* Petra E. M. Bosch *
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin der französischen, spanischen und englischen Sprache für Baden-Württemberg
Lindenstraße 32 - 73111 Lauterstein-Nenningen

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with *ISO 14025* and *EN 15804+A2*

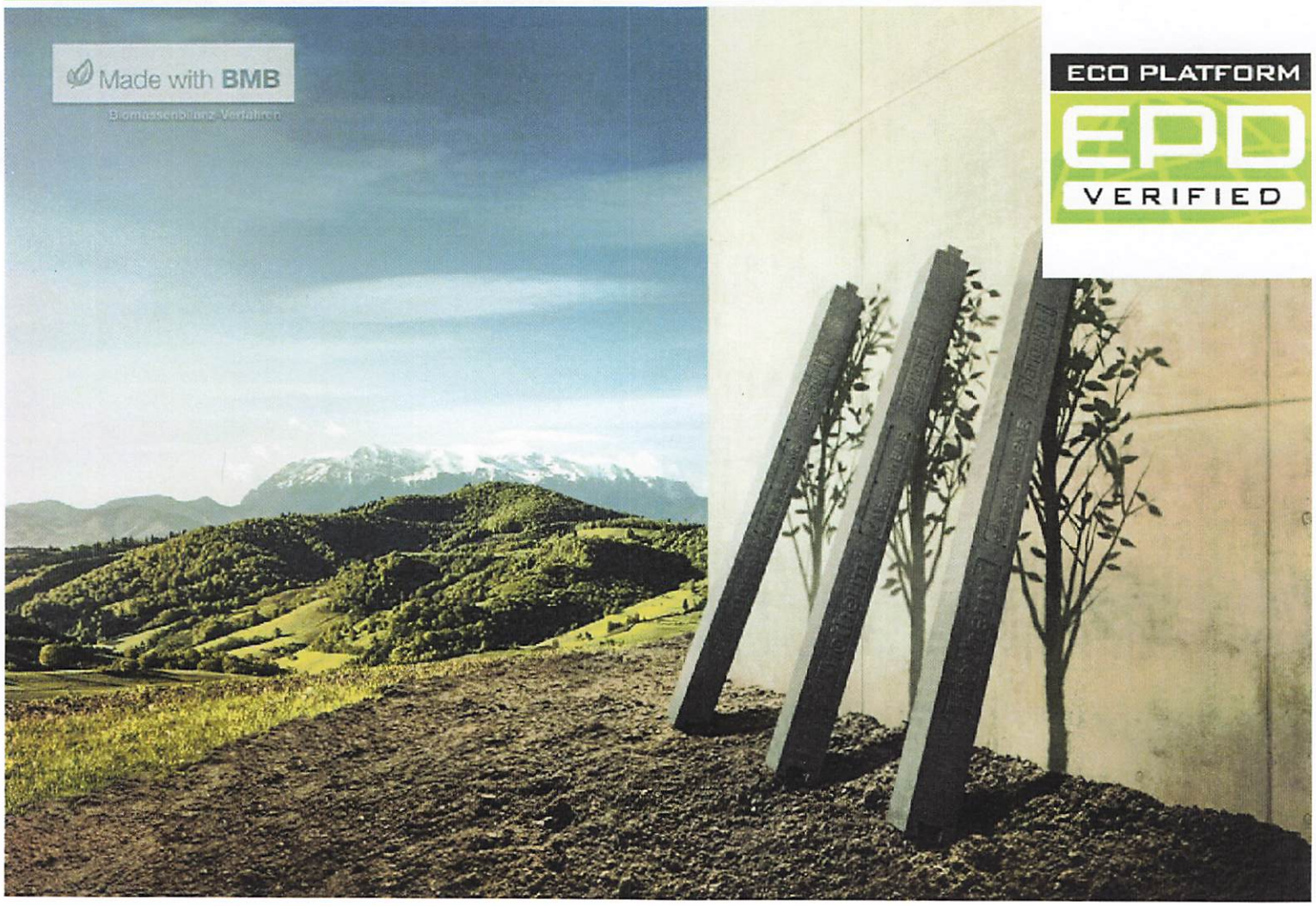
Declaration owner	Meesenburg Großhandel KG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-MEN-20230088-IBE1-DE
Issue date	14/04/2023
Valid to	13/04/2024

blaugelb Triotherm+ Profiles BMB

Meesenburg Großhandel KG

Institut Bauen und Umwelt e.V.

www.ibu-epd.com | https://epd-online.com



ECO PLATFORM
EPD
VERIFIED

1. General Information

Meesenburg Großhandel KG

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-MEN-20230088-IBE1-DE

This declaration is based on the Product Category Rules:

Insulating materials made of foam plastics, 01.01.0001
(PCR checked and approved by the independent Advisory Board (SVR))

Issue date

14/04/2023

Valid to

13/04/2024

Dipl.-Ing. Hans Peters
(Chairman of the Board of Institut Bauen und Umwelt e.V.)

Dipl.-Ing. Hans Peters
(Managing Director of Institut Bauen und Umwelt e.V.)

blaugelb Triotherm+ Profiles BMB

Owner of the declaration

Meesenburg Großhandel KG
Westerallee 162
24941 Flensburg
Germany

Declared product/declared unit

1 m³ blaugelb Trio**therm+** Profile BMB

Scope:

This Environmental Product Declaration applies to the declared unit of 1 m³ blaugelb Trio**therm+** Profile BMB (biomass balance method) with a bulk density of 150 kg/m³, distributed by Meesenburg Großhandel KG. The life cycle assessment is representative for 100 % of the products.

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 evidence.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will simply be referred to as *EN 15804*.

Verification

The European standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Matthias Schulz,
Independent verifier

* Petra E. M. Bosch * Lindenstraße 32 - 73111 Lauterstein-Nenningen
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin der französischen und englischen Sprache für Baden-Württemberg

Petra E. M. Bosch
Vom Landgericht öffentlich bestellte und beeidigte Urkundenübersetzerin der französischen und englischen Sprache für Baden-Württemberg
Lindenstraße 32 - 73111 Lauterstein-Nenningen

2. Product

2.1 Product description/product definition

In this Environmental Product Declaration (EPD), blaugelb Trio**therm +**Profiles BMB made of a high-density EPS (expanded polystyrene) from Meesenburg Großhandel KG are declared.

The blaugelb Trio**therm+** Profiles BMB are used for extending the masonry jamb in the insulation layer of the façade, as the load-bearing, dimensionally stable installation surface for the construction elements to be fitted. The blaugelb Trio**therm+** Profiles introduce the resulting forces into the load-bearing structure via the mechanical fastening. The blaugelb Trio**therm+** Profiles BMB form a level plane for the regulation-compliant sealing of connecting joints between construction elements and are used for the thermal and sound insulation of buildings.

The BMB used is produced from biomass. With the certified biomass balance method (BMB), up to 100 % of the fossil resources that are required for the manufacture of styrene foams can be replaced with renewable resources.
With the BMB concept, the product does not actually contain the declared biomass; this is only a calculation.

The manufacturer is certified in accordance with the *REDcert²* system for the certification of sustainable material flows in the chemical industry.

blaugelb Trio**therm+** Profiles based on biomass-balanced Neopor® F5 Pro BMB have the same formula, the same properties and thus the same quality as classically produced blaugelb Trio**therm+** Profiles (see the EPD published by the IBU for classically produced blaugelb Trio**therm+** Profiles from Meesenburg Großhandel KG, declaration number: EPD-MEN-20230041-IBE1-DE).

Regulation (EU) No. 305/2011 (CPR) applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland).

The product requires a Declaration of Performance, taking into consideration *DIN EN 13163:2017-02, Thermal insulation products for buildings – Factory made expanded polystyrene (EPS) products* and the CE marking.

The respective national provisions and certifications apply for the use of the products. The certifications in Germany include in particular specifications of the rated value of the thermal conductivity and on the fire behaviour, as well as *DIN 4108-10:2021-11, Thermal insulation and energy economy in buildings – Application-related requirements for thermal insulation materials*, for factory-made thermal insulation products with the minimum requirements for the individual areas of application.

2.2 Application

The main application area for the products declared here is the installation of windows/window doors in the insulation layer of the structure in a frame system made of the products declared here. System-tested complete systems with high thermal insulation are generally used.

The lower, transverse blaugelb Trio**therm+** Profile BMB is used for supporting the weight load of the construction element and is thus to be designed as a base structure passing all the way through (interlocking profile coupling is allowed).

All other blaugelb Trio**therm+** Profiles BMB are built upon this base.

2.3 Technical data

The following technical (construction) data in the delivery status are relevant for the declared product:

Construction data

Name	Value	Unit
Fire behaviour acc. to EN 13501-1	Euroclass E	
Water absorption during long-term immersion, Wlt [%] acc. to EN 12087	≤ 0.5	%
Discharge of hazardous substances into the interior of the building	NPD	
Heat transfer resistance R [m²K/W] acc. to EN 12667, thickness	2.267 dN 85	m²K/W mm
Thermal conductivity, λ (10) acc. to EN 12667, thickness	0.0375 dN 85	W/m*K mm
Water vapour permeability: Water vapour diffusion resistance factor (μ) acc. to EN 12086	228	μ
Air permeability acc. to EN 12207	Class 4	
Compression stress (2 %) compression acc. to EN 13163/EN 826	≥ 1435	kPa
Compressive strength: Compression stress at 10 % compression [kPa] acc. to EN 826	2090	kPa
Compressive strength: Deformation under defined compressive and temperature stress at 40 kPa, 70 °C and 168 h, DLT 5 acc. to EN 1605	< 0.4	%
Bending strength acc. to DIN EN 12089	2490	kPa
Shear strength acc. to ISO 14130	0.217	N/mm²
Durability of fire behaviour under the influence of heat, weathering, ageing/degradation, resistance properties	NPD	
Durability of the heat transfer resistance, resistance properties	Satisfied	
Dimensional stability under defined temperature and humidity conditions acc. to EN 1604	DS(70,-)1	
Dimensional stability in normal climatic conditions acc. to EN 1603	DS(N-)2	
Stability of the pressure resistance against ageing/degradation, creep behaviour	NPD	
Stability of the pressure resistance against ageing/degradation, freeze/thaw cycling	NPD	
Compressive load bearing capacity at max. total deformation of 2 %	1260	kg/dm²
Water absorption after 28 days under water acc. to EN 12087	≤ 0.5	vol. %

NPD = no performance determined

Performance values of the product corresponding to the Declaration of Performance with regard to its essential characteristics in accordance with *DIN EN 13163:2017-02, Thermal insulation products for buildings – Factory made expanded polystyrene (EPS) products.*

The external monitoring through removal from the factory as well as the certification are performed by testing, monitoring and certification bodies approved by the building inspectorate.

- Component inspection according to *ift guideline MO-02/1* (verification of the permanent suitability for purpose – fastening)
- Component inspection according to *ift guideline MO-01/1* (verification of the permanent suitability for purpose – sealing)
- ETB dynamic (connection of a fall-arresting system to the structure, pendulum impact)
- ETB static (connection of a fall-arresting system to the structure, compression test)
- Concentrated load tests (static rated values for resistance, rated vertical/horizontal values) – *ift guideline MO-02/1*
- Burglar resistance for RC 2 – according to the requirements of *EN 1627* to *EN 1630*
- Burglar resistance for RC 3 – according to the requirements of *EN 1627* to *EN 1630*
- Sound insulation – *ISO 10140-1* and *ISO 717-1*
- Passive house certified – *Passive House Institute*, window fitting system
- Fire safety – GAS MPA Braunschweig
- Technical data sheets for all offered mounting materials
- Compatibility with adjacent building materials

2.4 Delivery status

The dimensions comply with the approval documents. Standard dimensions: Length 1175 mm, width 70 to 230 mm, height 85 mm. Other dimensions are possible.

blaugelb Trio**therm+** Profile BMB 70 x 85 x 1175 mm
blaugelb Trio**therm+** Profile BMB 80 x 85 x 1175 mm
blaugelb Trio**therm+** Profile BMB 100 x 85 x 1175 mm
blaugelb Trio**therm+** Profile BMB 120 x 85 x 1175 mm
blaugelb Trio**therm+** Profile BMB 140 x 85 x 1175 mm
blaugelb Trio**therm+** Profile BMB 160 x 85 x 1175 mm
blaugelb Trio**therm+** Profile BMB 180 x 85 x 1175 mm
blaugelb Trio**therm+** Profile BMB 200 x 85 x 1175 mm
blaugelb Trio**therm+** Profile BMB 230 x 85 x 1175 mm

2.5 Base materials/ancillary materials

The polymeric base product for styrofoam or rigid EPS foam is polystyrene (PS). It is manufactured through the polymerisation of monomer styrene using various methods. With the certified biomass balance method (BMB), up to 100 % of the fossil resources that are required for the manufacture of styrene foams can be replaced with renewable resources.

The most frequently used method is the polymerisation in a styrene-water suspension, in which the propellant pentane is added toward the end of the polymerisation. The PS granulate created in this manner is processed further into foam in subsequent physical processing steps.

The base substance for manufacturing insulation is supplied in the form of bead-shaped granulate to the insulation manufacturer, where it is physically transformed/foamed and reworked.

Composition of silver-grey expanded polystyrene for blaugelb Trio**therm+** Profile BMB for façade insulation:

Portion in % w/w: 89 %
Pentane (referring to the % w/w in the raw material): 4.5 %
Miscellaneous (e.g. graphite) in % w/w: 6.5 %

The pentane added for foaming is a C5 hydrocarbon. The pentane is broken down during the manufacturing and storage processes.

To improve the insulating effect, graphite or alternatively carbon black is added to the product. This changes the reflection and absorption behaviour of the thermal radiation, which improves the insulating effect of the product with small layer thicknesses.

Polymer FR is used as a flame retardant. Polymer FR is a brominated styrene/butadiene copolymer.

The product/creation/at least one partial product contains substances from the ECHA candidate list of Substances of Very High Concern (SVHC) for authorisation (10/06/2022) above 0.1 % w/w: No.

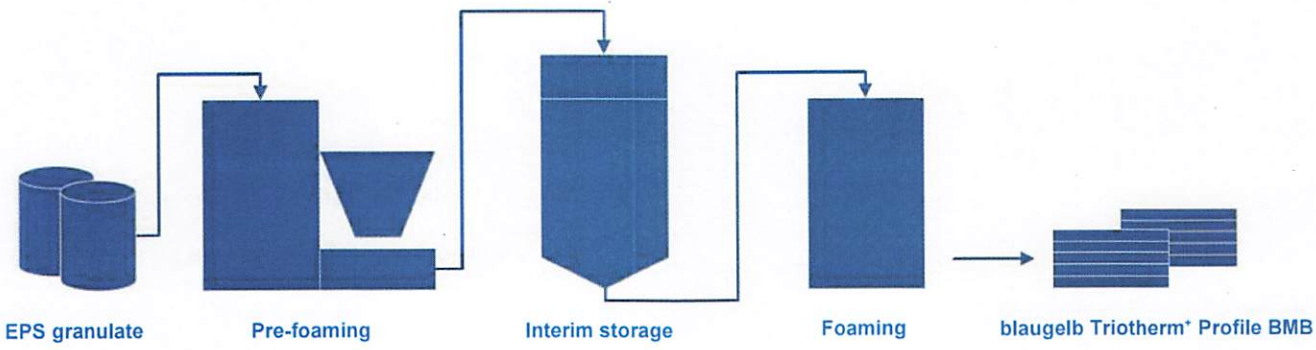
The product/creation/at least one partial product contains additional CMR substances of category 1A or 1B that are not on the candidate list above 0.1 % w/w in at least one partial product: No.

Biocidal products were added to this construction product or it was treated with biocidal products (this is a treated product within the meaning of the Biocidal Products Regulation (EU) No. 528/2012): No.

2.6 Manufacturing

During pre-foaming, the *REDcert²* certified EPS granulate is pre-foamed to the final bead size using the contained propellant pentane and by means of steam. The pre-foamed EPS beads are then put into interim storage for a time in ventilated silos.

After the given storage time, the pre-foamed EPS is transported to the moulded part machine where the beads are pressurised and then fused by feeding in steam. Following the cooling phase, the blaugelb Trio**therm+** Profiles BMB are demoulded, at which point they undergo a final quality control.



2.7 Environment and health during manufacturing

The manufacturer is certified in accordance with the *REDcert² system* for the certification of sustainable material flows in the chemical industry.

2.8 Product processing/installation

Installation of the blaugelb Trio**therm+** Profiles BMB includes the following steps:

- Fitting the profiles on the anchor base
- Drilling the holes
- Fitting the window element
- Fixing the window element

The profiles are fitted on the anchor base by bonding and, if necessary, with additional mechanical fastening. The blaugelb Trio**therm+** Profile BMB must be brought into the desired horizontal position and pressed on. For optimum load transfer, the profiles are additionally anchored using predefined screw connections.

The window element is then installed. Suitable blaugelb Multifunctional Tape is to be selected according to the planned joint width and contact area. The blaugelb Multifunctional Tape is fixed on the inside of the blaugelb Trio**therm+** Profiles BMB on three sides (top and both sides) in accordance with the guidelines for proper window fitting. After the application of a small amount of blaugelb Hybrid Polymer Power for sealing, the window frame is inserted with the attached blaugelb Sill Connection Profile EPS in the frame opening.

Note the stipulated fixing specifications / fixing spacings when screwing the window frame into the blaugelb Trio**therm+** Profiles BMB. It is essential that you observe these. Use only blaugelb Frame Screw Fix FK/ZK-T30 7.5 mm to fix the window elements directly in the blaugelb Trio**therm+** Profile BMB. These screws have been system-tested and are integral to the concept. Do not pre-drill the blaugelb Trio**therm+** Profiles BMB.

The application depends on the system. All system components as well as the processing are defined in the technical documentation.

With all applications, the relevant standards and guidelines (e.g. quality guidelines/controls from the German Federal Quality Assurance Department for EPS Rigid Foam [BFA QS EPS] and technical regulations from the trade associations) as well as the manufacturer's instructions must be observed.

2.9 Packaging

The blaugelb Trio**therm+** Profiles BMB are bundled with wrapping foil and packaged in plastic foil to protect them against solar radiation. They are delivered on conventional Europallets with cardboard inserts.

2.10 Condition of use

Raw material granulate is used to manufacture blaugelb Trio**therm+** Profiles BMB out of high-density EPS (expanded polystyrene). Most of the propellant pentane that is required for the foam structure escapes during the manufacturing process.

Emission during the storage and utilisation phase depends on various parameters such as the foam structure, the ambient temperature, the open surface and the air exchange when installed.

All substances used are resistant to ageing and moisture when installed, meaning that the insulating effect and the mechanical properties remain unchanged during the entire service life.

The blaugelb Trio**therm+** Profiles BMB have high ductility, compressive strength and flexural strength for load absorption.

2.11 Environment and health during use

EPS (expanded polystyrene) products have been used for over 50 years. There is no evidence of negative effects on humans, animals or the environment.

2.12 Reference service life

The service life specifications describe the time period assumed within the prognosis scenario after which a component installed today would likely be replaced. The specifications are based both on literature references as well as the experience of experts. In addition to the technical and functional aspects, replacements due to legal requirements as well as aspects for aesthetic reasons were also taken into consideration in the specifications.

The service life for blaugelb Trio**therm+** Profile BMB based on high-density EPS (expanded polystyrene) is over 50 years.

The listed service lives are taken from the *BBSR* table "Service life of components for life cycle analyses according to the Assessment System for Sustainable Building (BNB)" from the Federal Institute for Research on Building, Urban Affairs and Spatial Development (*BBSR*) in the German Federal Office for Building and Regional Planning.

* Petra E. M. Bosch * Lindenstraße 32 - 73111 Lauterstein-Nenningen
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin der französischen und englischen Sprache für Baden-Württemberg

2.13 Extraordinary effects

Fire

DIN 4102-1: Building material class B2, normal combustibility, no flaming droplets.

Fire protection

Name	Value
Building material class acc. to DIN 4102-1	B2 – normal combustibility
Flaming droplets	No flaming droplets
Smoke gas development Euroclass according to EN 13501-1	E

Water

High-density EPS (expanded polystyrene) is chemically neutral, not water-soluble and does not give off any water-soluble substances that could lead to contamination of the groundwater, rivers and seas.

Thanks to their closed cell structure, blaugelb Trio**therm+** Profiles BMB made of high-density EPS generally retain the existing profile structure even with substantial moisture content. The insulating effect is retained.

Mechanical destruction

Data on the behaviour of the product, including possible consequences for the environment, in the event of unexpected mechanical destruction are not relevant.

2.14 Re-use phase

Recycling of rigid EPS foam from production waste has functioned for many years and has proven itself very well. Production residues resulting from block trimming, cutting to size or edge profiles are reused in the production plants.

After use, EPS insulating material can undergo material recycling or energetic recovery.

2.15 Disposal

The products do not contain harmful substances that could limit their recyclability.

High-density EPS profiles that cannot be provided for the re-use phase under 2.14 contain great energetic potential that can be used in energetic recovery. The energy of 1 kg of EPS corresponds to that of approx. 1.1 litre of heating oil.

Additionally, the waste heat that is generated during recovery in a conventional waste-to-energy plant can be used both for electricity generation and for district heating generation. Where possible, the manufacturers recommend recycling of materials or at least an energetic recovery as a disposal procedure.

Waste code according to the European waste catalogue (Waste Catalogue Ordinance (*AVV*)): 17 06 04 – Insulation material except for those that fall under 17 06 01 and 17 06 03.

The blaugelb Trio**therm+** Profiles BMB are 100 % recyclable and are to be disposed of in accordance with the waste code 17 06 04 and 17 09 04.

2.16 Further information at www.meesenburg.de

3. LCA: Calculation rules

3.1 Declared unit

This Environmental Product Declaration applies to the declared unit of 1 m³ blaugelb Trio**therm+** Profile BMB (biomass balance method), with a bulk density of 150 kg/m³.

Declared unit

Name	Value	Unit
Declared unit	1	m³
Bulk density	150	kg/m³

The declared unit contains the saleable end product. blaugelb Trio**therm+** Profiles BMB are produced in various dimensions. With BMB preliminary material (biomass balance method), the raw material used – Neopor® F5 Pro – is manufactured from bio-based raw materials instead of fossil ones. The manufacturer is certified in accordance with the *REDcert²* system for the certification of sustainable material flows in the chemical industry. The data collection refers to an annual average and is representative for 100 % of the created products. Due to the homogeneous structure of the products, the environmental impact of the products correlates directly with their mass.

The fastenings of the blaugelb Trio**therm+** Profiles BMB in the frame of the Trio**therm+** System are not part of the examination.

Petra E. M. Bosch * Lindenstraße 32 - 73111 Lauterstein-Nenningen

3.2 System boundary

The life cycle assessment of the blaugelb insulation products includes a cradle-to-gate examination with the modules C1–C3 and module D (A1–A3, +C, +D). The following life cycle phases are included in the analysis:

Module A1–A3 | Product phase

The product phase includes the costs of manufacturing the used base materials (Neopor® F5 Pro BMB, pentane, etc.), as well as the associated transport of the raw materials. Within the factory borders, the process steps pre-foaming, interim storage, foaming, block interim storage and processing of the insulation products are considered. The thermal energy is provided at the site using natural gas, while electrical energy is drawn from the photovoltaic system on the roof of the production halls as well as from the regional power grid. Production of the packaging used for delivering the products is also included in module A1-A3.

Module C1 | Deconstruction/demolition

Manual removal of the insulation products was assumed. The associated costs are negligible, meaning that no environmental impacts from the deconstruction of the products are declared.

Module C2/1 | Transport for material recycling

Module C2 contains the transport for waste treatment.

For scenario 1, the transport via lorry over a transport distance of 100 km is estimated.

Module C2/2 | Transport for energy recovery
In scenario 2 for the energetic recovery of the products, the transport via lorry over a transport distance of 50 km is estimated.

Module C3/1 | Waste treatment with material recycling
In scenario 1, module C3 includes the shredding of the insulation products as the starting material for subsequent material recycling. The product flow that reaches module D for recycling leaves the product system in C3.

Module C3/2 | Waste treatment with energy recovery
Scenario 2 stipulates an energetic recovery of 100 % of the insulation products following removal from the building. It is assumed that at their end of life, the insulation products are treated in a waste incineration plant to generate energy. The emissions from the incineration are declared in module C3 in this case. Based on information from Sphera (see *GaBi*), an R1 value of the waste incineration plant of > 0.6 is assumed.

Module C4/1 | Disposal with material recycling
The estimated scenario 1 declares the material recycling of the insulation products, meaning that no environmental impacts are to be expected from the disposal of the products in C4.

Module C4/2 | Disposal with energy recovery
The environmental loads from the energetic recovery (scenario 2) of the declared products are declared in module C3.
There are thus no costs to be declared in module C4.

Module D/1 | Benefits and loads beyond the system boundary with material recycling
In module D/1 a 100 % recycling scenario is declared, taking into consideration the potential for substitution of fossil polystyrene primary material.

Module D/2 | Benefits and loads beyond the system boundaries with energy recovery
In scenario 2, in module D the potential for substitution for heat and power from the energetic recovery of the product in module C3 is described in the form of a European average scenario.

3.3 Estimates and assumptions
If a representative background data set for depicting the environmental impact of certain raw materials is missing, estimates and assumptions are used. All assumptions are substantiated with detailed documentation and correspond to the best possible depiction of reality in view of the available data base.

3.4 Cut-off criteria
All relevant inputs and outputs for which data are available are contained in the life cycle assessment model. With an available data base, data gaps are filled with conservative assumptions from average data or generic data and are documented accordingly. Only data with share of less than 1 % was cut. Neglect of this data is justified by the insignificance of the expected impact. As a result, no processes, materials or emissions were neglected which are recognised to make a significant contribution to the environmental impact of the examined products.

The total of the neglected input flows does not exceed 5 % of the energy usage and mass.

3.5 Background data
To calculate the life cycle assessment, the *GaBi* 2022.2 background database with *GaBi* software version 10 was used.

3.6 Data quality
The collection of data is performed using data collection sheets adapted specifically to the industry. Questions are clarified in an iterative process in writing via e-mail, by phone or in online coordination discussions. Through the intensive discussion between the life cycle assessors Daxner & Merl and Meesenburg Großhandel KG on the most realistic possible depiction of material and energy flows between the production sites, it can be assumed that the foreground data collected is of high quality. A consistent and uniform calculation method in line with *ISO 14044* was applied. When selecting the background data, attention is paid to the technological, geographical and time-related representativeness of the data basis. If specific data is missing, generic data sets or a representative average are used. The *GaBi* background data sets used are not older than ten years.

3.7 Period under review
During the collection of the foreground data, the inventory analysis for the declared products for production year 2021 was performed. All data refer to the used and produced annual quantities.

3.8 Geographical representativeness
Country or region in which the declared product system is manufactured and used, where applicable, as well as treated at its end of life: 27 EU member states.

3.9 Allocation
No by-products are created during production, which means that no co-product allocation was applied.

The costs for shredding the removed products in the end of life are considered part of the system boundary and declared in module C3. Environmental potential from the recycling of the products is taken into account after reaching the end-of-waste status in module D.

3.10 Comparability
Generally a comparison or the assessment of EPD data is only possible if all data sets to be compared were created in accordance with *EN 15804* and the building context or the product-specific performance characteristics are taken into account.

To calculate the life cycle assessment, the *GaBi* background database version 2022.2 with *GaBi* software version 10 was used.

* Petra E. M. Bosch * Lindenstraße 32 - 73111 Lauterstein-Nenningen
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin für die französische und englische Sprache

4. LCA: Scenarios and additional technical information

Characteristic product features of biogenic carbon
The content of biogenic carbon quantifies the amount of biogenic carbon in the declared construction product.

Information for a description of the biogenic carbon content at the factory gate

Name	Value	Unit
Biogenic carbon in the product	136.5	kg C
Biogenic carbon in the associated packaging	0.61	kg C

The carbon stored in the packaging was taken into account as "CO_2 neutral". This means that the storage effect through the carbon bound in the packaging is not included in the calculation and is considered theoretically immediately emitted.

Installation into the building (A5)
The end of life of the packaging materials is not declared in module A5.

Name	Value	Unit
Packaging (foil)	0.3	kg
Packaging (wood)	1.1	kg
Packaging (cardboard)	0.3	kg

End of life (C1–C4)
For the end of life of the products, a recycling scenario after the removal is assumed to be the probable scenario.

Name	Value	Unit
Collected separately (EPS)	150	kg
To recycling (C3/1)	150	kg
To energy recovery (C3/2)	150	kg

Re-use, recovery and recycling potential (D), relevant scenario information

Name	Value	Unit
Net flow (D/1, material recycling)	158	kg/m³

End-of-life scenario 1:
This scenario includes a recycling rate of 100 %.
blaugelb products do not contain any hazardous substances that could affect the recyclability. They can be shredded with a suitable device and then processed for future use.
The technical feasibility of the recycling is thus guaranteed.
Because these are new products that were developed for the longest possible utilisation in a building, no products have been deconstructed yet. Material recycling is thus considered the more realistic application.

The end-of-life scenario is to be adapted in the respective application context, where necessary.

The potentials resulting from recycling of the products are taken into account in module D. It is assumed that the processed material can replace the creation of primary PS. To quantify the potential for substitution at the product's end of life and for the production remnants for external recycling, the net material flow into module D was taken into account ("net flow calculation").

End-of-life scenario 2:
Through the energetic recovery of the insulation products in a waste incineration plant, thermal and electrical energy are generated. Potentials resulting from this are taken into account in module D through the substitution of thermal energy from natural gas and the average European electricity mix. This means that it is assumed that the thermal energy generated through the energetic recovery of the product can replace that generated from natural gas, and that the generated electrical energy can replace that generated from the regional electricity mix.

* Petra E. M. Bosch * Lindenstraße 32 - 73111 Lauterstein-Nenningen
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin der französischen, spanischen und englischen Sprache für Baden-Württemberg

Petra E. M. Bosch * Lindenstraße 32 - 73111 Lauterstein-Nenningen
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin der französischen, italienischen und englischen Sprache für Baden-Württemberg

5. LCA: Results

The following table contains the life cycle assessment results for a declared unit of 1 m³ blaugelb Triotherm+ Profile BMB (150 kg/m³).

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR 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	Deconstruction/ demolition	Transport	Waste processing	Disposal	Re-use, 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	X	X	X	X	X

RESULTS OF THE LCA – ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m³ blaugelb Triotherm+ Profiles BMB (150 kg/m³)

Indicator	Unit	A1-A3	C1	C2/1	C2/2	C3/1	C3/2	C4	D/1	D/2
GWP-total	kg CO_2 eq.	9.71E+01	0	9.09E-01	4.54E-01	5.12E+02	5.06E+02	0	-3.63E+02	-2.02E+02
GWP-fossil	kg CO_2 eq.	6.42E+02	0	9.03E-01	4.51E-01	1.11E+01	5.32E+00	0	-3.61E+02	-2.01E+02
GWP-biogenic	kg CO_2 eq.	-5.45E+02	0	0	0	5.01E+02	5.01E+02	0	-1.8E+00	-1.03E+00
GWP-luluc	kg CO_2 eq.	4.9E-01	0	6.07E-03	3.03E-03	2.34E-03	4.92E-04	0	-3.48E-02	-2.22E-02
ODP	kg CFC11 eq.	5.17E-09	0	8.84E-14	4.42E-14	1.62E-10	2.01E-11	0	-4.79E-10	-1.37E-09
AP	mol H+ eq.	1.43E+00	0	3.01E-03	1.5E-03	2.43E-02	4.43E-02	0	-5.08E-01	-2.65E-01
EP-freshwater	kg P eq.	8.07E-03	0	3.22E-06	1.61E-06	3.23E-05	4.68E-06	0	-4.36E-04	-2.78E-04
EP-marine	kg N eq.	5.25E-01	0	1.38E-03	6.88E-04	5.45E-03	9.65E-03	0	-1.39E-01	-7.19E-02
EP-terrestrial	mol N eq.	5.38E+00	0	1.54E-02	7.71E-03	5.72E-02	2.08E-01	0	-1.5E+00	-7.7E-01
POCP	kg NMVOC eq.	6.23E+00	0	2.7E-03	1.35E-03	1.47E-02	2.85E-02	0	-5.28E-01	-2.01E-01
ADPE	kg Sb eq.	9.94E-05	0	9.08E-08	4.54E-08	3.01E-06	4.86E-07	0	-4.22E-05	-3.05E-05
ADPF	MJ	9.08E+03	0	1.18E+01	5.91E+00	2.01E+02	5.47E+01	0	-1.15E+04	-3.42E+03
WDP	m³ world eq. deprived	2.16E+01	0	1.01E-02	5.04E-03	2.52E+00	4.1E+01	0	-3.82E+01	-2.15E+01

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 (ADP-minerals&metals) for non-fossil resources; ADPF = Abiotic depletion potential (ADP-fossil) for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA – INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m³ blaugelb Triotherm+ Profiles BMB (150 kg/m³)

Indicator	Unit	A1-A3	C1	C2/1	C2/2	C3/1	C3/2	C4	D/1	D/2
PERE	MJ	1.84E+04	0	8.19E-01	4.1E-01	6.69E+03	6.59E+03	0	-2.68E+02	-9.44E+02
PERM	MJ	6.6E+03	0	0	0	-6.58E+03	-6.58E+03	0	0	0
PERT	MJ	2.5E+04	0	8.19E-01	4.1E-01	1.11E+02	1.29E+01	0	-2.68E+02	-9.44E+02
PENRE	MJ	8.75E+03	0	1.19E+01	5.93E+00	2.01E+02	5.47E+01	0	-1.15E+04	-3.42E+03
PENRM	MJ	3.3E+02	0	0	0	0	0	0	0	0
PENRT	MJ	9.08E+03	0	1.19E+01	5.93E+00	2.01E+02	5.47E+01	0	-1.15E+04	-3.42E+03
SM	kg	2.3E-01	0	0	0	0	0	0	1.58E+02	0
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m³	2.01E+00	0	9.46E-04	4.73E-04	1.06E-01	9.61E-01	0	-1.79E+00	-9.08E-01

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 – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m³ blaugelb Triotherm+ Profiles BMB (150 kg/m³)

Indicator	Unit	A1-A3	C1	C2/1	C2/2	C3/1	C3/2	C4	D/1	D/2
HWD	kg	2.44E-06	0	6.28E-11	3.14E-11	1.74E-08	5.15E-09	0	-7.48E-07	-4.63E-07
NHWD	kg	1.18E+01	0	1.93E-03	9.67E-04	1.51E-01	1.83E+00	0	-2.71E+00	-1.73E+00
RWD	kg	2.18E-01	0	2.2E-05	1.1E-05	3.21E-02	3.31E-03	0	-4.27E-02	-2.71E-01

CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	1.5E+02	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	9.09E+02	0	0	0
EET	MJ	0	0	0	0	0	1.62E+03	0	0	0

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; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2 optional:
1 m³ blaugelb Triotherm+ Profiles BMB (150 kg/m³)

Indicator	Unit	A1-A3	C1	C2/1	C2/2	C3/1	C3/2	C4	D/1	D/2
PM	Disease incidence	ND	ND	ND	ND	ND	ND	ND	ND	ND
IR	kBq U235 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	SQP	ND	ND	ND	ND	ND	ND	ND	ND	ND

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

The additional and optional impact categories according to *EN 15804*+A2 are not declared, as these indicators are to be classified as highly uncertain.

Limitation note 1 – applies for the indicator "Potential Human exposure efficiency relative to U235":
This impact category mainly deals with the potential impact of a low dose of ionising radiation on human health in the nuclear fuel cycle. It does not take into account impacts due to possible nuclear accidents and occupational exposure, nor does it consider the disposal of radioactive waste in underground facilities. The potential ionising radiation emitted by the ground, by radon and by certain building materials is also not measured by this indicator.

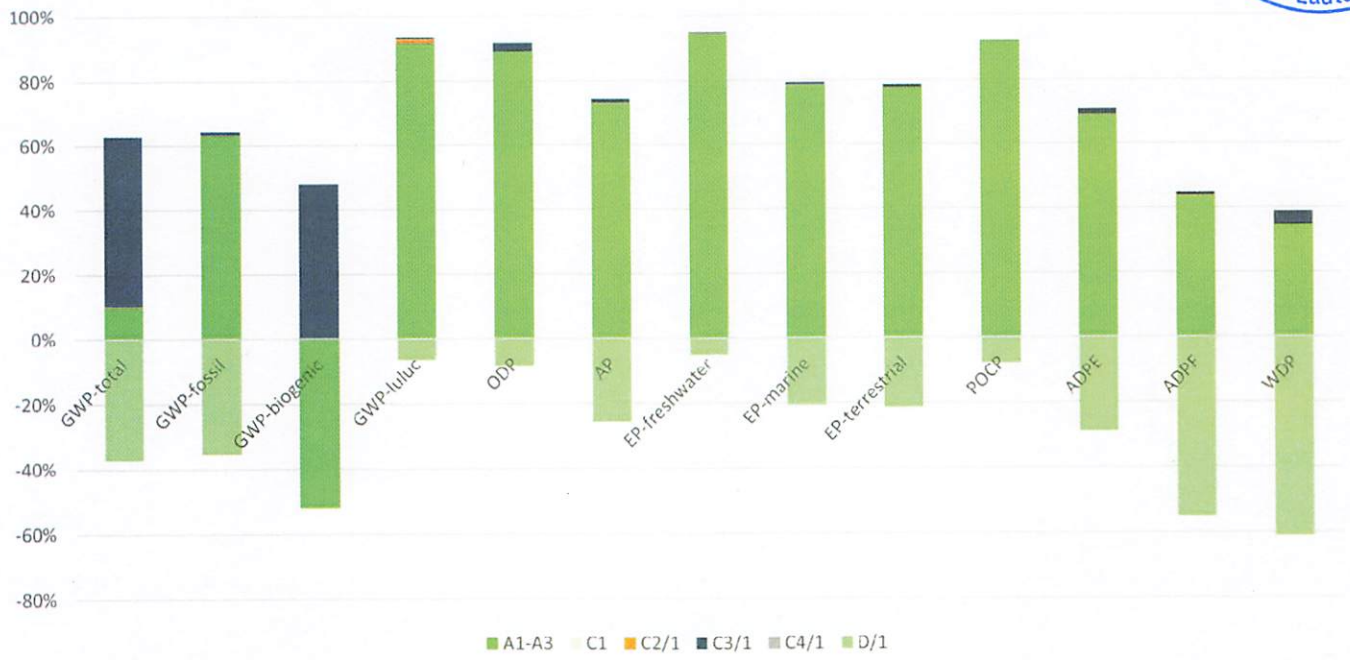
Limitation note 2 – applies for the indicators: "Abiotic depletion potential for non-fossil resources", "Abiotic depletion potential for fossil resources", "Water (user) deprivation potential", "Potential comparative Toxic Unit for ecosystems", "Potential comparative Toxic Unit for humans (cancerogenic)", "Potential comparative Toxic Unit for humans (not cancerogenic)", "Potential soil quality index": The results of this environmental impact indicator must be used with care, as these results are highly uncertain or because there is only limited experience with the indicator.

6. LCA: Interpretation

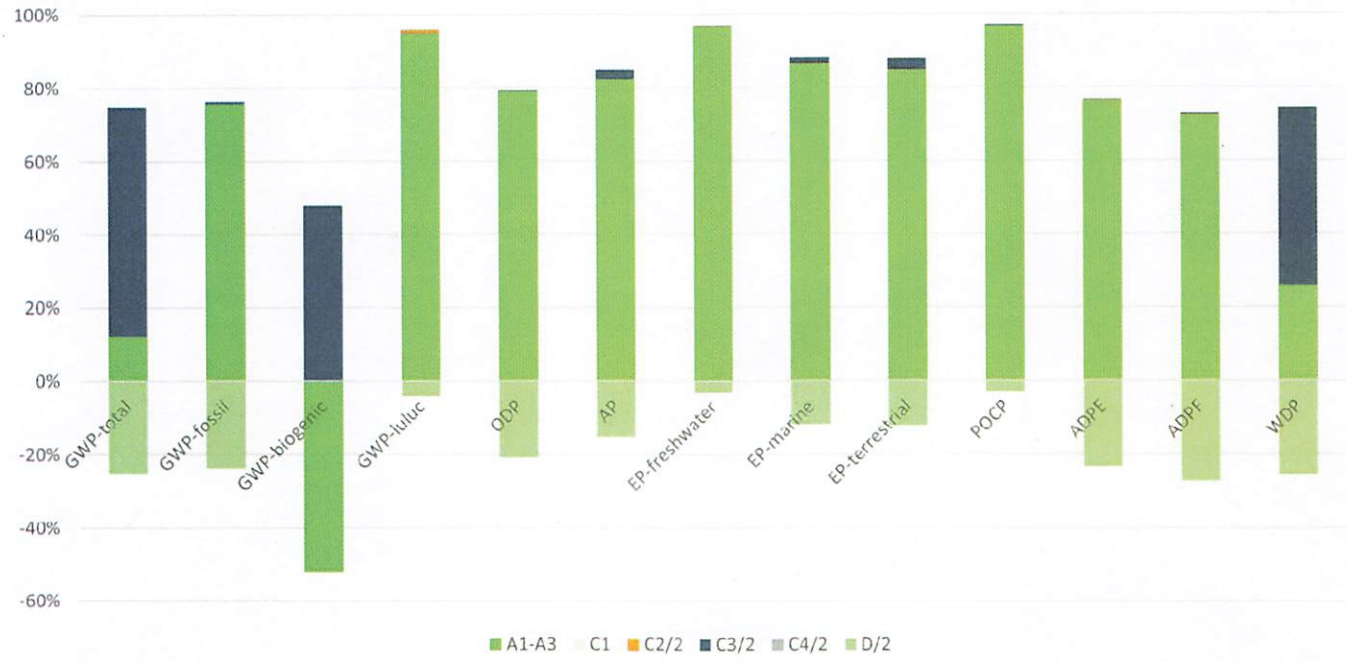
The following interpretation contains a summary of the life cycle assessment results with regard to a declared unit of 1 m³ blaugelb Trio**therm+** Profile BMB.

* Petra E. M. Bosch *
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin der französischen und englischen Sprache für Baden-Württemberg
Lindenstraße 32 - 73111 Lauterstein-Nenningen

Relative contributions of the various life cycle phases of the blaugelb Triotherm+ Profiles – BMB (100 % material recycling)



Relative contributions of the various life cycle phases of the blaugelb Triotherm+ Profiles – BMB (100 % energy recovery)



If you compare the individual phases for Trio**therm+** Profiles made of Neopor® F5 Pro BMB preliminary material, a clear dominance of the **product phase** (modules A1–A3) is established for the majority of the indicators. For the total global warming potential (GWP-total) and the biogenic global warming potential (GWP-biogen), significant influences from the waste treatment of the insulation products can be observed: in scenario 1 due to the material recycling (module C3/1) and in scenario 2 due to the energetic recovery (module C3/2). In scenario 2 the influence of the energetic recovery can also be observed for the water deprivation potential (WDP).

The global warming potential from biogenic emissions (GWP-biogenic) is also an exception here. The product phase (module A1–A3) results in a negative value for the biogenic global warming potential. With BMB preliminary material (biomass balance method) it is assumed that the raw material used – Neopor® F5 Pro – can be manufactured on the basis of a bio-based starting material instead of a fossil one.

The negative value is thus explained by the material use of bio-based raw materials in production.
While growing, bio-based raw materials store carbon dioxide in the form of biogenic carbon (negative global warming potential). This thus does not contribute to the greenhouse effect as long as the carbon is considered in the assessment as stored in the product. The only possibility for the stored carbon in the assessment to be released into the atmosphere, contributing to potential global warming, occurs at the product's end of life (module C3).

Scenario 1 of this EPD declares the material recycling of the products. This allows the assessment-based biogenic carbon in the product to remain stored. To close the carbon footprint, in the EPD the stored carbon in the assessment is recorded in module C3/1 as an emission into the atmosphere. For the next product lifecycle, the carbon thus remaining in the product due to recycling can be balanced again as a sink (negative value).

The total contribution to climate change of the BMB profiles is primarily dominated by the use of thermal energy.

With the exception of the potential overfertilisation of fresh water and the potential formation of tropospheric ozone, the remaining indicators are primarily influenced by the supply chain of the purchased primary material. The potential overfertilisation of the fresh water (EP-freshwater) is primarily influenced by the effects of the wastewater treatment plant and the potential formation of tropospheric ozone (POCP) is mainly attributable to direct emissions at the site.

Thanks to the recyclability of the products the removed material at the **end of life** can be used to prevent the creation of fossil primary polystyrene, provided that the secondary EPS meets the quality requirements in the subsequent product system.

The module D/1 shows the recycling potentials of fossil polystyrene at the products' end of life. Because no secondary material is used as input material in the production of the BMB primary material, this results in a high net flow into module D/1. This leads to high potentials from the substitution of primary PS ("credits").

The environmental impacts from the **transport for recycling** (module C2/1) and the **shredding** of the insulation products as the starting material for subsequent material recycling (C3/1) account for a small share of the environmental impact of the product.

In scenario 2, with GWP-total, GWP-biogen and WDP it can also be observed that the **energetic recovery** of the products has a significant influence (module C3/2). This is due to the fact that the stored carbon in the assessment in module C3/2 is released into the atmosphere as an emission from the energetic recovery of the products.
Module D/2 shows the substitution potentials from energy recovery. Use of the energy stored in the profiles can help to prevent emissions from energy provision based on (primarily) fossil energy sources.
The **transport for energetic recovery** (module C2/2) accounts for a small share of the environmental impact of the product.

In summary, the upstream environmental impacts from the production of the material component as well as the use of natural gas with the resulting direct emissions can be identified as the major factors of the environmental profile for the blaugelb products.

Due to the homogeneous structure of the products, the environmental impact of the products correlates directly with their mass.

7. Requisite evidence

7.1 VOC emissions

Like all EPS products, insulation panels made of the raw material Neopor® Plus BMB can be used for indoor applications. These are generally not directly exposed to the room air, however, but instead are covered by a surface coat such as plasterboard.
As part of a European study, emissions from EPS insulation panels were measured based on 12 different types of EPS raw materials.

The measurements in accordance with *CEN TS 16516* and *ISO 16000-3, -6, -9* and *-11* were performed by *Eurofins* in April 2016. The tested insulating materials meet the requirements of the *AgBB* scheme for the use of building products in indoor applications. According to the French VOC regulation, the tested insulating materials are rated A+.

Name	Value	Unit
AgBB result overview (28 days)	25	µg/m³
TVOC (C6 – C16) (3 days)	75	µg/m³
R (dimensionless)	0.084	-
Carcinogens	1	µg/m³

7.2 Leaching

The leaching behaviour is not relevant for insulation panels made of the raw material Neopor® Plus BMB.

8. References

Standards

DIN 4102-1
DIN 4102-1:1998-05, Fire behaviour of building materials and building components – Part 1: Building materials; concepts, requirements and tests, MFPA Leipzig inspection, monitoring and certification body for building materials.

DIN 4108
DIN 4108-10:2021-11, Thermal insulation and energy economy in buildings – Application-related requirements for thermal insulation materials.

EN 826
DIN EN 826:2013-05, Thermal insulating products for building applications – Determination of compression behaviour.

EN 1603
DIN EN 1603:2013-05, Thermal insulating products for building applications – Determination of dimensional stability under constant normal laboratory conditions (23 °C/ 50 % relative humidity).

EN 1604
DIN EN 1604:2013-05, Thermal insulating products for building applications – Determination of dimensional stability under specified temperature and humidity conditions.

* Petra L. M. Bosch *
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin der französischen/spanischen und englischen Sprache für Baden-Württemberg
Lindenstraße 32 - 73111 Lauterstein-Nenningen

EN 1605
DIN EN 1605:2013-05, Thermal insulating products for building applications – Determination of deformation under specified compressive load and temperature conditions.

EN 1627
DIN EN 1627:2011-09, RC3, Pedestrian doorsets, windows, curtain walling, grilles and shutters – Burglar resistance – Requirements and classification.

EN 1628
DIN EN 1628:2011-09, Pedestrian doorsets, windows, curtain walling, grilles and shutters – Burglar resistance – Test method for the determination of resistance under static loading.

EN 1629
DIN EN 1629:2021-11, Pedestrian doorsets, windows, curtain walling, grilles and shutters – Burglar resistance – Test method for the determination of resistance under dynamic loading.

EN 1630
DIN EN 1630:2021-11, Pedestrian doorsets, windows, curtain walling, grilles and shutters – Burglar resistance – Test method for the determination of resistance to manual burglary attempts.

EN 12086
DIN EN 12086:2013-06, Thermal insulating products for building applications – Determination of water vapour transmission properties.

EN 12087
DIN EN 12087:2013-06, Thermal insulating products for building applications – Determination of long-term water absorption by immersion.

EN 12089
DIN EN 12089:2013-06, Thermal insulating products for building applications – Determination of bending behaviour.

EN 12207
DIN EN 12207:2017-03, Windows and doors – Air permeability – Classification.

EN 12667
DIN EN 12667:2001-05, Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meter methods – Products of high and medium thermal resistance.

EN 13163
DIN EN 13163:2017-02, Thermal insulation products for buildings – Factory made expanded polystyrene (EPS) products – Specification.

EN 13501-1
DIN EN 13501-1:2019-05, Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests.

EN 15804
DIN EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

ISO 717-1
ISO 717-1:2020-12, Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation.

ISO 10140-1
ISO 10140-1:2021-05, Acoustics – Laboratory measurement of sound insulation of building elements – Part 1: Application rules for specific products.

ISO 14025
DIN EN ISO 14025:2011-10, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO 14044
DIN EN ISO 14044:2006-10, Environmental management – Life cycle assessment – Requirements and guidelines.

ISO 14130
ISO 14130:1997-12, Fibre-reinforced plastic composites – Determination of apparent interlaminar shear strength by short-beam method.

ISO 16000-3
ISO 16000-3:2022-09, Indoor air – Part 3: Determination of formaldehyde and other carbonyl compounds in indoor and test chamber air – Active sampling method.

ISO 16000-6
ISO 16000-6:2021-08, Indoor air – Part 6: Determination of organic compounds (VVOC, VOC, SVOC) in indoor and test chamber air by active sampling on sorbent tubes, thermal desorption and gas chromatography using MS or MS FID.

ISO 16000-9
ISO 16000-9:2006-02, Indoor air – Part 9: Determination of the emission of volatile organic compounds from building products and furnishing – Emission test chamber method.

ISO 16000-11
ISO 16000-11:2006-02, Indoor air – Part 11: Determination of the emission of volatile organic compounds from building products and furnishing – Sampling, storage of samples and preparation of test specimens.

Further literature

AgBB
AgBB, Committee for Health-related Evaluation of Building Products, German Environment Agency, Wörlitzer Platz 1, 06844 Dessau Roßlau, May 2010.

AVV
German Waste Catalogue Ordinance (AVV) of 10 December 2001 (German Federal Law Gazette I p. 3379), last amended by Article 1 of the Ordinance of 30 June 2020 (Federal Law Gazette I p. 3005).

BBSR
BBSR table (Federal Institute for Research on Building, Urban Affairs and Spatial Development). Service life of components for life cycle analyses according to the Assessment System for Sustainable Building (BNB), last revised: 11/2011.

Petra E. M. Bosch
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin der französischen, spanischen und englischen Sprache für Baden-Württemberg
Lindenstraße 32 - 73111 Lauterstein-Nenningen

CEN TS 16516

CEN TS 16516:2013-12, Construction products: Assessment of release of dangerous substances – Determination of emissions into indoor air.

EPEA GmbH

EPEA GmbH – Part of Drees & Sommer, 2021 Cradle to Cradle Products Innovation Institute, Cradle to Cradle Certified®, Cradle to Cradle SILVER. Certificate number: 5544.
Publication date: 27 September 2022. Expiry date: 30 June 2024.

ETB directive

ETB directive: 1985 and DIN 4103-1:2015, Components providing fall arrest protection, Internal non-loadbearing partitions – Part 1: Requirements and verification, Civil Engineering Materials Testing Institute (MPA), TU Braunschweig; test of the thermal conductivity MPA, Braunschweig.

Eurofins

Eurofins Product Testing A/S, Smedeskovvej 38, 8464 Galten, Denmark; test report 392-2016-004 18900.

GaBi

GaBi 10, Software System and Database for Life Cycle Engineering. DB 2022.2. Sphera, 1992-2022. Available at: https://gabi.sphera.com/support/gabi

GEV-EMICODE

Association for the Control of Emissions in Products for Flooring Installation, Adhesives and Building Materials, EC1PLUS.

IBU 2021

General instructions for the EPD programme from Institut Bauen und Umwelt e.V. (IBU). Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021. www.ibuepd.com

ift guideline MO-01/1

ift guideline MO-01/1: 2007-01, Structural connection of windows, Part 1: Method of determining the serviceability of sealing systems, section 5, Valuation of joint properties, ift Rosenheim GmbH.

ift guideline MO-02/1

ift guideline MO-02/1: 2015-06, Structural connection of windows Part 2: Method of determining the serviceability of fastening systems, ift Rosenheim GmbH.

Passive House Institute

Passivhaus Institut Dr. Wolfgang Feist; Darmstadt, category window connection, certified components.

PCR Part A

Product category rules for building-related products and services. Part A: Calculation rules for the life cycle assessment and requirements for the background report in accordance with EN 15804+A2:2019. Version 1.2. Berlin: Institut Bauen und Umwelt e.V., 2021.

PCR: Insulating materials made of foam plastics

Product category rules for building-related products and services. Part B: Requirements for the environmental product declaration for insulating materials made of foam plastics, version 1.7. Berlin: Institut Bauen und Umwelt e.V. (ed.), 2019.

REDcert²

Certification of sustainable material flows in the chemical industry. Gesellschaft zur Zertifizierung von nachhaltig erzeugter Biomasse e.V. REDcert GmbH, Bonn, www.redcert.org

Petra E. M. Bosch
Vom Landgericht Ulm öffentlich bestellte und beeidigte Urkundenübersetzerin für französischen und englischen Sprachraum für Baden-Württemberg
Lindenstraße 32 - 73111 Lauterstein-Nenningen

Publisher

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 30 3087748-0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 30 3087748-0
info@ibu-epd.com
www.ibu-epd.com

Author of the life cycle assessment

Daxner & Merl GmbH
Schleifmühlgasse 13/24
1040 Vienna
Austria

+43 676 849477826
office@daxner-merl.com
www.daxner-merl.com

Owner of the declaration

Meesenburg Großhandel KG
Westerallee 162
24941 Flensburg
Germany

+49 461 5808-0
flensburg@meesenburg.de
www.meesenburg.com

End of translation / May 23, 2023
Petra E. M. Bosch / Sworn translator for English and German languages;
Sworn in and publicly appointed by the Landgericht (Regional Court) Ulm, Germany

This is to certify the trueness and completeness of the English translation based on the German source text submitted for translation.