ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 EN and 15804+A2:2019 for

Section, Section-AL

Version 1

Date of publication: 2022-04-01
Validity: 5 years
Valid until: 2027-03-31
Based on PCR 2012:01 Construction products and construction services v 2.34 (EN 15804 +A2:2019) and its Sub-PCR-I Thermal insulation products

Scope of the EPD®: Russia

isotec
SAINT-GOBAIN

EPD®

General information

Manufacturer: CJSC “Zavod Minplita”, Russia, Chelyabinsk region, Sosnovsky district, Talovka village, industrial site of CJSC "Minplita Plant"

PCR identification: 2012:01 Construction products and construction services v 2.34 (EN 15804 +A2:2019) and its Sub-PCR-I Thermal insulation products

Product name and manufacturer represented: Section, Section-AL, Saint-Gobain Construction Products Rus

UN CPC CODE: 37990

Owner of the declaration: Saint-Gobain Construction Products Rus

Scope: The LCA is based on 2019 production data for one site Russia.
This EPD covers information modules A1 to C4 + module D (cradle to grave) as defined in EN 15804:2012

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Declaration issued:2022-04-01, **valid until**: 2027-03-31

CEN standard EN 15804 served as the core PCR	
LCA and EPD® performed by LCA Central TEAM**/** Saint-Gobain Construction Products Rus	
Independent verification of the environmental declaration and data according to standard EN ISO 14025:2010	
Internal ☒	External ☐
www.saint-gobain.ru	

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

EPDs within the same product category but from different programs 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 description

Product description and description of use

This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 m² of mineral wool with a thermal resistance of 1,111 K.m^2.W^{-1} .

If the study is done for one specific product, the annual values provided by the site are used. If the manufacturing takes place in different sites, the average used is a weighted arithmetic mean. This average is calculated by considering the yearly production per site, then, divide their share by the total sum and finally multiply the share by the total site inputs and outputs. This EPD, applies for one specific product coming from one single plant Saint-Gobain Construction Products Rus.

The production site of Saint-Gobain Construction Products Rus uses natural and abundant raw materials (volcanic rock), using fusion and fiberizing techniques to produce mineral wool. The products obtained come in the form of a "mineral wool mat" consisting of a soft and airy structure.

On Earth, naturally, the best insulator is dry immobile air at 10°C: its thermal conductivity factor, expressed in λ, is 0,025 W/(m.K) (watts per meter Kelvin degree). The thermal conductivity of mineral wool is close to immobile air as its lambda varies from 0,030 W/(m.K) for the most efficient to 0,045 W/(m.K) to the least.

With its entangled structure, mineral wool is a porous material that traps the air, making it one of the best insulating materials. The porous and elastic structure of the wool also absorbs noise in the air, knocks and offers acoustic correction inside premises. Mineral wool containing incombustible materials does not fuel fire or propagate flames.

Mineral wool insulation (mineral wool) is used in buildings as well as industrial facilities. It ensures a high level of comfort, lowers energy costs, minimizes carbon dioxide (CO_2) emissions, prevents heat loss through pitched roofs, walls, floors, pipes and boilers, reduces noise pollution and protects homes and industrial facilities from the risk of fire.

Mineral wool products last for the average building's lifetime (which is often set at 50 years as a default), or as long as the insulated building component is part of the building.

Technical data/physical characteristics (for a thickness of 40 mm):

Thermal resistance of the Product: **1,111 K.m^2.W^{-1} (Standard EN 13162)**
The thermal conductivity of the mineral wool is**: 0.036 W/(m·K) (Standard EN 13162)**
Reaction to fire**: Euroclass A1 – EN 13501-1**

Declaration of the main product components and/or materials

Description of the main components and/or materials for 1 m2 of mineral wool with a thermal resistance of 1,026 K.m2.W-1 for the calculation of the EPD®:

PARAMETER	VALUE
Quantity of wool for 1 m^2 of product	5.2 Kg
Thickness of wool	40 mm
Surfacing	None / Aluminum: 142 g
Packaging for the transportation and distribution	Carboard: 0.282 kg/m² Paper for label: 0.0000061 kg/m² Thermal ribbon 0,0018 kg/m² Pallet :0,089 kg/m²
Product used for the Installation	None

At the date of issue of this declaration, there is no “Substance of Very High Concern” (SVHC) in concentration above 0.1% by weight, and neither do their packaging, following the European REACH regulation (Registration, Evaluation, Authorization and Restriction of Chemicals).

The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

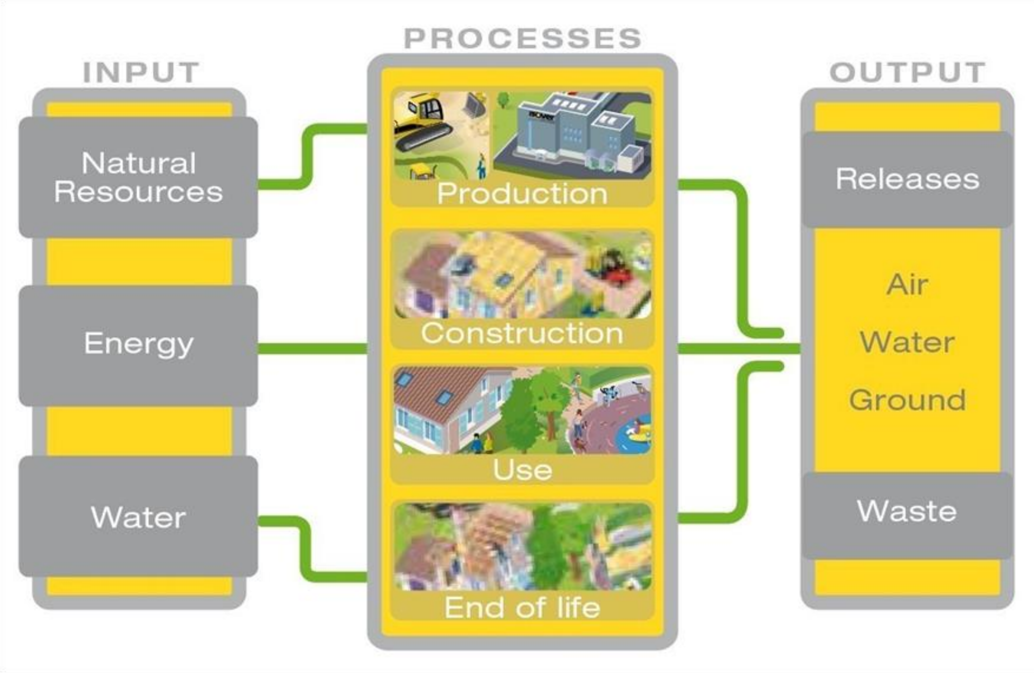
LCA calculation information

EPD TYPE	**Cradle to grave and module D**
FUNCTIONAL UNIT	Providing a thermal insulation on 1 m² of product with a thermal resistance of 1,111 $K.m^2.W^{-1}$
SYSTEM BOUNDARIES	Cradle to Grave: Mandatory stages = A1-3, A4-5, B1-7, C1-4 and D
REFERENCE SERVICE LIFE (RSL)	50 years
CUT-OFF RULES	All significant parameters shall be included. According to EN 15804, mass flows under 1% of the total mass input; and/or energy flows representing less than 1% of the total primary energy usage of the associated unit process may be omitted. However, the total amount of energy and mass omitted must not exceed 5% per module. Flows related to human activities such as employee transport are excluded. The construction of plants, production of machines and transportation systems are excluded since the related flows are supposed to be negligible compared to the production of the building product when compared at these systems lifetime level.
ALLOCATIONS	Allocation criteria are based on mass
GEOGRAPHICAL COVERAGE AND TIME PERIOD	ISOVER RUSSIA Chelyabinsk production 2019 RUSSIAN FEDERATION

- “EPDs of construction products may be not comparable if they do not comply with EN 15804 or ISO 21930"
- “Environmental Product Declarations within the same product category from different programs may not be comparable”

Life cycle stages

Flow diagram of the Life Cycle



A1-A3, Product stage

Description of the stage: the product stage of the mineral wool products is subdivided into 3 modules A1, A2 and A3 respectively "Raw material supply", "transport" and "manufacturing".

The aggregation of the modules A1, A2 and A3 is a possibility considered by the EN 15 804 standard. This rule is applied in this EPD.

Description of the scenarios and other additional technical information:

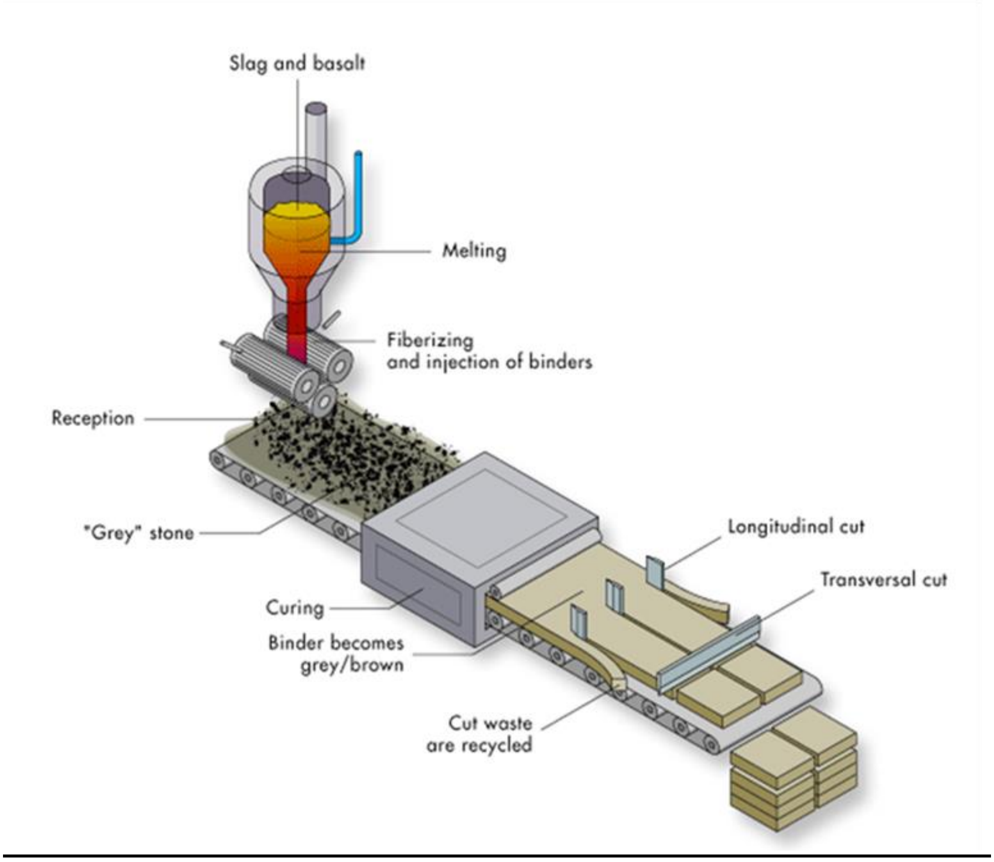
A1, Raw materials supply
This module takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process

Specifically, the raw material supply covers production of binder components and sourcing (quarry) of raw materials for fiber production, e.g. sand and borax for mineral wool. Besides these raw materials, recycled materials (agglomerates) are also used as input.

A2, Transport to the manufacturer
The raw materials are transported to the manufacturing site. In our case, the modeling include: road (average values) of each raw material.

A3, Manufacturing
This module includes the manufacturing of the product and packaging. Specifically, it covers the manufacturing of resin, mineral wool (including the processes of fusion and fiberizing showed in the flow diagram), and the packaging.

Mineral wool production



A4-A5, Construction process stage

Description of the stage: the construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building.

A4, Transport to the building site: this module includes transport from the production gate to the building site.
Transport is calculated on the basis of a scenario with the parameters described in the following table.

PARAMETER	VALUE/DESCRIPTION
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Average truck trailer (27 t payload) with a real 68.8 t payload, diesel consumption 38 liters for 100 km
Distance	1148 km by truck 5189 km by train
Capacity utilisation (including empty returns)	100% of the capacity in volume 30% of empty returns
Bulk density of transported products*	130 kg/m^3
Volume capacity utilisation factor	1 (based on a 90 m^3 truck)

A5, Installation in the building: this module includes:

No additional accessory was taken into account for the implementation phase insulation product. No energy is needed to install the product (manual installation without tool)

PARAMETER	VALUE/DESCRIPTION
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	5%
Distance	25 km to landfill by truck
Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)	Packaging wastes are 100% collected and modeled as recovered matter Mineral wool losses are landfilled

B1-B7, Use stage (excluding potential savings)

Description of the stage: the use stage is divided into the following modules:
- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational energy use
- B7: Operational water use

Description of the scenarios and additional technical information:
Once installation is complete, no actions or technical operations are required during the use stages until the end of life stage. Therefore, mineral wool insulation products have no impact (excluding potential energy savings) on this stage.

C1-C4, End of Life Stage

Description of the stage: this stage includes the next modules:

C1, Deconstruction, demolition
The de-construction and/or dismantling of insulation products take part of the demolition of the entire building. In our case, the environmental impact is assumed to be very small and can be neglected

C2, Transport to waste processing
The model use for the transportation (see A4, transportation to the building site) is applied.

C3, Waste processing for reuse, recovery and/or recycling
The product is considered to be landfilled without reuse, recovery or recycling.

C4, Disposal
The mineral wool is assumed to be 100% landfilled.

Description of the scenarios and additional technical information:

End of life:

PARAMETER	VALUE/DESCRIPTION
Collection process specified by type	The entire product, including any surfacing is collected alongside any mixed construction waste 5 410 g of mineral wool (collected with mixed construction waste)
Recovery system specified by type	There is no recovery, recycling or reuse of the product once it has reached its end of life phase.
Disposal specified by type	The product alongside the mixed construction waste from demolishing will go to landfill 5 410 g of mineral wool are landfilled
Assumptions for scenario development (e.g. transportation)	We assume that the waste going to landfill will be transported by truck with 24 tons payload, using diesel as a fuel consuming 38 liters per 100km. Distance covered is 25 km

D, Reuse/recovery/recycling potential

Description of the stage: An end of life recycling 0% (100% of wastes are landfilled) has been assumed using local demolition waste data and adjusted considering the recyclability of the product.

LCA results

As specified in EN 15804:2012+A2:2019 and also the Product-Category Rules. NPCR 12 rev. Insulation materials, epd-norge.no (2012), the environmental impacts are declared and reported using the baseline characterization factors are from the ILCD

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Raw materials and energy consumption, as well as transport distances have been taken directly from the manufacturing plant (Production data according 2019 and transport data according 2019).

All the results refer to 40 mm of thickness with value of R = 1,111 $m^2.K.W^{-1}$.

	PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	RU																

Environmental Impacts

	Product stage	Construction stage		Use stage							End of life stage				Reuse, Recovery Recycling
Environmental indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Climate Change [kg CO2 eq.]	9.77E+00	9.75E-01	6.20E-01	0	0	0	0	0	0	0	0.00E+00	8.21E-03	0	9.16E-02	0
Climate Change (fossil) [kg CO2 eq.]	1.05E+01	9.66E-01	5.50E-02	0	0	0	0	0	0	0	0.00E+00	8.01E-03	0	8.42E-02	0
Climate Change (biogenic) [kg CO2 eq.]	-7.49E-01	7.66E-03	5.65E-01	0	0	0	0	0	0	0	0.00E+00	2.01E-04	0	7.17E-03	0
Climate Change (land use change) [kg CO2 eq.]	7.49E-03	1.90E-03	1.08E-04	0	0	0	0	0	0	0	0.00E+00	4.69E-07	0	2.42E-04	0
Ozone depletion [kg CFC-11 eq.]	3.32E-06	6.26E-08	3.13E-09	0	0	0	0	0	0	0	0.00E+00	1.18E-18	0	3.12E-16	0
Acidification terrestrial and freshwater [Mole of H+ eq.]	4.86E-02	5.25E-03	3.09E-04	0	0	0	0	0	0	0	0.00E+00	4.73E-05	0	6.04E-04	0
Eutrophication freshwater [kg P eq.]	2.73E-03	3.64E-04	1.82E-05	0	0	0	0	0	0	0	0.00E+00	1.54E-09	0	1.45E-07	0
Eutrophication marine [kg N eq.]	5.50E-03	1.56E-03	9.33E-05	0	0	0	0	0	0	0	0.00E+00	2.34E-05	0	1.55E-04	0
Eutrophication terrestrial [Mole of N eq.]	5.62E-02	1.62E-02	9.82E-04	0	0	0	0	0	0	0	0.00E+00	2.57E-04	0	1.71E-03	0
Photochemical ozone formation - human health [kg NMVOC eq.]	4.13E-02	3.94E-03	2.35E-04	0	0	0	0	0	0	0	0.00E+00	4.39E-05	0	4.71E-04	0
Resource use, mineral and metals [kg Sb eq.]	1.71E-05	1.70E-06	8.54E-08	0	0	0	0	0	0	0	0.00E+00	9.60E-11	0	7.56E-09	0
Resource use, energy carriers [MJ]	1.30E+02	1.64E+01	9.11E-01	0	0	0	0	0	0	0	0.00E+00	1.11E-01	0	1.10E+00	0
Water scarcity [m³ world equiv.]	1.91E+01	8.36E-01	5.00E-02	0	0	0	0	0	0	0	0.00E+00	2.68E-03	0	1.45E-01	0

Resources Use

	Product stage	Construction stage		Use stage							End of life stage				D Reuse, recovery, recycling
Resources Use indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Use of renewable primary energy (PERE) [MJ]	1.91E+01	8.36E-01	5.00E-02	0	0	0	0	0	0	0	0.00E+00	2.68E-03	0	1.45E-01	0
Primary energy resources used as raw materials (PERM) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	1.91E+01	8.36E-01	5.00E-02	0	0	0	0	0	0	0	0.00E+00	2.68E-03	0	1.45E-01	0
Use of non-renewable primary energy (PENRE) [MJ]	1.26E+02	1.65E+01	9.12E-01	0	0	0	0	0	0	0	0.00E+00	1.11E-01	0	1.11E+00	0
Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	3.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	1.30E+02	1.65E+01	9.12E-01	0	0	0	0	0	0	0	0.00E+00	1.11E-01	0	1.11E+00	0
Input of secondary material (SM) [kg]	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	3.84E-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF) [MJ]	4.51E-07	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW) [m3]	5.92E-02	1.08E-02	5.54E-04	0	0	0	0	0	0	0	0.00E+00	4.87E-07	0	2.79E-04	0

Waste Category & Output flows

	Product stage	Construction stage		Use stage							End of life stage				D Reuse, recovery, recycling
Waste Category & Output Flows	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Hazardous waste disposed (HWD) [kg]	1.38E-07	2.79E-10	8.83E-10	0	0	0	0	0	0	0	0.00E+00	7.15E-12	0	1.68E-08	0
Non-hazardous waste disposed (NHWD) [kg]	2.90E-01	8.78E-05	2.86E-01	0	0	0	0	0	0	0	0.00E+00	2.25E-06	0	5.56	0
Radioactive waste disposed (RWD) [kg]	3.15E-04	4.91E-06	9.29E-07	0	0	0	0	0	0	0	0.00E+00	1.26E-07	0	0.0000126	0
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	3.01E+00	0	0.37	0	0	0	0	0	0	0	0	0	0	0	0
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported thermal energy (EET) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content

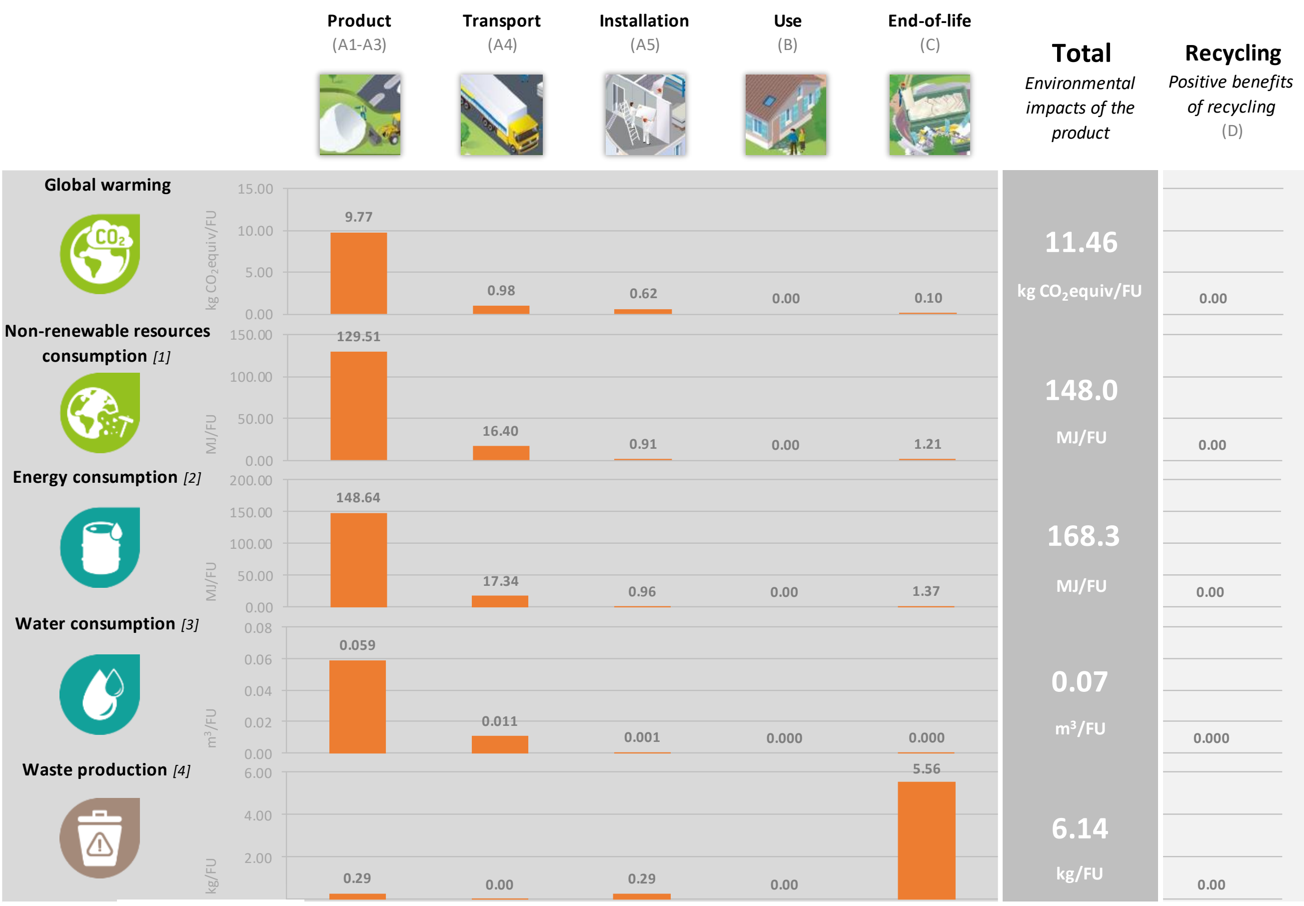
	Biogenic Carbon Content	Product stage A1 / A2 / A3
	Biogenic carbon content in product [kg]	4.73E-03
	Biogenic carbon content in packaging [kg]	1.62E-01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

There is no biogenic carbon in mineral product.

LCA interpretation

The following figure refers to a functional unit of 1 m² of mineral wool with a thermal resistance of 1.111 K*m2*W-1 of Section, Section-AL product.



[1] This indicator corresponds to the abiotic depletion potential of fossil resources.
[2] This indicator corresponds to the total use of primary energy.
[3] This indicator corresponds to the use of net fresh water.
[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.

Global Warming Potential (Climate Change) (GWP)
When analyzing the above figure for GWP, it can clearly be seen that the majority of contribution to this environmental impact is from the production modules (A1 – A3). This is primarily because the sources of greenhouse gas emissions are predominant in this part of the life cycle. CO2 is generated upstream from the production of electricity and is also released on site by the combustion of natural gas. We can see that other sections of the life cycle also contribute to the GWP; however the production modules contribute to over 80% of the contribution. Combustion of fuel in transport vehicles will generate the second highest percentage of greenhouse gas emissions.

Non-renewable resources consumptions
We can see that the consumption of non – renewable resources is once more found to have the highest value in the production modules. This is because a large quantity of natural gas is consumed within the factory to generate the large amount of electricity we use. The contribution to this impact from the other modules is very small and primarily due to the non – renewable resources consumed during transportation.

Energy Consumptions
As we can see, modules A1 – A3 have the highest contribution to total energy consumption. Energy in the form of electricity and natural gas is consumed in a vast quantity during the manufacture of mineral mineral wool so we would expect the production modules to contribute the most to this impact category.

Water Consumption
As we don't use water in any of the other modules (A4 – A5, B1 – B7, C1 – C4), we can see that there is no contribution to water consumption. For the production phase, water is used within the manufacturing facility and therefore we see the highest contribution here. However, we recycle a lot of the water on site so the contribution is still relatively low.

Waste Production
Waste production does not follow the same trend as the above environmental impacts. The largest contributor is the end of life module. This is because the entire product is sent to landfill once it reaches the end of life state. However, there is a still an impact associated with the production module since we do generate waste on site. The very small impact associated with installation is due to the loss rate of product during implementation.

ANNEX Influence of thicknesses

Influence of particular thicknesses of Section, Section-AL

This EPD® includes the range of thicknesses between 36 mm and 150 mm, for every thickness, using a multiplication factor in order to obtain the environmental performance of every thickness. In order to calculate the multiplication factors, a reference unit has been selected (value of R= 1.111 m^2.K / W for 40 mm). All the results refer to 40 mm of thickness.

The following table shows the multiplication factors for each individual thickness in the product family. In order to determine the environmental impacts associated with a determinate product thickness, the results indicated in this EPD® must be multiplied by the corresponding multiplication factor. To obtain this factor, a conservative principle has been followed, being the real impact of the product slightly lower than that indicated in the table.

Product Thickness (mm)	R Value	**Multiplication** FACTOR
36	1	1
40	1.1	1.1
50	1.4	1.4
100	2.8	2.8
150	4.2	4.2

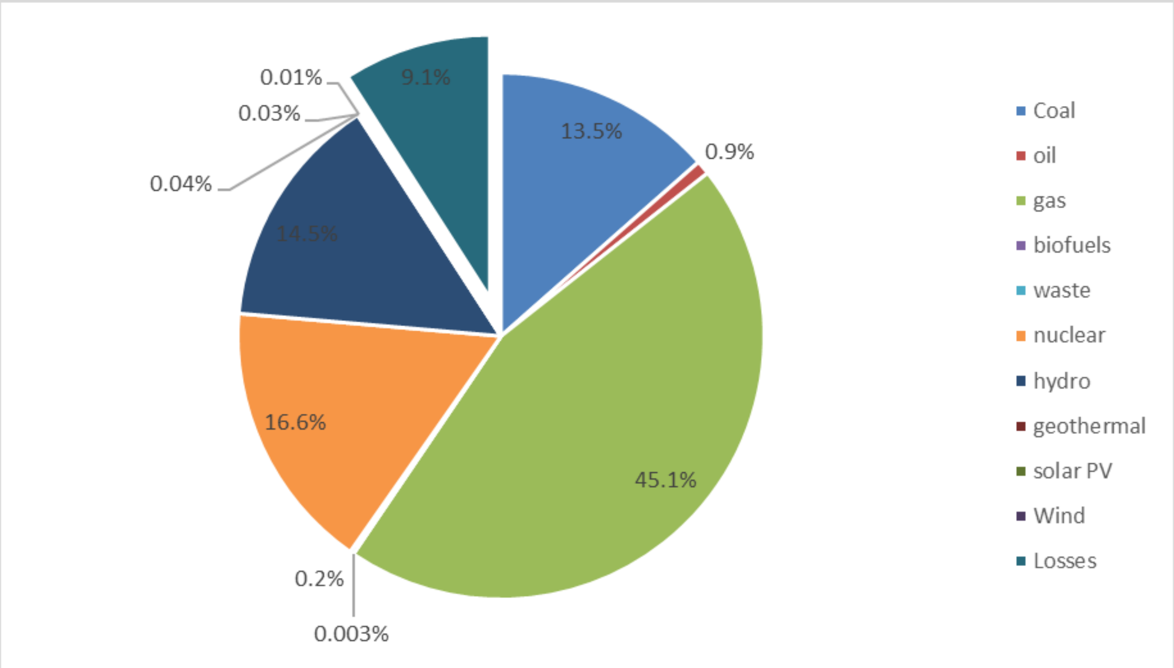
Appendix:

Electricity information

TYPE OF INFORMATION	DESCRIPTION
Location	**Representative of average production in Russian Federation (2015)**
Geographical representativeness description	Split of energy sources in Russian Federation Coal: 13,5% Oil: 0,9% Gas: 45,1% Biofuels: 0,003% Waste: 0,2% Nuclear: 16,6% Hydro: 14,5% Geothermal: 0,04% Solar PV: 0,03% Wind: 0,01% Distribution losses: 9,1%
Reference year	2015
Type of data set	Cradle to gate
Source	**IEA**

.

. **Russian Federation**



The dataset used to model the electricity mix used for these calculations come from Ecoinvent database.

DATA SOURCE	AMOUNT	UNIT
Ecoinvent 3.6 (2019)	0,797	kg CO2 eq / kWh (02 EN15804+A2 Climate Change (fossil)

Bibliography

- 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.
- PCR Multiple UN CPC codes Insulation materials (2014 :13) version 1.1
- UNE-EN 15804:2012+A2:2019: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- General Program Instructions for the International EPD® System, version 2.5
- The underlying LCA study
- EN 16783:2017 Thermal insulation products - Product category rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations
- EN 15804:2019+A2 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products