

Environmental Product Declaration

according to ISO 14025 and EN 15804



This declaration is for:

**Belgian limestone, sandstone and
porphyry aggregates, washed and
unwashed**

Provided by:

Fediex



program operator

Stichting MRPI®

publisher

Stichting MRPI®

www.mrpi.nl

MRPI® registration

1.1.00268.2022

date of first issue

28-1-2022

date of this issue

28-1-2022

expiry date

28-1-2027



Nationale

Milieu DATABASE





COMPANY INFORMATION



Rue Edouard Belin 7
1435
Mont-Saint-Guibert (Belgium)
003225116173
Thierry Vanmol
<https://www.fediex.be/>

PRODUCT

Belgian limestone, sandstone and porphyry aggregates, washed and unwashed

DECLARED UNIT/FUNCTIONAL UNIT

1 ton

DESCRIPTION OF PRODUCT

Belgian limestone, sandstone and porphyry aggregates intended to be physically integrated in mortar, concrete, bituminous mixtures, or hydraulically bound mixtures

VISUAL PRODUCT



MRPI® REGISTRATION

1.1.00268.2022

DATE OF ISSUE

28-1-2022

EXPIRY DATE

28-1-2027

MORE INFORMATION

www.fediex.be

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by **Harry van Ewijk, SGS Search.**

The LCA study has been done by **Arthur De Jaegher, Enperas.**

The certificate is based on an LCA-dossier according to ISO14025 and EN15804+A2/Bepalingsmethode. 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/Bepalingsmethode. 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:



Harry van Ewijk

[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

Aggregates are mineral materials excavated from natural quarries, crushed, screened and sometimes washed for distribution. This EPD concerns washed and unwashed limestone, sandstone and porphyry aggregates in different sizes produced by members of FedieX and intended to be physically integrated in mortar, concrete, bituminous mixtures, or hydraulically bound mixtures. The result is based on a weighted average of the members. The variability between the different members and the washed versus unwashed aggregates has been assessed in the background report.

This is a cradle-to-gate EPD of an intermediate product. This is a specific EPD from a federation.

Uncovering the quarry means removing the surface soil to expose the levels to be mined. The topsoil, the more or less altered rocks and the sterile levels are thus removed. Several holes are drilled to explore the quarry and install the explosives. Afterwards the rocks are transported to the processing site, where they are crushed and screened. Some aggregates are further treated by a secondary crushing and washing step. The crushed (and washed aggregates) are stored and transported to the customer, where it is further used as an intermediate product.

The reference service life depends on the product in which the aggregates are used.

This is a cradle-to-gate EPD of an intermediate product, so no installation has been declared. The impact of the installation will be declared in the final product.

The technical characteristics of the aggregates comply to one or more of the following European standards, depending on their application:

- EN12620 Aggregates for concrete
- EN13043 Aggregates for bituminous mixtures
- EN13139 Aggregates for mortar
- EN13242 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction

COMPONENT (> 1%)	[kg / %]
Limestone aggregates	77%
Sandstone aggregates	4%
Porphyry aggregates	19%

(*) > 1% of total mass

SCOPE AND TYPE

The composed datasets for this life cycle assessment are representative and relevant for aggregates produced in Belgium. The data describing the direct inputs and outputs of the foreground processes are representative for the sector of Belgian Aggregates producers, represented by 'Fediex'.

This is a sector EPD based on a weighted average. The data used for the LCA are specific for this product which is manufactured by multiple manufacturers in multiple production sites.

A questionnaire has been sent to all the members of Fediex and has finally been completed by a number of sites corresponding to more than 50% of the total production of aggregates by members of Fediex in 2019. The LCI data for the production stage have been checked by the EPD verifier (SGS Search). VITO/ENPERAS uses publicly available generic data provided by Ecoinvent 3.6 for all background processes such as the production of electricity, transportation by means of a specific truck...

For the calculation of the LCA results, the software program SimaPro 9.2.0.1 (PRé Consultants, 2021) has been used, together with the LCA database Ecoinvent 3.6. The results are calculated with the exclusion of long-term emissions.

PRODUCT STAGE	CONSTRUCTION					USE STAGE							END OF LIFE				BENEFITS AND
	PROCESS												STAGE				LOADS BEYOND THE
	STAGE																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	ND	ND	ND	ND	ND

X = Modules Assessed

ND = Not Declared

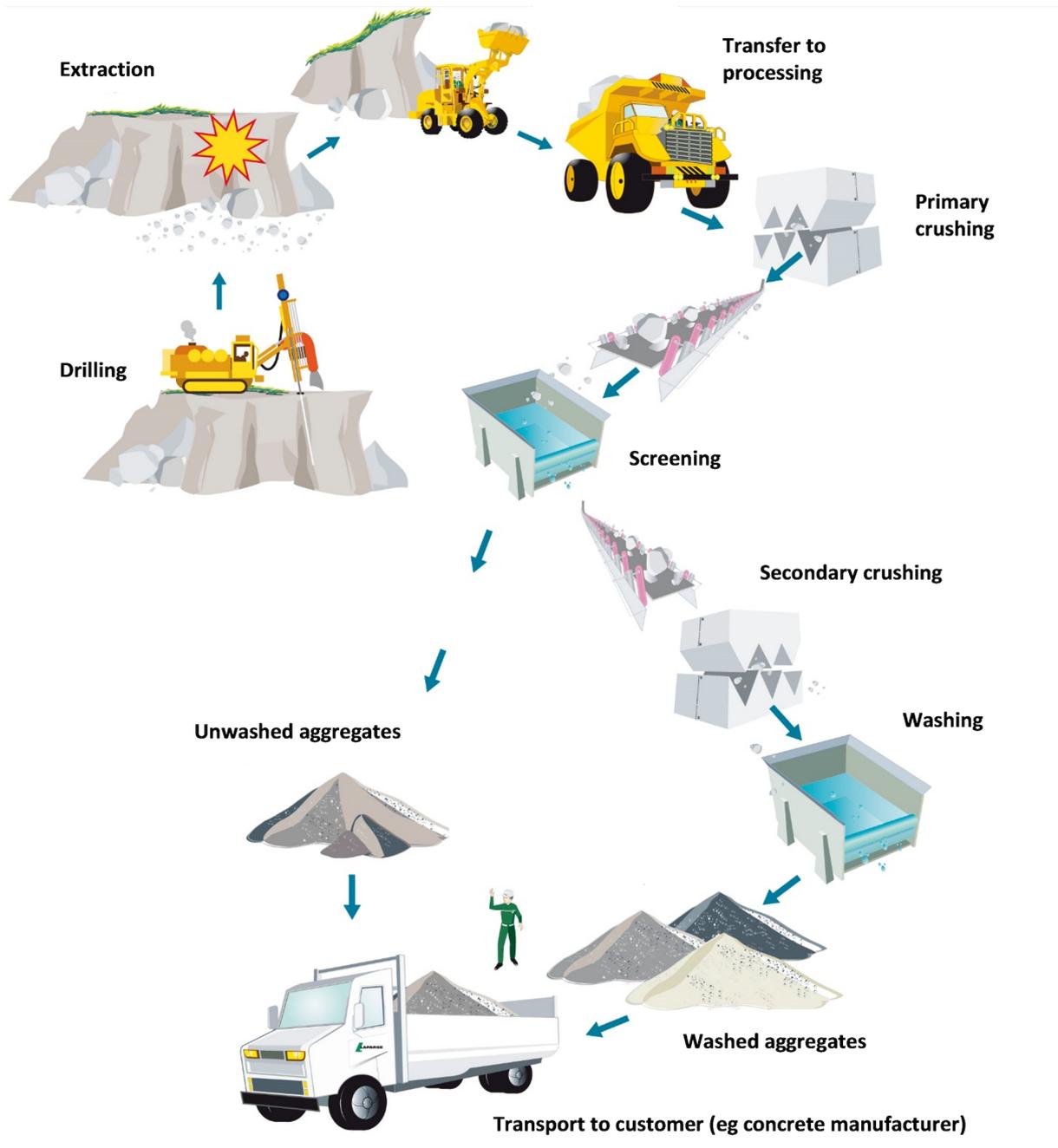


Figure: LCA process diagram according to EN 15804(7.2.1)

REPRESENTATIVENESS

The weighted average of the 20 participants (or 58% of the total production of members of FedieX in 2019) based on their production volumes in ton has been declared in this EPD. In the background report a variability study has been performed by comparing the weighted average with a worst-case scenario. The variability between the weighted average and the worst case is relatively high, up to 160-170% for the production stage A1-A3. However, no specific correlation could be found, nor could the members be divided in different groups. Therefore, the variability has been accepted and is the weighted average representative for FedieX, the sector federation for aggregates producers in Belgium. It is assumed that the remaining variability is caused by the use of different vehicles type (other diesel consumption) and the distance travelled between extraction location and processing (i.e. area of the plant, depth of the quarry etc...).

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

	UNIT	A1	A2	A3	A1-A3
ADPE	kg Sb eq.	0.00	0.00	8.77E-6	8.77E-6
ADPF	MJ	0.00	0.00	4.93E+1	4.93E+1
GWP	kg CO2 eq.	0.00	0.00	4.19E+0	4.19E+0
ODP	kg CFC11 eq.	0.00	0.00	6.92E-7	6.92E-7
POCP	kg ethene eq.	0.00	0.00	2.71E-3	2.71E-3
AP	kg SO2 eq.	0.00	0.00	2.28E-2	2.28E-2
EP	kg (PO4)3- eq.	0.00	0.00	5.33E-3	5.33E-3

Toxicity indicators for Dutch market

HTP	kg DCB eq.	0.00	0.00	1.48E+0	1.48E+0
FAETP	kg DCB eq.	0.00	0.00	2.46E-2	2.46E-2
MAETP	kg DCB eq.	0.00	0.00	8.63E+1	8.63E+1
TETP	kg DCB eq.	0.00	0.00	7.32E-3	7.32E-3
ECI	Euro	0.00	0.00	5.01E-1	5.01E-1
ADPF	kg Sb. eq.	0.00	0.00	2.37E-2	2.37E-2

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.]

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

	UNIT	A1	A2	A3	A1-A3
GWP-total	kg CO2 eq.	0.00	0.00	4.35E+0	4.35E+0
GWP-fossil	kg CO2 eq.	0.00	0.00	4.33E+0	4.33E+0
GWP-biogenic	kg CO2 eq.	0.00	0.00	1.40E-2	1.40E-2
GWP-luluc	kg CO2 eq.	0.00	0.00	2.76E-3	2.76E-3
ODP	kg CFC11 eq.	0.00	0.00	7.07E-7	7.07E-7
AP	mol H+ eq.	0.00	0.00	3.18E-2	3.18E-2
EP-freshwater	kg PO4 eq.	0.00	0.00	4.99E-5	4.99E-5
EP-marine	kg N eq.	0.00	0.00	1.10E-2	1.10E-2
EP-terrestrial	mol N eq.	0.00	0.00	1.33E-1	1.33E-1
POCP	kg NMVOC eq.	0.00	0.00	3.31E-2	3.31E-2
ADP-minerals & metals	kg Sb eq.	0.00	0.00	8.77E-6	8.77E-6
ADP-fossil	MJ, net calorific value	0.00	0.00	7.35E+1	7.35E+1
WDP	m3 world eq. deprived	0.00	0.00	9.12E-1	9.12E-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]

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
PM	Disease incidence	0.00	0.00	1.18E-6	1.18E-6
IRP	kBq U235 eq.	0.00	0.00	5.57E-1	5.57E-1
ETP-fw	CTUe	0.00	0.00	6.60E+1	6.60E+1
HTP-c	CTUh	0.00	0.00	1.89E-9	1.89E-9
HTP-nc	CTUh	0.00	0.00	4.87E-8	4.87E-8
SQP	---	0.00	0.00	2.82E+2	2.82E+2

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 experienced with the indicator.

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

	UNIT	A1	A2	A3	A1-A3
PERE	MJ	0.00	0.00	4.43E+0	4.43E+0
PERM	MJ	0.00	0.00	0.00	0.00
PERT	MJ	0.00	0.00	4.43E+0	4.43E+0
PENRE	MJ	0.00	0.00	7.65E+1	7.65E+1
PENRM	MJ	0.00	0.00	0.00	0.00
PENRT	MJ	0.00	0.00	7.65E+1	7.65E+1
SM	MJ	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	0.00
FW	m3	0.00	0.00	2.49E-2	2.49E-2

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
HWD	kg	0.00	0.00	1.14E-4	1.14E-4
NHWD	kg	0.00	0.00	2.01E-1	2.01E-1
RWD	kg	0.00	0.00	5.74E-4	5.74E-4
CRU	kg	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00
EEE	MJ	0.00	0.00	0.00	0.00
ETE	MJ	0.00	0.00	0.00	0.00

HWD = Hazardous Waste Disposed

RWD = Radioactive Waste Disposed

MFR = Materials for recycling

EEE = Exported Electrical Energy

NHWD = Non Hazardous Waste Disposed

CRU = Components for reuse

MER = Materials for energy recovery

ETE = Exported Thermal Energy

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

	UNIT	A1	A2	A3	A1-A3
BCCpr	kg C	0.00	0.00	0.00	0.00
BCCpa	kg C	0.00	0.00	0.00	0.00

BCCpr = Biogenic carbon content in product

BCCpa = Biogenic carbon content in packaging

CALCULATION RULES

Data collection period:

Manufacturer specific data have been collected for the year 2019.

Allocation:

Only facility level data were available for the use of electricity, natural gas, etc. The facility level data have been allocated to the analyzed product using their respective annual production volume in tons (physical relationship). Material inputs and outputs which were not available at the product level, such as waste, were allocated similarly.

Cut-off rules:

The following processes are considered below cut-off:

- Environmental impacts caused by the personnel of the production plants are not included in the LCA, e.g., waste from the cafeteria and sanitary installations, accidental pollution caused by human mistakes, or environmental effects caused by commuter traffic.
- The machinery was excluded, only spare parts are considered.
- Most members use quarry water for watering the transport tracks and for washing the aggregates. The latter is in most cases done in closed circuit. Therefore, no impact has been declared to the use of water. In some specific cases a minor amount of ground water and/or tap water is used. This impact is considered below the cut-off. The total of neglected input flows is less than 5% of energy usage and mass as prescribed by EN15804+A2.

Only the processes considered below cut-off are excluded from the study. No additional processes are excluded. Note that the construction of the building hall and the land use had been considered in this EPD.

Methodological assumptions:

The characterization factors from EC-JRC were applied. No additional or deviating characterisation factors were used.

Carbon offsetting is not allowed in the EN 15804 and hence not considered in the calculations.



SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

A1 – RAW MATERIAL SUPPLY

The raw materials are extracted and processed at the manufacturing site and is part of the production process. Therefore, no impacts are considered in this module.

A2 – TRANSPORT TO THE MANUFACTURER

The raw materials are extracted at the manufacturing site, no transport has been considered.

A3 – MANUFACTURING

This module takes into account the extraction and processing of the raw materials into aggregates. It also includes the production and use of ancillary materials.

DECLARATION OF SVHC

No measurements are available regarding the content of materials listed in the “Candidate list of Substances of Very High Concern for authorization”, as this does usually not occur in the product concerned in this EPD.

REFERENCES

- ISO 14040:2006: Environmental Management-Life Cycle Assessment-Principles and framework.
- ISO 14044:2006: Environmental Management-Life Cycle Assessment-Requirements and guidelines.
- ISO 14025:2006: Environmental labels and Declarations-Type III Environmental Declarations-Principles and procedures.
- EN 15804+A2:2019
- NBN/DTD B 08-001 (BE-PCR)
- JRC. 2018. <https://eplca.jrc.ec.europa.eu/ELCD3/>
- Servaes, R., Allacker, K., Debacker, W., Delem L., De Nocker, L., De Troyer, F. Janssen, A., Peeters, K., Spirinckx, C., Van Dessel, J. (2013). Milieuprofiel van gebouwelementen. Te raadplegen via: www.ovam.be/materiaalprestatie-gebouwen.
- Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <http://link.springer.com/10.1007/s11367-016-1087-8> .
- United States Environmental Protection Agency EPA. Explosives detonation. https://www.epa.gov/sites/default/files/2020-10/documents/13.3_explosives_detonation.pdf. Uses following references for the emissions during the explosion of ammonium nitrates:
 - o R. F. Chaiken, et. al., Toxic Fumes From Explosives: Ammonium Nitrate Fuel Oil Mixtures, Bureau Of Mines Report Of Investigations 7867, U. S. Department Of Interior, Washington, DC, 1974.
 - o Sheridan J. Rogers, Analysis Of Noncoal Mine Atmospheres: Toxic Fumes From Explosives, Bureau Of Mines, U. S. Department Of Interior, Washington, DC, May 1976.
- European Commission (2006). Guidance Document for the implementation of the European PRTR. https://ec.europa.eu/environment/industry/stationary/e-prtr/pdf/en_prtr.pdf

REMARKS

The MKI score of the product (module A1-A3) is 0,50 EURO/ton.