Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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European Technical Assessment

ETA-13/0557 of 8 July 2021

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	"Spardach", "Leichtdach", "Naturdach", "Retentionsdach Mäander 30", "Retentionsdach Mäander 60", "Retentionsdach Drossel intensiv", "Retentionsdach Drossel extensiv", "Gartendach", "Landschaftsdach", "Solargründach"
Product family to which the construction product belongs	Kit for Green Roofs
Manufacturer	Optigrün international AG Am Birkenstock 19 72505 Krauchenwies DEUTSCHLAND
Manufacturing plant	Optigrün international AG Am Birkenstock 19 72505 Krauchenwies DEUTSCHLAND
This European Technical Assessment contains	19 pages including 1 annex which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 220009-00-0401

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Specific part

1 Technical description of the product

This European Technical Assessment applies to the kits for green roofs with the following designations:

- "Spardach" (Extensive Green Roof) – Type 1
- "Leichtdach" (Extensive Green Roof) – Type 2
- "Naturdach" (Basic intensive Green Roof) – Type 3
- "Retentionsdach Mäander 30" (Extensive Green Roof) – Type 4
- "Retentionsdach Mäander 60" (Extensive Green Roof) – Type 5
- "Retentionsdach Drossel intensiv" (Intensive Green Roof) – Type 6
- "Retentionsdach Drossel extensiv" (Extensive Green Roof) – Type 7
- "Gartendach" (Intensive Green Roof) – Type 8
- "Landschaftsdach" (Intensive Green Roof) – Type 9
- "Solargründach" (Extensive Green Roof) – Type 10

The kits consist of the components specified in table 1, which are factory-made by the approval holder or a supplier. The kits are manufactured on site from these components.

The kits and components do not contain any substances that are intended to inhibit or prevent root penetration (protective agents for root penetration).

The European Technical Assessment has been issued for the products on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the products that have been assessed. The European Technical Assessment applies only to products corresponding to this agreed data/information.

The kits are placed above the roof covering on flat roofs and sloped roofs, respectively with a roof pitch of a maximum of 15°.

The roof covering and the greening (plants) are not included in the kit.

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Table 1: Components of the kits for green roofs

	Components (bottom – up)	Kit (Type)	Type of material	Dimensions, Thickness, mass surface density
Root barrier layer **(optional)**	TWB 1,0	1 - 10	PVC-P	2.00 m x 20.00 m, 0.95 mm, 1.29 kg/m²
	PELD 0,5	1 - 10	PELD	4.00 m/6.00 m/ 8.00 m x 25,00 m, 0.5 mm, 0.5 kg/m²
Protection mat	RMS 300	1 – 5, 7	PP/PES/ Acryl-Recycling-fibres	2.00 m x 50.00 m, 3.6 mm, 300 g/m²
	RMS 500	8, 10	PP/PES/ Acryl-Recycling-fibres	2.00 m x 50.00 m, 4.0 mm, 500 g/m²
	RMS 900	6, 9	PP/PES/ Acryl-Recycling-fibres	2.00 m x 25.00 m, 6.0 mm, 900 g/m²
	RSV 120 (only for inverted roof)	1 - 10	PP (Polypropylen)	4.50 m x 100.00 m, 0.75 mm, 120 g/m²
Drainage element	FKD 25	1, 2, 10	HDPE – made from regenerated recycling-material	1.00 m x 2.00 m, 25 mm, 1.35 kg/m²
	FKD 40	3, 8	HDPE – made from regenerated recycling-material	1.00 m x 2.00 m, 40 mm, 2.30 kg/m²
	FKD 40L	3	HDPE – made from regenerated recycling-material	1.00 m x 2.00 m, 40 mm, 1.80 kg/m²
	FKD 55	1, 2, 3	EPS (without HBCD)	0.70 m x 1.195 m, 55 mm, 555 g/m²
	FKD 60BO	8, 9	HDPE – made from regenerated recycling-material	1.004 m x 2.34 m, 60 mm, 2.50 kg/m²
	FKM 30	4	HDPE – made from regenerated recycling-material	1.03 m x 1.95 m, 30 mm, 1.70 kg/m²
	FKM 60	5	HDPE – made from regenerated recycling-material	0.95 m x 1.90 m, 60 mm, 2.30 kg/m²
	WRB 80F	7, 10	HDPE – made from regenerated recycling-material	0.55 m x 1.964 m, 80 mm, 3.60 kg/m²
	WRB 85i	6	PP-(Polypropylen) made from regenerated recycling-material	0.71 m x 0.71 m, 85 mm, 5.60 kg/m²

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	Components (bottom – up)	Kit (Type)	Type of material	Dimensions, Thickness, mass surface density
Filter fleece	FIL 105	1, 3, 4, 5, 8, 9	Polypropylen (PP)	2.00 m x 100.00 m, 1.1 mm, 105 g/m²
	FIL 150	8, 9, 10	Polypropylen (PP-continuous filament/fibre)	2.00 m x 90.00 m, 1.2 mm, 150 g/m²
	FIL 300	6 - 10	Polypropylen (PP)	2.00 m x 60.00 m, 3.0 mm, 300 g/m²
	RMS 500K	6, 7, 10	PES	2.00 m x 35.00 m, 3.6 mm, 500 g/m²
Vegetation support layer	Systemerde E leicht	1, 3, 4, 5 7, 10	Mineral Multilayer aggregate	60 – 250 mm, approx. 47 – 198 kg/m² (dry)
	Systemerde E schwer	1, 3, 4, 5 7, 10	Mineral Multilayer aggregate	60 – 250 mm, approx. 58 – 242 kg/m² (dry)
	Systemerde L	2	Mineral Light aggregate	30 – 60 mm, approx. 12 – 24 kg/m² (dry)
	Systemerde U leicht	9	Mineral aggregate base	0 – 1500 mm, approx. 0 – 1305 kg/m² (dry)
	Systemerde U schwer	9	Mineral aggregate base	0 – 1500 mm, approx. 0 – 2105 kg/m² (dry)
	Systemerde i leicht	6, 8, 9	Mineral Intensive aggregate	230 – 350 mm, approx. 202 – 308 kg/m² (dry)
	Systemerde i schwer	6, 8, 9	Mineral Intensive aggregate	230 – 350 mm, approx. 241 – 367 kg/m² (dry)

2 Specification of the intended use in accordance with the applicable European Assessment Document

The Kits are used for the production of green roofs. They protect the roof covering from UV radiation, temperature differences, and mechanical damage.

By the use of the Kits, a part of the incoming perceptible water can be held back and thus costs for the drainage systems will be reduced.

The selection of the Kits in conjunction with an appropriate planting depends on the concrete conditions at the place of installation and is not the subject of this European Technical Assessment.

The performance according to section 3 only applies if the Kits and the components are installed according to the manufacture's installation instructions and planning guidelines and according to annex A and if they are protected by appropriate measures (e.g. packaging or covering) from weathering, solar radiation (UV) and mechanical damage during transport, storage and installation.

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The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the Kits of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

For sampling, conditioning and testing the provisions of the EAD No. 220009-00-0401 "kits for green roofs" apply.

3.1 Performance of the assembled system / kit for green roofs

3.1.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
External fire performance	No performance assessed.

3.1.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed.
The drainage elements contain a coloring additive which has also an UV-stabilizing effect. The filter fleeces contain UV stabilizers.	

3.1.3 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Discharge coefficient / Runoff reference value C test acc. to Annex 2 of the "Green Roofing Guideline" - Guideline for the Planning, Construction and Maintenance of Green Roofing (FLL)	applicable to roof slopes ≤ 18 % with the given roof build-up (bottom - up) for rainfall (duration: 15 minutes) with r = 300 l/(s x ha)
Retentionsdach Mäander 30 RMS 300, FKM 30, FIL 105, Substrat E leicht (d = 60 mm)	C = 0.01 (with 2 % roof slope) C = 0.15 (with 9 % roof slope) C = 0.24 (with 18 % roof slope)
FKM 30 (without aggregate)	C = 0.29 (with 2 % roof slope)
Retentionsdach Mäander 60 RMS 300, FKM 60, FIL 105, Substrat E leicht (d = 60 mm)	C = 0.08 (with 0 % roof slope) C = 0.17 (with 2 % roof slope)
Retentionsdach Mäander 60 RMS 300, FKM 60, FIL 105, Substrat E leicht (d = 80 mm)	C = 0.05 (with 0 % roof slope) C = 0.13 (with 2 % roof slope)
FKM 60 (without aggregate)	C = 0.09 (with 0 % roof slope) C = 0.24 (with 2 % roof slope)

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Essential characteristic	Performance
Leichtdach RMS 300, FKD 25, Substrat L (approx. 30 l/m²)	C = 0.64 (with 0 % roof slope) C = 0.65 (with 2 % roof slope)
Naturdach RMS 300, FKD 40, FIL 105, Substrat E leicht (d = 60 mm)	C = 0.41 (with 0 % roof slope) C = 0.56 (with 2 % roof slope)
Naturdach RMS 300, FKD 40, FIL 105, Substrat E leicht (d = 80 mm)	C = 0.37 (with 0 % roof slope) C = 0.50 (with 2 % roof slope)
Naturdach RMS 300, FKD 40, FIL 105, Substrat E leicht (d = 100 mm)	C = 0.27 (with 0 % roof slope) C = 0.45 (with 2 % roof slope)

3.2 Performance of the individual components

3.2.1 Root barrier layer

3.2.1.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	No performance assessed.

3.2.1.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed.

3.2.1.3 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Resistance to root penetration test acc. to EN 13948:2008 Wurzelschutzbahn TWB 1,0 Wurzelschutzbahn PELD 0,5	 No performance assessed. root-resistant
Resistance to rhizomes test acc. to Annex 3 of the "Green Roofing Guideline" - Guideline for the Planning, Construction and Maintenance of Green Roofing (FLL) Wurzelschutzbahn TWB 1,0 Wurzelschutzbahn PELD 0,5	 No performance assessed. rhizome-resistant to couch grass
Behaviour after storage on bitumen	No performance assessed.
Resistance to ozone	No performance assessed.

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Long-term exposure under temperature and humidity load Wurzelschutzbahn TWB 1,0 Wurzelschutzbahn PELD 0,5	 No performance assessed. No performance assessed.
Microbiological resistance	No performance assessed.
Tensile strength	No performance assessed.

3.2.2 Protection mat

3.2.2.1 Safety in case of fire (BWR 2)

Essential characteristic	**Performance**
Reaction to fire	No performance assessed.

3.2.2.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	**Performance**
Content, emission and/or release of dangerous substances	No performance assessed.

3.2.2.3 Safety and accessibility (BWR 4)

Essential characteristic	**Performance**
Protection efficiency Schutzmatte RMS 300 Schutzmatte RMS 500 Schutzmatte RMS 900 Schutzmatte RSV 120	Residual thickness s_r No performance assessed. No performance assessed. No performance assessed. No performance assessed.
Behaviour under point loads test acc. to EN ISO 12236:2006 Schutzmatte RMS 300 Schutzmatte RMS 500 Schutzmatte RMS 900 Schutzmatte RSV 120	 $F_P \leq 1.0$ kN $F_P \leq 1.5$ kN $F_P \leq 2.3$ kN No performance assessed.
Tensile strength Schutzmatte RMS 300 Schutzmatte RMS 500 Schutzmatte RMS 900 Schutzmatte RSV 120	 No performance assessed. No performance assessed. No performance assessed. No performance assessed.
Durability test acc. to EN 13252:2000+A1:2005 (Annex B) and EAD, Annex B Schutzmatte RMS 300 Schutzmatte RMS 500 Schutzmatte RMS 900 Schutzmatte RSV 120	Tensile strength of the protection mats, tested according to EN 29073-3:1992 before and after each aging conditioning. No performance assessed. No performance assessed. No performance assessed. No performance assessed.

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3.2.3 Drainage element (without thermal insulating properties)

3.2.3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire test acc. to EN ISO 11925-2:2010 Dränelement FKD 40 Dränelement WRB 85i	 Klasse E gemäß EN 13501-1:2007+A1:2009 Klasse E gemäß EN 13501-1:2007+A1:2009
Dränelement FKD 20 Dränelement FKD 20 R Dränelement FKD 25 Dränelement FKD 40 L Dränelement FKD 55 Dränelement FKD 60 BO Dränelement FKM 30 Dränelement FKM 60 Dränelement WRB 80F	No performance assessed.

3.2.3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed.
The drainage elements contain a coloring additive which has also an UV-stabilizing effect.	

3.2.3.3 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Water flow capacity in the plane test acc. to EN ISO 12958:2010 (with the given boundary conditions)	
Dränelement FKD 25 (rigid/soft, 5 kPa)	i = 0.01 : 1.02 l/(m·s) i = 0.02 : 1.47 l/(m·s) i = 0.10 : 3.09 l/(m·s) i = 1.00 : 10.28 l/(m·s)
Dränelement FKD 25 (rigid/soft, 20 kPa)	i = 0.01 : 0.97 l/(m·s) i = 0.02 : 1.40 l/(m·s) i = 0.10 : 3.26 l/(m·s) i = 1.00 : 10.05 l/(m·s)
Dränelement FKD 25 (soft/soft, 20 kPa)	i = 1.00 : 5.24 l/(m·s)
Dränelement FKD 40 (rigid/soft, 5 kPa)	i = 0.01 : 1.87 l/(m·s) i = 0.02 : 2.63 l/(m·s) i = 0.10 : 5.87 l/(m·s) i = 1.00 : 17.74 l/(m·s)

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Essential characteristic	Performance
Dränelement FKD 40 (rigid/soft, 20 kPa)	i = 0.01 : 1.72 l/(m·s) i = 0.02 : 2.44 l/(m·s) i = 0.10 : 5.21 l/(m·s) i = 1.00 : 16.42 l/(m·s)
Dränelement FKD 40 (soft/soft, 20 kPa)	i = 0.1 : 4.00 l/(m·s) i = 1.0 : 11.4 l/(m·s)
Dränelement FKD 60 BO (soft/rigid, 20 kPa)	i = 0.01 : 1.58 l/(m·s) i = 0.02 : 2.29 l/(m·s) i = 0.10 : 5.15 l/(m·s) i = 1.00 : 16.83 l/(m·s)
Dränelement FKM 60 (soft/rigid, 20 kPa) (flow direction longitudinal)	i = 0.01 : 0.829 l/(m·s) i = 0.02 : 1.211 l/(m·s) i = 0.10 : 2.847 l/(m·s) i = 1.00 : 9.287 l/(m·s)
Dränelement FKM 60 (soft/rigid, 20 kPa) (flow direction lateral)	i = 0.01 : 0.484 l/(m·s) i = 0.02 : 0.696 l/(m·s) i = 0.10 : 1.659 l/(m·s) i = 1.00 : 5.488 l/(m·s)
Dränelement FKM 30 (rigid/rigid, 20 kPa)	i = 0.01 : 0.162 l/(m·s) i = 0.02 : 0.228 l/(m·s) i = 0.10 : 0.518 l/(m·s) i = 1.00 : 1.709 l/(m·s)
Dränelement WRB 85 i (rigid/soft, 5 kPa)	i = 0.01 : 4.52 l/(m·s) i = 0.02 : 6.30 l/(m·s) i = 0.10 : 13.64 l/(m·s)
Dränelement FKD 20 Dränelement FKD 20 R Dränelement FKD 40 L Dränelement FKD 55 Dränelement WRB 80F	No performance assessed.
Compression behaviour test acc. to EN ISO 25619-2:2008 Dränelement FKD 25 Dränelement FKM 30 Dränelement FKD 40 Dränelement FKD 60 BO Dränelement WRB 85i	compressive strength ≥ 180 kPa ≥ 100 kPa ≥ 200 kPa ≥ 85 kPa ≥ 800 kPa
Dränelement FKD 20 Dränelement FKD 20 R Dränelement FKD 40 L Dränelement FKD 55 Dränelement FKM 60 Dränelement WRB 80F	No performance assessed.
Compressive creep	No performance assessed.

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Essential characteristic	Performance
Durability test acc. to EN 13252:2000+A1:2005 (Annex B) and EAD, Annex B	Compressive strength of the drainage element, tested according to EN ISO 25619-2:2008 before and after each aging conditioning.
Dränelement FKD 20 Dränelement FKD 20 R Dränelement FKD 25 Dränelement FKD 40 L Dränelement FKD 55 Dränelement FKD 60 BO Dränelement FKM 30 Dränelement FKM 60 Dränelement WRB 80F Dränelement WRB 85i	No performance assessed.
Resistance to weathering acc. to EN 12224:2000 (430 h weathering) Dränelement FKD 40	 weathering resistant
Oxidation stability acc. to EN 13438:2004 Dränelement FKD 40 Dränelement FKD 25	 oxidation resistant oxidation resistant
Tensile strength	No performance assessed.

3.2.4 Filter fleece

3.2.4.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	No performance assessed.

3.2.4.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed.
The filter fleeces contain UV stabilizers.	

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3.2.4.3 Safety and accessibility (BWR 4)

Essential characteristic	**Performance**
Characteristic properties acc. to EN 13252 test acc. to EN 13252:2016	
Filtermatte 105	
Tensile strength test acc. to EN ISO 10319	7.5 kN/m
Static puncture test (CBR test) test acc. to EN ISO 12236	1200 N
Dynamic perforation test test acc. to EN ISO 13433	28 mm
Characteristic opening size test acc. to EN ISO 12956	105 µm
Water permeability characteristics (normal to the plane) test acc. to EN ISO 11058	0.13 m/s
Durability test acc. to EN 13252, Annex B	Maximum duration of exposure 2 weeks
Filtermatte RMS 500 K	
Tensile strength test acc. to EN ISO 10319	No performance assessed.
Static puncture test (CBR test) test acc. to EN ISO 12236	1700 N
Dynamic perforation test test acc. to EN ISO 13433	No performance assessed.
Characteristic opening size test acc. to EN ISO 12956	66 µm
Water permeability characteristics (normal to the plane) test acc. to EN ISO 11058	0.037 m/s
Durability test acc. to EN 13252, Annex B	No performance assessed.
Filtermatte 150	No performance assessed.
Filtermatte 300	No performance assessed.

3.2.5 Vegetation support layer

3.2.5.1 Safety in case of fire (BWR 2)

Essential characteristic	**Performance**
Reaction to fire	No performance assessed.

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3.2.5.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed.

3.2.5.3 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Particle size distribution test acc. to EN 933-1:2012	
Vegetationssubstrat Typ E leicht	
maximum particle size	18.0 mm
Fraction of particles ≤ 0,063 mm (plus ± 10 % tolerance)	9.0 % by mass
Fraction of particles > 4 mm (plus ± 10 % tolerance)	39.0 % by mass
Vegetationssubstrat Typ E schwer	
maximum particle size	18.0 mm
Fraction of particles ≤ 0,063 mm (plus ± 10 % tolerance)	6.9 % by mass
Fraction of particles > 4 mm (plus ± 10 % tolerance)	48.9 % by mass
Vegetationssubstrat Typ i leicht	
maximum particle size	18.0 mm
Fraction of particles ≤ 0,063 mm (plus ± 10 % tolerance)	12 % by mass
Fraction of particles > 4 mm (plus ± 10 % tolerance)	48 % by mass
Vegetationssubstrat Typ i schwer	
maximum particle size	16.0 mm
Fraction of particles ≤ 0,063 mm (plus ± 10 % tolerance)	11 % by mass
Fraction of particles > 4 mm (plus ± 10 % tolerance)	50 % by mass

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Essential characteristic	Performance
Vegetationssubstrat L	
maximum particle size	10.0 mm
Fraction of particles ≤ 0,063 mm (plus ± 10 % tolerance)	7.1 % by mass
Fraction of particles > 4 mm (plus ± 10 % tolerance)	47.5 % by mass
Vegetationssubstrat Typ U leicht	
maximum particle size	18.0 mm
Fraction of particles ≤ 0,063 mm (plus ± 10 % tolerance)	6 % by mass
Fraction of particles > 4 mm (plus ± 10 % tolerance)	51 % by mass
Vegetationssubstrat U schwer	No performance assessed.
Bulk density test acc. to EN 1097-3:1998	
Vegetationssubstrat Typ E leicht	0.79 – 1.14 g/cm³
Vegetationssubstrat Typ E schwer	0.97 – 1.41 g/cm³
Vegetationssubstrat Typ i leicht	0.83 – 1.33 g/cm³
Vegetationssubstrat Typ i schwer	1.05 – 1.50 g/cm³
Vegetationssubstrat U leicht	0.87 – 1.13 g/cm³
Vegetationssubstrat U schwer	No performance assessed.
Vegetationssubstrat L	No performance assessed.
Determination of the pH-value test acc. to EN 13037:2011	
Vegetationssubstrat Typ E leicht	7.0 – 9.0
Vegetationssubstrat Typ E schwer	6.0 – 8.5
Vegetationssubstrat Typ i leicht	6.0 – 8.5
Vegetationssubstrat Typ i schwer	6.5 – 8.5
Vegetationssubstrat L	6.5 – 8.5
Vegetationssubstrat U leicht	7.0 – 9.0
Vegetationssubstrat U schwer	No performance assessed.
Organic matter content test acc. to EN 13039:2011	
Vegetationssubstrat Typ E leicht	≤ 5.0 % by mass
Vegetationssubstrat Typ E schwer	≤ 6.5 % by mass
Vegetationssubstrat Typ i leicht	≤ 8.5 % by mass
Vegetationssubstrat Typ i schwer	≤ 4.0 % by mass
Vegetationssubstrat L	≤ 1.5 % by mass
Vegetationssubstrat U leicht	≤ 0.5 % by mass
Vegetationssubstrat U schwer	No performance assessed.

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Essential characteristic	**Performance**
Soluble nutrients content test acc. to EN 13651:2001	(plus ± 10 % tolerance)
Vegetationssubstrat Typ E leicht	
N	1 mg/l
P_2O_5	83 mg/l
K_2O	353 mg/l
Mg	83 mg/l
Vegetationssubstrat Typ E schwer	
N	3 mg/l
P_2O_5	176 mg/l
K_2O	25 mg/l
Mg	184 mg/l
Vegetationssubstrat Typ i leicht	
N	2 mg/l
P_2O_5	183 mg/l
K_2O	838 mg/l
Mg	141 mg/l
Vegetationssubstrat Typ i schwer	
N	4 mg/l
P_2O_5	179 mg/l
K_2O	788 mg/l
Mg	115 mg/l
Vegetationssubstrat L	
N	3 mg/l
P_2O_5	1 mg/l
K_2O	48 mg/l
Mg	6 mg/l
Vegetationssubstrat U leicht	
N	1 mg/l
P_2O_5	26 mg/l
K_2O	113 mg/l
Mg	35 mg/l
Vegetationssubstrat U schwer	No performance assessed.

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Salt content test acc. to EN 13038:2011	
Vegetationssubstrat Typ E leicht	≤ 1.0 g/l
Vegetationssubstrat Typ E schwer	≤ 2.5 g/l
Vegetationssubstrat Typ i leicht	≤ 2.0 g/l
Vegetationssubstrat Typ i schwer	≤ 2.0 g/l
Vegetationssubstrat L	≤ 0.5 g/l
Vegetationssubstrat U leicht	≤ 1.0 g/l
Vegetationssubstrat U schwer	No performance assessed.
Water permeability test acc. to Annex 2 of the "Green Roofing Guideline" - Guideline for the Planning, Construction and Maintenance of Green Roofing (FLL)	
Vegetationssubstrat Typ E leicht	0.11 cm/s
Vegetationssubstrat Typ E schwer	0.08 cm/s
Vegetationssubstrat Typ i leicht	0.009 cm/s
Vegetationssubstrat Typ i schwer	0.012 cm/s
Vegetationssubstrat L	0.41 cm/s
Vegetationssubstrat U leicht	0.115 cm/s
Vegetationssubstrat U schwer	No performance assessed.
Maximum water capacity test acc. to Annex 2 of the "Green Roofing Guideline" - Guideline for the Planning, Construction and Maintenance of Green Roofing (FLL)	
Vegetationssubstrat Typ E leicht	35.0 Vol.%
Vegetationssubstrat Typ E schwer	45.0 Vol.%
Vegetationssubstrat Typ i leicht	51.0 Vol.%
Vegetationssubstrat Typ i schwer	46.0 Vol.%
Vegetationssubstrat L	45.0 Vol.%
Vegetationssubstrat U leicht	27.0 Vol.%
Vegetationssubstrat U schwer	No performance assessed.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No 220009-00-0401 "kits for green roofs" the applicable European legal act is: Commission Decision 98/436/EC and 2001/596/EC (as amended).

The following system to be applied is: system 4

In addition, with regard to the essential characteristic (BWR 3) "Content, emission and/or release of dangerous substances", the following system to be applied is: system 3

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5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 8 July 2021 by Deutsches Institut für Bautechnik

Frank Iffländer
Head of Section

beglaubigt:
Getzlaff

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"Spardach", "Leichtdach", "Naturdach", "Retentionsdach Mäander 30", "Retentionsdach Mäander 60", "Retentionsdach Drossel intensiv", "Retentionsdach Drossel extensiv", "Gartendach", "Landschaftsdach", "Solargründach"

Annex A

The given performances for the kits and the individual components in clause 3 apply, if the following conditions regarding the structural assembly are met:

It will be used only components which are specified in clause 1 and which are compatible with each other.

To protect the roof waterproofing from root penetration a root barrier layer will be arranged, provided that no "root-resistant" roof waterproofing was performed. The entire roof including connections to other building components, penetrations, etc. will be carried out root-resistant.

The root barrier layer will be covered immediately after laying in order to avoid a longer weathering. The joints of the layers will be connected in a suitable manner.

Depending on the roof waterproofing executed, a suitable protection mat will be used.

It will be used only substrate which not contain any significant impurities.

Depending on the compressive strength of the drainage elements, these will be protected during the execution such that they will not be damaged.

For the protection mats, filter fleece and drainage elements, the following maximum durations of exposure after installation will be observed:

Table 2: Maximum duration of exposure of the protection mats, filter fleece and drainage elements

Protection mat /drainage element / filter fleece	**Maximum duration of exposure**
RMS 300	No performance assessed.
RMS 500	No performance assessed.
RMS 900	No performance assessed.
RSV 120	No performance assessed.
FKD 25	No performance assessed.
FKD 40	1 month
FKD 40L	No performance assessed.
FKD 55	No performance assessed.
FKD 60 BO	No performance assessed.
FKM 30	No performance assessed.
FKM 60	No performance assessed.
WRB 80F	No performance assessed.
WRB 85i	No performance assessed.
FIL 105	2 weeks
FIL 150	No performance assessed.
FIL 300	No performance assessed.
RMS 500K	No performance assessed.

The roof will be equipped with an appropriate drainage. For roofs with a roof pitch less than 2 % special requirements for dewatering and drainage are required.

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The roof will be designed such that no stagnant water will develop over a longer period of time. The roof structure, the roof pitch and the planting of the green roof will be coordinated.

The execution of the drainage will be carried out in accordance with EN 12056-3:2001 considering national provisions.

It will ensure that the roof system executed provides a sufficient resistance to wind load (wind suction), depending on the location of the building. The roof structure is designed such that it can transfer the additional loads from the green roof.

Only undamaged products will be used. The kits will be laid on surfaces which are sufficiently flat. The components will be laid single-layer.

When using plants with a strong rhizome growth (e.g. different types of bamboo), this will be taken into account by special measures in addition to the root barrier layer when executing.

Depending on the green roof carried out and the existing vegetation regular maintenance of the green roof is required (e.g. cleaning, removing unwanted vegetation, control of drainage, plant care).

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