Environmental Product Declaration

according to ISO 14025 and EN 15804

This declaration is for:

Tegalit Aerlox

Provided by:

BMI Germany

program operator

Stichting MRPI®

publisher

Stichting MRPI®

www.mrpi.nl

MRPI® registration

1.1.00458.2023

date of first issue

03-03-2022 (1.1.00266.2022)

date of this issue

07-12-2023

expiry date

07-12-2028

COMPANY INFORMATION

BMI Germany
Frankfurter Landstrasse 2-4
61440
Oberursel (Taunus), Germany

info@braas.de
https://www.bmigroup.com/de

MRPI® REGISTRATION

1.1.00458.2023

DATE OF ISSUE

07-12-2023

EXPIRY DATE

07-12-2028

PRODUCT

Tegalit Aerlox

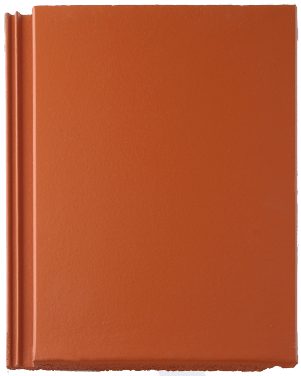
DECLARED UNIT/FUNCTIONAL UNIT

A m² of concrete roofing tile, as produced (not attached to the roof, gradle to gate)

DESCRIPTION OF PRODUCT

A m² of concrete roofing tile, as produced (not attached to the roof, gradle to gate)

VISUAL PRODUCT



MORE INFORMATION

https://www.bmigroup.com/de/p/tegalit-aerlox-granit-star-matt-beton-3100856246/?pathname=%2Fde%2Falle-steildachprodukte%2F

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by **Kamiel Jansen, Aveco de Bondt.**
The LCA study has been done by **Wouter Jan van den Berg, BMI Group.**
The certificate is based on an LCA-dossier according to ISO14025 and EN15804+A2. 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+A2. 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, Aveco de Bondt
[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

Aerlox Tegalit is made from natural raw materials: sand, cement, filler and water. We color the mixture with natural pigments which provides a long lasting color.

The Aerlox tiles are extruded and during the manufacturing process, a micro mortar layer is applied to the main body which provides a smooth surface. After curing the concrete tile is colored by a coating which gives the final finishing.

The Aerlox Tegalit is carefully designed to give value with its lower weight, higher density and enhanced durability performance.

Its visual aesthetics appeals to a variety of building types - and with its reduced CO2 emission, Aerlox also meets customer demands in terms of sustainability.

COMPONENT > 1% of total mass	[%]
Sand	confidential
Cement	confidential
Water	confidential
Pigment	confidential
Paint	confidential
Others	confidential

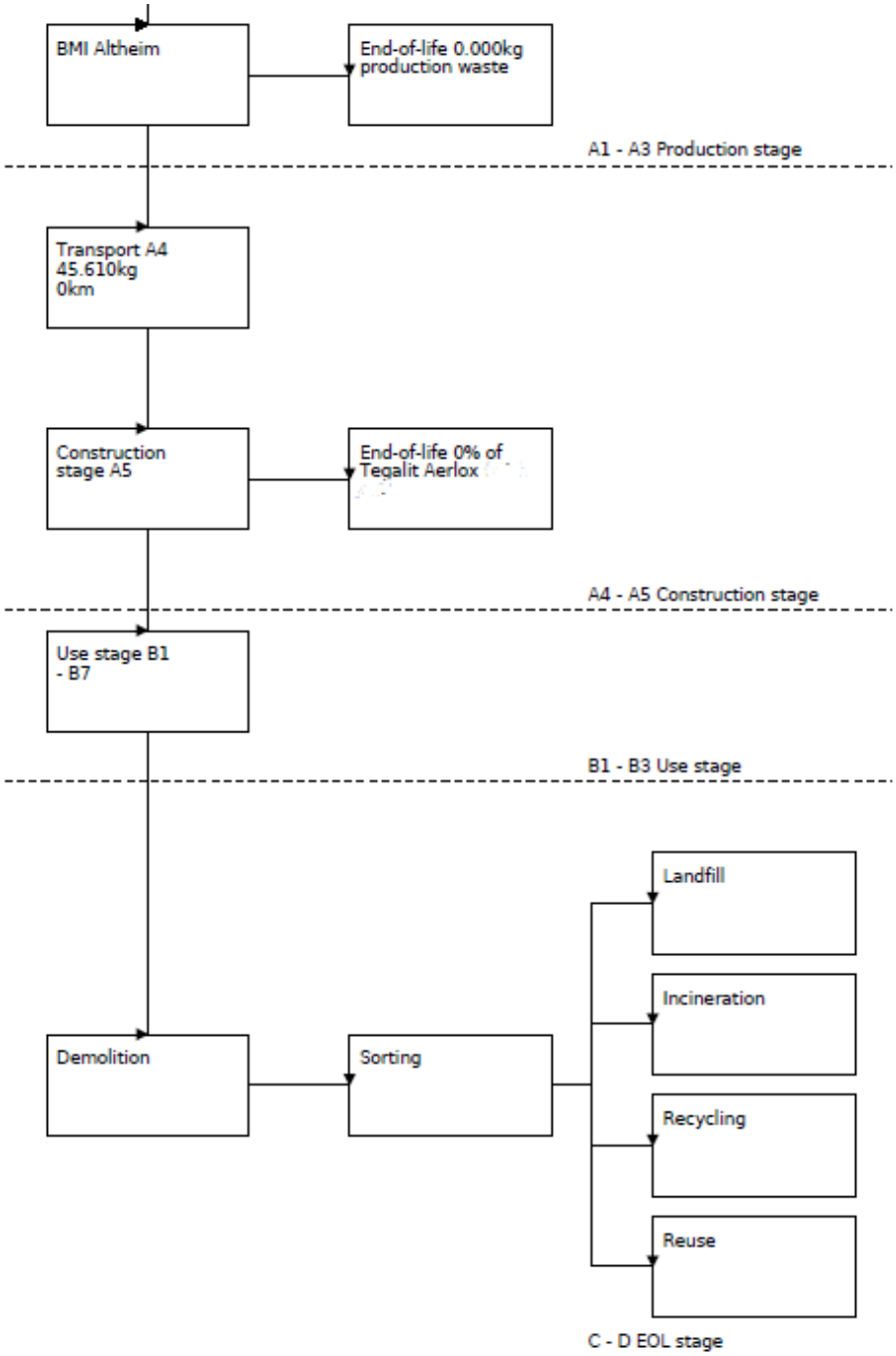
SCOPE AND TYPE

This specific EPD is relevant for Tegalit Aerlox, a product from BMI Steildach GmbH, Altheim (DE), to be sold at the European market. Backgrounddatabase is Eco Invent 3.6. For end of life we have used the waste scenario concrete (i.a. elements, brickwork, reinforced concrete)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
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	ND	ND	ND	ND	x	x	x	x	x

X = Modules Assessed

ND = Not Declared



LCA process diagram according to EN 15804 (7.2.1)

REPRESENTATIVENESS

The data are representative for Tegalit Aerlox, a product from BMI Steildach GmbH, Altheim, Germany, to be sold at the European market.

ENVIRONMENTAL IMPACT per functional unit or declared unit (core indicators A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	8.75 E+0	7.02 E-1	1.34 E+0	1.08 E+1	6.46 E-1	2.39 E+0	3.25 E-1	2.51 E-3	-6.75 E-1	0.00	7.72 E-2	1.36 E+1	0.00	0.00
GWP-fossil	kg CO2 eq.	8.60 E+0	6.99 E-1	1.33 E+0	1.06 E+1	6.45 E-1	2.31 E+0	3.25 E-1	2.51 E-3	-6.58 E-1	0.00	7.67 E-2	1.33 E+1	0.00	0.00
GWP-biogenic	kg CO2 eq.	7.52 E-2	1.76 E-3	7.21 E-3	8.41 E-2	4.72 E-4	6.36 E-2	1.50 E-4	4.97 E-6	-1.51 E-2	0.00	4.44 E-4	1.34 E-1	0.00	0.00
GWP-luluc	kg CO2 eq.	7.07 E-2	4.36 E-4	2.71 E-3	7.38 E-2	1.90 E-4	8.29 E-3	1.19 E-4	6.99 E-7	-1.97 E-3	0.00	1.46 E-5	8.04 E-2	0.00	0.00
ODP	kg CFC11 eq.	2.13 E-7	1.39 E-7	2.57 E-7	6.08 E-7	1.53 E-7	2.78 E-7	7.16 E-8	1.03 E-9	-7.70 E-8	0.00	9.95 E-9	1.04 E-6	0.00	0.00
AP	mol H+ eq.	2.09 E-2	4.14 E-3	6.88 E-3	3.19 E-2	3.30 E-3	2.82 E-2	1.88 E-3	2.38 E-5	-8.01 E-3	0.00	4.81 E-4	5.78 E-2	0.00	0.00
EP-freshwater	kg PO4 eq.	1.79 E-3	1.43 E-5	1.03 E-4	1.91 E-3	4.96 E-6	1.60 E-4	3.27 E-6	2.81 E-8	-3.51 E-5	0.00	2.39 E-6	2.05 E-3	0.00	0.00
EP-marine	kg N eq.	1.36 E-3	1.37 E-3	1.55 E-3	4.28 E-3	1.12 E-3	4.28 E-3	6.63 E-4	8.19 E-6	-2.22 E-3	0.00	1.92 E-4	8.33 E-3	0.00	0.00
EP-terrestrial	mol N eq.	6.93 E-2	1.52 E-2	1.92 E-2	1.04 E-1	1.23 E-2	1.08 E-1	7.31 E-3	9.03 E-5	-3.34 E-2	0.00	2.13 E-3	2.01 E-1	0.00	0.00
POCP	kg NMVOC eq.	1.81 E-2	4.41 E-3	5.99 E-3	2.85 E-2	3.69 E-3	1.33 E-2	2.09 E-3	2.62 E-5	-7.55 E-3	0.00	5.78 E-4	4.06 E-2	0.00	0.00
ADP-minerals & metals	kg Sb eq.	3.14 E-5	1.02 E-5	1.25 E-5	5.41 E-5	1.11 E-5	2.36 E-3	8.22 E-6	2.30 E-8	-1.30 E-5	0.00	2.16 E-7	2.42 E-3	0.00	0.00
ADP-fossil	MJ, net calorific value	2.50 E+1	1.06 E+1	2.71 E+1	6.27 E+1	1.01 E+1	2.93 E+1	4.90 E+0	7.01 E-2	-6.64 E+0	0.00	1.03 E+0	1.01 E+2	0.00	0.00
WDP	m3 world eq. deprived	2.96 E+0	5.58 E-2	3.41 E-1	3.35 E+0	3.29 E-2	5.05 E-1	1.75 E-2	3.14 E-3	-3.00 E+0	0.00	4.67 E-3	9.20 E-1	0.00	0.00

GWP-total = Global Warming Potential total
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 Exceedence
EP-freshwater = Eutrophication Potential, fraction of nutrients reaching freshwater end compartment
EP-marine = Eutrophication Potential, fraction of nutrients reaching marine end compartment
EP-terrestrial = Eutrophication Potential, Accumulated Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals = Abiotic Depletion Potential for non fossil resources [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

Disclaimer [2]

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ENVIRONMENTAL IMPACT per functional unit or declared unit (additional indicators A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
PM	Disease incidence	1.07 E-7	5.92 E-8	8.00 E-8	2.46 E-7	6.01 E-8	4.23 E-7	2.92 E-8	4.63 E-10	-1.17 E-7	0.00	1.06 E-8	6.52 E-7	0.00	0.00
IRP	kBq U235 eq.	2.53 E+2	5.08 E-2	7.66 E+0	2.60 E+2	4.42 E-2	7.92 E+0	2.05 E-2	2.88 E-4	-1.48 E-2	0.00	3.27 E-3	2.68 E+2	0.00	0.00
ETP-fw	CTUe	2.23 E+1	9.58 E+0	2.07 E+1	5.26 E+1	8.06 E+0	7.09 E+1	4.37 E+0	4.55 E-2	-6.61 E+1	0.00	8.35 E-1	7.06 E+1	0.00	0.00
HTP-c	CTUh	1.10 E-8	3.89 E-10	8.33 E-10	1.22 E-8	1.98 E-10	6.28 E-9	1.42 E-10	1.05 E-12	-7.96 E-10	0.00	1.98 E-11	1.81 E-8	0.00	0.00
HTP-nc	CTUh	2.86 E-7	1.08 E-8	2.42 E-8	3.21 E-7	9.17 E-9	9.73 E-8	4.77 E-9	3.23 E-11	2.77 E-8	0.00	5.60 E-10	4.61 E-7	0.00	0.00
SQP	---	2.29 E+1	1.02 E+1	6.57 E+0	3.96 E+1	1.16 E+1	8.88 E+2	4.25 E+0	1.47 E-1	-2.19 E+2	0.00	1.72 E-1	7.25 E+2	0.00	0.00

PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235 [1]
ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]
HTP-c = Potential Comparative Toxic Unit for humans [2]
HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]
SQP = Potential soil quality index [2]

Disclaimer [1]

- 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.

Disclaimer [2]

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

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

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
PERE	MJ	3.94 E+0	4.09 E-1	2.74 E+0	7.09 E+0	1.27 E-1	7.58 E+1	6.13 E-2	5.67 E-4	-4.45 E+1	0.00	5.86 E-2	3.86 E+1	0.00	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	4.67 E+1	0.00	0.00	0.00	0.00	0.00	4.67 E+1	0.00	0.00
PERT	MJ	3.94 E+0	4.09 E-1	2.74 E+0	7.09 E+0	1.27 E-1	1.23 E+2	6.13 E-2	5.67 E-4	-4.45 E+1	0.00	5.86 E-2	8.53 E+1	0.00	0.00
PENRE	MJ	2.90 E+1	1.13 E+1	2.46 E+1	6.49 E+1	1.07 E+1	3.11 E+1	5.20 E+0	7.45 E-2	-7.01 E+0	0.00	1.10 E+0	1.06 E+2	0.00	0.00
PENRM	MJ	1.52 E+0	0.00	4.43 E+0	5.95 E+0	0.00	1.78 E-1	0.00	0.00	0.00	0.00	0.00	6.13 E+0	0.00	0.00
PENRT	MJ	3.05 E+1	1.13 E+1	2.90 E+1	7.08 E+1	1.07 E+1	3.13 E+1	5.20 E+0	7.45 E-2	-7.01 E+0	0.00	1.10 E+0	1.12 E+2	0.00	0.00
SM	kg	0.00	0.00	6.00 E-6	6.00 E-6	0.00	9.47 E-2	0.00	0.00	2.06 E-4	0.00	0.00	9.50 E-2	0.00	0.00
RSF	MJ	1.17 E+1	0.00	3.51 E-1	1.21 E+1	0.00	3.62 E-1	0.00	0.00	0.00	0.00	0.00	1.24 E+1	0.00	0.00
NRSF	MJ	2.75 E+1	0.00	8.24 E-1	2.83 E+1	0.00	8.49 E-1	0.00	0.00	0.00	0.00	0.00	2.91 E+1	0.00	0.00
FW	m3	7.23 E-2	2.55 E-3	1.37 E-2	8.85 E-2	1.15 E-3	1.84 E-2	5.96 E-4	7.49 E-5	-7.01 E-2	0.00	3.44 E-4	3.89 E-2	0.00	0.00

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

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

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
HWD	kg	7.44 E-5	2.41 E-5	4.29 E-5	1.41 E-4	2.45 E-5	3.85 E-4	1.24 E-5	1.05 E-7	-4.61 E-5	0.00	1.79 E-6	5.20 E-4	0.00	0.00
NHWD	kg	2.10 E-1	6.27 E-1	1.34 E-1	9.71 E-1	8.80 E-1	1.37 E+0	3.11 E-1	4.76 E-1	-1.35 E-1	0.00	1.44 E-1	4.02 E+0	0.00	0.00
RWD	kg	3.87 E-5	6.97 E-5	1.17 E-4	2.25 E-4	6.91 E-5	1.40 E-4	3.21 E-5	4.60 E-7	-2.32 E-5	0.00	4.63 E-6	4.48 E-4	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
MFR	kg	0.00	0.00	1.41 E+0	1.41 E+0	0.00	1.82 E+0	0.00	0.00	0.00	0.00	4.71 E+1	5.04 E+1	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
EEE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.14 E+0	0.00	0.00	7.14 E+0	0.00	0.00
ETE	MJ	1.00 E-1	0.00	3.01 E-3	1.03 E-1	0.00	3.10 E-3	0.00	0.00	1.23 E+1	0.00	0.00	1.24 E+1	0.00	0.00

HWD = Hazardous Waste Disposed
NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 / A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D
BCCpr	kg C	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
BCCpa	kg C	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

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

CALCULATION RULES

Applicable time period collected data: 2020-2022

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Product Stage (A1-A3)

The production stage consists of the extraction of raw materials, transportation of the raw materials, processing the raw materials into materials and the production of the product. The required energy for production, external treatments, ancillary materials, packaging material and production emissions are included.

Construction process stage (A4-A5)

This stage consists the transport of the product from production plant to the construction site. It also includes the loss of material during construction. The additional needed production, transport and end-of-life of the lost material during construction is included. The end-of-life of packaging material up to the end-of-waste state or disposal of final residues is also included.
The installation of the product including manufacture, transportation and end-of-life of ancillary materials and any energy or water use required for installation or operation of the construction site are taken into account.

Use stage (B1-B3)

This stage consists of the impacts arising from components of the building and construction works during their use. The stage also covers the combination of all planned technical and associated administrative maintenance actions during the service life to maintain the product installed in a building, in a construction works or its parts in a state in which it can perform its required functional and technical performance, as well as preserve the aesthetic qualities of the product. This will include preventative and regular maintenance activities. Product replacement (B4) and renovation (B5) only apply when the product is considered in a lifespan (of a building, work , etc.). Operational water and energy use are not considered.

End of life stage (C1-C4)

When the end of the life stage of the building is reached, the de-construction/demolition begins. This EPD includes de-construction/demolition (C1), the necessary transport (C2) from the demolition site to the sorting location and distance to final disposal. The end of life stage includes the final disposal to landfill (C4), incineration (C3) and needed recycling processes up to the end-of-waste point (C3). Loads and benefits of recycling, re-use and exported energy are part of module D. The default end-of-life scenarios of the annex (november 2020) to the NMD Determination method v1.0 have been used for the various materials in the product.

Benefits and Loads beyond the system boundary (Module D)
This stage contains the potential loads and benefits of recycling and re-use of raw materials/products. The loads contain the needed recycling processes from end-of-waste-point up to the point-of-equivalence of the substituted primary raw material and a load for secondary material that will be lost at the end-of-life stage. The loads and benefits of recycling and reuse are included in this module. The benefits are calculated based on the primary content and the primary equivalent. In addition, the benefits of energy recovery are granted at this stage. The amount of avoided energy is based on the Lower Heating Values of the materials and the efficiencies of the incinerators as mentioned in the NMD Determination method v1.0 or EcoInvent 3.6 (2019).

DECLARATION OF SVHC

No substances that are listed in the latest Candidate List of substances of Very High Concern for authorisation" are included in the product that exceeds the limit for registration.

REFERENCES

- ISO 14040 - DIN EN ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006
- ISO 14044 - DIN EN ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006
- ISO 14025 - DIN EN ISO 14025:2011-10: Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- EN 15804- EN 15804:2012+A2:2019: Sustainability of construction works – Environmental Product PCR for roofs
- PCR https://www.epd-norge.no/getfile.php/138986-1528284889/PCRer/NPCR_022_Part_B_for_Roof_waterproofing_060618.pdf

REMARKS

none