ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A1*

Owner of the Declaration	**Saint-Gobain ISOVER G+H AG**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SGI-20160162-CAA1-EN
Issue date	20.12.2016
Valid to	19.12.2021

Unfaced ULTIMATE Slabs and Rolls

Saint-Gobain ISOVER G+H AG

Institut Bauen und Umwelt e.V.

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General Information

Saint-Gobain ISOVER G+H AG

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number

EPD-SGI-20160162-CAA1-EN

This declaration is based on the product category rules:

Mineral insulating materials, 07/2014
(PCR checked and approved by the SVR)

Issue date

20/12/2016

Valid to

19/20/2021

Prof. Dr. Horst J. Bossenmayer
(chairman of Institut Bauen und Umwelt e.V.)

Dr. Burkhart Lehman
(Managing Director Institut Bauen und Umwelt e.V.))

Unfaced ULTIMATE Slabs and Rolls

Owner of the declaration

Saint-Gobain ISOVER G+H AG
Bürgermeister-Grünzweig-Straße 1
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Declared product / declared unit

1 m³ unfaced or uncoated artificial-resin-bonded Ultimate insulation material from ISOVER in the bulk density range from 16 to 100 kg/m³. In addition, the environmental impacts of 3 facings are presented in the Annex based on an area of 1 m².

Scope:

The EPD refers to the life cycle of unfaced or uncoated resin-bonded Ultimate mineral wool from ISOVER. Since the insulating materials can be supplied with lamination or coating, the Annex to this EPD provides the ecologically balanced parameters for specific calculation of laminated/coated product variants. Ultimate mineral wool is manufactured at the factory in Luebz/Germany, the production data on which the LCA is based are from the year 2013. The LCA thus represents 100% of the Ultimate mineral wool produced by ISOVER.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of *EN 15804+A1*. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard *EN 15804* serves as the core PCR
Independent verification of the declaration and data according to *ISO 14025:2010*
☐ internally ☒ externally

Patricia Wolf
(Independent verifier appointed by SVR)

Product

Product description/Product definition

The declared mineral wool material comprises unfaced Ultimate plates and felts acc. to /EN 13162:2012+A1:2015 Thermal Insulation Materials for Buildings - Factory-Produced Mineral Wool (MW) Products - Specification/.
Ultimate is a mineral wool insulation material comprised chiefly of monofil artificial mineral fibres with a non-crystalline structure obtained from a siliceous melt. The average fibre diameter is 3 - 6 µm. The length of the fibres can reach several centimetres. The definition of mineral wool acc. to /CLP/ is: Artificial mineral fibres with random orientation comprising vitreous (silicate) fibres with a mass content of sodium, potassium, calcium, magnesium and barium oxides exceeding 18%. Product definition (Please select one of the following options).

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration EN xyz:date, title and the CE-marking. For the application and use the respective national provisions apply.

Application

In principle, mineral wool applications are differentiated as being either in/on buildings (roof, wall, floor or ceiling insulation; interior and exterior) or technical insulation applications. The individual areas of application are listed below:

· Heat, cold, noise and Eire protection in building construction, e.g. insulating material for roofs (steep

and flat roofs, twin-wall sheet metal roofs), exterior walls (composite thermal insulation systems, twin-wall masonry, ventilated curtain facades, walls between houses, timber frame construction, industrial construction coffered walls, interior walls (light partition walls and wall facings), floors (sound and thermal insulation of floating screeds, top floor ceilings, wooden beam ceilings), ceilings (underground garage and cellar ceilings, industrial ceilings, soundabsorbing ceilings)

· Building technology (insulation of heating and hot water pipes, cable and pipe ducts, airconditioning ducts, ventilation ducts)

· Operating technology (insulation of pipelines, district heating pipelines, boilers, tanks and equipment)

· Industrial processing (air conditioning ducts, fire doors, prefabricated house elements and chimney systems, solar systems, automotive applications)

· Fire protection elements (cable insulation and for steel construction elements)

Technical Data

Designation	ULTIMATE	Unit	Test regulation
Declared thermal conductivity	31 -39	mW/(m*K)	/EN 12667/
Designed thermal conductivity	32 - 40	mW/(m*K)	/DIN 4108-4/
Water vapour diffusion resistance factor	μ = 1	-	/ISO 10456/
Water vapour diffusion equivalent air layer thickness	9 x component thickness in [m]	m	-
Sound absorption coefficient	See below	%	/ISO 354/
Bulk density	16 - 100 kg/m³		-
Compressive strength	No area of application	kPa	/EN 826/

Sound absorption levels as a function of frequency (e.g.: sound absorption coefficient of Ultimate of approx. 30 kg/m³ and a thickness of 50 mm: αW=0.90):

Frequency (Hz)	125	250	500	1000	2000	4000
Absorption coefficient α_p	0.25	0.60	1.00	1.00	1.00	1.00

Bautechnische Daten

Da sich in Abhängigkeit der Rohdichte breite Wertspannen ergeben können, wird hier auf einen Ausweis spezifischer Daten verzichtet.

Name	Value	Unit
Thermal conductivity	-	W/(mK)
Calculation value for thermal conductivity	-	W/(mK)
Water vapour diffusion resistance factor	-	-
Water vapor diffusion equivalent air layer thickness	-	m
Sound absorption coefficient	-	%
Gross density	30	kg/m^3
Compressive strength	-	N/mm^2
Formaldehyde emissions acc. to EN 717-1	-	µg/m^3

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to EN xyz:date, title.Voluntary data: source, date, title (not part of CE-marking).

Base materials/Ancillary materials

The main raw materials used in Ultimate production are phonolite (up to approx. 50 wt.-%), lime (up to about 20 wt.-%) and bauxite (approximately 10 wt.-%). Other components, besides internal recyclate (up to approx. 10 wt.-13/0) are dolomite, iron oxide, soda, phosphate, and nepheline (1-5 wt.-% respectively). The networking of the fibres is achieved by using up to 8% binding agent (based on a urea modified phenol formaldehyde resin) in the finished product.
The basic materials/additives of the facings are:

Facing	g/m² (one side)	Component
Glass tissue	50	Glass fibre
Glass fabric	420	Water glass
Wired mesh	270	Galvanized steel

Reference service life

The useful life of ISOVER mineral wool insulating materials is within the order of magnitude of the useful life of the respective component or building.

LCA: Calculation rules

Declared Unit

The Declaration refers to production of 1 m³ of the ISOVER product ULTIMATE (unfaced). The bulk density of the declared mineral wool products can be between 16 and 100 kg/m³. As a result of averaging (annual production volume in t / annual production volume in m³), this results in an average density of 30 kg/m³, on which Basis the following ecobalance results are arrived at. Extrapolation of the results to other bulk densities is possible by means of linear scaling.

Designation

Name	Value	Unit
Declared unit	1	m^3
Gross density	30	kg/m^3
Conversion factor to 1 kg	0.033	-

In addition, the environmental profiles of 3 facings, based on the above specifications, are provided in the Annex. The inclusion of the LCA results for the facings must first on 1 m³-related results for the mineral wool on the desired thickness to be converted.
The results for the facings are then added up for each 1 m². The environmental profiles of the facings were calculated for one-sided facing. Any adhesive / mounting medium required in addition is included in the results for the facings.

System boundary

The selected system limits include production of the product from raw material extraction to finished packaged product at the factory gate (Cradle-to-gate). Details of factors considered:

- Raw material supply
- Energy supply
- Transport of raw materials and semi-finished products
- Production (energy, waste, emissions), incl. product packaging

- Disposal of production wastes

The utilization phase is not included in the calculations because of the wide variety of potential applications and structures. The disposal of the product itself is not sufficiently quantifiable due to its long service life and is therefore not included in the balance.

Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

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LCA: Scenarios and additional technical information

Not relevant for this EPD Type: cradle-to-gate

LCA: Results

A presentation of the environmental impacts of 1 m³ of unfaced mineral wool with an average bulk density of 30 kg/m³, manufactured by Saint-Gobain ISOVER G+H AG, follows. The following tables show the results for the impact assessment indicators, consumption of resources, wastes and other output flows for 1 m³ of Ultimate insulating material. The modules marked with an "x" acc. to /EN 15804/ are addressed here. The environmental impacts and material balance sheet indicators for the different laminations are set out in the Annex.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m³ ULTIMATE (Dichte 30 kg/m3)

Parameter	Unit	A1-A3
Global warming potential	[kg CO_2-Eq.]	6.75E+1
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.54E-9
Acidification potential of land and water	[kg SO_2-Eq.]	2.35E-1
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	4.88E-2
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	1.92E-2
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	7.01E-5
Abiotic depletion potential for fossil resources	[MJ]	1.10E+3

RESULTS OF THE LCA - RESOURCE USE according to EN 15804+A1: 1 m³ ULTIMATE (Dichte 30 kg/m3)

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier	[MJ]	9.73E+1
Renewable primary energy resources as material utilization	[MJ]	4.36E+1
Total use of renewable primary energy resources	[MJ]	1.41E+2
Non-renewable primary energy as energy carrier	[MJ]	1.04E+3
Non-renewable primary energy as material utilization	[MJ]	1.30E+2
Total use of non-renewable primary energy resources	[MJ]	1.17E+3
Use of secondary material	[kg]	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0
Use of net fresh water	[m³]	3.03E-1

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES according to EN 15804+A1: 1 m³ ULTIMATE (Dichte 30 kg/m3)

Parameter	Unit	A1-A3
Hazardous waste disposed	[kg]	4.76E-5
Non-hazardous waste disposed	[kg]	1.27E+0
Radioactive waste disposed	[kg]	2.83E-2
Components for re-use	[kg]	0.00E+0
Materials for recycling	[kg]	0.00E+0
Materials for energy recovery	[kg]	0.00E+0
Exported electrical energy	[MJ]	0.00E+0
Exported thermal energy	[MJ]	0.00E+0

References

PCR 2014, Teil B:
Institut Bauen und Umwelt e.V., Product category rules for construction products, Part B: Requirements applying to EPDs for mineral insulation materials, 2014-07

CLP
EC Regulation 1272/2008 an Classification, Labelling and Packaging of Substances and Mixtures, Nota. Q, 2008

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DIN EN 826: 1996-05
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DIN EN 13162:2012+A1:2015

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DIN EN ISO 10456:2010-05
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DIN EN 12667: 2001-05
Technical Thermal Behaviour of Construction Materials and Products - Determination of Heat Transfer Resistance acc. to Plate Device Method and Heat Flux Plate Meter — Products with High and Average Heat Transfer Resistance, German version EN12667:2001

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Thermal Insulation and Energy Savings in Buildings - Part 4: Rated Technical Thermal and Moisture Values

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