

## European Technical Approval ETA-13/0668

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung  
*Trade name*

"Sedumteppich", "Steinrosenflur", "Lavendelheide", "Dachgarten"  
"Sedum Carpet", "Rockery Type Plants", "Heather with Lavender",  
"Roof Garden"

Zulassungsinhaber  
*Holder of approval*

ZinCo GmbH  
Lise-Meitner-Straße 2  
72622 Nürtingen  
DEUTSCHLAND

Zulassungsgegenstand  
und Verwendungszweck  
*Generic type and use  
of construction product*

Bausätze für Dachbegrünungen  
*Kits for Green Roofs*

Geltungsdauer:  
*Validity:* vom  
from  
bis  
to

22 June 2013  
22 June 2018

Herstellwerk  
*Manufacturing plant*

ZinCo GmbH  
Lise-Meitner-Straße 2  
72622 Nürtingen  
DEUTSCHLAND

Diese Zulassung umfasst  
*This Approval contains*

17 Seiten einschließlich 2 Anhänge  
*17 pages including 2 annexes*

## I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
  - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998<sup>4</sup>, as amended by Article 2 of the law of 8 November 2011<sup>5</sup>;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plants. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
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- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

<sup>1</sup> Official Journal of the European Communities L 40, 11 February 1989, p. 12  
<sup>2</sup> Official Journal of the European Communities L 220, 30 August 1993, p. 1  
<sup>3</sup> Official Journal of the European Union L 284, 31 October 2003, p. 25  
<sup>4</sup> *Bundesgesetzblatt Teil I* 1998, p. 812  
<sup>5</sup> *Bundesgesetzblatt Teil I* 2011, p. 2178  
<sup>6</sup> Official Journal of the European Communities L 17, 20 January 1994, p. 34

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of products and intended use

The kits for green roofs, hereinafter referred to as GRK (Green Roof Kits), are planned and executed according to the installation instructions of the approval holder deposited with Deutsches Institut für Bautechnik (DIBt).

The GRK consist of the components specified in section 1.1, which are factory-made by the approval holder or a supplier. The GRK are manufactured on site from these components. In the end, it is the approval holder who is responsible for the GRK.

#### 1.1 Definition of the construction product

The GRK are placed above the roof covering on flat roofs and sloped roofs, respectively with a roof pitch of a maximum of 15° and consist of the components stated in Table 1 (bottom-up).

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

The following Green Roof Kits can be executed:

- 1) Extensive Green Roof - Type "Sedum Carpet"
- 2) Extensive Green Roof - Type "Rockery Type Plants"
- 3) Basic intensive Green Roof - Type "Heather with Lavender"
- 4) Intensive Green Roof - Type "Roof Garden"

Table 1: Components of the kit for green roofs

	<b>Components</b> (see section 2.3 for more details, properties and performances)	GRK (Type)	Type of material	Dimensions, Thickness, mass surface density
<b>Root barrier layer</b>  <b>(optional)</b>	Root barrier layer WSB 100-PO	1,2,3,4	flexible Polyolefin (FPO), reinforced with polyester fabric	2.40 m x 30.5 m; Thickness: 1.1 mm; mass surface density: 1.13 kg/m <sup>2</sup>
<b>Protection mat</b>	Moisture Retention/Protection Mat SSM 45	1,2,3	approx. 70 % Polyester / approx. 30 % Polypropylene (both pre consumer recycled material)	2.00 m x 50.00 m; Thickness: approx. 5 mm; mass surface density: approx. 470 g/m <sup>2</sup>
	Insulation protection mat ISM 50	4	approx. 70 % Polyester / approx. 30 % Polypropylene (both pre consumer recycled material)	2.00 m x 25.00 m; Thickness: approx. 6 mm; mass surface density: approx. 850 g/m <sup>2</sup>
	Separation and protection mat TSM 32	1,2	Polyester (pre consumer recycled material)	2.00 m x 50.00 m; Thickness: approx. 3 mm; mass surface density: approx. 320 g/m <sup>2</sup>
	Irrigation and protection mat BSM 64	3	approx. 70 % Polyester / approx. 30 % Polypropylene (both pre consumer recycled material)	2.00 m x 25.00 m; Thickness: approx. 7 mm; mass surface density: approx. 650 g/m <sup>2</sup>

	<b>Components</b> (see section 2.3 for more details, properties and performances)	GRK (Type)	Type of material	Dimensions, Thickness, mass surface density
<b>Drainage element</b>	Floradrain FD 25	1,2	Polyethylene (HDPE) made from regenerated material	1.00 m x 2.00 m; Thickness: approx. 25 mm; mass surface density: approx. 1.7 kg/m <sup>2</sup>
	Floradrain FD 40	1,2,3,4	Polyethylene (HDPE) made from regenerated material	1.00 m x 2.00 m; Thickness: approx. 40 mm; mass surface density: approx. 2.2 kg/m <sup>2</sup>
	Fixodrain XD 20	1,2	Polyethylene (HDPE) made from regenerated material, with laminated geotextile made of polypropylene (PP)	1.00 m x 20.00 m; Thickness: approx. 20 mm; mass surface density: approx. 1.0 kg/m <sup>2</sup>
<b>Filter fleece</b>	System filter SF	1,2,3,4	Polypropylene (PP)	2.00 m x 100.00 m; Thickness: approx. 0.6 mm; mass surface density: approx. 0.10 kg/m <sup>2</sup>
<b>Vegetation support layer</b>	Sedum Carpet	1	-	60 – 80 mm, approx. 68 - 90 kg/m <sup>2</sup>
	Sedum Carpet - Light	1	-	60 – 80 mm, approx. 55 - 74 kg/m <sup>2</sup>
	Rockery Type Plants	2	-	70 – 100 mm, approx. 70 - 100 kg/m <sup>2</sup>
	Rockery Type Plants - Light	2	-	70 – 100 mm, approx. 56 - 80 kg/m <sup>2</sup>
	Heather with Lavender	3	-	100 – 200 mm, ca. 100 – 200 kg/m <sup>2</sup>
	Heather with Lavender - Light	3	-	100 – 200 mm, approx. 80 - 160 kg/m <sup>2</sup>
	Lawn	4	-	≥ 200 mm, ≥ 190 kg/m <sup>2</sup>
	Roof garden	4	-	≥ 200 mm, ≥ 200 kg/m <sup>2</sup>

## 1.2 Intended use

The GRK 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 GRK, 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 GRK 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 approval.

The provisions made in this European technical approval (ETA) are based on an assumed working life of the GRK of 25 years; provided that the conditions laid down in section(s) 4.2/5.1/5.2 for the packaging, transport, storage, installation, use, maintenance and repair are met. 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.

## 2 Characteristics of products and methods of verification

### 2.1 General

The assessment of the fitness of the GRK for the intended use was carried in accordance with the EOTA<sup>7</sup> assessment criteria No. 04.01/11 "Kits for Green Roofs" (Version May 2011).

### 2.2 Characteristics of the assembled system / kit for green roofs

#### 2.2.1 External fire performance

When observing the requirements given in Annex 1.1 and Annex 1.2 roof structures including the GRK satisfy the requirements of class B<sub>ROOF</sub> (t1) according to EN 13501-5:2005+A1:2009 without further testing.

#### 2.2.2 Discharge coefficient C / runoff reference value C

The discharge coefficient C / the runoff reference value C for different rainfalls r is determined according to clause 5 of attachment 2 of the "Green Roofing Guideline" - Guideline for the Planning, Construction and Maintenance of Green Roofing (2008 edition).

Table 2 lists the discharge coefficients as a function of the roof structure, applicable to roof slopes  $\leq 5^\circ$ .

<sup>7</sup> Deposited with Deutsches Institut für Bautechnik.

Table 2: Discharge coefficients C / runoff reference values C

Roof build-up	Rainfall	Discharge coefficient / runoff reference value C
≥ 70 mm Sedum Carpet System filter SF Fixodrain XD 20	300 l/(s x ha) / duration: 15 min	C = 0.6
≥ 85 mm Rockery Type Plants System filter SF Floradrain FD 25 Protection mat SSM 45	300 l/(s x ha) / duration: 15 min	C = 0.6
≥ 150 mm heather with lavender System filter SF Floradrain FD 40 Protection mat SSM 45	300 l/(s x ha) / duration: 15 min	C = 0.45

### 2.2.3 Resistance to wind loads

The assessment of the resistance to wind loads is not subject of the European technical approval. The verification shall be provided by the planner for the respective construction works taking account of EN 1991-1-4 as well as the relevant applicable national provisions.

### 2.2.4 Release of dangerous substances or radiation

Note: In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

The filter fleece "System filter SF" contains UV stabilizers.

## 2.3 Characteristics of the individual components

### 2.3.1 Root barrier layer

#### 2.3.1.1 Resistance of the root barrier layer to root penetration

The resistance of the root barrier layer to root penetration is determined according to EN 13948:2008.

The root barrier layer WSB 100-PO is "root-resistant".

#### 2.3.1.2 Resistance of the root barrier layer to rhizomes

The resistance of the root barrier layer to rhizomes is determined in accordance with Appendix 3 of the "Green Roof Guideline" (2008 edition).

The root barrier layer WSB 100-PO is "rhizome-resistant to couch grass".

#### 2.3.1.3 Reaction to fire of the root barrier layer

No performance determined.

#### 2.3.1.4 Behaviour of the root barrier layer after storage on bitumen.

No performance determined.

#### 2.3.1.5 Resistance of the root barrier layer to ozone

No performance determined.

2.3.1.6 Long-term exposure under temperature and humidity load

The tensile strength of the root barrier layer is determined in accordance with EN 12311-2:2010 before and after the following conditionings.

- a. Temperature load: 28 days at  $70 \pm 2$  °C (in accordance with EN 1296:2001)
- b. Humidity load: 28 days at  $60 \pm 2$  °C (in accordance with EN 1847:2010)

The tensile strength of the root barrier layer is reduced by no more than 5 % after the temperature and moisture load.

2.3.1.7 Microbiological resistance

No performance determined.

**2.3.2 Protection mat**

2.3.2.1 Protection efficiency

The protection efficiency of the protection mats is determined according to EN ISO 13428:2005. The percentage of the residual thickness  $s_r$  of the initial thickness of the lead plates is given in Table 3.

Table 3: Percentage of the residual thickness of the lead plates

Protection mat	Residual thickness in %
Separation and protection mat "TSM 32"	$\geq 20$
Moisture Retention/Protection Mat "SSM 45"	$\geq 25$
Irrigation and protection mat "BSM 64"	$\geq 30$
Insulation protection mat "ISM 50"	$\geq 40$

2.3.2.2 Behaviour under point loads

The behaviour of the protection mat under point loads is tested according to EN ISO 12236:2006.

The results are listed in Table 4.

Table 4: Behaviour under point load

Protection mat	$F_P$ [kN]
Separation and protection mat "TSM 32"	$\geq 2.0$
Moisture Retention/Protection Mat "SSM 45"	$\geq 2.0$
Irrigation and protection mat "BSM 64"	$\geq 3.0$
Insulation protection mat "ISM 50"	$\geq 3.5$

2.3.2.3 Tensile strength of the protection mat

No performance determined.

2.3.2.4 Durability of the protection mat

The durability of the protection mat is determined for a working life of 25 years in accordance with Annex B of EN 13252 in conjunction with the EOTA assessment criteria No. 04.01/11 "Kits for Green Roofs".

The tensile strength of the protection mats is tested according to EN 29073-3:1992 before and after each aging conditioning. The tensile strength after aging amounts to at least 50 % of the initial value.

The "Moisture Retention/Protection Mat SSM 45", the "Insulation protection mat ISM 50", the "Irrigation and protection mat BSM 64" and the "Separation and Protection Mat TSM 32" fulfil the requirements concerning resistance to weathering according to EN 12224:2000-11 (430 h weathering) and resistance to hydrolysis according to EN 12447:2001 (28 d exposure).



2.3.2.5 Reaction to fire of the protection mat

No performance determined.

**2.3.3 Drainage element**

2.3.3.1 Water flow capacity of the drainage element in the plane

The water flow capacity of the drainage element in the plane is tested according to EN ISO 12958:2010.

The water flow capacity determined of the drainage element in the plane, as well as the existing boundary conditions while testing are given in Table 6 of the ETA.

Table 6: Water flow capacity [in l/(m s) ]

	i = 0.01	i = 0.02	i = 0.10	i = 1.00	boundary conditions
Floradrain FD 40	0.896	1.282	3.040	10.25	rigid/rigid, 20 kPa
Floradrain FD 25	0.377	0.541	1.25	4.272	rigid/rigid, 20 kPa
Fixodrain XD 20	0.36	0.53	1.27	4.42	soft / rigid, 20 kPa

2.3.3.2 Reaction to fire of the drainage element

No performance determined.

2.3.3.3 Compression behaviour of the drainage element

The compressive strength is tested according to EN ISO 25619-2:2008.

The determined compressive strength of the drainage element is given in Table 7.

Table 7: Compressive strength

Drainage element	Compressive strength
Fixodrain XD 20	≥ 115 kPa
Floradrain FD 40	≥ 115 kPa
Floradrain FD 25	≥ 150 kPa

2.3.3.4 Compressive creep of the drainage element

No performance determined.

2.3.3.5 Durability of the drainage element

The durability of the drainage element shall be tested for a working life of 25 years according to Annex B of EN 13252:2000+A1:2005.

Before and after aging conditioning the compressive strength of the drainage element shall be determined according to EN ISO 25619-2:2008.

The drainage elements "Fixodrain XD 20", "Floradrain FD 40" and "Floradrain FD 25" fulfil the requirements concerning resistance to weathering according to EN 12224:2000 (430 h weathering) and oxidation stability according to EN 13438:2004.

2.3.3.6 Tensile strength of the drainage element

No performance determined.

## 2.3.4 Filter fleece

### 2.3.4.1 Characteristic properties according to EN 13252

The filter fleece "System filter SF" is a geotextile according to EN 13252:2000+A1:2005 with the characteristic properties for the functions "filtration" and "separation". The respective relevant properties are listed below.

- Tensile strength (according to EN ISO 10319) : 7 kN/m
- Static puncture test (CBR test) (according to EN ISO 12236) : 1100 N
- Dynamic perforation test (according to EN ISO 13433) : 35 mm
- Characteristic opening size (according to EN ISO 12956) : 95 µm
- Water permeability characteristics normal to the plane (according to EN ISO 11058) : 0.07 m/s
- Durability according to EN 13252, Annex B.

### 2.3.4.2 Reaction to fire of the filter fleece

No performance determined.

## 2.3.5 Vegetation support layer

### 2.3.5.1 Reaction to fire of the substrate

No performance determined.

### 2.3.5.2 Particle size distribution of the substrate

The particle size distribution of the substrate is determined according to EN 933-1:2012.

The maximum particle size as well as the fraction of particles < 0.063 mm and > 4 mm of the substrate are given in Table 9.

Table 9: Particle sizes

	Fraction of particles* ≤ 0.063 mm	Fraction of particles* > 4 mm	maximum particle size
Rockery Type Plants	7 % by mass	56 % by mass	13.0 mm
Rockery Type Plants - Light	8.5 % by mass	52 % by mass	8.0 mm
Roof garden	13 % by mass	30 % by mass	13.0 mm
Sedum Carpet	5 % by mass	73 % by mass	12.5 mm
Sedum Carpet - Light	6 % by mass	61 % by mass	12.5 mm
Heather with Lavender	8 % by mass	51 % by mass	8.0 mm
Heather with Lavender - Light	10 % by mass	38 % by mass	12.5 mm
Lawn	8 % by mass	36 % by mass	8.0 mm

\* plus ± 10 % tolerance

### 2.3.5.3 Bulk density of the substrate

The bulk density of the substrate is determined in accordance with EN 1097-3:1998.

The bulk density determined (tolerance included) is given in Table 10.

Table 10: Bulk density

	g/cm <sup>3</sup>
Rockery Type Plants	0.95 – 1.05
Rockery Type Plants - Light	0.80 – 0.90
Roof garden	0.95 – 1.05
Sedum Carpet	1.0 – 1.10
Sedum Carpet - Light	0.80 – 0.90
Heather with Lavender	0.95 – 1.05
Heather with Lavender - Light	0.70 – 0.80
Lawn	0.85 – 0.95

#### 2.3.5.4 Determination of the pH-value of the substrate

The pH-value of the substrate is determined according to EN 13037:2012.

The determined pH-value of the substrate is given in Table 11.

Table 11: pH-values (tolerance included)

	pH-value
Rockery Type Plants	7.0 – 9.0
Rockery Type Plants - Light	7.0 – 9.0
Roof garden	7.0 – 9.0
Sedum Carpet	7.5 – 9.5
Sedum Carpet - Light	7.0 – 9.0
Heather with Lavender	7.0 – 9.0
Heather with Lavender - Light	7.0 – 9.0
Lawn	7.5 – 9.5

#### 2.3.5.5 Determination of organic matter content

The organic matter content is determined according to EN 13039:2012.

The organic matter content determined is given in Table 12.

Table 12: Organic matter content

	% by mass
Rockery Type Plants	≤ 2.5
Rockery Type Plants - Light	≤ 5.0
Roof garden	≤ 6.5
Sedum Carpet	≤ 2.5
Sedum Carpet - Light	≤ 2.5
Heather with Lavender	≤ 5.5
Heather with Lavender - Light	≤ 8.5
Lawn	≤ 5.0

#### 2.3.5.6 Determination of soluble nutrients content

The soluble nutrients content is determined according to EN 13651:2002.

The soluble nutrients content (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, Mg) determined is given in Table 13.

Table 13: Soluble nutrients content (in [mg/l], plus  $\pm$  10 % tolerance)

	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	MgO
Rockery Type Plants	21	57	205	88
Rockery Type Plants - Light	16	74	520	212
Roof garden	7	70	343	128
Sedum Carpet	19	25	347	132
Sedum Carpet - Light	16	42	338	150
Heather with Lavender	16	63	505	269
Heather with Lavender - Light	17	109	610	225
Lawn	13	46	376	225

#### 2.3.5.7 Salt content and electrical conductivity

The salt content is determined according to EN 13038:2012.

The salt content determined is given in Table 14.

Table 14: Salt content

	g/l
Rockery Type Plants	$\leq 2.5$
Rockery Type Plants - Light	$\leq 3.0$
Roof garden	$\leq 2.0$
Sedum Carpet	$\leq 3.5$
Sedum Carpet - Light	$\leq 3.5$
Heather with Lavender	$\leq 2.5$
Heather with Lavender - Light	$\leq 3.0$
Lawn	$\leq 3.5$

#### 2.3.5.8 Water permeability of the substrate

The water permeability of the substrate is determined according to Appendix 2 of the "Green Roofing Guideline" (2008 edition).

The determined water permeability of the substrate "Rockery Type Plants" is 0.019 cm/s.

#### 2.3.5.9 Maximum water capacity of the substrate

The maximum water capacity of the substrate is determined according to Appendix 2 of the "Green Roofing Guideline" (2008 edition).

The determined maximum water capacity of the substrate "Rockery Type Plants" is 42.0 % by volume.

### 3 Evaluation and attestation of conformity and CE marking

#### 3.1 System of attestation of conformity

According to Decision 98/436/EC<sup>8</sup> of the European Commission amended by Decision 2001/596/EC<sup>9</sup>, system 4 of the attestation of conformity shall apply.

This system of attestation of conformity is defined in the following:

<sup>8</sup> Official Journal of the European Communities L 29/44, 03.02.1999

<sup>9</sup> Official Journal of the European Communities L 209/33, 02.08.2001

System 4: Declaration of conformity of the product by the manufacturer on the basis of:

Tasks for the manufacturer:

- (1) Initial type-testing of the product;
- (2) Factory production control.

Note: Approved bodies are also referred to as "notified bodies".

## 3.2 Responsibilities

### 3.2.1 Tasks for the manufacturer

#### 3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this European Technical Approval.

The manufacturer may only use raw materials listed in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the test and control plan which is part of the technical documentation of this European technical approval. The test and control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.<sup>10</sup>

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the test and control plan.

#### 3.2.1.2 Other tasks for the manufacturer

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

## 3.3 CE marking

The CE marking shall be affixed to the packaging or on the accompanying commercial documents, e.g. EC declaration of conformity. The letters "CE" shall be followed by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the European technical approval,
- identification of the product (trade name),

## 4 Assumptions under which the fitness of the products for the intended use was favourably assessed

### 4.1 Manufacturing

Depending on composition and manufacturing process the components of the GRK shall comply with those on which the approval tests were based.

<sup>10</sup> The test and control plan is a confidential part of the European technical approval and only handed over to the approved bodies involved in the procedure of attestation of conformity. See section 3.2.2.

The ETA is issued for the GRK on the basis of agreed data and information, deposited with DIBt, which identifies the GRK that has been assessed and judged. Changes to the GRK or the components or their manufacturing process, which could result in the deposited data and information being incorrect, shall be notified to DIBt before the changes are introduced. DIBt will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA, and if so whether further assessment or alterations to the ETA is required.

The substrate must not contain any significant impurities.

Only products according to Table 1 may be used. The individual components for the GRK shall be compatible with each other.

#### 4.2 Installation / Execution

The installation of the GRK takes place on site. The holder of approval is obliged to inform all persons entrusted with design and execution of the GRK of the Specific Conditions of this ETA and all further details necessary for a proper execution of the GRK.

Only the components may be used for the GRK that are specified in clause 1.

When installing the GRK, the processing instructions of the manufacturer shall be followed. The components shall be protected from weathering, solar radiation (UV) and mechanical damage during transport, storage and installation.

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

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

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

Depending on the compressive strength of the drainage elements, these shall 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 shall be observed:

Table 15: Maximum duration of exposure of the protection mats, filter fleece and drainage elements

Protection mat /drainage element / filter fleece	Maximum duration of exposure
System filter SF	2 weeks
Moisture Retention/Protection Mat SSM 45	2 weeks
Insulation protection mat ISM 50	2 weeks
Irrigation and protection mat BSM 64	2 weeks
Separation and protection mat TSM 32	2 weeks
Floradrain FD 25	1 month
Floradrain FD 40	1 month
Fixodrain XD 20	1 month

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

The roof shall 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 shall be coordinated.

The execution of the drainage shall be carried out in accordance with EN 12056-3:2001 and shall take national provisions into account.

The roof system executed shall provide sufficient resistance to wind load (wind suction), depending on the location of the building. The roof structure shall be designed such that it can transfer the additional loads from the green roof.

Only undamaged products may be used. The surface on which the GRK is laid shall be sufficiently flat. The components shall be laid single-layer.

When using plants with a strong rhizome growth (e.g. different types of bamboo), this shall 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).

In addition to the provisions of this ETA there may be requirements applicable to the kit or components of the kit, which shall also be complied with.

## 5 Indications to the manufacturer

### 5.1 Packaging, transport and storage

The components of the GRK shall be packed and/or covered such that they are protected from weathering, solar radiation (UV) and mechanical damage during transport and storage.

Dirk Brandenburger  
Head of Department

*beglaubigt:*  
Getzlaff

**External fire performance – assessment without testing**

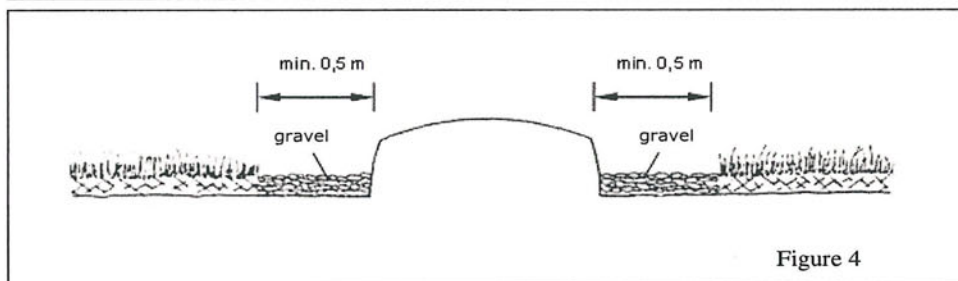
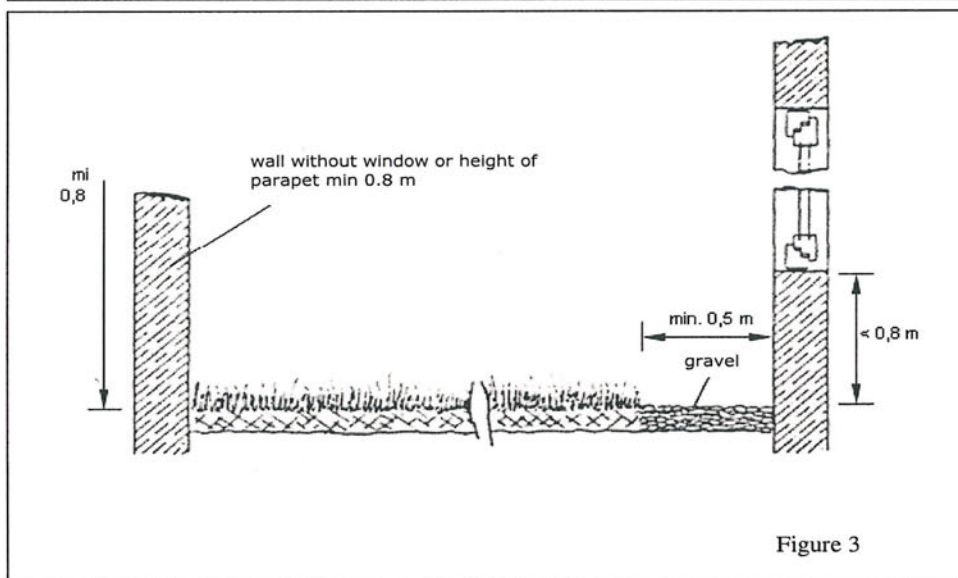
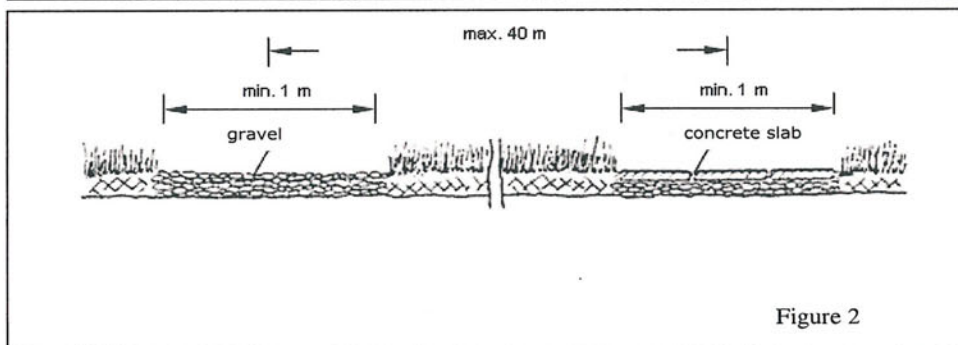
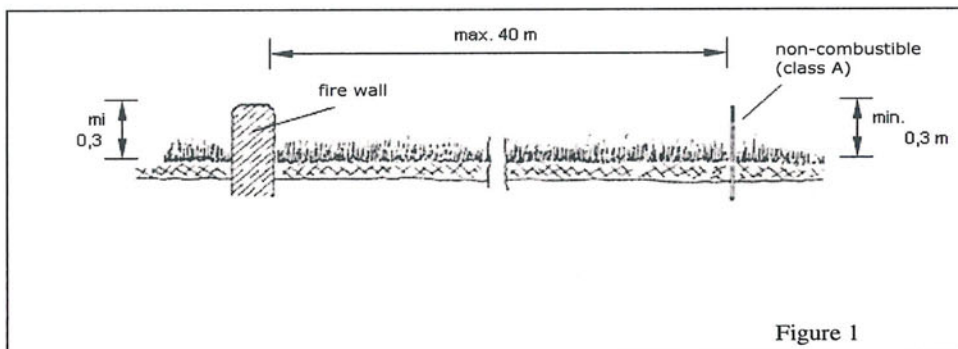
For the assessment of the resistance to external fire the following criteria shall be applied:

- 1 Roofs with intensive greening and roof gardens - that are those, which are irrigated and cultivated and usually have a thick vegetation support layer - have to be assessed as resistant to external fire in accordance with class B<sub>ROOF</sub> (t1) according to EN 13501-5:2005+A1:2009.
- 2 In the case of roofs with extensive greening of mainly low-growing plants (e.g. grass, sedum, erica), the resistance to external fire in accordance with class B<sub>ROOF</sub> (t1) according to EN 13501-5:2005+A1:2009 is given if
  - 2.1 a vegetation support layer of at least 3 cm thickness (roof garden soil, soil substrate) with maximum 20 % by weight organic material exists.  
In the case of a build-up which does not correspond to that (e.g. substrate with a higher proportion of organic material, vegetation mats made of foam materials), a test according to 2.4.2.1 with a roof slope of 15° and in dry condition (equilibrium moisture at a climate of 23 °C/50 % relative humidity) is to be carried out without planting.
  - 2.2 end walls of the building, fire walls or walls permitted instead of fire walls are guided at intervals of maximum 40 m, minimum 30 cm over the green roof (top edge of substrate and/or soil (see Figure 1). Unless based on the provisions of legal building regulations these walls do not have to be guided over the roof, an upstand of 30 cm in height made of non-combustible construction materials or a band of 1 m in width made of solid slabs or coarse gravel is also sufficient (see Figures 1 and 2).
  - 2.3 in front of openings in the roof surfaces (roof-lights, domed roof-lights) and in front of walls with openings a band of at least 0.5 m width made of solid slabs or coarse gravel is arranged, unless the parapet of the wall opening is more than 0.8 m high over the top edge of the substrate. In front of roof exit doors solid slabs or coarse gravel are to be laid in an area of at least 1 m x 1 m (see Figures 3 and 4).
  - 2.4 in the case of adjoining buildings with gables towards the street, a band measured in the horizontal of at least 1 m width remains without vegetation in the area of eaves and provided with a roof covering made of non-combustible construction materials.

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"Sedum Carpet", "Rockery Type Plants", "Heather with Lavender", "Roof Garden"	Annex 1.1
External fire performance – assessment without testing	





"Sedum Carpet", "Rockery Type Plants", "Heather with Lavender", "Roof Garden"	Annex 1.2
External fire performance – assessment without testing	