

Environmental Product Declaration

In accordance with
EN 15 804
ISO 14 025



Alternative products:	
Manufactured by:	CIUR a.s.
EPD programme:	Národní program environmentálního značení
Declaration number:	3013EPD-16-0540
Issued:	1.12.2016
Valid until:	30.11.2021
Verified by:	Building Research Institute - Certification company Ltd. Accredited third party verifier



Climastone® thermal and acoustic insulation

General information



Manufacturer	CIUR a.s.
Official address	Malé náměstí 142/3, 110 00 Prague 1, Czech Republic
Manufacturing site	Pražská 1012, 250 01 Brandýs nad Labem, Czech Republic
About	CIUR a.s. is a manufacturing company with a (history) of producing blown insulation products from secondary materials since 1991.
Website	www.ciur.cz ; www.climatizer.com
e-mail	info@ciur.cz
Phone	00420 326 901 411
VAT	CZ40612724
Product	Climastone® - S, M, L
Alternative names	
Description	<p>Climastone® is a unique thermal and acoustic insulation, made from mineral fibre. The production method is based on shredding of composition melt. The mineral fibre is then shaped into in-situ formed loose-fill mineral wool products on the production line. The entire fibre surface is hydrophobised, however, it is necessary to protect the insulation in the construction from the elements (avoiding contact with rain water).</p> <p>The three product alternatives differ in technical properties, such as thermal conductivity and density.</p>
Product code (HS)	68061000
EPD	Environmental Product Declaration
EPD Programme	Národní program environmentálního značení (National programme of environmental labelling), CENIA, the Czech Environmental Information Agency, Litevská 1174/8, 100 05 Praha 10
Declaration number	3013EPD-16-0540
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Valid until	30. 11. 2021
General PCR	EN 15 804
Prepared by	Jan Weinzettel, Charles University, Environment Centre (e-mail: wein-zettel@seznam.cz)
Based on	Weinzettel J. and D. Kapitulčinová, LCA studie vybraných produktů firmy CIUR a.s. (LCA study of selected CIUR products), CIUR, 2016
Verified by	Barbora Vlasatá, Bulding Research Institute – Certification Company Ltd. (e-mail: vlasata@vups.cz)
Accredited by	Czech Accreditation Institute (a national accreditation body)

Product Description



Climastone® - L and -M is made from soft fibre of stone wool, while **Climastone® - S is made from harder** fibre of stone wool. Climastone® is used for thermal and acoustic insulation in the external and internal structures. Installation is carried out by using blowing machines, free blowing or injection filling into the prepared cavity walls, roofs or ceilings. The system enables penetrate very easily into the smallest corners and hence provides a full fill installation without any air gaps. Blowing technology ensures quick and easy work. When applying free blowing, the material meets the S1 requirements of settlement at higher densities. The manufacturer installation instructions regarding minimum required density should be followed, in order to avoid any settlement.

Climastone® - S is suitable for all applications in common structures. Density in horizontal and slightly sloping structures, depending on the method of processing and storing, in the range from 50 to 90 kg/m³. It can be used in all external building elements including walls. Wall structure, in terms of long-term stability, must be filled with a greater density. It must be installed at a minimum density of 70 kg/m³.

Density ranges:

- open blowing in horizontal surfaces: 50-60 kg/m³
- volume filling in vertical structures: 70-110 kg/m³

Table 1 Technical parameters of Climastone® - S.

Parameter	Measured Value	Unit	Harmonized Technical Specification
THERMAL PROPERTIES			
Thermal conductivity factor λ (according to volume density)	0,041 – 0,036	W·m ⁻¹ ·K ⁻¹	EN 12667
Specific heat capacity c_d	900	J·kg ⁻¹ ·K ⁻¹	EN ISO 8990, EN 675
PHYSICAL PROPERTIES			
Volume weight	50 – 69 (70 – 90)*	kg·m ⁻³	EN 1602
Settling rate (open blowing on horizontal surface)	S2 (S1)	-	EN 14064-1
Settling rate (volume filling – ceilings, roofs, partitions)	undetectable (≤ 1)	%	-
FIRE PROPERTIES			
Reaction to fire	A1	-	EN 13501-1
Flame spread index i_f	0,00	mm·min ⁻¹	ČSN 73 0863
Maximum used temperature	200	°C	-
Melting temperature of mineral fibre	1000	°C	-
OTHER PROPERTIES			
Diffusion resistance factor μ	1	-	EN 12086

* according to the construction type

S1 = settling rate undetectable (≤ 1 %) according to EN 14064-1

S2 = settling rate > 1 % and ≤ 5 % according to EN 14064-1

Product Description



Climastone® - M is designed for specific fire design, installation shafts, cable routes and filling of thin structures with a small volume in general. Flakes of this type are very small and therefore allow very detailed filling even complicated and complex space. The density of this product falls in the range of 70-130 kg/m³ and most are around 100 kg/m³.

Density ranges:

- open blowing in free horizontal surfaces: 70-130 kg/m³

Table 2 Technical parameters of Climastone® - M.

Parameter	Measured Value	Unit	Harmonized Technical Specification
THERMAL PROPERTIES			
Thermal conductivity factor λ (according to volume density)	0,036 – 0,038	W·m ⁻¹ ·K ⁻¹	EN 12667
Specific heat capacity c_d	900	J·kg ⁻¹ ·K ⁻¹	EN ISO 8990, EN 675
PHYSICAL PROPERTIES			
Settling rate (open blowing on horizontal surface)	S1	-	EN 14064-1
Settling rate (volume filling – ceilings, roofs, partitions)	undetectable (≤ 1)	%	-
FIRE PROPERTIES			
Reaction to fire	A1	-	EN 13501-1
Flame spread index i_s	0,00	mm·min ⁻¹	CSN 73 0863
Maximum used temperature	200	°C	-
Melting temperature of mineral fibre	1000	°C	-
OTHER PROPERTIES			
Diffusion resistance factor μ	1	-	EN 12086

S1 = settling rate undetectable (≤ 1 %) according to EN 14064-1

Product Description



Climastone® - L is particularly suitable in the ceiling and on the undersides. Its bulk density in the range of 40-90 kg/m³ is used in this case in the lower limit, where the use of this type of product is most economically and qualitatively advantageous.

Density ranges:

- open blowing in free horizontal surfaces: 40-60 kg/m³
- volume filling in horizontal or inclined structures: 42-90 kg/m³

Table 3 Technical parameters of Climastone® - L.

Parameter	Measured Value	Unit	Harmonized Technical Specification
THERMAL PROPERTIES			
Thermal conductivity factor λ (according to volume density)	0,037	W·m ⁻¹ ·K ⁻¹	EN 12667
Specific heat capacity c_d	900	J·kg ⁻¹ ·K ⁻¹	EN ISO 8990, EN 675
PHYSICAL PROPERTIES			
Settling rate (open blowing on horizontal surface)	S1	-	EN 14064-1
Settling rate (volume filling – ceilings, roofs, partitions)	undetectable (≤1)	%	-
FIRE PROPERTIES			
Reaction to fire	A1	-	EN 13501-1
Flame spread index i_s	0,00	mm·min ⁻¹	ČSN 73 0863
Maximum used temperature	200	°C	-
Melting temperature of mineral fibre	1000	°C	-
OTHER PROPERTIES			
Diffusion resistance factor μ	1	-	EN 12086

S1 = settling rate undetectable (≤1 %) according to EN 14064-1

Function and declared unit

The main function of **Climastone®** products is to provide thermal insulation. The declared unit is a provision of the thermic isolation of 1m^2 structure with a thermal resistance of $1\text{m}^2\text{KW}^{-1}$ for a non-loadbearing panel located under a waterproof surface, during 50 years.

Reference flow

The amount of the product to fulfill the declared unit depends on specific type of Climastone®, application type and the corresponding density. Therefore, the results are provided for more values of the reference flow in order to provide the boundary combinations of density and thermal conductivity:

Climastone® - S (minimal and maximum value according to application type)

- 1.8-2.46 kg for open blowing in horizontal surfaces (1.8 kg for density 50 kg.m^{-3} and λ 0.036 W/m.K; 2.46 kg for density 60 kg.m^{-3} and λ 0.041 W/m.K)
- 2.52-4.51 kg for volume filling in vertical structures (2.52 kg for density 70 kg.m^{-3} and λ 0.036 W/m.K; 4.51 kg for density 110 kg.m^{-3} and λ 0.041 W/m.K)

Climastone® - M (minimal and maximum value for all combinations of thermal specific thermal conductivity and density)

- 2.52 kg for density 70 kg.m^{-3} and λ 0.036 W/m.K
- 4.94 kg for density 130 kg.m^{-3} and λ 0.038 W/m.K

Climastone® - L (values according to application type)

- 1.48-2.22 kg for density $40\text{-}60\text{ kg.m}^{-3}$ (open blowing in free horizontal surfaces)
- 1.55-3.33 kg for density $42\text{-}90\text{ kg.m}^{-3}$ (volume filling in horizontal or inclined structures)

As the overall results are determined by the reference flow, the results are reported for each reference flow listed above in order to cover the full range of possibilities. In addition, results per 1 kg of the product are reported as well.

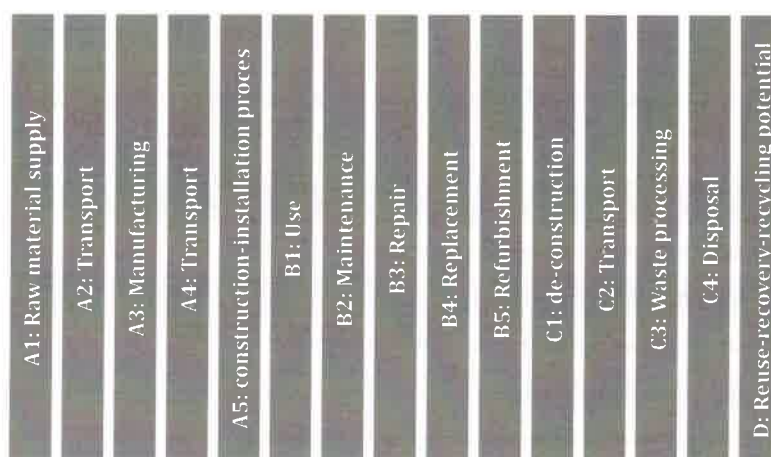


Figure 1 Overview of life cycle modules.

Reference service life

The reference service life is assumed to be 50 years.

Life cycle stages

The life cycle stages covered by this EPD include modules A1-A4, C2-C4, i.e. A1 – raw material supply, A2 – transport of raw materials, A3 – manufacturing, A4 – transport from the manufacturing site, C2 – transport for disposal, C3 – waste processing and C4 – disposal.

EPD-type

Cradle to gate with options – modules B1-B5 are not relevant for this product and are not part of this EPD.

Comparability of EPD

EPD of construction products may not be comparable if they do not comply with EN 15 804.

Key assumptions

Environmental impacts of upstream processes of all secondary materials are excluded, however, the transport processes to the manufacturing site of the distance of 50 km are included in the assessment.

Due to inert chemical properties of the product, landfilling is assumed as the final product disposal.

Electricity mix

Electricity mix used in LCA is the Ecoinvent 3 process Electricity, medium voltage {CZ}| market for | Alloc Def, U with these inputs:

Electricity, high voltage {CZ} electricity production, nuclear, pressure water reactor Alloc Def, U	31%
Electricity, high voltage {CZ} electricity production, lignite Alloc Def, U	30%
Electricity, high voltage {CZ} import from PL Alloc Def, U	9,8%
Electricity, high voltage {CZ} heat and power co-generation, lignite Alloc Def, U	9,5%
Electricity, high voltage {CZ} import from DE Alloc Def, U	2,9%
Electricity, high voltage {CZ} heat and power co-generation, hard coal Alloc Def, U	2,6%
Electricity, high voltage {CZ} treatment of blast furnace gas, in power plant Alloc Def, U	2,4%
Electricity, high voltage {CZ} electricity production, hard coal Alloc Def, U	2,3%
Electricity, high voltage {CZ} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014 Alloc Def, U	2,0%
Electricity, high voltage {CZ} electricity production, hydro, run-of-river Alloc Def, U	1,7%
Electricity, high voltage {CZ} heat and power co-generation, biogas, gas engine Alloc Def, U	1,6%
Electricity, high voltage {CZ} heat and power co-generation, natural gas, conventional power plant, 100MW electrical Alloc Def, U	1,2%
Electricity, high voltage {CZ} electricity production, hydro, pumped storage Alloc Def, U	0,80%
Electricity, high voltage {CZ} electricity production, hydro, reservoir, non-alpine region Alloc Def, U	0,58%
Electricity, high voltage {CZ} electricity production, wind, 1-3MW turbine, onshore Alloc Def, U	0,40%
Electricity, high voltage {CZ} treatment of coal gas, in power plant Alloc Def, U	0,27%
Electricity, high voltage {CZ} heat and power co-generation, oil Alloc Def, U	0,07%
Electricity, high voltage {CZ} import from AT Alloc Def, U	0,06%
Electricity, high voltage {CZ} electricity production, wind, <1MW turbine, onshore Alloc Def, U	0,05%
Electricity, high voltage {CZ} electricity production, natural gas, conventional power plant Alloc Def, U	0,04%
Electricity, high voltage {CZ} import from SK Alloc Def, U	0,03%
Electricity, high voltage {CZ} electricity production, oil Alloc Def, U	0,02%
Electricity, high voltage {CZ} electricity production, natural gas, combined cycle power plant Alloc Def, U	0,01%

Allocation

Mass allocation is applied on the processes within the manufacturing site.

System boundaries

Secondary materials are assumed with zero environmental impacts at their production site, just the transport is included for input materials and no impacts are allocated to waste for reuse generated at the production site. Complete production chains are included for other input products and materials.

Reference year and geographical scope

The EPD is based on data collected for year 2015. The geographical scope is global, however, the EPD is only relevant to products manufactured at the specified production site at Brandýs nad Labem, Czech Republic.

Content Declaration



Climastone® products are composed of those materials:

Material	Content
Waste mineral wool insulation	>99%
Mineral wool	>95%
Additives	<5%

The main component of **Climastone®** products is waste mineral wool which is a secondary material obtained mainly from the production of mineral wool insulation products. Therefore, the material content is determined by the parent product, which is composed from mineral wool and additives.

Resource use

Table 4 Use of resources per 1 kg of product and per declared unit (all boundary values of reference flow displayed)

Indicator	Unit	1kg	L				M		S			
			1.48	2.22	1.55	3.33	2.52	4.94	1.8	2.46	2.52	4.51
Use of renewable primary energy excluding renewable energy used as raw materials	MJ, net calorific value	0.25	0.37	0.55	0.38	0.82	0.62	1.22	0.45	0.61	0.62	1.12
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	0.25	0.37	0.55	0.38	0.82	0.62	1.22	0.45	0.61	0.62	1.12
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value	5.73	8.49	12.73	8.89	19.09	14.45	28.33	10.32	14.11	14.45	25.86
Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	5.73	8.49	12.73	8.89	19.09	14.45	28.33	10.32	14.11	14.45	25.86
Use of secondary material	kg	1.00	1.48	2.22	1.55	3.33	2.52	4.94	1.80	2.46	2.52	4.51
Use of renewable secondary fuels	MJ, net calorific value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non renewable secondary fuels	MJ, net calorific value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of net fresh water	m ³	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Content Declaration



Waste generation

Table 5 Waste generation per 1 kg of product and per declared unit (all boundary values of reference flow displayed)

Waste type	Unit	1kg	L				M		S			
			1.48	2.22	1.55	3.33	2.52	4.94	1.8	2.46	2.52	4.51
Hazardous waste disposed	kg	$5.0 \cdot 10^{-6}$	$7.4 \cdot 10^{-6}$	$1.1 \cdot 10^{-5}$	$7.8 \cdot 10^{-6}$	$1.7 \cdot 10^{-5}$	$1.3 \cdot 10^{-5}$	$2.5 \cdot 10^{-5}$	$9 \cdot 10^{-6}$	$1.2 \cdot 10^{-5}$	$1.4 \cdot 10^{-5}$	$2.3 \cdot 10^{-5}$
Non hazardous waste disposed	kg	0.026	0.04	0.06	0.04	0.09	0.07	0.13	0.05	0.06	0.07	0.12
Radioactive waste disposed	kg	-	-	-	-	-	-	-	-	-	-	-

Environmental Performance



Potential environmental impacts

Table 6 Potential environmental impacts per 1 kg of product Climastone (all variants have the same results per 1 kg).

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	$4.7 \cdot 10^{-7}$	$2.2 \cdot 10^{-8}$	$3.5 \cdot 10^{-7}$	$8.8 \cdot 10^{-8}$	$5.5 \cdot 10^{-9}$
Abiotic depletion (fossil fuels)	MJ	4.50	$1.3 \cdot 10^{-1}$	3.70	$5.4 \cdot 10^{-1}$	$1.6 \cdot 10^{-1}$
Global warming (GWP100a)	kg CO _{2eq}	$3.0 \cdot 10^{-1}$	$8.2 \cdot 10^{-3}$	$2.5 \cdot 10^{-1}$	$3.3 \cdot 10^{-2}$	$5.3 \cdot 10^{-3}$
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	$2.7 \cdot 10^{-8}$	$1.5 \cdot 10^{-9}$	$1.7 \cdot 10^{-8}$	$6.2 \cdot 10^{-9}$	$1.8 \cdot 10^{-9}$
Photochemical oxidation	kg C ₂ H _{4eq}	$5.0 \cdot 10^{-5}$	$1.3 \cdot 10^{-6}$	$4.1 \cdot 10^{-5}$	$6.3 \cdot 10^{-6}$	$1.9 \cdot 10^{-6}$
Acidification	kg SO _{2eq}	$1.2 \cdot 10^{-3}$	$2.1 \cdot 10^{-5}$	$9.2 \cdot 10^{-4}$	$1.7 \cdot 10^{-4}$	$4.0 \cdot 10^{-5}$
Eutrophication	kg PO _{4---eq}	$9.3 \cdot 10^{-4}$	$4.3 \cdot 10^{-6}$	$8.8 \cdot 10^{-4}$	$4.0 \cdot 10^{-5}$	$8.5 \cdot 10^{-6}$

Table 7 Climastone® - S: Potential environmental impacts per declared unit for reference flow of 1.8 kg (density of 50 kg.m⁻³, lambda 0.036 W/m.K, lower bound for open blowing in horizontal surfaces)

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	$8.4 \cdot 10^{-7}$	$4.0 \cdot 10^{-8}$	$6.3 \cdot 10^{-7}$	$1.6 \cdot 10^{-7}$	$1.0 \cdot 10^{-8}$
Abiotic depletion (fossil fuels)	MJ	8.1	$2.3 \cdot 10^{-1}$	6.7	$9.6 \cdot 10^{-1}$	$2.9 \cdot 10^{-1}$
Global warming (GWP100a)	kg CO _{2eq}	$5.4 \cdot 10^{-1}$	$1.5 \cdot 10^{-2}$	$4.6 \cdot 10^{-1}$	$6.0 \cdot 10^{-2}$	$9.5 \cdot 10^{-3}$
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	$4.8 \cdot 10^{-8}$	$2.7 \cdot 10^{-9}$	$3.1 \cdot 10^{-8}$	$1.1 \cdot 10^{-8}$	$3.2 \cdot 10^{-9}$
Photochemical oxidation	kg C ₂ H _{4eq}	$9.0 \cdot 10^{-5}$	$2.3 \cdot 10^{-6}$	$7.3 \cdot 10^{-5}$	$1.1 \cdot 10^{-5}$	$3.5 \cdot 10^{-6}$
Acidification	kg SO _{2eq}	$2.1 \cdot 10^{-3}$	$3.7 \cdot 10^{-5}$	$1.7 \cdot 10^{-3}$	$3.1 \cdot 10^{-4}$	$7.2 \cdot 10^{-5}$
Eutrophication	kg PO _{4---eq}	$1.7 \cdot 10^{-3}$	$7.7 \cdot 10^{-6}$	$1.6 \cdot 10^{-3}$	$7.3 \cdot 10^{-5}$	$1.5 \cdot 10^{-5}$

Table 8 Climastone® - S: Potential environmental impacts per declared unit for reference flow of 2.46kg (density of 60 kg.m⁻³, lambda 0.041 W/m.K, upper bound for open blowing in horizontal surfaces)

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	$1.2 \cdot 10^{-6}$	$5.4 \cdot 10^{-8}$	$8.7 \cdot 10^{-7}$	$2.2 \cdot 10^{-7}$	$1.4 \cdot 10^{-8}$
Abiotic depletion (fossil fuels)	MJ	11	$3.2 \cdot 10^{-1}$	9.1	1.3	$3.9 \cdot 10^{-1}$
Global warming (GWP100a)	kg CO _{2eq}	$7.4 \cdot 10^{-1}$	$2.0 \cdot 10^{-2}$	$6.3 \cdot 10^{-1}$	$8.2 \cdot 10^{-2}$	$1.3 \cdot 10^{-2}$
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	$6.6 \cdot 10^{-8}$	$3.7 \cdot 10^{-9}$	$4.3 \cdot 10^{-8}$	$1.5 \cdot 10^{-8}$	$4.4 \cdot 10^{-9}$
Photochemical oxidation	kg C ₂ H _{4eq}	$1.2 \cdot 10^{-4}$	$3.2 \cdot 10^{-6}$	$1.0 \cdot 10^{-4}$	$1.6 \cdot 10^{-5}$	$4.8 \cdot 10^{-6}$
Acidification	kg SO _{2eq}	$2.8 \cdot 10^{-3}$	$5.1 \cdot 10^{-5}$	$2.3 \cdot 10^{-3}$	$4.3 \cdot 10^{-4}$	$9.8 \cdot 10^{-5}$
Eutrophication	kg PO _{4---eq}	$2.3 \cdot 10^{-3}$	$1.1 \cdot 10^{-5}$	$2.2 \cdot 10^{-3}$	$9.9 \cdot 10^{-5}$	$2.1 \cdot 10^{-5}$

Environmental Performance



Table 9 Climastone® - S: Potential environmental impacts per declared unit for reference flow of 2.52 kg (density of 70 kg.m⁻³, lambda 0.036 W/m.K, lower bound for volume filling in vertical structures).

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	1.2*10 ⁻⁶	5.5*10 ⁻⁸	8.9*10 ⁻⁷	2.2*10 ⁻⁷	1.4*10 ⁻⁸
Abiotic depletion (fossil fuels)	MJ	11	3.3*10 ⁻¹	9.3	1.4	4.0*10 ⁻¹
Global warming (GWP100a)	kg CO _{2eq}	7.6*10 ⁻¹	2.1*10 ⁻²	6.4*10 ⁻¹	8.4*10 ⁻²	1.3*10 ⁻²
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	6.8*10 ⁻⁸	3.8*10 ⁻⁹	4.4*10 ⁻⁸	1.6*10 ⁻⁸	4.5*10 ⁻⁹
Photochemical oxidation	kg C ₂ H _{4eq}	1.3*10 ⁻⁴	3.2*10 ⁻⁶	1.0*10 ⁻⁴	1.6*10 ⁻⁵	4.9*10 ⁻⁶
Acidification	kg SO _{2eq}	2.9*10 ⁻³	5.2*10 ⁻⁵	2.3*10 ⁻³	4.4*10 ⁻⁴	1.0*10 ⁻⁴
Eutrophication	kg PO ₄ --- _{eq}	2.3*10 ⁻³	1.1*10 ⁻⁵	2.2*10 ⁻³	1.0*10 ⁻⁴	2.1*10 ⁻⁵

Table 10 Climastone® - S: Potential environmental impacts per declared unit for reference flow of 4.51kg (density of 110 kg.m⁻³, lambda 0.041 W/m.K, upper bound for volume filling in vertical structures)

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	2.1*10 ⁻⁶	9.9*10 ⁻⁸	1.6*10 ⁻⁶	4.0*10 ⁻⁷	2.5*10 ⁻⁸
Abiotic depletion (fossil fuels)	MJ	20	5.9*10 ⁻¹	17	2.4	7.2*10 ⁻¹
Global warming (GWP100a)	kg CO _{2eq}	1.4	3.7*10 ⁻²	1.1	1.5*10 ⁻¹	2.4*10 ⁻²
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	1.2*10 ⁻⁷	6.8*10 ⁻⁹	7.9*10 ⁻⁸	2.8*10 ⁻⁸	8.1*10 ⁻⁹
Photochemical oxidation	kg C ₂ H _{4eq}	2.3*10 ⁻⁴	5.8*10 ⁻⁶	1.8*10 ⁻⁴	2.8*10 ⁻⁵	8.8*10 ⁻⁶
Acidification	kg SO _{2eq}	5.2*10 ⁻³	9.3*10 ⁻⁵	4.1*10 ⁻³	7.8*10 ⁻⁴	1.8*10 ⁻⁴
Eutrophication	kg PO ₄ --- _{eq}	4.2*10 ⁻³	1.9*10 ⁻⁵	4.0*10 ⁻³	1.8*10 ⁻⁴	3.8*10 ⁻⁵

Table 11 Climastone® - M: Potential environmental impacts per declared unit for reference flow of 2.52kg (density of 70 kg.m⁻³, lambda 0.036 W/m.K, lower bound for Climastone® - M)

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	1.2*10 ⁻⁶	5.5*10 ⁻⁸	8.9*10 ⁻⁷	2.2*10 ⁻⁷	1.4*10 ⁻⁸
Abiotic depletion (fossil fuels)	MJ	11	3.3*10 ⁻¹	9.3	1.4	4.0*10 ⁻¹
Global warming (GWP100a)	kg CO _{2eq}	7.6*10 ⁻¹	2.1*10 ⁻²	6.4*10 ⁻¹	8.4*10 ⁻²	1.3*10 ⁻²
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	6.8*10 ⁻⁸	3.8*10 ⁻⁹	4.4*10 ⁻⁸	1.6*10 ⁻⁸	4.5*10 ⁻⁹
Photochemical oxidation	kg C ₂ H _{4eq}	1.3*10 ⁻⁴	3.2*10 ⁻⁶	1.0*10 ⁻⁴	1.6*10 ⁻⁵	4.9*10 ⁻⁶
Acidification	kg SO _{2eq}	2.9*10 ⁻³	5.2*10 ⁻⁵	2.3*10 ⁻³	4.4*10 ⁻⁴	1.0*10 ⁻⁴
Eutrophication	kg PO ₄ --- _{eq}	2.3*10 ⁻³	1.1*10 ⁻⁵	2.2*10 ⁻³	1.0*10 ⁻⁴	2.1*10 ⁻⁵

Environmental Performance



Table 12 Climastone® - M: Potential environmental impacts per declared unit for reference flow of 4.94kg (density of 130 kg.m⁻³, lambda 0.038 W/m.K, upper bound for Climastone® - M)

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	2.3*10 ⁻⁶	1.1*10 ⁻⁷	1.7*10 ⁻⁶	4.3*10 ⁻⁷	2.7*10 ⁻⁸
Abiotic depletion (fossil fuels)	MJ	22	6.4*10 ⁻¹	18	2.6	7.9*10 ⁻¹
Global warming (GWP100a)	kg CO _{2eq}	1.5	4.1*10 ⁻²	1.3	1.7*10 ⁻¹	2.6*10 ⁻²
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	1.3*10 ⁻⁷	7.5*10 ⁻⁹	8.6*10 ⁻⁸	3.1*10 ⁻⁸	8.8*10 ⁻⁹
Photochemical oxidation	kg C ₂ H _{4eq}	2.5*10 ⁻⁴	6.3*10 ⁻⁶	2.0*10 ⁻⁴	3.1*10 ⁻⁵	9.6*10 ⁻⁶
Acidification	kg SO _{2eq}	5.7*10 ⁻³	1.0*10 ⁻⁴	4.5*10 ⁻³	8.6*10 ⁻⁴	2.0*10 ⁻⁴
Eutrophication	kg PO ₄ ^{---eq}	4.6*10 ⁻³	2.1*10 ⁻⁵	4.3*10 ⁻³	2.0*10 ⁻⁴	4.2*10 ⁻⁵

Table 13 Climastone® - L: Potential environmental impacts per declared unit for reference flow of 1.48kg (density of 40 kg.m⁻³, lower bound for open blowing in free horizontal surfaces)

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	6.9*10 ⁻⁷	2.5*10 ⁻⁸	4.0*10 ⁻⁷	1.0*10 ⁻⁷	6.3*10 ⁻⁹
Abiotic depletion (fossil fuels)	MJ	5.2	1.5*10 ⁻¹	4.2	6.1*10 ⁻¹	1.8*10 ⁻¹
Global warming (GWP100a)	kg CO _{2eq}	3.4*10 ⁻¹	9.4*10 ⁻³	2.9*10 ⁻¹	3.8*10 ⁻²	6.0*10 ⁻³
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	3.1*10 ⁻⁸	1.7*10 ⁻⁹	2.0*10 ⁻⁸	7.1*10 ⁻⁹	2.0*10 ⁻⁹
Photochemical oxidation	kg C ₂ H _{4eq}	5.7*10 ⁻⁵	1.5*10 ⁻⁶	4.6*10 ⁻⁵	7.2*10 ⁻⁶	2.2*10 ⁻⁶
Acidification	kg SO _{2eq}	1.3*10 ⁻³	2.3*10 ⁻⁵	1.0*10 ⁻³	2.0*10 ⁻⁴	4.5*10 ⁻⁵
Eutrophication	kg PO ₄ ^{---eq}	1.1*10 ⁻³	4.9*10 ⁻⁶	1.0*10 ⁻³	4.6*10 ⁻⁵	9.6*10 ⁻⁶

Table 14 Climastone® - L: Potential environmental impacts per declared unit for reference flow of 2.22kg (density of 60 kg.m⁻³, upper bound for open blowing in free horizontal surfaces)

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	1.0*10 ⁻⁶	4.9*10 ⁻⁸	7.8*10 ⁻⁷	2.0*10 ⁻⁷	1.2*10 ⁻⁸
Abiotic depletion (fossil fuels)	MJ	10	2.9*10 ⁻¹	8.2	1.2	3.5*10 ⁻¹
Global warming (GWP100a)	kg CO _{2eq}	6.7*10 ⁻¹	1.8*10 ⁻²	5.7*10 ⁻¹	7.4*10 ⁻²	1.2*10 ⁻²
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	6.0*10 ⁻⁸	3.4*10 ⁻⁹	3.9*10 ⁻⁸	1.4*10 ⁻⁸	4.0*10 ⁻⁹
Photochemical oxidation	kg C ₂ H _{4eq}	1.1*10 ⁻⁴	2.8*10 ⁻⁶	9.0*10 ⁻⁵	1.4*10 ⁻⁵	4.3*10 ⁻⁶
Acidification	kg SO _{2eq}	2.6*10 ⁻³	4.6*10 ⁻⁵	2.0*10 ⁻³	3.8*10 ⁻⁴	8.8*10 ⁻⁵
Eutrophication	kg PO ₄ ^{---eq}	2.1*10 ⁻³	9.5*10 ⁻⁶	1.9*10 ⁻³	9.0*10 ⁻⁵	1.9*10 ⁻⁵

Table 15 Climastone® - L: Potential environmental impacts per declared unit for reference flow of 1.55kg (density of 42 kg.m⁻³, lower bound for volume filling in horizontal or inclined structures)

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	7.3*10 ⁻⁷	3.4*10 ⁻⁸	5.5*10 ⁻⁷	1.4*10 ⁻⁷	8.6*10 ⁻⁹
Abiotic depletion (fossil fuels)	MJ	7.0	2.0*10 ⁻¹	5.7	8.3*10 ⁻¹	2.5*10 ⁻¹
Global warming (GWP100a)	kg CO _{2eq}	4.7*10 ⁻¹	1.3*10 ⁻²	3.9*10 ⁻¹	5.2*10 ⁻²	8.2*10 ⁻³
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	4.2*10 ⁻⁸	2.3*10 ⁻⁹	2.7*10 ⁻⁸	9.6*10 ⁻⁹	2.8*10 ⁻⁹
Photochemical oxidation	kg C ₂ H _{4eq}	7.8*10 ⁻⁵	2.0*10 ⁻⁶	6.3*10 ⁻⁵	9.8*10 ⁻⁶	3.0*10 ⁻⁶
Acidification	kg SO _{2eq}	1.8*10 ⁻³	3.2*10 ⁻⁵	1.4*10 ⁻³	2.7*10 ⁻⁴	6.2*10 ⁻⁵
Eutrophication	kg PO ₄ --- _{eq}	1.4*10 ⁻³	6.7*10 ⁻⁶	1.4*10 ⁻³	6.3*10 ⁻⁵	1.3*10 ⁻⁵

Table 16 Climastone® - L: Potential environmental impacts per declared unit for reference flow of 3.33kg (density of 90 kg.m⁻³, upper bound for volume filling in horizontal or inclined structures)

Impact category	Unit	Total	A1-A3	A4	C2	C3-C4
Abiotic depletion	kg Sb _{eq}	1.6*10 ⁻⁶	7.3*10 ⁻⁸	1.2*10 ⁻⁶	2.9*10 ⁻⁷	1.8*10 ⁻⁸
Abiotic depletion (fossil fuels)	MJ	15	4.3*10 ⁻¹	12	1.8	5.3*10 ⁻¹
Global warming (GWP100a)	kg CO _{2eq}	1.0	2.7*10 ⁻²	8.5*10 ⁻¹	1.1*10 ⁻¹	1.8*10 ⁻²
Ozone layer depletion (ODP)	kg CFC-11 _{eq}	9.0*10 ⁻⁸	5.0*10 ⁻⁹	5.8*10 ⁻⁸	2.1*10 ⁻⁸	6.0*10 ⁻⁹
Photochemical oxidation	kg C ₂ H _{4eq}	1.7*10 ⁻⁴	4.3*10 ⁻⁶	1.3*10 ⁻⁴	2.1*10 ⁻⁵	6.5*10 ⁻⁶
Acidification	kg SO _{2eq}	3.8*10 ⁻³	6.8*10 ⁻⁵	3.1*10 ⁻³	5.8*10 ⁻⁴	1.3*10 ⁻⁴
Eutrophication	kg PO ₄ --- _{eq}	3.1*10 ⁻³	1.4*10 ⁻⁵	2.9*10 ⁻³	1.3*10 ⁻⁴	2.8*10 ⁻⁵

Other environmental information describing output flows

Table 17 Other environmental information describing output flows

Parameter	Unit	Amount
Components for re-use	kg	0
Materials for recycling	kg	0
Materials for energy recovery	kg	0
Exported energy	MJper energy carrier	0

Transport to the building site

Table 18 Information describing transport to the building site.

Parameter	Unit	Value
Vehicle type	European Emission Standard	Euro 3 (Lorry 16-32 metric ton)
Distance	km	200
Capacity utilization (including empty returns)	%	~50%
Bulk density of transported products	kg/m ³	156
Volume capacity utilization factor	-	1

End of life

Table 19 End of life information.

Processes	Unit	Amount
Collection process specified by type	kg collected separately	100%
	kg collected with mixed construction waste	0
Recovery system specified by type	kg for re-use	0
	kg for recycling	0
	kg for energy recovery	0
Disposal specified by type	kg product or material for final deposition	100%
Assumptions for scenario development, e.g. transportation	-	It is assumed that the product will be collected separately and land-filled.

Verification

CEN standard EN 15804 serves as the core PCR (product category rules)

Independent verification of the declaration and data, according to EN ISO 14025:2010

☐ internal

☒ external

Third party verifier:

Building Research Institute - Certification company Ltd.



Additional information

CIUR a.s. was certified according to ISO 9001:2008 (Quality Management), ISO14001:2004 (Environmental Management) and OHSAS 18001:2007 (Occupational Health and Safety Management).

References

Weinzettel, J., D. Kapitulčinová, LCA studie vybraných produktů firmy CIUR a.s. (LCA study of selected products manufactured by CIUR a.s.), CIUR, 2016.

EN 15804:2012+A1:2013 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

ISO 14 025:2006 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures

