ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	**Sika Deutschland GmbH**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SIK-20190172-IBA1-EN
ECO EPD Ref. No.	ECO-00001187
Issue date	24.04.2020
Valid to	23.04.2025

Sarnafil® TS 77
Sika Deutschland GmbH

Institut Bauen und Umwelt e.V.

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ECO PLATFORM EPD
EN 15804 VERIFIED

1. General Information

Sika Deutschland GmbH	Sarnafil® TS 77
Programme holder IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** Sika Deutschland GmbH Kornwestheimer Straße 103-107 70439 Stuttgart Germany
Declaration number EPD-SIK-20190172-IBA1-EN	**Declared product / declared unit** 1 m^2 Sarnafil® TS 77 polymeric waterproofing membrane
This declaration is based on the product category rules: Plastic and elastomer roofing and sealing sheet systems, 07.2014 (PCR checked and approved by the SVR)	**Scope:** This document applies to Sarnafil® TS 77 polymeric waterproofing membrane in thicknesses of 1.5, 1.8, 2.0 and 2.5 mm manufactured by Sika Services AG in CH-6060 Sarnen (Switzerland). The EPD covers the production of the waterproofing membrane, transport of the product to the construction site, installation of the waterproofing membrane, disposal, as well as benefits and loads outside the system limits. The model was calculated on the basis of production data for the thickness 2.0 mm provided by Sika Services AG from the year 2018. 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*.
Issue date 24.04.2020	
Valid to 23.04.2025	
	Verification The standard *EN 15804* serves as the core PCR Independent verification of the declaration and data according to *ISO 14025:2010* ☐ internally ☒ externally
Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)	
Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))	Juliane Franze (Independent verifier)

2. Product

2.1 Information about the enterprise
This chapter should give information about the company.

2.2 Product description/Product definition
Sarnafil® TS 77 polymeric waterproofing membrane is made of flexible polyolefin (FPO) and is treated with flame retardant and stabilizers against UV radiation. An inlay of glass non-woven and polyester reinforcement is encapsulated within the sheet. Sarnafil® TS 77 polymeric waterproofing membrane is available in the following thicknesses: 1.5 mm (TS 77-15), 1.8 mm (TS 77-18), 2.0 mm (TS 77-20), and 2.5 mm (TS 77-25).

For th e placement on the market of the product in the EU/EFTA (with the exception of Switzerland) is subject to *Regulation (EU) No. 305/2011* (CPR). The product requires a Declaration of Performance in accordance with *EN 13956:2012*, Flexible sheets for waterproofing, and the CE marking. Application is subject to the respective national provisions, in Germany the Application Standard *DIN SPEC 20000-201*.

2.3 Application
Sarnafil® TS 77 polymeric waterproofing membrane is used chiefly to seal flat roofs. The roofing sheets can be loose laid and mechanically fastened to roofs with a slope of up to 20°. Application on roofs with gravel ballast or in green roof systems is also possible.

2.4 Technical Data

Building material data

Name	Value	Unit
Waterproof as per EN 1928	passed	-
Tensile strain performance as per EN 12311-2	≥ 13	%
Peel resistance of the seam joint as per EN 12316-2	≥ 300	N/50mm
Shear resistance of the seam joint as per EN 12317-2	≥ 500	N/50mm
Shear resistance of joint as per EN 12317-2; DIN SPEC 20000-201	Tear outside joint	-
Tear propagation resistance as per EN 12310-2	≥ 300	N
Artificial ageing as per EN 1297	passed (>5,000 hrs.)	-
Dimensional stability as per EN 1107-2	≤ 0.2 to≤ 0.1	%
Folding in the cold as per EN 495-5	≤ -35 to ≤ -40	°C
Bitumen compatibility as per EN 1548	passed	-
Resistance to root penetration (for green roofs) as per EN 13948 or FLL method	FLL passed	-

Performance data of the product in accordance with the Declaration of Performance with respect to its essential characteristics in accordance with *EN 13956:2012*, Flexible sheets for waterproofing.

2.5 Delivery status

The product is delivered in various sizes, depending on the material thickness, on pallets:

- Sarnafil® TS 77-15: 20 m x 1 m, 40 m x 1 m or 20 m x 2 m
- Sarnafil® TS 77-18: 20 m x 1 m, 30 m x 1 m or 15 m x 2 m
- Sarnafil® TS 77-20: 30 m x 1 m or 15 m x 2 m
- Sarnafil® TS 77-25: 10 m x 2 m

2.6 Base materials/Ancillary materials

The raw materials and additives of Sarnafil® TS 77 polymeric waterproofing membrane can be given as follows:

- Thermoplastic polyolefins: 50 – 70 %
- Stabilizers (UV/heat): 0 – 1 %
- Flame retardant (inorganic): 20 – 30 %
- Carrier material (glass nonwoven/polyester): 3 – 6 %
- Pigment: 0 – 5 %

The product/material/at least one sub-product contains substances on the *Candidate List* (date 03.12.2018) exceeding 0.1 mass-%: no

The product/material/at least one sub-product contains further CMR substances (cancerogenic mutagenic reprotoxic) of Category 1A or 1B that do not appear on the *Candidate List* in excess of 0.1 mass-% in at least one sub-product: no

Biocidal products have been added to the presented construction product or the product has been treated with biocidal products (the product is a treated product as defined by *Biocidal Products Regulation (EU) No. 528/2012)*: no

2.7 Manufacture

Sarnafil® TS 77 polymeric waterproofing sheets are manufactured on production lines developed in-house in the following stages:

- Melting of the polymeric components and additives in extruders
- Dispersing of the molten materials
- Coating of the carrier or the reinforcing in layers, producing homogenous encapsulation
- Cooling of the polymeric waterproofing sheet
- Winding of the sheets onto cardboard spools made of recycled paper
- Individually wrapping each roll

The quality management system of the Sarnen plant has been *ISO 9001* certified since 1993.

2.8 Environment and health during manufacturing

The environmental management system of the Sarnen plant is *ISO 14001* certified.

2.9 Product processing/Installation

Sarnafil® TS 77 polymeric waterproofing membrane is loose laid and mechanically fastened without ballast to roofs with a slope up to < 20°. It is also suitable on roofs with gravel ballast and in green roof systems. The individual sheets are joined by means of hot-air welding. The Sika fastening systems Sarnabar® or Sarnafast are recommended for fastening.

As a rule, the latest product data sheet for each product (available at **www.sika.com**) is to be observed.

2.10 Packaging

The rolls of polymeric waterproofing membrane are individually wrapped in polyethylene (PE) foil and shipped on pallets. The spools are of cardboard made from recycled paper. The packaging materials can be sorted and collected for recycling.

2.11 Condition of use

With professional installation and proper use, the condition and material composition of Sarnafil® TS 77 polymeric waterproofing membrane remains unchanged throughout the service life. This was verified in 2014 by the third-party study *Durability of Sarnafil® T Polymeric Waterproofing Membranes*.

2.12 Environment and health during use

The product contains no substances that are released during normal use. Neither the environment nor the health of users is negatively influenced during the service life. No environmental emissions are known to occur.

2.13 Reference service life

The reference service life of Sarnafil® TS 77 polymeric waterproofing membrane is at least 50 years.

According to the study *Durability of Sarnafil® T Polymeric Waterproofing Membranes* from 2014, experience to date with Sarnafil® polymeric waterproofing membranes indicates that a service life of over 50 years can be expected, provided the standard requirements and the application and maintenance recommendations are observed.

This conclusion reflects the high resistance to weathering and ageing of the product when properly used.

2.14 Extraordinary effects

Fire
Sarnafil® TS 77 polymeric waterproofing membrane is classified in Construction Product Class E, as defined by *EN 13501-1*.

Fire resistance

Name	Value
Building material class	E
Burning droplets	-
Smoke gas development	-

Water
No environmental impact is known due to water exposure of installed Sarnafil® TS 77 polymeric waterproofing membrane.

Mechanical destruction
Sarnafil® TS 77 polymeric waterproofing membrane possesses good mechanical strength and is highly robust. No environmental impact is known to result from unexpected mechanical damage.

Based on the study *Durability of Sarnafil® T Polymeric Waterproofing Membranes* from 2014, no significant change in the mechanical properties of the roofing membrane is to be expected even after 25 years.

2.15 Re-use phase
At the end of the service life or when roofing sheets must be replaced, Sarnafil® TS 77 waterproofing sheets can be selectively removed and recycled. This allows a closed-loop material cycle and increasingly greater material recovery from used polymeric waterproofing membranes.

Sika Deutschland GmbH is affiliated with Roofcollect, the recycling system for polymeric roofing and waterproofing membranes.

2.16 Disposal
Sarnafil® TS 77 polymeric waterproofing sheets should be recycled in order to keep the material cycle intact. The used waterproofing sheets can be removed, cleaned and ground in a shredding plant. The reclaimed material thus obtained can be kept within the material cycle e.g. by incorporating it into the manufacture of protective membranes. If the product cannot be recycled, the waterproofing sheets are to be used for their calorific value.

Sarnafil® TS 77 polymeric waterproofing membrane can be classified under Waste Code 170213 of the *European Waste Catalogue*.

2.17 Further information
More information about the company and its products is available in the internet at **www.sika.com**.

3. LCA: Calculation rules

3.1 Declared Unit
This declaration applies to 1 m^2 of installed Sarnafil® TS 77 polymeric waterproofing membrane, thickness 2.0mm.

A formula is given in Chapter 5 for independent calculation of the values for other thicknesses.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Grammage	2.2	kg/m^2
Type of sealing	hot-air weld	-
Conversion factor to 1 kg	0.45455	-
Layer thickness	-	m

3.2 System boundary
Type of EPD: Cradle to gate with options

The system boundaries of the EPD follow the modular structure set forth by *EN 15804*. The LCA takes into account the following modules:

- A1-A3: Extraction, processing and transport of raw materials (e.g. polymers, pigments, processing aids, stabilizers, fillers, flame retardants and carrier materials) used for the production of intermediate products and the waterproofing membrane and the packaging materials used to package the waterproofing membranes, such as wooden pallets, cardboard and PE film, for transport to the plant. Waste processing of production waste (edge trim), which occurs during the production of the waterproofing membrane.
- A4: Transport of the waterproofing membrane to the building site
- A5: Installation of the waterproofing membrane into the building by means of hot-air welding (including welding energy and water consumption), disposal or recycling of packaging, and waterproofing membrane scraps
- C1: Manual deconstruction and removal of the waterproofing membrane (recovery)
- C2: Transport of the recovered waterproofing membrane to waste-processing facility
- C3: Processing of the recovered waterproofing membrane for material recycling (Scenario 1 – C3/1) or thermal energy recovery (Scenario 2 – C3/2)
- C4: Disposal of the recovered waterproofing membrane in landfill

- D: Benefits for reuse, recovery and/or recycling (through thermal energy recovery, recycling of the recovered waterproofing membrane and reuse of the wooden pallets)

3.3 Estimates and assumptions

Various stabilizers and pigments were valued with a general chemical data set (conservative approach). The percentage by mass is < 1 %.

At the end of life, either material recycling of 100% (Scenario 1) or thermal energy recovery of 100 % (Scenario 2) is assumed.

3.4 Cut-off criteria

All data was taken into account (recipe constituents, thermal energy used, electricity used). Loads due to transportwere taken into account for all inputs and outputs. The manufacture of the production machines and systems and the associated infrastructure were not taken into account in the LCA.

3.5 Background data

The underlying data were extracted from the databases of *GaBi 9* software and *ecoinvent Version 3.4*.

3.6 Data quality

Considering the chronological, geographic and technical aspects as well as the completeness and plausibility, the overall quality of the data is assessed as good. The primary data for assessing the production processes originate from the year 2018 and were collected directly at the plant. All background data sets are more recent than 10 years.

3.7 Period under review

The period of study is the year 2018 (1 January – 31 December 2018).

3.8 Allocation

Mass allocation was applied for production.

Production waste that was recovered and reused internally was simulated as closed-loop recycling in Modules A1-A3, including the energy reclaimed through thermal energy recovery. The material for the manufacture of the product and the production waste have the same quality.

Regarding thermal energy recovery of production waste, benefits for electricity and thermal energy were calculated input-specifically, taking into account the elementary composition and the calorific value.

Regarding material recycling of the reclaimed polymeric waterproofing sheets and the installation scrap, the amount of recyclable membrane was treated as a corresponding polypropylene benefit adjusted with a downgrade.

Benefits for the disposal of packaging, scrap and roofing membrane are credited in Module D. This also applies to the reuse of wooden pallets.

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.

The underlying data were extracted from the databases of *GaBi 9* software and *ecoinvent Version 3.4*.

4. LCA: Scenarios and additional technical information

The following technical information serves as a basis for the declared modules or can be used for the development of specific scenarios in the context of a building assessment.

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	0.0066	l/100km
Transport distance	600	km
Capacity utilization	85	%
Gross density of products transported	1156	kg/m³
Volume-utilization factor	100	%

Installation into the building (A5)

Name	Value	Unit
Electricity consumption	0.016	kWh/m^2
Installation loss (membrane scrap)	2	%
Overlaps (membrane joints)	6	%

End-of-life stage (C1-C4)

For modelling the end-of-life stage, two different scenarios are calculated, each of which represents a 100 % scenario but also allows pro-rata calculation (for example, Scenario 1 = 80 % / Scenario 2 = 20 %).

Name	Value	Unit
For material recycling (Scenario 1: C1, C2/1, C3/1, C4)	100	%
Transport to material recycling facility (Scenario 1: C1, C2/1, C3/1, C4)	250	km
For thermal energy recovery (Scenario 2: C1, C2/2, C3/2, C4)	100	%
Transport to energy recovery facility (Scenario 2: C1, C2/2, C3/2, C4)	50	km

5. LCA: Results

The results displayed below apply to Sarnafil® TS 77-20. To calculate results for other thicknesses, please use this formula:

$I_x = ((x+0.14)/2.14)\ I_{2,0}$

[Ix = the unknown parameter value for Sarnafil® TS 77 products with a thickness of "x" mm (e.g. 1.5mm)]

Two scenarios were calculated in End-of-Life and Module D:
Scenario 1 (C2/1, C3/1, D/1) describes the effects of 100% material recycling, whereas
Scenario 2 (C2/2, C3/2, D/2) refers to 100% thermal energy recovery.

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	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m2 waterproofing membrane

Parameter	Unit	A1-A3	A4	A5	C1	C2/1	C2/2	C3/1	C3/2	C4	D/1	D/2
GWP	[kg CO_2-Eq.]	3.27E+0	1.06E-1	4.89E-1	0.00E+0	4.49E-2	8.98E-3	2.82E-1	7.67E+0	0.00E+0	-3.26E+0	-2.77E+0
ODP	[kg CFC11-Eq.]	6.31E-9	3.62E-17	5.04E-10	0.00E+0	7.40E-18	1.48E-18	5.39E-15	7.13E-16	0.00E+0	-2.40E-9	-2.40E-9
AP	[kg SO_2-Eq.]	8.31E-3	2.36E-4	7.18E-4	0.00E+0	1.04E-4	2.09E-5	2.59E-4	4.94E-4	0.00E+0	-5.20E-3	-3.92E-3
EP	[kg $(PO_4)^{3-}$-Eq.]	1.07E-3	5.88E-5	9.73E-5	0.00E+0	2.61E-5	5.23E-6	4.34E-5	1.05E-4	0.00E+0	-7.03E-4	-4.20E-4
POCP	[kg ethene-Eq.]	9.44E-4	-8.36E-5	7.09E-5	0.00E+0	-3.49E-5	-6.98E-6	1.67E-5	5.06E-5	0.00E+0	-9.41E-4	-4.19E-4
ADPE	[kg Sb-Eq.]	7.65E-6	1.00E-8	6.18E-7	0.00E+0	3.45E-9	6.91E-10	6.01E-8	4.20E-8	0.00E+0	-8.34E-7	-7.48E-7
ADPF	[MJ]	1.00E+2	1.42E+0	8.98E+0	0.00E+0	6.07E-1	1.21E-1	1.31E+0	8.06E-1	0.00E+0	-1.33E+2	-4.02E+1

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 waterproofing membrane

Parameter	Unit	A1-A3	A4	A5	C1	C2/1	C2/2	C3/1	C3/2	C4	D/1	D/2
PERE	[MJ]	8.11E+0	8.66E-2	1.04E+0	0.00E+0	3.54E-2	7.07E-3	8.91E-1	1.71E-1	0.00E+0	-6.52E+0	-1.79E+1
PERM	[MJ]	1.99E+0	0.00E+0	-1.59E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	1.01E+1	8.66E-2	8.83E-1	0.00E+0	3.54E-2	7.07E-3	8.91E-1	1.71E-1	0.00E+0	-6.52E+0	-1.79E+1
PENRE	[MJ]	5.52E+1	1.43E+0	4.71E+0	0.00E+0	6.10E-1	1.22E-1	6.57E+1	6.50E+1	0.00E+0	-1.36E+2	-5.75E+1
PENRM	[MJ]	6.06E+1	0.00E+0	4.82E+0	0.00E+0	0.00E+0	0.00E+0	-6.40E+1	-6.40E+1	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	1.16E+2	1.43E+0	9.53E+0	0.00E+0	6.10E-1	1.22E-1	1.70E+0	9.62E-1	0.00E+0	-1.36E+2	-5.75E+1
SM	[kg]	8.64E-2	0.00E+0	6.91E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-2.33E+0	0.00E+0
RSF	[MJ]	1.96E-21	0.00E+0	1.57E-22	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	2.31E-20	0.00E+0	1.84E-21	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m^3]	1.79E-2	9.91E-5	1.96E-3	0.00E+0	5.98E-5	1.20E-5	9.31E-4	1.66E-2	0.00E+0	-1.57E-2	-1.87E-2

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 waterproofing membrane

Parameter	Unit	A1-A3	A4	A5	C1	C2/1	C2/2	C3/1	C3/2	C4	D/1	D/2
HWD	[kg]	2.42E-6	8.11E-8	2.01E-7	0.00E+0	3.41E-8	6.81E-9	1.65E-9	7.65E-10	0.00E+0	-3.39E-8	-2.48E-8
NHWD	[kg]	4.19E-1	9.54E-5	3.56E-2	0.00E+0	4.96E-5	9.91E-6	2.28E-2	3.04E-2	0.00E+0	-1.81E-2	-3.96E-2
RWD	[kg]	2.18E-3	1.69E-6	1.87E-4	0.00E+0	8.27E-7	1.65E-7	1.57E-4	6.16E-5	0.00E+0	-1.33E-3	-6.69E-3
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.33E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	4.12E-1	0.00E+0	0.00E+0	0.00E+0	5.85E-1	1.68E+1	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	7.36E-1	0.00E+0	0.00E+0	0.00E+0	1.06E+0	2.98E+1	0.00E+0	0.00E+0	0.00E+0

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

6. LCA: Interpretation

The following charts show the relative contributions of the different modules to the various LCA categories and to primary energy use in a dominance analysis.

The product stage (Modules A1-A3) has by far the greatest impact on nearly all indicators; only global warming potential (GWP) in Scenario 2 is also significantly impacted by greenhouse gases resulting from thermal energy recovery (C3). For this reason, the product stage is examined more closely in the following interpretation.

Indicators of the inventory analysis:

Due to electricity use, pre-product manufacturing (51 %), packaging (29 %) and the manufacturing process (20 %) account for most of the use of renewable primary energy resources (PERT). The manufacturing of polymers in the product stage has the greatest impact (86 %) of raw materials on the use of nonrenewable primary energy resources (PENRT), whereas the impact of the production process (electrical energy) amounts to 3 %.

Indicators of the impact assessment:

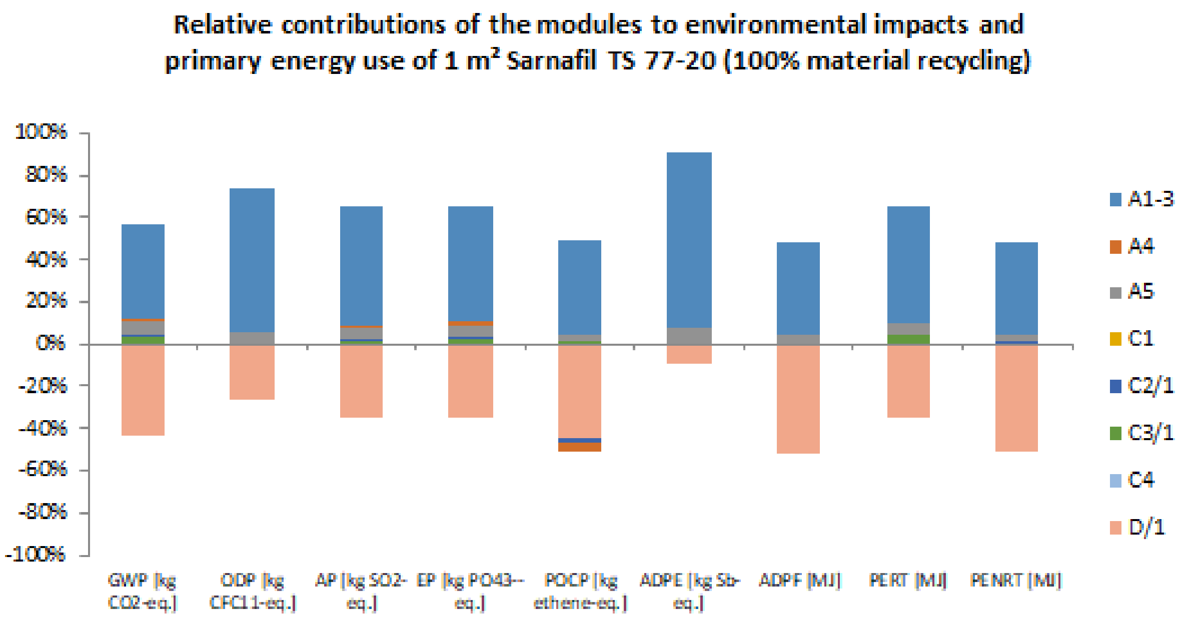
The dominant influence of pre-product manufacturing is apparent in all impact categories, with at least 87 % of the impact in each category attributed to raw materials. The only exception is the Depletion Potential of the Stratospheric Ozone layer (ODP), where this share measures only 55 %. Within pre-product manufacturing, polymers play a significant role regarding Global Warming Potential GWP (72 %), Acidification Potential of soil and water (AP) (54 %), Eutrophication Potential (EP) (57 %), Formation Potential of Tropospheric Ozone (POCP) (70 %) and Abiotic Depletion Potential for fossil fuels (ADPF) (86 %).

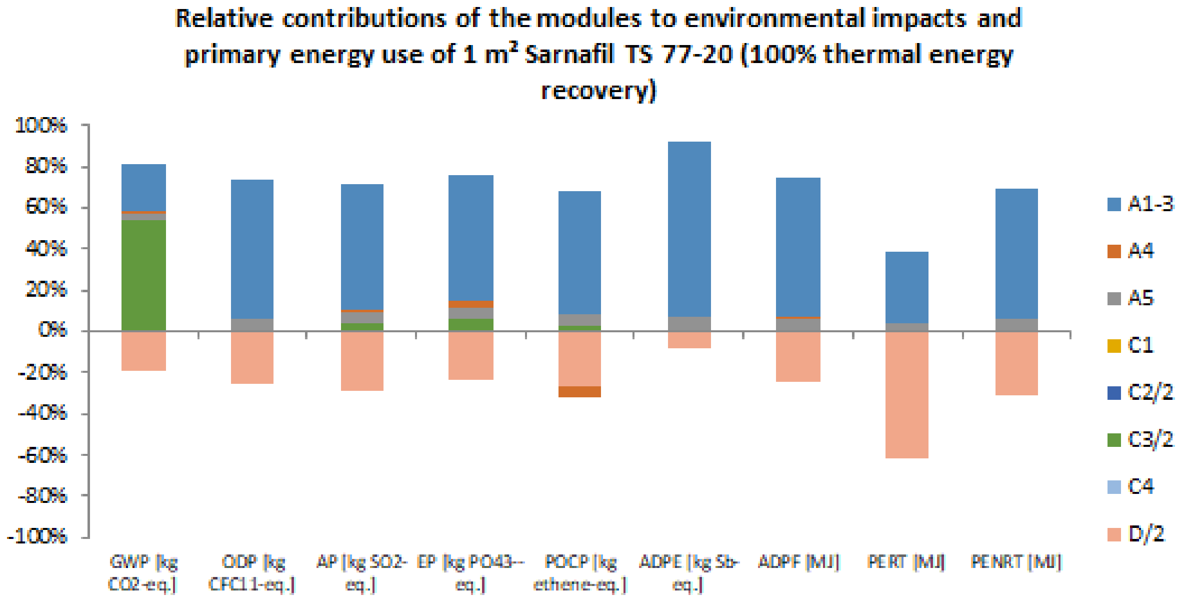
Pigments (primarily titanium dioxide) mainly impact ODP (45 %) and Abiotic Depletion Potential for non-fossil resources (ADPE) (24 %).

The carrier material impacts the parameters GWP (13 %), AP (13 %) and Abiotic Depletion Potential for non-fossil resources (ADPE) (64 %).

Polymers, one of the raw materials that generally has the greatest influence on the impacts, also has the greatest proportion by mass of the polymeric waterproofing membrane.

Electricity consumption has the greatest impact in the production process of the polymeric waterproofing membrane. The production process contributes most to EP (3 %), GWP (3 %) and AP (2 %).





7. Requisite evidence

No requisite evidence is required for Sarnafil® TS 77 polymeric proofing membrane.

8. References

IBU 2016
IBU (2016): General Principles of the EPD Program of the Institut Bauen und Umwelt e.V. (IBU). Version 1.1, Institut Bauen und Umwelt e.V., Berlin.

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

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

PCR Part B
Product category rules for construction products, Part B: PCR Guidance Texts for Building-Related Products and Services for the building group Plastic and elastomer roofing and sealing sheet systems. Institut Bauen und Umwelt e.V. (publisher), 2017.

Regulation (EU) 305/2011
Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 on the establishment of harmonised conditions for the marketing of building products and the repealing of Council Directive 89/106/EEC (EEA-relevant text).

EN 13956
DIN EN 13956:2012, Flexible sheets for waterproofing - Plastic and rubber sheets for roof waterproofing - Definitions and characteristics.

DIN SPEC 20000-201
DIN SPEC 20000-201:2018, Use of building products in construction works - Part 201: Adaption standard for flexible sheets for waterproofing according to European standards for the use as waterproofing of roofs.

EN 1928
DIN EN 1928: 2000-07, Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of watertightness.

EN 12311-2
DIN EN 12311-2:2010, Flexible sheets for waterproofing - Determination of tensile properties - Part 2: Plastic and rubber sheets for roof waterproofing.

EN 12316-2
DIN EN 12316-2:2013, Flexible sheets for waterproofing - Determination of peel resistance of joints - Part 2: Plastic and rubber sheets for roof waterproofing.

EN 12317-2
DIN EN 12317-2:2010, Flexible sheets for waterproofing - Determination of shear resistance of joints - Part 2: Plastic and rubber sheets for roof waterproofing.

EN 12310-2
DIN EN 12310-2:2000: Flexible sheets for waterproofing - Determination of resistance to tearing - Part 2: Plastic and rubber sheets for roof waterproofing.

EN 1297
DIN EN 1297:2004, Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof

waterproofing - Method of artificial ageing by long term exposure to the combination of UV radiation, elevated temperature and water.

EN 1107-2
DIN EN 1107-2:2001: Flexible sheets for waterproofing - Determination of dimensional stability - Part 2: Plastic and rubber sheets for roof waterproofing.

EN 495-5
DIN EN 495-5:2013, Flexible sheets for waterproofing - Determination of foldability at low temperature - Part 5: Plastic and rubber sheets for roof waterproofing.

EN 1548
DIN EN 1548:2007, Flexible sheets for waterproofing - Plastic and rubber sheets for roof waterproofing - Method for exposure to bitumen.

EN 13948
DIN EN 13948:2007, Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of resistance to root penetration.

FLL Method
Test procedure for determining root resistance of sheets and coatings for green roofs. Test method of the Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau e.V. (FLL), Version 2008.

Candidate List
Candidate List of Substances of Very High Concern for Authorisation. The current Candidate List can be found on the following ECHA webpage: https://echa.europa.eu/candidate-list-table.

Biocidal Products Regulation (EU) No. 528/2012
Regulation (EU) No. 528/2012 of the European Parliament and of the Council of 22 May 2012 on the making available on the market and the use of biocidal products (EEA-relevant text).

ISO 9001
DIN EN ISO 9001:2015, Quality management systems - Requirements.

ISO 14001
DIN EN ISO 14001:2015, Environmental management systems - Requirements with guidance for use.

Durability of Sarnafil® T Polymeric Waterproofing Membranes
Study by the Institut für Bautenschutz, Baustoffe und Bauphysik, Dr. Rieche und Dr. Schürger GmbH & Co. KG, Fellbach. Summary Report, 2014.

EN 13501-1
DIN EN 13501–1:2007 + A1:2009, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.

European Waste Catalogue
European Waste Catalogue code (EWC), 2001.

GaBi 9
Software and database for life cycle assessments, Version 9.2.0.58. thinkstep AG, Leinfelden-Echterdingen, 1992-2019.

ecoinvent Version 3.4
Database for life cycle assessments. Swiss Centre for Life Cycle Inventories (ecoinvent Centre), 2017.

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