

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	FEICA, IVK, DBC
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-FEI-20250068-IBP1-EN
Issue date	04.06.2025
Valid to	03.06.2030

Products based on butyl chemistry

FEICA - Association of the European Adhesive and Sealant Industry

DBC - Deutsche Bauchemie e.V.

IVK - Industrieverband Klebstoffe e.V

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1. General Information

DBC - Deutsche Bauchemie e.V.
 FEICA - Association of the European Adhesive
 and Sealant Industry
 IVK - Industrieverband Klebstoffe e.V.

Programme holder

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

Declaration number

EPD-FEI-20250068-IBP1-EN

This declaration is based on the product category rules:

Building sealants, 01.08.2021
 (PCR checked and approved by the SVR)

Issue date

04.06.2025

Valid to

03.06.2030



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Products based on butyl chemistry

Owner of the declaration

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 FEICA, Rue Belliard 40, B-1040 Brussels
 IVK, Völklingerstr. 4, D-40219 Düsseldorf

Declared product / declared unit

1 kg products based on butyl chemistry; density 1.0 - 2.5 g/cm³

Scope:

This verified EPD entitles the holder to bear the symbol of the Institut Bauen und Umwelt e.V. It exclusively applies for products produced in Europe and for a period of five years from 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, FEICA and IVK and their members provided it has been proven that the respective product can be represented by this EPD. For this purpose, a guideline is available at the secretariats of the three associations. The members of the associations are listed on their respective websites. 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

Products based on the butyl chemistry with a Volatile Organic Compound (VOC) content of $\leq 1\%$ (VOC definition according to *Decopaint Directive*) are one-component, non-crosslinking products manufactured from polyisobutene (PIB), polybutene (PB), butyl rubber (IIR) and other polymers (e.g. Amorphous poly alpha olefin (APAO), Polyolefin (PO), Styrene butadiene rubber (SBR), Styrene isoprene styrene blockcopolymer (SIS), Styrene butadiene styrene blockcopolymer (SBS), Styrene ethylene butadiene styrene blockcopolymer (SEBS), Ethylene vinylacetate polymer (EVA), fillers, resins, plasticisers, colour pigments and other additives. The formulated products are delivered (i) typically packed in cartridges, slugs, siliconised cardboard boxes, metal pails & drums or (ii) supplied in the form of tapes, round profiles, sheets, stampings, sections or plasticine with the preformed materials separated by an appropriate release liner.

Products based on butyl chemistry fulfil key functions. Ingress of moisture into the structure via the joints is prevented by the use of products based on butyl as a seal. With the use of products based on butyl, the fitness for use of the building and the service life are decisively extended. The product displaying the highest environmental impacts was used as a representative product for calculating the Life Cycle Assessment results (worst-case approach).

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 taking into consideration either the relevant harmonised European standard or the European Technical Assessment and the CE marking. For the application and use of the products the respective national provisions apply.

2.2 Application

Module 1: Sealants and adhesives for roofing

Sealants and adhesives based on butyl chemistry are used (i) to seal joints or to seal and bond roofing membranes. Membrane roofing is part of the roofing system for buildings. It is used to create a watertight covering to protect the interior of a building. Membrane roofs are most commonly made from synthetic rubber or thermoplastic material (ii) for ridge and hip or abutments (for pitched roof, roof-wall connections), sealing of lapped joints and fixation of foils.

Module 2: Products for insulating glazing (IGU)

They are particularly suitable for applications that require a low-maintenance, long-lasting seal, such as insulating glass for residential windows and doors, or commercial windows and facade elements (bonded glazing).

Module 2a: Primary sealants

One-component primary sealants are used to maintain a moisture vapour and gas tight seal for long-term insulating glass unit performance. They seal the spacer bar to the glass and prevent moisture from entering the insulating glass unit cavity and keep the gas sealed inside the insulating glass cavity.

Module 2b: Secondary sealants

Hotmelt sealants (reactive and non-reactive) based on butyl rubber are used as a secondary sealant of the bonded hermetic seal in insulating glass units. They are responsible for maintaining the structural integrity of the unit during expansion

and contraction caused by environmental forces such as fluctuations in temperature, barometric pressure and wind speed.

Module 2c: Thermoplastic Spacer

One-component reactive or non-reactive sealants based on butyl chemistry with integrated desiccant are used as warm edge spacer systems. They completely replace the conventional spacer bar systems with spacer, desiccant and primary sealant, optimally ensuring and combining the functions of all three components.

Module 3: Self-adhering butyl rubber

Self-adhering butyl rubber products are used, under tiles and dispersion-based membranes, in combination with sealing membranes, to crack bridging and waterproof substrates like concrete, screeds and gypsum boards in wet rooms, for example, bathrooms and shower rooms.

Module 4: Sealing tapes for protective sealing tasks of a building

Butyl sealant tapes are immediately functional tapes, used for sealing and fixing in the building sectors, such as roofing, facades, civil engineering, concrete construction, window connection, air conditioning, ventilation channels, sanitary, electronics or containers. These tapes are also used for covering joints, lapped joints and protective sealing tasks without the transmission of mechanical forces on connections, joints, seams, wrapping, breakthroughs, nail and screw points and butt joints for indoor and outdoor applications. Butyl sealant tapes can be used as corrosion protection between metal materials or as vibration and noise insulation. Typically fleece- or foil-laminated tapes or double-sided self-adhesive sealing profiles are used.

2.3 Technical Data

The density of the products is between 1.0 and 2.5 g/cm³; other relevant technical data can be found in the manufacturer's technical documentation.

Module 1: Sealants and adhesives for roofing

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

Module 2: Products for insulation glazing

Module 2a: Primary sealants

Module 2b: Secondary sealants

Module 2c: Thermoplastic spacer

All Butyl-based sealants for insulating glass (all modules) must comply with *EN 1279-4*.

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

Module 3: Self-adhering butyl rubber

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EAD 03052-00-0503*, *EAD 030436-00-05035*, and *EAD 030437-00-0503* as a kit component in combination with a dispersion-based membrane and sealing membrane.

Module 4: Sealing tapes for protective sealing tasks of a building

Performance data of the product with respect to its characteristics in accordance with the relevant technical

provision (no CE-marking).

Typical data

Due to the variety of formulations and formulation types, it is not possible to give generally valid exact figures for specific technical properties, the following information can only be given as typical values.

Name	Value	Unit
Shore Hardness 00, modules 1, 3, 4; DIN EN ISO 868	20 - 85	
Peel strength [180° Peel test], modules 1, 3, 4; DIN EN 29862	25 - 80	N/25mm
Gas permeation (Argon), modules 2a, 2b, 2c; EN 1279-4, annex D	<=0.2	g/(m²d)
Water vapor transmission rate, modules 2a, 2b, 2c; EN 1279-4, annex D	<=0.2	g/(m²d)
Volatiles, modules 2a, 2c; EN 1279-4, annex H	<=0.2	%
Volatiles, module 2b; EN 1279-4, annex H	<=1.5	%
Standard moisture absorption capacity, module 2c; EN 1279-4, annex F	>= 3.3	%
Density, modules 1, 3, 4; DIN EN ISO 1183-1	1100 - 2500	kg/m³
Density, module 2a; DIN EN ISO 2811-1, 23 Grad	1000 - 1250	kg/m³
Density, modules 2b, 2c; DIN EN ISO 2811-1, 23 Grad	1000 - 1300	kg/m³
Compressive strength, modules 1, 3, 4; NF P30-303	0.02 - 0.8	N/mm²
Water vapor permeability diffusion resistance coefficient μ , modules 1, 3, 4; DIN 53122 Teil 1; DIN EN ISO 12572, DIN EN 1931	approx. 500,000 - 1,200,000	

valid for all modules: Other performance characteristics in accordance with the manufacturer's technical documentation/declaration of performance

2.4 Delivery status

High viscosity to solid: in drums or pails made of metal or fibre-material. Typical container sizes 20 l or 200 l. Cartridges with 310 ml are also available. Silicone lined boxes for hotmelt butyl products.

Products in containers made of plastic, foil, siliconised cardboard boxes, fibre-material or metal. For sealants for insulated glazing 200 l metal drums and 20 l metal pails are used as containers. For smaller amounts (1 to 10 kg) siliconised slugs or cardboard boxes/cylinders are used. Products can also be delivered in the form of preformed strips, tapes or profiles which are separated by suitable release films or liners.

A combination of HDPE (high-density polyethylene) cartridges, cardboard, steel and pallets was modelled for the LCA.

2.5 Base materials/Ancillary materials

Products based on butyl chemistry with a Volatile Organic Compound (VOC) content of ≤ 1 % (VOC definition according to *Decopaint Directive*) are manufactured from polyisobutene (PIB), polybutene (PB), butyl rubber (IIR) and other polymers (e.g. APAO; PO, SBR, SIS, SBS, SEBS and EVA), fillers, plasticisers, resins, colour pigments and other additives.

Typically, the products covered by this EPD contain the following range of base materials and auxiliaries (% by mass):

Liquid and solid non-polar polymers: 10-75

Plasticisers and resins: 0-40

Fillers: 5-85

Pigments: 0-5

Additives: <5

VOC according to *Decopaint Directive*: ≤ 1 % (**mandatory**)

These ranges are average values, and the composition of products complying with the EPD can deviate from these concentration levels in individual cases. More detailed information is available in the respective manufacturers' documentation (e.g. product data sheets).

Note: For companies to declare their products within the scope of this EPD it is not sufficient to simply comply with the product composition shown above. The application of this EPD is possible only for member companies of DBC, FEICA, and IVK member associations and only for specific formulations with a total score below the declared maximum score for a product group according to the associated guidance document.

1. Substances from the 'Candidate List of Substances of Very High Concern for Authorisation (SVHC)

If the product based on the butyl chemistry contains SVHC exceeding 0.1 percentage by mass, the respective SVHC, its CAS number, information on the concentration and/or concentration range together with information on their hazardous properties are listed in the safety data sheet of the respective product.

2. CMR substances in categories 1A and 1B

If the product based on the butyl chemistry contains carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B exceeding 0.1 percentage by mass, the respective CMR substances, information on the concentration and/or concentration range together with information on their hazardous properties are listed in the safety data sheet of the respective product.

3. Biocide products added to the construction product

If the product based on the butyl chemistry contains biocide products, the active substances, information on the concentration and/or concentration range, the product type together with information on their hazardous properties are listed in the safety data sheet of the respective product.

2.6 Manufacture

Products based on butyl chemistry are generally manufactured by mixing the ingredients and then filling them into the delivery containers. Products which are to be delivered in the form of preformed strips or other profiles or tapes boxes, pails or drums are manufactured by extruding the mixed ingredients.

2.7 Environment and health during manufacturing

As a general rule, no other environmental or health protection measures other than those specified by law are necessary.

2.8 Product processing/Installation

The one-component products based on butyl chemistry are usually applied with a specialised extrusion equipment (guns, stationary extruders or special drum melters [20 - 200l]) at elevated temperatures. The heated butyl is then fed to the application point via heated hoses using screws, pistons, gear or rotary pumps and applied by machine or manually. Products in the form of preformed strips, tapes or other profiles are manually applied to the substrate and pressed.

Health and safety measures (gloves and goggles, ventilation) are to be taken and consistently adhered to in accordance with the information on the safety data sheet and conditions on site.

2.9 Packaging

A detailed description of packaging is provided in section 2.4. Cleaned steel containers and cardboard boxes can be recycled after use.

2.10 Condition of use

During the use phase, products based on butyl chemistry are chemically stable. They are durable products which protect buildings and significantly contribute towards building function and long-term value.

2.11 Environment and health during use

Option 1 – Products for applications outside indoor areas where people stay permanently

During use, products based on butyl chemistry are inert. No risks are known for water, air and soil if the products are used as designated.

Option 2 – Products for applications inside indoor areas where people stay permanently

When used in indoor areas with permanent stays by people, evidence of the emission performance of construction products in contact with indoor air must be submitted according to national requirements. No further influences on the environment and health by emanating substances are known.

2.12 Reference service life

Products based on butyl chemistry fulfil key functions in buildings. They improve the usability of building structures and extend the lifetime. Information supplied by the manufacturer on maintenance and care must be observed.

The anticipated reference lifetime depends on the specific installation situation and the exposure associated with the product. The lifetime can be influenced by weathering as well as by mechanical or chemical loads.

2.13 Extraordinary effects

Fire

Even without any special fire safety features, products based on butyl chemistry should comply with at least the requirements

of *EN 13501-1* for fire class E. Depending on the application (type of product) and use (type of building), a potentially higher reaction to fire classification may be required, and verification with national requirements is advised.

Water

Products based on butyl are insoluble in water.

Mechanical destruction

The mechanical destruction of products based on butyl chemistry does not lead to any decomposition of products which are harmful to the environment or health.

2.14 Re-use phase

Products based on butyl chemistry cannot be recycled. According to present knowledge, no environmentally hazardous effects in terms of landfilling are to be generally anticipated through dismantling and recycling of components to which products based on butyl chemistry adhere.

2.15 Disposal

Low amounts of products based on butyl chemistry applied to a construction product will not interfere with the disposal/recycling of this. Residual products and mechanically removed products from substrates must be disposed of as commercial/site waste. The following waste codes according to the European List of Waste (EWC) (2000/532/EC) can apply: EWC 08 04 10 with the exception of waste covered by EWC 08 04 09 (classified products)

2.16 Further information

More information is available on the manufacturer's product or safety data sheets and is available on the manufacturer's websites or on request. Valuable technical information is also available on the associations' websites.

3. LCA: Calculation rules

3.1 Declared Unit

This EPD refers to the declared unit of 1 kg of product based on butyl chemistry applied into the building with a density of 1.0 - 2.5 g/cm³ in accordance with the *IBU PCR part B* for building sealants.

The results of the Life Cycle Assessment provided in this declaration have been selected from the product with the highest environmental impact (worst-case scenario).

Depending on the application, a corresponding conversion factor such as the density to convert volumetric use to mass must be taken into consideration.

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).

Declared unit

Name	Value	Unit
Declared unit	1	kg
Gross density	1 - 2.5	g/cm ³

3.2 System boundary

Modules A1, A2 and A3 are taken into consideration in the LCA:

- A1 Production of preliminary products

- A2 Transport to the plant
- A3 Production incl. provision of energy, production of packaging as well as auxiliaries, waste treatment and emissions to air
- A4 Transport to site
- A5 Installation, product applied into the building during A5 phase operations and packaging disposal. The emissions of VOC (Volatile Organic Compounds) is also considered in this module. The end of life for the packaging material considered is described below:
 - incineration, for materials like plastic, cardboard and wood.
 - landfill, for inert materials like metals
 In this form is also considered the incineration of product residue (1%) and the extra production of this amount.
- C1-C2-C3-C4-D: the building deconstruction (demolition process) takes place in the C1 module which considers energy production and consumption in terms of diesel and all the emissions connected with the fuel-burning process to run the machines. After the demolition, the product is transported to the end-of-life processing (C2 module) where all the impacts related to the transport processes are considered. For the precautionary principle and as a worst-case scenario, thermal treatment is the only end-of-life scenario considered. This is modelled by the incineration process

(module C3) where the product ends its life cycle. Module C4 is not relevant for the EoL of this product. Module D accounts for potential benefits that are beyond the defined system boundaries. Credits are generated during the incineration of wastes and related energy produced that are occurring in the A5 and C3 modules.

3.3 Estimates and assumptions

For this EPD formulation and production data defined and collected by the associations were considered. Production waste was assumed to be disposed of by incineration as a worst-case.

An average of steel and plastic containers, cardboard and wooden pallets was considered in the LCA.

3.4 Cut-off criteria

All raw materials submitted for the formulations and production data were taken into consideration.

The manufacture of machinery, plant and other infrastructure required for the production of the products under review was not taken into consideration in the LCA.

Transport of packaging materials is excluded.

3.5 Background data

Data from the *Managed LCA Content database SP40* (2020) was used as background data.

3.6 Data quality

Representative products were evaluated for this EPD and the product displaying the highest environmental impact was selected for calculating the LCA results. The background data sets used are less than 8 years old.

Production data and packaging are based on details provided by the manufacturer. The formulation used for evaluation refers to a specific product.

The data quality of the background data is considered to be good.

3.7 Period under review

Representative formulations are valid for 2024.

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: Europe

3.9 Allocation

Mass allocation has been applied when primary data have been used and implemented into the LCA model.

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. *Sphera's Managed LCA Content SP 40* (2020) serves as background database for the calculation.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The packaging material contains biogenic carbon content which is presented below.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	0.0564	kg C
Biogenic carbon content in accompanying packaging	0.0331	kg C

For the preparation of building life cycle assessments, it must be taken into account that in modules A5 (installation in the building) and C3 (incineration) the biogenic amount of CO₂ of the packaging and product bound in modules A1-A3 is mathematically booked out:

(A5) $0.0331 \text{ kg C} \cdot 3.67 = 0.121 \text{ kg CO}_2\text{-eq.}$

(C3) $0.0564 \text{ kg C} \cdot 3.67 = 0.207 \text{ kg CO}_2\text{-eq.}$

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂.

The emission factor associated with the electricity considered for the production phase is: 0.466 kg CO₂-eq. / kWh

Transport to the building site (A4)

Name	Value	Unit
Transport distance	2000	km
Gross weight	34 - 40	t
Payload capacity	27	t

Installation into the building (A5)

Name	Value	Unit
Material loss	0.01	kg

Material loss regards the amount of product not used during the application phase into the building. This amount is 1 % of the product, impacts related to the production of this part are charged to the A5 module.

This percentage is considered as waste to incineration and impacts of its end of life have been considered in the LCA model and declared in A5.

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste	0.99	kg
Incineration	0.99	kg

The amount of product considered in the end-of-life does not correspond to 1 kg because an amount of VOC corresponding to 0.01 kg is emitted during the installation phase.

5. LCA: Results

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 of products based on butyl chemistry

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	4.49E+00	1.23E-01	1.87E-01	2.78E-04	4.94E-03	1.47E+00	0	-3.97E-01
GWP-fossil	kg CO ₂ eq	4.77E+00	1.23E-01	1.06E-01	2.78E-04	4.93E-03	1.25E+00	0	-3.96E-01
GWP-biogenic	kg CO ₂ eq	-2.75E-01	1.79E-04	8.09E-02	4.12E-07	7.21E-06	2.21E-01	0	-9.24E-04
GWP-luluc	kg CO ₂ eq	1.72E-03	7.03E-06	2.59E-05	1.62E-08	2.83E-07	4.17E-05	0	-2.73E-04
ODP	kg CFC11 eq	9.19E-13	1.96E-17	9.24E-15	4.51E-20	7.9E-19	3.34E-16	0	-4.06E-15
AP	mol H ⁺ eq	1.1E-02	3.49E-04	1.71E-04	3.6E-06	1.4E-05	6.58E-04	0	-5.5E-04
EP-freshwater	kg P eq	7.63E-06	2.72E-08	8.64E-08	6.26E-11	1.09E-09	1.19E-07	0	-5.02E-07
EP-marine	kg N eq	3.28E-03	1.58E-04	5.16E-05	1.63E-06	6.35E-06	2.55E-04	0	-1.43E-04
EP-terrestrial	mol N eq	3.57E-02	1.74E-03	6.01E-04	1.79E-05	6.98E-05	2.9E-03	0	-1.53E-03
POCP	kg NMVOC eq	1.4E-02	3.18E-04	1.92E-04	4.89E-06	1.28E-05	6.66E-04	0	-4.1E-04
ADPE	kg Sb eq	3.11E-06	4.66E-09	3.2E-08	1.07E-11	1.87E-10	5.16E-09	0	-6.42E-08
ADPF	MJ	1.1E+02	1.65E+00	1.26E+00	3.8E-03	6.64E-02	5.95E-01	0	-6.71E+00
WDP	m ³ world eq deprived	4.54E-01	3.27E-04	2.62E-02	7.52E-07	1.32E-05	1.56E-01	0	-4.03E-02

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 of products based on butyl chemistry

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	9.65E+00	8.33E-03	1.38E+00	1.91E-05	3.35E-04	1.02E-01	0	-1.44E+00
PERM	MJ	1.25E+00	0	-1.25E+00	0	0	0	0	0
PERT	MJ	1.09E+01	8.33E-03	1.24E-01	1.91E-05	3.35E-04	1.02E-01	0	-1.44E+00
PENRE	MJ	6.97E+01	1.66E+00	2.26E+00	3.81E-03	6.67E-02	4.03E+01	0	-6.71E+00
PENRM	MJ	4.06E+01	0	-1E+00	0	0	-3.97E+01	0	0
PENRT	MJ	1.1E+02	1.66E+00	1.26E+00	3.81E-03	6.67E-02	5.95E-01	0	-6.71E+00
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	2.04E-02	1.36E-05	7.17E-04	3.13E-08	5.47E-07	3.69E-03	0	-1.67E-03

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 of products based on butyl chemistry

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	8.79E-08	4.36E-10	1.36E-09	1E-12	1.76E-11	2.19E-09	0	-2.68E-09
NHWD	kg	1.41E-01	1.79E-04	1.37E-01	4.12E-07	7.21E-06	1.71E-01	0	-3.08E-03
RWD	kg	1.27E-03	2.73E-06	1.64E-05	6.27E-09	1.1E-07	2.61E-05	0	-4.92E-04
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	2.57E-01	0	0	1.39E+00	0	0
EET	MJ	0	0	4.66E-01	0	0	2.61E+00	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 of products based on butyl chemistry

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

Potential Human exposure efficiency relative to U235, Disclaimer 1 – 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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and (from) some construction materials is also not measured by this indicator.

ADP minerals & metals, ADP fossil, WDP, ETF-fw, HTP-c, HTP-nc, SQP, Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Additional environmental impact indicators 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 EN 15804, table 5). For this reason, results based on these indicators are not considered suitable for a decision-making process.

6. LCA: Interpretation

The majority of impacts are associated with the production phase modules (A1-A3). The most significant contribution to the production phase impacts is the upstream production of raw materials as the main driver. A small contribution to the impact of the production phase is also given by the transport of raw materials and manufacturing.

Emissions associated with the manufacturing of raw materials also have some influence on the formation potential of tropospheric ozone (POCP) in the production phase. CO₂ is the most important contributor to the Global Warming Potential (GWP). For the Acidification Potential (AP) NO_x and SO₂ contribute to the largest share.

The majority of energy consumption takes place during the production phase (A1-A3). Significant contributions to Primary Energy Demand – Non-renewable (PENRT), come from the energy resources used in the production of raw materials. The

largest contributor to Primary Energy Demand – Renewable (PERT) impacts comes from the consumption of renewable energy resources required for the generation and supply of electricity and the energy resources used for raw materials production as well as the energy resources used for packaging. It should be noted that PERT generally represents a small percentage of the production phase primary energy demand with the bulk of the demand coming from non-renewable energy resources.

Transportation to the construction site (A4) and the installation process (A5) make a low contribution to the overall impact, not as significant and relevant as the other phases.

Instead, another relevant module is waste processing (C3). The End-of-Life phase influences Climate Change indicators due to the impact related to the thermal treatment process of resin occurring in the C3 module.

7. Requisite evidence

VOC

Special tests have not been carried out within the framework of drawing up this Model EPD. Some member states require special documentation on VOC emissions into indoor air for specific areas of application. This documentation, as well as documentation for voluntary VOC labelling, must be provided separately and is specific to the product in question.

Evidence pertaining to VOC emissions shall show -either an attestation of compliance with, -or documentation of test data that is required in any of the existing regulations or in any of the existing voluntary labelling programs for low-emitting products, as far as these

(1) include limits for the parameters TVOC, TSVOC, carcinogens, formaldehyde, acetaldehyde, LCI limits for individual substances (including but not limited to the European list of harmonized LCIs), and the R-value;

(2) base their test methods on EN 16516;

(3) perform testing and apply the limits after 28 days of storage

in a ventilated test chamber, under the conditions specified in EN 16516; some regulations

and programs also have limits after 3 days, on top of the 28 days limits;

(4) express the test results as air concentrations in the European Reference Room, as specified in EN 16516. Examples of such regulations are the *Belgian Royal Decree C-2014/24239*, or the *German AgBB/ABG*. Examples of such voluntary labelling programs are *EMICODE*, *Blue Angel* or *Indoor Air Comfort*.

Relevant test results shall be produced either by an ISO 17025 accredited commercial test lab or by a qualified internal test lab of the manufacturer. Examples for the applied limits after 28 days of storage in a ventilated test chamber are:

- TVOC: 1000 µg/m³
- TSVOC: 100 µg/m³
- Each carcinogen: 1 µg/m³
- Formaldehyde: 100 µg/m³
- LCI: different per substance involved

- R-value: 1 (meaning that, in total, 100 % of the combined LCI values must not be exceeded)

Informative Annexes (2 tables):

Table 1 shown below is an overview of the most relevant regulations and specifications as of October 2024, as regards requirements after 3 days of storage in a ventilated test

chamber.

Table 2 provides an overview of the most relevant regulations and specifications as of October 2024, as regards requirements after 28 days of storage in a ventilated test chamber. Some details may be missing in the table due to lack of space. Values given represent maximum values/limits.

	TVOC µg/m³	Sum of carcinogens. C1A,CA2 µg/m³	Formaldehyde µg/m³	Acetaldehyde µg/m³	Sum of Form- and Acetaldehyde
German AgBB/ABG regulation	10 000	10	-/-	-/-	-/-
Belgian regulation	10 000	10	-/-	-/-	-/-
EMICODE EC1	1 000	10	50	50	50 ppb
EMICODE EC1 ^{PLUS}	750	10	50	50	50 ppb

	TVOC µg/m³	TSVOC µg/m³	Each carcinogen C1A,CA2 µg/m³	Formalde- hyde µg/m³	Acetalde- hyde µg/m³	LCI	R value	Specials	Sum of non-LCI & non- identified µg/m³
Belgian regulation	1000	100	1	100	200	Belgian list	1	Toluene 300 µg/m³	-/-
French regulations class A+	1000	-/-	-/-	10	200	-/-	-/-	List of 8 VOCs, 4 CMR	-/-
French regulations class A	1500	-/-	-/-	60	300	-/-	-/-	List of 8 VOCs, 4 CMR	-/-
French regulations class B	2000	-/-	-/-	120	400	-/-	-/-	List of 8 VOCs, 4 CMR	-/-
French regulations class C	>2000	-/-	-/-	>120	>400	-/-	-/-	List of 8 VOCs, 4 CMR	-/-
German DIBt/AgBB regulation	1000	100	1	100	300	German AgBB list	1	-/-	100
EMICODE EC1	100	50	1	(after 3 days)	(after 3 days)	-/-	-/-	-/-	-/-
EMICODE EC1 ^{PLUS}	60	40	1	(after 3 days)	(after 3 days)	German AgBB list	1	-/-	40
Finnish M1, sealants	20	-/-	1	10	300	EU LCI list	-/-	Ammonia, odour	-/-
Finnish M1, adhesives	200 µg/m²h	-/-	5 µg/m²h	50 µg/m²h	300	EU LCI list	-/-	Ammonia, odour	-/-

8. References

EN ISO 868

EN ISO 868:2003 Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)

EN ISO 1183-1

EN ISO 1183-1:2019 Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method

EN 1279-4

EN 1279-4:2018 Glass in building - Insulating glass units
- Part 4: Methods of test for the physical attributes of edge seals

EN 1931

EN 1931:2000 Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of water vapour transmission properties

EN ISO 2811-1

EN ISO 2811-1:2023 Paints and varnishes - Determination of density - Part 1: Pycnometer method

EN ISO 12572

EN ISO 12572:2016 + A1:2024 Hygrothermal performance of building materials and products - Determination of water vapour transmission properties - Cup method

EN 13501-1

EN 13501-1:2018 Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests

ISO 14025

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

EN 15804

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

EN 16516

EN 16516:2017+A1:2020 Construction products - Assessment of release of dangerous substances - Determination of emissions into indoor air

EN ISO 17025

EN ISO 17025: 2018-03 General requirements for the competence of testing and calibration laboratories

EN ISO 29862

EN ISO 29862:2024 Self adhesive tapes - Determination of peel adhesion properties

EAD 030352-00-0503

EAD 030352-00-0503:2020-10 Liquid applied watertight covering kits for wet room floors and/or walls

EAD 030436-00-0503

EAD 030436-00-0503:2020-10 Watertight covering kits based on flexible sheets for wet room floors and/or walls

EAD 030437-00-0503

EAD 030437-00-0503:2020-10 Watertight covering kits based on inherently watertight boards for wet room floors and/or walls

DIN 53122-1

DIN 53122-1:2001-08 Testing of plastics and elastomer films, paper, board and other sheet materials - Determination of water vapour transmission - Part 1: Gravimetric method

NF P30-303

NF P30-303:1998-12-01 Building covering. Extruded mastic sealing strips for fibre-cement roofing. Specifications. Tests

2000/532/EC

Commission decision dated 3 May 2000 replacing decision 94/3/EC on a waste directory in accordance with Article 1 a) of

Council Directive 75/442/EEC on waste and Council decision 94/904/EC on a directory of hazardous waste in terms of Article 1, paragraph 4 of Directive 91/689/EEC on hazardous waste

Belgian Royal Decree C-2014/24239

Belgisch Staatsblad 8 MEI 2014, p.60603. — Koninklijk besluit tot vaststelling van de drempelniveaus voor de emissies naar het binnenmilieu van bouwproducten voor bepaalde geogode gebruiken

Blue Angel

Environmental label organised by the federal government of Germany www.blauer-engel.de

Candidate list

Candidate List of substances of very high concern for Authorisation, published in accordance with Article 59(10) of the REACH Regulation, ECHA, www.echa.europa.eu/candidate-list-table

CPR

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

Decopaint Directive

Directive 2004/42/CE of the European Parliament and the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC

EMICODE

EMICODE, GEV – Gemeinschaft Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte e. V. (pub.). www.emicode.de

EWC waste code

Directive governing introduction of the European Waste Catalogue

Sphera's Life Cycle for Expert (LCA FE) software

Sphera Solutions, 'Life Cycle Assessment for Expert software', Sphera Solutions, Chicago, US, 2024. Retrieved from <https://sphera.com/life-cycle-assessment-lca-software/>

Sphera Managed Lifecycle Content (MLC)

Sphera Solutions, Managed LCA content dataset documentation, Sphera Solutions, Chicago, US. Retrieved from <https://sphera.com/product-sustainability-gabi-data-search/>

German AgBB

Committee for Health-related Evaluation of Building Products: health-related evaluation of emissions of volatile organic compounds (VOC and SVOC) from building products; status: June 2024
www.umweltbundesamt.de/produkte/bauprodukte/agbb.htm

IBU 2022

Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V. EPD programme. Version 2.1. Berlin: Institut Bauen und Umwelt e.V., 10-2022 www.ibu-epd.com

Indoor Air Comfort

Product certification by Eurofins, Galten, Denmark
www.eurofins.com

IBU PCR Part A

Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. Version 1.4, 04-2024 www.ibu-epd.de

PCR Part B

Product Category Rules for Construction Products, Part B: Building sealants, v.11, 2024-08

REACH

Directive (EG) No. 1907/2006 of the European Parliament and of the Council dated 18 December 2006 on the registration, evaluation, approval and restriction of chemical substances (REACH), for establishing a European Agency for chemical substances, for amending Directive 1999/45/EC and for annulment of Directive (EEC) No. 793/93 of the Council, Directive (EC) No. 1488/94 of the Commission, Guideline 76/769/EEC of the Council and Guidelines 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC of the Commission



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