Environmental Product Declaration

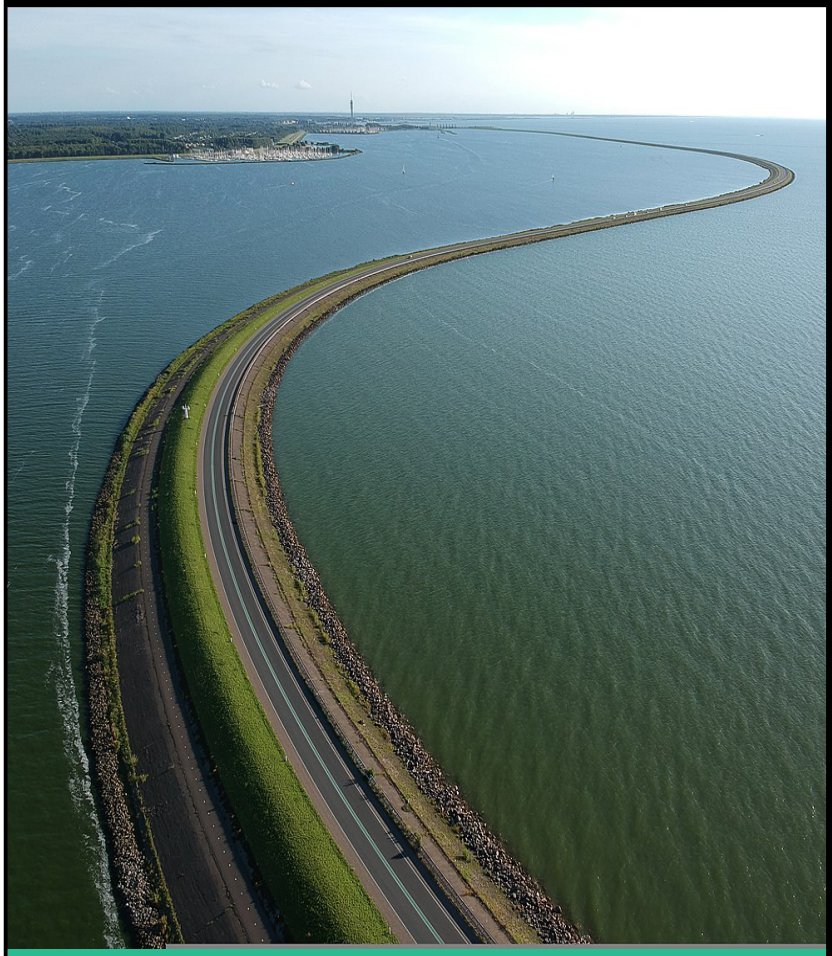
according to ISO 14025 and EN 15804

MRPI
milieu relevante product informatie

This declaration is for:
Armour Stone

Provided by:
Carrières Cuvelier Philippe s.a.

CARRIÈRES
CUVELIER PHILIPPE S.A.



program operator
Stichting MRPI®
publisher
Stichting MRPI®
www.mrpi.nl

MRPI® registration
1.1.00225.2021
date of first issue
19-05-2021
date of this issue
19-05-2021
expiry date
19-05-2026

Nationale Milieu DATABASE

ECO PLATFORM EPD EN 15804 VERIFIED

COMPANY INFORMATION

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PRODUCT

Armour Stone

DECLARED UNIT/FUNCTIONAL UNIT

1000KG

DESCRIPTION OF PRODUCT

Armour stone is produced in several weight- and dimension categories for use in e.g. dyke reinforcements

VISUAL PRODUCT

MRPI® REGISTRATION

1.1.00225.2021

DATE OF ISSUE

19-05-2021

EXPIRY DATE

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MORE INFORMATION

www.cuveliersa.be

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by **P. Stadhouders, Ecoreview b.v..**
The LCA study has been done by **A.K. Jeeninga & M.C. van Kooij, Advieslab v.o.f..**
The certificate is based on an LCA-dossier according to ISO14025 and EN15804+A2 (incl. A1). 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 (incl. A1). 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: Pieter Stadhouders, Ecoreview
[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

OPERATIONS

Philippe Cuvelier SA extracts from their quarries stones of different sizes, the main outlet being the Armourstone. Armourstone of different sizes is transported to a loading dock along the Meuse river and then loaded and transported by boat to to its final destination.

ROCK FILL SIZES:

32-125 mm, 45-125 mm, 63-180 mm, 90-180 mm 5-40 kg, 10-60 kg, 40-200 kg, 60-300 kg, 300-1000kg and flat stones over 500kg

Production according to EN 13383-1:2002/AC:2004. This EPD is meant for B to B delivery.

COMPONENT (> 1%)	[kg / %]
Composition classified	----

(*) > 1% of total mass

SCOPE AND TYPE

The input data are representative for Armourstone from quarry Marchin and Modave in Belgium, a product of Philippe Cuvelier s.a This is a cradle to grave EPD with specific data of Armour stone from the quarries Marchin and Modave of Philippe Cuvelier s.a. The calculation basis for this EPD are as follows:

- LCA Method: EN 15804 and PCR: NMD Determination method v 1.0 (July 2020) | set1+2;
- LCA Software: Simapro 9.1;
- Characterization method: Karakteristatiefactoren volgens NMD Bepalingsmethode, dec 2019 & EN 15804 +A2 Method v1.0;
- LCA database proles: EcoInvent version 3.5;
- Version database: v3.03 (2021-03-26);
- Version NIBE's EPD Application:v2.0;
- Version Environmental Prole database: v3.03 (2021-03-26).

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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X

X = Modules Assessed

ND = Not Declared

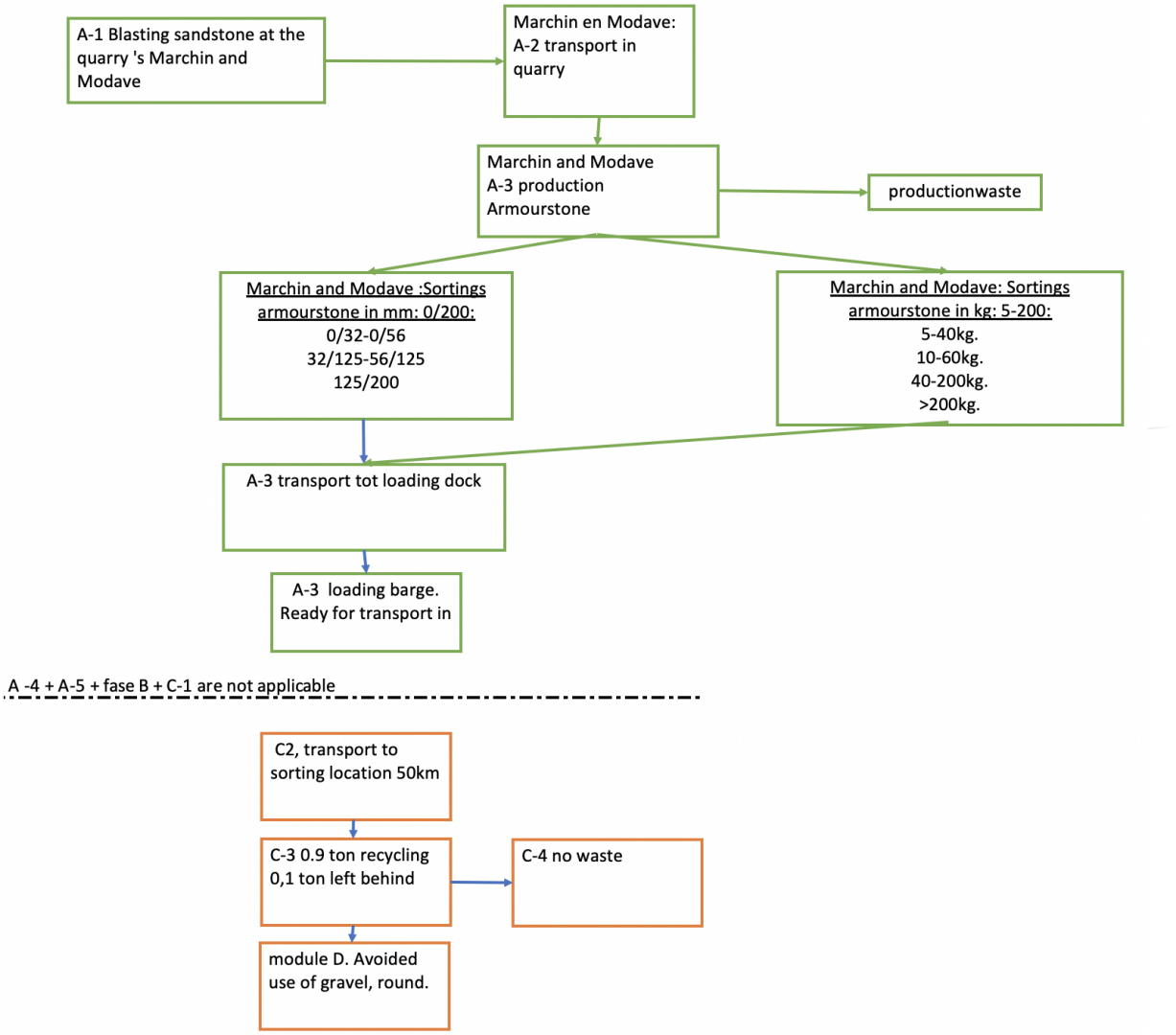

Figure: LCA process diagram according to EN 15804 (7.2.1)

REPRESENTATIVENESS

The calculation is based on the average of the production of armourstone at the quarry's Marchin and Modave.

ENVIRONMENTAL IMPACT per functional unit or declared unit (indicators A1)

	UNIT	A1	A2	A3	A1-A3	C2	C3	C4	D
ADPE	kg Sb. eq.	0.00	0.00	1.94 E-5	1.94 E-5	1.67 E-5	9.29 E-7	5.95 E-7	-2.09 E-5
ADPF	MJ	0.00	0.00	3.78 E-2	7.85 E+1	9.14 E+1	2.17 E+1	1.61 E+1	-5.39 E+1
GWP	kg CO2 eq.	0.00	0.00	5.51 E+0	5.51 E+0	5.88 E+0	1.46 E+0	5.28 E-1	-3.78 E+0
ODP	kg CFC 11 eq.	0.00	0.00	9.08 E-7	9.08 E-7	1.10 E-6	1.69 E-7	1.90 E-7	-3.39 E-7
POCP	kg ethene eq.	0.00	0.00	7.74 E-3	7.74 E-3	3.49 E-3	8.34 E-4	5.75 E-4	-2.74 E-3
AP	kg SO2 eq.	0.00	0.00	3.82 E-2	3.82 E-2	2.55 E-2	7.25 E-3	3.98 E-3	-2.17 E-2
EP	kg (PO4)3- eq.	0.00	0.00	8.59 E-3	8.59 E-3	5.13 E-3	1.64 E-3	7.53 E-4	-3.77 E-3

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB-eq.	0.00	0.00	3.21 E+0	3.21 E+0	2.41 E+0	3.34 E-1	2.30 E-1	-1.69 E+0
FAETP	kg DCB-eq.	0.00	0.00	4.57 E-2	4.57 E-2	7.00 E-2	5.71 E-3	5.56 E-3	-2.42 E-2
MAETP	kg DCB-eq.	0.00	0.00	1.60 E+2	1.60 E+2	2.50 E+2	2.11 E+1	1.95 E+1	-1.06 E+2
TETP	kg DCB-eq.	0.00	0.00	1.17 E-2	1.17 E-2	8.31 E-3	4.22 E-3	5.73 E-4	-8.81 E-3
ECI	Euro	0.00	0.00	8.34 E-1	8.34 E-1	7.00 E-1	1.52 E-1	7.43 E-2	-4.83 E-1
ADPF	kg Sb. eq.	0.00	0.00	1.94 E-5	1.94 E-5	1.67 E-5	9.29 E-7	5.95 E-7	-2.09 E-5

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water
EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources expressed in [kg Sb-eq.]
ND = Not Declared

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

	UNIT	A1	A2	A3	A1-A3	C2	C3	C4	D
GWP-total	kg CO2 eq.	0.00	0.00	5.29 E-2	5.29 E-2	3.39 E-2	1.02 E-2	5.23 E-3	-2.83 E-2
GWP-fossil	kg CO2 eq.	0.00	0.00	5.59 E+0	5.59 E+0	5.93 E+0	1.48 E+0	5.40 E-1	-3.88 E+0
GWP-biogenic	kg CO2 eq.	0.00	0.00	-7.68 E-3	-7.68 E-3	1.72 E-3	1.31 E-2	9.21 E-4	-1.12 E-2
GWP-luluc	kg CO2 eq.	0.00	0.00	5.60 E+0	5.60 E+0	5.93 E+0	1.47 E+0	5.39 E-1	-3.87 E+0
ODP	kg CFC11 eq.	0.00	0.00	1.80 E-3	1.80 E-3	1.76 E-3	3.50 E-4	1.46 E-4	-3.98 E-3
AP	mol H+ eq.	0.00	0.00	5.29 E-2	5.29 E-2	3.39 E-2	1.02 E-2	5.23 E-3	-2.83 E-2
EP-freshwater	kg PO4 eq.	0.00	0.00	2.28 E-4	2.28 E-4	8.90 E-5	6.16 E-5	9.49 E-6	-2.36 E-4
EP-marine	kg N eq.	0.00	0.00	2.00 E-2	2.00 E-2	1.19 E-2	3.67 E-3	1.71 E-3	-7.81 E-3
EP-terrestrial	mol N eq.	0.00	0.00	2.31 E-1	2.31 E-1	1.32 E-1	4.42 E-2	1.90 E-2	-9.30 E-2
POCP	kg NMVOC eq.	0.00	0.00	6.68 E-2	6.68 E-2	3.74 E-2	1.10 E-2	5.53 E-3	-2.51 E-2
ADP-minerals& metals	kg Sb eq.	0.00	0.00	1.94 E-5	1.94 E-5	1.67 E-5	9.29 E-7	5.95 E-7	-2.09 E-5
ADP-fossil	MJ, net calorific value	0.00	0.00	7.79 E+1	7.79 E+1	9.19 E+1	2.05 E+1	1.62 E+1	-4.91 E+1
WDP	m3 world eq. deprived	0.00	0.00	-3.38 E+1	-3.38 E+1	6.54 E-1	1.50 E-1	7.17 E-1	-5.43 E+1

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]
ND = Not Declared

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 experienced with the indicator.

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

	UNIT	A1	A2	A3	A1-A3	C2	C3	C4	D
PM	Disease incidence	0.00	0.00	1.27 E-6	1.27 E-6	5.37 E-7	2.09 E-7	9.79 E-8	-4.74 E-7
IRP	kBq U235 eq.	0.00	0.00	3.21 E-1	3.21 E-1	3.91 E-1	6.99 E-2	6.72 E-2	-1.99 E-1
ETP-fw	CTUe	0.00	0.00	2.87 E+3	2.87 E+3	6.59 E+1	1.47 E+1	9.60 E+0	-7.12 E+1
HTP-c	CTUh	0.00	0.00	4.49 E-9	4.49 E-9	2.50 E-9	3.71 E-10	2.11 E-10	-2.73 E-9
HTP-nc	CTUh	0.00	0.00	9.67 E-8	9.67 E-8	8.39 E-8	9.96 E-9	6.81 E-9	-7.63 E-8
SQP	---	0.00	0.00	1.21 E+2	1.21 E+2	7.66 E+1	3.90 E+0	3.10 E+1	-6.02 E+1

PM = Potential incidence of diseasedue 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]
ND = Not Declared

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 experienced with the indicator.

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

	UNIT	A1	A2	A3	A1-A3	C2	C3	C4	D
PERE	MJ	0.00	0.00	5.32 E-1	5.32 E-1	9.62 E-1	1.17 E+0	1.33 E-1	-3.19 E+0
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	0.00	0.00	1.29 E+0	1.29 E+0	9.62 E-1	1.17 E+0	1.33 E-1	-3.19 E+0
PENRE	MJ	0.00	0.00	7.41 E+1	7.41 E+1	9.76 E+1	2.19 E+1	1.72 E+1	-5.22 E+1
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	0.00	0.00	8.28 E+1	8.28 E+1	9.76 E+1	2.19 E+1	1.72 E+1	-5.22 E+1
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	m3	0.00	0.00	-7.86 E-1	-7.86 E-1	1.73 E-2	9.62 E-3	1.69 E-2	-1.27 E+0

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
ND = Not Declared

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

	UNIT	A1	A2	A3	A1-A3	C2	C3	C4	D
HWD	kg	0.00	0.00	7.58 E-5	7.58 E-5	5.84 E-5	3.34 E-5	1.09 E-5	-6.96 E-5
NHWD	kg	0.00	0.00	2.02 E+0	2.02 E+0	5.59 E+0	2.74 E+0	1.00 E+2	-4.93 E-1
RWD	kg	0.00	0.00	5.04 E-4	5.04 E-4	6.18 E-4	9.87 E-5	1.07 E-4	-2.20 E-4
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	0.00	0.00	0.00	9.00 E+2	0.00	0.00
MER	kg	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
ETE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	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
ND = Not Declared

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

	UNIT	A1	A2	A3	A1-A3	C2	C3	C4	D
BCCpr	kg C	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

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging
ND = Not Declared

CALCULATION RULES

Methodological assumptions, cutt off rules are af given in the Dutch PCR: NMD Determination method v 1.0 (July 2020) The data is according tot the production at Modave and Marchin. The production data of 2017,2018 and 2019 is used and is updated in 2020. Alocation is not applicable. the phases C2,3,4 and module D is based on the Dutch PCR: C-2: 50 km transport for recycling. Waste processing: 10% of the material is left behind and 90% will be recycled. Module D is based on avoiding of use of primary gravel (round).

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Production process Quarries Marchin & Modave:
Drilling Holes are made in the rock formation and filled with explosives in order to detach the bricks from the formation. A shovel loads the detached bricks in a dumper-truck and drives towards the screen. The bricks are loaded into the feed hopper and the drawer feeder towards the drum separating the product in different fractions. This production process is the same for both quarries in Modave and Marchin.

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:ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044:ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006

ISO 14025:ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804:EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

SBK-verification protocol:SBK-verification protocol – inclusion data in the Dutch environmental database, Final Version 3.0, January 2019, SBK

NMD Determination method:NMD Determination method Environmental performance Construction works v1.0 July 2020, foundation NMD

REMARKS

Reference service life of the material (sandstone) >999 years. The product does not contain hazardous components. The product apply's to environmental regulations egg. the Dutch "Besluit Bodemkwaliteit"