ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Deutsche Bauchemie e.V.
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DBC-20250266-IBP1-EN
Issue date	03.09.2025
Valid to	02.09.2030

Methacrylate resin products, highly filled, mortar

Deutsche Bauchemie e.V.

Institut Bauen und Umwelt e.V.

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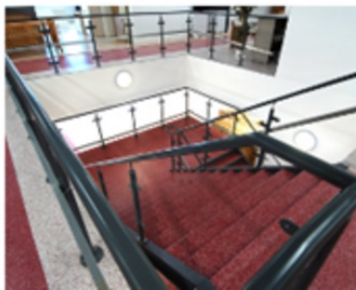

1. General Information

Deutsche Bauchemie e.V.

Programme holder

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

Declaration number

EPD-DBC-20250266-IBP1-EN

This declaration is based on the product category rules:

Reaction resin products, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

03.09.2025

Valid to

02.09.2030

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

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Methacrylate resin products, highly filled, mortar

Owner of the declaration

Deutsche Bauchemie e.V.
Mainzer Landstr. 55
60329 Frankfurt
Germany

Declared product / declared unit

1kg/1kg; Density: 1200 kg/m³ to 2500 kg/m³

Scope:

This declaration is exclusively valid for the specified product groups (Methacrylate resin products, highly filled, mortar) for works in Germany for five years after the date of issue. This EPD is a Model EPD where the product displaying the highest environmental impact in a group was selected for calculating the EPD results.
This EPD may be used by members of DBC provided it has been proven that the respective product can be represented by this EPD. For this purpose, a guideline is available at the secretariat of DBC. The members of the association are listed on the website.
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

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

Verification

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

Matthias Schulz,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The reaction resin products consist of two or more components based on acrylate formulations, hardeners and fillers.

They fulfill a wide variety of often specialized tasks in the construction, furnishing, repair and waterproofing of buildings. The serviceability of structures can be decisively improved, and their service life considerably be extended through the use of methacrylate-based reaction resins.

For the placing on the market in the European Union/European Free Trade Association (EU/EFTA) with the exception of Switzerland, products falling under Regulation (EU) No 305/2011 (CPR) need a Declaration of Performance (DoP) taking into consideration either the relevant harmonised European standards (hEN) or the European Technical Assessment (ETA) and the CE marking, including:

- *EN 1504*, Parts 2, 3, and 6 Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity (**Module 1)**. The respective national regulations apply to use

or

- *EN 13813* Screed material and floor screeds – Screed materials – Properties and requirements (**Module 4**). The respective national regulations apply to use.

- The product requires a declaration of performance taking into consideration *EAD 030675-00-0107* Liquid applied Bridge deck waterproofing Kits and CE marking (**Module 2)**. The respective national regulations apply to use.

or

- The product requires a declaration of performance taking into consideration EAD 030352-00-0503 Watertight covering kits for wet room floors and or walls (**Module 3.1**). The respective national regulations apply to use.

Product which is not subject to any EU harmonisation legislation:

The respective national regulations apply to use of the product at the location of use, in Germany for example the *building regulations of the federal states and the technical regulations based on these regulations:*

Modules 3.2, 5, 6, and 7.

2.2 Application

Methacrylate resin products, highly filled, are used for the following applications:

Module 1: Reaction resins to protect and repair concrete building components
Products for surface protection of concrete, for increasing the as for new concrete and for maintenance and repair work (Requirements 1.1), products for structural and non-structural repair used for restoring the original condition of concrete supporting structures and/or replacing faulty concrete and providing reinforcements with protection (Requirements 1.2), as well as products for anchoring of reinforcing steel bars (Requirements 1.3).

Module 2: Reaction resins for liquid-applied bridge deck waterproofing kits
Products for liquid-applied waterproofing kits for use on concrete bridge decks (Requirements 2.1 and 2.2) and products for liquid-applied waterproofing kits for use on steel bridge decks (Requirements 2.3).

Module 3: Reaction resins for watertight covering kits Products for waterproofing floors and/or walls in wet rooms (Requirements 3.1) and waterproofing products in accordance with *DIN 18534-3* and *DIN 18535-3* (Requirements 3.2).

Module 4: Screed materials and floor screeds
Products for screed/synthetic resin screed for use in floor constructions.

Module 5: Liquid-applied products for waterproofing buildings
Liquid-applied products for waterproofing buildings.

Module 6: Liquid-applied products for waterproofing joints
Reaction resins for use as joint sealants

Module 7: Reaction resins for waterproofing concrete components or masonry and for pre-treating mineral Substrates such as screed or concrete floors or for optical design

To be applied in accordance with the manufacturer's technical documentation/declaration of performance.

2.3 Technical Data

Information on construction product performance in relation to their technical properties is contained in the declaration of performance in accordance with EU Regulation No. 305/2011 (Construction Products Regulation).

Construction products with a declaration of performance in accordance with the EU Construction Products Regulation.

Module 1: *Reaction resins for protecting and repairing concrete structures.*
The minimum requirements according to *EN 1504* are to be complied with. They are as follows:

1.1 : Surface protection for concrete - requirements regarding essential characteristics for all intended uses in accordance with *EN 1504-2*, Tables 1 and 5:

- CO_2 permeability *EN 1062-6*
- Water vapour permeability ISO 7783-1 and *ISO 7783-2*
- Capillary absorption and water permeability *EN 1062-3*
- Pull-off test to test adhesive strength *EN 1542*

1.2 : Products for structurally relevant and non-relevant repair - requirements regarding essential characteristics for all intended uses in accordance with EN 1504-3, Tables 1 and 3:

- Compressive strength *EN 12190*
- Chloride ion content *EN 1015-17*
- Adhesive strength *EN 1542*

1.3 : Products for anchoring reinforcing bars – requirements regarding essential characteristics for all intended uses in accordance with *EN 1504-6*, Table 1:
- Pull-out resistance *EN 1881*
- Chloride ion content *EN 1015-17*
- Glass transition temperature *EN 12614*

- Creep behaviour under tensile load *EN 1544*

Further essential characteristics in accordance with the manufacturer's technical documentation//declaration of performance.

Module 2: *Reaction resins for liquid-applied bridge deck waterproofing kits*

2.1 The requirements in accordance with *ZTV ING Part 6*, Section 3 (*ZTV BEL-B Part 3*) are to be complied with.

2.2 The minimum requirements in accordance with *EAD 030675-00-0107* Liquid-applied bridge deck waterproofing kits are to be complied with. The essential characteristics are to be specified in accordance with the European technical approval/assessment (ETA, specification no.).

2.3 The requirements in accordance with *ZTV ING Part 6*, Sections 4 and 5 are to be complied with. The performance characteristics are to be specified accordingly.

Module 3: *Watertight covering kits*

3.1 The minimum requirements of *EAD 030352-00-0503* Seals for walls and floors in wet rooms must be complied with. The essential characteristics are to be specified in accordance with the European technical approval/assessment (ETA, specification no.).

3.2 The minimum requirements of the Testing principles regarding the issuing of general building supervisory inspection certificates for liquid applied waterproofing materials used in conjunction with tiles and paving Part 1: Liquid applied waterproofing materials (PG-AIV-F) must be complied with. The characteristics are to be specified in accordance with PG- AIV-F.

Module 4: *Screed material and floor screeds*

The minimum requirements of *EN 13813*, Screed material and floor screeds – Screed material – Properties and requirements must be complied with. These are as follows for synthetic resin screeds: ·Tensile adhesive strength (EN 13892-8) · fire behaviour (*EN 13501-1)* Further essential characteristics in accordance with the manufacturer's technical documentation//declaration of performance.

Module 5: Liquid-applied waterproofing for waterproofing buildings

The minimum requirements of the Testing principles regarding the issuing of general building supervisory inspection certificates for liquid applied products for waterproofing of buildings (PG-FLK) must be complied with. The characteristics for the proof of usability are to be specified in accordance with the Test principles for granting general building authority test certificates for liquid-applied products for waterproofing buildings

Module 6: *Liquid-applied products for waterproofing joints Reaction resins for use as joint sealants*.
Essential characteristics in accordance with the manufacturer's technical documentation/declaration of performance.

Module 7: *Reaction resins for waterproofing concrete components or masonry and for pre-treating mineral substrates* such as screed or concrete floors or for optical design

Constructional data

The following requirements must be fulfilled as a minimum:

Name	Value	Unit
Viscosity /ISO 3219/	< 200	Pa·s
Shore hardness A /ISO 7619-1/	> 50	-
Shore hardness D /ISO 7619-1/	> 25	-
Density /ISO 2811-1/	1,2 - 2,5	kg/dm³

Note: Specification of tensile shear strength and tensile adhesive strength in accordance with /DIN EN 14239/ are not typical properties of MMA resins.

Further performance characteristics are in accordance with the manufacturer's technical documentation/declaration of performance.

Product in accordance with the CPR, based on a hEN:

Performance data of the product in accordance with the declaration of performance in relation to its essential characteristics in accordance with:

- *EN 1504*, Parts 2, 3, 6 Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity (**Module 1**)

or

- *EN 13813* Screed material and floor screeds – Screed material – Properties and requirements (**Module 4)**

Product in accordance with the CPR, based on an ETA:

Performance data of the product in accordance with the declaration of performance in relation to its essential characteristics in accordance with:

-*EAD 030675-00-0107* Liquid-applied bridge deck waterproofing kits (**Module 2**)

or

- *EAD 030352-00-0503* Watertight covering kits for wet room floors and/or walls (**Module 3.1**)

2.4 Delivery status

2.4.1 *Reaction resins: Liquid or pasty in containers made of tin plate.*
Typical container sizes contain from 2 to 200 kg of material. IBCs (Intermediate Bulk Containers) with up to 1 tonne are used for larger applications. A tin container was modelled for the LCA.

2.4.2 *Hardener(Initiator):*
Can be in powder, paste or liquid consistency. Depending on the consistency, packed in cardboard lining with PE foil lining or plastic pails or cartridges. The typical pack size is 2 to 25 kg. Smaller packages, ready-made to size, are also available. This packaging is negligible due to the very low quantity of hardener used in the recipe.

2.4.3 *Additional components: pasty in plastic containers*.
Typical container sizes from 100 ml to 1000 ml.

2.4.4 *Eventual Filler Components: powder form, packed in paper or plastic bags as well as plastic pails.*
Typical pack size: 5 to 25 kg. This packaging is negligible due to the very low quantity of hardener used in the recipe.

2.5 Base materials/Ancillary materials

Methacrylate reaction resins, highly filled, consist of a resin and a hardening component. In most cases, the resin component contains methyl methacrylate as a main reactive ingredient and further co-monomers from the methacrylate or acrylate group. Hardening takes place after installation on-site using the hardening component. Radical-forming initiators which are added as a powdery hardener are used for hardening. The components can contain dissolved polymers and other auxiliaries such as accelerators, wetting agents, foam regulators and viscosity regulators to configure the required application properties.

The mixing ratio for resin and hardener is set according to the specifications depending on the temperature. Product hardening begins directly after the components have been mixed. On average, products covered by this EPD contain the basic and ancillary materials listed within the following margins:

For mortar:

- Filler: 80 - 95 %
- Acrylate: < 15 %
- Others: < 5 %

The margins specified are average values and the composition of products which comply with the EPD can deviate from the specified concentration margins in individual cases.
More detailed information is available in the respective manufacturer's documentation (e.g. product data sheets).

1) This product contains materials from the ECHA list of materials which are especially problematic for approval: Substances of Very High Concern – SVHC) (Date 31/01/2025) above a mass percentage of 0.1: **no**.

CHCCH
Insofar as products contain other REACH candidate list substances (list as per Article 59 Paragraph 1 of the REACH regulation), these are listed as from a concentration of 0.1 % together with other ingredients which must be declared in Section 3 of the safety data sheet for the respective product.

2) This product contains further Category 1A or 1B carcinogenic, mutagenic and reprotoxic (CMR) materials which are not on the candidate list at a mass % concentration of above 0.1 in at least one partial product: **no**

None of the input materials were classified as category 1A or 1B CMR at the time this model EPD was issued. Substances classified as Category 1A/1B as CMR as from a concentration of 0.1 % may be listed next to other ingredients to be declared in Section 3 of the safety data sheet of the respective product.

3) Biocide products were added to this construction product or it was treated with biocidal products (this then concerns a treated product as defined by the EU Regulation on Biocidal Products No 528/2012): **no**

2.6 Manufacture

The formulated product components are generally mixed together from the ingredients in a batch process and packed into the supply container. Quality standards in accordance with ISO 9001 and the provisions of relevant regulations such as the Industrial Safety Directive and the Federal Emissions Control Act are complied with.

2.7 Environment and health during manufacturing

Generally, no further environmental protection measures beyond those specified by law are necessary.

2.8 Product processing/Installation

Methacrylate resin products, highly filled, are applied by trowelling/knife-coating or rolling, pouring or injection. Work safety measures (hand and eye protection and ventilation) are to be taken in accordance with the specifications in the safety data sheet and the conditions on-site and consistently complied with. Methacrylate resin products, unfilled or low-filled, are generally assigned to the RMA 10 or GISCODE/GISBAU product code due to their composition.

Methacrylate resin products, highly filled, react after mixing resin and hardener under heat development (exothermicity). The mixed components should therefore be processed rapidly within the specified pot life. Larger quantities of the mixture remaining in the container can lead to intense heating and decomposition.

2.9 Packaging

Steel tin plate and wooden pallets have been used for the packaging of the material.

2.10 Condition of use

In the use phase, methacrylate resin products are hardened and consist mainly of an inert three-dimensional network. They are long-life products which protect buildings as a primer, sealant, coating or waterproofing and make a large contribution to their functionality and value retention.

2.11 Environment and health during use

Option 1: *Products for use outside of commonly used rooms.*

During the use phase, methacrylate resin products, highly filled, have lost their reactivity and behave inertly. No hazards are known for water, air and soil if the products are used as designated.

Option 2: *Products for use in commonly used rooms.*

When used in commonly used rooms, evidence must be submitted which confirms that the emission performance complies with at least one of the following regulations or criteria:
- *AgBB*-VOC concept with additional product-related definitions for chamber loading, test specimen preparation etc.
- Emission classes A+, A, B or C in accordance with the French 'Décret n° 2011-321'. No further influences on the environment or health by emanating substances are known.

No further influences on the environment or health from substances emitted are known of.

2.12 Reference service life

Methacrylate resin products, highly filled, fulfil a wide variety of frequently specialised tasks in the construction or restoration of buildings. The usability of building structures can be improved accordingly and their original service life significantly extended by their use. The anticipated reference service life depends on the specific installation situation and the associated exposure of the product. It can be influenced by weathering and also mechanical or chemical loads. -

2.13 Extraordinary effects

Fire

Even without special fire protection equipment, methacrylate resin products, highly filled, fulfil the requirements of *EN 13501-1* for fire classes E and Ef as a minimum. Cross-linked

methacrylate resins do not melt and drip down, so that the resins do not contribute in any way to the spread of a fire. In addition to the normal main products of carbon monoxide and carbon dioxide, the combustion gases can contain traces of methyl methacrylate, esters, alcohols and hydrocarbons. In addition, due to the quantities in which they are used, they have only a minor influence on the fire properties of the buildings in which they are installed.

Water
Methacrylate resin products, highly filled, are chemically inert and insoluble in water. They are often used to protect buildings against damaging water ingress.

Mechanical destruction
The mechanical destruction of methacrylate-based reaction resins does not produce decomposition products which are hazardous to the environment or health.

2.14 Re-use phase
According to the current state of knowledge, no environmentally harmful effects are to be expected from dismantling and recycling components to which hardened methyl methacrylate-based products still adhere, for example, by being placing in landfill.

Due to their energy content, thermal recycling is a viable recycling variant if methyl methacrylate systems can be removed from the building components without appreciable time and effort.

The small amounts which still adhere are not significant for disposal. They do not disrupt the disposal or recycling of the remaining components/building materials.

2.15 Disposal
Individual components which can no longer be recycled must be mixed together at the prescribed ratio and hardened.

Hardened product residues are not hazardous waste. Non-hardened product residues are hazardous waste.

Completely empty, dried containers (free of drops and scraped-clean) are recycled. Residual quantities are to be disposed of in accordance with the local regulations. The following *EWC waste codes* may be appropriate:

Non-hardened product residues:

- 070208 Reaction and distillation residues ·
- 080111 Waste from the manufacture,

formulation, sale, use (MFSU) and removal of paints and varnishes (paint and varnish residues which contain organic solvents or other hazardous substances).

2.16 Further information
Further information can be found in the manufacturer's product or safety data sheets and is also available from the manufacturer's website or on enquiry. Valuable technical information is also available from the association's website (www.deutsche-bauchemie.de).

3. LCA: Calculation rules

3.1 Declared Unit
This model EPD is based on the declared unit of 1 kg of methacrylate resin products, highly filled, mortar in accordance with *PCR Part B* for reaction resins. An LCA for highly filled methacrylate products has been calculated in this EPD. The product which has the highest environmental impact within the product group has been declared.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	kg
conversion factor	1	-
Gross density min value	1200	kg/m^3
Gross density max value	2500	kg/m^3

Consumption per unit of area of products which are applied to flat surfaces can lie between a few hundred grams and more than 1 kg per m^2. The mixing ratio of resin and hardener is included in the LCA with 1% hardener.
The quantity of hardener is measured according to the processing temperature and can range from 1% at 30°C to 6% at <0°C.The density ranges from 1200 to 2500 kg/m³.

3.2 System boundary
The Declaration type is according to *EN 15804*: Cradle to gate with options, modules C1–C4, and module D (A1–A3, C, D) and additional modules (A4-A5).
Modules A1-A3, A4, A5, C1, C2,C3 C4 and D are included in the LCA:
· A1: Raw materials supply;
· A2: Transport to works;
· A3: Production including energy provision, manufacture of packaging and also auxiliary and operating materials and waste treatment;
· A4: Transport to the building site;
· A5: Installation (burning of packaging materials (wooden pallets) and product residues, emissions during installation);
· C1: Deconstruction and demolition;
· C2: Transport to EoL;
· C3: Waste processing for reuse, recovery and/or recycling;
· C4: Disposal;
· D: Credits from the burning of the packaging materials and product residues and from recycling the metal containers.

3.3 Estimates and assumptions
If no specific Managed LCA Content 2024 processes were available, the individual component ingredients of the formulations were estimated based on manufacturer specifications or literature.

3.4 Cut-off criteria
No cut-off rules were applied in calculating the LCA. All raw materials which were sent by the association for the formulations were included. The manufacture of machines, systems and other infrastructure required to produce the products under consideration was not included in the LCA.

3.5 Background data
Data from the *Managed LCA Content 2024* database was used as background data. This was supplemented by information from the manufacturer and research in the relevant literature If background data was not available.

3.6 Data quality
Representative products have been used, and the product from the group with the greatest environmental impact has been used to calculate the LCA results for this model EPD. The primary data is not more than 5 years old, and the production data represent an average of the year 2023.

3.7 Period under review

Representative formulations from Deutsche Bauchemie e.V. From 2024 were compiled for the formulations. The production data relates to a primary data collection from 2023.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Germany

3.9 Allocation

No allocations were applied for production. However, production waste was sent to a waste incineration plant for disposal. Potential credits for electrical and thermal energy were calculated after incineration. A multi-input allocation with a potential credit for electricity and thermal energy is deployed in accordance with the simple credit method for the burning of the packaging. The potential credits from disposal of the packaging are credited in Module D.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.
The *Managed LCA Content 2024* background database was used for modelling

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

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Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.037	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

The emission factor used for the electricity grid mix used in A3 is equal to 0.847 *EN15804+A2* (EF 3.1) Climate Change - total kg CO_2 eq./kWh.

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

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	0.0016	l/100km
Transport distance	500	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	1200 - 2500	kg/m^3
Capacity utilisation volume factor	100	-

Installation into the building (A5)

Name	Value	Unit
Auxiliary	-	kg
Water consumption	-	m^3
Other resources	-	kg
Electricity consumption	0.0033	kWh
Other energy carriers	-	MJ
Material loss	0.01	kg
Output substances following waste treatment on site	-	kg
Dust in the air	-	kg
VOC in the air	0.00195	kg

-

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type waste type	-	kg
Collected as mixed construction waste	0.9881	kg
Reuse	-	kg
Recycling	-	kg
Energy recovery	-	kg
Landfilling	0.9881	kg

5. LCA: Results

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DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = 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	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	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 kg methacrylate resin products, highly filled, mortar

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	7.35E-01	4.67E-02	1.51E-01	4.73E-04	1.44E-02	0	1.49E-02	-5.83E-02
GWP-fossil	kg CO_2 eq	8.61E-01	4.56E-02	1.12E-02	4.61E-04	1.4E-02	0	1.48E-02	-5.78E-02
GWP-biogenic	kg CO_2 eq	-1.26E-01	2.61E-04	1.39E-01	3.14E-06	8.01E-05	0	4.28E-05	-4.04E-04
GWP-luluc	kg CO_2 eq	1.18E-03	8.76E-04	1.05E-05	8.79E-06	2.69E-04	0	8.89E-05	-6.95E-06
ODP	kg CFC11 eq	2.32E-12	1.44E-14	3.37E-14	1.44E-16	4.42E-15	0	4E-14	-7.44E-13
AP	mol H^+ eq	2.1E-03	1.69E-04	4.79E-05	2.28E-06	8.34E-05	0	1.05E-04	-5.57E-05
EP-freshwater	kg P eq	1.33E-06	1.24E-07	1.03E-08	1.25E-09	3.81E-08	0	3.37E-08	-1.51E-07
EP-marine	kg N eq	5.49E-04	7.86E-05	1.38E-05	1.1E-06	4.06E-05	0	2.71E-05	-2.01E-05
EP-terrestrial	mol N eq	6E-03	8.85E-04	2.06E-04	1.23E-05	4.53E-04	0	2.98E-04	-2.14E-04
POCP	kg NMVOC eq	1.73E-03	1.59E-04	4.41E-05	3.12E-06	8.07E-05	0	8.29E-05	-5.3E-05
ADPE	kg Sb eq	6.04E-06	7.75E-09	3.41E-10	7.78E-11	2.38E-09	0	9.6E-10	-5.77E-09
ADPF	MJ	1.56E+01	5.98E-01	9.28E-02	6E-03	1.84E-01	0	1.95E-01	-8.76E-01
WDP	m^3 world eq deprived	1.23E-01	3.26E-04	1.84E-02	3.28E-06	1E-04	0	1.7E-03	-7.93E-04

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; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 kg methacrylate resin products, highly filled, mortar

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.56E+00	6.62E-02	1.35E+00	6.64E-04	2.04E-02	0	3.41E-02	-3.58E-01
PERM	MJ	1.34E+00	0	-1.33E+00	0	0	0	0	0
PERT	MJ	2.9E+00	6.62E-02	1.77E-02	6.64E-04	2.04E-02	0	3.41E-02	-3.58E-01
PENRE	MJ	1.2E+01	5.98E-01	3.32E-01	6E-03	1.84E-01	0	1.95E-01	-8.76E-01
PENRM	MJ	3.63E+00	0	-2.4E-01	0	0	0	0	0
PENRT	MJ	1.56E+01	5.98E-01	9.28E-02	6E-03	1.84E-01	0	1.95E-01	-8.76E-01
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	3.8E-03	6.18E-05	4.38E-04	6.21E-07	1.9E-05	0	5.18E-05	-1.14E-04

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 kg methacrylate resin products, highly filled, mortar

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	7.84E-08	2.91E-11	3.83E-11	2.92E-13	8.95E-12	0	4.87E-11	-8.3E-10
NHWD	kg	2.04E-01	1.01E-04	9.69E-02	1.02E-06	3.11E-05	0	9.91E-01	-5E-04
RWD	kg	1.79E-04	9.52E-07	3.04E-06	9.56E-09	2.93E-07	0	2.05E-06	-3.19E-05
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	2.09E-01	0	0	0	0	0

EET	MJ	0	0	4.91E-01	0	0	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 kg methacrylate resin products, highly filled, mortar

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	ND	ND	ND	ND	ND	ND	ND	ND
IR	kBq U235 eq	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND	ND	ND
SQP	SQP	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

Disclaimer for (*DIN EN 15804:2012+A2:2019*): additional indicators

1) Potential Human exposure efficiency relative to U235 (IRP). This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

2) The results of the environmental impact indicator. ADP, WDP, ETP-fw, HTP-c, HTP-nc, SQP shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

3) Additional environmental impact indicators suggested by (*DIN EN 15804:2012+A2:2019*) are not declared in the EPD. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high and as there is limited experience with the indicator (see ILCD classification in (*DIN EN 15804:2012+A2:2019*) table 5). For this reason, results based on these indicators are not considered suitable for decision making process and are thus not declared in the EPD.

6. LCA: Interpretation

The majority of the impacts are associated with the production phase (A1-A3). The most significant contribution to the production phase impact is the upstream production of the raw materials.

Overall, the impact categories and LCI parameters are dominated by the production process A1-A3:

GWP: for global warming potential (100y) a very high percentage approximately 70% is dominated by the production an installation. The raw materials production and acquisition is the primarily responsible of this high impact. The transport of the raw materials A2 has a lower impact compared to A1 and A3.

ODP: this impact is driven by the raw materials production and acquisition in A1, leading the A1-A3 modules set to achieve an impact higher than 70%.

AP: for this environmental impact indicator the main contribution is given by A1-A3 and in particular the raw materials production and acquisition result the most significant.

EP – freshwater- marine- terrestrial: these indicators behave in a similar way. The production of raw materials and their acquisition is again dominant compared to the other phases. However in this case the module A4 results to have a non-negligible impact (higher than 10%).

POCP: as for the previous indicators, this impact category is mainly influenced by A1-A3 emission.

ADPe: this category has a predominant process that has the almost unique contribution given by A1-A3 modules (almost 100%) and specifically raw materials and acquisition. All the other processes do not contribute significantly to the impact.

ADPf: Also for this category the main contribution is given by the modules A1-A3

WU: This impact category shows a high impact related to A1-A3 and a non-negligible impact for the module A5 installation mainly due to the wooden pallet incineration.

Summarizing it is possible to say that A1-A3 represent the main responsible for all impact categories, the transportation to the construction site (A4) generates the second largest impacts in the values of Eutrophication (freshwater, marine and terrestrial) Acidification and POCP due principally to the emission of phosphate. The installation process (A5) generates a minor contribution to almost all impacts except for Global Warming Potential (GWP), due to the incineration of pallets and Water depletion due to the type industrial process.

The end-of-life phases have a minor influence on all impacts.

7. Requisite evidence

7.1 VOC Evidence

No special tests and verifications have been done or provided as part of compiling this model EPD. Verification should be sought from the manufacturer insofar as products are deployed in any application area (e.g. common room) in which the verification/detection of VOC emissions in the common rooms are demanded. **Measurement procedure**:

GEV test method to determine emissions of volatile organic

compounds from building products in accordance with *ISO 16000 Part 3*, Part 6, Part 9 and Part 11 in a test chamber. Test for CMR substances and also TVOC/TSVOC after 3 and 28 days.

The corresponding test certificate serves as verification. The results may be given in the form of an emissions class.

The following threshold values apply to products which are used in common rooms.

Name	Value	Unit
TVOC (C6 - C16) after 3 / 28 d	10.000/1.000	µg/m³
Sum SVOC (C16 - C22) after 28d	100	µg/m³
C1, C2 substances after 3 and 28 d	10 / 1**	µg/m³
Total formaldehyde / acetaldehyde after 3 d	-/-	ppb
VOC without NIK after 28 d	100	µg/m³
R (dimensionless) after 28 d	1	-

* Total after 3 days
** per individual substance after 28 days

8. References

Standards

EN 15804

EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

ISO 14025
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

Further references

AgBB Ausschuss zur gesundheitlichen Bewertung von Bauprodukten
Committee for Health-related Evaluation of Building Products-Requirements for the Indoor Air Quality in Buildings: Healthrelated Evaluation Procedure for Emissions of Volatile Organic Compounds (VVOC, VOC and SVOC) from Building Products

CPR Regulation
(EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

DIN 18534-3
DIN 18534-3:2017-07
Waterproofing for indoor applications - Part 3: Waterproofing with liquid-applied waterproofing materials in conjunction with tiles and paving (AIV-F)

DIN 18535-3
DIN 18535-3:2017-07
Waterproofing of tanks and pools - Part 3: Waterproofing with liquid-applied waterproofing materials

EWC waste code
European Waste Catalogue regulation (EWC)

EN 1015-17
DIN EN 1015-17:2005-01
Methods of test for mortar for masonry - Part 17: Determination of water-soluble chloride content of fresh mortars

EN 1062-3
DIN EN 1062-3:2008-04
Paints and varnishes – Coating materials and coating systems for exterior masonry and concrete – Part 3: Determination of liquid water permeability

EN 1062-6
DIN EN 1062-6:2002-10
Paints and varnishes – Coating materials and coating systems for exterior masonry and concrete - Part 6: Determination of carbon dioxide permeability

EN 1542
DIN EN 1542:1999-07
Products and systems for the protection and repair of concrete structures – Test methods – Measurement of bond strength by pull-off

EN 1504-2
DIN EN 1504-2:2005-01
Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity - Part 2: Surface protection systems for concrete

EN 1504-3
DIN EN 1504-3:2006-03
Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity - Part 3: Structural and non-structural repair

EN 1504-6
DIN EN 1504-6:2006-11
Products and systems for the protection and repair of concrete structures –Definitions, requirements, quality control and evaluation of conformity - Part 6: Anchoring of reinforcing steel bar

EN 1544
DIN EN 1544:2007-01
Products and systems for the protection and repair of concrete structures – Test methods – Determination of creep under sustained tensile load for synthetic resin products (PC) for the

anchoring of reinforcing bars

EN 1881
DIN EN 1881:2007-01
Products and systems for the protection and repair of concrete structures – Test methods – Testing of anchoring products by the pull-out method

EN 12190
DIN EN 12190:1998-12
Products and systems for the protection and repair of concrete structures – Test methods – Determination of compressive strength of repair mortar

EN 12614
DIN EN 12614:2005-01
Products and systems for the protection and repair of concrete structures – Test methods – Determination of glass transition temperatures of polymers

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 13813
DIN EN 13813:2003-01
Screed material and floor screeds – Screed materials – Properties and requirements

EN 13892-8
DIN EN 13892-8: 2003-02
Methods of test for screed materials – Part 8: Determination of bond strength

EAD 030352-00-0503
(former ETAG 022:2007-07, Part 1)
Guideline for the European Technical Approval of watertight covering kits for wet room floors and/or walls

EAD 030675-00-0107
(former ETAG 033)
Liquid applied bridge deck waterproofing Kits 2020

EU Ordinance on Biocide Products (EU) No 528/2012
Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products* harmonises the rules in the European Union (EU) concerning the sale and use of biocidal products, while ensuring high levels of protection of human and animal health, and of the environment.
* products such as household disinfectants, insecticides and other chemicals used to suppress pests - parasites, fungi, bacteria, etc. - or to protect materials. As their properties can pose risks to humans, animals and the environment, they are regulated at the EU level.

IBU 2022
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ISO 2811-1
DIN EN ISO 2811-1:2023-01
Paints and varnishes – Determination of density – Part 1: Pycnometer method (ISO 2811-1:2023)

ISO 3219
DIN EN ISO 3219:1994-10
Plastics – polymers/resins in the liquid state or as emulsions or dispersions – Determination of viscosity using a rotational viscometer with defined shear rate (ISO 3219:2021)

ISO 7619-1
DIN ISO 7619-1:2012-02
Rubber, vulcanised or thermoplastic - Determination of indentation hardness - Part 1: Durometer method (Shore hardness) (ISO 7619-1:2010)

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DIN EN ISO 9001:2015-11
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Calculation rules for the LCA and requirements of the project report , Version 1.4, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 04-2024

PCR Part B
Product category rules for building products Part B: Requirements of the EPD for Reaction Resin Products, Version 11, Institut Bauen und Umwelt e.V. (IBU), 08-2024

PG-AIV-F
Testing principles regarding the issuing of general building supervisory inspection certificate for liquid applied waterproofing materials used in conjunction with tiles and paving. Part 1: Liquid-applied waterproofing materials: 2018-03

PG-FLK
Testing principles regarding the issuing of general building supervisory inspection certificate for liquid applied products for waterproofing of buildings (PG-FLK:07-2019)

REACH regulations
Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18th December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, 2006-12

ZTV-ING Part 6, Section 3
Additional technical contractual conditions and guidelines for civil engineering. ZTV-ING Part 6, Bridge seals; Section 3 (ZTV-BEL-B3), Bridge seals on concrete with a liquid plastic sealing layer (2022)

ZTV-ING Part 6, Section 4
Additional technical contractual conditions and guidelines for civil engineering. ZTV-ING Part 6, Bridge seals; Section 4, Bridge seals on steel with a waterproofing system (2022)

ZTV-ING Part 6, Section 5
Additional technical contractual conditions and guidelines for civil engineering. ZTV-ING Part 6, Bridge seals, Section 5: Reaction resin-bound thin seals on steel (2022) -

Publisher

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

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

Author of the Life Cycle Assessment

Sphera Solutions GmbH
Hauptstraße 111- 113
70771 Leinfelden-Echterdingen
Germany

+49 (0)711 341817-0
info@sphera.com
www.sphera.com

Owner of the Declaration

Deutsche Bauchemie e.V.
Mainzer Landstr. 55
60329 Frankfurt
Germany

+49 (0)69 2556-1318
info@deutsche-bauchemie.de
www.deutsche-bauchemie.de