2.68E-1	3.23E0	7.62E0	1.46E-1	1.05E-2	MND	5.86E-7	0E0	5.1E-7	1E-1	-5.1E-7
Secondary materials	kg	5.7E-4	0E0	3.38E-4	9.08E-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	3.39E-3	5.14E-5	3.45E-4	3.79E-3	3.04E-5	9.72E-6	MND	1.17E-7	0E0	1.03E-7	1.1E-4	-1.03E-7

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	7.19E-3	2.66E-4	3.75E-3	1.12E-2	1.42E-4	1.66E-5	MND	3.44E-9	0E0	0E0	9.34E-5	-2.7E-9
Non-hazardous waste	Kg	2.37E-1	2.43E-2	1.55E-1	4.16E-1	1.57E-2	3.32E-2	MND	1.25E-7	0E0	0E0	6.8E-1	-1.12E-7
Radioactive waste	Kg	1.06E-5	1.84E-6	5.59E-6	1.8E-5	1E-6	6.52E-8	MND	3.16E-12	0E0	0E0	6.62E-7	-3.05E-12

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

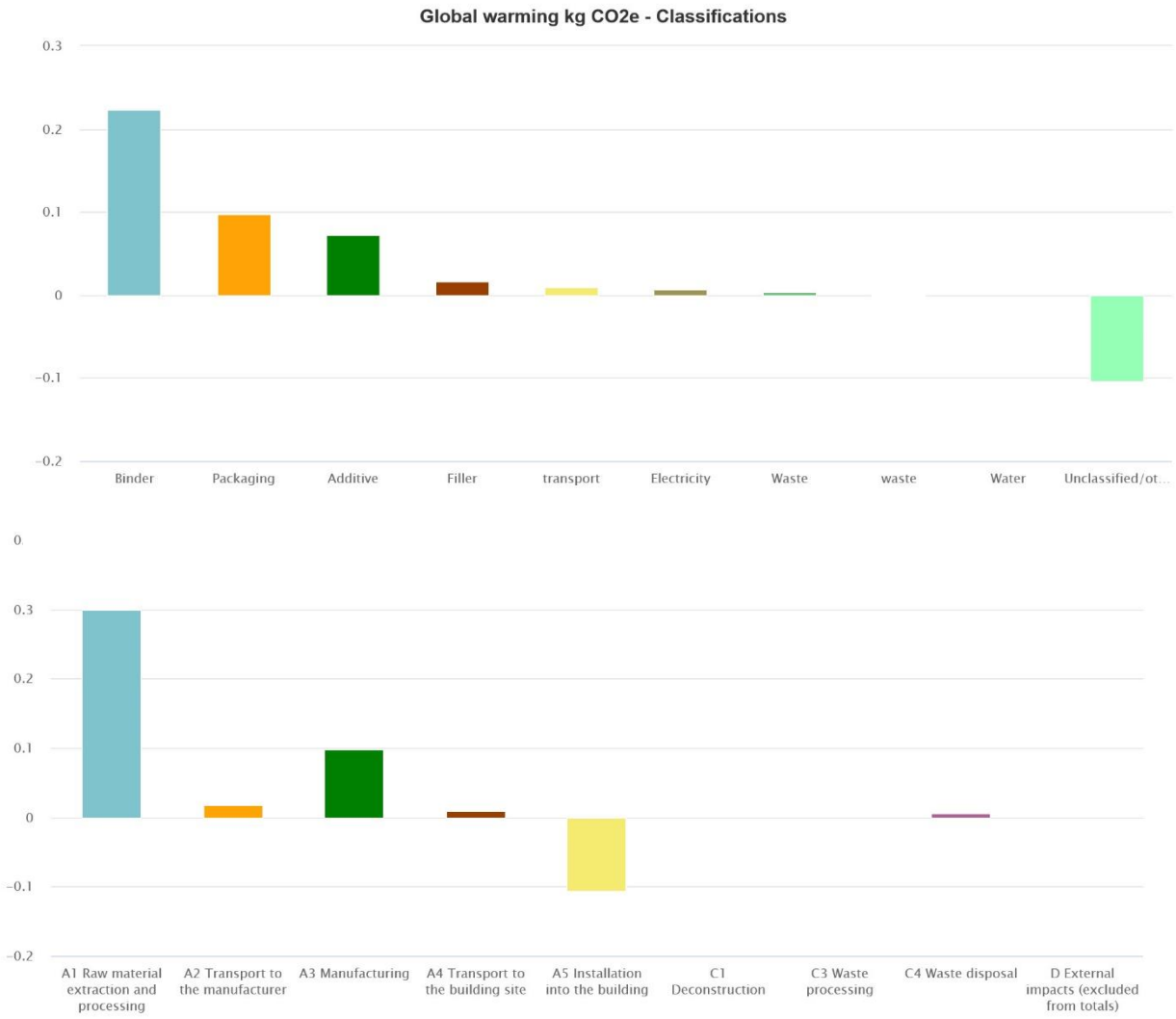
Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG	kg CO2e	3.08E-1	1.75E-2	1.05E-1	4.3E-1	9.39E-3	-1.07E-1	MND	3.43E-8	0E0	2.69E-8	6.68E-3	-2.69E-8

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.

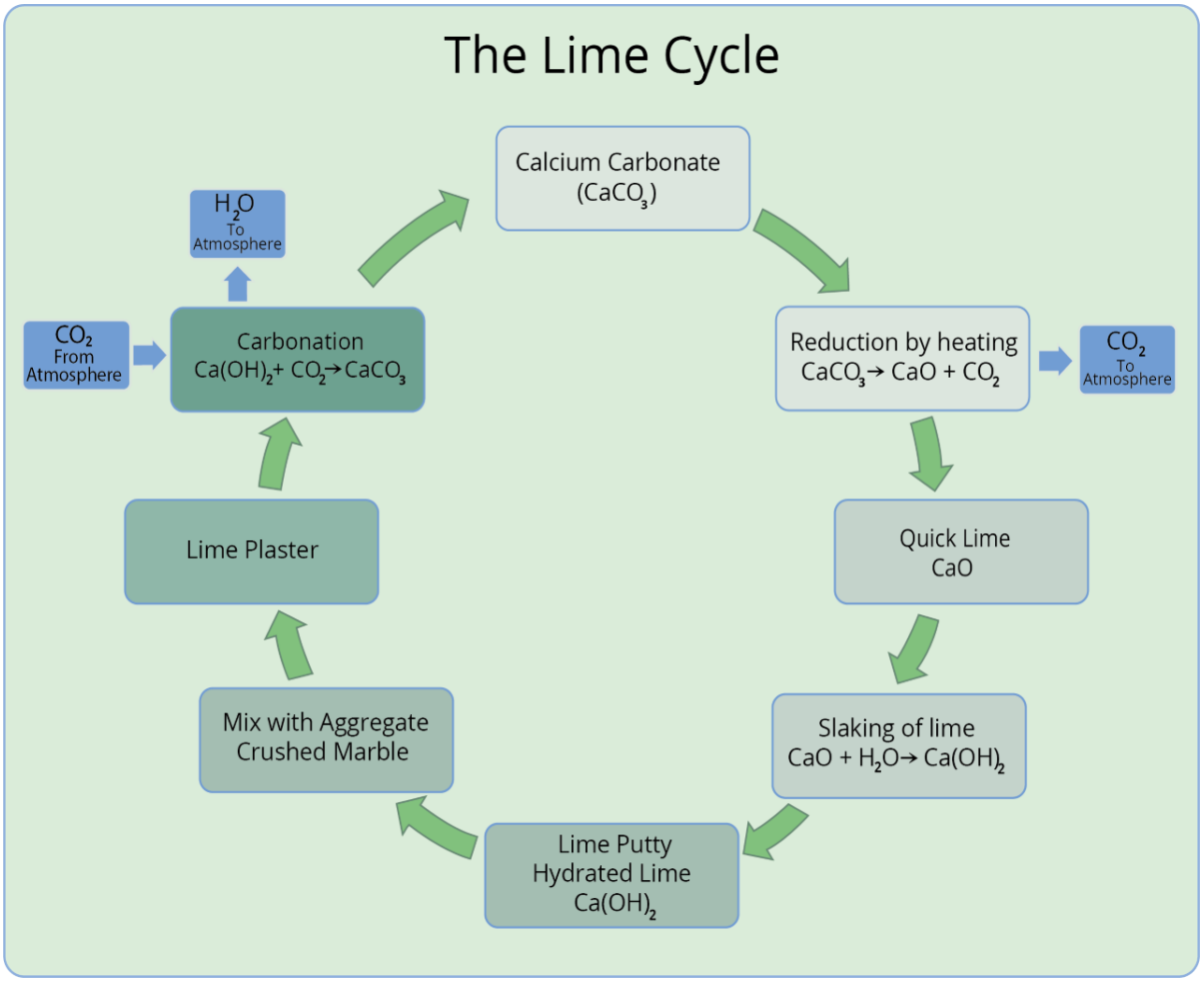
Additional Information
Core environmental impact indicator EN 15804 +A2 PEF (all catagories Cradle to grave)

0.336 kg CO_2 e
Coverage rate 0.7-1 kg/m^2
0.24 – 0.34 kg CO_2 e / m^2

CHART



The raw material extraction and processing (A1) account for 92% of the total GWP.
The next largest contributor is from the Manufacture A3 at 30%. The highest contributing material in A1 is the Lime and which account for 69% , however once 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 which offsets a proportion of the CO2 generated in A1 by - 33%. This is a process known as the lime cycle.
The other significant contribution is the packaging due to the plastic buckets.



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_2e / kWh	0.37
District heating data source and quality	None
District heating CO_2e / kWh	None

Transport scenario documentation (A4)

Scenario parameter	Value
Specific transport CO_2e emissions, kg CO_2e / tkm	0.132
Average transport distance, km	100
Capacity utilization (including empty return) %	100
Bulk density of transported products	1200
Volume capacity utilization factor	1

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	0.68kg
Collection process – kg collected with mixed waste	0.68kg
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	0.68kg
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
Spatulata P80 LCA background report 17.06.2021

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

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

Why does verification transparency matter? Read more online.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Armourcoat Ltd
EPD author	Duncan Mackellar - Armourcoat Ltd
EPD verifier	Dr Andrew Norton - Renuables Ltd
EPD program operator	The International EPD System
Background data EPD-034	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Dr Andrew Norton - Renuables Ltd
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)

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)	
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 www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
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: ☐ Internal certification ☑ 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	☐ yes ☑ no

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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 potential	kg CO2e	3E-1	1.73E-2	9.86E-2	4.16E-1	9.31E-3	3.41E-4	MND	3.35E-8	0E0	2.64E-8	3.51E-3	-2.64E-8
Depletion of stratospheric ozone	kg CFC11e	4.23E-8	3.22E-9	6.15E-9	5.17E-8	1.75E-9	8.6E-11	MND	3.43E-15	0E0	2.96E-15	1.17E-9	-2.96E-15
Acidification	kg SO2e	6.57E-4	3.53E-5	3.49E-4	1.04E-3	1.91E-5	2.36E-5	MND	1.62E-10	0E0	1.49E-10	1.42E-5	-1.49E-10
Eutrophication	kg PO4 3e	2.45E-4	7.19E-6	1.25E-4	3.77E-4	3.86E-6	4.81E-7	MND	9.18E-11	0E0	8.14E-11	2.74E-6	-8.14E-11
Photochemical ozone formation	kg C2H4e	7.28E-5	2.28E-6	2.3E-5	9.81E-5	1.21E-6	8.9E-8	MND	1.08E-11	0E0	6.72E-12	1.04E-6	-6.72E-12
Abiotic depletion of non-fossil res.	kg Sbe	2.39E-6	3.78E-7	8.63E-7	3.63E-6	1.6E-7	3.74E-9	MND	1.01E-12	0E0	2.89E-13	3.27E-8	-2.89E-13
Abiotic depletion of fossil	MJ	4.13E0	2.68E-1	3.23E0	7.62E0	1.46E-1	8.17E-3	MND	5.86E-7	0E0	5.1E-7	1E-1	-5.1E-7

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