ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A1*

Owner of the Declaration	Sto SE & Co. KGaA and Sto Scandinavia AB
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-STO-20200207-CBD1-EN
Issue date	04.12.2020
Valid to	03.12.2025

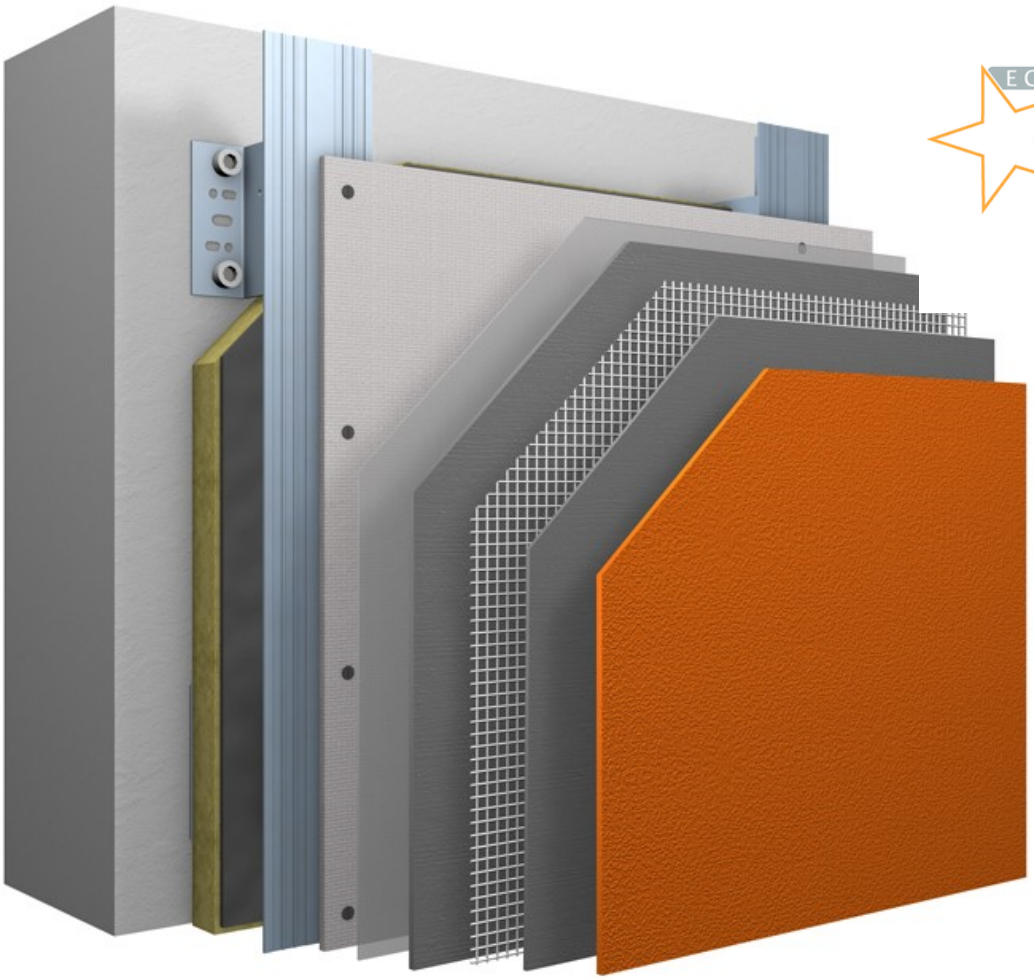
StoVentec R

Sto SE & Co. KGaA

Sto Scandinavia AB

Institut Bauen und Umwelt e.V.

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



ECO PLATFORM EPD EN 15804 VERIFIED

Building with conscience.

General Information

Sto SE & Co. KGaA and Sto Scandinavia AB

Programme holder
IBU – Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-STO-20200207-CBD1-EN

This declaration is based on the product category rules:
Curtain walling, 11.2017
(PCR checked and approved by the SVR)

Issue date
04.12.2020

Valid to
03.12.2025

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

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.))

StoVentec R

Owner of the declaration
Sto SE & Co. KGaA
Ehrenbachstr. 1
79780 Stühlingen, Germany
and
Sto Scandinavia AB
Gesällgatan 6
582 77 Linköping, Sweden

Declared product / declared unit
1m² StoVentec R (1) facade system based on organic plaster with a surface weight of 13,287 kg/m².
1m² StoVentec R (2) facade system based on mineral plaster with a surface weight of 19,504 kg/m² (LCA results in public annex to this EPD document).

Scope:
This declaration covers the StoVentec R ventilated façade systems without subconstruction and insulation. Two specific façade variations are covered:

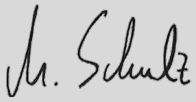
- StoVentec R (1), based on organic plaster, declared in this document.
- StoVentec R (2), based on mineral plaster, LCA results can be found in the public annexe to this EPD.

Product components are produced by Sto SE & Co. KGaA (site at Stühlingen, Germany), Sto Scandinavia AB (site at Linköping, Sweden), and external suppliers.

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+A1*. 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 14025:2010*
☐ internally ☒ externally



Matthias Schulz
(Independent verifier)

Product

Product description/Product definition
StoVentec R is a ventilated rainscreen cladding system with a seamless render finish, allowing walls to breathe and levelling uneven substrates.
StoVentec R can be mounted on different types of substructures. The substructure or the insulation is not included in this declaration. The declaration includes the following components. The specific (Sto-)products of some components can vary:

StoVentec R organic:
- StoVentec Carrier Board / StoVentec Carrier Board A
- Fixing screws for StoVentec Carrier Board
(used for this declaration: StoVentec Screw / Sto-Façade Screw)
- Basecoat
(used for this declaration: StoArmat Classic Plus)

- Compressed sealing tape made of impregnated flexible foam (used for this declaration: StoVentec Waterproofing Joint 10/3-7)
- Protective profile for the outer edges of the render carrier board (used for this declaration: Sto-Edge Protection Profile G)
- Stop profile with drip edge (used for this declaration: Sto-Rain Guard Profile G)
- Edge profile with integrated glass fibre mesh (used for this declaration: Sto-Mesh Angle Bead Standard 11/13 cm)
- Alkali-resistant reinforcing mesh (used for this declaration: Sto-Glass Fibre Mesh F)
- Finish (used for this declaration: StoLotusan K)

StoVentec R mineralic:
- StoVentec Carrier Board / StoVentec Carrier Board A
- Fixing screws for StoVentec Carrier Board (used for this declaration: StoVentec Screw)
- Substrate coating (used for this declaration: Sto Primer)
- Basecoat (used for this declaration: StoLevell Evo)
- Compressed sealing tape made of impregnated flexible foam (used for this declaration: StoVentec Waterproofing Joint 10/3-7)
- Protective profile for the outer edges of the render carrier board (used for this declaration: Sto-Edge Protection Profile G)
- Stop profile with drip edge (used for this declaration: Sto-Rain Guard Profile G)
- Edge profile with integrated glass fibre mesh (used for this declaration: Sto-Mesh Angle Bead Standard 11/13 cm)
- Alkali-resistant reinforcing mesh (used for this declaration: Sto Glass Fibre Mesh)
- Intermediate coat (used for this declaration: StoPrep Miral)
- Finish (used for this declaration: StoLotusan K)

For the placing of the product on the market in the European Union/European Free Trade Association /EU/EFTA) (with the exception of Switzerland) the Regulation (EU) No. 305/2011 (CPR) applies.

The product needs a declaration of performance taking into consideration ETA no. ETA-17/0406 :date 13/6-2017, title StoVentec R and the CE-marking.

For the application and use the respective national provisions apply.

Application
The declared product StoVentec R is being used as a seamless plaster system within an RSC (Rainscreen cladding) system. For the application and use national regulations apply. For example, in Germany the “Allgemeine bauaufsichtliche Zulassung Z-10.3-717” issued by the Deutsches Institut für Bautechnik (DiBt), Berlin, applies.

Technical Data

Constructional data according ETA

Name	Value	Unit
Reaction to fire acc. EN 13501-1	A2-s1, d0 / B-s1, d0*	class
Water tightness acc. EN 12154	600	Pa
Water absorption (base coat with finishing render) EAD 090019-00-0404	<0,5 kg	m²
Flexural strength of the carrier board EAD 090019-00-0404	8,5	MPa
Elastic modulus of the carrier board EAD 090019-00-0404	1,93	GPa
Impact resistance EAD 090019-00-0404	Category I and II	class
Screw pull-through / pull-out test EAD 090019-00-0404	See ETA-17/0406	-
Shear test for fixing EAD 090019-00-0404	See ETA-17/0406	-
Hygrothermal behaviour EAD 090019-00-0404	Pass	class
Bond strength after ageing between base coat and carrier board EAD 090019-00-0404	≥ 0.08	MPa
Bond strength after ageing between finishing render / base coat and carrier board EAD 090019-00-0404	≥ 0.08	MPa
Frost/dew behaviour EAD 090019-00-0404	Pass	class
Heat transfer coefficient glass acc. DIN EN 673	NR	W/(m²K)
Air permeability acc. EN 12152	NR	class
Fire resistance class DIN EN 1634-3 (for fire protection facades)	NR	class
Resistance to own weight (L/500, max. 3mm)	NR	-
Direct airborne sound insulationn Rw (C,Ctr) EN ISO 717-1	NR	dB
Radiation properties acc. EN 410 or 13363-1 and -2: Total energy transmittance g	NR	%
Radiation properties EN 410 or 13363-1 and -2: Light transmission level rv	NR	%

NR = not relevant
* A2-s1, d0 with StoVentec Carrier Board A
  B-s1, d0 with StoVentec Carrier Board

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to ETA no. ETA-17/0406 xyz, date 13/6 2017, title StoVentec R.

Voluntary data: (not part of CE-marking).

Base materials/Ancillary materials
This EPD applies with the following system components with the corresponding mass shares:

StoVentec R organic:
- Carrier Board (StoVentec Carrier Board): 6,000 kg/m2 (1 pc/m²)

- Fixing screws (Stainless steel screws): 0,049 kg/m2 (12 pc/m²)

- Basecoat (StoArmat Classic Plus): 4,500 kg/m²

- Compressed sealing tape made of impregnated flexible foam (StoVentec Waterproofing Joint 10/3-7): 0,005 kg/m²

- Protective profile for the outer edges of the render carrier board (Sto-Edge Protection Profile G): 0,058 kg/m²

- Profile with drip edge (Sto-Rain Guard Profile G): 0,063 kg/m²

- Edge profile with integrated glass fibre mesh (Sto-Mesh Angle Bead Standard 11/3 cm): 0,040 kg/m²

- Alkali-resistant reinforcing mesh (Glass Reinforcement mesh): 0,174 kg/m²

- Finish (StoLotusan K): 2,400 kg/m²

StoVentec R Mineralic:
- Carrier Board (StoVentec Carrier Board): 6,000 kg/m2 (1 pc/m²)

- Fixing screws Stainless steel screws: 0,049 kg/m2 (12 pc/m²)

- Substrate coating (Sto Primer): 0,300 kg/m²

- Basecoat (StoLevell Evo):10,000 kg/m²

- Compressed sealing tape made of impregnated flexible foam (StoVentec Waterproofing Joint 10/3-7): 0,005 kg/m²

- Protective profile for the outer edges of the render carrier board (Sto-Edge Protection Profile G): 0,058 kg/m²

- Stop profile with drip edge (Sto-Rain Guard Profile G): 0,063 kg/m²

- Edge profile with integrated glass fibre mesh (Sto-Mesh Angle Bead Standard 11/3 cm): 0,040 kg/m²

- Alkali-resistant reinforcing mesh (Glass reinforcement mesh): 0,190 kg/m²

- Intermediate coat (StoPrep Miral): 0,400 kg/m²

- Finish (StoLotusan K): 2,400 kg/m²

This product/article/at least one partial article contains substances listed in the *candidate list* (date: 25.06.2020) exceeding 0.1 percentage by mass: No.

This product/article/at least one partial article does contain other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the *candidate list*, exceeding 0.1 percentage by mass: No.

The individual chemical products might contain hazardous substances and might be classified hazardous according to the CLP regulation (Classification, Labelling and Packaging).
See chapter 2 and 3 in the individual product safety data sheets for details.

The chemical product safety data sheets can be found at www.sto.se and/or www.sto.de.

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): Yes.

The chemical products may contain in-can preservatives such as 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-2H-isothiazol-3-one (3:1), and/or film-preservatives such as 2-octyl-2H-isothiazol-3-one, Terbutryn, pyrithione zinc.

See the individual chemical product safety data sheet in chapter 2 and 3 on the websites www.sto.se and/or www.sto.de.

Reference service life
The length of the service life highly depends on the installation quality. Here, the planning and execution of rainproof connections to other buildings or building parts is of special importance. With regular and proper maintenance, the systems can reach the life span of the building *Lengsfeld 2015*. The Sustainable Building Assessment System *BNB* specifies the service life of the façade system for 40 years. A reference service life according to *ISO 15686* is not reported.

Maintenance
The surface quality is affected by climatic and environmental influences on the system over time. Regular maintenance e.g. by painting contributes for optical enhancement and extension of the lifespan.

LCA: Calculation rules

Declared Unit
The declared unit for the StoVentec R (1) facade system is 1 m² with a surface weight of 13,287 kg/m² and a thickness of 16mm.

The declared unit for the StoVentec R (2) facade system (see public annex to the EPD) is 1 m² with a surface weight of 19,504 kg/m² and a thickness of 20mm.

Declared unit

Name	Value	Unit
Declared unit	1	m²
conversion factor [Mass/Declared	13.287	-
Unit]		
Layer thickness	0,016	m
Grammage	13,287	kg/m²

System boundary
Cradle to gate - with options.

Description of the system boundaries:

Module A1 to A3:
This module considers the manufacturing of system components (e.g. carrier board, fastening, plaster etc.), the transport to the site in Sweden and the

manufacturing/compiling of the façade system components. The impact for producing packaging materials is included as well.

Module A4:
This module considers 100 km truck transport to site. The transport distance can be modified project-specific.

Module A5:
Treatment and disposal of packaging material. Credits for potential avoided burdens on electricity and thermal energy generation are declared in module D and affects only the rate of virgin material.

An overlap of 10% with glass fibre mesh is considered in A5 (production of overlap within module A1-A3, “kit-approach”).

Electricity consumption for drilling and mortar application is considered.

Installation losses have not been accounted for, since such losses highly depend on the specific building geometry and other site-specific factors. Installation losses may be estimated based on the LCA results for manufacturing and End-Of-Life (EoL), e.g. via scaling.

Module C1 to C4:
C1: Manual dismantling, no environmental burdens.
C2: 50 km transport to waste treatment by truck (may be adapted on building level).
C3: No additional waste processing, no environmental burdens.
C4: European scenario for average landfill emissions is declared.

Module D:
Benefits and loads for metal components and avoided burdens from packaging treatment.

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.

For calculating the LCA, the folllowing software and databases have been used:
GaBi Software version 9.5.1, Sphera Solutions GmbH, Stuttgart. GaBi Professional database, Service Pack 40, 2020

LCA: Scenarios and additional technical information

The following scenario information can also be applied for the StoVentec R (2) variation (see public annex to this EPD), with the exception, that the masses concerning the end of life stage (modules C1-C4) are 19.504 kg/m².

Transport from the gate to the site (A4)

Name	Value	Unit
Litres of fuel	0.0259	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%

Assembly (A5)

Name	Value	Unit
Electricity consumption	0,2362	MJ/m²
Overlap of glass fibre mesh	10	%

Reference service life

Name	Value	Unit
Life Span (according to BBSR)	40	a

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste	13.287	kg
Landfilling	13.287	kg

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LCA: Results

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

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m² StoVentec R (1) ventilated facade system (13,287 kg/m²), based on organic plasters

Parameter	Unit	A1-A3	A4	A5	C1	C2	C4	D
GWP	[kg CO_2-Eq.]	15.74	0.09	1.86	0.00	0.05	0.18	-0.80
ODP	[kg CFC11-Eq.]	2.41E-11	1.49E-17	1.04E-15	0.00E+0	7.43E-18	9.94E-16	-1.02E-14
AP	[kg SO_2-Eq.]	3.09E-2	7.11E-5	2.01E-4	0.00E+0	3.55E-5	1.15E-3	-1.34E-3
EP	[kg $(PO_4)^{3-}$-Eq.]	4.65E-3	1.31E-5	3.90E-5	0.00E+0	6.54E-6	1.29E-4	-1.40E-4
POCP	[kg ethene-Eq.]	2.82E-3	-3.22E-7	1.75E-5	0.00E+0	-1.61E-7	8.71E-5	-1.11E-4
ADPE	[kg Sb-Eq.]	5.49E-5	6.66E-9	1.14E-8	0.00E+0	3.33E-9	1.82E-8	-3.36E-6
ADPF	[MJ]	286.10	1.23	0.58	0.00	0.62	2.56	-11.10

Caption	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

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 m² StoVentec R (1) ventilated facade system (13,287 kg/m²), based on organic plasters

Parameter	Unit	A1-A3	A4	A5	C1	C2	C4	D
PERE	[MJ]	34.50	0.07	7.66	0.00	0.03	1.13	-2.95
PERM	[MJ]	8.17	0.00	-7.39	0.00	0.00	-0.79	0.00
PERT	[MJ]	42.67	0.07	0.27	0.00	0.03	0.35	-2.95
PENRE	[MJ]	270.10	1.24	9.50	0.00	0.62	24.10	-13.50
PENRM	[MJ]	30.19	0.00	-8.69	0.00	0.00	-21.50	0.00
PENRT	[MJ]	300.80	1.24	0.81	0.00	0.62	2.64	-13.50
SM	[kg]	5.11	0.00	0.00	0.00	0.00	0.00	0.00
RSF	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	[m³]	5.83E-2	8.04E-5	4.53E-3	0.00E+0	4.02E-5	6.65E-4	-4.90E-3

Caption	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+A1: 1 m² StoVentec R (1) ventilated facade system (13,287 kg/m²), based on organic plasters

Parameter	Unit	A1-A3	A4	A5	C1	C2	C4	D
HWD	[kg]	1.44E-6	5.75E-8	4.28E-10	0.00E+0	2.88E-8	4.02E-8	-1.21E-5
NHWD	[kg]	1.00E+0	1.89E-4	1.15E-2	0.00E+0	9.46E-5	1.33E+1	-5.90E-3
RWD	[kg]	5.54E-3	1.53E-6	9.10E-5	0.00E+0	7.65E-7	3.00E-5	-9.27E-4
CRU	[kg]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	[kg]	0.00	0.00	0.00	0.01	0.00	0.00	0.00
MER	[kg]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	[MJ]	0.00	0.00	3.07	0.00	0.00	0.00	0.00
EET	[MJ]	0.00	0.00	5.49	0.00	0.00	0.00	0.00

Caption	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; EEE = Exported thermal energy

References

DIN EN 673
DIN EN 673:2011-04: Glass in building - Determination of thermal transmittance (U value) - Calculation method.

DIN EN 1634-3
DIN EN 1634-3:2005-01: Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 3: Smoke control test for door and shutter assemblies.

DIN EN 12154
DIN EN 12154:2000-06, Curtain walling - Watertightness - Performance requirements and classification.

DIN EN 13501
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 410
EN 410:2011-04: Glass in building - Determination of luminous and solar characteristics of glazing.

EN 12152
EN 12152:2002-08: Curtain walling - Air permeability - Performance requirements and classification; German version EN 12152:2002.

EN 15804
EN 15804:2012-04+A1 2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

EN ISO 717-1
EN ISO 717-1:2013-06: Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation (ISO 717-1:2013).

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

ISO 15686
ISO 15686-1:2011-05:Buildings and constructed assets - Service life planning - Part 1: General principles and framework.

EAD 090019-00-0404
Kits for ventilated external wall claddings of lightweight boards on subframe with rendering applied in situ with or without thermal insulation.

BBSR
Service Life of Building Components; version 03.11.2011; https://www.nachhaltigesbauen.de/austausch/nutzungsdauern-von-bauteilen/.

BNB
Bewertungssystem nachhaltiges Bauen, Bundesministerium des Innern, für Bau und Heimat (BMI); https://www.bnb-nachhaltigesbauen.de/, 2019.

Candidate List
Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation; No. 1907/2006.

CLP regulation
Classification, labelling and packaging of substances and mixtures (CLP); No. 1272/2008.

IBU 2016
Institut Bauen und Umwelt e.V.: General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V. Version 1., Berlin: Institut Bauen und Umwelt e.V., 2016. "http://www.ibu-epd." www.ibu-epd.com.

Lengsfeld 2015
Lengsfeld, Kristin: Beurteilung der Langzeitbewährung von Ausgeführten Wärmedämmverbundsystemen, Fraunhofer IBP-Bericht HTB-06/2015, beauftragt vom Fachverband Wärmedämmverbundsystem e. V., Juni 2015.

OBP
Ordinance on Biocide Products (BPR); Regulation (EU) No. 528/2012.

PCR A: Product Category Rules for Building-Related Products and Services. Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report. Version 1.8. Berlin: Institut Bauen und Umwelt e.V. (Ed.), 04.07.2019.

PCR B: Curtain Walling
PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for Curtain walling, Version 1.6. Berlin: Institut Bauen und Umwelt e.V. (Ed.), 30.11.2017.

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