ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	FEICA - Association of the European Adhesive and Sealant Industry
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-FEI-20150323-IBG1-EN
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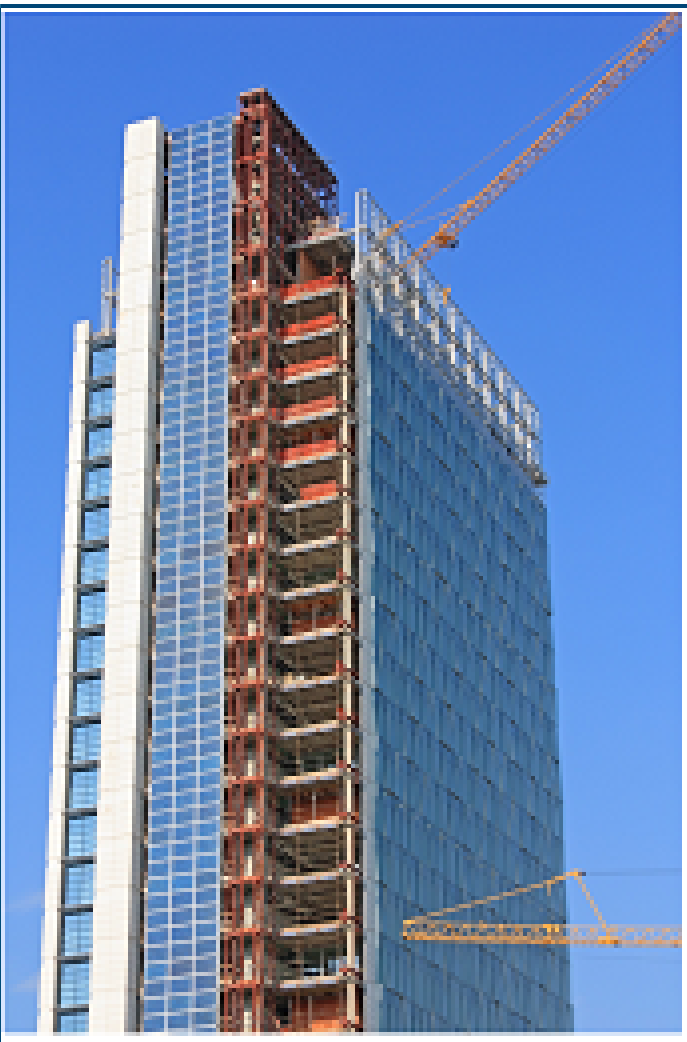
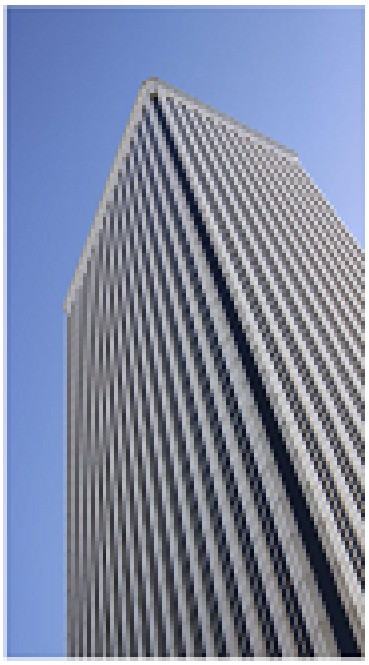
Valid to	01.02.2021

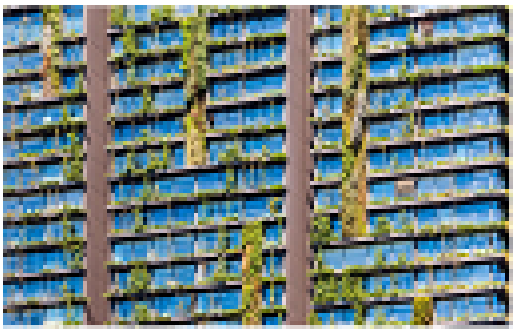
Silicone-based construction sealants

FEICA - Association of the European Adhesive and Sealant Industry

www.bau-umwelt.com / https://epd-online.com







1. General Information

FEICA - Association of the European Adhesive and Sealant Industry	Silicone-based construction sealants
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the Declaration** FEICA - Association of the European Adhesive and Sealant Industry Avenue E. van Nieuwenhuyse 4 1160 Brussels Belgium
Declaration number EPD-FEI-20150323-IBG1-EN	**Declared product / Declared unit** 1 kg silicone-based construction sealant; density 1.0 - 1.5 g/cm³
This Declaration is based on the Product Category Rules: Building sealants, 07.2014 (PCR tested and approved by the SVR)	**Scope:** This validated Declaration 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 may be used by FEICA members 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 FEICA secretariat. The members of FEICA are listed on its 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.
Issue date 02.02.2016	
Valid to 01.02.2021	**Verification** The CEN Norm /EN 15804/ serves as the core PCR Independent verification of the declaration according to /ISO 14025/ ☐ internally ☒ externally
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	
Dr. Burkhart Lehmann (Managing Director IBU)	Mr Olivier Muller (Independent verifier appointed by SVR)

2. Product

2.1 Product description

Silicone-based construction sealant, filled or unfilled, transparent or pigmented.

Silicone-based construction sealants are manufactured from reactive siloxane and so-called silicone oil, sometimes using fillers, extenders, colour pigments, cross-linkers, bonding agents and catalysts.

They permanently and elastically seal joints planned for the building. Silicone-based construction sealants fulfill key functions. Ingress of moisture into the structure via the joints is prevented by joint sealants. By using silicone-based sealants 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).

2.2 Application

Module 1: *Façade sealants*

Silicone-based construction sealants are used for the elastic sealing of joints. The areas of application for façade sealants include expansion joints (movement joints) and/or connection joints already existing in exterior walls and on window and door frames (including the inside section). All these sealants fulfill key functions of the building.

Module 2: *Sealants for glazing*

Silicone-based construction sealants are used for the elastic sealing of joints which may be subject to movement. Sealants for glazing are used in the following areas:

Glass to glass
Glass to frame
Glass to porous substrates

Module 3: *Sanitary sealants*

The areas of application for silicone-based sanitary sealants are joints in sanitary areas and kitchens. Joints sealed using sanitary sealants comprise connection joints between sanitary furnishings and the wall, connection joints between the floor and wall or movement joints across surfaces, for example.

2.3 Technical Data

Module 1: *Façade sealants*
The minimum requirements on water and airtightness as per Table ZA.1 of /EN 15651-1:2012/ apply: see table
Module 2: *Sealants for glazing*
The minimum requirements on water and airtightness as per Table ZA.1 of /EN 15651- 2:2012/ apply: see table
Module 3: Sanitary sealants
The minimum requirements on water and airtightness as per Table ZA.1 of /EN 15651-3:2012/ apply: see table

Name	Value	Unit
Density	1 - 1.5	kg/m^3
Elastic recovery /EN ISO 7389/	only for module 2: >/=25 or >/=100	%
Loss of volume /EN ISO 10563/	value to be declared by the manufacturer	%
Resistance to flow /EN ISO 7390/	value to be declared by the manufacturer	mm
Tensile properties /EN ISO 8339/	only for module 1 and 3: </=0,9	
Adhesion/cohesion properties at maintained extension after immersion in water /EN ISO 10590/	only for module 1: NF*	
Adhesion/cohesion properties at maintained extension after immersion in water for sealants in class XS and/or adhesion/cohesion properties after immersion in water for sealants in class S /EN ISO 10590:2005/, /EN ISO 10590/	only for module 3: NF*	
Adhesion/cohesion properties after immersion in water plastic sealants /EN ISO 10591/	only for module 1: >/=25 or >/=100	%
Adhesion/cohesion properties after exposure to heat, water and artificial light /EN ISO 11431/	only for module 2:NF*	

* NF: Passed-Failed criteria.
The sealant class must also be indicated for the declared product.

2.4 Placing on the market / Application rules

For the placing on the market in the EU/EFTA (with the exception of Switzerland) products falling under the Regulation (EU) No 305/2011 need a Declaration of Performance taking into consideration either the relevant harmonised European standard as cited in chapter 2.3 or the European Technical Assessment and the CE-marking.
For the application and use of the products the respective national provisions apply.

2.5 Delivery status

Pasty in containers made of plastic, foil or metal. Typical container sizes contain 50 ml to 1000 ml of product.
A combination of HDPE (high-density polyethylene) cartridges, cardboard and pallets was modelled for the LCA.

2.6 Base materials / Ancillary materials

Silicone-based construction sealants are manufactured from reactive siloxane and silanes, sometimes using fillers. The cross-linking reaction occurs through the effects of humidity in air when installed.
On average, the products covered by this EPD contain the following ranges of base materials and ancillary materials referred to:

Siloxanes: 45-90 wt.%
Silanes: 2-10 wt.%
Silicone plasticizers: 0-30 wt.%
Mineral fillers: 0-40 wt.%
Fumed silica: 2 wt.%
Mineral oil: 0-30 wt.%
Pigments: 0-20 wt.%
Water: 0-20 wt.%
Additives: <5 wt.%

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 manufacturer's documentation (e.g. product data sheets).
In individual cases, it is possible that substances on the list of materials of particularly high concern for inclusion in /Annex XIV of the REACH regulation 2011/ are contained in concentrations exceeding 0.1%. If this is the case, this information can be found on the respective safety data sheet.

2.7 Manufacture

Silicone-based sealants are generally manufactured by mixing the ingredients and then filling them into the delivery containers. The quality of the products and safe handling thereof is ensured by the corresponding regulations such as /EN ISO 9001:2008-12/ and the provisions outlined in the relevant regulations such as the Industrial Safety Regulation and Federal Pollution Control Act.

2.8 Environment and health during manufacturing

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

2.9 Product processing/Installation

Silicone-based construction sealants are usually processed manually on site using suitable tools. In most cases, the products are inserted into joints using cartridge guns, whereby 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. VOC-emissions may occur.

2.10 Packaging

A detailed description of packaging is provided in section 2.5. Empty containers and clean foils can be recycled.

2.11 Condition of use

During the use phase, silicone-based sealants are fully cross-linked and hardened.
They are durable products which protect buildings and

significantly contribute towards their appearance, function and sustainability.

2.12 Environment and health during use

Option 1 – Products for applications outside indoor areas with permanent stays by people

During use, silicone-based construction sealants lose their reactive capacity and 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 with permanent stays by people

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.

2.13 Reference service life

Sealants fulfill key functions in buildings. They decisively improve the usability of building structures and significantly extend their original service lives. Information supplied by the manufacturer on maintenance and care must be observed.

2.14 Extraordinary effects

Fire

Even without any special fire safety features, joint sealants comply with at least the requirements of /EN 13501-1:2009/ for fire class E.
In terms of volumes used, sealants generally have no or only a minor influence on the fire characteristics (e.g. smoke gas development) of the building in which they are applied.

Water

Silicone-based construction sealants are insoluble in water. They are often used to protect building structures from damaging water ingress / the effects of flooding.

Mechanical destruction

The mechanical destruction of silicone sealants does not lead to any decomposition products which are harmful for the environment or health.

2.15 Re-use phase

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 hardened silicone sealants adhere.

2.16 Disposal

Silicone sealants which cannot be recycled can be hardened. Empty containers are directed to the recycling process. Only a low volume of silicone sealants is incurred in the disposal of components in which they are used. Low levels of adhesion do not play any role in terms
of disposal. They do not impair the disposal/ recycling of other components / building materials.
Hardened residual product mechanically removed from substrates must be disposed of as commercial/site waste.
The following European Waste Codes waste (EWC) codes can apply:
Product residue:
/EWC 2000/532/EC 080409/
/EWC 2000/532/EC 080410/ with the exception of those covered by /EWC 2000/532/EC 08 04 09/

2.17 Further information

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

3. LCA: Calculation rules

3.1 Declared Unit

This EPD refers to the declared unit of 1 kg silicone-based construction sealant with a density of 1 - 1.5 kg/l in the mixing ratio required for processing the components in accordance with the PCR Part B for Building sealants.
The results of the Life Cycle Assessment provided in this declaration have been calculated from the product with the highest environmental impact (worst-case scenario).
With the information about the consumption per running meter together with width and depth of the joint, the results can be calculated into a declared unit of l/m.

Declared unit

Name	Value	Unit
Declared unit	1	kg
Conversion factor to 1 kg	1	-

3.2 System boundary

Modules A1-A3, A4, A5 and D are taken into consideration in the LCA:

- A1 Production of preliminary products
- A2 Transport to plant
- A3 Production incl. provision of energy, production of packaging as well as auxiliaries and consumables, waste treatment)
- A4 Transport to site
- A5 Installation (disposal of packaging & installation losses and emissions during installation)
- D Credits from incineration of packaging materials & installation losses and recycling the metal container

The declaration is therefore from "cradle to gate - with options".

3.3 Estimates and assumptions

Where no specific /GaBi/ processes were available, the individual recipe ingredients of formulation were estimated on the basis of information provided by the manufacturer or literary sources.

3.4 Cut-off criteria

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

The manufacture of machinery, plants and other infrastructure required for production of the products under review was not taken into consideration in the LCA.
Transport of packaging materials is also excluded.

3.5 Background data

Data from the /GaBi/ 6 database was used as background data. Where no background data was available, it was complemented by manufacturer information and literary research.

3.6 Data quality

Representative products were applied for this EPD and the product in a group displaying the highest environmental impact was selected for calculating the LCA results. The datasets are less than 5 years old. Production data and packaging are based on details provided by the manufacturer. The formulation used for evaluation refers to a specific product.

3.7 Period under review

Representative formulations were accepted by FEICA Ltd and collected in 2011.

3.8 Allocation

No allocations were applied for production. A multi-input allocation with a credit for electricity and thermal energy was used for incineration of production residues and packaging materials. The credits achieved through packaging disposal are declared in Module D.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account. In this case, 1 kg construction sealant was selected as the declared unit. Depending on the application, a corresponding conversion factor such as the specific use per running meter must be taken into consideration.

4. LCA: Scenarios and additional technical information

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

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	0.0016	l/100km
Transport distance	1000	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	1000 - 1500	kg/m^3
Capacity utilisation volume factor	1	-

Installation into the building (A5)

Name	Value	Unit
Material loss	0.01	kg
VOC in the air (NMVOC)	0.05	kg

5. LCA: Results

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

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 kg silicone-based construction sealant

Parameter	Unit	A1-A3	A4	A5	D
Global warming potential	[kg CO_2-Eq.]	7.08E+0	5.61E-3	6.23E-1	-3.14E-1
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.77E-9	2.31E-14	1.63E-12	-1.09E-10
Acidification potential of land and water	[kg SO_2-Eq.]	3.41E-2	1.44E-5	5.59E-5	-8.46E-4
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	2.71E-3	3.56E-6	1.05E-5	-5.70E-5
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	3.15E-3	-3.90E-6	1.80E-2	-6.89E-5
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	4.74E-4	2.20E-10	4.00E-9	-3.20E-8
Abiotic depletion potential for fossil resources	[MJ]	1.19E+2	7.73E-2	8.00E-2	-4.38E+0

RESULTS OF THE LCA - RESOURCE USE: 1 kg silicone-based construction sealant

Parameter	Unit	A1-A3	A4	A5	D
Renewable primary energy as energy carrier	[MJ]	3.70E+1	IND	IND	IND
Renewable primary energy resources as material utilization	[MJ]	0.00E+0	IND	IND	IND
Total use of renewable primary energy resources	[MJ]	3.70E+1	4.33E-3	9.25E-3	-5.51E-1
Non-renewable primary energy as energy carrier	[MJ]	1.23E+2	IND	IND	IND
Non-renewable primary energy as material utilization	[MJ]	1.22E+1	IND	IND	IND
Total use of non-renewable primary energy resources	[MJ]	1.35E+2	7.76E-2	9.55E-2	-5.37E+0
Use of secondary material	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m^3]	7.46E-2	7.60E-6	1.40E-3	-1.11E-3

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 kg silicone-based construction sealant

Parameter	Unit	A1-A3	A4	A5	D
Hazardous waste disposed	[kg]	2.94E-5	3.68E-8	2.79E-8	-1.56E-6
Non-hazardous waste disposed	[kg]	1.31E+0	1.10E-5	2.50E-3	-1.62E-3
Radioactive waste disposed	[kg]	6.26E-3	1.06E-7	6.17E-6	-3.92E-4
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	1.09E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	2.48E+0	0.00E+0

6. LCA: Interpretation

All impacts are associated with the production phase (A1-A3). The most significant contribution to the production phase impacts is the upstream production of raw materials as main driver. The majority of life cycle energy consumption takes place during the production phase (A1-A3). Significant contributions to Primary Energy Demand – Non-renewable (**PENRT**) derive from the energy resources used in the production of raw materials. The largest contributor to Primary Energy Demand – Renewable (**PERT**) is the consumption of renewable energy resources required for the generation and supply of electricity. During manufacturing (A1-A3) some influence also arises due to the wooden pallets and paper used as packaging that need solar energy for photosynthesis. It should be noted that Primary Energy Demand – Renewable (**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.

CO2 is the most important contributor to Global Warming Potential (**GWP**). For the Acidification Potential (**AP**), NOx and SO2 contribute to the largest share.

Transportation to the construction site (A4) and the installation process (A5) make a negligible contribution to almost all impacts. The only exception is the photochemical ozone creation potential (**POCP**) that is significantly influenced by the installation of the product due to emissions of volatile compounds of maximum 5%. This leads to a contribution of the installation phase of up to 85% on the overall life cycle of the product. Emissions associated with the manufacturing of product (A3) only have a minor influence on POCP.

In module A4, transport to construction site, values for POCP are negative due to emission profile modelled for the selected transportation process and of the characterisation method used in CML 2001 for the calculation of the POCP. Transportation processes are responsible for the emission of NOx in the ground layer atmosphere. NO in particular can have an ozone depleting effect that is reflected in CML 2001 by assigning a negative characterisation factor to this substance. However, although these negative values may appear unusual, it should be considered that POCP is only one of the analysed environmental impact categories. All other potential impacts would increase with greater transportation distances, showing that transportation is a process leading to net environmental burdens. Furthermore, even for POCP, transportation processes needed for supply of materials and product distribution only have limited counterbalance effects on the overall LCA results. Energy credit from incineration of packaging material reported in module D show a negligible influence on the overall results.

7. Requisite evidence

VOC

Special tests and evidence have not been carried out or provided within the framework of drawing up this Model EPD. Some EU 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, has to be provided separately and is specific for products in question.

Evidence pertaining to VOC emissions shall show
- either an attestation of compliance with,
- or documentation of test data that are required in, any of the existing regulations or in any of the existing voluntary labeling 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 /CEN/TS 16516/ (or /EN 16516/, after the on-going revision of /CEN/TS 16516/);
(3) perform testing and apply the limits after 28 days storage in a ventilated test chamber, under the conditions specified in /CEN/TS 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 /CEN/TS 16516/.

Examples of such regulations are the Belgian /Royal Decree C-2014/24239/, or the German /AgBB/. Examples of such voluntary labeling 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 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):
The table shown below is an overview of the most relevant regulations and specifications as of April 2015, as regards requirements after 3 days storage in a ventilated test chamber.

	TVOC [µg/m³]	Sum of carcinogens. C1A,CA2 [µg/m³]	Formal-dehyde [µg/m³]	Acet-aldehyde [µg/m³]	Sum of Form- and Acet-aldehyde
German DIBt/AgBB regulation	10 000	10	-/-	-/-	-/-
draft Lithuanian regulation	10 000	10	-/-	-/-	-/-
EMICODE EC1	1 000	10	50	50	50 ppb
EMICODE EC1 *PLUS*	750	10	50	50	50 ppb

The table above provides an overview of the most relevant regulations and specifications as of April 2015, as regards requirements after 28 days 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]	TSVOC [µg/m³]	Each carcinogen C1A,CA2 [µg/m³]	Formaldehyde [µg/m³]	Acetaldehyde [µg/m³]	LCI	R value	Specials	Sum 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	1200	German AgBB list	1	-/-	100
draft Lithuanian regulation	1000	100	1	product type specific	-/-	Lithua-nian list	1	-/-	-/-
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	-/-	-/-	-/-	Ammonia, odour	-/-
Finnish M1, adhesives	200 µg/m²h	-/-	5 µg/m²h	50 µg/m²h	-/-	-/-	-/-	Ammonia, odour	-/-

8. References

PCR 2013, Part A
Institut Bauen und Umwelt e.V., Berlin (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; 2013-04
www.bau-umwelt.de

PCR 2012, Part B
Product Category Rules for Building Products, Part B: Requirements on the EPD for construction sealants, 2013-07
www.bau-umwelt.de

EN ISO 9001:2008-12
Quality management systems – Requirements

ISO 16000-3:2002-08
Indoor air – Part 3: Determination of formaldehyde and other carbonyl compounds by sampling using a pump

ISO 16000-6:2004-12
Indoor air – Part 6: Determination of volatile organic compounds indoors and in test chambers by sampling on TENAX TA®, thermal desorption and gas chromatography using MS or FID

EN ISO 16000-9:2008-04
Indoor air – Part 9: Determination of the emission of volatile organic compounds from building products and furnishings – Emission test chamber method

EN ISO 16000-11:2006-06
Indoor air – Part 11: Determination of the emission of volatile organic compounds from building products and furnishings – Sampling, storage of samples and preparation of test specimens

CEN/TS 16516:2013-10
Construction products - Assessment of release of dangerous substances - Determination of emissions into indoor air

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 geoogde gebruiken

EN 17025: 2007-05
General requirements for the competence of testing and calibration laboratories

GaBi 6 2014
GaBi 6: Software and database for comprehensive analysis. LBP, University of Stuttgart and thinkstep AG, 2014

GaBi 6 2014b
GaBi 6: Documentation of GaBi 6 data sets from the data base for comprehensive analysis LBP, University of Stuttgart and thinkstep AG, 2014
http://documentation.gabi-software

EN 15651:2012-12
Sealants for non-structural use in joints in buildings and pedestrian walkways – Part 1: Sealants for façade elements – Part 2: Sealants for glazing – Part 3: Sealants for sanitary joints,

EN ISO 10563:2005-10
Building construction – Sealants – Determination of change in mass and volume

EN ISO 8339: 2005-09
Building construction – Sealants – Determination of tensile properties (Extension to break)

EN ISO 10590:2005-10
Building construction – Sealants – Determination of tensile properties of sealants at maintained extension after immersion in water

EN ISO 10591:2005-10
Building construction – Sealants - Determination of adhesion/cohesion properties of sealants after immersion in water

EN ISO 7390:2004-04
Building construction – Jointing products – Determination of resistance to flow of sealants

EN ISO 11431:2003-01
Building construction – Jointing products – Determination of adhesion/cohesion properties of sealants after exposure to heat, water and artificial light through glass

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