Environmental Product Declaration

according to ISO 14025

Wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back

Vitrulan Textile Glass GmbH

Declaration number
EPD-VIT-2010211-E

Institute Construction and Environment e.V. (IBU)
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Brief version

Umwelt-Produktdeklaration

Environmental Product Declaration

Institute Construction and Environment e.V. (IBU) **www.bau-umwelt.com**	**Programme holder**
Vitrulan Textile Glass GmbH **Bernecker Str. 8** **D-95509 Marktschorgast**	**Declaration holder**
EPD-VIT-2010211-E	**Declaration number**
Wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back This Declaration is an Environmental Product Declaration in accordance with ISO 14025 and describes the environmental features of the construction products outlined here. It intends to promote the development of construction which is compatible with the environment and health. This validated Declaration discloses all of the relevant environmental data. This Declaration is based on the PCR “Glass wall and ceiling coverings” document, 2010 (/PCR 2010/).	**Declared construction products**
This validated Declaration entitles the holder to bear the symbol of the Institut Bauen und Umwelt e.V. It exclusively applies for the products referred to for a period of three years from the date of issue. The Declaration holder is liable for the details and documentation upon which the evaluation is based.	**Validity**
The Declaration is complete and comprises in detail: • Product definition and physical construction data • Details on base materials and material origin • Description of the product manufacturing process • Information on product processing • Data on the utilisation status, extraordinary effects and re-use phase • Results of the Life Cycle Assessment • Documentation and tests	**Content of the Declaration**
1 October 2010	**Issue date**
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt)	**Signatures**
This Declaration and the regulations upon which it is based have been tested by the independent Committee of Experts (SVA) in line with ISO 14025.	**Testing the Declaration**
Prof. Dr.-Ing. Hans-Wolf Reinhardt (Chairman of the SVA) Dr. Frank Werner (tester appointed by the SVA)	**Signatures**

Brief version

Umwelt-Produktdeklaration

Environmental Product Declaration

Wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back are structured, patterned or practically smooth fabrics comprising glass yarns arranged vertically and horizontally, usually with a fixed non-slip finish based on starch and plastic.	**Product description**
The products outlined here are exclusively used as functional and decorative wall and ceiling coverings in interior applications. **Areas of application:** **Representation areas** — e.g. company buildings / public buildings / catering trade / sales area **Play and learning areas** — e.g. kindergartens / crèches / schools / colleges **Residential applications** — e.g. private accommodation / rented accommodation / social housing **Wet areas** — e.g. indoor swimming pools / spa centres / private bathrooms **Hygiene areas** — e.g. doctors' surgeries / hospitals / laboratories / OP areas / intensive care / nursing homes **Production areas** — e.g. bakeries / abattoirs / industrial kitchens	**Area of application**
The **Life Cycle Assessment** has been performed in accordance with DIN EN ISO 14040 and DIN EN ISO 14044, the requirements of the IBU Guidelines as regards Type III Declarations and the specific rules governing wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back. Specific plant data on the products tested as well as data from the "GaBi 4" data base was applied. The Life Cycle Assessment comprises the life cycle stages of raw material and energy exploitation, raw material transport and the actual manufacture of wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back, including the manufacture and disposal of packaging.	**Life Cycle Assessment framework**
Wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back	**Results of the Life Cycle Assessment**

Analysis factor	Declared unit	Product
Non-regenerative primary energy	[MJ]	14.64
Regenerative primary energy	[MJ]	1.42
(Global warming potential (GWP 100 years)	[kg CO_2 equiv.]	7.60E-01
Ozone depletion potential (ODP)	[kg R11 equiv.]	6.36E-08
Acidification potential (AP)	[kg SO_2 equiv.]	4.05E-03
Overfertilisation potential (NP)	[kg PO_4^{3-} equiv.]	2.65E-04
(Photochemical ozone creation potential (POCP)	[kg C_2H_4 equiv.]	2.04E-04

Created by: Vitrulan Textile Glass GmbH, Marktschorgast in co-operation with PE INTERNATIONAL, Leinfelden-Echterdingen	
Documentation and tests in accordance with PCR * ÖkoTex Standard 100: "Textiles Vertrauen – Schadstoffgeprüfte Textilien nach Öko-Tex Standard 100" (Confidence in Textiles - Tested for harmful substances according to Öko-Tex Standard 100), Hohenstein Textile Testing Institute GmbH & Co. KG, Hohenstein * Testing toxic combustion gases as per DIN 53436, Elektro-Physik Aachen GmbH (epa Aachen), Aachen	**Documentation and tests**

Area of applicability

This document refers to wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back. The Life Cycle Assessment data was recorded in 2009 by Vitrulan Textile Glass GmbH in Marktschorgast, Germany.

1 Product definition

Product definition

Wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back are structured, patterned or practically smooth fabrics comprising glass yarns arranged vertically and horizontally, usually with a fixed non-slip finish based on starch and plastic. They are used for both functional and decorative purposes. The water-activatable adhesive is already applied to the fabric backing to facilitate work and reduce processing times for the user. This adhesive can be easily activated using the "Aqua-Quick device" specially developed for this purpose.

Application

The products referred to here are exclusively used in interior applications as wall and ceiling coverings. Thanks to their variety of design and elegant appearance, they can be used for both decorative purposes and multiple functional purposes, e.g. anti-crack reinforcement in plaster and drywall construction as well as for bridging cracks. Owing to their resistance to impact and piercing, abrasion, disinfectant and cleaning agents, water vapour permeability, fire safety, compatibility in terms of harmful substances and foodstuffs as well as suitability for allergy sufferers, these coverings can also be used in applications with high requirements on hygiene, for example.

Placing on the market / Application rules

On the basis of the current state of the art, there are no rules governing placing wall and ceiling coverings made of glass yarns on the market.

Quality assurance

Internal monitoring:

Development, manufacture and distribution of functional and decorative glass wall and ceiling coverings under application of a Quality Management System in accordance with DIN EN ISO 9001:2008

Certified external monitoring / annually:

In accordance with the framework conditions governing the "Öko-Tex® Standard 100"

Certified external monitoring / every 5 years:

In accordance with the framework conditions governing "Fire testing"

Delivery status, Features

Weight [g/m²]	35.00 to 350.00
Roll length [m]	10.00 to 50.00 + 0.2
Roll width [cm]	100.00 ± 0.1
Thickness [mm]	0.30 to 1.20

Technical construction data (thermal protection, moisture protection etc.)

The physical variables of wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back are not indicated and are not based on the corresponding approvals, supplier specifications or values specified in other guidelines.

The following values are tested in-house:

- Tear resistance to DIN EN ISO 13934-1
- Elongation on breaking load as per DIN EN ISO 13934-1

Table 1: Technical data (tear resistance and elongation)

Fabric	Tear resistance			
Aqua fabric	$Warp_{min}$	500 N/5cm	$Weft_{min}$	380 N/5cm
	$Warp_{max}$	2720 N/5cm	$Weft_{max}$	2010 N/5cm
Fabric	Elongation			
Aqua fabric	$Warp_{min}$	1.40%	$Weft_{min}$	1.40%
	$Warp_{max}$	3.80%	$Weft_{max}$	4.50%

Fire protection

Building material classification in accordance with EN EN 13501-1:2007 (DIN EN 13501-1) or applicable national regulation: Class B-s1, d0

2 Base materials

Base materials, Primary products

Glass:

The exact mixture composition for manufacturing C- and E-glass depends on the composition of the individual raw glass materials.

Typical components of C- and E-glass are:

Table 2: Components of C- and E-glass

Components	***C-glass***	***E-glass***
SiO_2	*60.5 – 62.5*	*53.0 – 57.0*
Al_2O_3	*3.8 – 5.0*	*12.0 – 15.0*
CaO + MgO	*6.0 – 11.0*	*22.0 – 26.0*
B_2O_3	*4.0 – 6.0*	*5.0 – 8.0*
F_2	*0.0 – 0.6*	*0.0 – 0.6*
$Na_2O + K_2O$	*15.0 – 17.0*	*0.0 – 1.0*
Fe_2O_3	----------	*0.5*
ZnO	*0.0 – 0.5*	----------

Consumables / Additives

Starch crosslinkers and thickeners are used as consumables and/or additives in the coating and adhesive as well as white pigments for the pigmented wall and ceiling coverings made of glass yarns.

Material definitions

Raw glass materials for manufacturing the mixture:

1. Sand

Sand is a natural sediment rock with an SiO_2 content of approx. 99%.

2. Kaolin

Kaolin is a natural mineral which contains kaolinite, a hydro aluminium silicate comprising $Al_4(OH)_8[Si_4O_{10}]$, as its main component.

The exact composition depends on the respective deposit.

Typically, the SiO_2 content is approx. 45-50% and the Al_2O_3 content is approx. 35-40%. The percentage of colouring oxides (Fe_2O_3 and TiO_2) is usually less than 1.5%.

3. Limestone

Limestone refers to natural sediment rock largely comprising calcium carbonate $CaCO_3$. The $CaCO_3$ content is usually > 95%.

Glass:

1. C-glass: Use as weft material

2. E-glass: Use as weft and warp material

Coating / Adhesive:

Comprising plastic dispersions made of modified potato starch and polymers dispersed in water, e.g. acrylate, polyvinyl acetate, EVA types

Harvesting raw materials and origin of materials

Glass:

Comprising natural raw materials available all over the world and extracted in regional quarrying

Coating / Adhesive:

Modified potato starch is extracted from natural regenerative raw materials. The organic binders are largely extracted from crude oil.

The average transport distance for the raw materials used covers a radius of 500 km from the manufacturing chemical industry.

Regional and general availability of raw materials

- **Resources:**

  Glass:

  Practically unlimited availability of natural mineral raw material deposits

  Potato starch:

  Regenerative perennial raw material which is not susceptible to shortage

  Binders:

  Fossil deposits of raw materials are limited with the result that shortages can be anticipated in the future.

- **Recycling and secondary materials:**

  Glass:

  Uncoated waste glass materials are recycled and directed to the fleece manufacturing processes.

3 Product manufacture

Product manufacture

Manufacturing textile glass yarns

Electric furnaces are used to generate melted glass from a corresponding volume of mixed glass. Glass yarns can be manufactured in a direct process or via an intermediate product, so-called glass pellets.

Textile glass yarns are manufactured via the nozzle drawing process. During this drawing process, the melted glass is drawn from the trough base as thin elementary threads. This trough base is made of a platinum and rhodium alloy, and features several drill holes referred to as nozzles. The filaments emitted are received by a delivery roller and stripped at a speed of up to 3600 m/minute while being stretched to the desired filament diameter. The fibres are then cooled and sized. The glass filaments are directed across a picking roll which combines the individual filaments as glass fibre strands before winding them on a bobbin. These spools are then subjected to a drying process. The textile glass yarns are partially textured to give the fabric structure more volume.

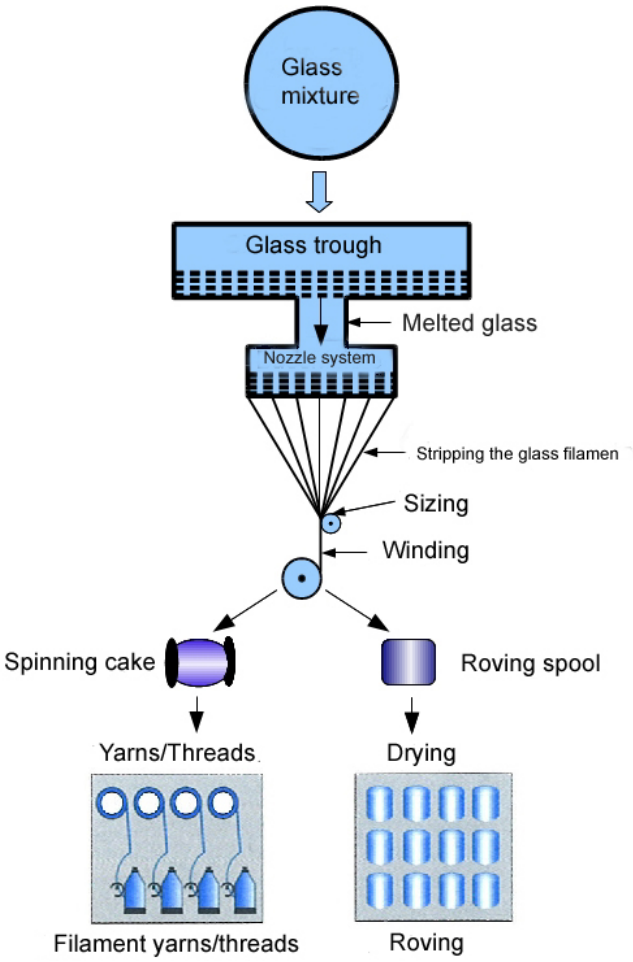

Fig. 1: Manufacturing textile glass yarns

Product manufacture

Warp beam manufacture involves attaching the textile glass yarns to fibre creels and combining as warp beams.

In weaving, gripper needle and air-jet weaving looms generate textile glass fabric from the weft and warp materials. This is referred to as manufacturing fabric from glass yarns which are manufactured on weaving looms by means of crossing two thread systems.

These textile glass fabrics are attributed a non-slip coating using spray and silk screen printing machines and dried additionally using drying units.

In the packing area, the dried and coated fabric is wound and shortened in line with customer specifications.

In the packaging area, the picked wallpaper rolls are packaged individually before being sent for dispatch.

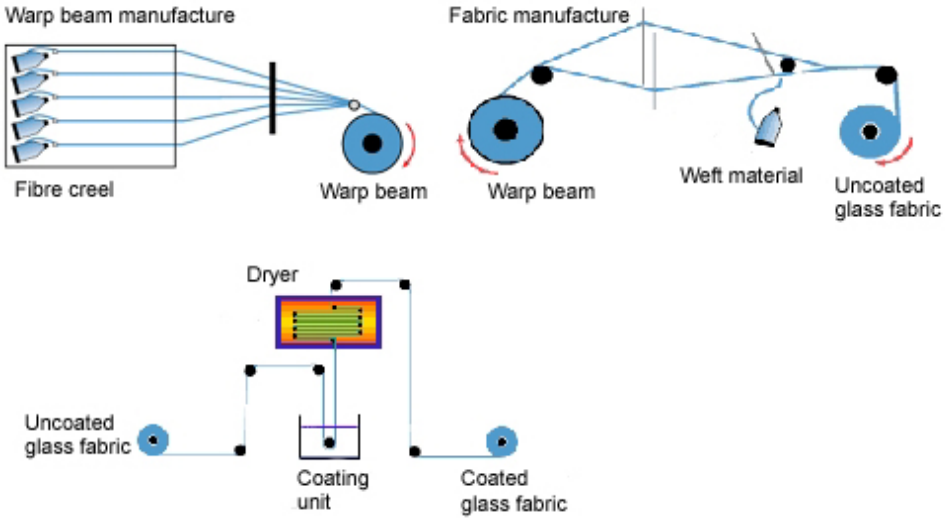

Fig. 2: Manufacturing the warp beam and fabric, and coating the fabric

Health protection in manufacturing

In line with the Ordinance on Hazardous Substances, Annex IV, no. 22, no bio-persistent fibres or chemicals are used in the manufacturing and application process.

Furthermore, no bio-persistent fibres or chemicals are put into circulation in line with the Chemicals Prohibition Regulation, no. 23 in the Annex to § 1.

Environmental protection in manufacturing

The requisite statutory specifications are adhered to during the manufacturing process. Environmental pollution is reduced by managing production water within the circuit, for example.

4 Product processing

Processing recommendations

Innovative fabrics with integrated, water-activatable adhesive on the back ensure swift and clean adhesion which in turn saves working time and costs.

Depending on the product, the corresponding processing guidelines are included as inserts with the rolls as well as being described in brochures, safety data sheets and technical leaflets.

Important for all products:

Do not process under +8 °C. Only use the same product series number for adjacent areas (please refer to imprint on box). Add 5-10 cm when cutting lengths for walls/ceilings. Cut off excess paper.

1 (preparing the surface):

The surface must be dry, clean and dimensionally stable. Uneven surfaces must be smoothed. Finishing marks should be ≤ 1 mm. Absorbent surfaces should be pre-treated with suitable primers.

2 (application using the Aqua-Quick device):

Pull the material through the Aqua-Quick device and fold loosely. The integrated adhesive is activated within approx. 1 minute; approx. 2-3 minutes are required for applying to ceilings. Please refer to the Aqua-Quick instructions for more information. The drying time at normal room temperature (18 °C) is 7-12 hours.

3 (avoiding differences in structure):

Never apply the product upside down or back to front. The coloured markings on the back facilitate orientation. When glued, the markings on the back are 1 metre apart from one length to the next.

4 (butt joining):

The lengths must display good contact along the seams.

5 (pressing on and trimming):

Apply sufficient pressure using the wallpaper spatula to press any bubbles out of the fabric. Carefully press excess paper into the corner and trim along the edge of a wallpaper spatula or cutting ruler using a sharp-bladed cutter knife.

6 (coating):

1st coat: Apply the paint consistently once the product has fully dried and observe the processing guidelines provided by the manufacturer.

2nd coat: Do not apply until the 1st coat is fully dry.

Unpigmented fabric: at least 2 coats required

Pigmented fabric: at least 1 coat required

The exact volumes required depend on the fabric structure and surface, and should be established in a test on site.

Industrial safety / Environmental protection

The industrial safety measures outlined in the respective safety data sheets must be observed.

Residual materials

Indication of the waste key in accordance with the AVV (List of Wastes Ordinance)

Residual manufacturing material:

Commission communal facilities as regards recycling or disposal.

Waste key as per AVV:

040222: Waste from processed textile fibres

101103: Glass fibre waste

Residual materials / Packaging incurred by preliminary products:

Commission companies to recycle packaging materials.

Waste key as per AVV:

150101: Paper and cardboard

150102: Plastic packaging

150103: Wood

Packaging

Transport and sales packaging:

Commission companies to recycle packaging materials (e.g. Grüner Punkt, Interseroh etc.) in accordance with the Packaging Directive.

Waste key as per AVV:

150101: Paper and cardboard

150102: Plastic packaging

150103: Wood

5 Condition of use

Contents

Coating contents are selected in line with the criteria of the Öko-Tex Standard 100 / Class 1 (Öko-Tex® Standard 100).

Relationships between environment and health

When wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back are used as designated, the emissions or otherwise release of harmful substances are below the detection limits. This is confirmed by external monitoring in accordance with the Öko-Tex standard 100.

Useful life

The useful life for wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back is similar to that of the entire building.

6 Extraordinary effects

Fire

Of relevance for fire performance

- Building material class (EN DIN 13501-1:2007 (DIN EN 13501-1) or applicable national regulation):

Classification of all products in Class B-s1, d0

B (fire performance): very low contribution towards fire

s1 (smoke development): 30 sec flame impingement; flame propagation ≤ 150 mm

d0 (flaming droplets/particles): no flaming droplets/particles

- Testing toxic combustion gases as per DIN 53436 at 400 °C:

The flue gases can be assessed as harmless under the selected test conditions (see section 9, Documentation).

Water

In the case of wall and ceiling coverings with water-activatable adhesive on the back, unforeseen water impingement does not cause any water-polluting contents of verifiable volumes to be washed out (please refer to the Öko-Tex certificate in section 9, Documentation).

7 Re-use phase

Re-use

When the building is demolished, pure segregation of wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back is not possible from the remaining structure. All of the residual materials are regarded as building rubble.

Further use

Wall and ceiling coverings made of glass yarns can not be subjected to further use.

Recycling

Nor is recycling possible as pure segregation from the remaining structure is impossible.

Further use

Uncoated residual materials comprising wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back are largely recycled.

Coated residual materials comprising wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back are currently landfilled or directed to thermal recycling / disposal.

Packaging materials are recycled by service-providers.

Disposal

The waste key number for production leftovers in the manufacture of wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back is 101103 (glass fibre waste).

Non-recycled wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back can be disposed of as normal building rubble (waste key 170904); packaging is either thermally recycled, landfilled or reused.

8 Life Cycle Assessment

8.1 Information on system definition and modelling the life cycle

Declared unit

The Declaration refers to 1 m² wall and ceiling covering with water-activatable adhesive coating on the back with a grammage of 184 g/m².

System limits

For manufacturing, the system limits concern extraction of the raw material to delivery of the product ready for shipping, i.e. cradle-to-gate. Transport to the site has not been included in calculating the Life Cycle Assessment and requires supplementing.

Apart from the manufacture of preliminary products for glass production, manufacturing of the product also includes manufacture of the raw materials used for coating the glass fabric.

The following individual processes have been included:

- Provision processes concerning preliminary products and energy
- Manufacturing processes for wall and ceiling coverings made of glass fibres with water-activatable adhesive coating on the back
- Transporting the raw materials to the plant
- Packaging and disposal thereof

The usage and disposal stages of wall and ceiling coverings made of glass yarns have not been taken into consideration in this study and need to be supplemented for assessment within the context of the respective building.

Assumptions and estimates

Production and the ensuing effects associated with the environment were estimated by means of literary research as regards starch modification as modified starch accounts for a considerable share of the product. Primary data was recorded for the remaining data or secondary data already available from the GABI 4 data bank used.

Cut-off criteria

All operating data, i.e. all of the starting materials used, thermal energy, internal fuel consumption and electricity consumption, all direct production waste as well as all emission measurements available were taken into consideration in the Assessment. Assumptions were made as regards the transport expenses associated with all input and output data taken into consideration. Accordingly, material and energy flows with a share of less than 1 per cent were also considered.

It can be assumed that the total of all neglected processes does not exceed 5% in the effective categories.

Machinery and plants required in the manufacturing process are neglected.

Transport

All transports of raw materials and consumables used were taken into consideration in the Assessment.

The average transport distance for the distribution chain in Germany (plant to site) has not been taken into consideration in the Life Cycle Assessment; according to the manufacturer, it is 411 km.

Period under review

The primary data used refers to production year 2009.

Background data

GaBi 4 2009 – the software system for comprehensive analysis developed by PE INTERNATIONAL (GaBi 4) – was used for modelling the life cycle for the manufacture of wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back. The data items contained in the GaBi data base are documented in the online GaBi documentation. The basic data in the GaBi data base was applied for energy, transport and consumables.

The Life Cycle Assessments for the plant in Germany under review have been drawn up for Germany. This means that apart from the production processes under these marginal conditions, the pre-stages also of relevance for Germany such as provision of electricity or energy carriers were used.

Data quality

GaBi 4 2009 – the software system for comprehensive analysis developed by PE International (GaBi 4) – was used for modelling the life cycle for the manufacture of wall and ceiling coverings made of glass yarns with water-activatable adhesive coating on the back. All of the background data records of relevance for manufacturing wall and ceiling coverings made of glass yarns were taken from the GaBi 4 software data base. The data used was last revised less than 8 years ago.

In addition to the primary data relating to production of wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back at Vitrulan Textile Glass GmbH, primary data on the manufacture of glass threads was also recorded among the suppliers (textured textile glass; please refer to the flow chart). The requisite background data on the raw materials used was modelled specifically or taken from the GaBi data base. Modelling the glass threads used as weft material was on the basis of a supplier recipe with an estimate as regards energy consumption and emission calculations.

The data on the provision of preliminary products for coating was taken from the GaBi data base. Estimates were made based on literary research as regards modification of starch.

Allocation

Where necessary, plant data was allocated quantitatively.

Thermal recycling of waste and packaging

As regards thermal recycling of packaging, the energy obtained as electricity and/or thermal energy from natural gas is allocated to Germany as the point of reference and assigned to the life cycle section of manufacturing in terms of definition.

8.2 Depicting the analyses and evaluations

The following section depicts the life cycle inventory analysis in terms of material and energy resources as well as waste incurred.

Primary energy

One square metre of wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back complies with non-regenerative primary energy consumption of 14.64 MJ/m².

Apart from the share of regenerative energy from electricity or thermal energy, the percentage of regenerative primary energy amounting to 1.42 MJ/m² is primarily attributable to solar energy (see Fig. 5) which is absorbed by the starch.

Table 3: Primary energy consumption

Primary energy	Unit	Volume
Non-regenerative primary energy	[MJ]	14.64
Regenerative primary energy	[MJ]	1.42

As the raw materials for coating (dark blue in the following graphic) include glaze and adhesive, they are associated with the highest effects (40.2%).

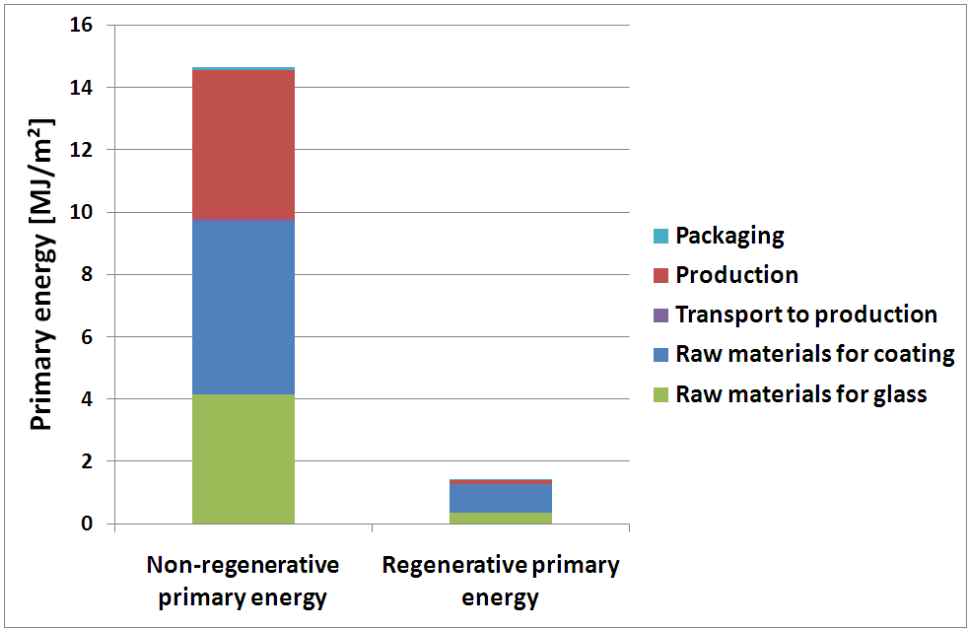

Fig. 3: Primary energy consumption

The adhesive requires increased energy during production as it is dried using thermal energy in addition to manufacture of the glaze coating which is why the share of production is also high (30.5%).

The percentage of raw materials required for glass manufacture accounts for the third highest effects (27.7%). the lower share compared to coating is attributable to the fact that the mass percentage of glass is smaller which in turn has a relative reduction in the effects on primary energy consumption.

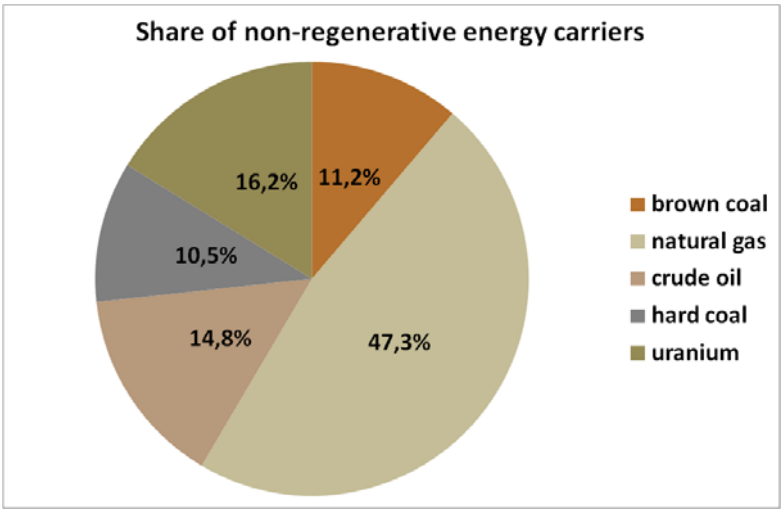

Fig. 4: Share of non-regenerative primary energy carriers

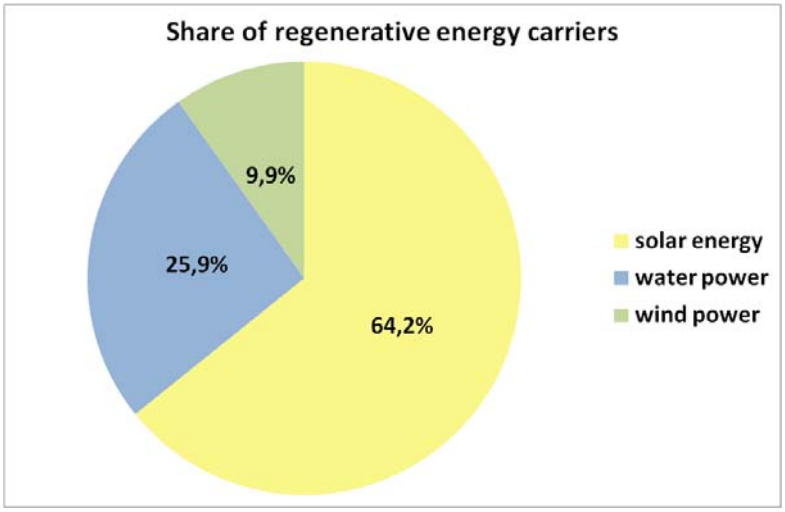

Fig. 5: Share of regenerative primary energy carriers

Water requirements

The water consumption for manufacturing 1 m² of wall and ceiling coverings made of glass yarns including the upstream chain complies with 7.83 litres.

A major percentage of this is accounted for by the fabric coating as the glaze and adhesive display a water content of approx. 80%. Just under 10% of the water is added in Marktschorgast.

Waste

The following table depicts the waste volumes incurred in the manufacture of 1 m² of wall and ceiling coverings made of glass yarns with water-activatable adhesive on the back:

Mining waste represents the largest share of pile waste which is primarily attributable to the production of electric energy.

Special waste is incurred primarily during upstream manufacture of raw materials. Radioactive waste is exclusively incurred in generating electricity in nuclear power plants.

Table 4: Waste

Waste	Unit	Volume
Mining waste / Pile waste	[kg]	2.30E+00
Commercial waste similar to domestic waste	[kg]	3.22E-03
Special waste	[kg]	1.15E-03
Radioactive waste	[kg]	8.38E-04

Estimated impact

The effects referred to above can also be observed in the effect categories: on account of its lower quantitative share in the coating, the glass has a less extensive effect on the coating than the raw materials.

The global warming potential (GWP) is mainly influenced by the glass and production of the actual coating. This is attributable to the glass manufacturing process on the one hand: melting causes carbon dioxide to evaporate from the limestone. The effects of energy consumption arise during production. The GWP is positively influenced by the input of carbon dioxide to starch during growth.

The share attributable to production is higher as regards the ozone depletion potential. The ODP is primarily influenced by the provision of energy.

The acidification potential however displays an entirely different picture: the maximum influence is displayed by coating raw materials (especially by titanium dioxide).

Once again, the overfertilisation potential (NP) is heavily influenced by the materials used (for glass, coating and adhesive). One reason for this involves starch as it is fertilised during growth. The percentage of NP for glass is attributable to energy consumption.

The photochemical ozone creation potential (POCP) is largely caused by the base materials used – and therefore primarily attributable to energy consumption.

Table 5: Effect categories

Effect categories	Unit	Volume
GWP	[kg CO_2 equiv.]	7.60E-01
ODP	[kg R11 equiv.]	6.36E-08
AP	[kg SO_2 equiv.]	4.05E-03
NP	[kg PO_4 equiv.]	2.65E-04
POCP	[kg ethene equiv.]	2.04E-04

The shares of the various sections are visualised in relative terms in the following graphic. Transporting the raw materials to the production facility in Marktschorgast and product packaging only play a subordinate role.

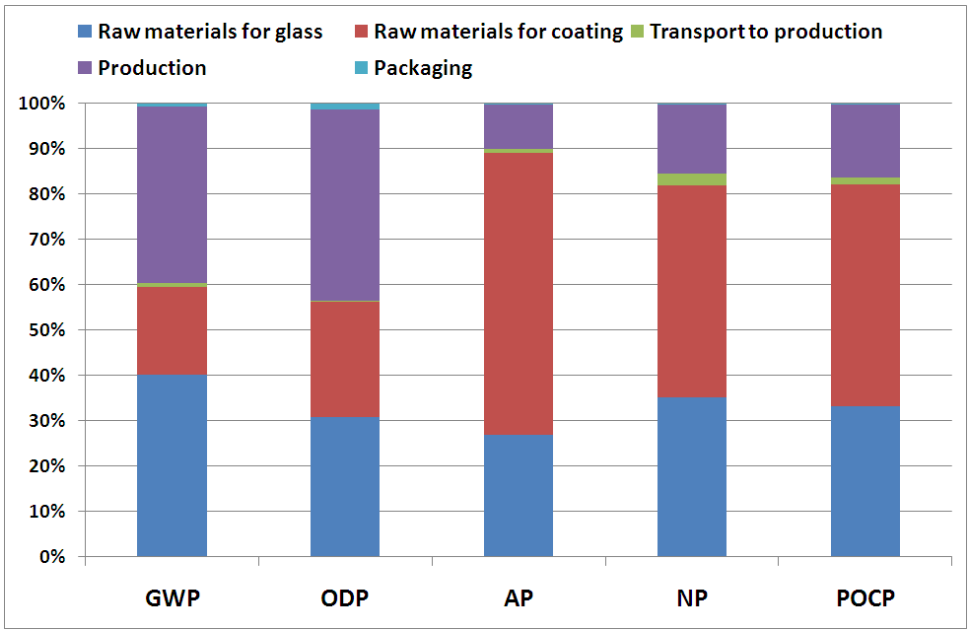

Fig. 6: Relative contributions of effective categories

9 Requisite evidence

9.1 Pollutant test

Measuring agency: Hohenstein Textile Testing Institute GmbH & Co.KG, Hohenstein

Test reports, date: 10.0.74686, 22 March 2010 (=03.0.8293 ZV7)

Result: Certification in accordance with Öko-Tex Standard 100, confirmation of confidence in textiles – Textiles for product class i (products for babies) tested for pollutants

Table 6: Results of the Öko-Tex Standard 100

Test	Result
pH value	< 7
Formaldehyde	n.n.
Phenols	n.n.
Extractable heavy metals and heavy metals	Product class I
Odour	n.n.

9.2 Testing toxic combustion gases

Measuring agency: Elektro-Physik Aachen GmbH (epa Aachen), Aachen

Test reports, date: 7/2010, 25 January 2010

Result: Confirmation of toxicological safety of combustion gases in accordance with DIN 53436 at 400 °C

"The flue gases pertaining to the tested material can be assessed as harmless under the selected test conditions."

10 PCR document and examination

This Declaration is based on the PCR "Glass wall and ceiling coverings" document, 2010-04

Review of the PCR document by the Expert Committee. Chairman of the Expert Committee: Prof. Dr.-Ing. Hans-Wolf Reinhardt (University of Stuttgart, IWB)
Independent examination of the Declaration in accordance with ISO 14025: ☐ internal ☒ external
Validation of the Declaration: Dr. Frank Werner

11 Literature

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