ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804 and ISO 14025

ISOVER RKL-31 Facade 30mm

Realization data : June 16, 2016
Version : 1.2

EPD VERIFIED

The environmental impacts of this product have been assessed over its whole life cycle. Its Environmental Product Declaration has been verified by an independent third party.

ECOBIO-1140155b

ISOVER SAINT-GOBAIN

General information

Manufacturer: Saint-Gobain Rakennustuotteet Oy; PL 250, 05801 HYVINKÄÄ
PCR identification: Saint-Gobain Methodological Guide for Construction Products (2012)
Product name and manufacturer represented: ISOVER RKL-31 Facade 30mm; Saint-Gobain Rakennustuotteet Oy
Declaration issued: 6/16/2016, **valid until**: 6/16/2019

Product description

Product description and description of use:

This Environmental Product Declaration (EPD) describes the environmental impacts of 1 m² of mineral wool.

The production site of Saint-Gobain ISOVER Forssa uses natural and abundant raw materials (sand), using fusion and fiberizing techniques to produce glass wool. The products obtained come in the form of a "mineral wool mat" consisting of a soft, 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 0.040 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 (glass wool) is used in buildings as well as industrial facilities. It ensures a high level of comfort, lowers energy costs, minimizes carbon dioxide (CO2) 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.

Main components

Mineral wool	90-95 %	(REACH registration number 01-2119472313-44-0041)
Binder	0-10%	

Possible facing materials can include glass mat and aluminum or wire net mesh

Technical data/physical characteristics:

The thermal resistance of the product: 0, 95 $K.m^2.W^{-1}$
The thermal conductivity of the product: 0,031 W/ (m.K)
Reaction to fire: A1 meets the requirements of EN 13162

Description of the main product components and or materials for 1 m² of product:

PARAMETER	VALUE
Quantity of wool	2 100 g
Thickness of wool	30 mm
Surfacing	Glass *tissue* white 299 g Glass tissue yellow 333 g
Packaging for the transportation and distribution	Polyethylene 32 g Wood 112 g
Product used for the Installation:	None

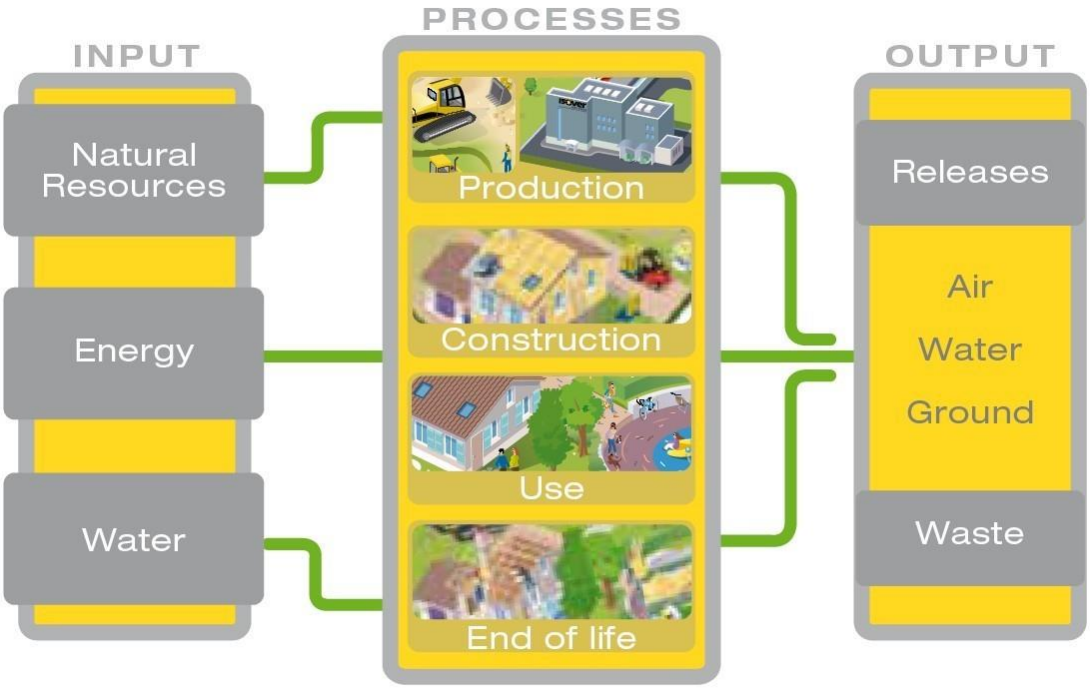
LCA calculation information

FUNCTIONAL UNIT	Providing a thermal insulation on 1 m² with a thermal resistance of equals 0, 95 $K.m^2.W^{-1}$.
SYSTEM BOUNDARIES	Cradle to Grave: Mandatory stages = A1-3, A4-5, B1-7, C1-4 and Optional stage = D
REFERENCE SERVICE LIFE (RSL)	50 years
CUT-OFF RULES	The use of cut-off criterion on mass inputs and primary energy at the unit process level (1%) and at the information module level (5%); 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	Finland 2013

According to EN 15804, EPD of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPD might not be comparable if they are from different programmes.

Life cycle stages

Flow diagram of the Life Cycle



Product stage, A1-A3

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.

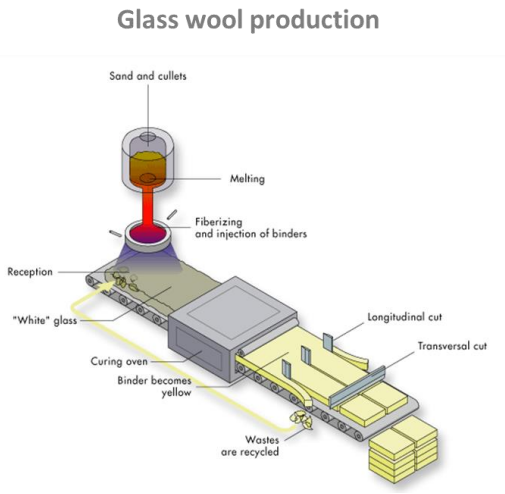
A1, Raw material supply
This module takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process.

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 glass wool. Besides these raw materials, recycled materials (glass cullet) 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 and boat transportations (average values) of each raw material.

A3, manufacturing
This module covers glass wool fabrication, including melting and fiberization (see process flow diagram).In addition, the production of packaging material is taking into account at this stage.

Manufacturing process flow diagram



Construction process stage, A4-A5

Description of the stage:

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

Description of scenarios and additional technical information:

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
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Average truck trailer with a 24t payload, diesel consumption 38 liters for 100 km
Distance	150 km
Capacity utilisation (including empty returns)	95 % of the capacity in volume 30 % of empty returns
Bulk density of transported products	80 kg/m^3
Volume capacity utilisation factor	1

A5, Installation in the building:

This module includes wastage of products during the implementation, the additional production processes to compensate the loss and the waste processing which occur in this stage.

Scenarios used for quantity of product wastage and waste processing are:

PARAMETER	VALUE
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	2 %
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 Glass wool losses are landfilled

Use stage (excluding potential savings), B1-B7

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 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.

End-of-life stage C1-C4

Description of the stage:

The stage includes the different modules of end-of-life : C1, de-construction, demolition, C2, transport to waste processing C3, waste processing for reuse, recovery and/or recycling; C4, disposal.

Description des scenarios et des informations techniques supplémentaires :

C1, de-construction, demolition

The de-construction and/or dismantling of insolation 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 glass wool is assumed to be 100% landfilled.

PARAMETER	VALUE/DESCRIPTION
Collection process specified by type	2 100 g of glass wool (collected with mixed construction waste)
Recovery system specified by type	No re-use, recycling or energy recovery
Disposal specified by type	2 100 g of glass wool are landfilled
Assumptions for scenario development (e.g. transportation)	Average truck trailer with a 24t payload, diesel consumption 38 liters for 100 km 25 km

Reuse/recovery/recycling potential, D

Description des scenarios et des informations techniques supplémentaires :
Packaging wastes from module A5 are reported in this module as recovered matter.

LCA results

LCA model, aggregation of data and environmental impact are calculated from the TEAM™ software 5.1.

Resume of the LCA results detailed on the following tables.

ENVIRONMENTAL IMPACTS

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	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	
Global Warming Potential (GWP) - *kg CO2 equiv/FU*	3,8E+00	1,1E-01	2,0E-01	0	0	0	0	0	0	0	0	1,8E-02	0	0	0
	The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.														
Ozone Depletion (ODP) *kg CFC 11 equiv/FU*	2,6E-07	7,7E-08	1,7E-08	0	0	0	0	0	0	0	0	1,3E-08	0	0	0
	Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.														
Acidification potential (AP) *kg SO2 equiv/FU*	3,0E-02	6,6E-04	1,5E-03	0	0	0	0	0	0	0	0	1,1E-04	0	0	0
	Acid depositions have negative impacts on natural ecosystems and the man-made environment incl, buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.														
Eutrophication potential (EP) *kg (PO4)3- equiv/FU*	3,4E-03	1,6E-04	1,8E-04	0	0	0	0	0	0	0	0	2,7E-05	0	9,4E-06	0
	Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.														
Photochemical ozone creation (POPC) *Ethene equiv/FU*	3,2E-03	1,5E-05	1,6E-04	0	0	0	0	0	0	0	0	2,4E-06	0	0	0
	Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.														
Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU*	1,4E-06	8,9E-11	7,2E-08	0	0	0	0	0	0	0	0	1,5E-11	0	0	0
Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU*	7,9E+01	1,4E+00	4,0E+00	0	0	0	0	0	0	0	0	2,3E-01	0	0	0
	Consumption of non-renewable resources, thereby lowering their availability for future generations.														

RESOURCE USE

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	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	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU*	7,2E+00	9,4E-04	3,6E-01	0	0	0	0	0	0	0	0	1,6E-04	0	0	0
Use of renewable primary energy used as raw materials *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	7,2E+00	9,4E-04	3,6E-01	0	0	0	0	0	0	0	0	1,6E-04	0	0	0
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	7,5E+01	1,4E+00	4,0E+00	0	0	0	0	0	0	0	0	2,3E-01	0	0	0
Use of non-renewable primary energy used as raw materials *MJ/FU*	3,5E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	7,9E+01	1,4E+00	4,0E+00	0	0	0	0	0	0	0	0	2,3E-01	0	0	0
Use of secondary material *kg/FU*	1,9E+00	0	9,6E-02	0	0	0	0	0	0	0	0	0	0	0	5,3E-02
Use of renewable secondary fuels- *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels - *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water - *m3/FU*	2,5E-02	1,3E-04	1,3E-03	0	0	0	0	0	0	0	0	2,2E-05	0	0	0

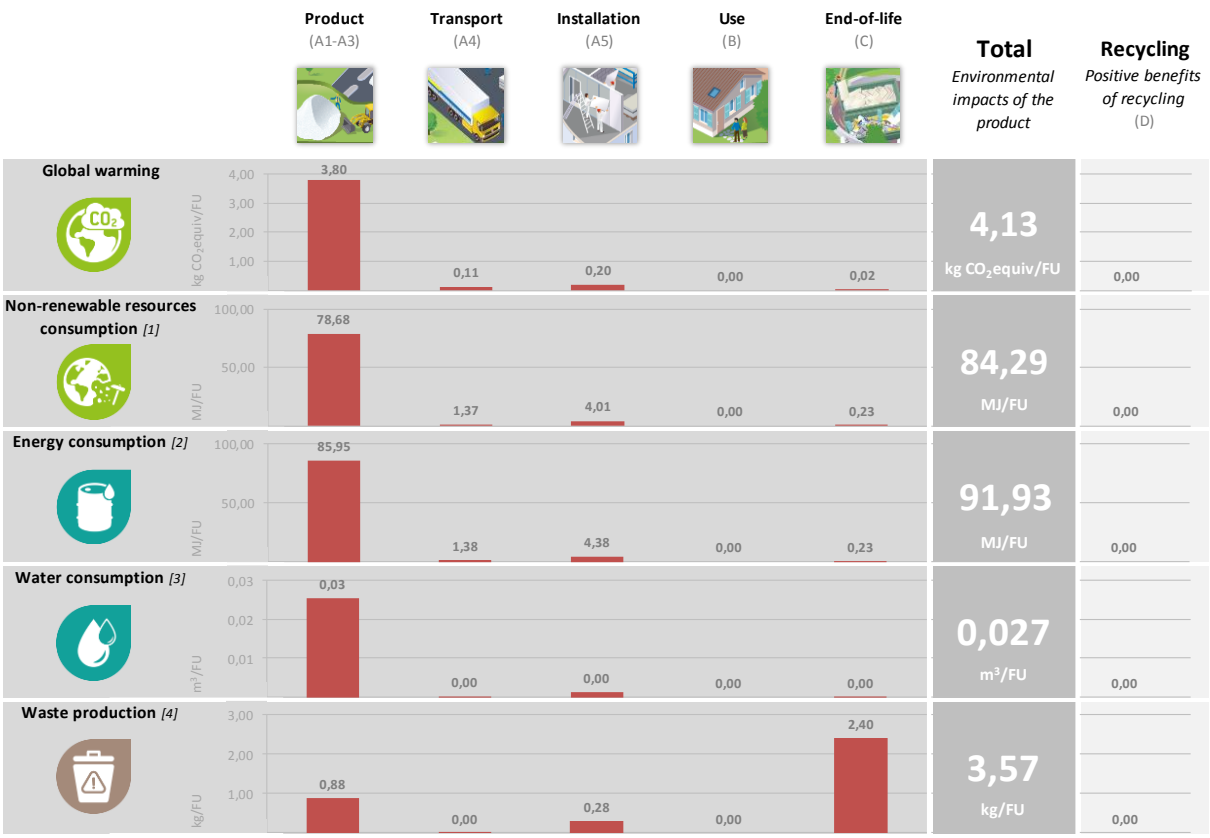
WASTE CATEGORIES

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	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	
Hazardous waste disposed *kg/FU*	7,3E-04	3,1E-05	3,8E-05	0	0	0	0	0	0	0	0	5,1E-06	0	0	0
Non-hazardous waste disposed *kg/FU*	8,8E-01	2,0E-04	2,8E-01	0	0	0	0	0	0	0	0	3,3E-05	0	2,4E+00	0
Radioactive waste disposed *kg/FU*	1,4E-04	2,2E-05	8,3E-06	0	0	0	0	0	0	0	0	3,7E-06	0	0	0

OUTPUT FLOWS

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	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	
Components for re-use *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling *kg/FU*	3,8E-01	9,9E-07	7,2E-02	0	0	0	0	0	0	0	0	1,7E-07	0	0	0
Materials for energy recovery *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy *MJ/FU*	2,3E-02	1,1E-09	1,2E-03	0	0	0	0	0	0	0	0	1,8E-10	0	0	0

LCA interpretation



[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.

Health characteristics

ISOVER mineral wool products are all classified as not hazardous according to REACH.

To guarantee proper safe handling and use of ISOVER products, following text and pictograms are printed in materials safety data sheet and on packaging.

"The mechanical effect of fibres in contact with skin may cause temporary itching"

Ventilate working area if possible

Waste should be disposed of according to local regulations

Cover exposed skin. When working in unventilated area wear disposable face mask

Clean area using vacuum equipment

Wear goggles when working overhead

Rinse in cold water before washing

EUCEB

The glass wool fibres of this product are exonerated from the carcinogenic classification according to the European directive 97/69/CE and the Regulation (EC) 1272/2008 if they fulfil one of the criteria of the nota Q of these texts.

All glass wool products manufactured by Saint-Gobain Rakennustuotteet Oy name are made of non-classified fibres and are certified by EUCEB.

EUCEB, European Certification Board of Mineral Wool Products - www.euceb.org, is a voluntary initiative by the mineral wool industry. It is an independent certification authority that guarantees that products are made of fibres, which comply with the exoneration criteria for carcinogenicity (Note Q) of the Directive 97/69/EC and the Regulation (EC) 1272/2008.

To ensure that fibres comply with the exoneration criteria all tests and supervision procedures are carried out by independent, expert qualified institutions. EUCEB ensures that the producers of mineral wool have put in place self-control measures.

The mineral wool producers commit to EUCEB to:

- supply sampling and analysis reports established by laboratories recognized by EUCEB, proving that the fibres comply with one of the four criteria of exoneration described in Note Q of the Directive 97/99/EC,
- be controlled, twice per year, of each production unit by an independent third party recognized by EUCEB (sampling and conformity to the initial chemical composition),
- put in place procedures of internal self-control in each production unit.

The products responding to the EUCEB certification are recognized by the EUCEB logo put on the packaging.

EUCEB is an ISO 9001:2000 certified association.

Moreover, in 2001, the International Agency for Research on Cancer, re-evaluated and reclassified mineral wool (insulation glass wool, rock(stone) wool and slag wool) from Group 2B (possibly carcinogenic) to Group 3 « agent which cannot be classified as for their carcinogenicity to humans». (See Monograph Vol 81, http://monographs.iarc.fr/)

ISOVER mineral wool products are low-emitting building products. ISOVER products have M1 rating on the Emission Classification of Building Materials.

RAKENNUSTIETO
The Building Information Foundation RTS

M1 EMISSION CLASS FOR BUILDING MATERIAL

EMISSION CLASSIFICATION OF BUILDING MATERIALS

Saint-Gobain Rakennustuotteet Oy

The classification working group set up by the Building Information Foundation RTS has approved the following product:

ISOVER RKL-31
ISOVER RKL-31 EJ FAÇADE
ISOVER RKL-31 FAÇADE
ISOVER RKL-A
ISOVER VKL

as belonging to emission class M1 for building materials.

The classification is valid until 9.1.2018.

Saint-Gobain Rakennustuotteet Oy has the right to equip its classified products with the classification mark and to use this classification mark when marketing these products.

The decision is in line with the requirements laid down in the Classification of Indoor Climate 2008 and the Classification of Building Materials: General Instructions.

THE BUILDING INFORMATION FOUNDATION RTS

Matti Rautiola
Director General

Laura Seitola
Secretary of the Classification Working Group

More information on M1-classification

https://www.rakennustieto.fi/index/english/emissionclassificationofbuildingmaterials.html

Environmental positive contribution

Recycled material content

Isover glass wool's recycled glass content is on the average 70%. This recycled glass content fulfills the LEED-standard requirements for postconsumer recycled content and it calculated according to the standard ISO 14021. Recycled glass content calculation is based on the product weight and calculated according to the 2014 raw material and production data.

Additional information

Production, design and marketing of ISOVER and ISOTEC products are certified according to these international ISO standards.

ISO 9001


BUREAU VERITAS
Certification

Saint-Gobain Rakennustuotteet Oy

STANDARD

ISO 9001:2008

SCOPE OF CERTIFICATION

ISO 14001


BUREAU VERITAS
Certification

Saint-Gobain Rakennustuotteet Oy

Bureau Veritas Certification certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

STANDARD

ISO 14001:2004

SCOPE OF CERTIFICATION

Production, design and marketing of ISOVER® and ISOTEC® products and production of ECOPHON® and EUROCOUSTIC® products

EPD verification

CEN Standard FprEN 15804 serves as the core PCR*
Independent external verification of the declaration, according to the EN ISO 14025:2010
Third party verifier Demonstration of verification: an independent verification of the declaration was made, according to EN 15804:2012. This verification was external and conducted by the following third party: Insinööritoimisto Ecobio Oy (Runeberginkatu 4c B 21, FI-00100 Helsinki, +358 20 756 9450, www.ecobio.fi), M.Sc. Taru Halla and M.Sc. Thomas Andersson, based on the PCR mentioned above.