bauroc BLOCK PRODUCTS

Environmental Product Declaration

EN 15804+A2 & ISO 14025

EPD of multiple products, based on average product

EPD number: XXX
Publishing date: 3.6.2021
Version date: XXX

bauroc
INABLE BUILDING SINCE 2001

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

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Bauroc AS
Address	Andja, Rakvere vald, 44209 Lääne-Virumaa, Estonia
Contact details	toomas.nilson@bauroc.eu
Website	www.bauroc.ee

PRODUCT IDENTIFICATION

Product name	Autoclaved aerated concrete blocks
Additional label(s)	CE
Place(s) of production	Estonia, Andja
Averaging in EPD	Multiple products

EPD INFORMATION

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	Rakennustieto EPD Malminkatu 16 A, 00100 Helsinki, Finland https://ymparisto.rakennustieto.fi/en
EPD standards	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
Product category rules	CEN standard 15804+A2 serves as the core PCR, RTS PCR (English version, 12.11.2024)
EPD author	Mari-Liis Tommula, LCA Support LCA Support, www.lcasupport.com
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Sigita Židonienė, Vesta Consulting UAB sigita@vestaconsulting.lt
Previous EPD number	RTS_120_21
EPD number	RTS_482_26
Publishing date	3.6.2021
Version date	3.6.2026
EPD valid until	3.6.2031

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Managing Director

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PRODUCT INFORMATION

PRODUCT DESCRIPTION

Bauroc autoclaved aerated concrete (AAC) products are made purely from natural raw minerals, practically inexhaustible in nature - sand, cement, lime, gypsum and water – using an aerating agent, the aluminium. Mixed slurry formulation is poured into the casting moulds. After expansion of the mixture in pre-curing room during several hours, the aerated concrete blocks are cut and then they are put into the autoclave in groups for steam curing.
Bauroc AAC products are produced with various densities from 300 kg/m3 up to 700 kg/m3. Autoclaved aerated concrete is extremely strong and durable despite its lightweight. AAC's solidity comes from the calcium silicate that encloses its millions of air pores and from the process of curing in a pressurised steam chamber, an autoclave.

PRODUCT APPLICATION

Bauroc products are used in single and multi-floor houses, social and touristic facilities as well as commercial and industrial buildings, providing economy, quality, comfort and speed in constructions. The products are used as interior or exterior wall material in all kinds of framed and/or bearing-wall construction. Products are also used as permanent infill in ribbed floor-deck construction.

Having a porous structure, bauroc products provide a high level of thermal insulation. It is an ideal material that offers significant savings in the initial outlay and running costs of heating or cooling buildings as well as opportunity for exploiting other potential benefits.

All Bauroc products have excellent resistance to fire. Bauroc AAC is classified as non-combustible and has a reaction to fire of Class A1. A 150 mm thick bauroc block wall is fire resistant up to 4 hours in non-loadbearing situations and 2 hours in loadbearing situations. AAC inhibits heat transfer through a wall several times better than normal concrete.

PRODUCT STANDARDS

EN 771-4:2011+A1:2015 Specification for masonry units. Autoclaved aerated concrete masonry units;

PHYSICAL PROPERTIES OF THE PRODUCT

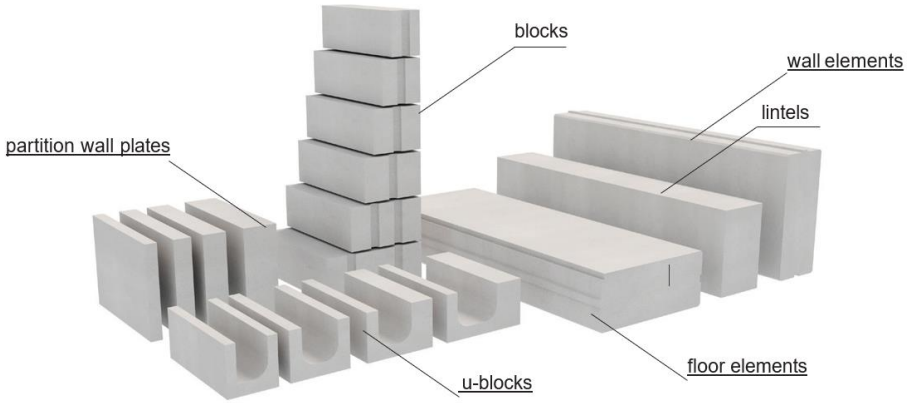
Product properties can be found on the manufacturer website at https://bauroc.eu/products/

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at https://bauroc.ee/

TECHNICAL SPECIFICATIONS

Product	Thickness (mm)	Density (kg/m^3)	Thermal conductivity λ10,dry(W/mK)
ECOTERM+	300, 375, 400, 425, 500	300	0,072
UNIVERSAL	200/300, 200/250	375	0,09
ECOTERM	375	375	0,09
ECOLIGHT	100, 150, 200, 250	375	0,09
CLASSIC	100, 150, 200, 250, 300	425	0,1
ELEMENT	50, 75, 100, 150	475	0,11
ROCLITE	100, 150, 200, 250, 300	475	0,11
GREEN	200/300, 200/250	480	0,11
PLADE	50, 75, 100, 125, 150	535	0,13
HARD	150, 200, 250, 300	550	0,13
ACOUSTIC	100, 150, 200, 250	575	0,14



PRODUCT RAW MATERIAL COMPOSITION

Materials	Amount (%)	Usability			Origin
		Renewable	Non-renew-able	Recycled	
Cement, powder	0-30		X		Estonia
Lime, powder	0-6		X		Estonia
Oil shale ash	6-42		X		Estonia
Sand	39-42		X		Estonia
Gypsum stone	3		X		EU
Additives	<1		X		EU and non-EU
Water	7-10		X		Estonia

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass (%)	Material origin
Metals	0	N/A
Minerals	82-87	EU
Water	13-18	Estonia
Fossil materials	0	N/A
Bio-based materials	0	N/A

SUBSTANCES. REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT PACKING MATERIALS

Packing material	318 kg/m^3 (kg)	425 kg/m^3 (kg)	471 kg/m^3 (kg)	553 kg/m^3 (kg)
Stretch film	0.5	0.5	0.6	0.5
Wooden pallets	6.6	6.7	6.7	5.9
Total	7.1	7.2	7.3	6.4

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

Key ingredient for manufacturing bauroc AAC products is silica rich sand. Sand is mixed with gypsum and water and grinds finally in the ball mill converting it into sand slurry. Sand slurry is pumped into a separate container/tank. Similarly, lime powder and cement are transported into individual containers using screw conveyors. Once the required amount of each ingredient is reached, control system releases all ingredients into mixing drum. A small amount of aluminium suspension is added separately. Once the mixture has settled, it is ready to be poured into moulds using the dosing unit.

Before casting, moulds are coated with a thin layer of oil. This is done in order to ensure that green-cake does not stick to moulds.

While slurry is mixed and poured into oiled moulds, aluminium reacts with Calcium Hydroxide and water to form Hydrogen. Millions of tiny Hydrogen bubbles are released due to this reaction. This leads to the formation of tiny unconnected cells causing the slurry mix to expand. This process is called rising. These cells are the reason behind the lightweight and insulating properties of bauroc blocks. Once the rising process is over, green-cake is allowed to settle and cure for some time. This ensures the cutting strength required for wire cutting.

Usually rising and the pre-curing process takes around 4-6 hours. At end of the pre-curing process, green-cake will achieve cutting strength and will be sent by a crane to cutting line using flat-cake technology and two cutting machines.

During cutting process, the top and side layers will be removed of crust in the green stage. This crust is recycled and afterwards reused in production process. After cutting, the blocks are transported into the autoclave (a large pressure vessel), where the curing process is completed.

Autoclaving is required to achieve the desired structural properties and dimensional stability. The process takes about 10 to 12 hours under a high pressure and a temperature.

The final manufacturing process stage is sorting and packaging blocks on wooden pallets and covering with plastic wrap. Eventually, the elements are moved out and transported to the construction site.

A market-based approach is used in modelling the electricity mix utilized in the factory. The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), and its use is ensured throughout the validity period of this EPD.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site cover direct exhaust emissions of fuel, environmental impacts of fuel production, as well as related infrastructure emissions. Transportation from the manufacturing plant to the building site has been calculated using a most likely scenario, an export to Latvia. The scenario is estimating the distance to be 364 km with a truck. The transportation doesn't cause losses as products are packaged properly.

Vehicle capacity utilization volume factor is assumed to be 1 which means full load. Empty returns are not taken into account as it is assumed that return trip is used by transportation company to serve needs of other clients.

Optional A5 module is not declared.

PRODUCT USE AND MAINTENANCE (B1-B7)

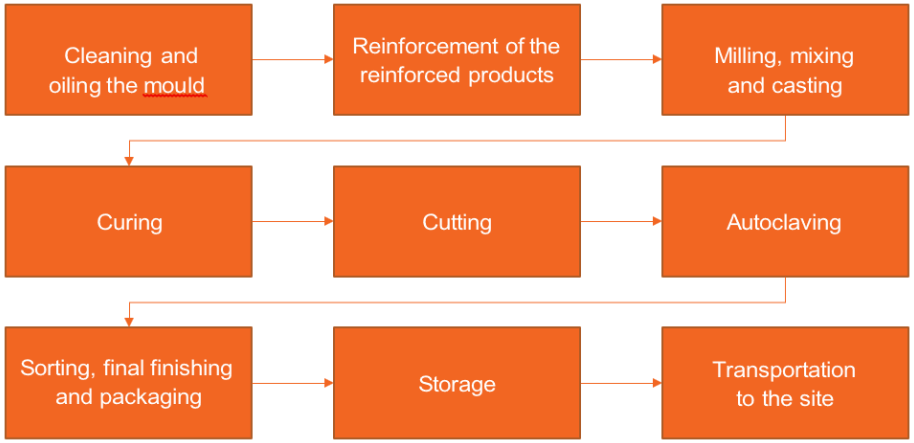
This EPD does not cover use phase. Air, soil and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At the end-of-life, in the demolition phase 100% of the waste is assumed to be collected as separate construction waste (C1). It's assumed that energy consumption of demolition process is on the average 10 kWh per 1 tonne of product (Bozdağ, Ö & Seçer, M. 2007). All of end-of-life product is assumed to be sent to the closest facilities (C2). Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is assumed as lorry, which is most common.

70% of concrete is recycled (C3) and the remaining (30%) is sent to local landfill for disposal (C4). 70% was based on the Waste Framework Directive 2008/98/EC, which aims to have 70% of Construction and Demolition waste recycled. Due to the recycling potential of concrete, the end-of-life product is converted into recycled raw materials (D).

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	Manufacturer data for the calendar year 2025 is used

DECLARED UNIT

Declared unit	1 m3 (1 cubic meter)
Mass per declared unit	318 / 425 / 471 / 553 kg/m3

Product group	Product densities	Variation in GWP-fossil for A1-A3, %
Products with the weighted average dry density of **318** kg/m^3	• ECOTERM+ (300 kg/m3) • UNIVERSAL (375 kg/m3 • ECOTERM (375 kg/m3 • ECOLIGHT (375 kg/m3)	-9.7 / +7.9%
Products with the weighted average dry density of **425** kg/m^3	• CLASSIC (425 kg/m3)	N/A
Products with the weighted average dry density of **471** kg/m^3	• GREEN (480 kg/m3) • ELEMENT (475 kg/m3) • ROCLITE (475 kg/m3)	-8.2/+1.8%
Products with the weighted average dry density of **553** kg/m^3	• PLADE (535 kg/m3) • HARD (550 kg/m3) • ACOUSTIC (575 kg/m3)	-2.6 / 3.7 %

BIOGENIC CARBON CONTENT

The product itself does not contain biogenic carbon. Packaging contains biogenic carbon.

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,3

Note. 1 kg biogenic carbon is equivalent to 44/12 kg of biogenic CO2.

SYSTEM BOUNDARY

This EPD covers the cradle to gate with options (A4), modules C1-C4 and module D.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded. The following minor input materials were excluded from the system boundary based on the cut-off criteria, each contributing less than 1% of total input mass: aluminium powder and liquid aerating agent, mold release oil, cast iron milling balls and steel cutting wires.

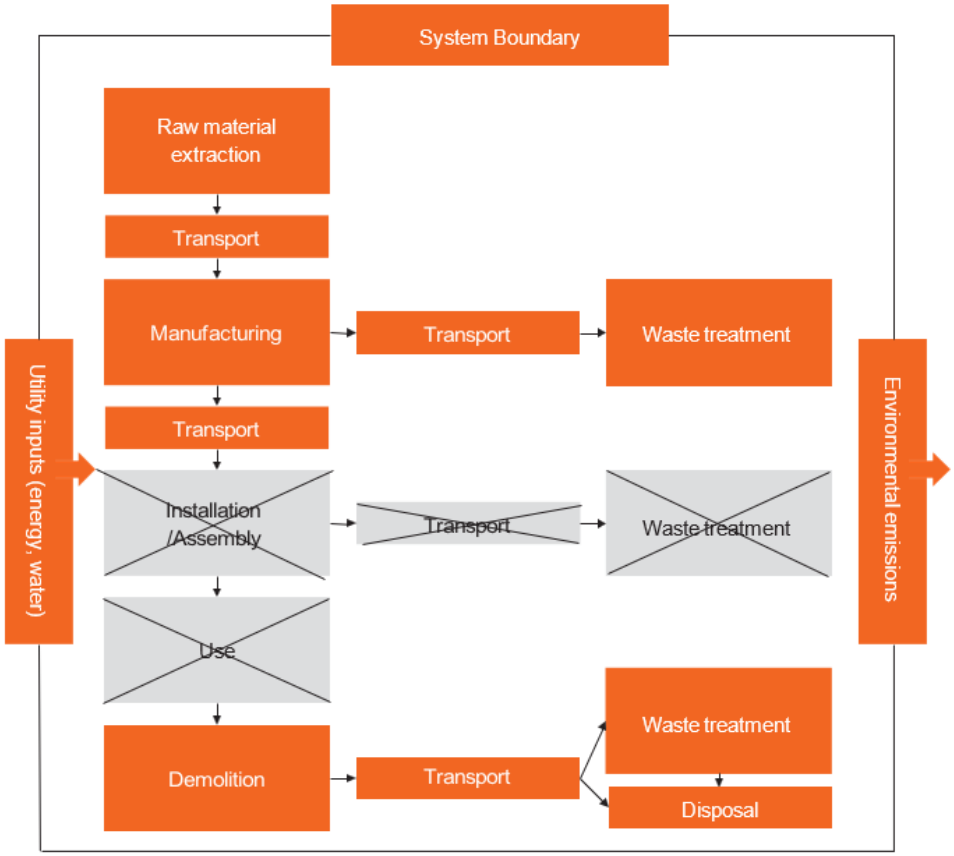
ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. Flows measured on factory level (manufacturing energy and waste, ancillary materials) were allocated per production mass.

DATA QUALITY ASSESSMENT

The data used in this assessment are considered to be of good and very good quality and representative of the declared product, production processes, and reference year. The life cycle inventory data are based on accurate production data. Environmental data for the main raw materials are supplier-specific. Background data were selected to be representative of the relevant processes.

LIFE CYCLE STAGES DIAGRAM



ENVIRONMENTAL IMPACT DATA – PRODUCTS WITH AVERAGE DENSITY OF 318 KG/M^3

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS - EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	1,22E+02	2,49E+00	3,08E+01	1,56E+02	1,21E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,16E+00	1,62E+00	9,81E-01	5,98E-01	-2,00E+00
GWP – fossil	kg CO_2e	1,21E+02	2,49E+00	3,08E+01	1,54E+02	1,21E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,16E+00	1,62E+00	9,80E-01	5,98E-01	-1,99E+00
GWP – biogenic	kg CO_2e	1,59E+00	1,49E-03	2,55E-02	1,62E+00	7,11E-03	ND	ND	ND	ND	ND	ND	ND	ND	2,20E-04	9,54E-04	1,87E-04	1,89E-04	-6,58E-03
GWP – LULUC	kg CO_2e	1,94E-02	9,11E-04	7,12E-03	2,74E-02	4,50E-03	ND	ND	ND	ND	ND	ND	ND	ND	1,18E-04	6,04E-04	1,00E-04	3,40E-04	-1,99E-03
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	4,92E-07	5,60E-08	6,65E-07	1,21E-06	2,74E-07	ND	ND	ND	ND	ND	ND	ND	ND	1,72E-08	3,67E-08	1,46E-08	1,75E-08	-1,60E-08
Acidification potential	mol H^+e	2,33E-01	5,91E-03	5,99E-02	2,99E-01	2,93E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,03E-02	3,94E-03	8,76E-03	4,12E-03	-1,24E-02
EP-freshwater[2)]	kg Pe	1,11E-02	1,80E-04	2,09E-03	1,33E-02	8,83E-04	ND	ND	ND	ND	ND	ND	ND	ND	3,72E-05	1,18E-04	3,15E-05	5,26E-05	-7,11E-04
EP-marine	kg Ne	6,58E-02	1,53E-03	2,39E-02	9,12E-02	7,72E-03	ND	ND	ND	ND	ND	ND	ND	ND	4,81E-03	1,04E-03	4,08E-03	1,63E-03	-2,94E-03
EP-terrestrial	mol Ne	7,42E-01	1,66E-02	2,37E-01	9,95E-01	8,36E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,27E-02	1,12E-02	4,47E-02	1,77E-02	-3,54E-02
POCP ("smog")[3)]	kg NMVOCe	2,23E-01	9,79E-03	1,00E-01	3,33E-01	4,91E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,58E-02	6,59E-03	1,34E-02	6,42E-03	-9,82E-03
ADP-minerals & metals[4)]	kg Sbe	7,10E-04	7,69E-06	3,88E-05	7,56E-04	3,60E-05	ND	ND	ND	ND	ND	ND	ND	ND	4,16E-07	4,82E-06	3,53E-07	9,07E-07	-1,18E-05
ADP-fossil resources	MJ	4,89E+02	3,73E+01	4,82E+02	1,01E+03	1,83E+02	ND	ND	ND	ND	ND	ND	ND	ND	1,51E+01	2,46E+01	1,28E+01	1,46E+01	-2,52E+01
Water use[5)]	m^3e depr.	1,77E+01	2,13E-01	2,48E+00	2,04E+01	1,06E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,88E-02	1,43E-01	3,29E-02	6,42E-01	-3,06E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,36E-06	2,35E-07	9,69E-07	2,56E-06	1,20E-06	ND	ND	ND	ND	ND	ND	ND	ND	2,95E-07	1,61E-07	1,91E-06	9,66E-08	-1,92E-07
Ionizing radiation[6)]	kBq U235e	2,82E+00	4,24E-02	5,41E-01	3,40E+00	2,05E-01	ND	ND	ND	ND	ND	ND	ND	ND	6,41E-03	2,75E-02	5,43E-03	8,42E-03	-1,98E-01
Ecotoxicity (freshwater)	CTUe	1,08E+02	3,20E+01	1,46E+02	2,85E+02	1,58E+02	ND	ND	ND	ND	ND	ND	ND	ND	8,61E+00	2,11E+01	7,29E+00	1,82E+00	-5,85E+01
Human toxicity, cancer	CTUh	1,12E-08	4,16E-10	4,96E-09	1,66E-08	2,01E-09	ND	ND	ND	ND	ND	ND	ND	ND	1,18E-10	2,70E-10	9,99E-11	1,05E-10	-5,50E-10
Human tox. non-cancer	CTUh	6,12E-07	2,39E-08	8,05E-08	7,17E-07	1,18E-07	ND	ND	ND	ND	ND	ND	ND	ND	1,85E-09	1,58E-08	1,57E-09	2,53E-09	-1,65E-08
SQP[7)]	-	9,65E+01	3,46E+01	1,16E+02	2,47E+02	1,84E+02	ND	ND	ND	ND	ND	ND	ND	ND	9,96E-01	2,47E+01	8,44E-01	2,88E+01	-2,26E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	3,42E+01	5,83E-01	5,31E+01	8,79E+01	2,82E+00	ND	ND	ND	ND	ND	ND	ND	ND	9,46E-02	3,79E-01	8,01E-02	1,36E-01	-2,47E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	3,42E+01	5,83E-01	5,31E+01	8,79E+01	2,82E+00	ND	ND	ND	ND	ND	ND	ND	ND	9,46E-02	3,79E-01	8,01E-02	1,36E-01	-2,47E+00
Non-re. PER as energy	MJ	4,89E+02	3,73E+01	4,60E+02	9,87E+02	1,83E+02	ND	ND	ND	ND	ND	ND	ND	ND	1,51E+01	2,46E+01	1,28E+01	1,46E+01	-2,52E+01
Non-re. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	4,89E+02	3,73E+01	4,60E+02	9,87E+02	1,83E+02	ND	ND	ND	ND	ND	ND	ND	ND	1,51E+01	2,46E+01	1,28E+01	1,46E+01	-2,52E+01
Secondary materials	kg	2,21E+01	1,60E-02	2,33E-01	2,24E+01	7,73E-02	ND	ND	ND	ND	ND	ND	ND	ND	6,24E-03	1,04E-02	5,28E-03	3,63E-03	-2,77E-02
Renew. secondary fuels	MJ	1,36E-03	2,11E-04	3,76E-01	3,77E-01	1,02E-03	ND	ND	ND	ND	ND	ND	ND	ND	1,63E-05	1,37E-04	1,38E-05	7,61E-05	-1,98E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	4,50E-01	4,95E-03	2,45E-01	7,00E-01	2,47E-02	ND	ND	ND	ND	ND	ND	ND	ND	9,65E-04	3,32E-03	8,18E-04	1,51E-02	-7,07E-02

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	4,26E+00	5,43E-02	1,39E+00	5,70E+00	2,67E-01	ND	ND	ND	ND	ND	ND	ND	ND	1,69E-02	3,58E-02	1,43E-02	4,74E-02	-1,97E-01
Non-hazardous waste	kg	6,56E+01	1,12E+00	1,21E+02	1,87E+02	5,45E+00	ND	ND	ND	ND	ND	ND	ND	ND	2,46E-01	7,31E-01	2,08E-01	9,59E+01	-3,88E+00
Radioactive waste	kg	7,08E-04	1,04E-05	1,32E-04	8,50E-04	5,04E-05	ND	ND	ND	ND	ND	ND	ND	ND	1,58E-06	6,76E-06	1,33E-06	1,99E-06	-4,81E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	2,23E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	1,21E+02	2,49E+00	3,08E+01	1,54E+02	1,21E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,16E+00	1,62E+00	9,80E-01	5,98E-01	-1,99E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero

ENVIRONMENTAL IMPACT DATA - PRODUCTS WITH AVERAGE DENSITY OF 425 KG/M^3

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS - EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	1,61E+02	4,08E+00	3,90E+01	2,04E+02	1,66E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,59E+00	2,16E+00	1,31E+00	7,99E-01	-2,67E+00
GWP – fossil	kg CO_2e	1,59E+02	4,08E+00	3,89E+01	2,02E+02	1,66E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,59E+00	2,16E+00	1,31E+00	7,98E-01	-2,66E+00
GWP – biogenic	kg CO_2e	2,10E+00	2,43E-03	6,55E-02	2,17E+00	9,75E-03	ND	ND	ND	ND	ND	ND	ND	ND	3,03E-04	1,27E-03	2,49E-04	2,53E-04	-8,80E-03
GWP – LULUC	kg CO_2e	2,56E-02	1,50E-03	8,23E-03	3,53E-02	6,17E-03	ND	ND	ND	ND	ND	ND	ND	ND	1,63E-04	8,06E-04	1,34E-04	4,54E-04	-2,66E-03
Ozone depletion pot.	kg CFC-$_{11}$e	6,48E-07	9,18E-08	8,35E-07	1,57E-06	3,75E-07	ND	ND	ND	ND	ND	ND	ND	ND	2,36E-08	4,90E-08	1,94E-08	2,33E-08	-2,14E-08
Acidification potential	mol H^+e	3,07E-01	9,72E-03	7,44E-02	3,91E-01	4,02E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,42E-02	5,25E-03	1,17E-02	5,50E-03	-1,66E-02
EP-freshwater[2)]	kg Pe	1,46E-02	2,96E-04	2,56E-03	1,74E-02	1,21E-03	ND	ND	ND	ND	ND	ND	ND	ND	5,11E-05	1,58E-04	4,21E-05	7,03E-05	-9,50E-04
EP-marine	kg Ne	8,66E-02	2,53E-03	3,11E-02	1,20E-01	1,06E-02	ND	ND	ND	ND	ND	ND	ND	ND	6,61E-03	1,38E-03	5,44E-03	2,18E-03	-3,94E-03
EP-terrestrial	mol Ne	9,77E-01	2,73E-02	2,98E-01	1,30E+00	1,15E-01	ND	ND	ND	ND	ND	ND	ND	ND	7,24E-02	1,50E-02	5,96E-02	2,37E-02	-4,74E-02
POCP ("smog")[3)]	kg NMVOCe	2,93E-01	1,61E-02	1,25E-01	4,35E-01	6,73E-02	ND	ND	ND	ND	ND	ND	ND	ND	2,17E-02	8,79E-03	1,78E-02	8,57E-03	-1,31E-02
ADP-minerals & metals[4)]	kg Sbe	9,21E-04	1,25E-05	4,30E-05	9,76E-04	4,93E-05	ND	ND	ND	ND	ND	ND	ND	ND	5,72E-07	6,44E-06	4,70E-07	1,21E-06	-1,58E-05
ADP-fossil resources	MJ	6,44E+02	6,12E+01	6,05E+02	1,31E+03	2,51E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,07E+01	3,28E+01	1,70E+01	1,95E+01	-3,37E+01
Water use[5)]	m^3e depr.	2,35E+01	3,51E-01	2,81E+00	2,66E+01	1,46E+00	ND	ND	ND	ND	ND	ND	ND	ND	5,33E-02	1,91E-01	4,39E-02	8,57E-01	-4,09E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,79E-06	3,89E-07	1,21E-06	3,39E-06	1,64E-06	ND	ND	ND	ND	ND	ND	ND	ND	4,06E-07	2,15E-07	2,55E-06	1,29E-07	-2,57E-07
Ionizing radiation[6)]	kBq U235e	3,72E+00	6,93E-02	6,45E-01	4,44E+00	2,81E-01	ND	ND	ND	ND	ND	ND	ND	ND	8,81E-03	3,67E-02	7,25E-03	1,12E-02	-2,65E-01
Ecotoxicity (freshwater)	CTUe	1,42E+02	5,26E+01	1,68E+02	3,62E+02	2,16E+02	ND	ND	ND	ND	ND	ND	ND	ND	1,18E+01	2,82E+01	9,73E+00	2,43E+00	-7,82E+01
Human toxicity, cancer	CTUh	1,48E-08	6,80E-10	5,84E-09	2,13E-08	2,76E-09	ND	ND	ND	ND	ND	ND	ND	ND	1,62E-10	3,60E-10	1,33E-10	1,40E-10	-7,35E-10
Human tox. non-cancer	CTUh	8,06E-07	3,92E-08	1,00E-07	9,46E-07	1,61E-07	ND	ND	ND	ND	ND	ND	ND	ND	2,55E-09	2,11E-08	2,10E-09	3,38E-09	-2,20E-08
SQP[7)]	-	1,28E+02	5,78E+01	1,16E+02	3,01E+02	2,52E+02	ND	ND	ND	ND	ND	ND	ND	ND	1,37E+00	3,30E+01	1,13E+00	3,84E+01	-3,02E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	4,51E+01	9,53E-01	5,39E+01	1,00E+02	3,87E+00	ND	ND	ND	ND	ND	ND	ND	ND	1,30E-01	5,06E-01	1,07E-01	1,81E-01	-3,30E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	4,51E+01	9,53E-01	5,39E+01	1,00E+02	3,87E+00	ND	ND	ND	ND	ND	ND	ND	ND	1,30E-01	5,06E-01	1,07E-01	1,81E-01	-3,30E+00
Non-re. PER as energy	MJ	6,44E+02	6,12E+01	5,83E+02	1,29E+03	2,51E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,07E+01	3,28E+01	1,70E+01	1,95E+01	-3,37E+01
Non-re. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	6,44E+02	6,12E+01	5,83E+02	1,29E+03	2,51E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,07E+01	3,28E+01	1,70E+01	1,95E+01	-3,37E+01
Secondary materials	kg	2,90E+01	2,61E-02	2,80E-01	2,94E+01	1,06E-01	ND	ND	ND	ND	ND	ND	ND	ND	8,57E-03	1,38E-02	7,05E-03	4,84E-03	-3,70E-02
Renew. secondary fuels	MJ	1,80E-03	3,44E-04	3,60E-01	3,62E-01	1,40E-03	ND	ND	ND	ND	ND	ND	ND	ND	2,24E-05	1,83E-04	1,85E-05	1,02E-04	-2,64E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	5,91E-01	8,15E-03	2,51E-01	8,50E-01	3,39E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,33E-03	4,43E-03	1,09E-03	2,01E-02	-9,46E-02

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	5,64E+00	8,92E-02	1,73E+00	7,46E+00	3,66E-01	ND	ND	ND	ND	ND	ND	ND	ND	2,32E-02	4,78E-02	1,91E-02	6,33E-02	-2,64E-01
Non-hazardous waste	kg	8,65E+01	1,83E+00	2,11E+02	2,99E+02	7,47E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,38E-01	9,76E-01	2,78E-01	1,28E+02	-5,19E+00
Radioactive waste	kg	9,34E-04	1,70E-05	1,57E-04	1,11E-03	6,91E-05	ND	ND	ND	ND	ND	ND	ND	ND	2,16E-06	9,02E-06	1,78E-06	2,65E-06	-6,43E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	2,98E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	1,59E+02	4,08E+00	3,89E+01	2,02E+02	1,66E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,59E+00	2,16E+00	1,31E+00	7,98E-01	-2,66E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero

ENVIRONMENTAL IMPACT DATA - PRODUCTS WITH AVERAGE DENSITY OF 471 KG/M^3

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS - EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	7,71E+00	4,83E+00	4,55E+01	5,80E+01	1,77E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,71E+00	2,40E+00	1,45E+00	8,85E-01	-1,00E+00
GWP – fossil	kg CO_2e	7,70E+00	4,83E+00	4,54E+01	5,79E+01	1,77E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,71E+00	2,40E+00	1,45E+00	8,84E-01	-1,00E+00
GWP – biogenic	kg CO_2e	2,98E-04	3,04E-03	8,58E-02	8,91E-02	1,04E-02	ND	ND	ND	ND	ND	ND	ND	ND	3,26E-04	1,41E-03	2,76E-04	2,80E-04	-3,31E-03
GWP – LULUC	kg CO_2e	1,47E-02	1,63E-03	1,76E-02	3,40E-02	6,61E-03	ND	ND	ND	ND	ND	ND	ND	ND	1,75E-04	8,94E-04	1,48E-04	5,03E-04	-1,00E-03
Ozone depletion pot.	kg CFC-$_{11}$e	5,59E-08	1,05E-07	9,80E-07	1,14E-06	4,02E-07	ND	ND	ND	ND	ND	ND	ND	ND	2,54E-08	5,43E-08	2,15E-08	2,58E-08	-8,06E-09
Acidification potential	mol H^+e	5,11E-02	1,04E-02	9,29E-02	1,54E-01	4,31E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,53E-02	5,82E-03	1,30E-02	6,10E-03	-6,23E-03
EP-freshwater[2)]	kg Pe	2,70E-03	3,35E-04	3,41E-03	6,45E-03	1,30E-03	ND	ND	ND	ND	ND	ND	ND	ND	5,50E-05	1,75E-04	4,66E-05	7,79E-05	-3,58E-04
EP-marine	kg Ne	9,75E-03	2,51E-03	3,85E-02	5,08E-02	1,13E-02	ND	ND	ND	ND	ND	ND	ND	ND	7,12E-03	1,53E-03	6,03E-03	2,41E-03	-1,48E-03
EP-terrestrial	mol Ne	1,04E-01	2,71E-02	3,67E-01	4,99E-01	1,23E-01	ND	ND	ND	ND	ND	ND	ND	ND	7,79E-02	1,66E-02	6,61E-02	2,63E-02	-1,78E-02
POCP ("smog")[3)]	kg NMVOCe	3,10E-02	1,65E-02	1,55E-01	2,02E-01	7,20E-02	ND	ND	ND	ND	ND	ND	ND	ND	2,33E-02	9,75E-03	1,98E-02	9,50E-03	-4,94E-03
ADP-minerals & metals[4)]	kg Sbe	7,06E-04	1,69E-05	5,66E-05	7,79E-04	5,28E-05	ND	ND	ND	ND	ND	ND	ND	ND	6,15E-07	7,14E-06	5,22E-07	1,34E-06	-5,93E-06
ADP-fossil resources	MJ	8,02E+01	6,87E+01	7,10E+02	8,58E+02	2,69E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,23E+01	3,64E+01	1,89E+01	2,16E+01	-1,27E+01
Water use[5)]	m^3e depr.	1,54E+01	3,65E-01	4,24E+00	2,00E+01	1,56E+00	ND	ND	ND	ND	ND	ND	ND	ND	5,74E-02	2,11E-01	4,86E-02	9,50E-01	-1,54E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	7,11E-07	3,64E-07	1,53E-06	2,61E-06	1,76E-06	ND	ND	ND	ND	ND	ND	ND	ND	4,37E-07	2,38E-07	2,82E-06	1,43E-07	-9,68E-08
Ionizing radiation[6)]	kBq U235e	2,12E-01	8,28E-02	9,04E-01	1,20E+00	3,01E-01	ND	ND	ND	ND	ND	ND	ND	ND	9,48E-03	4,07E-02	8,04E-03	1,25E-02	-9,96E-02
Ecotoxicity (freshwater)	CTUe	1,06E+02	5,84E+01	2,37E+02	4,01E+02	2,31E+02	ND	ND	ND	ND	ND	ND	ND	ND	1,27E+01	3,13E+01	1,08E+01	2,70E+00	-2,94E+01
Human toxicity, cancer	CTUh	5,11E-09	8,12E-10	1,62E-08	2,22E-08	2,95E-09	ND	ND	ND	ND	ND	ND	ND	ND	1,74E-10	3,99E-10	1,48E-10	1,55E-10	-2,77E-10
Human tox. non-cancer	CTUh	7,64E-08	4,33E-08	1,33E-07	2,53E-07	1,73E-07	ND	ND	ND	ND	ND	ND	ND	ND	2,74E-09	2,34E-08	2,32E-09	3,75E-09	-8,28E-09
SQP[7)]	-	3,26E+01	4,19E+01	9,08E+02	9,83E+02	2,70E+02	ND	ND	ND	ND	ND	ND	ND	ND	1,47E+00	3,65E+01	1,25E+00	4,26E+01	-1,14E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	8,99E+00	1,13E+00	1,15E+02	1,25E+02	4,14E+00	ND	ND	ND	ND	ND	ND	ND	ND	1,40E-01	5,60E-01	1,18E-01	2,01E-01	-1,24E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	8,99E+00	1,13E+00	1,15E+02	1,25E+02	4,14E+00	ND	ND	ND	ND	ND	ND	ND	ND	1,40E-01	5,60E-01	1,18E-01	2,01E-01	-1,24E+00
Non-re. PER as energy	MJ	8,02E+01	6,87E+01	6,77E+02	8,26E+02	2,69E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,23E+01	3,64E+01	1,89E+01	2,16E+01	-1,27E+01
Non-re. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	8,02E+01	6,87E+01	6,77E+02	8,26E+02	2,69E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,23E+01	3,64E+01	1,89E+01	2,16E+01	-1,27E+01
Secondary materials	kg	2,29E+02	3,11E-02	6,47E-01	2,30E+02	1,13E-01	ND	ND	ND	ND	ND	ND	ND	ND	9,22E-03	1,54E-02	7,82E-03	5,36E-03	-1,39E-02
Renew. secondary fuels	MJ	3,60E-04	4,08E-04	3,43E+00	3,43E+00	1,50E-03	ND	ND	ND	ND	ND	ND	ND	ND	2,42E-05	2,03E-04	2,05E-05	1,13E-04	-9,94E-05
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	4,07E-01	8,43E-03	3,21E-01	7,36E-01	3,63E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,43E-03	4,91E-03	1,21E-03	2,23E-02	-3,56E-02

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	2,26E+00	9,97E-02	2,06E+00	4,42E+00	3,92E-01	ND	ND	ND	ND	ND	ND	ND	ND	2,50E-02	5,30E-02	2,12E-02	7,01E-02	-9,93E-02
Non-hazardous waste	kg	1,77E+01	2,14E+00	2,75E+02	2,95E+02	8,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,64E-01	1,08E+00	3,08E-01	1,42E+02	-1,95E+00
Radioactive waste	kg	5,27E-05	2,04E-05	2,22E-04	2,96E-04	7,39E-05	ND	ND	ND	ND	ND	ND	ND	ND	2,33E-06	1,00E-05	1,97E-06	2,94E-06	-2,42E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	3,30E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	7,71E+00	4,83E+00	4,54E+01	5,79E+01	1,77E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,71E+00	2,40E+00	1,45E+00	8,85E-01	-1,00E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero

ENVIRONMENTAL IMPACT DATA - PRODUCTS WITH AVERAGE DENSITY OF 553 KG/M^3

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS - EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	2,11E+02	4,51E+00	5,03E+01	2,66E+02	2,08E+01	ND	ND	ND	ND	ND	ND	ND	ND	2,00E+00	2,82E+00	1,70E+00	1,04E+00	-3,47E+00
GWP – fossil	kg CO_2e	2,08E+02	4,50E+00	5,02E+01	2,63E+02	2,08E+01	ND	ND	ND	ND	ND	ND	ND	ND	2,00E+00	2,81E+00	1,70E+00	1,04E+00	-3,46E+00
GWP – biogenic	kg CO_2e	2,75E+00	2,21E-03	1,19E-01	2,87E+00	1,22E-02	ND	ND	ND	ND	ND	ND	ND	ND	3,81E-04	1,66E-03	3,24E-04	3,29E-04	-1,14E-02
GWP – LULUC	kg CO_2e	3,34E-02	1,68E-03	9,72E-03	4,48E-02	7,74E-03	ND	ND	ND	ND	ND	ND	ND	ND	2,05E-04	1,05E-03	1,74E-04	5,90E-04	-3,46E-03
Ozone depletion pot.	kg CFC-$_{11}$e	8,47E-07	9,83E-08	1,07E-06	2,02E-06	4,70E-07	ND	ND	ND	ND	ND	ND	ND	ND	2,97E-08	6,38E-08	2,53E-08	3,03E-08	-2,79E-08
Acidification potential	mol H^+e	4,03E-01	1,08E-02	9,46E-02	5,08E-01	5,04E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,79E-02	6,84E-03	1,52E-02	7,16E-03	-2,15E-02
EP-freshwater[2)]	kg Pe	1,91E-02	3,24E-04	3,21E-03	2,26E-02	1,52E-03	ND	ND	ND	ND	ND	ND	ND	ND	6,44E-05	2,06E-04	5,48E-05	9,15E-05	-1,24E-03
EP-marine	kg Ne	1,14E-01	2,83E-03	4,12E-02	1,58E-01	1,33E-02	ND	ND	ND	ND	ND	ND	ND	ND	8,33E-03	1,80E-03	7,08E-03	2,83E-03	-5,12E-03
EP-terrestrial	mol Ne	1,28E+00	3,06E-02	3,85E-01	1,70E+00	1,44E-01	ND	ND	ND	ND	ND	ND	ND	ND	9,12E-02	1,95E-02	7,76E-02	3,08E-02	-6,16E-02
POCP ("smog")[3)]	kg NMVOCe	3,84E-01	1,79E-02	1,60E-01	5,62E-01	8,44E-02	ND	ND	ND	ND	ND	ND	ND	ND	2,73E-02	1,14E-02	2,32E-02	1,12E-02	-1,71E-02
ADP-minerals & metals[4)]	kg Sbe	1,21E-03	1,37E-05	4,87E-05	1,27E-03	6,18E-05	ND	ND	ND	ND	ND	ND	ND	ND	7,20E-07	8,38E-06	6,12E-07	1,58E-06	-2,05E-05
ADP-fossil resources	MJ	8,43E+02	6,73E+01	7,75E+02	1,69E+03	3,15E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,61E+01	4,27E+01	2,22E+01	2,53E+01	-4,38E+01
Water use[5)]	m^3e depr.	3,07E+01	3,77E-01	3,27E+00	3,43E+01	1,83E+00	ND	ND	ND	ND	ND	ND	ND	ND	6,72E-02	2,48E-01	5,71E-02	1,12E+00	-5,33E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2,35E-06	4,25E-07	1,56E-06	4,33E-06	2,06E-06	ND	ND	ND	ND	ND	ND	ND	ND	5,11E-07	2,79E-07	3,31E-06	1,68E-07	-3,35E-07
Ionizing radiation[6)]	kBq U235e	4,87E+00	7,70E-02	7,87E-01	5,74E+00	3,52E-01	ND	ND	ND	ND	ND	ND	ND	ND	1,11E-02	4,78E-02	9,43E-03	1,46E-02	-3,44E-01
Ecotoxicity (freshwater)	CTUe	1,85E+02	4,57E+01	1,99E+02	4,30E+02	2,71E+02	ND	ND	ND	ND	ND	ND	ND	ND	1,49E+01	3,67E+01	1,27E+01	3,17E+00	-1,02E+02
Human toxicity, cancer	CTUh	1,94E-08	7,51E-10	7,00E-09	2,72E-08	3,46E-09	ND	ND	ND	ND	ND	ND	ND	ND	2,04E-10	4,69E-10	1,74E-10	1,82E-10	-9,56E-10
Human tox. non-cancer	CTUh	1,06E-06	4,32E-08	1,27E-07	1,23E-06	2,02E-07	ND	ND	ND	ND	ND	ND	ND	ND	3,21E-09	2,75E-08	2,73E-09	4,40E-09	-2,86E-08
SQP[7)]	-	1,67E+02	6,29E+01	1,11E+02	3,40E+02	3,16E+02	ND	ND	ND	ND	ND	ND	ND	ND	1,72E+00	4,29E+01	1,47E+00	5,00E+01	-3,93E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	5,90E+01	1,06E+00	5,46E+01	1,15E+02	4,85E+00	ND	ND	ND	ND	ND	ND	ND	ND	1,64E-01	6,58E-01	1,39E-01	2,36E-01	-4,29E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	5,90E+01	1,06E+00	5,46E+01	1,15E+02	4,85E+00	ND	ND	ND	ND	ND	ND	ND	ND	1,64E-01	6,58E-01	1,39E-01	2,36E-01	-4,29E+00
Non-re. PER as energy	MJ	8,43E+02	6,73E+01	7,53E+02	1,66E+03	3,15E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,61E+01	4,27E+01	2,22E+01	2,53E+01	-4,38E+01
Non-re. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	8,43E+02	6,73E+01	7,53E+02	1,66E+03	3,15E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,61E+01	4,27E+01	2,22E+01	2,53E+01	-4,38E+01
Secondary materials	kg	3,79E+01	2,89E-02	3,41E-01	3,83E+01	1,33E-01	ND	ND	ND	ND	ND	ND	ND	ND	1,08E-02	1,80E-02	9,18E-03	6,30E-03	-4,81E-02
Renew. secondary fuels	MJ	2,34E-03	3,78E-04	3,20E-01	3,22E-01	1,75E-03	ND	ND	ND	ND	ND	ND	ND	ND	2,83E-05	2,38E-04	2,40E-05	1,32E-04	-3,44E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	7,70E-01	9,16E-03	2,61E-01	1,04E+00	4,25E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,67E-03	5,77E-03	1,42E-03	2,62E-02	-1,23E-01

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	7,37E+00	9,85E-02	2,21E+00	9,68E+00	4,59E-01	ND	ND	ND	ND	ND	ND	ND	ND	2,92E-02	6,22E-02	2,49E-02	8,23E-02	-3,43E-01
Non-hazardous waste	kg	1,13E+02	2,01E+00	3,33E+02	4,48E+02	9,37E+00	ND	ND	ND	ND	ND	ND	ND	ND	4,26E-01	1,27E+00	3,62E-01	1,67E+02	-6,75E+00
Radioactive waste	kg	1,22E-03	1,90E-05	1,90E-04	1,43E-03	8,66E-05	ND	ND	ND	ND	ND	ND	ND	ND	2,73E-06	1,17E-05	2,32E-06	3,45E-06	-8,37E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	3,87E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	2,08E+02	4,50E+00	5,02E+01	2,63E+02	2,08E+01	ND	ND	ND	ND	ND	ND	ND	ND	2,00E+00	2,82E+00	1,70E+00	1,04E+00	-3,46E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity production, photovoltaic, Ecoinvent - 0.0843 CO2e / kWh
	Electricity production, wind, 1-3MW turbine, onshore, Ecoinvent - 0.0207 CO2e / kWh
Diesel data source and quality	Diesel, burned in building machine, Ecoinvent - 0.10 kgCO2e/MJ
Heating data source and quality	Heat production, natural gas, at industrial furnace >100kW, Ecoinvent - 0.0754 kgCO2e/MJ

Transport scenario documentation - A4 (Transport resources)

Scenario parameter	Value
Fuel and vehicle type. Eg, electric truck, diesel powered truck	Diesel powered truck, EURO6
Average transport distance, km	364 km
Capacity utilization (including empty return) %	100
Volume capacity utilization factor	<1

End of life (C1-C4) - Scenario documentation

Scenario information	Value			
	318 kg/m^3	425 kg/m^3	471 kg/m^3	553 kg/m^3
Collection process: collected separately (kg)	318	425	471	553
Collection process: Mixed waste (kg)	0	0	0	0
Recovery: re-use (kg)	0	0	0	0
Recovery: recycling (kg)	223	298	330	387
Recovery: energy recovery (kg)	0	0	0	0
Disposal (kg)	95	127	141	166
Scenario assumptions e.g. transportation (mode, km) & other	50			

ABOUT THE MANUFACTURER

Bauroc group, with headquarter in Estonia, is the largest producer of aircrete i.e. autoclaved aerated concrete (AAC) products in the Northern Europe. The family owned group which was established 2001, operates two state of the art AAC factories in Estonia and Latvia. The machinery of both plants come from two of the most famous German manufacturers - Wehrhahn and Hess.

The brand “bauroc” symbolize a wide range of building products from autoclaved aerated concrete, which are used throughout the field of construction. Word “bau” is “construction” in German language and second part of the word “roc” means, that all products are made from ecological stone material – natural mineral-based autoclaved aerated concrete.

High quality, purely natural and mineral raw materials as well as modern technology guarantee that bauroc products are among the leading autoclaved aerated concrete products worldwide thanks to their technical properties. Bauroc is a member of the European Autoclaved Aerated Concrete Association EAACA and all products have the CE certification. Thanks to high quality products, the bauroc brand has become popular in many countries. Bauroc wide range of products are sold in Estonia, Latvia, Lithuania, Sweden, Finland, Denmark, Iceland, Poland, Switzerland and Germany.

There has been continuous process in product development and product mix has increased significantly during 20 years in business. Bauroc product portfolio includes wide range of block products, einforced lintels, large roof and wall elements, instruments, dry mixes and accessories for installing the products.

We are not speaking only about very light aircrete products, but much larger product mix.

Bauroc brand can be recognised from bright orange colour, all products have been wrapped in orange folio during the whole 25 years in business.

DATABASES AND SOFTWARE

The calculations were conducted using One Click LCA's cloud-based LCA software. The source of LCA data is supplier-specific EPDs, Ecoinvent 3.11 and 3.12. JRC characterization factors EF 3.1 have been used.

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