ENVIRONMENTAL PRODUCT DECLARATION

in compliance with ISO 14025 and EN 15804

Owner of the Declaration	**Paul Bauder GmbH & Co. KG**
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Program Holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration Number	EPD-BAU-20130188-IBCC-EN
Date of Issue	26 September 2013
Valid until	25 September 2018

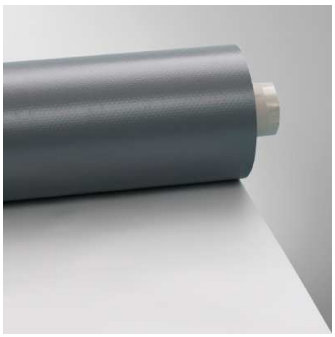
PVC-P Roofing and Waterproofing Membranes

BauderTHERMOFOL U
BauderTHERMOFOL M

Paul Bauder GmbH & Co. KG

Institut Bauen und Umwelt e.V.

www.bau-umwelt.com



1. General Information

Paul Bauder GmbH & Co. KG

Program Holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
D-10178 Berlin

Declaration Number
EPD-BAU-20130188-IBCC-DE

This declaration is based on the product category rules:
Roofing and Waterproofing Membrane Systems of synthetic material and elastomer, 10-2012
(PCR tested and approved by the independent committee of experts)

Issue Date
26 September 2013

Valid to
25 September 2018

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Prof. Dr.-Ing. Hans-Wolf Reinhardt
(SVA Chairman)

PVC-P Roofing and Waterproofing Membranes THERMOFOL U and M

Owner of the Declaration
Paul Bauder GmbH & Co. KG
Korntaler Landstraße 63
D-70499 Stuttgart

Declared Product / Declared Unit
The declared unit is one square meter (1 m²) of the mechanically fastened or ballasted, hot-air welded THERMOFOL PVC-P roofing and waterproofing membranes, including packaging materials.

Scope:
This document applies to the PVC-P roofing and waterproofing membranes:

- BauderTHERMOFOL U (12/15/18/20/24),
- BauderTHERMOFOL U (15/18/20) V
- BauderTHERMOFOL M (12/15/18/20)

manufactured in the German BAUDER production facilities in Bernsdorf (Data basis 2012).
The Declaration Holder is liable for the underlying data and supporting evidence for this document.

Verification

The CEN Norm EN 15804 serves as core PCR.
Verification of EPD by an objective third party in compliance with ISO 14025
☐ intern ☒ extern

Matthias Schulz
(Independent auditor contracted bySVA)

2. Product

2.1 Product description

BauderTHERMOFOL is PVC-P roofing and waterproofing membranes with a reinforcing insert of synthetic fibers. The product palette is divided into the following variants:

- ***BauderTHERMOFOL U (12/15/18/20/24)***
  core polyester reinforcement
- ***BauderTHERMOFOL U (15/18/20) V***
  core polyester reinforcement, backed with special fleece
- ***BauderTHERMOFOL M (12/15/18/20)***
  core polyester reinforcement

The reported results declare an average for all THERMOFOL products. The average is based on the relevant production quantity (in terms of produced surface area) for the calendar year 2012.

2.2 Application

The PVC-P roofing and waterproofing membranes are installed in a single layer (single-ply) and the seams sealed by hot-air welding. Mechanical fastening, ballast or bonding is used to safeguard against wind suction.

Roofing Seal
Single-ply seal for used and unused areas of flat and pitched roofs

Waterproofing of buildings – Single-ply seal of non-watertight buildings and components against non-pressing water on floors.
BauderTHERMOFOL roofing and waterproofing membranes are installed depending on requirements:

- mechanically fastened,
- ballasted or
- bonded.

2.3 Technical Data

BauderTHERMOFOL U

Parameter	Testing Method	Unit	Requirement
Watertightness for Type B	DIN EN 1928 Method B	kPa / 72h	passed
Peel resistance of joint	DIN EN 12316-2	N / 50 mm	≥ 200
Shear resistance of joint	DIN EN 12317-2	N / 50 mm	≥ 600, demolition outside the joints
Maximum tensile force	DIN EN 12311-2 A	N / 50 mm	longitudinal: ≥ 1000 transverse: ≥ 1000
Elongation at max.	DIN EN	%	longitudinal:

Parameter	Testing Method	Unit	Requirement
tensile force	12311-2 A		≥ 19 transverse: ≥ 19
Tear propagation resistance	DIN EN 12310-2	N	> 200
Root resistance	DIN EN 13948/FLL	-	FLL fulfilled
Dimensional stability	DIN EN 1107-2	%	< 0,3
Cold seaming	DIN EN 495-5	°C	< - 30
UV radiation (1000 h)	DIN EN 1297	-	fulfilled > 1000 h
Vapor permeance µ	DIN EN 1931	-	about 20.000
Durability of watertightness with regard to ageing	DIN EN 1296 as per DIN EN 1928	-	passed
Durability of watertightness when exposed to liquid chemicals	DIN EN 1847 as per DIN EN 1928	-	passed
Durability when exposed to alkali	DIN EN 14909, C	-	passed

BauderTHERMOFOL M

Parameter	Testing Method	Unit	Requirement
Watertightness for Type B	DIN EN 1928 Method B	kPa / 72h	passed
Peel resistance of joint	DIN EN 12316-2	N / 50 mm	≥ 200
Shear resistance of joint	DIN EN 12317-2	N / 50 mm	≥ 600, demolition outside the joints
Maximum tensile force	DIN EN 12311-2 A	N / 50 mm	longitudinal: ≥ 1000 transverse: ≥ 1000
Elongation at max. tensile force	DIN EN 12311-2 A	%	longitudinal: ≥ 19 transverse: ≥ 19
Tear propagation resistance	DIN EN 12310-2	N	> 200
Dimensional stability	DIN EN 1107-2	%	< 0,3
Cold seaming	DIN EN 495-5	°C	< - 30
UV radiation (1000 h)	DIN EN 1297	-	fulfilled > 1000 h
Vapor permeance µ	DIN EN 1931	-	about 20.000

2.4 Placing in the market / Application rules

Regulation EU Nr. 305/2011 for the marketing of construction products applies. The products require a performance declaration that takes into consideration harmonized specifications and CE marking.

National regulations apply for the use of the products.

Roofing membranes

in compliance with DIN EN 13956 and usage standard DIN V 20000-201:

- BauderTHERMOFOL U 12/15/18/20/24
  DE/E1 PVC-P-NB-V-PG-1.2 (1.5/1.8/2.0/2.4)
- BauderTHERMOFOL U 15/18/20 V
  DE/E1 PVC-P-NB-V-PG-K-KV-1,5 (1.8/2.0)
- BauderTHERMOFOL M 12/15/18/20
  DE/E1 PVC-P-NB-V-PG-1.2 (1.5/1.8/2.0)

Waterproofing membranes

in compliance with /DIN EN 13967/ and usage standard /DIN V 20000-202/:

- BauderTHERMOFOL U 12/15/18/20/24
  BA PVC-P-NB-V-PG-1.2 (1.5/1.8/2.0/2.4)
- BauderTHERMOFOL U 15/18/20 V
  BA PVC-P-NB-V-PG-K-KV-1,5 (1.8/2.0)

2.5 Delivery status

The PVC-P roofing and waterproofing membranes are rolled around cardboard sleeves, covered with shrink-wrap film and delivered on a disposable pallet from the factory. THERMOFOL variants have the following dimensions:

THERMOFOL	Length [m]	Width [m]	Thickness [mm]	Color
U12	20	1.5	1.2	light gray
U15	20	1.5	1.5	light gray
U18	20	1.5	1.8	light gray
U20	20	1.5	2.0	light gray
U24	15	1.5	2.4	light gray
U15V	20	1.5	1.5+fleece	light gray
U18V	20	1.8	1.8+fleece	light gray
U20V	15	2.0	2.0+fleece	light gray
M12	25	1.5	1.2	light gray
M15	20	1.5	1.5	light gray
M18	20	1.5	1.8	light gray
M20	20	1.5	2.0	light gray
U pre-cut strips	20	0.2 - 1.0	1.2 - 2.0	light gray
M pre-cut strips	20	0.2 - 1.0	1.2 - 2.0	light gray

Other colors – anthracite, slate blue and brick red – are available upon request.

2.6 Base materials / Ancillary materials

Material	Elements	Proportion (Mass %)
PVC	Basic polymer / generated by suspension polymerization of vinyl chloride (synthesis)	45 - 55 %
Plasticizer	Derivative of phthalic acid to make basic polymer flexible / generated by esterification with branched-chain C-10 alcohols (synthesis)	30 - 40 %
Stabilizers	Calcium and zinc compounds for thermal protection of basic polymer / generated by synthesis	1 - 2 %
Additive	Acrylate-based polymer compounds as processing aids / generated by polymerization (synthesis)	1 - 5 %
Flame retardant	Oxide compound of a metalloid to reduce combustibility / generated by synthesis (retting process)	1 - 2 %
Finish / color	Oxide compound of titan as white pigment and UV protection plus inorganic pigments / generated by synthesis	1 - 4 %
Recycled material	Edge trimming; waste / generated from semi-finished and finished goods	0 - 6 %

2.7 Manufacture

A two-stage process is used in the manufacture of PVC-P roofing and waterproofing membranes.

In the first stage the raw materials are mixed together and plasticized onto an extruder. The synthetic material is then rolled out in sheets on a calender.

In the second stage a polyester reinforcing insert is added to the sheets. Part of the PVC-P roofing and waterproofing membranes is backed with a special fleece.

Once the sheets have cooled, they are trimmed and packed.

All incurred production waste is recycled in-house and reintroduced directly into the manufacturing process.
Use of a quality management system in compliance with DIN EN ISO 9001 guarantees permanent measurement of product quality and continuous improvement of internal processes.

2.8 Environment and health during manufacturing

The Maximum Allowable Concentration (MAC) during production is regularly monitored and maintained. In addition to the general industrial safety standards, preventive measures are offered and implemented.
National and factory-specific requirements for environmental protection are observed during the manufacturing process. Water used to cool the product is recirculated in order to achieve optimal use of raw material.

2.9 Product processing / Installation

PVC-P roofing and waterproofing membranes can be installed in the following ways:

- ***Loosely laid, mechanically fastened***

The products are loosely laid and then mechanically fastened with approved fastening elements at the edges or on the open field area. The seams (membrane overlaps) and trim are hot-air welded.

- ***Loosely laid, ballasted***

The products are loosely laid and then secured with ballast of vegetation (green roof), gravel or paving. Seams are sealed with hot-air welding.

- ***Bonded***

The fleece-backed products are partially or fully bonded with 1-K-PU adhesive to the substrate. The seams (membrane overlaps) and trim are hot-air welded.

In all types of installation the relevant standards and guidelines (e.g., DIN 18531, DIN 18195 and technical guidelines of the German Roofing Industry – flat roof guidelines) and installation instructions and manufacturer's information are to be observed.

Remnants from PVC-P roofing and waterproofing membranes can be reused or disposed of as mixed building and demolition waste (waste disposal code 17 09 04 as per List of Wastes Ordinance (AVV).

2.10 Packaging

The PVC-P roofing and waterproofing membranes are rolled on cardboard sleeves and packed on wooden pallets. The load is secured by PP-straps and PE shrink-wrap hoods. All packaging materials are recyclable.
Single-variety collections are taken back and recycled by INTERSEROH (INTERSEROH certificate 27113).

2.11 Condition of use

A partial migration of the plasticizer occurs during the period of use. Consequently, the PVC-P roofing and waterproofing membranes gradually harden.

2.12 Environmental and health during use

During use the PVC-P roofing and waterproofing membranes have no negative impact on the environment or the health of the user.

2.13 Reference service life

The service life depends on the thickness of the roofing and waterproofing membrane and the utilized surface protection (gravel, vegetation).

The expected service life of properly installed BauderTHERMOFOL U20 is more than 30 years.

2.14 Extraordinary Effects

Fire

Parameter	Test Method	Requirement
Exposure to external fire	DIN V ENV 1187	passed*
Reaction to fire	DIN EN ISO 11925-2	Class E as per DIN EN 13501-1

* In defined roof structures

Fire Protection

Designation	Value
Building material class	E
Burning droplets	-
Toxic gas development	-

Water

When properly used, the declared PVC-P roofing and waterproofing membranes are water insoluble and water resistant. Watertightness is tested for compliance with DIN EN 1928.

Mechanical destruction

No environmentally harmful products and no hazardous waste are generated by the destruction of PVC-P roofing and waterproofing membranes.

2.15 Re-use phase

PVC-P roofing and waterproofing membranes are dismantled and recycled at the end of their useful life.
Loosely laid roof structures are suitable for single-variety dismantling. Adhesive residue and fleece particles are unavoidable with bonded roof structures.
Once the membranes have been thoroughly cleaned, the materials can be separated and crushed for recycling. Then used plastics can be returned to the material cycle.

Thermal recycling is an option at the end of the product's service life. The energy contained in the declared product can be recovered through the use of an incinerator.

2.16 Disposal

A list of waste disposal codes as per the European Waste Catalogue and List of Wastes Ordinance for the individual product components follows.

Packaging

INTERSEHROH AG handles disposal of packaging materials. The packaging components that accrue during installation in a building have the following waste disposal codes:

- EAK 15 01 01: Paper and cardboard packaging
- EAK 15 01 02: Plastic packaging
- EAK 15 01 03: Wooden packaging

End of Life

The product has the following waste disposal code at the end of its life:

- EAK 17 09 04: Mixed building and demolition waste, except for those with the codes 17 09 01, 17 09 02 and 17 09 03.

Recycling is generally preferred over disposal (incineration).

2.17 Further information

Contact information is on the back page of this declaration. Additional product information is available as an online download. Product-specific BAUDER accessories also are available online at www.bauder.de.

3. LCA: Calculation Rules

3.1 Declared Unit

The declared unit is the average for one square meter (1 m2) of the mechanically fastened or ballasted, hot-air welded THERMOFOL roofing membrane variants U (12/15/18/20/24), U (15/18/20) V and M (12/15/18/20), including packaging materials.

Description	Value	Unit
Declared unit	1	m²
Surface weight	1.938	kg/m²
Conversion factor to 1 kg	0.516	m²/kg

3.2 System boundary

Type of EPD: Cradle to Gate (with options).

In accordance with EN 15804, the modules A1-5, C2-4 and D were used. The following points were taken into account for the LCA:

Module A1-3

All upstream chains of utilized raw materials and materials and their procurement transport. Production processes including energy and waste flows (Cradle to Gate). Incurred wastes are accounted for up till End of Waste status.

Module A4-5

Transportation to the building site and average installation expenditure (hot air welding and accrued scrap). Recycling of packaging materials. Fastening material is not part of the examined product system. Refer to separate EPDs for the products and materials (metal/plastic) used.

Module C2

Transportation to waste management at End of Life.

Module C3

Recycling of product, including pre-processing.

Module C4

Thermal recycling (incineration) to reduce waste volume for disposal.

Module D

Credits from waste treatment in Modules A5, C3 and C4.

3.3 Estimates and assumptions

No estimates or assumptions were made that are relevant for the interpretation of LCA results.

3.4 Cut-off criteria

All incoming material and energy flows without exception were taken into consideration. Therefore, it may be assumed that the portion of neglected results from impact categories does not exceed 5%.

3.5 Background data

Modeling of the life cycle utilized the current version of the GaBi (GaBi 6) software system for Life Cycle Assessment. All background data records were retrieved from the GaBi database and the ecoinvent database (Version 2.2).

3.6 Data quality

The background data records from the GaBi database were from the reference year 2010 and the utilized ecoinvent data records were from 1995 to 2003. Some data records therefore were older than 10 years, but are still considered the most suitable available data for modeling the examined product system. Based on past experience, the ecoinvent data records in general are considered conservative.

Data for the examined product were captured by means of analyses of internal production and environmental data and of LCA-relevant data within the supply chain. The collected data were checked for plausibility and consistency, allowing for the assumption of a good representative sample.

3.7 Period under review

Data were collected during the analysis period from 1 January 2012 to 31 December 2012.

3.8 Allocation

The material input and output flows were captured on the basis of corresponding production quantities. The energy input and output flows based on total quantities from 2012 were taken into account and allocated according to measured consumption in production.

The credits from Modules A5 and C3 are shown in Module D-1 and credits from Modules A5 and C4 in Module D-2.

3.9 Comparability

A comparison or assessment of EPD data is possible only when all data records are created according to DIN EN 15804 and the building context or the product-specific performance characteristics are taken into consideration.

4. LCA: Scenarios and Additional Technical Information

Transport to the construction site (A4)

Transport means	Truck 17.3 tons load capacity, Euro 3
Transport distance	686 km
Utilization (including empty trips)	85 %

The transport distance was modeled on average distance to customer base. European data records were used for the European distribution channels.

Installation in the building (A5)

Installation expenditure:

Energy for hot air welding	0.0206 kWh/m²
Material loss during installation	1%

Energy consumption for hot air is measured; information about material loss is based on experience. Other information is not relevant to the installation.

Disposal transport:

Transport means:	Truck 17.3 tons load capacity, Euro 3
Transport distance:	75 km
Utilization (including empty trips)	85 %

Data records representing a European average are used.

Reference service life

Reference Service Life	25 years

Transport to disposal (C2)

Transport means	: Truck 17.3 tons load capacity, Euro 3

Scenario 1:

Transport distance (C3)	250 km

Scenario 2:

Transport distance (C4)	75 km
Utilization (including empty trips)	85 %

Distance modeling took into account the availability of waste management companies for Scenario 1 and 2 based on estimated values. Data records representing a European average are used.

End-of-Life stages (C3-C4)

Scenario 1:

Recycling (C3)	100 %

Scenario 2:

Energy recovery (C4)	100 %

For the modeling of End of Life (EoL), each scenario was calculated at 100%, but each may also be expressed proportionally (e.g., Scenario 1 = 30% / Scenario 2 = 70%).
The processes in EoL were modeled with data records representing a European average. Intra-Europe transport and recovery rates were taken into account.

Re-Use, recovery and recycling potential (D)

Module D shows credits for the product's energy recovery in EoL (resulting from Modules C3 and C4) and for packaging materials (resulting from Module A5). To allow for separate views of the EoL scenarios, figures are shown in the Modules D-1 (credits from Scenario 1) and D-2 (credits from Scenario 2).

5. LCA: Results

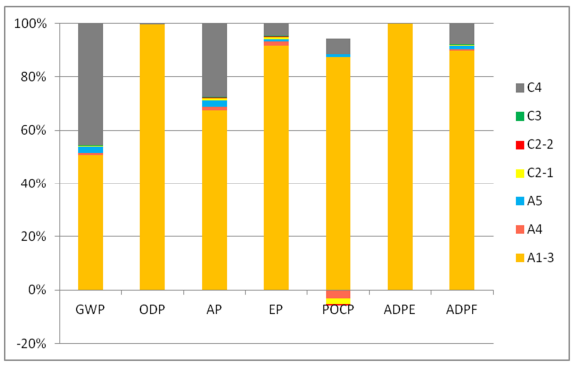
Raw material supply	Transport	Manufac-turing	Transport from gate to site	Assembly	Use	Mainte-nance	Repair	Replace-ment	Refurbish-ment	Operation-al energy use	Operation-al water use	De-con-struction / demolition	Transport	Waste processing	Disposal	Re-use, recovery, recycling potential
A1	**A2**	**A3**	**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	X	X	X	X

Parameter	Unit	A1-3	A4	A5	C2-1	C2-2	C3	C4	D-1	D-2
LCA RESLTS: ENVIRONMENTAL IMPACT: 1 m² BauderTHERMOFOL U (12/15/18/20/24), U (15/18/20) V and M (12/15/18/20)										
Global Warming Potential (GWP)	[kg CO_2 equiv.]	5.04E+00	6.31E-02	2.47E-01	2.37E-02	8.26E-03	1.28E-02	4.51E+00	-3.44E+00	-1.28E+00
Depletion potential of the stratospheric ozone layer (ODP)	[kg CFC11 equiv.]	7.25E-08	1.10E-12	9.36E-11	4.14E-13	1.44E-13	1.15E-11	2.69E-10	-1.25E-09	-1.68E-11
Acidification potential of land and water (AP)	[kg SO_2 equiv.]	1.51E-02	2.86E-04	5.53E-04	1.52E-04	5.32E-05	6.05E-05	6.16E-03	-6.81E-03	-1.21E-03
Eutrophication Potential (EP)	[kg PO_4^{3-} equiv.]	3.72E-03	6.59E-05	2.98E-05	3.65E-05	1.28E-05	3.19E-06	1.94E-04	-7.97E-04	-1.45E-04
Formation potential of tropospheric ozone photochemical oxidants (POCP)	[kg ethylene equiv.]	2.65E-03	-9.38E-05	3.12E-05	-6.19E-05	-2.16E-05	3.56E-06	1.73E-04	-2.29E-03	-1.62E-04
Abiotic Depletion Potential for non fossil resources (ADPE)	[kg Sb equiv.]	9.47E-04	2.35E-09	3.52E-08	8.83E-10	3.08E-10	1.76E-09	1.90E-06	-1.41E-05	-6.01E-08
Abiotic Depletion Potential for fossil resources (ADPF)	[MJ]	1.26E+02	8.74E-01	1.91E+00	3.28E-01	1.14E-01	2.25E-01	1.11E+01	-8.83E+01	-2.09E+01
LCA RESULTS: RESOURCE UTILIZATION: 1 m² BauderTHERMOFOL U (12/15/18/20/24). U (15/18/20) V and M (12/15/18/20)										
Renewable primary energy as energy carrier (PERE)	[MJ]	5.89E+00	3.43E-02	3.00E-01	1.29E-02	4.49E-03	3.75E-02	5.63E-01	-3.42E+00	-6.02E-02
Renewable primary energy resources as material utilization (PERM)	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (PERT)	*[MJ]*	*5.89E+00*	*9.09E-01*	*2.21E+00*	*3.41E-01*	*1.19E-01*	*2.63E-01*	*1.16E+01*	*-9.17E+01*	*-2.10E+01*
Non renewable primary energy as energy carrier (PENRE)	[MJ]	1.26E+02	8.74E-01	1.91E+00	3.28E-01	1.14E-01	2.25E-01	1.11E+01	-8.83E+01	-2.09E+01
Non renewable primary energy as material utilization (PENRM)	[MJ]	2.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non renewable primary energy resources *(PENRT)*	*[MJ]*	*2.00E-04*	*0.00E+00*	*0.00E+00*	*0.00E+00*	*0.00E+00*	*0.00E+00*	*0.00E+00*	*0.00E+00*	*0.00E+00*
Use of secondary material (SM)	[kg]	8.05E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non renewable secondary fuels (NRSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	[m³]	-	-	-	-	-	-	-	-	-
LCA RESULTS: OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² BauderTHERMOFOL U (12/15/18/20/24). U (15/18/20) V and M (12/15/18/20)										
Hazardous Waste Disposed (HWD)	[kg]	-	-	-	-	-	-	-	-	-
Non-Hazardous Waste Disposed (NHWD)	[kg]	-	-	-	-	-	-	-	-	-
Radioactive Waste Disposed (RWD)	[kg]	-	-	-	-	-	-	-	-	-
Components for Re-Use (CRU)	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials For Recycling (MFR)	[kg]	8.05E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E+00	0.00E+00	0.00E+00	0.00E+00
Materials for Energy Recovery (MER)	[kg]	1.47E-02	0.00E+00	7.92E-02	0.00E+00	0.00E+00	0.00E+00	1.86E+00	0.00E+00	0.00E+00
Exported Electrical Energy (EEE)	[MJ]	3.29E-02	0.00E+00	1.64E-01	0.00E+00	0.00E+00	0.00E+00	4.09E+00	0.00E+00	0.00E+00
Exported Thermal Energy (ETE)	[MJ]	8.08E-02	0.00E+00	4.60E-01	0.00E+00	0.00E+00	0.00E+00	1.15E+01	0.00E+00	0.00E+00

6. LCA: Interpretation

Results from Module D are not included in the interpretation because they involve expenditures and credits related to a downstream product system.

Environmental Impact



Module A1-3 has a dominant influence on every environmental impact. In terms of the Carbon Footprint (GWP) the PCV compound created for the product is primarily responsible for emission potential with a share of about 80%. The PVC granules with 40% and plasticizers with 25% follow. Energy use for production is about 10% and the reinforcing inserts and fleece backing make up about 5% of the total GWP share for Module A1-3. Transportation to the customer is not of great environmental relevance (**A4**). Product installation at the building site (**A5**), for which packaging materials are used and power is consumed for hot-air welding, makes a small but notable contribution to the impact.

Disposal transportation (**C2-1 / C-2**) has hardly any effect on the result. The recycling of the product at EoL likewise has hardly any environmental impact (**C3**), while the disposal of the product and associated emissions from the incinerator (**C4**) make a significantly high contribution (about 40%) to the total.

Resource Utilization

Primary Energy

The use of non-renewable resources dominates Module **A1-3**. Energy use is attributed mostly to the PVC compound with 80%. PVC granules with 40% and plasticizer with about 25% follow. The calendering and backing of the PVC-P roofing and waterproofing membranes are responsible for a share of 15% (including electricity and reinforcing inserts).

The product installation (**A5**), for which an incinerator route was modelled and the energy use for sealing the roofing and waterproofing membranes was measured, accounted for <1%.

Although energy use in the recycling route (**C3**) is barely perceptible (<0.5%). the energy use for the incinerator route (**C4**) has a notable effect on the result. Here the PVC is a major energy source in that it is used as fuel for the energy-recovering incineration of waste (credits reported in Module D).
Transportation (**A4, C2-1** and **C2-2**) at 1% represents only a small portion of the total results.

Water Use

*N/A**

Waste Categories

*N/A**

** According to the SVA decision of 4 October 2012. no statement can be made regarding Water and Waste Indicators if non-EN15804-compliant data records exceed 3% of records. Because data records to that extent were used in the analyzed product system, unintended misinterpretations ought to be precluded by non-disclosure of results.*

7. Requisite Evidence

No evidence required.

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