ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	FDT FlachdachTechnologie GmbH &. Co. KG
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-FDT-20180020-IAA1-EN
Issue date	26.02.2018
Valid to	25.02.2023

Rhenofol CV, Rhenofol CG

FDT FlachdachTechnologie GmbH &. Co. KG

Institut Bauen und Umwelt e.V.

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

FDT FLACHDACH · TECHNOLOGIE

1. General Information

FDT FlachdachTechnologie GmbH & Co. KG	Rhenofol CV, Rhenofol CG
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** FDT FlachdachTechnologie GmbH & Co. KG Eisenbahnstraße 6-8 68199 Mannheim
Declaration number EPD-FDT-20180020-IAA1-EN	**Declared product / declared unit** 1 m² produced Rhenofol CV and Rhenofol CG roofing membrane system
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 Environmental Product Declaration refers to the following products manufactured by FDT Flachdach Technologie GmbH & Co. KG at its Mannheim-Neckerau plant: Rhenofol CG 1.2 mm / 1.5 mm / 1.8 mm Rhenofol CV 1.2 mm / 1.5 mm / 1.8 mm This Declaration concerns a specific product (Rhepanol CG 1.8 mm). The LCA results can be taken into consideration for Rhenofol CV roofing membrane systems as well as for lower thicknesses as Rhepanol CG 1.8 mm was selected as a representative product in a worst-case scenario approach. 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.
Issue date 26.02.2018	
Valid to 25.02.2023	**Verification** The standard /EN 15804/ serves as the core PCR Independent verification of the declaration and data according to /ISO 14025:2010/ ☐ internally ☒ externally
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	Matthias Schulz (Independent verifier appointed by SVR)
Dipl. Ing. Hans Peters (Head of Board IBU)	

2. Product

2.1 Product description / Product definition

Rhenofol CV is a bitumen-incompatible PVC-P synthetic roofing membrane in various colours with a central woven or roving as reinforcement. Seams are joined by hot air or solvent welding agent.

Rhenofol CG is a bitumen-incompatible PVC-P synthetic roofing membrane with a central glass fleece as an internal layer. Seams are joined by hot air or solvent welding agent.

Rhenofol CV:
Product according to /CPR/ with hEN:
Directive (EU) No. 305/2011 /CPR/ applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland).

Rhenofol CV has a Declaration of Performance “01 200 20 30 40 50” taking consideration of the /DIN EN 13956:2013-03/ and /DIN SPEC 20.000-201: 2015-08/, application type: DE/E1 PVC-P-NB-V-PG-1.5 and CE marking.
/FPC/ certificate no.: 1343-CPD-K06-0660.6, 1343-CPD-K06-0660.8

Rhenofol CG:
Product according to /CPR/ with hEN:
Directive (EU) No. 305/2011 /CPR/ applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland).
Rhenofol CG has a Declaration of Performance “01 200 60 80 90 100” taking consideration of the /DIN EN 13956: 2013-03/ and /DIN SPEC 20.000-201: 2015-

08/, application type: DE/E1 PVC-P-NB-E-GV-1.5 as well as a Declaration of Performance “01 200 60 80 90 100 67” taking consideration of the /DIN EN 13967:2017-08/ and /DIN SPEC 20.000-202: 2016-03/, application type: BA PVC-P-NB-E-GV-1.5 and CE marking.
/FPC/ certificate no.: 1343-CPD-K06-0660.3; 1343-CPD-K06-0660.5

Use is governed by the respective national regulations.

2.2 Application

Rhenofol CV is used for sealing in mechanically fastened layers.

Rhenofol CG is suitable for sealing green, gravel ballasted or used roofs. Rhenofol CG is also used as a damp-proof sheet (type A) and as a tanking sheet (type T).

The manufacturer's installation instructions must be maintained during processing.

2.3 Technical Data

The data in the Declaration of Performance applies.

Other data is outlined below.

Rhenofol CV and Rhenofol CG

Name	Value	Unit
Water vapour diffusion resistance value µ /DIN EN 1931/ (method B)	18.000	
Tensile strength (Rhenofol CV) /DIN EN 12311-2/ (method A)	≥ 1000	N/50 mm
Tensile strength (Rhenofol CG) /DIN EN 12311-2/ (method B)	≥ 10	N/mm²
Tensile strain (Rhenofol CV) /DIN EN 12311-2/ (method A)	≥ 15	%
Tensile strain (Rhenofol CG), /DIN EN 12311-2/ (method B)	≥ 200	%
Seam peel resistance (Rhenofol CV) /DIN EN 12316-2/	≥ 250	N/50 mm
Seam peel resistance (Rhenofol CG) /DIN EN 12316-2/	≥ 600	N/50 mm
Seam shear resistance /DIN EN 12317-2/	≥ 900	N/50 mm
Resistance to abrupt loads, rigid underlay / flexible underlay (Rhenofol CV 1.5 mm), /DIN EN 12691/	≥ 900	mm
Resistance to abrupt loads, rigid underlay / flexible underlay (Rhenofol CG 1.5 mm), /DIN EN 12691/	≥ 650	mm
Resistance to static loads /DIN EN 12730/ (method A/B)	≥ 20	kg
Hail, rigid underlay / flexible underlay /DIN EN 13583/	≥ 20 / ≥ 30	m/s
Tear resistance /DIN EN 12310-2/	≥ 150	N
Resistance to root penetration (Rhenofol CG) FLL, /DIN EN 13948/	Root- and rootstock-proof	
Dimensional stability after warm storage (Rhenofol CV) /DIN EN 1107-2/	≤ 0,2	%
Dimensional stability after warm storage (Rhenofol CG) /DIN EN 1107-2/	≤ 0,05	%
Folding at low temperatures /DIN EN 495-5/	≤ -30	°C
Resistance to chemicals /DIN EN 1847/ (list in Annex C)	fulfilled	
UV radiation /DIN EN 1297/	Class 0 (5.000 h)	h
Water tightness /DIN EN 1928/ (method B)	≥ 400	kPa

Rhenofol CV product according to /CPR/ with hEN: The product’s performance values correspond with the Declaration of Performance “01 200 20 30 40 50” in terms of its essential properties in accordance with para. 2.1.

Rhenofol CG product according to /CPR/ with hEN: The product’s performance values correspond with the Declaration of Performance “01 200 60 80 90 100” and “01 200 60 80 90 100 67” in terms of its essential properties in accordance with para. 2.1.

2.4 Delivery status

Rhenofol CV:
20 m x 2.05 / 1.50 / 1.03 / 0.68 m x 1.2 mm;
20 m x 1.50 m x 1.5 mm;
15 m x 2.05 / 1.03 / 0.68 / 0.50 m x 1.5 mm;
15 m x 2.05 / 1.50 / 1.03 m x 1.8 mm;
15 m x 1.5 m x 2.0 mm.

Rhenofol CG:
20 m x 2.05 m x 1.2 mm;
15 m x 2.05 m x 1.5 / 1.8 / 2.0 mm.

2.5 Base materials / Ancillary materials

Rhenofol CV and Rhenofol CG comprise (45-60)% polyvinyl chloride, (30-40)% phthalate plasticisers, (2-4)% epoxy-enhanced soy bean oil, (0.4-2)% mineral flame retardants, (1-3)% stabilisers, (3-10)% titanium dioxide and (0-2.0)% carbon black and additives (silicon dioxide and acrylate). Rhenofol CG also contains (0.05-0.15)% of a biocide based on isothiazolinone.
No materials are used which are included in the /REACH/ list of candidates.

2.6 Manufacture

The PVC mixture for Rhenofol CV and Rhenofol CG is produced via a dry blend. After homogenisation and jellifying in the heating mixer, the mixture is added to the cooling mixer from where it is plastified with an extruder and mixing roll and shaped as foil using calendar technology. A second processing stage involves reinforcement of these foils with a roving or woven or an internal layer glass fleece via a doubling calendar to form Rhenofol CV and Rhenofol CG.

Production is subject to the quality management system introduced in accordance with /ISO 9001/ (certificate register 12 100 22279 TMS). The certification agency is TÜV Süd Management Service.

External quality monitoring and tests are also performed by the /State Material Testing Institute in Darmstadt/ as well as the /BBA/ (British Board of Agrément, certificate No. 98/3491), FM Approvals (CV

1.2 and CV 1.5: Index No. GE3492F) and /Intron Certificatie B.V./ (KOMO attest).

2.7 Environment and health during manufacturing

Over and beyond national guidelines, environmentally-friendly processes are used in the production of Rhenofol CV and Rhenofol CG, e.g.
> an electric separator is used for waste air which achieves a high degree of waste air purity,
> waste heat for heating and hot water is used in the energy-efficient production processes (Energy Management System as per /DIN 50 001/) and
> the production waste incurred is redirected to the production circuit in the form of in-company recycling.

In order to ensure the health and safety of employees, workplace designs are continuously improved for the purpose of physical relief and optimised ergonomics and regular seminars are held on the topic of health and safety.

2.8 Product processing/Installation

Rhenofol CV and Rhenofol CG are rolled out on the roof and joined at the seams by hot air welding or solvent-welding agent.

No particular measures concerning health and safety are required when hot air welding on the roof.

When joining seams with solvent-welding agent, the following points must be maintained:
- Avoid contact with the skin and eyes
- Wear gloves
- No smoking, no naked flames, avoid sparking
- Do not inhale vapours, only use outdoors or in well-ventilated rooms

Rhenofol CV is mechanically fastened.

Rhenofol CG is laid loosely and ballasted e.g. with gravel or tile surfaces and under green areas.

More information on installation is outlined in the technical manual.

2.9 Packaging

Nine rolls of Rhenofol CV or Rhenofol CG are stored on two Euro pallets covered with a PE hood. A protective separating layer made of cardboard is between the Euro pallets and rolls and the top side of the rolls features a protective cardboard sheet. The rolls are secured by four wooden wedges. The pallet is shrink-wrapped in PE stretch foil and bound by four plastic straps.

All packaging materials are recyclable.

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2.10 Condition of use

On the basis of long-term experience, there are no relevant changes concerning material composition for the period of use of Rhenofol CV and Rhenofol CG.

2.11 Environment and health during use

There are no references to possible material emissions during the use phase for Rhenofol CV and Rhenofol CG. Accordingly, there are no indications of impacts on health and the Environment.

2.12 Reference service life

Under normal conditions and correct installation, empirical values indicate that Rhenofol CV and Rhenofol CG have a life cycle of 35 years and more; please refer to the attached BBA Agrément Certificate No. 98/3491.

2.13 Extraordinary effects

Fire

Rhenofol CV and Rhenofol CG

Name	Value
Performance in case of external fire exposure to roofs, /DIN CEN/TS 1187/	Rhenofol CV and CG: B (t1) / passed
Reaction to fire tests /DIN EN ISO 11925-2/; /DIN EN 13501-1/	E
Burning droplets	-
Smoke gas development	-

Comments:
Rhenofol CV:
The B roof (t1) test results to /ENV 1187/ apply for the roof build-ups tested on behalf of FDT.
Rhenofol CG:
No additional requirements are made on fire safety (ballasted roofs).
Hydrochloric gases and dioxins can arise in the event of a fire.

Water

The materials used for Rhenofol CV and Rhenofol CG are not water-soluble.

Mechanical destruction

There are no known negative consequences for the environment in the event of unforeseen mechanical destruction of Rhenofol CV or Rhenofol CG.

2.14 Re-use phase

Rhenofol CV and Rhenofol CG are not reused in their original form once the use phase has expired. When separated by type, Rhenofol CV and Rhenofol CG can be directed to the "ROOFCOLLECT" collection system (recycling system for synthetic roofing and water-proofing membrane systems). This collection system manufactures a recyclate from the old roofing membranes which can be used for a variety of applications, e.g. for garden slabs or noise-insulating boards.

Thermal utilisation is also possible with the result that the energy contained in Rhenofol CV and Rhenofol CG is released and used during incineration.

2.15 Disposal

After Rhenofol CV and Rhenofol CG have fulfilled their function, they are directed towards thermal utilisation; please refer to 2.14. The roofing membranes can be

allocated to number 170904 or 200139 in the /List of Wastes Ordinance/.

2.16 Further information

More information on Rhenofol CV and Rhenofol CG in the form of brochures, data sheets, installation instructions and technical manuals can be found on the FDT website (www.fdt.de).

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 m² Rhenofol CV/CG of roof membrane produced.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Grammage	2.6	kg/m^2
Type of sealing	Thermisches Verschweißen	-
Conversion factor to 1 kg	0.384615385	-
Thickness	1,8	mm

For IBU core EPDs (where clause 3.6 is part of the EPD): for average EPDs, an estimate of the robustness of the LCA values must be made, e.g. concerning variability of the production process, geographical representatively and the influence of background data and preliminary products compared to the environmental impacts caused by actual production.

3.2 System boundary

This Life Cycle Analysis addresses the life cycle stage of product manufacturing (cradle to gate). The product stage comprises Module A1 (Raw material supply), A2 (Transport), A3 (Production) in accordance with EN 15804 including the provision of all materials, products and energy. Waste indicated in A1-A3 only concerns that which is recycled internally.

3.3 Estimates and assumptions

The lubricant comprises a 50:50 mixture of methyl methacrylate and butyl acrylate. The methyl methacrylate data record with the higher effect was used as a worst-case scenario. This is modelled as 100% for raw material mixtures in which one component accounts for at least 95%.

3.4 Cut-off criteria

All data from the operating data survey was taken into consideration in the analysis, i.e. all starting materials used according to the recipe, the thermal energy used as well as electricity. Transport costs were considered for all inputs and outputs.

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3.5 Background data

The primary data was provided by FDT FlachdachTechnologie GmbH Co. KG. The relevant background data was taken from the /GaBi 8/ data base. The German power mix was applied.

3.6 Data quality

The representativity can be classified as very good. Manufacturing of the synthetic roofing membrane systems was modelled using primary data from FDT FlachdachTechnologie GmbH Co. KG. All other relevant background data records were taken from the /GaBi 8/ software data base and are less than 7 years old.

3.7 Period under review

The volumes of raw materials, energy, auxiliaries and consumables used are considered as average annual values in the Hemsbach manufacturing plant. FDT Flachdach Technologie GmbH & Co. KG has confirmed that the data continues to be valid in 2017 as there have been no essential changes made since data collation in 2017 in terms of:

- product composition,
- production-related energy consumption and energy sources used,
- direct process emissions, e.g. into air,
- types and volumes of waste and
- production technology.

The site of the production facility remains unchanged.

3.8 Allocation

Production waste which is re-used internally (the edge trims in production) is modelled as closed-loop recycling in Modules A1-A3.

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 used background database has to be mentioned. The used background database is /GaBi databse version SP34/.

4. LCA: Scenarios and additional technical information

Disposal
It can be assumed that in 80% of current roof refurbishments the roofing membranes remains on the roof and serves as an underlay for a new covering. Accordingly, in most cases disposal of the roofing membrane occurs later when the building is demolished and this subsequent use means that it is no longer within the system boundaries considered here. Under such conditions, disposal as municipal solid waste can therefore be assumed for 20% of waste (25% incineration, 75% landfilling).
No scenarios are considered in this Life Cycle Analysis of synthetic roofing membrane systems.

Packaging
The following packaging materials were declared for the analysis of 1 m^2 roofing membrane:

- 1g PE stretch foil
- 6g cardboard packaging box

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

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	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² Dachbahn Rhenofol CV/CG

Parameter	Unit	A1-A3
Global warming potential	[kg CO_2-Eq.]	7.03E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.58E-10
Acidification potential of land and water	[kg SO_2-Eq.]	3.08E-2
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	2.42E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	3.02E-3
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.09E-2
Abiotic depletion potential for fossil resources	[MJ]	1.47E+2

RESULTS OF THE LCA - RESOURCE USE: 1 m² Dachbahn Rhenofol CV/CG

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier	[MJ]	1.39E+1
Renewable primary energy resources as material utilization	[MJ]	1.95E+0
Total use of renewable primary energy resources	[MJ]	1.59E+1
Non-renewable primary energy as energy carrier	[MJ]	8.72E+1
Non-renewable primary energy as material utilization	[MJ]	6.73E+1
Total use of non-renewable primary energy resources	[MJ]	1.54E+2
Use of secondary material	[kg]	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0
Use of net fresh water	[m³]	4.99E-2

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² Dachbahn Rhenofol CV/CG

Parameter	Unit	A1-A3
Hazardous waste disposed	[kg]	1.54E-6
Non-hazardous waste disposed	[kg]	1.09E-1
Radioactive waste disposed	[kg]	2.85E-3
Components for re-use	[kg]	0.00E+0
Materials for recycling	[kg]	0.00E+0
Materials for energy recovery	[kg]	0.00E+0
Exported electrical energy	[MJ]	0.00E+0
Exported thermal energy	[MJ]	0.00E+0

6. LCA: Interpretation

Indicators of the Life Cycle Inventory Analysis

The primary energy used for 1 m² average roofing membrane comprises approx. 154 MJ/m2 from non-renewable primary energy sources (**PENRT**). Primary energy use decreased by 17% compared to the results of 2013. The use of PVC (44%) and plasticizers (38%) has a relevant influence.

Approx. 15.9 MJ/m2 are procured from renewable primary energy (**PERT**), which is practically double the value of 2013 (factor of 1.8), of which PVC has a relevant influence (39%), while the power mix required in the primary system (21%) and manufacturing of the stabilising agent (12%) have a certain influence.

Waste

46% of radioactive waste **(RWD)** is incurred by manufacturing of PVC, 25% by the power mix and 14% by the manufacture of plasticizers. 30% of non-hazardous waste for disposal (**NHWD**) is incurred by pigments, 27% by PVC, 15% by plasticizers and 10% by glass fleece. Approx. 96% of hazardous waste for disposal (**HWD**) is incurred by the manufacture of PVC.

Indicators of estimated impacts

In the dominance analysis for Rhenofol CV and Rhenofol CG 1.8 mm, it transpires that the manufacture of PVC, plasticizers and pigments

represents the main drivers in the various environmental categories.

42% of the global warming potential (**GWP**) is caused by the PVC used, 29% by plasticizers and 10% is attributable to thermal energy. PVC has a significant influence on the ozone depletion potential (**ODP**) accounting for 96%. Pigments contribute 43%, PVC 23% and plasticizers 14% to the acidification potential (**AP**). Stabilising agents, electricity and thermal energy have a lower influence. The eutrophication potential (**EP**) is accounted for by 33% plasticizers, 27% PVC and 17% stabilising agents. The photochemical ozone creation potential (**POCP**) is primarily caused by NMVOC emissions, but also nitrogen oxide, methane, sulphuric oxide and carbon monoxide. The manufacture of PVC accounts for a relevant share of 37% with plasticizers incurring 34%. Pigments have an influence accounting for 25%. In a consideration of the abiotic depletion of fossil resources (**ADP f**ossil), the manufacture of PVC is dominant with 44% while plasticizers production accounts for 39%. The pigments used account for 99.9% of abiotic depletion of non-fossile resources (**ADP E**lementary).

7. Requisite evidence

No evidence is required.

8. References

/IBU 2016/
IBU (2016): General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V., Version 1.1 Institut Bauen und Umwelt e.V., Berlin.
www.ibu-epd.de

/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 2014, Part B
PCR instructions for construction -related products and services in the construction products group pertaining to synthetic and elastomer roofing membrane systems, version 1.3, 07-2014

IBU 2017, Part A
PCR – Part A: Calculation rules for the LCA and requirements on the Background Report, Version 1.6, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2017

AVV: 2001-12, Ordinance on the List of Wastes dated 10 December 2001 (BGBl. I p. 3379), last amended by Article 2 of the Directive dated 17 July 2017 (BGBl. I, p. 2644)

CPR (Construction Products Regulation): Directive (EU) No. 305/2011 of the European Parliament and Council dated 9 March 2011 on specifying harmonised conditions for marketing building products (Construction Products Regulation)

DIN EN 495-5:2013-08, Flexible sheets for waterproofing – Determination of foldability at low temperature – Part 5: Plastic and rubber sheets for roof waterproofing

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

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

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 1847:2010-4, Flexible sheets for waterproofing – Plastics and rubber sheets for roof waterproofing – Methods for exposure to liquid chemicals, including water

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

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

ISO 9001:2015-11, Quality management systems – Requirements

DIN EN ISO 11925-2:2011-02, Reaction to fire tests – Ignitability of products subjected to direct impingement of flame

DIN EN 12310-2:2000-12, Flexible sheets for waterproofing – Determination of resistance to tearing – Part 2: Plastic and rubber sheets for roof waterproofing

DIN EN 12311-2:2013-11, Flexible sheets for waterproofing – Determination of tensile properties – Part 2: Plastic and rubber sheets for roof waterproofing

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

DIN EN 12317-2:2010-12, Flexible sheets for waterproofing – Determination of shear resistance of

joints – Part 2: Plastic and rubber sheets for roof waterproofing

DIN EN 12691:2006-06, Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Determination of resistance to impact

DIN EN 12703:012-06, Adhesives for paper and board, packaging and disposable sanitary products – Determination of low temperature flexibility or cold crack temperature

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

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

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 13956:2013-03, Flexible sheets for waterproofing – Plastic and rubber sheets for roof waterproofing – Definitions and characteristics

DIN EN ISO 14025:2009-11, Environmental labels and declarations – Type III environmental declarations – Principles and procedures

DIN EN ISO 50001:2011-12, Energy management systems – Requirements with guidance for use

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

DIN V 20000-201:2015-08, Use of construction products in construction works – Part 201: Adaptation standard for flexible sheets for waterproofing according to European standards for use as waterproofing of roofs

DIN V 20000-202:2016-03, Use of construction products in construction works – Part 202: Adaptation standard for flexible sheets for waterproofing according to European standards for use as waterproofing

FPC certificate: EC certificate of conformity of factory production control (FPC)

GaBi 8: thinkstep AG; GaBi 8: software and data base for comprehensive analysis; copyright, TM Stuttgart, Echterdingen, 1992-2018

GaBi data base, version SP34: documentation of GaBi 8 data sets in the Data Base for Comprehensive Analysis; copyright, TM Stuttgart, Echterdingen, 1992-2018

REACH: Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency

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