Statement of Verification

BREG EN EPD No.: 000039 Issue 03

ECO EPD Ref. No. 000165

This is to verify that the

Environmental Product Declaration

provided by:

Sika Ltd.

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

Sikaplan S / Sika-Trocal S

Company Address

Watchmead
Welwyn Garden City
AL7 1BQ

BUILDING TRUST

Signed for BRE Global Ltd	Emma Baker Operator	05 October 2023 Date of this Issue
27 February 2017 Date of First Issue		30 March 2025 Expiry Date

This Statement of Verification is issued subject to terms and conditions (for details visit www.greenbooklive.com/terms.

To check the validity of this statement of verification please, visit www.greenbooklive.com/check or contact us.

BRE Global Ltd., Garston, Watford WD25 9XX.
T: +44 (0)333 321 8811 F: +44 (0)1923 664603 E: Enquiries@breglobal.com

© BRE Global Ltd, 2017

Environmental Product Declaration

EPD Number: 000039

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom www.bre.co.uk	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	**LCA consultant/Tool**
Sika Ltd Watchmead Welwyn Garden City AL7 1BQ United Kingdom	Sika Technology AG Tüffenwies 16 8048 Zurich Switzerland www.sika.com/sustainability
Declared/Functional Unit	**Applicability/Coverage**
1 m^2 of Sikaplan S / Sika-Trocal S	Product Average.
EPD Type	**Background database**
Cradle to Gate with options	ecoinvent and GaBi

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Pat Hermon
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A1:2013 for further guidance

© BRE Global Ltd, 2017

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Sika Trocal GmbH
Muelheimer Str. 26
53840 Troisdorf
Germany

Construction Product:

Product Description

Sika-Trocal S is a homogeneous, multi-layer, synthetic roof waterproofing sheet based on premium-quality polyvinyl chloride (PVC) according to EN 13956. Sika-Trocal S is available in the following thicknesses: 1.5 mm (Sika-Trocal S 1.5 mm) and 2.0 mm (Sika-Trocal S 2.0 mm).

Technical Information

Property	Value, Unit
Water tightness to EN 1928	Pass
Joint peel resistance as per EN 12316-2	≥ 300 N/50 mm
Joint shear resistance as per EN 12317-2	≥ 500 N/50 mm
Water vapour transmission properties as per EN 1931	μ = 20'000
Tensile stress - longitudinal (machine direction) as per EN 12311-2	≥ 12 N/mm²
Tensile stress - transversal (cross machine direction) as per EN 12311-2	≥ 12 N/mm²
Elongation - longitudinal (machine direction) as per EN 12311-2	≥ 250%
Elongation - transversal (cross machine direction) as per EN 12311-2	≥ 250%
Tear strength - longitudinal (machine direction) as per EN 12310-2	≥ 100 N
Tear strength - transversal (cross machine direction) as per EN 12310-2	≥ 100 N

© BRE Global Ltd, 2017

Property	Value, Unit
Dimension stability - longitudinal (machine direction) as per EN 1107-2	≤ 2.0 %
Dimension stability - transversal (cross machine direction) as per EN 1107-2	≤ 2.0 %
Foldability at low temperature as per EN 495-5	≤ -25 °C
UV exposure as per EN 1297	Pass, > 5'000 h

Main Product Contents

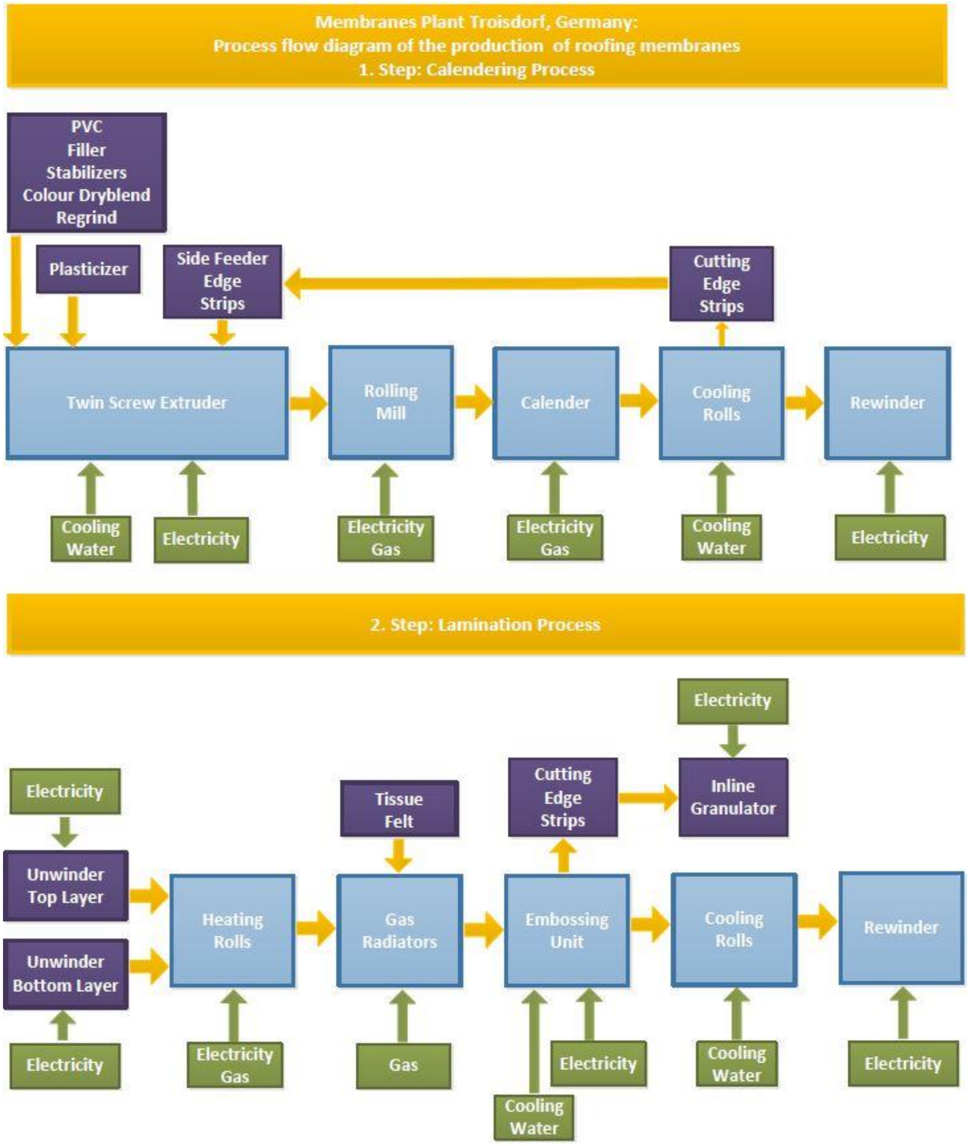
Material/Chemical Input	%
Pigment	0 - 8
Fire retardant (inorganic)	0 – 3
Stabiliser (UV/Heat)	0 - 2
Plasticiser (Phthalate)	34 - 38
Polyvinyl chloride / PVC	50 - 70

Manufacturing Process

The membranes are produced on an “in-line compounding” calendering line and subsequently finished on a lamination line. The polymers, plasticiser, recycling materials and the main additives are fed directly into the extruder. Colour pigments and some special additives are mixed to a dry blend before fed into the extruder. Via a rolling mill the melted plastic get formed between the calendar rolls to a flat membrane, cooled down and wound up to jumbo rolls. The edge trimming is fed back directly into the extruder. On the lamination line the top and back layer of the membrane and the reinforcement as well are welded together by using gas radiators and wounded up again to jumbo rolls. Afterwards the membrane is cut down to customer rolls and packaged on pallets.

© BRE Global Ltd, 2017

Process flow diagram



Construction Installation

Sika-Trocal S roof waterproofing membrane is mechanically fastened to exposed flat roofs, either by fastening in seam overlaps or field fastening with the Sika-Trocal disc system.

Sheet overlap cold welded with Sika-Trocal THF Welding Agent.

Edges must be sealed with Sika-Trocal Seam Sealant.

Hot welding equipment suitable for homogeneous membranes can also be used and is required for detailing. Please see www.sikatrocal.co.uk for datasheet.

Use Information

Installation works must be carried out only by Sika instructed contractors for roofing and according to the valid installation instructions of manufacturer for Sika-Trocal S - types for mechanically fastened roofs.

© BRE Global Ltd, 2017

Reference Service Life

The reference service life of Sika-Trocal S is at least 35 years. According to Agrément Certificate 09/4668 all available evidence indicates that under normal service conditions the products will provide durable waterproof coverings with a service life in excess of 35 years

End of Life

The membrane can be recycled, or disposed of in incinerator or landfill. As shown in the "Scenarios and Additional Technical Information", for this EPD an incineration scenario was taken.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 m^2 of Sika-Trocal S roof waterproofing sheet (reinforced PVC membrane) for a reference service life of 35 years.

System boundary

In accordance with the modular approach as defined in EN 15804, this cradle to gate with options EPD includes the product stage (A1-A3), construction process stage (A4-A5), and end-of-life stage (C1-C4).

Data sources, quality and allocation

The primary data provided by Sika derive from the plant at Troisdorf, Germany for 2014. Background LCI datasets are taken from the databases of GaBi software and ecoinvent Version 2.2. All datasets are less than 10 years old. Production waste that was reclaimed and reused internally was simulated as closed-loop recycling in Modules A1-A3. Benefits from incineration of product and for the disposal of packaging are credited in Module D; this also applies to the reuse of wooden pallets.

Cut-off criteria

All data was taken into consideration (recipe constituents, thermal energy used, electricity used). Transportation was considered for all inputs and outputs. The manufacturing of the production machines and systems and associated infrastructure were not taken into account in the LCA.

© BRE Global Ltd, 2017

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO_2 equiv.	kg CFC 11 equiv.	kg SO_2 equiv.	kg $(PO_4)^{3-}$ equiv.	kg C_2H_4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	5.33	7.12E-08	0.0158	0.00217	0.00301	0.00927	125
Construction process stage	Transport	A4	0.106	2.55E-13	0.000387	8.88E-05	4.60E-05	5.00E-09	1.45
	Construction	A5	0.779	7.12E-09	0.00183	0.000239	0.000313	0.000927	13.00
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transport	C2	MND	MND	MND	MND	MND	MND	MND
	Waste processing	C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Disposal	C4	5.25	2.98E-11	0.0073	0.000245	0.000182	2.21E-06	11.9
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.4	-2.19E-09	-0.0031	-0.00032	-2.64E-04	-3.86E-07	-24.1

GWP = Global Warming Potential;
ODP = Ozone Depletion Potential;
AP = Acidification Potential for Soil and Water;
EP = Eutrophication Potential;

POCP = Formation potential of tropospheric Ozone;
ADPE = Abiotic Depletion Potential – Elements;
ADPF = Abiotic Depletion Potential – Fossil Fuels;

© BRE Global Ltd, 2017

LCA Results (continued)

Parameters describing resource use, primary energy			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	6.52	3.01	9.52	95.9	40.4	136
Construction process stage	Transport	A4	0.00	0.00	0.0865	0.00	0.00	1.45
	Construction	A5	0.652	0.301	1.03	9.59	3.62	17.00
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00	0.00	0.00	0.00	0.00	0.00
	Transport	C2	MND	MND	MND	MND	MND	MND
	Waste processing	C3	0.00	0.00	0.00	0.00	0.00	0.00
	Disposal	C4	0.00	0.00	0.717	0.00	0.00	12.8
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00	0.00	-3.09	0.00	0.00	-26.8

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

© BRE Global Ltd, 2017

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00	0.00	0.00	0.00298
Construction process stage	Transport	A4	0.00	0.00	0.00	5.59E-05
	Construction	A5	0.00	0.00	0.00	0.000871
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00	0.00	0.00	0.00
	Transport	C2	MND	MND	MND	MND
	Waste processing	C3	0.00	0.00	0.00	0.00
	Disposal	C4	0.00	0.00	0.00	0.00955
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00	0.00	0.00	-0.00297

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

© BRE Global Ltd, 2017

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00538	0.263	0.00355
Construction process stage	Transport	A4	6.46E-06	0.000278	2.03E-06
	Construction	A5	0.000572	0.0938	0.000404
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00	0.00	0.00
	Transport	C2	MND	MND	MND
	Waste processing	C3	0.00	0.00	0.00
	Disposal	C4	0.000862	3.24	0.000367
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-0.00109	-0.00527	-0.00105

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

© BRE Global Ltd, 2017

LCA Results (continued)

Other environmental information describing output flows – at end of life			CRU	MFR	MER	EE
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00	0.00	0.00	0.00
Construction process stage	Transport	A4	0.00	0.00	0.00	0.00
	Construction	A5	0.00	0.00	0.00	0.699
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00	0.00	0.00	0.00
	Transport	C2	MND	MND	MND	MND
	Waste processing	C3	0.00	0.00	0.00	0.00
	Disposal	C4	INA	INA	INA	17.2
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00	0.00	0.00	0.00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

© BRE Global Ltd, 2017

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	Fuel consumption / Vehicle type (truck)	litres/km	NA
	Distance	km	915.000
	Capacity utilisation (incl. empty returns)	%	85
	Bulk density of transported products	kg/m^3	1266.670
A5 – Installation in the building	Ancillary materials for installation - Overlap	%	8
	Energy Use – Welding energy	kWh/m^2	0.016
	Waste materials from installation wastage – Installation losses	%	2
C1 – End of life deconstruction	Assumed no demolition impacts	NA	0
C3 – End of life waste processing	No information required as 100% of product goes to incineration.		
C4 – End of life disposal	Quantity of waste for disposal – membrane incineration	%	100
D – Reuse/Recovery/Recycling Potential	The benefits from incineration of product and waste are credited in Module D, since in modern incineration plants the energy of combustion is used to produce electricity and thermal energy.		

© BRE Global Ltd, 2017

Summary, comments and additional information

Interpretation

The displayed results apply to Sikaplan S 1.5. To calculate results for other thicknesses, please use this formula:
Ix = ((x-0.11)/1.39)I1.5
[Ix = the unknown parameter value for Sikaplan S products with a thickness of "x" mm (e.g. 2.0 mm)]

The following chart shows the relative contributions of the different modules to the various environmental impact categories and to primary energy use in a dominance analysis. It is clear that most impacts come from Module A1-3, though the incineration of the membrane (C4) also contributes, especially for AP and GWP, due to its greenhouse gas emissions. For this reason, the Product Stage is examined more closely in the following interpretation.

Energy resource use
Pre-product manufacturing (51%), packaging (40%) and the manufacturing process (8%) account for the total of the use of renewable primary energy resources (PERT). The manufacturing of raw materials (96%) has the greatest impact on the use of non-renewable primary energy resources (PENRT), while the impact of the production process (due to electricity consumption) measures 3%.

Environmental impacts
The dominant influence in all impact categories for Module A1-A3 comes from pre-product manufacturing (at least 92% in each case). Within pre-product manufacturing, polymers play an important role regarding Global Warming Potential (GWP), Acidification Potential for Soil and Water (AP), Eutrophication Potential (EP), Photochemical Ozone Creation Potential (POCP) and Abiotic Depletion Potential - Fossil Fuels (ADPF). The plasticiser has significant impact on Ozone Depletion Potential (ODP), and also on GWP, AP, EP, POCP and ADPF. In addition, the stabilisers impact the EP, while pigments contribute mostly to AP. The fire retardant impacts on Abiotic Depletion Potential - Elements (ADPE) , as well as to AP, and the impacts from fillers are negligible.

The raw materials with the greatest effect on the impacts also show the greatest percentage by mass of the waterproofing membrane: polymers and plasticiser. The manufacturing process (due to electricity use) contributes mostly to AP (3.3 %) and GWP (5.7%).

© BRE Global Ltd, 2017

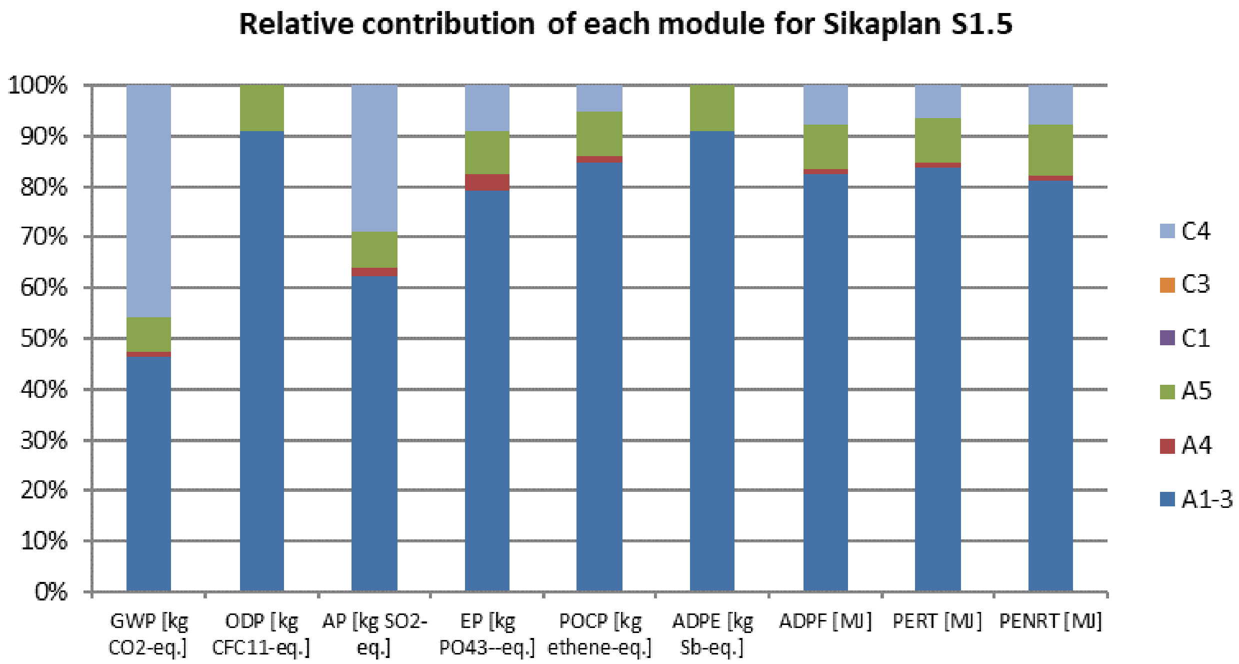


Figure 1

References

BRE Global. BRE Environmental Profiles 2013: Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013. PN 514. Watford, BRE, 2014.

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A1:2013. London, BSI, 2013.

BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

BSI. Environmental management – Life cycle assessment – Principles and framework. BS EN ISO 14040:2006. London, BSI, 2006.

BSI. Environmental management – Life cycle assessment – requirements and guidelines. BS EN ISO 14044:2006. London, BSI, 2006.

PE INTERNATIONAL AG; GaBi 6: Software-System and Databases for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2014.

ecoinvent Version 2.2: Database for Life Cycle Assessment. Swiss Centre for Life Cycle Inventories (ecoinvent Centre), 2010.

BBA (British Board of Agrément). Agrément Certificate 09/4668 Product Sheet 1. Sika Roof Waterproofing Membranes: Sika-Trocal S and SG mechanically fastened membranes, October 2014.

© BRE Global Ltd, 2017