Environmental Product Declaration

In accordance with ISO 14025:2010 and EN 15804:2012+A2:2019/AC:2021

EPD of multiple products, based on a representative product (high-quality polyisobutylene, one-component, solvent-free sealants for IGU).

BUTYLVER
BUTYLVER GB
BUTYLVER GREY
BUTYLVER SS
BUTYLVER SS-XL
BUTYLVER XL

FENZI

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	EPD-IES-13054:001
Publication date:	2024-07-25
Valid until:	2029-07-25

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Company information

The Fenzi Group is a leader in chemicals for glass processing. This particular focus on glass has allowed an extremely high degree of specialization and the manufacture of products whose quality is recognized around the world. The Group was established in 1941. Today, it is the international network capable of delivering the most complete range of solutions for the glass industry, with targeted, diversified products that deliver peak performance.

- **18 manufacturing plants and sales offices** around the world.
- Customers in more than **80 countries.**
- **#1 in the world** in the development of mirror-backing paints, sealants and spacers for insulating glass, precious-metal pastes and industrial decorative paints for flat and hollow glass, and solutions for digital printing on glass.

The Fenzi Group has the largest, most complete range of solutions for the glass industry. Whatever the field of application, all of the Group's products ensure the highest levels of performance in the market and, above all, the peace of mind that comes from total reliability, durability over time, ease-of-use and customer support staff trained to understand and meet the increasingly exacting needs of glass processors.

The products range includes:

- **Sealants and traditional and warm edge spacers for high-performance insulating glass.**
- **Decorative enamels and paints for flat and hollow glass**, with a vast range of applications - from architecture to interior design, home appliances to automotive, to glass packaging.
- **Mirror-backing paints and silvering solutions** engineered for the entire mirror production cycle.
- **Special glass enamels and precious-metal pastes**.
- The most state-of-the-art **technologies for digital printing on glass.**

OWNER OF THE EPD	Fenzi Group, Via Sant'Andrea 21, 20121 – Milano (MI) Italy
MANUFACTURER	Fenzi Group, Via Sant'Andrea 21, 20121 – Milano (MI) Italy
NAME AND LOCATION OF PRODUCTION SITE	Fenzi S.p.A.: Via Trieste 13/15, 20067 – Tribiano (MI) Italy
EPD PREPARED BY	Fenzi Group – [ESG Manager]
GEOGRAPHICAL SCOPE OF THE EPD®	Global
EPD® REGISTRATION NUMBER	EPD-IES-13054:001
DECLARATION ISSUED	2024

Contact Alessandro Manzi - esg@fenzigroup.com

Programme information

PROGRAMME	**THE INTERNATIONAL EPD® SYSTEM**
ADDRESS	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
WEBSITE	www.environdec.com
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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)

Product Category Rules (PCR):
PCR 2019:14 Construction products (EN 15804+A2) (1.3.3)
PCR 2019:14-c-PCR-017 c-PCR-017 Technical-chemical products (for construction sector) (c-PCR to PCR 2019:14) (adopted from EPD Norway 2022-07-08)
PCR review was conducted by: *The Technical Committee of the International EPD® System. See www.environdec.com for a list of members.*

Life Cycle Assessment (LCA)
LCA accountability: Fenzi Group, Via Sant'Andrea 21, 20121 – Milano (MI) Italy

Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
☒ EPD verification by individual verifier
Third-party verifier: *Dr.Ugo Pretato – Studio Fieschi & Soci srl*

Approved by: The International EPD® System

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.

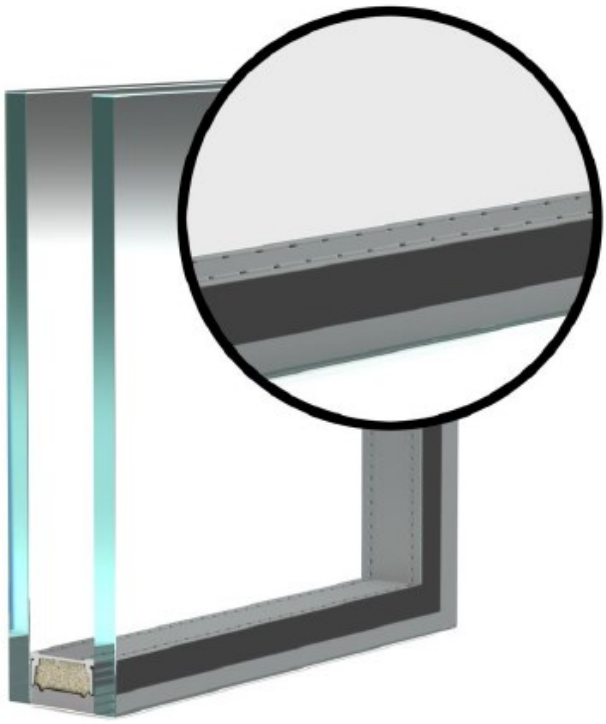
EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products 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.

Product information

Product name BUTYLVER

TRADE NAME	NOTE
BUTYLVER	***Representative product***
BUTYLVER GB	
BUTYLVER GREY	
BUTYLVER SS	
BUTYLVER SS-XL	
BUTYLVER XL	

The representative product of this EPD was chosen for highest production volumes.



Product description BUTYLVER products are high-quality, single-component, solvent-free polyisobutylene-based sealants for internal insulation (first barrier) of double or triple IG units. They feature minimal permeability to water vapor and gases, high resistance to UV aging, excellent adhesion to glass, aluminium, galvanized steel, and stainless steel.
They come in different colours to facilitate structural matching.
Using the BUTYLVER range of products in an insulating glass unit provides a high level of moisture vapor migration resistance, and controls and minimizes gas and solvent migration into the IG unit's sealed space. It also acts as a permanent hermetic barrier to the permeation of inert gases (for example, argon) when gases are used in the sealed space of the IG unit.
BUTYLVER is designed to fill the space between the sides of the spacer and the faces of the two or three glass panes, and to develop adequate adhesion to the surfaces of both. It has movement capability so as not to fail due to limited differential movement that may occur between the spacer and the glass light.
Thanks to these features BUTYLVER contributes to limiting the formation of internal condensation achieving a longer lifetime of the window system, to increasing thermal performance of the window and energy efficiency in any season.

PROPERTY	RESULT	METHOD
Base	Polyisobutylene	
Colour	Black or Grey	
Consistency	Solid mass, thermoplastic	
Water Vapor Transmission Rate	< 0,1 [g/m²·d]	EN 1279-4
Gas Permeation Rate	< 0,03 [g/m²·d]	EN 1279-4
VOC %	Conform	EN 16516
Thermal Conductivity	0,20 [W/m·K]	EN 10077-2
Service Temperatures	- 40°C to + 80°C	

For detailed and complete product specifications please refer to the technical data sheet.

Product standards:

The products meet requirements established and measured following:

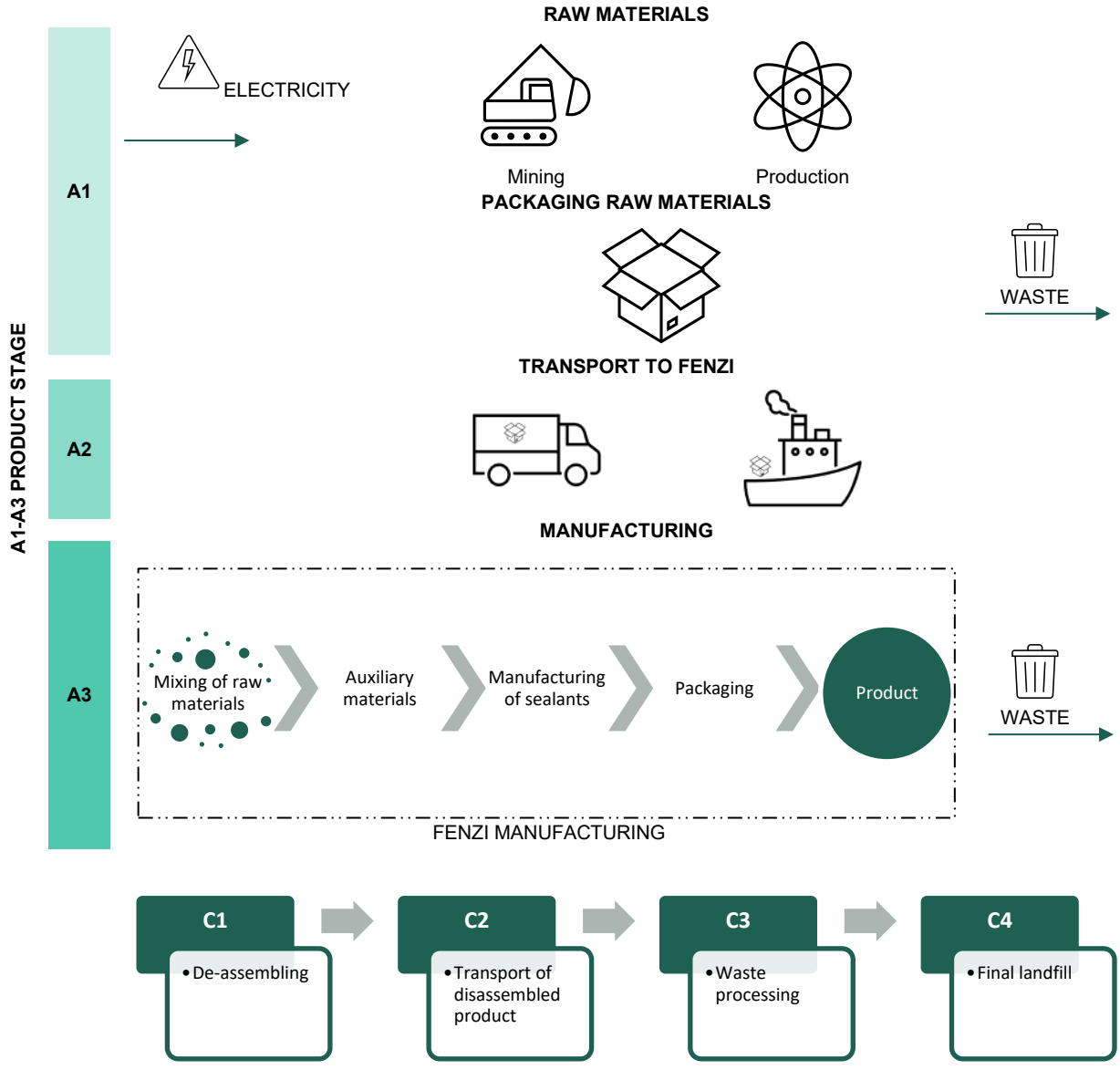
- EN 1279-2:2018 Glass in Building – Insulating Glass Units – Long term test method and requirements for moisture penetration.
- EN 1279-3:2018 Glass in Building – Insulating Glass Units – Long term test method and requirements for gas leakage rate and for gas concentration tolerances.
- EN 1279-4:2018 Glass in Building – Insulating Glass Units – Methods of test for the physical attributes of edge seal components and insert.
- EN 10077-2:2017 Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Numerical method for frames.
- EN 16516:2020 Construction Products – Assessment of release of Dangerous substances – Determination of emission into indoor air.

UN CPC code 35354

LCA information

Declared unit	1 kg of product plus packaging
Reference service life	30 years, according to PCR EN 17074:2019
Geographical scope	Global
Time representativeness	The primary data was provided by all Fenzi Group's production site and refers to the year 2022
Database and LCA software used	Database Ecoinvent 3.9.1, with software SimaPro 9.5.0.0, package version: EF 3.1
Description of system boundaries	Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D)
Electricity grid CO_2 coefficient	0,628 kg CO_2eq/kWh based on the renewable and non-renewable fuel sources in Italy

System diagram



A1 - RAW MATERIALS SUPPLY

A1 includes:

- extraction and processing of raw materials, until reaching a raw material, which cannot yet be defined as a finished product;
- generation and supply of energy necessary for the extraction and refining of the raw material;
- generation of energy used for the production of the finished product;
- production of waste resulting from these processes;
- raw materials packaging.

Energy Source	Ecoinvent process	kg CO_2eq/kWh
National electricity grid (ITALY)	Electricity, medium voltage {IT}| electricity, medium voltage, residual mix | Cut-off, U	0,628

A2 - TRANSPORT

A2 includes external and internal transport for the supply of raw materials.
The raw materials are transported to the manufacturing site. The modelling includes road and ship transportation of each raw material from the supplier's site to the manufacturing site.

Transport modality	Ecoinvent process
Road	Transport, freight, lorry 16-32 metric ton, EURO5 {RER}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U
Ship	Transport, freight, sea, container ship {GLO}| transport, freight, sea, container ship | Cut-off, U

A3 - MANUFACTURING

A3 includes:

- production of the product;
- production of packaging accompanying the finished product;
- production of auxiliary materials used for the production of the product;
- management of waste related to the production process;
- production of emissions into the atmosphere.

Manufacturing process The manufacturing process for sealants involves the mixing and dispersing of raw materials into a homogeneous mixture. Raw materials include powders (mineral fillers, rubber, additives) and a liquid part (plasticizers). Loading of raw materials is both automatic and manual.
Production takes place in hot mixers for high viscosity fluids, equipped with internal stirrer and heater.
The mixers are equipped with a localized system for the extraction and removal of dust and are also equipped with a safety device for any overpressure. At the end of mixing, the product is extruded from the machine and packaged directly into small cylindrical packaging where it is left to cool.
The product is then shipped to the customers for IGU application.

Product packaging Detailed data of product packaging is reported in the following table.

Material	Ecoinvent process
Fibreboard	Kraft paper {RER}| market for kraft paper | Cut-off, U Carton board box production, with offset printing {GLO}| market for carton board box production, with offset printing | Cut-off, U
Plastic	Polyethylene, low density, granulate {GLO}| market for polyethylene, low density, granulate | Cut-off, U Extrusion, plastic film {GLO}| market for extrusion, plastic film | Cut-off, U
Metal	Steel, low-alloyed {GLO}| market for steel, low-alloyed | Cut-off, U Sheet rolling, steel {GLO}| market for sheet rolling, steel | Cut-off, U

Auxiliary materials All data relating to materials used for maintenance were excluded from the LCI: clothing and cleaning solvents, spare parts for machinery, air filters.

Waste production All waste produced during this stage is included.

Emissions To calculate the contribution relating to emissions generated by gas consumption, calorific value of 1 m^3 of gas is assumed equal to 36 MJ.

Emissions	Ecoinvent process
Generated by gas consumption	Heat, district or industrial, natural gas {Europe without Switzerland}| heat production, natural gas, at industrial furnace >100kW | Cut-off, U (mod_only emissions)

Emissions generated during production stage are included in the modelling.

A4 - A5 CONSTRUCTION PROCESS STAGE

A4 (Transport) and A5 (Construction installation) are not included.

B1-B7 - USE STAGE

B1-B7 are not included.

C1-C4 – END OF LIFE STAGE

C1 includes de-construction and demolition.
C2 includes transport.
C3 includes waste processing.
C4 includes final disposal.

Assumptions Not having data provided by suppliers or scientific research or market analysis available, for the end-of-life scenario the following hypotheses were made:

- C1: manual de-assembling
- C2: transport for 50 km - Transport, freight, lorry 16-32 metric ton, EURO5 {RoW}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U
- C3: 0% recycle
- C4: 100% landfill -Inert waste {RoW}| treatment of inert waste, sanitary landfill | Cut-off, U

D - RESOURCE RECOVERY STAGE

Module D quantifies the potential costs and benefits of end-of life recovery.
Assumptions 100% of wastes are considered as landfilled. There is no reuse nor recovery nor recycling of this product. Hence, no recycling benefits are reported on stage D.

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	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	IT										GLO				GLO
Specific data used	10,7%																
Variation – products	2,5% -12,2%																
Variation – sites	/																

Regarding the share of specific data, according to 5.4.3 PCR 2019:14 v.1.3 definition, materials involved in production phase (e.g. raw materials) even when combined with specific activity data can't be qualified as specific data. Therefore, according to this, a computation of the sharing in GWP-GHG impact of other A1-A3 data are quantified in percentage terms over the total A1-A3 module. Generic data are raw materials, raw materials packaging, product packaging, auxiliary materials. According to this method, the share of specific data in GWP-GHG accounts for 10,7%.

As regards the data relating to the variation-products, they represent the difference in GWP-GHG between the representative product and the one with the best performance and between the representative product and the one with the worst performance.

Percentage variation of each environmental impact indicator, aggregated over all included modules (from A to C) between the value minimum and maximum of the included products:

%	ODP	AP	EP-freshwater	EP-marine	EP-terrestrial	POCP	ADP-minerals&metals*	ADP-fossil*	WDP*
Variation	20%	22%	29%	13%	14%	16%	54%	24%	31%

Content information

Product components	Weight, %	Post-consumer material, weight, %	Biogenic material, kg C/kg
Polymers	50-70	0	0
Fillers	20-60	0	0
Pigments	1-27	0	0
Resins	1-10	0	0
TOTAL	**100**		

Packaging materials	Weight, kg	Weight, % (versus the product)	Weight biogenic carbon, kg C/kg
Fibreboard	0,0029	0,29	0,0015
LDPE	0,0002	0,02	0
Metal	0,0945	9,45	0
TOTAL	**0,0976**		

None of the substances included in the “Candidate List” (June 27th, 2024) or in the “Authorization List” (September 22nd, 2023), are contained in Products in concentration ≥ 0,1 % by weight.

None of the hazardous substances listed in Annex II of RoHS Directive 2011/65/EU (August 06th, 2011) and subsequent amendments, relating to restrictions on the use in electrical and electronic equipment are contained in concentration above prescribed limits.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impacts categories, exceeding threshold values, safety margins and/or risks.
It is not recommended to use the results of modules A1-A3 without considering the results of module C.

Mandatory impact category indicators according to EN 15804

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO_2 eq.	3,56E+00	0,00E+00	9,62E-03	0,00E+00	1,17E-02	0,00E+00
GWP-biogenic	kg CO_2 eq.	-5,03E-02	0,00E+00	3,24E-06	0,00E+00	5,03E-02	0,00E+00
GWP-luluc	kg CO_2 eq.	2,45E-03	0,00E+00	4,95E-06	0,00E+00	8,58E-06	0,00E+00
GWP-total	kg CO_2 eq.	3,51E+00	0,00E+00	9,62E-03	0,00E+00	1,18E-02	0,00E+00
ODP	kg CFC 11 eq.	3,66E-08	0,00E+00	1,44E-10	0,00E+00	2,77E-10	0,00E+00
AP	mol H^+ eq.	2,01E-02	0,00E+00	3,40E-05	0,00E+00	8,35E-05	0,00E+00
EP-freshwater	kg P eq.	2,19E-04	0,00E+00	7,81E-07	0,00E+00	3,07E-06	0,00E+00
EP-marine	kg N eq.	3,19E-03	0,00E+00	1,12E-05	0,00E+00	3,13E-05	0,00E+00
EP-terrestrial	mol N eq.	3,38E-02	0,00E+00	1,19E-04	0,00E+00	3,34E-04	0,00E+00
POCP	kg NMVOC eq.	1,75E-02	0,00E+00	4,58E-05	0,00E+00	1,13E-04	0,00E+00
ADP-minerals&metals*	kg Sb eq.	3,25E-06	0,00E+00	3,07E-08	0,00E+00	2,37E-08	0,00E+00
ADP-fossil*	MJ	8,26E+01	0,00E+00	1,35E-01	0,00E+00	2,54E-01	0,00E+00
WDP*	m^3 eq.	6,96E-01	0,00E+00	5,99E-04	0,00E+00	1,07E-02	0,00E+00
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.*

Additional mandatory and voluntary impact category indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO_2 eq.	3,54E+00	0,00E+00	9,57E-03	0,00E+00	1,17E-02	0,00E+00
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017							

Resource use indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	1,50E+00	0,00E+00	1,72E-03	0,00E+00	4,32E-03	0,00E+00
PERM	MJ	6,60E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,16E+00	0,00E+00	1,72E-03	0,00E+00	4,32E-03	0,00E+00
PENRE	MJ	5,62E+01	0,00E+00	1,35E-01	0,00E+00	2,54E-01	0,00E+00
PENRM	MJ	2,64E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	8,26E+01	0,00E+00	1,35E-01	0,00E+00	2,54E-01	0,00E+00
SM	kg	0,00E+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	m^3	1,72E-02	0,00E+00	1,89E-05	0,00E+00	2,62E-04	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						

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.

Waste indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,63E-04	0,00E+00	8,71E-07	0,00E+00	1,26E-06	0,00E+00
Non-hazardous waste disposed	kg	2,24E-01	0,00E+00	6,55E-03	0,00E+00	1,00E+00	0,00E+00
Radioactive waste disposed	kg	9,26E-06	0,00E+00	2,74E-08	0,00E+00	7,79E-08	0,00E+00

Output flow indicators

Indicator	Unit	A1-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	5,29E-02	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

References

ISO 14040:2021 Environmental management — Life Cycle Assessment — Principles and Framework

ISO 14044:2021 Environmental Management — Life Cycle Assessment — Requirements and Guidelines

ISO 14025:2010 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 product

General Programme Instructions of the International EPD® System. Version 4.0.

PCR 2019:14 Construction products (EN 15804+A2) (1.3.3)

PCR 2019:14-c-PCR-017 c-PCR-017 Technical-chemical products (for construction sector) (c-PCR to PCR 2019:14) (adopted from EPD Norway 2022-07-08)

Fenzi Group for sustainability

As a leading force in the glass industry, the Fenzi Group is committed to significantly reducing the environmental footprint of its products by opting for greener alternatives and using the most appropriate technologies and manufacturing processes for sustainable growth. The Group has set itself the ambitious goal of reducing emissions by 2050, with several milestones planned along the way. This includes phasing out greenhouse gas emissions by improving energy efficiency and increasing the use of renewable energy in its operations.

Fenzi supports the 17 SDGs and has taken up the challenge of implementing an integrated action plan for People, the Planet, Prosperity and Peace, showing its commitment to adhering in particular to SDGs shown in the image below:

For more information on the Fenzi Group: **www.Fenzigroup.com**

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