Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Crushed zeolites

from

ZEOCEM, s.r.o.

Programme:	"National Environmental Labeling Program" - Czech Republic (NPEZ)
Programme operator:	Ministry of the Environment of the Czech Republic
EPD type:	EPD of a single product from a manufacturer/service provider
EPD registration number:	**3015-EPD-030069249**
Publication date:	2025-10-20
Valid until:	2030-10-20
	An EPD should provide current information and may be updated if conditions change.

General information

Programme information

Programme:	"National Environmental Labeling Program" - Czech Republic (NPEZ)
Address:	Ministry of the Environment of the Czech Republic Department of Voluntary Instruments 100 10 Praha 10, Vršovická 1442/65
Website:	www.mzp.cz, www.cenia.cz
E-mail:	info@mzp.cz

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR) and together with the ČSN EN ISO 14067 standard, it serves as a basis for a supplementary declaration of the product's carbon footprint.
Product Category Rules (PCR): *EN 15804:2012+A2:2019/AC:2021*
Life Cycle Assessment (LCA)
LCA accountability: *ZEOCEM, s.r.o.*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by accredited certification body Third-party verification: ***Technický a zkušební ústav stavební Praha, s.p.*** is an approved certification body accountable for the third-party verification. 190 00 Praha 9, Prosecká 811/76a, CZ The certification body is accredited by: ***Českým institutem pro akreditaci, o.p.s., Osvědčení č. 456/2024*** Verifier: Ing. Lenka Vrbová
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: ZEOCEM, s.r.o.

Prešovská 282/1, 094 34 Bystré, SK, IČO: 36457728
Contact:
Dzivák Martin
mail: dzivak@zeocem.sk
www.zeocem.sk

Description of the organisation:

ZEOCEM is a dynamically developing company with more than 70 years of experience in the processing of natural and construction materials. The company's core production program focuses on the extraction and processing of natural zeolite, the manufacture of products based on natural zeolite, including the processing of construction materials containing zeolite.

Adapting the production program to market requirements, together with the development of new products, has enabled the company to maintain economic growth and to become one of the most significant producers of zeolite-based products in Europe as well as worldwide. The plant has undergone modernization, including the construction of new production capacities and the installation of energy-efficient mechanical and technological equipment for key production stages (drying, milling, classification, dispatch), which has increased the overall economic efficiency of production.

Global presence

ZEOCEM markets its products throughout Europe, Southeast Asia, Central and South America, as well as in other global markets. An experienced logistics team dispatches products worldwide using road, rail, maritime, and intermodal transport, the share of which in total deliveries to customers is continuously increasing.

High-quality clinoptilolite source

One of the highest-quality clinoptilolite deposits worldwide, combined with careful processing methods, enables the company to offer premium-quality products. ZEOCEM holds mining permits for the opening, preparation, and surface extraction of reserved mineral deposits within the mining areas of Nižný Hrabovec and Skrabské. The company also operates its own processing and production facilities at the Nižný Hrabovec quarry and at the plant in Bystré.

Development of the company

The strategic objective of the company is to build an advanced enterprise of European standard and to be a reliable manufacturer, seller, and supplier of zeolite-based products. To ensure long-term sustainable growth and to meet customer requirements and expectations in a highly competitive market, the company strives to differentiate itself from competitors through continuous technological optimization and product innovation.

Member of international holdings

Since its establishment, ZEOCEM has been part of the ownership structure of two significant European holdings – CTR Group and Glock Health, Science and Research GmbH.

Member of the CTR Group

CTR Group a.s. is a stable and strong company with a long-standing history. The company operates long-term in three main business areas – production and distribution of construction materials, commercial and private aviation transport, and the implementation of development projects. CTR Group operates not only in the Czech Republic but also in Slovakia, Germany, Austria, and Hungary.

Member of the Glock Health, Science and Research GmbH Group

Glock Health, Science and Research GmbH focuses on the development, production, and sale of high-quality products in the field of healthy nutrition. The company covers a wide range of know-how and expertise, from geology to biology, supported by research activities at recognized universities. Glock Health, Science and Research GmbH operates in the European and North American markets.

Product-related or management system-related certifications:

Product quality at the company is ensured by an effective quality management system certified in accordance with EN ISO 9001 and the FAMI-QS Code. The company's products are manufactured in

compliance with applicable technical standards and regulations relevant to the respective product categories.
The company continuously monitors global scientific and research information sources in the relevant fields to ensure ongoing development. Internal research activities cover areas such as agriculture, animal feed, chemistry, ecology, construction, and others. In its own research laboratory and in cooperation with external companies and institutions, the company develops innovative products and technologies for new applications.
Product quality is ensured by a team of qualified specialists who, operating 24/7, carry out more than 30,000 input, in-process, and final analyses annually to verify compliance with product quality parameters.

Name and location of production site(s):
ZEOCEM, s.r.o.
Nižný Hrabovec Quarry
Production plant in Bystrom, Prešovská 282/1, 094 34 Bystré, SK

Product information

Product name: Crushed zeolites

Product identification:
Average product delivered.

Product description:
The basic raw material is natural zeolite (clinoptilolite) – a natural mineral with exceptional physical properties resulting from its unique crystal structure.

Structure
The structure of clinoptilolite is formed by a three-dimensional grid. It consists of silicate tetrahedrons SiO44- connected to each other through oxygen atoms, while part of the silicon atoms is replaced by aluminum atoms AlO45-. This creates a characteristic spatial structure with a significant occurrence of cavities, connected into channels in which metal cations or water molecules are stored. The total volume of these hollow spaces is 24-32%.
The extensive possibilities of using zeolite result primarily from the following specific physico-chemical properties:

- High ion exchange and selectivity
- Reversible hydration and dehydration
- High gas sorption capacity
- High thermostability
- Resistance to aggressive environment
- Highly specific surface

Clinoptilolite – Zeolite is widely used in agriculture, animal husbandry, construction, environmental protection, water and flue gas cleaning and various industries.
The company produces a wide portfolio of products based on natural zeolite, of various granulometries, divided according to the area of use into:

Zeolite products – Agro line
Zeolite and its active component, clinoptilolite, have a wide range of applications in agriculture. More than 30 years of experience in research and applications in agriculture, horticulture, and animal nutrition enable us to offer a comprehensive portfolio of products for the agro sector. Zeolite products are used in livestock farming as feed additives and as bedding materials to increase efficiency and improve animal welfare. They function primarily as technological additives, water-regime regulators, ammonia binders, anti-caking agents, and for the immobilization of heavy metals.
The ZeoSand and ZeoGravel product ranges are used as soil amendments or soil conditioners for soil hydration and nutrient retention. The properties of zeolite are also utilized by fertilizer and substrate manufacturers in the construction of green roofs, lawn establishment, as well as for lawn fertilization and aeration.
Zeolite products – Building line
In the construction industry, zeolite is widely used in the production of cements of various strength classes, as an additive to concrete and concrete products, and as a component of blended binders for soil and ground stabilization. As a natural pozzolan, zeolite improves the technological properties of cement and concrete, increases resistance to aggressive environments, enhances mechanical properties, and extends the service life of final construction products.
Zeolite products – Enviro line
Enviro line products have been specifically developed for a variety of environmental applications. The unique properties of zeolite make these products suitable for a wide range of filtration processes. Zeolite acts as an excellent filtration and sorption material, capable of capturing, among other substances, heavy metals. ZeoAqua and ZeoWater are highly effective filtration materials that ensure water purity and quality.
In addition to water treatment, Enviro line products play an important role in air and gas filtration, in the creation of filtration barriers for landfill construction to prevent soil contamination. These products reduce the environmental impact of industrial processes and support biological processes involved in biogas production.
Zeolite products – Industry line
For industrial requirements, the ZeoCem Micro product has been formulated to serve as an absorbent, filler, and desiccant in the production of various industrial materials. It is capable of absorbing odors, reducing the effects of UV radiation, and improving the stabilization of material mixtures.
Zeolite products – Hobby line
Zeolite products for household use hold a stable position in the company's product portfolio. For a long time, the highest demand has been for zeolite-based litter products. Also of interest are filtration gravels and aquarium media, zeolite as decorative stone, and various other applications in garden establishment, maintenance, and natural pond construction.

UN CPC code:
16390 Other minerals

Geographical scope:
The generic data used from the Ecoinvent database are used with validity for the Czech Republic (e.g. energy inputs) and in the event that data for the Czech Republic are not available, data valid for the EU or according to the location of the supplier are used. Based on the evaluation according to EN 15804+A2, Annex E, tab. E.1 the generic data used meet the quality level - medium.
Product packaging:
Products are delivered in accordance with applicable standards. Some products are shipped in bulk (tank trucks, dump trucks). Some products are packed in BigBags or bags by trucks.

Environment and health during use

During the entire production process, it is not necessary to take any extraordinary health protection measures exceeding the legislatively specified occupational health and safety measures for production employees. Due to the areas of use of the products, no environmental impacts and emissions into water, air or soil are expected. Zeolite is an ecological raw material.

LCA information

Functional unit / declared unit:

The declared unit is 1 t of the average manufactured product – Crushed zeolites.

Designation	Unit	Value
Declared unit	t	1
Conversion factor to 1 kg	kg	1000

Reference service life:
Given the nature of the products manufactured and provided that the specified storage conditions are met, the Reference Shelf Life (RSL) for the product can be considered unlimited.
Time representativeness:
For specific data, the manufacturer's data for the **year 2023** is used. For generic data, data from the Ecoinvent database version 3.11 is used. Based on the evaluation according to EN 15804+A2, Annex E, tab. E.1 the generic data used meet the quality level - very good.
Database(s) and LCA software used:
SimaPro Craft calculation software, version 10.2, Ecoinvent database version 3.11.
GWP-GHG from electricity production: 0,0033 kg CO2 eq/kWh (SK guaranteed nuclear source 2023).

Description of system boundaries:

"Cradle to gate with options, modules C1–C4, module D and with optional modules"

The production phase includes the following modules:

- **A1** - **extraction and processing of raw materials** and production of packaging from input raw materials
- **A2** - **transport of input raw materials** from the supplier to the manufacturer, waste removal
- **A3 - production of products**, production of auxiliary materials and semi-finished products, energy consumption, including waste processing until reaching a state where it ceases to be waste or after removal of the last material residues during the production phase.

The construction phase includes the following modules:

- **A4** - **transport to the construction site**. Transport is carried out by truck with a capacity of 32 t (EURO 6). Transport of the declared product unit over a distance of 1 km is considered.

The end-of-life phase includes modules:

- **C1,** deconstruction, demolition; of a product from a building/construction including its dismantling or demolition, including the initial sorting of materials at the construction site. Decomposition and/or dismantling of the product is part of the demolition of the entire construction. In this case, it is assumed: 300 kg of product (30% DJ), construction machine consumption 0.45 MJ/1 kg.
- **C2,** transport to the waste processing site; transport of the discarded product as part of waste processing, e.g. to a recycling site, and transport of waste, e.g. to a final disposal site. Transport from the dismantled structure (300 kg) is carried out by a truck with a load capacity of 7.5 - 16 t (EURO 6) to the recycling centre, the estimated transport distance according to calculations is 50 km.
- **C3,** waste treatment for reuse, recovery and/or recycling; e.g. collection of waste fractions from deconstruction, and treatment of waste from material streams intended for recycling (300 kg). The loads from the necessary treatment for further use (300 kg) are included. This includes treatment by crushing 0.00398 kWh/ 1 kg (electricity) and transport within the recycling 0.143 MJ/ 1 kg (diesel consumption).
- **C4,** Waste disposal including pre-treatment and management of the disposal site. Landfilling of the product is not considered.

Benefits and costs beyond the product system boundary are presented in module D.

Module D includes:

- **D,** the potential for reuse, recovery and/or recycling, expressed in net impacts or benefits. The module D scenario takes into account the saving of primary raw material inputs (excluding transport and energy) in another product system (e.g. crushed aggregate for backfill and fill).

Additionally, the system boundaries are also given in the life cycle structure common to non-construction products:

"Cradle to the Gate"

- **upstream** – previous processes (extraction and processing of raw materials, external transport of components)
- **core** - production process (production of products, internal transport)

(see also the chapter "Other environmental performance indicators").

Production:

The input raw material consists of extracted and dried zeolite.

Crushing and sorting of zeolite

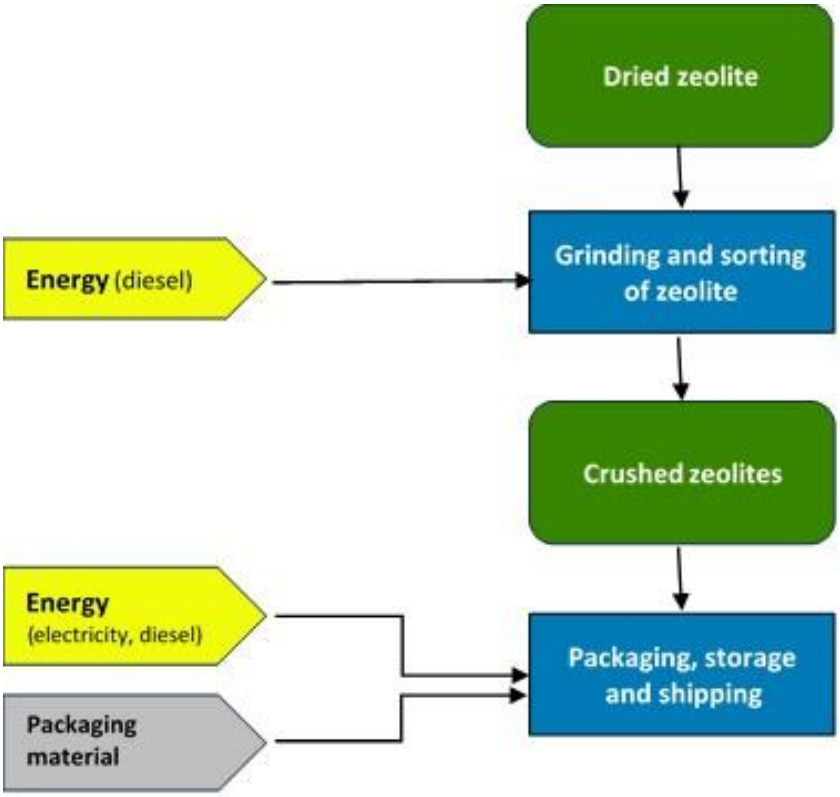
The production of crushed zeolites of different fractions is carried out on two (technology-identical) production crushing and sorting lines. Dried zeolite from a covered landfill of dried materials is transported by overhead crane to designated boxes of the crushing and sorting lines. Zeolite is dosed from the boxes via a belt conveyor with a built-in magnetic separator to a double-rotor hammer crusher, where it is crushed to a designated fraction. Subsequently, the zeolite is transported via transport routes, an elevator and via a vibrating feeder to a Mogensen vibrating screen. The screen is equipped with screens with a designated mesh size. When the material passes through the screen, final fractions of crushed products are obtained, which, after sorting, are directed via transport routes to designated steel silo containers. Several controlled production (sorting) modes are applied according to the current sales requirements for the output fractions. For each of the production modes, the screening of the sorter (set of sieves) and the addressability of the silos are determined. The most frequently produced crushed products are standard fractions: 0/0.2 , 0.2/0.5 , 0.2/1 , 0.5/1 , 1/2.5 , 2.5/5 , 4/8 , 0/1 , 2.5/4 , 0.6/1.8 . In smaller volumes, fractions , 8/16 and 16/32 mm are also produced (which can alternatively be produced on a small sorting line). Other fractions are also produced according to customer requirements and production capabilities.

Packaging, storage and shipping (of crushed zeolites)

Grained zeolites (various fractions) are shipped from designated storage silos either directly as bulk in tankers and dump trucks or are finally packed before shipment according to customer requirements into BigBags (mobile BB packages) or into paper ones (on a packaging and palletizing line). In the production of packaged crushed products (BB and bags), a wide range of packaging material is used, taking into account customer requirements for the size of the pallet unit, type of BigBag, type of bags (if the customer requires packaging also in PE and POP bags), type of pallets or type of transport (container, truck). Magnetic separators are used in the packaging process, and when packaging crushed products into bags, a checkweigher and a metal detector with rejection are also used in order to ensure the quality and safety of the ground products.

Finally packaged palletized crushed products (BB and bags) are, after being labeled in accordance with applicable legislation, stored in a designated covered warehouse for crushed products until the date of shipment. The loading of packaged crushed products onto trucks or into shipping containers is carried out using forklifts.

System diagram:



More information:

Information modules from the use phase **B1 to B7** are also not declared, as these types of products, assuming correct use, do not require maintenance, repair or replacement during the normal life time in the use phase. They also do not require energy or water consumption during the use phase.

For the study, all operational data related to the consumption of main and auxiliary materials for the production of the product, energy data, diesel consumption and the distribution of annual waste production and emissions according to plant records were taken. In terms of produced waste, only those wastes that are clearly related to production activities were included in the analysis.

The processes required for the installation of production equipment and the construction of infrastructure were not included in the analysis. Also, administrative processes are not included – inputs and outputs are balanced per production phase.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results)::

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	GLO	GLO, EU	EU, CZ	EU	EU								EU	EU	EU	EU	GLO, EU
Specific data used	> 95 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	< 10 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0 %					-	-	-	-	-	-	-	-	-	-	-	-

The data used to calculate the EPD conforms to the following principles:

Technological point of view: Data corresponding to the current production of individual types of partial products of the plant and corresponding to the current state of the technologies used are used.

Based on the evaluation according to EN 15804+A2, Annex E, tab. E.1 the generic data used meet the quality level - very good.

The aspect of completeness and completeness: Most of the input data is based on consumption balances, which are precisely recorded in the manufacturer's information system. The reliability of the source of specific data is determined by the uniformity of the collection methodology of the information system.

Consistency point of view: Uniform points of view are used throughout the report (allocation rules, age of data, technological scope of validity, temporal scope of validity, geographical scope of validity).

Credibility aspect: All important data were checked for adherence to cross-comparison of mass balances.

The GWP-GHG variability between the sub-products included (see Product Description) is less than 10%. Production takes place at only one production site.

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

Content information

Product components	Weight %	Post-consumer material, weight-%	Biogenic carbon content in kg C/DU
Zeolit	100	0	0
TOTAL	100	0	0
Packaging materials	**Weight %**	**Weight-% (versus the product)**	**Biogenic carbon content in kg C/DU**
Palette	86,3	1,28	5,73
PE foil	1,1	0,02	0,00
Polypropylene PP	6,7	0,10	0,00
Cardboard	0,5	0,01	0,03
Paper	5,4	0,08	0,36
TOTAL	**100,0**	**1,49**	**6,12**

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit (DU)
They are not	-	-	-

Substances listed on the list of substances of very high concern subject to authorization by the European Chemicals Agency are not contained in the product in declarable quantities.

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804:2012+A2:2019/AC:2021 (characterisation factors based on EF 3.1 package)

Results per functional or declared unit															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fosil	kg CO_2 ekv.	4,84E+01	1,87E-01	8,81E-01	ND	ND	ND	ND	ND	ND	ND	2,19E+00	3,53E+00	9,22E-01	0,00E+00	-1,07E+00
GWP-biogenic	kg CO_2 ekv.	-2,14E+01	1,30E-04	2,96E+01	ND	ND	ND	ND	ND	ND	ND	3,83E-03	1,62E-03	5,45E-03	0,00E+00	-2,35E-02
GWP- luluc	kg CO_2 ekv.	3,51E-02	6,28E-05	6,64E-05	ND	ND	ND	ND	ND	ND	ND	2,47E-04	1,10E-03	2,11E-03	0,00E+00	-7,06E-04
GWP - total	kg CO_2 ekv.	2,70E+01	1,87E-01	3,05E+01	ND	ND	ND	ND	ND	ND	ND	2,20E+00	3,54E+00	9,30E-01	0,00E+00	-1,09E+00
ODP	kg CFC 11 ekv.	1,80E-06	4,07E-09	4,51E-09	ND	ND	ND	ND	ND	ND	ND	3,49E-08	7,77E-08	1,34E-08	0,00E+00	-1,36E-08
AP	mol H^+ ekv.	1,26E-01	4,01E-04	2,06E-03	ND	ND	ND	ND	ND	ND	ND	2,03E-02	7,18E-03	6,72E-03	0,00E+00	-8,56E-03
EP-freshwater	kg P ekv.	3,61E-03	1,30E-05	1,35E-04	ND	ND	ND	ND	ND	ND	ND	6,74E-05	2,38E-04	5,51E-04	0,00E+00	-2,35E-04
EP- marine	kg N ekv.	5,27E-02	9,66E-05	6,15E-03	ND	ND	ND	ND	ND	ND	ND	9,43E-03	1,70E-03	2,25E-03	0,00E+00	-2,54E-03
EP - terrestrial	mol N ekv.	4,99E-01	1,04E-03	9,67E-03	ND	ND	ND	ND	ND	ND	ND	1,02E-01	1,83E-02	2,33E-02	0,00E+00	-3,43E-02
POCP	kg NMVOC ekv.	2,13E-01	6,35E-04	4,98E-03	ND	ND	ND	ND	ND	ND	ND	3,03E-02	1,15E-02	7,04E-03	0,00E+00	-8,52E-03
ADP- minerals& metals*	kg Sb ekv.	6,85E-05	6,41E-07	5,58E-07	ND	ND	ND	ND	ND	ND	ND	7,66E-07	1,21E-05	8,74E-07	0,00E+00	-1,61E-05
ADP-fosil*	MJ	1,06E+03	2,65E+00	3,20E+00	ND	ND	ND	ND	ND	ND	ND	2,87E+01	4,98E+01	1,84E+01	0,00E+00	-1,59E+01
WDP*	m^3	1,15E+01	1,04E-02	2,81E-02	ND	ND	ND	ND	ND	ND	ND	6,34E-02	1,77E-01	1,33E-01	0,00E+00	-2,93E-01
Acronyms	**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 Exceedance; **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 Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADP-minerals&metals** = Abiotic depletion potential for non-fossil resources; **ADP-fossil** = Abiotic depletion for fossil resources potential; **WDP** = Water (user) deprivation potential, deprivation-weighted water consumption														

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*
Disclaimer: If module C is included then when assessing the results of A1-A3, also take into account the results of modules C.

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 ekv.	4,84E+01	1,87E-01	5,66E+00	ND	ND	ND	ND	ND	ND	ND	2,19E+00	3,54E+00	9,26E-01	ND	-1,07E+00
PM	Disease incidence	2,44E-06	1,40E-08	3,42E-08	ND	ND	ND	ND	ND	ND	ND	5,67E-07	2,23E-07	1,17E-07	0,00E+00	-1,99E-07
IRP	kBq U235 ekv.	1,47E+01	3,20E-03	3,30E-03	ND	ND	ND	ND	ND	ND	ND	1,36E-02	7,26E-02	4,22E-01	0,00E+00	-2,69E-01
ETP- fw	CTUe	5,81E+01	3,56E-01	7,72E+00	ND	ND	ND	ND	ND	ND	ND	1,21E+01	7,25E+00	1,51E+00	0,00E+00	-4,80E+00
HTP-c	CTUh	2,80E-08	3,12E-11	9,84E-10	ND	ND	ND	ND	ND	ND	ND	3,69E-10	5,46E-10	1,08E-10	0,00E+00	-5,65E-10
HTP- nc	CTUh	2,16E-07	1,67E-09	9,49E-08	ND	ND	ND	ND	ND	ND	ND	1,09E-08	2,89E-08	4,14E-09	0,00E+00	-1,39E-08
SQP	dimensionless	1,97E+03	1,59E+00	8,09E+00	ND	ND	ND	ND	ND	ND	ND	1,92E+00	2,54E+01	1,66E+00	0,00E+00	-3,22E+01
Acronyms	**GWP-GHG** = this indicator includes all greenhouse gases except biogenic uptake and emissions of carbon dioxide and biogenic carbon stored in the product; as such the indicator is identical to GWP-total except that the CF for biogenic CO 2 is set to zero, **PM** = Potential incidence of disease due to PM emissions, **IRP** = Potential Human exposure efficiency relative to U235, **ETP-fw** = Potential Comparative Toxic Unit for ecosystems, **HTP-c** = Potential Comparative Toxic Unit for humans, **HTP-nc** = Potential Comparative Toxic Unit for humans, **SQP** = Potential soil quality index															

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Resource use indicators

Results per functional or declared unit															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3,68E+02	4,39E-02	4,84E-02	ND	ND	ND	ND	ND	ND	ND	1,12E-01	9,12E-01	1,04E+00	0,00E+00	-5,08E+00
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	3,68E+02	4,39E-02	4,84E-02	ND	ND	ND	ND	ND	ND	ND	1,12E-01	9,12E-01	1,04E+00	0,00E+00	-5,08E+00
PENRE	MJ	2,96E+02	2,11E-01	2,70E-01	ND	ND	ND	ND	ND	ND	ND	6,89E-01	3,84E+00	1,10E+01	0,00E+00	-6,47E+00
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,96E+02	2,11E-01	2,70E-01	ND	ND	ND	ND	ND	ND	ND	6,89E-01	3,84E+00	1,10E+01	0,00E+00	-6,47E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	**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 re-sources; **SM** = Use of secondary material; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Use of net fresh water														

Additional environmental information - Waste indicators

Results per functional or declared unit															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2,27E-02	6,40E-03	1,88E-02	ND	ND	ND	ND	ND	ND	ND	1,66E-04	1,16E-03	4,33E-04	0,00E+00	-1,05E-02
Non-hazardous waste disposed	kg	6,00E+00	4,54E+00	1,51E-01	ND	ND	ND	ND	ND	ND	ND	1,19E-02	2,02E+00	3,07E-02	0,00E+00	-3,08E-01
Radioactive waste disposed	kg	3,49E-03	1,40E-03	8,15E-07	ND	ND	ND	ND	ND	ND	ND	1,85E-06	1,80E-05	1,00E-04	0,00E+00	-6,01E-05

Additional environmental information - Output flow indicators

Results per functional or declared unit																
Indicator	**Unit**	**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	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,49E+01	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	3,00E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	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	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

The result tables shall only contain values or the letters "ND" (Not Declared). It is not possible to specify ND for mandatory indicators. ND shall only be used for voluntary parameters that are not quantified because no data is available.

Other environmental performance indicators

Results of environmental performance indicators for non-construction products

Products intended for use outside the construction sector are often not expressed in the structure of the construction life cycle, as specified in the EN 15804+A2 standard, but in the structure of the life cycle boundaries common to non-construction products:

"Cradle to the Gate"

- **upstream** – previous processes (extraction and processing of raw materials, external transport of components)
- **core** - production process (production of products, internal transport)

The following are the environmental indicators from the previous tables grouped in this structure:

Impact category indicators (according to EN 15804:2012+A2:2019/AC:2021)

Results per functional or declared unit				
Indicator	**Unit**	**Upstream**	**Core**	**TOTAL**
GWP-fosil	kg CO_2 ekv.	4,14E+01	7,83E+00	4,93E+01
GWP-biogenic	kg CO_2 ekv.	2,08E-02	8,18E+00	8,20E+00
GWP- luluc	kg CO_2 ekv.	5,01E-03	3,02E-02	3,52E-02
GWP - total	kg CO_2 ekv.	4,15E+01	1,60E+01	5,75E+01
ODP	kg CFC 11 ekv.	1,63E-06	1,72E-07	1,81E-06
AP	mol H^+ ekv.	8,96E-02	3,81E-02	1,28E-01
EP-freshwater	kg P ekv.	1,29E-03	2,45E-03	3,74E-03
EP- marine	kg N ekv.	3,98E-02	1,91E-02	5,89E-02
EP - terrestrial	mol N ekv.	3,69E-01	1,39E-01	5,08E-01
POCP	kg NMVOC ekv.	1,63E-01	5,42E-02	2,17E-01
ADP- minerals& metals*	kg Sb ekv.	3,71E-05	3,20E-05	6,90E-05
ADP-fosil*	MJ	8,01E+02	2,59E+02	1,06E+03
WDP*	m^3	2,58E+00	8,93E+00	1,15E+01
Acronyms	**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 Exceedance; **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 Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADP-minerals&metals** = Abiotic depletion potential for non-fossil resources; **ADP-fossil** = Abiotic depletion for fossil resources potential; **WDP** = Water (user) deprivation potential, deprivation-weighted water consumption			

* *Statement: The results of this environmental impact indicator should be used with caution because the uncertainty of these results is high or because there is limited experience with the indicator.*

Other impact category indicators

Results per functional or declared unit				
Indicator	**Unit**	**Upstream**	**Core**	**TOTAL**
GWP-GHG[2]	kg CO_2 ekv.	4,15E+01	1,27E+01	5,41E+01
PM	Disease incidence	1,65E-06	8,28E-07	2,47E-06
IRP	kBq U235 ekv.	5,88E+00	8,78E+00	1,47E+01
ETP- fw	CTUe	3,25E+01	3,33E+01	6,58E+01
HTP-c	CTUh	5,33E-09	2,37E-08	2,90E-08
HTP- nc	CTUh	1,04E-07	2,07E-07	3,11E-07
SQP	dimensionless	6,63E+01	1,91E+03	1,98E+03
Acronyms	**GWP-GHG** = this indicator includes all greenhouse gases except biogenic uptake and emissions of carbon dioxide and biogenic carbon stored in the product; as such the indicator is identical to GWP-total except that the CF for biogenic CO 2 is set to zero, **PM** = Potential incidence of disease due to PM emissions, **IRP** = Potential Human exposure efficiency relative to U235, **ETP-fw** = Potential Comparative Toxic Unit for ecosystems, **HTP-c** = Potential Comparative Toxic Unit for humans, **HTP-nc** = Potential Comparative Toxic Unit for humans, **SQP** = Potential soil quality index			

Indicators describing resource consumption (optional)

Results per functional or declared unit				
Indicator	**Unit**	**Upstream**	**Core**	**TOTAL**
PERE	MJ	4,63E+00	3,64E+02	3,68E+02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	4,63E+00	3,64E+02	3,68E+02
PENRE	MJ	1,20E+02	1,76E+02	2,96E+02
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,20E+02	1,76E+02	2,96E+02
SM	kg	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00
FW	m^3	0,00E+00	0,00E+00	0,00E+00
Acronyms	**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 re-sources; **SM** = Use of secondary material; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Use of net fresh water			

[2] This indicator includes all greenhouse gases except biogenic uptake and emissions of carbon dioxide and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero..

Additional environmental information – waste category description (optional)

Results per functional or declared unit				
Indicator	**Unit**	**Upstream**	**Core**	**TOTAL**
Hazardous waste disposed	kg	6,40E-03	3,51E-02	4,15E-02
Non-hazardous waste disposed	kg	4,54E+00	1,61E+00	6,15E+00
Radioactive waste disposed	kg	1,40E-03	2,10E-03	3,49E-03

Additional environmental information – description of output streams (optional)

Results per functional or declared unit				
Indicator	**Unit**	**Upstream**	**Core**	**TOTAL (CELKEM)**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00

The result tables may only contain values or the letters "ND" (not declared). It is not possible to specify ND for mandatory indicators. ND is only used for voluntary parameters that are not quantified because no data are available.

Carbon Footprint - CFP

Within the product system defined in the section "LCA information" on page 7, the partial carbon footprint (CFP) of all assessed product groups is also assessed and declared in accordance with **ČSN EN ISO 14067:2022** *Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification*. The carbon footprint addresses only one impact category: **climate change**. The calculation is based on the **IPCC-2021** model and expressed in 100-year global warming potential (GWP) in [kg CO2e].

CFP for construction products

The scope of the carbon footprint study, the product system and its boundaries are identical to the assessment of products within the EPD according to EN 15804+A2. The relevant environmental indicators are declared according **to the information modules A1-C4** used in the EPD (see table on page 10). The declared unit is **1 t of product**.

Greenhouse gas emissions	**Carbon footprint by life cycle stage in [kg CO2e]**							
	A1-A3	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**TOTAL**
Net emissions and removals of **fossil** greenhouse gases	4,84E+01	1,87E-01	8,81E-01	1,36E+00	3,53E+00	9,22E-01	0,00E+00	5,53E+01
Net emissions and removals of **biogenic** greenhouse gases	-2,14E+01	1,30E-04	2,96E+01	2,75E-04	1,62E-03	5,45E-03	0,00E+00	8,21E+00

Greenhouse gas emissions	Carbon footprint by life cycle stage in [kg CO2e]							
	A1-A3	A4	A5	C1	C2	C3	C4	TOTAL
Greenhouse gas emissions and removals from **direct land-use change**	3,51E-02	6,28E-05	6,64E-05	1,39E-04	1,10E-03	2,11E-03	0,00E+00	3,86E-02
Greenhouse gas emissions **from aviation**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Note: A1-A3 = production phase *(for which the CFP value is most often given)*

CFP for non-construction products

The scope of the carbon footprint study, the product system and its boundaries are identical to the assessment of non-construction products within the boundaries of the "**Cradle to Gate**" life cycle. The declared unit is **1 t of product**.

Greenhouse gas emissions	Carbon footprint by life cycle stage in [kg CO2e]		
	Upstream	Core	TOTAL
Net emissions and removals of **fossil** greenhouse gases	4,14E+01	7,83E+00	4,93E+01
Net emissions and removals of **biogenic** greenhouse gases	2,08E-02	8,18E+00	8,20E+00
Greenhouse gas emissions and removals from **direct land-use change**	5,01E-03	3,02E-02	3,52E-02
Greenhouse gas emissions **from aviation**	0,00E+00	0,00E+00	0,00E+00

Additional environmental information

Differences versus previous versions

First version of EPD, 2025-10-20

ABBREVIATIONS

Abbreviation	Definition
General abbreviations	
EN	European standard
EPD	Environmental product declaration
EF	Environmental footprint
GPI	General guidelines for the environmental labelling program (in the Czech Republic – NPEZ)
ISO	International Organization for Standardization
LCA	Life cycle assessment
LCI	Life cycle inventory analysis
LCIA	Life cycle impact assessment
DJ / DU	Declared unit
ILCD	International Reference Life cycle data system
PCR	Product category rules
c-PCR	Additional rules for product categories
PRICE	European Committee for Standardization
CPC	Central Product Classification (Central Product Classification)
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GRI	Global Reporting Initiative
National	Undeclared
Environmental impact indicators (EN 15804)	
Greenhouse gas	a gas in the atmosphere that absorbs and emits infrared radiation, thereby contributing to the warming of the planet (CO_2, CH_4, N_2O and others)
GWP	Global warming potential (kg CO_2 eq .)
GWP-fossil	Global warming potential from fossil fuels (kg CO_2 eq .)
GWP-biogenic	Global warming potential from biogenic sources (kg CO_2 eq .)
GWP- luluc	Global warming potential due to land use and land use change (kg CO_2 (eq .)
ODP	Stratospheric ozone depletion potential (kg CFC-11 equivalent)
AP	Acidification potential, cumulative exceedance (mol H^+ (eq .)
EP	Eutrophication potential
EP-freshwater	Freshwater eutrophication potential (kg P eq .)
EP-seawater	Seawater eutrophication potential (kg N eq .)
EP-soils	Land eutrophication potential (mol N eq .)
POCP	Ground-level ozone formation potential (kg NMVOC equivalent)
ADP	Potential for resource/raw material depletion
ADP - minerals and metals	Potential for depletion of non-fossil resources/raw materials (kg Sb equivalent)
ADP-fossil	Fossil resource/raw material depletion potential (MJ)
WDP	Water shortage potential (m^3)
Additional environmental impact indicators (EN 15804)	
GWP-GHG	Global warming potential for greenhouse gases (kg CO_2 eq .). The indicator includes all greenhouse gases except biogenic uptake and emissions of carbon dioxide and biogenic carbon stored in the product; as such, the indicator is identical to GWP- total except that the CF for biogenic $CO2_{is}$ set to zero.

Abbreviation	Definition
PM	Potential incidence of diseases due to particulate matter emissions
IRP	Potential effect of human exposure to the isotope U235
ETP- fw	Potential toxicity benchmark for ecosystems
HTP-c	Potential human toxicity comparator – carcinogenic effects
HTP- oc	Potential human toxicity comparator - non-carcinogenic effects
SQP	Potential Soil Quality Index
Resource utilization indicators	
PERE	Renewable primary energy consumption excluding energy sources used as raw materials (MJ)
PERM	Consumption of renewable primary energy sources used as raw materials (MJ)
PERT	Total consumption of renewable primary energy sources (primary energy and primary energy sources used as raw materials) (MJ)
PENRE	Consumption of non-renewable primary energy excluding energy sources used as raw materials (MJ)
PENRM	Consumption of non-renewable primary energy sources used as raw materials (MJ)
PENRT	Total consumption of non-renewable primary energy sources (primary energy and primary energy sources used as raw materials) (MJ)
SM	Consumption of secondary raw materials (kg)
RSF	Consumption of renewable secondary fuels (MJ)
NRSF	Consumption of non-renewable secondary fuels (MJ)
FW	Net drinking water consumption (m^3)
Waste indicators	
HWD	Hazardous waste removed (kg)
NHWD	Other waste removed (kg)
RWD	Radioactive waste removed (kg)
Output flow indicators	
CRU	Reusable building elements (kg)
MR	Materials to be recycled (kg)
MER	Materials for energy recovery (kg)
EEE	Exported energy, electricity (MJ)
EET	Exported thermal energy (MJ)
Lifecycle phases/modules	
A1	Mining and processing of raw materials, processing of input secondary raw materials
A2	Transport to the manufacturer
A3	Production
A4	Transport to the construction site
A5	Installation in a building
B1	Use or application of the installed product
B2	Maintenance
B3	Repair
B4	Exchange
B5	Reconstruction
B6	Operating energy consumption

Abbreviation	Definition
B7	Operating water consumption
C1	Deconstruction / Demolition
C2	Transportation to the waste processing site
C3	Waste treatment for reuse, recovery and/or recycling
C4	Removal
D	Reuse, recovery and recycling potential
Other relevant terms	
Substances of Very High Concern (SVHC)	Substances of very high concern
CAS number	An internationally recognized unique numerical code used in chemistry for chemical substances
CF	Characterization factor
RSL	Reference life span
MJ	Megajoule
kg	Kilogram
m³	Cubic meter
NMVOC	methane volatile organic compounds
Sat eq .	Antimony equivalents
P eq .	Phosphorus equivalents
Not equal .	Nitrogen equivalents
Equivalent to CFC-11	Chlorofluorocarbon-11 equivalents
CO $_2$ equivalent	Carbon dioxide equivalents
kg C	Kilograms of carbon
kg CO_2 eq .	Kilograms of carbon dioxide equivalent
OTE	OTE, as (in the Czech Republic) – energy market operator

References

EN ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
EN ISO 14040:2006 Environmental management - Life Cycle Assessment - Principles and Framework
EN ISO 14044:2006 Environmental management - Life Cycle Assessment – Requirements and guidelines
EN ISO 14063:2020 Environmental management - Environmental communication - Guidelines and examples
EN 15643:2021 Sustainability of construction works - Framework for assessment of buildings and civil engineering works
EN 15941:2024 Sustainability of construction works - Data quality for environmental assessment of products and construction work - Selection and use of data
EN 15942:2021 Sustainability of construction works - Environmental product declarations - Communication format business-to-business
EN 17672:2022 Sustainability of construction works - Environmental product declarations - Horizontal rules for business-to-consumer communication
EN 16908:2017+A1:2022 Cement and building lime - Environmental product declarations - Product category rules complementary to EN 15804
EN 16449:2014 Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
ILCD General guide for Life Cycle Assessment (2010) - JRC EU
Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives; CZ - Act No. 541/2020 Coll., as amended (Waste Act)
Decree No. 8/2021 Coll. Waste catalogue – Waste catalogue
Regulation (EC) No 1907/2006 of the European Parliament concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency - REACH (Registration, Evaluation and Authorisation of Chemicals
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
SimaPro LCA Package, Pré Consultants, the Netherlands, www.pre-sustainability.com
Ecoinvent Centre, www.Ecoinvent.org
EU PEF (EF reference package) - https://eplca.jrc.ec.europa.eu/LCDN/EN15804.html
Explanatory documents are available from the head of Technical Support of the EPD owner.