B-EPD ENVIRONMENTAL PRODUCT DECLARATION

Fediex

Belgian limestone, sandstone and porphyry aggregates for use in mortar, concrete and bituminous or hydraulically bound mixtures

Production and transport of 1 ton of aggregates

Issued 04.01.2022
Valid until 04.01.2027

Third party verified
Conform to EN 15804+A2, NBN/DTD B08-001 and ISO 14025

Modules declared Cradle-to-gate EPD with options					
A123	A4	A5	B2 B4	C	D
•	•				

[B-EPD n° 22-0144-001.00.00]

FÉDÉRATION DE L'INDUSTRIE EXTRACTIVE
VERBOND VAN ONTGINNINGSBEDRIJVEN

OWNER OF THIS ENVIRONMENTAL PRODUCT DECLARATION
Fediex
www.fediex.be

EPD PROGRAM OPERATOR
Federal Public Service of Health, Food Chain Safety and Environment
www.b-epd.be

The intended use of this EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings. This EPD is only valid when registered on www.b-epd.be. The FPS Public Health cannot be held responsible for the information provided by the owner of the EPD.

PRODUCT DESCRIPTION

PRODUCT NAME

Belgian limestone, sandstone and porphyry aggregates, washed and unwashed

PRODUCT DESCRIPTION

Aggregates are mineral materials excavated from natural quarries, crushed, sorted and sometimes washed for distribution. This EPD concerns washed and unwashed limestone, sandstone and porphyry aggregates in different sizes produced by Fediex members 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 an intermediate product.

This is a specific EPD from a federation.

INTENDED USE

The aggregates are intended to be physically integrated in mortar, concrete, bituminous mixtures, or hydraulically bound mixtures.

REFERENCE FLOW / DECLARED UNIT

Production and transport of 1 ton of limestone, sandstone and porphyry aggregates, washed and unwashed, in Belgium.

The product does never contain packaging.

The weight per reference flow is 1000 kg.

INSTALLATION

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.

IMAGES OF THE PRODUCT AND ITS INSTALLATION

COMPOSITION AND CONTENT

Components	Composition / content / ingredients	Quantity
Product	*Weighted average of limestone (77%), sandstone (4%) and porphyry (19%) aggregates*	
Fixation materials	*NA*	
Jointing materials	*NA*	
Treatments	*NA*	
Packaging	*No packaging, bulk*	

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.

REFERENCE SERVICE LIFE

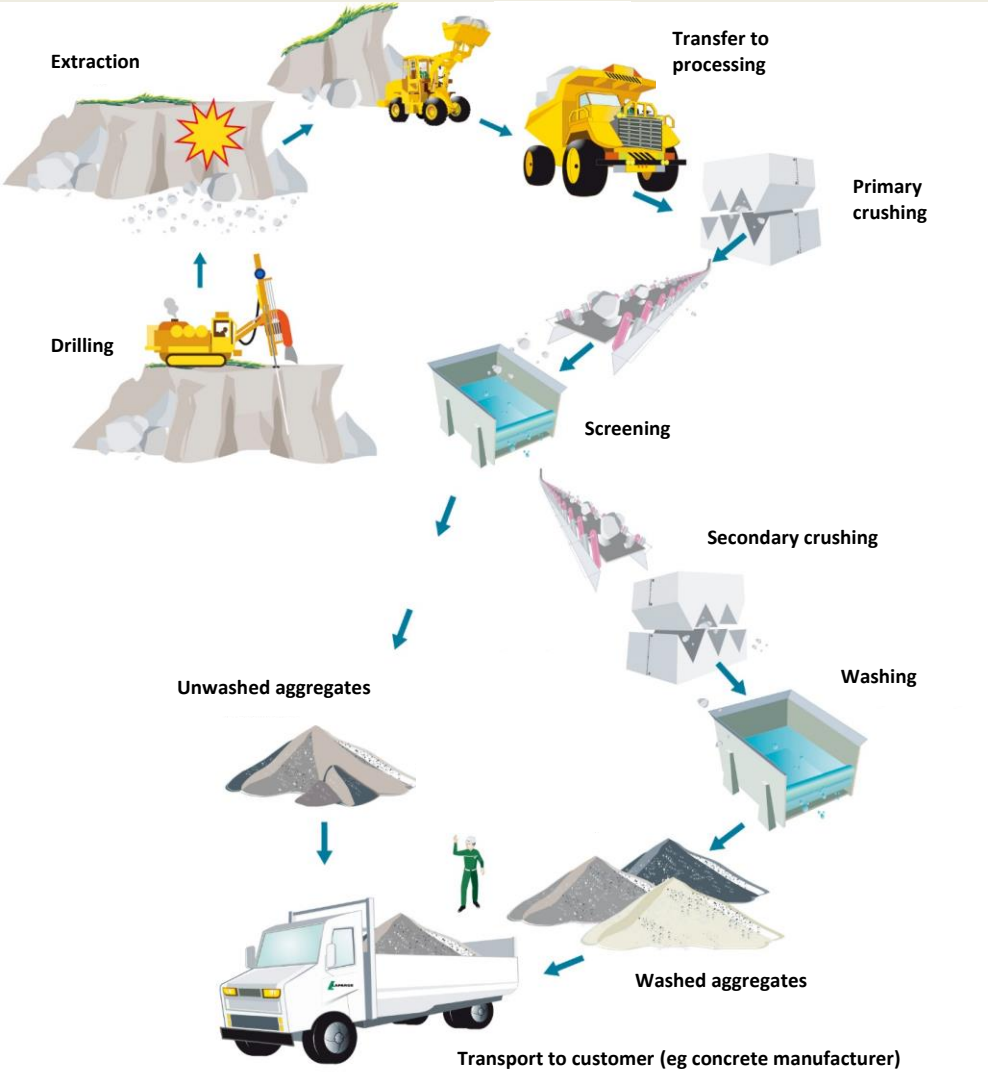
The reference service life depends on the product in which the aggregates are used.

DESCRIPTION OF GEOGRAPHICAL REPRESENTATIVITY

The EPD is representative for the Belgian market.
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 Belgian Aggregates sector 'Fediex'.

DESCRIPTION OF THE PRODUCTION PROCESS AND TECHNOLOGY

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 mine 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.



TECHNICAL DATA / PHYSICAL CHARACTERISTICS

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

LCA STUDY

DATE OF LCA STUDY
December 2021

SOFTWARE
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.

INFORMATION ON 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.

INFORMATION ON CUT OFF
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 mine 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.

INFORMATION ON EXCLUDED PROCESSES
Only the processes considered below cut-off are excluded from the study. No additional processes are excluded.

INFORMATION ON BIOGENIC CARBON MODELLING
The product does not contain biogenic carbon.

	Biogenic carbon content (kg C / FU)
Biogenic carbon content in product (at the gate)	0
Biogenic carbon content in accompanying packaging (at the gate)	0

INFORMATION ON CARBON OFFSETTING
Carbon offsetting is not allowed in the EN 15804 and hence not considered in the calculations.

ADDITIONAL OR DEVIATING CHARACTERISATION FACTORS
The characterization factors from EC-JRC were applied. No additional or deviating characterisation factors were used.

DESCRIPTION OF THE VARIABILITY
The weighted average of the 20 participants (or 58% of the total production 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 of aggregates 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 site, height of the site etc…).

DATA

SPECIFICITY
The data used for the LCA are specific for this product which is manufactured by multiple manufacturers in multiple production sites.

PERIOD OF DATA COLLECTION
Manufacturer specific data have been collected for the year 2019.

INFORMATION ON DATA COLLECTION
A questionnaire has been sent to all the members of Fediex and has finally been completed by a numer of sites correspondingto more than 50% of the total production of aggregates by 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 for all background processes such as the production of electricity, transportation by means of a specific truck.

DATABASE USED FOR BACKGROUND DATA
The LCI sources used in this study are the Ecoinvent v3.6 database (Wernet et al., 2016).

ENERGY MIX
The Belgian electricity mix (consumption mix + import) has been used to model electricity use in life cycle stage A3. The used record is the Ecoinvent record 'Electricity, low voltage {BE}| market for | Cut-off, U' (Wernet et al., 2016). For the own produced solar energy, the datarecord 'Electricity, low voltage {BE}| electricity production, photovoltaic, 3kWp slanted-roof installation, single-Si, panel, mounted | Cut-off, U' is used.

PRODUCTION SITES

The members of Fediex can be found in following link: https://www.fediex.be/c/7/2/membres-federation-fediex.html

SYSTEM BOUNDARIES

Product stage			Construction installation stage		Use stage							End of life stage					Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	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
☒	☒	☒	☒	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**		**MND**

X = included in the EPD
MND = module not declared

The product does not contain recycled content.

The sludge that remains after the washing step, is in most cases sold as a by-product (eg backfiller) and thus reaches the end-of-waste state ate the gate of the mine. No co-product allocation is applied but treated as a waste that reaches end-of-waste state at the gate. In other words, the production is still 100% allocated to the main product.

POTENTIAL ENVIRONMENTAL IMPACTS PER REFERENCE FLOW

	Production			Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling	Total excl module D
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal		
GWP total (kg CO2 equiv/FU)	0,00E+	0,00E+00	4,35E+00	1,63E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,06E+01
GWP fossil (kg CO2 equiv/FU)	0,00E+00	0,00E+00	4,33E+00	1,63E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,06E+01
GWP biogenic (kg CO2 equiv/FU)	0,00E+00	0,00E+00	1,40E-02	9,11E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,31E-02
GWP luluc (kg CO2 equiv/FU)	0,00E+00	0,00E+00	2,76E-03	5,57E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,33E-03
ODP (kg CFC 11 equiv/FU)	0,00E+00	0,00E+00	7,07E-07	3,71E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,42E-06
AP (mol H^+ equiv/FU)	0,00E+00	0,00E+00	3,18E-02	6,67E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	9,86E-02
EP - freshwater (kg P-equiv/FU)	0,00E+00	0,00E+00	4,99E-05	1,28E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,77E-04
EP - marine (kg N-equiv/FU)	0,00E+00	0,00E+00	1,10E-02	1,98E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,09E-02
EP - terrestrial (mol N-equiv/FU)	0,00E+00	0,00E+00	1,33E-01	2,19E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,53E-01
POCP (kg NMVOC equiv/FU)	0,00E+00	0,00E+00	3,31E-02	6,77E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,01E-01

ADP Elements (kg Sb equiv/FU)	0,00E+00	0,00E+00	8,77E-06	3,02E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,89E-05
ADP fossil fuels (MJ/FU)	0,00E+00	0,00E+00	7,35E+01	2,46E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,20E+02
WDP (m^3 water eq deprived /FU)	0,00E+00	0,00E+00	9,12E-01	7,03E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,61E+00

GWP total = total Global Warming Potential (Climate Change); GWP-luluc = Global Warming Potential (Climate Change) land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential for Soil and Water; EP = Eutrophication Potential; POCP = Photochemical Ozone Creation; ADPE = Abiotic Depletion Potential – Elements; ADPF = Abiotic Depletion Potential – Fossil Fuels; WDP = water use (Water (user) deprivation potential, deprivation-weighted water consumption)

RESOURCE USE

	Production			Construction process		Use stage							End-of-life stage					
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
PERE (MJ/FU, net calorific value)	0,00E+00	0,00E+00	4,43E+00	3,36E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,79E+00
PERM (MJ/FU, net calorific value)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00
PERT (MJ/FU, net calorific value)	0,00E+00	0,00E+00	4,43E+00	3,36E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,79E+00
PENRE (MJ/FU, net calorific value)	0,00E+00	0,00E+00	7,65E+01	2,48E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,25E+02
PENRM (MJ/FU, net calorific value)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00
PENRT (MJ/FU, net calorific value)	0,00E+00	0,00E+00	7,65E+01	2,48E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,25E+02
SM (kg/FU)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00
RSF (MJ/FU, net calorific value)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00

NRSF (MJ/FU, net calorific value)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00
FW (m^3 water eq/FU)	0,00E+00	0,00E+00	2,49E-02	2,47E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,96E-02

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary 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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

WASTE CATEGORIES & OUTPUT FLOWS

	Production			Construction process stage		Use stage							End-of-life stage					
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
Hazardous waste disposed (kg/FU)	0,00E+00	0,00E+00	1,14E-04	6,39E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,53E-04
Non-hazardous waste disposed (kg/FU)	0,00E+00	0,00E+00	2,01E-01	1,32E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,34E+01
Radioactive waste disposed (kg/FU)	0,00E+00	0,00E+00	5,74E-04	1,68E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,25E-03
Components for re-use (kg/FU)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00
Materials for recycling (kg/FU)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00
Materials for energy recovery (kg/FU)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00
Exported energy (MJ/FU)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00

IMPACT CATEGORIES ADDITIONAL TO EN 15804

		Production			Construction process		Use stage							End-of-life stage					
		A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
	*PM (disease incidence)*	0,00E+00	0,00E+00	1,18E-06	1,18E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,36E-06
	*IRHH (kg U235 eq/FU)*	0,00E+00	0,00E+00	5,57E-01	1,08E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,63E+00
	*ETF (CTUe/FU)*	0,00E+00	0,00E+00	6,60E+01	1,97E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,63E+02
	*HTCE (CTUh/FU)*	0,00E+00	0,00E+00	1,89E-09	5,45E-09	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,34E-09
	*HTnCE (CTUh/FU)*	0,00E+00	0,00E+00	4,87E-08	2,16E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,65E-07
	*Land Use Related impacts (dimensionless)*	0,00E+00	0,00E+00	2,82E+02	1,86E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,68E+02

HTCE = Human Toxicity – cancer effects; HTnCE = Human Toxicity – non cancer effects; ETF = Ecotoxicity – freshwater; (potential comparative toxic unit)
PM = Particulate Matter (Potential incidence of disease due to PM emissions);
IRHH = Ionizing Radiation – human health effects (Potential Human exposure efficiency relative to U235);

	*Global Warming Potential*	*The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.* *It is split up in 4:* - *Global Warming Potential total (GWP-total) which is the sum of GWP-fossil, GWP-biogenic and GWP-luluc* - *Global Warming Potential fossil fuels (GWP-fossil) : The global warming potential related to greenhouse gas (GHG) emissions to any media originating from the oxidation and/or reduction of fossil fuels by means of their transformation or degradation (e.g. combustion, digestion, landfilling, etc).* - *Global Warming Potential biogenic (GWP-biogenic) : The global warming potential related to carbon emissions to air (CO2, CO and CH4) originating from the oxidation and/or reduction of aboveground biomass by means of its transformation or degradation (e.g. combustion, digestion, composting, landfilling) and CO2 uptake from the atmosphere through photosynthesis during biomass growth – i.e. corresponding to the carbon content of products, biofuels or above ground plant residues such as litter and dead wood.[1]* - *Global Warming Potential land use and land use change (GWP-luluc): The global warming potential related to carbon uptakes and emissions (CO2, CO and CH4) originating from carbon stock changes caused by land use change and land use. This sub-category includes biogenic carbon exchanges from deforestation, road construction or other soil activities (including soil carbon emissions).*
	*Ozone Depletion*	*Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons), Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.*
	*Acidification potential*	*Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.*
	*Eutrophication potential*	*The potential to cause over-fertilization of water and soil, which can result in increased growth of biomass and following adverse effects.* *It is split up in 3:* - *Eutrophication potential – freshwater: The potential to cause over-fertilization of freshwater, which can result in increased growth of biomass and following adverse effects.* - *Eutrophication potential – marine: The potential to cause over-fertilization of marine water, which can result in increased growth of biomass and following adverse effects.* - *Eutrophication potential – terrestrial: The potential to cause over-fertilization of soil, which can result in increased growth of biomass and following adverse effects.*
	*Photochemical ozone creation*	*Chemical reactions brought about by the light energy of the sun creating photochemical smog. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.*
	*Abiotic depletion potential for non-fossil ressources*	*Consumption of non-renewable resources, thereby lowering their availability for future generations. Expressed in comparison to Antimonium (Sb).* *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.*
	*Abiotic depletion potential for fossil ressources*	*Measure for the depletion of fossil fuels such as oil, natural gas, and coal. The stock of the fossil fuels is formed by the total amount of fossil fuels, expressed in Megajoules (MJ).* *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.*
	*Ecotoxicity for aquatic fresh water*	*The impacts of chemical substances on ecosystems (freshwater).* *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.*
	*Human toxicity (carcinogenic effects)*	*The impacts of chemical substances on human health via three parts of the environment: air, soil and water.*

[1] Carbon exchanges from native forests shall be modelled under GWP - luluc (including connected soil emissions, derived products or residues), while their CO2 uptake is excluded.

		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.
	*Human toxicity (non-carcinogenic effects)*	*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.*
	*Particulate matter*	*Accounts for the adverse health effects on human health caused by emissions of Particulate Matter (PM) and its precursors (NOx, SOx, NH3)*
	*Resource depletion (water)*	*Accounts for water use related to local scarcity of water as freshwater is a scarce resource in some regions, while in others it is not.* *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.*
	*Ionizing radiation - human health effects*	*This impact category deals mainly with the eventual impact on human health of low dose ionizing radiation 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.*
	*Land use related impacts*	*The indicator is the "soil quality index" which is the result of an aggregation of following four aspects:* - *Biotic production* - *Erosion resistance* - *Mechanical filtration* - *Groundwater* *The aggregation is done based on a JRC model. The four aspects are quantified through the LANCA model for land use.* *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.*

DETAILS OF THE UNDERLYING SCENARIOS USED TO CALCULATE THE IMPACTS

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.

A4 – TRANSPORT TO THE BUILDING SITE

Fuel type and consumption of vehicle or vehicle type used for transport	Truck 16-32 ton (EURO 5) 0,260 l/km	Truck >32 ton (EURO 5) 0,366 l/km	Truck 7.5-16 ton (EURO 5) 0,186 l/km
Distance	100 (75% from factory to construction site) 35 (90%*25% from supplier to construction site)	100 (25% from factory to supplier)	35 (90%*10% from supplier to construction site)
Capacity utilisation (including empty returns)	50%	50%	50%
Bulk density of transported products	Ecoinvent	Ecoinvent	Ecoinvent
Volume capacity utilisation factor	Ecoinvent	Ecoinvent	Ecoinvent

The B-PCR provides default transport scenarios for the transport to the building site for cases where specific data on transport are missing. The B-PCR provides scenarios for this life cycle stage. Aggregates are categorized as 'bulk materials for structural works' in table 5 of the B-PCR. The following transport steps apply:

- 75% directly to the construction site over 100 km with a 16-32 ton lorry (ecoinvent record: 'Transport, freight, lorry 16-32 metric ton, EURO5 {RER}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U')
- 25% to a supplier over 100 km with a >32 ton lorry (ecoinvent record: 'Transport, freight, lorry >32 metric ton, EURO5 {RER}| transport, freight, lorry >32 metric ton, EURO5 | Cut-off, U')
    - 90% of these 25% is transported over 35 km from supplier to construction site with a 16-32 ton lorry (ecoinvent record: 'Transport, freight, lorry 16-32 metric ton, EURO5 {RER}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U')
    - 10% of these 25% is transported over 35 km from supplier to construction site with a 7.5-16 ton lorry (ecoinvent record: 'Transport, freight, lorry 7.5-16 metric ton, EURO5 {RER}| transport, freight, lorry 7.5-16 metric ton, EURO5 | Cut-off, U')

ADDITIONAL INFORMATION ON RELEASE OF DANGEROUS SUBSTANCES TO INDOOR AIR, SOIL AND WATER DURING THE USE STAGE

INDOOR AIR
Not relevant

SOIL AND WATER
Not relevant

DEMONSTRATION OF VERIFICATION

EN 15804+A2 serves as the core PCR +BE-PCR NBN…
Independent verification of the environmental declaration and data according to standard EN ISO 14025:2010 Internal ☐ External☒
Third party verifier: SGS Search etc Harry.vanewijk@sgs.com

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General information

Owner of the EPD, Responsible for the data, LCA and information	**Fediex** **Rue Edouard Belin 7** **1435 Mont-Saint-Guibert** **Belgium** Tel : *+ 32 2 511 61 73* *For more information you can contact Thierry Vanmol* *t.vanmol@fediex.be*
EPD program Program operator Publisher of this EPD	**B-EPD** Federal Public Service of Health / DG Environment Galileelaan 5/2 1210 Brussels Belgium www.environmentalproductdeclarations.eu
Contact programma operator	epd@environment.belgium.be
Based on following PCR documents	EN 15804+A2:2019 NBN/DTD B 08-001 and its complement
PCR review conducted by	Federal Public Service of Health and Environment & PCR Review committee
Author(s) of the LCA and EPD	Arthur De Jaegher, info@enperas.be
Identification of the project report	Life cycle assessment of Belgian limestone, sandstone and porphyry aggregates intended to be physically integrated in mortar, concrete, bituminous mixtures, or hydraulically bound mixtures (VITO/Enperas, 01/12/2021)
Verification	External independent verification of the declaration and data according to EN ISO 14025 and relevant PCR documents
Name of the third party verifier Date of verification	Harry van Ewijk, SGS Search 13.12.2021
www.b-epd.be	**www.environmentalproductdeclarations.eu**

Comparing EPDs is not possible unless they are conform to the same PCR and taking into account the building context.
The program operator cannot be held responsible for the information supplied by the owner of the EPD nor LCA practitioner.

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