HUMBLE
Advice

Environmental Product Declaration

EPD

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

PHOMI

PHOMI MCM CLADDING



Conducted by

HUMBLE BUILDINGS

Owner of the declaration:	PHOMI Holding
Issue date:	2022-03-25
Valid until:	2027-03-26

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to continuous updating and tracking of changes.

GENERAL INFORMATION

Owner of the declaration:
PHOMI Benelux
Hilversumsestraatweg 1B
3744KB Baarn
Netherlands

Declared product / functional unit:
1 m^2 of PHOMI MCM CLADDING

Scope:
This declaration refers to MCM Cladding, produced by PHOMI Benelux, a member of PHOMI Holding. The declared reference product in this EPD is 1m^2 of Standard Line cladding products used for façades, floors, ceilings and indoor/outdoor pathways.

The PHOMI CLADDING presented in this declaration is produced in Laibin (China) transported to Amsterdam. The production data corresponds to the year of 2021.

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programs may not be comparable. EPDs if not complied with EN 15804 are not comparable. For further information about comparability, see EN 15804 and ISO 14025.

DETAILED PRODUCT INFORMATION

The LCA study is done according to the PCR for kaolin and clay products. The product that is reported in this document is cladding from PHOMI based on the Standard Line. The products of the Standard Lines (SL) are the classic PHOMI MCM products. The core ranges of the SL are characterized by their thinness and light weight. The maximum dimensions are 1200 x 600 mm, with an average width around 3mm. The density between the various products in the Standard Line is highly dependable on the desirable cladding and therefore very different.

Phomi cladding is nearly completely made of natural components (see table 1 below). The main ingredients are Kaolin (Clay from China) and Quartz Sand. The material is primarily used within the built environment as a cladding material, floor material, ceiling material, or at the inner and outer façade of buildings. Special Moulds are used in combination with special innovative technology that makes sure that the texture of each and every produced slab is unique.

Component (>1%)	[kg / %]
Kaolin Clay	*53%*
Quartz Sand	*43%*
Binder material	*4%*

Tabel 1 Components of Phomi MCM cladding

Figure 1 Kaolin Clay

Figure 2 Quartz Sand

SCOPE & TYPE

The factory for the cladding created by Phomi is located in China in the city Laibin. From there the cladding is shipped all over the world, as Phomi is active in 30 countries spread over Asia and Europe and is also active in Canada.

The scope of this EPD is the entire life cycle. The following modules have been included. The product stage (A1-A3): extraction of raw materials and energy (A1), transport to the production location (A2) and the production phase (A3). The construction stage (Module A4 - A5), the use stage (Module B), End-of-Life (Module C) and reuse and recycling stage (Module D) are also included.

The chosen Reference Services Life (RSL) of 50 years is the same as from PHOMI's actual technical life span.

PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND SYSTEM BOUNDRIES
Raw materials	Transport	Production	Transport to building site	Installation into building	Use/application	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x			x	x	x					x	x	x				x

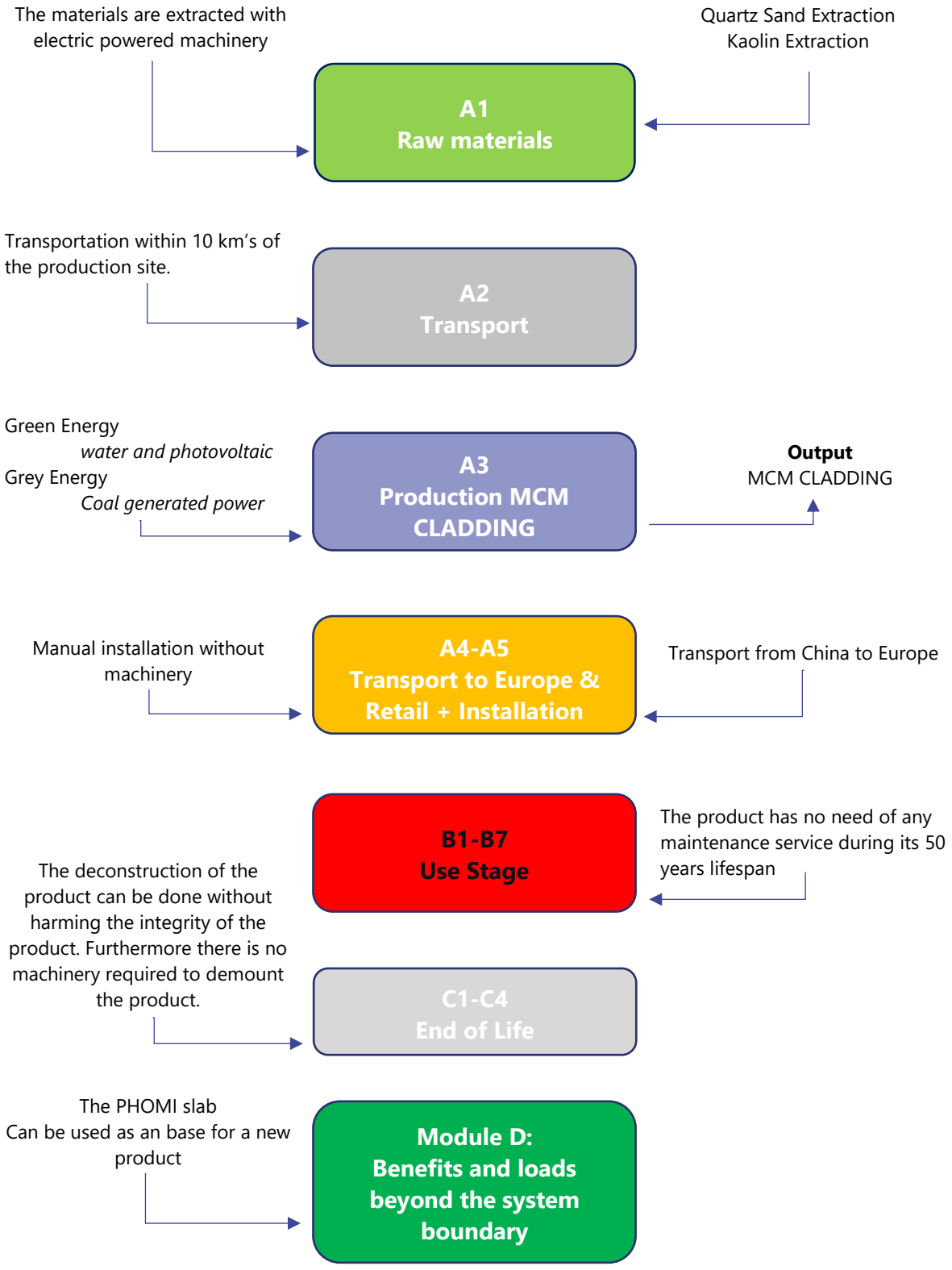
x = modules assessed

The EPD is compiled using the "NMD Bepalingsmethode Milieuprestatie Bouwwerken v1.0" as PCR, Ecoinvent v3.5 & 3.6 for background processes, and Mobius Software to make the LCA calculations. The main impact categories have been calculated with the characterization factors in "EN 15804 +A2 Method v.100/ EF 3.0 Normalization and weighting set" and "NMD Bepalingsmethode 1.0, jul 2020 (NMD3.3) V.3.04/MKI-SBK single-score.

REPRESENTATIVENESS

This EPD represents all of the Phomi MCM cladding from the Standard Line. Variability of the results for the Phomi MCM cladding is based on the transport distances from Guangzhou (China) to different ports in Europe. This effects the outcome of the LCA results calculated to the environmental cost indicator with a differ of maximum 9%.

LCA PROCESS DIAGRAM ACCORDING TO EN 15804



LCA RESULTS - EVIRONMENTAL IMPACT PER FUNCTIONAL UNIT

Impact category name	Reference unit	A1	A2	A3	A4-A5	B1-B7	C1-C4	D
ADPF	kg Sb eq	3,89E-03	3,94E-05	2,98E-03	5,89E-03	0,00E+00	2,80E-04	-1,18E-03
ODP	kg CFC-11 eq	4,56E-08	9,50E-10	1,67E-08	1,51E-07	0,00E+00	5,91E-09	-1,43E-10
POCP	kg C2H4 eq	1,82E-04	3,23E-06	1,34E-04	1,05E-03	0,00E+00	2,14E-05	-4,49E-06
AP	kg SO2 eq	2,82E-03	2,35E-05	2,75E-03	1,86E-02	0,00E+00	1,75E-04	1,53E-04
ADPE	kg Sb eq	1,80E-05	1,37E-07	2,71E-06	8,35E-06	0,00E+00	6,97E-07	-1,08E-07
EP	kg PO4--- eq	2,70E-04	4,62E-06	2,47E-04	2,10E-03	0,00E+00	3,28E-05	1,18E-05
GWP	kg CO2 eq	5,54E-01	5,35E-03	4,62E-01	9,11E-01	0,00E+00	3,83E-02	1,31E-01

ADPF = Abiotic depletion, fuel
ODP = Ozone layer depletion
POCP = Photochemical oxidation
AP = Acidification
ADPE = Abiotic depletion, non-fuel
EP = Eutrophication
GWP = Global warming

LCA RESULTS – RESOURCE USE PER FUNCTIONAL UNIT

Impact category name	Reference unit	A1	A2	A3	A4-A5	B1-B7	C1-C4	D
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	7,14E+00	8,64E-02	4,76E+00	1,31E+01	0,00E+00	5,97E-01	-1,87E+00
FW	m3	7,37E-03	9,92E-06	2,73E-03	9,47E-04	0,00E+00	1,89E-04	-5,09E-03
PERT	MJ	5,29E-01	1,02E-03	2,01E+00	9,75E-02	0,00E+00	1,57E-02	-1,77E-02

PERM = Energy, primary, renewable, materials
PENRM = Energy, primary, non-renewable, materials
NRSF = Secondary fuel, non-renewable
RSF = Secondary fuel, renewable
PERE = Energy, primary, renewable, excluding materials
SM = Secondary material
PENRE = Energy, primary, non-renewable, excluding materials
PENRT = Energy, primary, non-renewable
FW = Water, fresh water use
PERT = Energy, primary, renewable

LCA RESULTS – OUTPUT FLOWS AND WASTE CATEGORIES

Impact category name	Reference unit	A1	A2	A3	A4-A5	B1-B7	C1-C4	D
HWD	kg	6,48E-06	2,06E-07	1,98E-05	1,55E-05	0,00E+00	1,27E-06	-2,80E-06
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RWD	kg	1,46E-05	5,35E-07	2,37E-06	8,48E-05	0,00E+00	3,23E-06	-1,88E-06
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NHWD	kg	4,37E-02	5,16E-03	3,72E-02	3,13E-01	0,00E+00	3,79E-02	-2,69E-03
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

HWD = Waste, hazardous
MFR = Materials for recycling
CRU = Components for re-use
EET = Exported energy, thermal
RWD = Waste, radioactive
EEE = Exported energy, electric
NHWD = Waste, non-hazardous
MER = Materials for energy recovery

ADDITIONAL TECHNICAL INFORMATION

Material extraction (A1)
The different base materials used to form the MCM CLADDING have been connected to representative LCA references.

Transport to factory (A2)
Means of transport were modelled based on supplier information from the transporter to the production location. It is important that return transports are also taken into account, stated in EN-17160. In the transport reference used in the LCA program this is already incorporated and therefore taken into account.

Manufacturing (A3)
All products and processes relevant to producing the mcm cladding are included in this study. PHOMI MCM is partly produced with renewable and partly with coal-generated electricity. The steam from the coal powerplant's cooler is used to create conditions where the MCM powder is mixed with water to form a slurry. After the steam cools down, it condensates and this water is re-used, so that there is no form of water waste.

Transport to Europe and in Europe to retail (A4)
The product is shipped to Europe with large container vessels. From there it is shipped to retail with a fixed value.

Installation (A5)
The product does not need any use of machinery, only manual labor is needed by installation.

Use Phase (B1 – B7)
Stated by PHOMI the product has no need of any maintenance, repair, replacement or refurbishment under conditions of normal use during its 50 years lifespan. Coating of the cladding is optional and therefore not considered in the scope of this research.

End of Life (C1 – C4)
The deconstruction of the product can be done without harming the integrity of the product or products nearby, furthermore there is no machinery required to demount the product. At the end of its lifecycle the product carries close to 100% of its initial physical mass and content, therefore the product is crushed into smaller fractions before it goes to a local material processor.

Module D (Reuse, recovery, recycling)
The recycle potential of the product is very high. As stated, should it be crushed into smaller fractions before it can be used to mix with other similar materials out of which it was essentially created in order to become a new product again.

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