ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	BMI Group Holdings UK Ltd
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-BMI-20200173-IBB1-EN
Issue date	19.11.2020
Valid to	18.11.2025

Cosmofin/Monarplan

BMI Group

Institut Bauen und Umwelt e.V.

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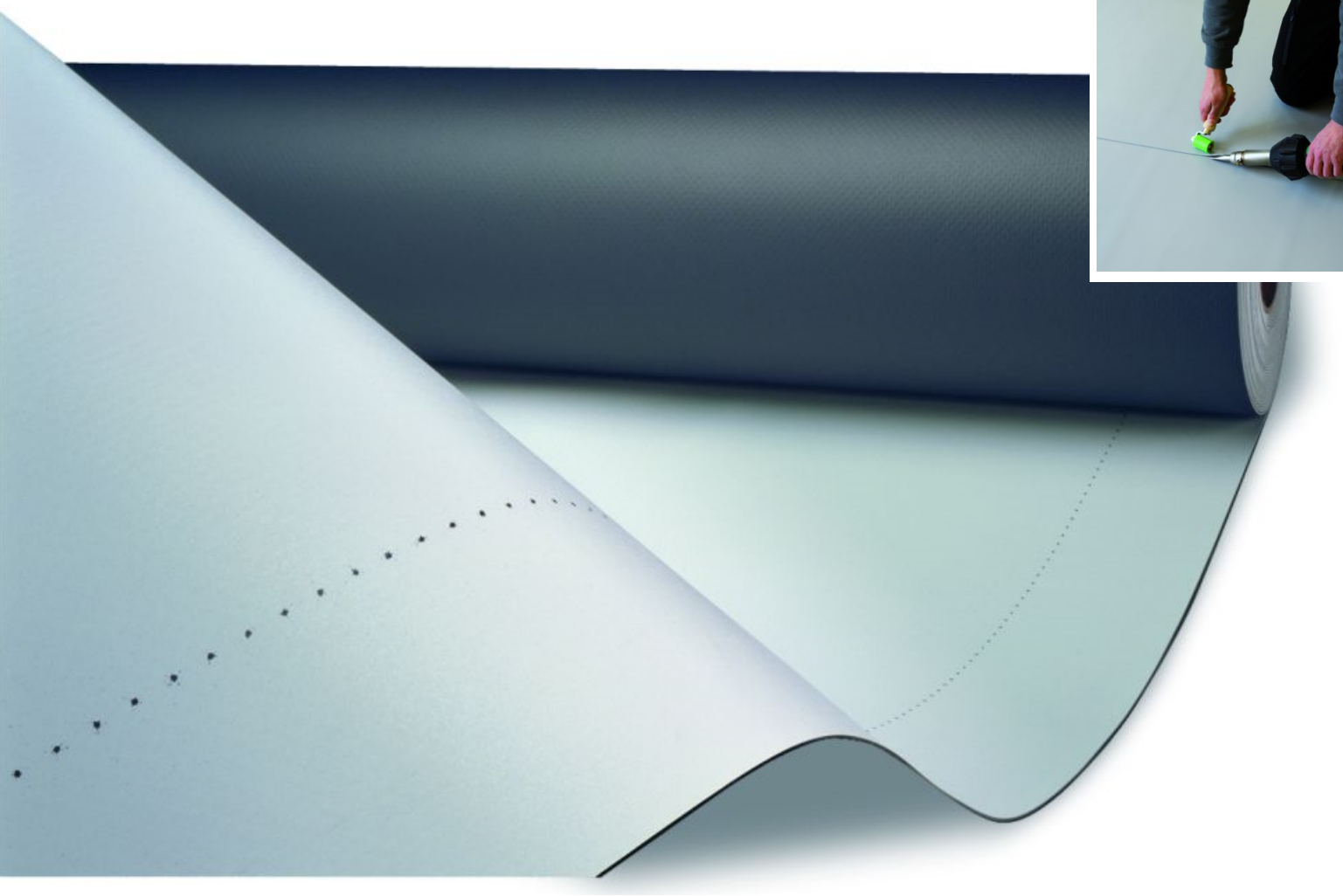


General Information

BMI Group

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

Declaration number
EPD-BMI-20200173-IBB1-EN

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)

Issue date
19.11.2020

Valid to
18.11.2025

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

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

Cosmofin/Monarplan

Owner of the declaration
BMI Group Holdings UK Ltd
Thames Tower, Station Rd
Reading RG1 1LX
United Kingdom

Declared product / declared unit
1 m² plastic and elastomer roofing and sealing membrane system produced

Scope:
This Declaration applies for Cosmofin and Monarplan roofing and sealing membrane systems manufactured at the Sturovo site in Slovakia. The LCA results of Cosmofin/Monarplan with a thickness of 1.5 mm and a surface weight of 1.9 kg/m² are declared.

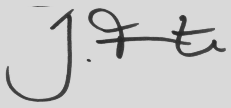
The LCA is based on average production data for fiscal 2019. This was supplied by BMI GmbH.

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+A2*. 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



Juliane Franze
(Independent verifier)

Product

Product description/Product definition
Cosmofin FG, FG R, GG plus and Monarplan FM are monomer, plasticized, bitumen-incompatible PVC-P synthetic roofing membrane systems with an internal layer and/or reinforcement. Seams are joined by hot air or solvent welding agent.

(EU) Directive No. 305/2011 (CPR) applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland). The product has a Declaration of Performance taking consideration of *DIN EN 13956:*2012, Flexible sheets for waterproofing – Plastic and rubber sheets for roof waterproofing, and CE marking. Use is governed by the respective national regulations.

Application
Cosmofin/Monarplan are single-layer synthetic roofing membrane systems which are used as roof waterproofing for exposed and covered flat roofs. It is laid exposed, mechanically fastened or ballasted (gravel, paving, parking decks and greening).

Technical Data
Data from the Declarations of Performance for Cosmofin FG, FG R, GG plus and Monarplan FM

Structural data

Name	Value	Unit
Waterproof acc. to EN 1928	fulfilled	-
Tensile strain performance acc. to EN 12311-2	≥ 15 (≥ 2 at GG plus)	%
Peel resistance of the seam joint acc. to DIN EN 12317-2	≥ 300	N/50mm
Shear resistance of the seam joint acc. to DIN EN 12317-2	≥ 800	N/50mm
Tear propagation resistance acc. to EN 12310-2	≥ 200	N
Artificial ageing acc. to EN 1297	fulfilled	-
Folding in the cold acc. to EN 495-5	-25	°C
Resistance to impact loads acc. to EN 12691 (method A/B	500 / 1000	mm
Resistance to static loads acc. to DIN	≥ 20	kg

EN 12730 Methode B		
Tensile strength acc. to DIN EN 12311-2	≥ 1000	N/50mm

Product performance values in line with the Declarations of Performance in terms of their essential characteristics in accordance with *DIN EN 13956:*2012

Roofing membranes acc. to *EN 13956* and Application standard *DIN SPEC 20000-201*
Designation:
Cosmofin FG R
DE/E1 PVC-P-NB- V-(PG)-1.5 (1.8 / 2.0)
Cosmofin GG plus
DE/E1 PVC-P-NB- V-GG-GV-1.5 (1.8 / 2.0)
Cosmofin FG
DE/E1 PVC-P-NB- V-(PG)-1.5 (1.8 / 2.0)
Monarplan FM
DE/E1 PVC-P-NB- V-(PG)-1.2 (1.5 / 1.8 / 2.0)
FPC (Factory Production Control) certificate no.:
1213-CPR-012-Cosmofin
1213-CPR-066-Monarplan

Base materials/Ancillary materials
Cosmofin FG, FG R, GG plus and Monarplan FM comprising:

- Polyvinylchloride (PVC): 40-60%
- Phthalate plasticizers: 30-40%
- Epoxidized soy bean oil: 2-4%
- Mineral flame retardants: 0.4-3%
- Stabilisers: 1-3%
- Titanium dioxide: 3-10%
- Additives (carbon black, mineral aggregates, pigments, depending on colour): 0-20%

1) The product / At least one partial product contains substances from the *List of candidates* of substances of very high concern (SVHC) (dated 25.06.2020) exceeding 0.1 percentage by mass: **no**
2)The product / At least one partial product contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass in at least one partial product: **no**

Reference service life
In the case of normal conditions of use and when laid as designated in accordance with the specifications in the installation instructions for Cosmofin/Monarplan sheets, a service life > 30 years can be assumed; see also *BBA certificate*.

LCA: Calculation rules

Declared Unit
The declared unit is 1 m² Cosmofin/Monarplan roofing membrane produced. The Declaration applies for a thickness of 1.5 mm and a surface weight of 1.9 kg/m².

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Grammage	1.9	kg/m^2
Conversion factor to 1 kg	0.526	-

System boundary
Type of EPD: cradle to gate, with options
The following modules are considered in the LCA:

Product stage (A1-A3): The BMI roofing membranes product stage comprises:

- A1 Raw material supply and processing and processing of secondary materials serving as input (e.g. recycling processes)
- A2 Transporting raw materials by truck to the plant (Štúrovo in Slovakia)
- A3 Manufacturing sheets in the plant (incl. provisions of energy, provision of water, provisions of auxiliaries, disposal of production waste, manufacturing packaging materials)

End-of-life stage (C1-C4): The BMI roofing membranes end-of-life stage comprises:
EoL scenario: 100% thermal utilisation of roofing membranes in a waste incineration plant with an R1 value > 0.6 with recovery potentials in D from energy substitution

- C1 Manual selective removal (unencumbered)
- C2 Transport by truck (50 km) to thermal utilisation (waste incineration plant)
- C3 Waste treatment of roofing membranes: 100% thermal utilisation in a waste incineration plant
- C4 No further expenses incurred by landfilling/disposal

Potentials and loads outside the system boundaries (D) of BMI roofing membranes:
Module D comprises recovery potentials from thermal utilisation of roofing membranes in a waste incineration plant by means of energy substitution.

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.

LCA: Scenarios and additional technical information

Characteristic product properties
Information on biogenic Carbon
Only the product packaging contains biogenic carbon, not the actual product: 21g carbon per square metre.

Information on describing the biogenic Carbon Content at factury gate

Name	Value	Unit
Biogenic Carbon Content in product	-	kg C
Biogenic Carbon Content in accompanying packaging	0.021	kg C

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

Construction installation process (A5)
Module A5 is not declared. When drawing up building LCAs, it must be taken into account that the biogenic volume of CO2 (7.55E-2 kg CO2 equiv.) for packaging bound in Modules A1-A3 is written off in A5.

The manufacture of the following packaging materials is considered in the LCA but not the disposal thereof:

Name	Value	Unit
Wood	0.029	kg
Plastic (PE)	0.003	kg
Paper	0.025	kg

End of Life (C1-C4)

De-construction (C1)
De-construction takes the form of manual selective removal without using machinery and is neutral in terms of the LCA.

Transport for waste processing (C2)
50 km are assumed as a transport distance for thermal utilisation.
Transport by truck: EURO 6, 34-40 tonnes overall weight, 27 tonnes useful load

Waste processing (C3)

Name	Value	Unit
Collected separately EWC 17 09 04	1.9	kg
Energy recovery	1.9	kg

Reuse, recovery and recycling potential (D), relevant scenario information
Module D includes the potential benefits of the incineration processes from C3 (incineration of the roofing membrane). A waste incineration plant with an R1 value > 0.6 was assumed.

LCA: Results

The following tables depict the results of the indicators concerning impact estimates, use of resources as well as the waste and other output flows with reference to 1m² roofing membrane produced.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR 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	ND	ND	ND	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² Cosmofin/Monarplan: 1.5 mm thick; 1.9 kg/m² surface weight

Core Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Global warming potential - total	[kg CO_2-Eq.]	5.12E+0	0.00E+0	4.53E-3	4.93E+0	0.00E+0	-1.18E+0
Global warming potential - fossil fuels	[kg CO_2-Eq.]	5.31E+0	0.00E+0	4.51E-3	4.93E+0	0.00E+0	-1.18E+0
Global warming potential - biogenic	[kg CO_2-Eq.]	-1.99E-1	0.00E+0	1.82E-6	-2.15E-3	0.00E+0	-2.76E-3
GWP from land use and land use change	[kg CO_2-Eq.]	1.09E-2	0.00E+0	1.89E-5	1.00E-3	0.00E+0	-8.22E-4
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.30E-10	0.00E+0	1.11E-18	7.50E-15	0.00E+0	-1.22E-14
Acidification potential, accumulated exceedance	[mol H^+-Eq.]	1.14E-2	0.00E+0	3.79E-6	1.46E-3	0.00E+0	-1.65E-3
Eutrophication, fraction of nutrients reaching freshwater end compartment	[kg PO_4-Eq.]	5.47E-5	0.00E+0	9.83E-9	1.26E-6	0.00E+0	-1.51E-6
Eutrophication, fraction of nutrients reaching marine end compartment	[kg N-Eq.]	2.94E-3	0.00E+0	1.10E-6	4.84E-4	0.00E+0	-4.26E-4
Eutrophication, accumulated exceedance	[mol N-Eq.]	3.20E-2	0.00E+0	1.35E-5	5.92E-3	0.00E+0	-4.57E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg NMVOC-Eq.]	1.07E-2	0.00E+0	3.05E-6	1.37E-3	0.00E+0	-1.23E-3
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.24E+2	0.00E+0	6.00E-2	9.10E+0	0.00E+0	-2.00E+1
Abiotic depletion potential for fossil resources	[MJ]	4.43E-4	0.00E+0	3.75E-10	1.08E-7	0.00E+0	-1.93E-7
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	[m^3 world-Eq deprived]	4.01E-1	0.00E+0	1.94E-5	3.81E-1	0.00E+0	-1.22E-1

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² Cosmofin/Monarplan: 1.5 mm thick; 1.9 kg/m² surface weight

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier	[MJ]	1.22E+1	0.00E+0	3.49E-3	1.89E+0	0.00E+0	-4.35E+0
Renewable primary energy resources as material utilization	[MJ]	7.10E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	1.29E+1	0.00E+0	3.49E-3	1.89E+0	0.00E+0	-4.35E+0
Non-renewable primary energy as energy carrier	[MJ]	9.01E+1	0.00E+0	6.00E-2	4.52E+1	0.00E+0	-2.00E+1
Non-renewable primary energy as material utilization	[MJ]	3.62E+1	0.00E+0	0.00E+0	-3.61E+1	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	1.26E+2	0.00E+0	6.00E-2	9.10E+0	0.00E+0	-2.00E+1
Use of secondary material	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m^3]	3.66E-2	0.00E+0	3.13E-6	1.00E-2	0.00E+0	-5.03E-3

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² Cosmofin/Monarplan: 1.5 mm thick; 1.9 kg/m² surface weight

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	[kg]	1.15E-6	0.00E+0	2.24E-9	4.11E-8	0.00E+0	-7.97E-9
Non-hazardous waste disposed	[kg]	2.66E-1	0.00E+0	1.05E-5	3.02E+0	0.00E+0	-9.22E-3
Radioactive waste disposed	[kg]	2.58E-3	0.00E+0	6.31E-8	2.88E-4	0.00E+0	-1.48E-3
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	4.97E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	9.05E+0	0.00E+0	0.00E+0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² Cosmofin/Monarplan: 1.5 mm thick; 1.9 kg/m² surface weight

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Potential incidence of disease due to PM emissions	[Disease Incidence]	1.33E-7	0.00E+0	4.28E-11	3.52E-8	0.00E+0	-1.40E-8
Potential Human exposure efficiency relative to U235	[kBq U235-Eq.]	2.10E-1	0.00E+0	6.09E-6	2.93E-2	0.00E+0	-2.43E-1
Potential comparative toxic unit for ecosystems	[CTUe]	7.00E+1	0.00E+0	4.99E-2	7.54E+0	0.00E+0	-4.30E+0
Potential comparative toxic unit for humans - cancerogenic	[CTUh]	5.23E-9	0.00E+0	1.19E-12	2.98E-10	0.00E+0	-1.87E-10
Potential comparative toxic unit for humans - not cancerogenic	[CTUh]	4.70E-7	0.00E+0	5.29E-11	3.17E-8	0.00E+0	-6.94E-9
Potential soil quality index	[-]	4.09E+1	0.00E+0	1.88E-2	2.06E+0	0.00E+0	-3.12E+0

Disclaimer 1 – for the indicator IRPThis impact category deals mainly with the eventual impact of low dose ionizingradiation on human health of the nuclear fuel cycle. It does not consider effects due to possiblenuclear accidents, occupational exposure nor due to radioactive waste disposal in undergroundfacilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQPThe results of this environmental impact indicator shall be used with care as theuncertainties on these results are high or as there is limited experienced with the indicator.

References

PCR, Part A
Product category rules for building-related products and services from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation rules for the Life Cycle Assessment and requirements on the Project Report; version 1.8, 07/2019, www.bau-umwelt.com

PCR: Plastic and elastomer roofing and sealing membrane systems
Product category rules – Product category rules for building-related products and services, Part B: Requirements on the Environmental Product Declaration for plastic and elastomer roofing and sealing membrane systems; Institut Bauen und Umwelt e.V. (pub.), 1.6, 2017

EN 15804
EN 15804:2012+A2 2020, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

IBU 2019
Institut Bauen und Umwelt e.V.: General principles for the EPD range of Institut Bauen und Umwelt e.V. (IBU), version 1.8, Berlin: Institut Bauen und Umwelt e.V., 2019, http://www.ibu-epd.com

ISO 14025
DIN EN ISO 14025:2011-10, Environmental designations and declarations – Type III Environmental Declarations – Basic principles and processes

GaBi ts
GaBi 9 dataset documentation for the software system and databases, LBP (University of Stuttgart) and thinkstep AG, Leinfelden-Echterdingen, 2020 (http://www.gabi-software.com/deutsch/databases/gabi-databases/)

AVV
Ordinance governing the European Waste Catalogue (List of Wastes Directive – AVV) dated 10.12.2001, last amended by Article 5, para. 22 of the law dated 22.02.2012

BBA certificate
BBA: British Board of Agreement, British facility issuing certificates for construction products and systems
The BBA certificate for Cosmofin and Monarplan is published on:
https://www.bbacerts.co.uk/search/?doc=%2F1ApZ8k5LNI3jKX4F68EC7M%3D
https://www.bbacerts.co.uk/search/?doc=%2F1EuZ8g%2BK9s3jKX4EK8EC7M%3D

DIN 4102-1
DIN 4102-1:1998-05, Reaction to fire of building materials and components – Part 1: Building materials; concepts, requirements and tests

DIN EN 495-5
DIN EN 495-5:2012-10, Flexible sheets for waterproofing – Determination of foldability at low temperature – Part 5: Plastic and rubber sheets for roof waterproofing

DIN EN 1107-2
DIN EN 1107-2:2001-04, Flexible sheets for waterproofing – Determining dimensional stability – Part 2: Plastic and rubber sheets for roof waterproofing

DIN EN CEN / TS 1187
DIN EN CEN / TS 1187: 2012-03, Test methods for external fire exposure to roofs

DIN EN 1297
DIN EN 1297:2004-12, 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

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

DIN EN 1548
DIN EN 1548:2007-11, Flexible sheets for

waterproofing – Plastic and rubber sheets for roof waterproofing – Method for exposure to bitumen

DIN EN 1931
DIN EN 1931:2001-03, Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Determination of water vapour transmission properties

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DIN EN 12311-2
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DIN EN 12316-2
DIN EN 12316-2:2013-08, Flexible sheets for waterproofing – Determination of peel resistance of joints – Part 2: Plastic and rubber sheets for roof waterproofing

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DIN EN 12730
DIN EN 12730:2015-06, Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Determination of resistance to static loads

DIN EN 12691
DIN EN 12691:2018-05, Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Determination of resistance to impact

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DIN EN 13501-1
DIN EN 13501-1:2010-01, Classification of building products and methods by fire performance – Part 1: Classification with the results of tests on reaction to fire of construction products

DIN EN 13583
DIN EN 13583:2012-10, Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Determination of resistance to hail

DIN EN 13948
DIN EN 13948:2008-01, Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Determination of resistance to root penetration

DIN EN 13956
DIN EN 13956:2012-05, Flexible sheets for waterproofing – Plastic and rubber sheets for roof waterproofing – Definitions and characteristics

DIN 18531-1
DIN 18531-1:2017-07, Waterproofing of roofs – Waterproofing of non-utilised roofs – Part 1: Terms, requirements, principles for design

DIN SPEC 20000-201
DIN SPEC 20000-201:2018-08, Application of building products in buildings – Part 201: Application standard for flexible sheets for waterproofing in accordance with European product standards for use in waterproofing of roofs

DIN SPEC 20000-202
DIN SPEC 20000-202:2016-03, Application of building products in buildings – Part 202: Application standard for flexible sheets for waterproofing according to European standards for use as waterproofing

EWC 17 09 04
European Waste Catalogue 17 09 04: Mixed construction and de-construction rubble with the exception of those covered by 17 09 01, 17 09 02 and 17 09 03

REACH
Directive (EC) No. 1907/2006 of the European Parliament and Council of 18 December 2006 on the registration, evaluation, authorisation and restriction of chemicals (REACH)

List of candidates
European Chemicals Agency list of substances of very high concern, last revised: 25 June 2020

FLL
Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau (FLL guidelines): Roof Greening Directive, 2018: FLL process for examining the root resistance of sheets and coatings for roof greening; 2018

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