

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025

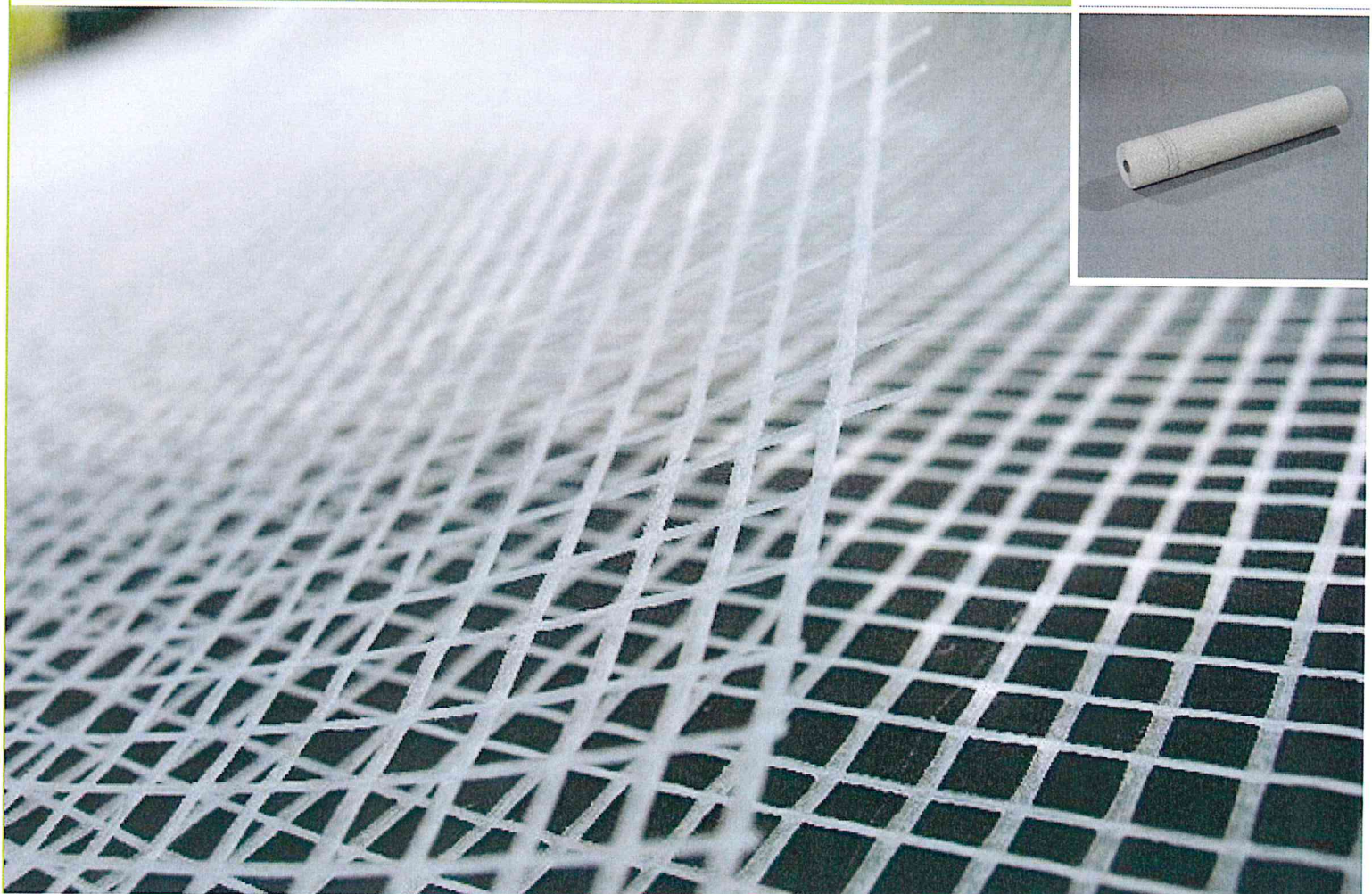
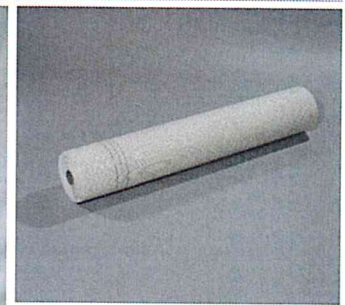
Owner of the Declaration	Saint-Gobain ADFORS
Programme holder	Institut Bauen und Umwelt (IBU)
Publisher	Institut Bauen und Umwelt (IBU)
Declaration number	EPD-SGA-2012111-E
Issue date	24.05.2012
Valid to	23.05.2017

Reinforcement mesh fabric
Saint-Gobain ADFORS

www.bau-umwelt.com



Institut Bauen
und Umwelt e.V.



1 Summary

Saint-Gobain ADFORS

Programme holder

IBU - Institut Bauen und Umwelt e.V.
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D-53639 Königswinter

Declaration number

EPD-SGA-2012111

This Declaration is based on the Product Category Rules:

Glass Reinforcement Mesh, 06-2011
(PCR tested and approved by the independent expert committee)

Issue date

24.05.2012

Valid to

23.05.2012

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Prof. Dr.-Ing. Hans-Wolf Reinhardt
(Chairman of SVA)

Reinforcement mesh fabric

Owner of the Declaration

Saint-Gobain ADFORS
Sokolovska 106
CZ-57021 Litomysl
Czech Republic

Declared product / Declared unit

Mesh fabric / m²

Scope:

This EPD covers the products range of glass reinforcement mesh fabrics manufactured by Saint-Gobain ADFORS at Litomysl plant, Czech Republic. This product is sold in Europe and its main function is to reinforce wall, ceiling and floor applications. The owner of the declaration shall be liable for the underlying information and evidence.

Verification

The CEN standard FprEN 15804 serves as the core PCR.

Verification of the EPD by an independent third party as per ISO 14025

internally externally

Prof. Dr. Birgit Grahlf,
(Independent tester appointed by SVA)

2 Product

2.1 Product description

The products covered by this EPD are the reinforcement mesh fabric produced by Saint-Gobain ADFORS at Litomysl, Czech Republic. The mesh fabric R 131 has been taken as a reference product for this product range¹. It is a mixture of E Glass in the form of continuous filaments with, in addition, a coating preparation. It is mainly made of glass fibre and polymeric coating.

The product name "[reinforcement] mesh fabric" represents in this EPD any commercial reference of reinforcement mesh from the R131 products range. LCI results are given for the reference product R131. For any other reinforcement mesh from the same range, LCI indicators may be calculated for stages A1 to A4 using a linear proportional rule. The extrapolation is based on the ratio between the weight of the chosen product and the reference product. Here is an example with product R161: $\text{impact}(R161) = \text{impact}(R 131) * 161/131$.

2.2 Application

The mesh fabric is implemented within the ETICS (External Thermal Insulation Composite System) system. It is used to reinforce wall, ceiling and floor applications.

¹ Product range includes: R 51, R 52, R 58, R 79, R 85, R 93, R 118, R 119, R 122, R 123, R131, R 137, R 161, R 163, R 178 and R 190; Range of weight including coating: 51 – 190 g/m²

2.3 Technical Data

The mesh fabric R131, considered as reference product, has the following properties:

- Tensile strength according to DIN EN ISO 13934-1 (standard conditions):

Nominal value: 2200 / 2200 N/50 mm

Individual value: 1900 / 1900 N/50 mm

- Elongation at break according to DIN EN ISO 13934-1 Reference (standard conditions): 3.8%

- Alkali resistance/residual strength after alkali immersion >50% according to the ETAG 004 test method:

Tensile strength: 1000 / 1000 N/50 mm, 50% / 50%

The products line of reinforcement mesh fabrics produced by Saint-Gobain ADFORS covers a range of surface density from 51 to 190 g/m².

2.4 Placing on the market / Application rules

The mesh fabric for plaster reinforcement is a system component of the ETICS (External Thermal Insulation Composite System) according to ETAG 004 (Guideline for European Technical Approval of ETICS with rendering).

2.5 Delivery status

The mesh fabric R131 is delivered with the following dimensions:

Standard width: 100 or 110 cm

Roll length: 50 m
 Treated fabric thickness: 0.52 mm
 Loom state fabric weight: 131 g/m²
 Treated fabric weight: 160 g/m²

2.6 Base materials / Ancillary materials

The glass fibre mesh is composed of 0.131 kg/m² of sized E-glass, and 0.029 kg/m² of polymeric coating, mainly based on styrene acrylic resins, EVA and PVC.

The mesh fabric R131 (reference product) is implemented using mortar glue (4 kg/m²) composed of:

- Water: 20.25 %
- Sand: 47.75 %
- Cement: 24 %
- Limestone: 8 %

The impacts due to the production of the mortar glue have been accounted at the installation stage (A5) but the mortar is not part of the packaged product. As the glass fibre textile can be cut out, each part of it can be re-used during the construction. Thus, construction produces 2% of losses maximum.

2.7 Manufacture

The manufacturing process of the mesh fabric starts with the glass production in a furnace. The melted glass is then formed and sized to create a continuous filament. This glass fibre can be then woven. The resulting mesh is finally coated and packaged.

2.8 Environment and health during manufacturing

A mixture of natural/synthetic materials is used in the product manufacture. Saint-Gobain ADFORS follows a general environmental policy of Saint-Gobain and manufacturing plant will be ISO 14001 certified by LRQA in 2011.

2.9 Product processing / Installation

The mesh fabric is manually installed. No specific protection equipment is required, except individual protections used for any type of construction works.

2.10 Packaging

The product is packaged with:

- Cardboard: 9.5 g/declared unit

- Plastic (LDPE): 0.61 g/declared unit

2.11 Condition of use

No specific information to declare

2.12 Environment and health during use

As the product is intended to be embedded within the ETICS system, there is no specific recommendation.

2.13 Reference service life

The reference service life (RSL) of the mesh fabric is 25 years.

The assumptions for which the reference service life exclusively applies are provided in section "LCA: Scenarios and additional technical information".

2.14 Extraordinary effects

Fire

Gross heat of combustion of the packaged product (according to EN ISO 1716 fire reaction test):

8.17 MJ/kg

This figure does not include gross heat combustion of ancillary products and their packaging.

Water

The product is not intended to be in contact with drinking water nor has any effect on the environment following unforeseeable influence of water.

Mechanical destruction

The product does not have any impacts on the environment following unforeseeable mechanical destruction.

2.15 Re-use phase

Once implemented, the product cannot be reused or recycled. No energy recovery is considered.

2.16 Disposal

The mesh fabric is mainly disposed of in landfill.

The waste code in accordance with the European Waste Index is 101103.

2.17 Further information

Technical sheet available on:
www.sg-adfors.com

3 LCA: Calculation rules

3.1 Declared unit

The declared unit is:

"1 m² of reinforcement mesh fabric used for a wall application, the product being installed in accordance with related standards."

This corresponds to 0.160 kg of the reference mesh fabric R131.

3.2 System limit

Type of EPD: cradle to grave.

Module "A1 – Raw material supply" comprises the extraction of raw materials for glass production (sand, limestone, kaolin) and the production of all chemicals, of which transport to the plant site is accounted in module "A2 – Transport". Module "A3 – Manufacturing"

represents the whole manufacturing process of the final product (melted glass production, forming, sizing, beaming, weaving, coating and packaging), including industrial and waste water treatment.

Road transport of the final product to the construction site is accounted in the module "A4 – Transport" and module "A5 – Construction-installation process" represents its application as finishing, using mortar glue. The production of mortar components is included in this stage. 2% of product loss during the process stage has been accounted.

The use stage has no impacts on the environment.

The end-of-life stages considered are modules "C2 – Transport" for waste road transport to landfill and module "C4 - Disposal", which represents impacts of the discharge in landfill. No waste processing is

considered and demolition does not present any impacts.

3.3 Estimates and assumptions

All key assumptions and estimates are specified in this section "LCA: Calculation rules".

3.4 Cut-off criteria

99% (in mass) of all inputs are covered by the present environmental impact assessment. The whole energy consumption is included into the scope of this EPD.

3.5 Background data

The main sources for background data used are Ecoinvent 2.0 and DEAM™.

3.6 Data quality

Reliability, completeness, representativity, reproducibility, and consistency of specific and background data have been checked by PwC.

3.7 Period under review

Specific data were collected in 2008, which represents the current production levels.

3.8 Allocation

An allocation per weight of glass fiber used for the finished product has been applied to determine the impacts of the final product's manufacturing (energy consumption, auxiliaries, operating materials, recycling line) among all co-products. This allocation has been performed for all stages considering relevant physical flows (melted glass (kg), glass fibre (kg), woven fabric (m²)).

3.9 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 FprEN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account.

4 LCA: Scenarios and additional technical information

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared (MND).

Transport to the construction site (A4)

Litres of fuel	diesel: 38 l/100 km
Transport distance	500 km
Capacity utilisation (including empty runs)	60%
Capacity utilisation volume factor	1

Installation in the building (A5)

Mortar glue	4 kg
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Water consumption (in mortar)	8E-7 m ³
Material loss	2 %

Use (B1)

Please refer to section 2.12 "Use"

End of Life (C1-C4)

Collected separately	0 kg
Collected as mixed construction waste:	
Landfilling	4.16 kg
Transport distance to landfill	30 km

5 LCA: Results for reinforcement mesh R131 (reference product)

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

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement ¹⁾	Refurbishment ¹⁾	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	X	X	X	MND	MND	MND	MND	MND	MND	X	X	MND	X	MND

1) The modules Replacement (B4) and Refurbishment (B5) are normally not relevant on the product. For clarity reasons, those two modules have been deleted in the following tables. If one or both modules are declared respective columns can be inserted.

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² of reinforcement mesh fabric R131

		Product stage	Transport	Installation	Use	Demolition	Waste transport	Disposal
Parameter	Unit	A1-A3*	A4*	A5	B1	C1	C2	C4
GWP	kg CO ₂ -Eq.	3.20E-01	4.76E-02	9.82E-01	0	0	2.81E-04	0
ODP	kg CFC11-Eq.	0.00E+00	0.00E+00	0.00E+00	0	0	0.00E+00	0
AP	kg SO ₂ -Eq.	3.41E+00	1.69E-02	9.24E-01	0	0	0.00E+00	0
EP	kg PO ₄ ³⁻ -Eq.	6.79E-03	5.03E-05	7.00E-02	0	0	5.01E-06	2.71E-01
POCP	kg Ethene Eq.	6.23E-02	3.16E-04	2.88E-01	0	0	3.15E-05	0
ADPE	kg Sb Eq.	4.19E-08	1.10E-12	1.23E-07	0	0	1.09E-13	0
ADPF	MJ	5.44E+00	3.51E-02	8.41E+00	0	0	3.49E-03	0

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources

RESULTS OF THE LCA - RESOURCE USE: 1 m² of reinforcement mesh fabric R131

		Product stage	Transport	Installation	Use	Demolition	Waste transport	Disposal
Parameter	Unit	A1-A3*	A4*	A5	B1	C1	C2	C4
PERE	MJ	2.99E-01	2.87E-04	4.53E-01	0	0	1.69E-06	0
PERM	MJ	0.00E+00	0	0	0	0	0	0
PERT	MJ	2.99E-01	2.87E-04	4.53E-01	0	0	1.69E-06	0
PENRE	MJ	4.42E+00	5.92E-01	5.80E+00	0	0	3.49E-03	0
PENRM	MJ	4.33E+00	0	3.50E-03	0	0	0	0
PENRT	MJ	8.75E+00	5.92E-01	5.80E+00	0	0	3.49E-03	0
SM	kg	9.67E-03	0	0	0	0	0	0
RSF	MJ	0	0	4.58E-01	0	0	0	0
NRSF	MJ	0	0	9.07E-01	0	0	0	0
FW	m ³	4.38E-03	5.62E-05	1.79E-03	0	0	3.32E-07	0

Caption: 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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² of mesh reinforcement mesh fabric R131

		Product stage	Transport	Installation	Use	Demolition	Waste transport	Disposal
Parameter	Unit	A1-A3*	A4*	A5	B1	C1	C2	C4
HWD	kg	7.11E-03	1.36E-05	1.92E-04	0	0	8.01E-08	0
NHWD	kg	1.63E-02	1.02E-08	1.53E-02	0	0	6.05E-11	4.16E+00
RWD	kg	3.02E-07	6.50E-07	1.27E-06	0	0	3.83E-09	0
CRU	kg	0.00E+00	0	0	0	0	0	0
MFR	kg	1.55E-03	2.47E-07	6.09E-04	0	0	1.46E-09	0
MER	kg	3.20E-04	0	5.85E-04	0	0	0	0
EE	MJ	0.00E+00	0	0	0	0	0	0

Caption: HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy carrier

* LCI results are given for the reference product R131. For any other reinforcement mesh from the same range, LCI indicators may be calculated for stages A1 to A4 using a linear proportional rule. The extrapolation is based on the ratio between the weight of the chosen product and the reference product. Here is an example with product R161: $impact(R161) = impact(R131) * 161/131$.

6 LCA: Interpretation

Climate change

Carbon dioxide (CO₂) emitted over the life cycle is mainly due to the installation at process stage (73%), product stage (23%), and transport (4%). At process stage these emissions are related to the cement production: 853kg CO₂/t cement. CO₂ emissions during manufacturing mainly come from fossil fuel combustion and raw materials decarbonation.

Natural resources depletion and resource use

Natural resources depletion reflects the consumption of relatively rare elements such as gold (Au), molybdenum (Mo) and uranium (U), related to the extraction of kaolin, colemanite and sand and to electricity consumption.

Secondary materials consumption refers to the inclusion of alternative raw materials into the cement production. Secondary fuels used at process stage are consumed for the cement manufacturing. These are mainly biomass (20 MJ/kg) and waste rubber (26 MJ/kg).

Primary energy consumed is due to the melted glass production in the furnace (product stage) and accounts for about 55% of total non-renewable primary energy consumption. The application of mortar

glue also consumes about 39% of total non-renewable primary energy, because of raw auxiliary materials production.

Acidification

Acidification is related to air pollutants released like sulphur and nitrogen oxides. These emissions mainly come from the production of auxiliary materials used for the application of mortar glue (51%) and the melted glass (17%).

Eutrophication

Water eutrophication is mainly due to leachates related to glass fiber waste disposal in landfill.

Photochemical ozone formation

79% of ozone formation in the tropospheric layer is due to ethylene emissions at the process stage.

Ozone layer destruction

No CFC gases are emitted during the life cycle of the mesh fabric R131.

Waste

Main source of waste generation is the product's end-of-life.

7 Requisite evidence

There are no evidences required.

8 References

Institut Bauen und Umwelt 2011

Institut Bauen und Umwelt e.V., Königswinter (pub.): Generation of Environmental Product Declarations (EPDs); General principles for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2011-06

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PCR 2011, Part A

Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. July 2011

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PCR 2011, Part B

Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part B: Requirements on the EPD for Glass Reinforcement Mesh. 29.06.2011

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ISO 14025

DIN EN ISO 14025:2009-11: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

FprEN 15804

FprEN 15804:2011-04: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

ETAG 004

Guideline for European Technical Approval of ETICS (External thermal insulation composite system) with rendering

http://www.ue.itb.pl/files/ue/etag/etag_004.pdf

DIN EN ISO 13934-1

Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1:1999); German version EN ISO 13934-1:1999



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