SUSTONABLE
The Circular Design Surface

Environmental Product Declaration

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

Sustonable rGlass+rPET+Feldspar Circular Design Surface

from

Innovative Stone Technologies BV

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Programme Information

Programme:	The International EPD® System
Programme Operator:	EPD International AB
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

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> Product category rules (PCR):

PCR Construction products 2019:14, version 1.3.4

> PCR review was conducted by:

The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.

> Independent third-party verification of the declaration and data, according to ISO 14025:2006:

☐ EPD process certification ☒ EPD verification

> Third party verifier:

Sunil KUMAR
SIPL Pvt. Ltd.
Office No. B -710, Plot No. A- 40, Ithum,
Sector-62, Noida,
UP-201014, India

> Approved by:

The International EPD® System Technical Committee,
supported by the Secretariat

Procedure for follow-up of data during EPD validity involves third party verifier:

☐ Yes ☒ No

LCA Study &
EPD Design Conducted By:

Semtrio Sustainability Consulting
BUDOTEK Teknopark, No 4/21,
Umraniye / Istanbul Turkey
www.semtrio.com

Innovative Stone Technologies BV has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Product Information

Owner of the EPD: Innovative Stone Technologies BV
A. van Leeuwenhoekweg 24, 2408 AM
Alphen aan den Rijn, Netherlands

Contact: Mr Tuğcan Tercan
ttercan@sustonable.com

Manufacturing Plant: Polatlı Org. San. Böl. 212. Cad. No:4
Polatlı, Ankara Türkiye

Description of the organisation:

Sustonable, brings the only truly circular design surface made of post-consumer recycled PET, pre-consumer recycled glass and natural stone. Sustonable provides a more ecological surface capable of fulfilling the most challenging technical capabilities and excelling in quality and design.

100% recyclable, free of hazardous chemicals, unlimited design options, and high-tech qualities present Sustonable surfaces as the best choice for designing authentic, sustainable spaces. In fact, for every Sustonable m2, around **100 PET plastic bottles are recycled.** The rigorous manufacturing method, all Sustonable slabs are carefully produced to maintain the same detail and quality.

Product Name: Sustonable rGlass+rPET+Feldspar Circular Design Surface

Product Identification: This LCA study evaluates the potential environmental impacts for 1 m^2 of 6 mm Sustonable rGlass+rPET+Feldspar Circular Design Surface, Cradle to gate with options, with modules C1–C4 and module D (A1–A3 + C + D) approach. 1 m^2 of 6 mm Sustainable rGlass + rPET + Feldspar Circular Design Surface weighs 13.28 kg.

UN CPC Code: 376 Monumental or building stone and articles thereof

Sustonable Technical Specifications of rGlass+rPET+Feldspar Circular Design Surface

Technical specification	Test Method	Unit	Value
Apparent Density	EN 14617-1	g/cm^3	1.97
Water Absorption	EN 14617-1	%	0.0852
Impact Resistance	EN 14617-9	Joule	3.80
Hardness	EN 101	Mohs	4
Scratch Resistance	EN 438-2	Newton	1.0
Dry Heat Resistance	EN 12722	at 180 °C	4
Wet Heat Resistance	EN 12721	at 180 °C	3

Intended use of the product:

Sustonable is a versatile product; it can be used for bathroom wall panels, vanity tops, backsplashes, worktops, tabletops, and soon, kitchen countertops and bars. It perfectly fits any project that needs to be durable, resistant, elegant, and mindful of the environment.

Sustonable surfaces look like the most beautiful natural stone, where upto 50% fewer natural resources are employed to produce them.

Product Description:

Sustonable is the new revolutionary sustainable, thin and ultra-lightweight surface made with a unique combination of pre-consumer recycled Glass, Feldspar and post-consumer recycled PET plastic. Sustonable material is thin, lightweight, ultraresistant, sizeable, with unlimited designs that look like natural stone, and can be recycled and used in a new Sustonable product again. The material can be used for bathroom wall panels, vanity tops, backsplashes, worktops, tabletops, kitchen countertops and bars. It fits perfectly any project that needs to be durable, resistant, elegant, and mindful of the environment. Sustonable follows the goal of designing out waste, keeping materials in use (no planned obsolescence), and helping the environment from the current exhaustion.

See the Sustonable production process:

Production Process of Sustonable

Kneader-Extruder Line

The production process begins with the preparation of raw materials, post-consumer recycled PET, Feldspar and pre-consumer recycled glass. These materials are stored and transported to the kneader using a vacuum loader and a gravimetric feeder. The kneader operates at high temperatures, reaching up to 300°C, to ensure proper melting and mixing of the materials.

Additives such as antioxidants, lubricants, pigments, and glass fibers are pre-mixed and introduced into the kneader via another gravimetric feeder. Once the mixture is homogenized, it is transferred to an extruder, which processes the material further and pushes it through a die to form a continuous flat slab. The slab then passes through a double-belt press, where it is slowly cooled under controlled pressure to achieve uniform thickness and structural integrity. Then the slabs are trimmed to precise dimensions using a cross saw and an edge trimmer before entering the polishing unit.

Polishing Line

After forming, the slabs proceed to the polishing line, a crucial phase for achieving a high-gloss surface and optimal smoothness.

In the polishing phase, the slabs are treated with abrasive polishing heads that gradually refine the surface texture. A sequence of finer abrasives is used to remove imperfections and achieve the desired gloss level. The final polishing step ensures that the slabs meet the required quality standards, with minimal surface roughness and no visible scratches or defects.

Printing Line

Once polished, the slabs move to the printing line, where designs are transferred onto the surface through sublimation printing. This process involves the application of specially formulated inks that are sublimated into the slab material under controlled temperature and pressure conditions.

A vacuumable sublimation oven is used to ensure precise ink transfer and deep penetration into the surface, resulting in vibrant, long-lasting designs. The printed slabs undergo a final quality inspection to ensure they meet ISO 9001 standards before being packed and prepared for shipment.

By combining advanced extrusion, precision polishing, and high-quality sublimation printing, the production process ensures that composite stone slabs exhibit superior durability, aesthetic appeal, and consistency.

LCA Information

Declared unit: 1 m^2 of 6 mm Sustonable rGlass+rPET+Feldspar Circular Design Surface ready to delivery at the factory gate.

Reference service life: Not Applicable.

Time representativeness: The production data in this LCA study represents the period of 1st January 2024 and 31st December 2024.

Database(s) and LCA software used: SimaPro LCA v9.6.0.1 and Ecoinvent v3.10

Description of system boundaries: Cradle to gate with options, with modules C1–C4 and module D (A1–A3 + C + D). Other stages are very dependent on particular scenarios and are better developed for specific building or construction works.

Data quality and data collection: Data collection for this LCA study has been carried out in accordance with data requirement stated in ISO 14040-44, ISO 14025, ISO 14020 and the requirements given in the General Program Instructions v5.0.1; PCR Construction products 2019:14, version 1.3.4 by The International EPD® System and EN 15804:2012+A2.2019/AC:2021.

Upstream data, raw materials production, transportation, fossil fuels and electricity mix data have been obtained from Ecoinvent v3.10 as secondary data. All manufacturing data in core processes has been gathered from the manufacturing plant.

Calculation Methods: The indicators, disclaimers, and other requirements in Section 7.2.3 (for environmental impacts based on the LCIA) and Section 7.2.4 (for resource use, waste, etc.) of EN 15804:2012+A2.2019/ AC:2021. have been used and calculated in SimaPro LCA v9.6.0.1

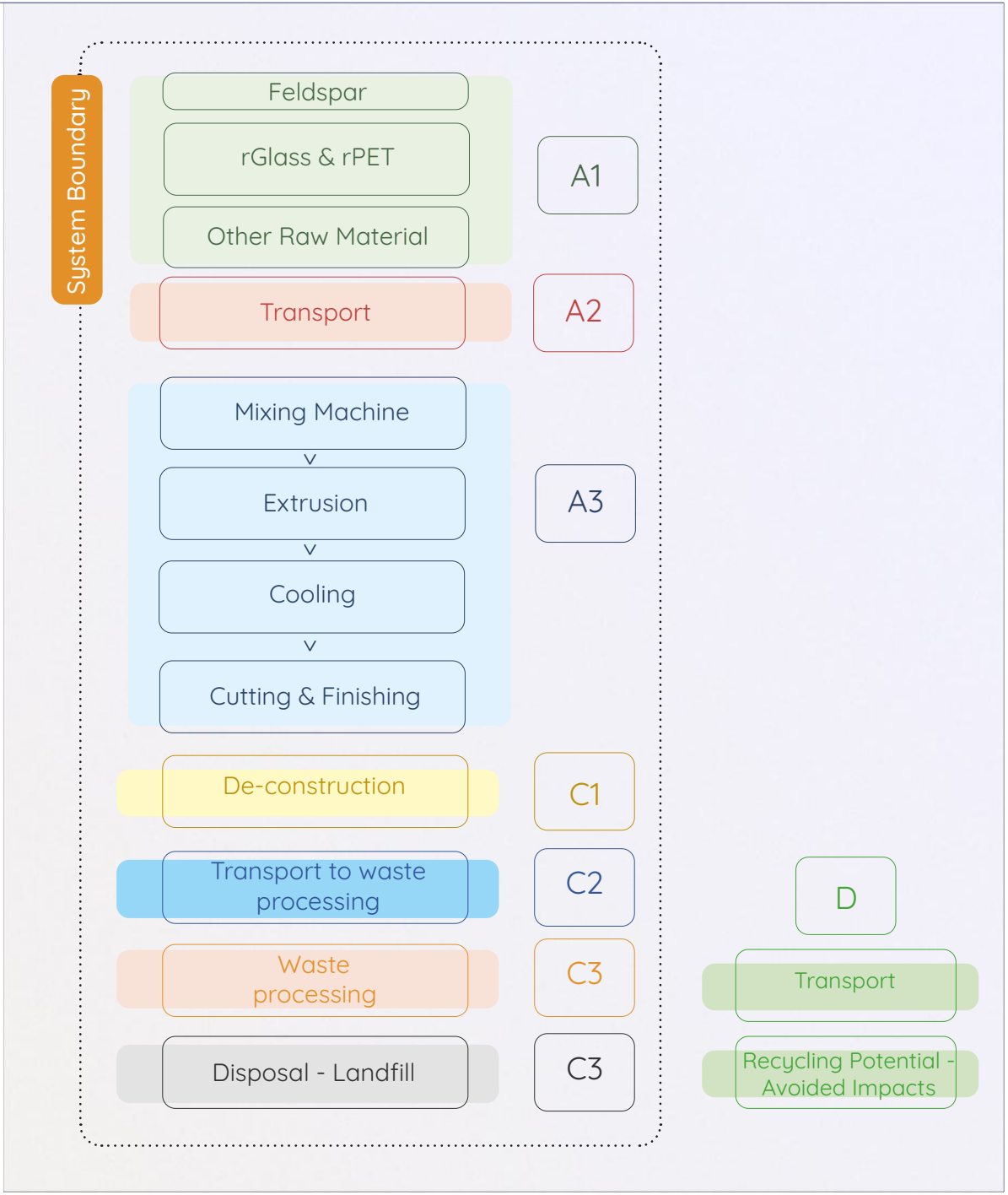
Allocation: Allocation was avoided by dividing the unit process into two or more sub-processes and collecting the environmental data related to these sub-processes. If not possible, allocation problems were solved by partitioning the system inputs and outputs using the mass criteria according to GPI v5.0.1.

Mass allocation has been applied for pre-consumer recycled materials according to EN 15804:2012+A2.2019/ AC:2021. Allocation for module D as follows: Scrap inputs to the production stage are subtracted from scrap to be recycled at end of life in order to obtain the net scrap output from the product system. This remaining net scrap is then sent to recycling.

Cut-off Rules: Life Cycle Inventory data for a minimum of 99 % of total inflows to the three life cycle stages have been included and a cut-off rule of 1% regarding energy, mass and environmental relevance was applied.

Regarding to material, chemical and energy inputs, no cut-off rule has been applied.

Electricity: Electricity is supplied 100 % from the grid at Manufacturing Plant and residual mix 0.57538 kg CO_2 eq./ kWh.



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

	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	Recycling potential
MODULES	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	TR	-	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	>80%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X: Declared
ND: Not declared.

Description of declared modules

A1 - Raw Materials Supply

This module takes into account raw material extraction, processing and energy used in the production process. Given that a substantial share of raw materials is modelled using data obtained directly from suppliers, this has an impact on specific data.

A2 – Transport to The Manufacturer

This module includes transportation of the raw materials from supplier to factory gate. Transportation types are considered as roadway and seaway.

A3 – Manufacturing

This stages includes energy and water consumption during the manufacturing processes.

Followed production processes are as;

- Mixing
- Extrusion
- Cooling
- Polishing

A1-3 - Cradle to gate – Mandatory Module

The aggregation of the modules A1, A2 and A3 is allowed by EN 15804:2012+A2.2019/AC:2021. This rule is applied in this EPD and denoted by A1-3. This module represents the extraction and processing of raw materials, the transport to production sites and the manufacture.

C1 - De-construction – Mandatory Module

During the de-construction operations there will be no water consumption and no machine energy consumption. Deconstruction of Sustonable can be considered negligible.

C2 - Transport to Waste Processing – Mandatory Module

In module C2, we assume that the distance of 2500 km has been assumed for the transport to recycling and to fed into the same production system.

Parameters for C2 Module		
Data	**Amount**	**Unit**
Collection rate	100%	-
Transport type	lorry <32 metric tonne*	-
Distance	**2500**	**km**
Product	1	kg
Recycling	1	kg
Landfill	0	kg
tkm	2.5**	tkm

**Technology is Euro 6*

***This amount refers to 1m² product.*

C3 - Waste Processing for Reuse, Recovery and/or Recycling – Mandatory Module

It has been assumed that during the de-construction operations, the same electricity is consumed as during the Construction installation of the products.

Crushing of product will require energy. It has been assumed that during the crushing operations 1.2 kWh electricity is consumed.

C4 - Final Disposal – Mandatory Module

In module C4, it was assumed a 95% for recovery rate while the remaining 5% of the product is lost during de-construction. 100% of used product after the lifetime will be collected and recycled into the manufacturing system. It is assumed that 5% of the product is lost during de-construction and 95% is reached to recycling system.

D - Reuse, recovery or recycling – Mandatory Module

In module D, it has been assumed that the all raw material used during production is recycled.

Content Declaration

Content declaration of of rGlass+rPET+Feldspar Circular Design Surface				
Product components	**Weight, kg**	**Post-consumer recycled material, weight-% of product**	**Biogenic material, weight-% of product**	**Biogenic material, kg C/product or declared unit**
Recycled Glass	450-500	100	0.00	0.00
Recycled PET	200-250	100	0.00	0.00
Feldspar	175-180	0.00	0.00	0.00
Masterbatches	100-150	0.00	0.00	0.00
Glass fibre	25-30	0.00	0.00	0.00
Additives	4-9	0.00	0.00	0.00
Total	1000	-	-	-

Environmental Information

Potential Environmental Impact – Mandatory Indicators According to EN 15804

Results per 1 m² rGlass&Feldspar Circular Design Surface							
Indicator	**Unit**	**Total A1/A2/A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1,12E+01	0,00E+00	2,60E-01	6,81E-01	7,62E-01	-1,60E+00
GWP-biogenic	kg CO_2 eq.	2,76E-01	0,00E+00	1,28E-03	2,16E-02	1,16E+00	-5,10E-02
GWP-luluc	kg CO_2 eq.	2,00E-02	0,00E+00	1,10E-04	7,28E-03	1,20E-03	-1,10E-03
GWP-total	kg CO_2 eq.	1,15E+01	0,00E+00	2,62E-01	7,10E-01	1,92E+00	-1,65E+00
ODP	kg CFC 11 eq.	2,23E-05	0,00E+00	4,14E-09	3,97E-09	4,15E-09	-5,85E-06
AP	mol H+ eq.	5,20E-02	0,00E+00	6,62E-04	4,44E-03	4,16E-03	-7,46E-03
EP-freshwater	kg P eq.	3,23E-03	0,00E+00	2,10E-05	6,85E-04	2,91E-04	-3,94E-04
EP-marine	kg N eq.	9,10E-03	0,00E+00	1,68E-04	7,84E-04	1,99E-03	-1,34E-03
EP-terrestrial	mol N eq.	9,29E-02	0,00E+00	1,82E-03	7,18E-03	1,30E-02	-1,38E-02
POCP	kg NMVOC eq.	5,03E-02	0,00E+00	1,00E-03	2,13E-03	4,38E-03	-6,85E-03
ADP minerals&metals*	kg Sb eq.	7,17E-04	0,00E+00	7,31E-07	7,61E-07	7,33E-06	-4,55E-05
ADP-fossil*	MJ	2,44E+02	0,00E+00	3,91E+00	7,54E+00	6,42E+00	-3,39E+01
WDP*	m^3	3,55E+00	0,00E+00	2,43E-02	2,41E-01	1,86E-01	-5,15E-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						

* 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.
**The results of this environmental product declaration (EPD) are only valid if modules A1–C4 are considered. The use of modules A1–A3 results alone without considering the end-of-life stage (module C) may lead to misinterpretation of the product's environmental performance.

Potential environmental impact – additional mandatory and voluntary indicators

Results per 1 m² rGlass&Feldspar Circular Design Surface							
Indicator	**Unit**	**Total A1/A2/A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG *	kg CO2 eq.	1,12E+01	0,00E+00	2,61E-01	6,90E-01	1,66E+00	-1,60E+00
Results per 1 m² rGlass&Feldspar Circular Design Surface							
PM/RI	[disease inc.]	5,11E-07	0,00E+00	2,55E-08	1,97E-08	4,00E-07	-6,45E-08
IRP	[kBq U235 eq]	7,48E-01	0,00E+00	3,45E-03	5,52E-03	2,06E-02	-1,47E-01
ET-freshwater	[CTUe]	3,18E+02	0,00E+00	4,18E+00	1,71E+01	7,71E+02	-4,05E+01
HT-cancer	[CTUh]	4,53E-08	0,00E+00	1,34E-09	7,95E-10	2,82E-08	-5,05E-09
HT-non-cancer	[CTUh]	2,04E-07	0,00E+00	3,23E-09	5,45E-09	4,32E-08	-3,52E-08
SQP	[pt]	5,59E+01	0,00E+00	3,93E+00	9,31E-01	1,22E+01	-4,75E+00
Net use of fresh water	m3	5,89E-01	0,00E+00	3,67E-03	4,13E-02	2,57E-02	-9,77E-02
Eutrophication	kg PO4--- eq	1,40E-02	0,00E+00	1,25E-04	2,35E-03	2,08E-03	-1,69E-03
Acronyms	GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology; IRP = Ionizing radiation, human health; ET-freshwater = Eco-toxicity (freshwater); HT-cancer = Human toxicity, cancer effects; HT-non-cancer = Human toxicity, non-cancer effects; SQP = Potential soil quality index (SQP)						

*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 CO2 is set to zero.

Use of Resources

Results per 1 m² rGlass+rPET+Feldspar Circular Design Surface							
Indicator	**Unit**	**Total A1/A2/A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1,39E+01	0,00E+00	5,12E-02	3,16E+00	6,62E-01	-1,70E+00
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,39E+01	0,00E+00	5,12E-02	3,16E+00	6,62E-01	-1,70E+00
PENRE	MJ	2,60E+02	0,00E+00	4,16E+00	8,04E+00	6,84E+00	-3,62E+01
PENRM	MJ.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,60E+02	0,00E+00	4,16E+00	8,04E+00	6,84E+00	-3,62E+01
SM	kg	1,55E+00	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	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	5,89E-01	0,00E+00	3,67E-03	4,13E-02	2,57E-02	-9,77E-02
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						

Waste production and output flows

Waste Production

Results per 1 m² rGlass+rPET+Feldspar Circular Design Surface							
Indicator	Unit	Total A1/A2/A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output Flows

Results for 1 m² rGlass+rPET+Feldspar Circular Design Surface							
Indicator	Unit	Total A1/A2/A3	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	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	1,26E+01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	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	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

*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.

References

- ISO 14040: 2006 Environmental management -- Life cycle assessment -- Principles and framework
- ISO 14044: 2006 Environmental management -- Life cycle assessment -- Requirements and guidelines
- ISO 14025: 2006 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations - Core rules for the product category of construction products
- The International EPD® System / www.environdec.com
- The International EPD® System / The General Programme Instructions v5.0.1 / https://www.environdec.com/resources/documentation#generalprogrammeinstructions
- The International EPD® System / PCR 2019:14 Construction products v1.3.4 (EN 15804:A2) /
- https://environdec.com/pcr-library
- Product Environmental Footprint Category Rules Guidance / https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR_guidance_v6.3.pdf
- Ecoinvent 3.10 / http://www.ecoinvent.org/
- SimaPro LCA Software / https://simapro.com/
- EN 15804 reference package based on EF 3.1 eplca.jrc.ec.europa.eu

Contact

Third party verifier:
Sunil KUMAR

Office No. B -710, Plot No. A- 40, Ithum,
Sector-62, Noida, UP-201014, India

SIPL Sustainability
LCA, GHG and ESG Consultants

Owner of the Declaration:
Innovative Stone Technologies BV

A. van Leeuwenhoekweg 24, 2408 AM
Alphen aan den Rijn, Netherlands
https://www.sustonable.com

SUSTONABLE
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LCA Practitioner & EPD Design:
Semtrio Sustainability Consulting

BUDOTEK Teknopark, No 4/21,
Umraniye Istanbul Turkey
www.semtrio.com

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