July 2020

BREEAM INTERNATIONAL NEW CONSTRUCTION

Product Data for Building Certification

URBANSCAPE GREEN ROOF SYSTEMS

BREEAM (Building Research Establishment Environmental Assessment Methodology) International New Construction[1] is a voluntary standard that defines high performance green buildings which are healthier, more environmentally responsible and more profitable structures. Using independent assessors, BREEAM examines criteria covering a range of issues in sections that evaluate: management processes, health and wellbeing, energy, transport, water, materials, waste, land use and ecology, pollution and innovation.

KNAUF INSULATION products as **URBANSCAPE GREEN ROOF SYSTEMS** can put you on the right track to get the highest result for BREEAM certification.

BREEAM - Credit Category code	Assessment Criteria and Definition	Knauf Insulation Products contribution	Contributes towards
Hea 04 (Thermal comfort) 	To ensure through design that appropriate thermal comfort levels are achieved and controls are selected to maintain a thermally comfortable environment.	Thermal modelling with full dynamic thermal analysis is facilitated through Knauf Insulation expertise and available databases. Green roof is a design alternative for thermal comfort strategy. Due to green roof's cooling effect, and limiting sun radiation transfer through the roof there will be less heat radiation from the ceiling and air-conditioning will be minimized which will have positive comfortability feel and increased productivity for workers. ***See Annex 1***: Urbanscape Green Roof Performance Evaluation Tool.	**1 credit**
Hea 05 (Acoustic performance) 	To insure the building's acoustic performance, including internal sound insulation, meets the appropriate standards for its purpose.	Systems mitigate indoor ambient noise originating from the roofs (i.e.: rain and hail). ***See Annex 2***: Airborn Sound Insulation for Urbanscape Green Roof Systems.	**1 credit**
Ene 01 Reduction of energy use and carbon emissions 	To recognize and encourage buildings designed to minimise operational energy demand, primary energy consumption and CO2 emissions.	Systems help reducing the 3 parameters: operational energy demand, primary energy consumption and CO_2 emissions by keeping appropriate temperature through the summer season and through the general improving of energy building performance (e.g. Uvalue) in accordance with EPBD best practices and ASHRAE standard 90.1-2013 or 90.2-2007 (as applicable).	**15 credits**

[1]Technical manual : SD233 – 2.0:2016

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BREEAM - Credit Category code	Assessment Criteria and Definition	Knauf Insulation Products contribution	Contributes towards
		***See Annexe 1*:** Urbanscape Green Roof Performance Evaluation Tool.	
Ene 04 Low carbon design	To encourage the adoption of design measures, which reduce building energy consumption and associated carbon emissions and minimise reliance on active building services systems.	Urbanscape products contribute to implement passive design solutions that reduce building energy demand and associated carbon emissions.	**1 credit**
Ene 05 Energy efficiency cold storage 	Energy efficient design, installation and commissioning: To encourage the installation of energy efficient refrigeration systems, therefore reducing operational greenhouse gas emissions. The building has been designed to minimize heat loads.	Products help reducing The Total Equivalent Warming Impact (TEWI) through roof insulation efficiency in the design options. ***See Annex 1*:** Urbanscape Green Roof Performance Evaluation Tool.	**3 credits**
Wat 04 Water efficient equipment 	To reduce water consumption by encouraging specification of water efficient equipment	External soft landscaping and planting relies solely on precipitation, during all seasons of the year. Urbanscape products can help. ***See Annex 1*:** Urbanscape Green Roof Performance Evaluation Tool.	**1 credit**
Mat 01 Life cycle impacts	To encourage the use of robust and appropriate life cycle assessment tools and specification of construction materials with a low environmental impact over the full life cycle of the building	The Environmental Product Declaration (EPD)[2] is available and 3rd party verified against EN 15804, this allows to maximise points through Mat 01 calculator and contribute to reach the target of 5 products (10 products for exemplary level) with EPDs for additional points (with confirmation of use on the construction site at Post-Construction Stage)	**1 credit + 1 credit exemplary level** 
Wst 01 Construction waste management	To promote resource efficiency via the effective and appropriate management of construction waste	Packaging's (wood pallet and plastics foils) and products at end of life are recyclable.	**3 credits**

[2] https://www.knaufinsulation.com/downloads/environmental-product-declaration-epd/urbanscape https://ibu-epd.com/

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Le 04 Enhancing site ecology	To recognize and encourage actions taken to maintain and enhance the ecological value of the site as a result of development	Urbanscape can enhance biodiversity of the site with the 15 species of sedum applied for the green roof. Sedum flowers will attract insects.	**3 credits**
Pol 03 Surface water run-off 	To avoid, reduce and delay the discharge of rainfall to public sewers and watercourses, minimizing the risk of flooding	Urbanscape products are a source control system that helps reducing peak rate of run-off from the site. ***See Annex 1*:** Urbanscape Green Roof Performance Evaluation Tool.	**5 credits**
Pol 05 Noise attenuation 	To reduce the likelihood of noise, arising from fixed installations on the new development, affecting nearby noise-sensitive buildings.	Noise attenuation originating from rainfall/hail on the roofs that could disturb neighbours. ***See Annex 2***: Airborn Sound Insulation for Urbanscape Green Roof Systems.	**1 credit**

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Annex 1: Urbanscape Green Roof Performance Evaluation Tool.

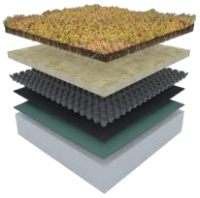
Roof construction

Composition: Concrete (2000) ; d = 18 cm
KI vapour barrier LDS 100 ; d = 0,1 cm
Rock mineral wool (160) ; d = 12 cm
Bitumen - felt/sheet ; d = 0,8 cm

U = 0,281 W/m²K
roof colour: very dark ; αs = 0,85

URBANSCAPE

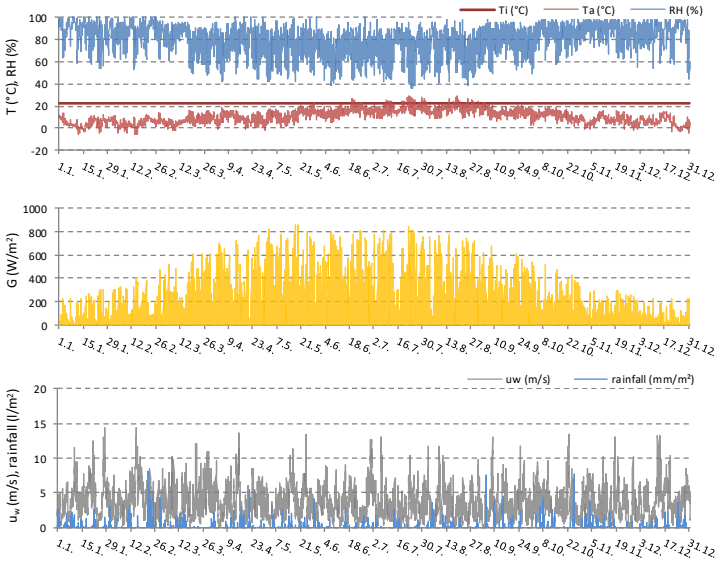
Composition: Sedum-mix blanket
no additional soil layer
GreenRoll 4 cm
Drainage system without buffer
Thickness: 7 cm (without Sedum-mix plants height)
Max.water content: 37 l/m²
Irrigation: NO



Meteo data

Location: London, United Kingdom

	Ta (°C)	RH (%)	H (kWh/m²d)	rainfall (l/m²m)
jan	4,5	86	0,7	52
feb	4,6	85	1,2	64
mar	6,9	79	2,2	43
apr	8,5	76	3,4	46
may	12,2	72	4,5	40
jun	15,5	69	4,9	25
jul	18,0	70	4,6	22
aug	17,9	71	4,0	34
sep	14,6	78	2,9	60
oct	11,0	83	1,7	62
nov	7,0	87	0,9	41
dec	5,4	84	0,5	44
Year	10,6	78	958 kWh/m²y	533 l/m²y



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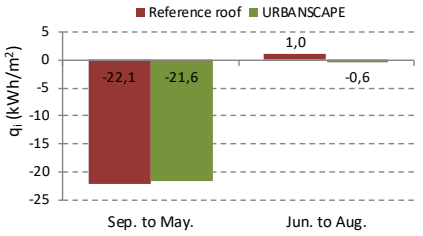
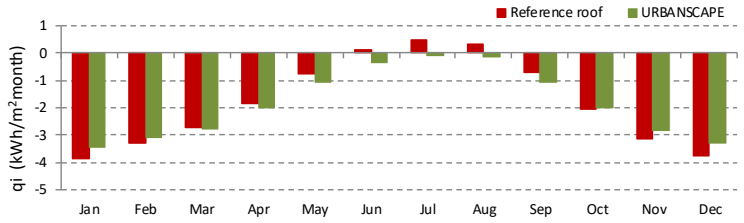
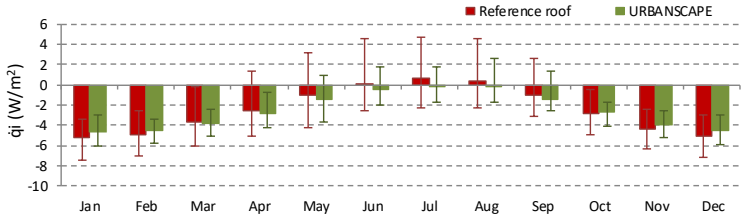
URBANSCAPE GREEN ROOF SYSTEMS

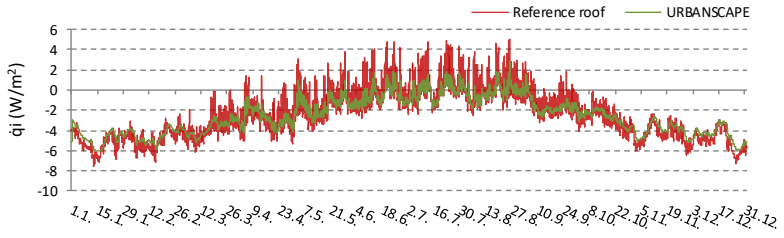
Results - energy

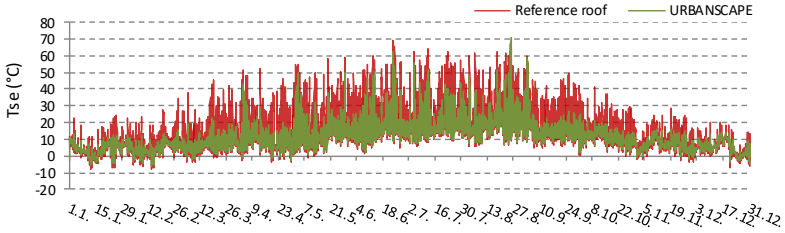


	$q_{i,ref.roof}$ (kWh/m²)	$q_{i,URBANSCAPE}$ (kWh/m²)
jan	-3,8	-3,5
feb	-3,3	-3,1
mar	-2,7	-2,8
apr	-1,8	-2,0
may	-0,8	-1,1
jun	0,1	-0,4
jul	0,5	-0,1
aug	0,3	-0,1
sep	-0,7	-1,0
oct	-2,1	-2,0
nov	-3,1	-2,8
dec	-3,7	-3,3
Year		









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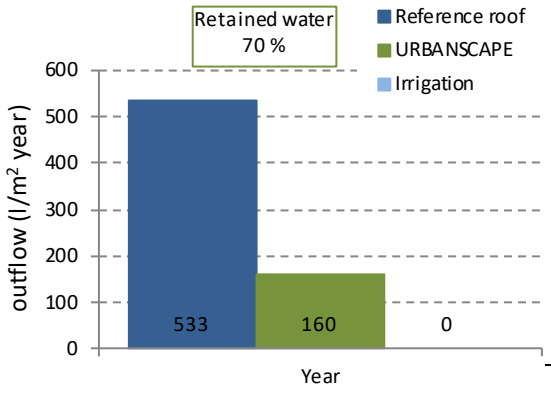
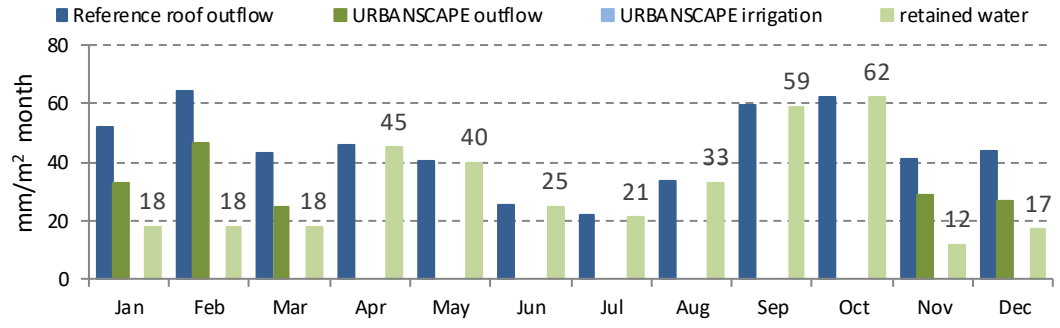
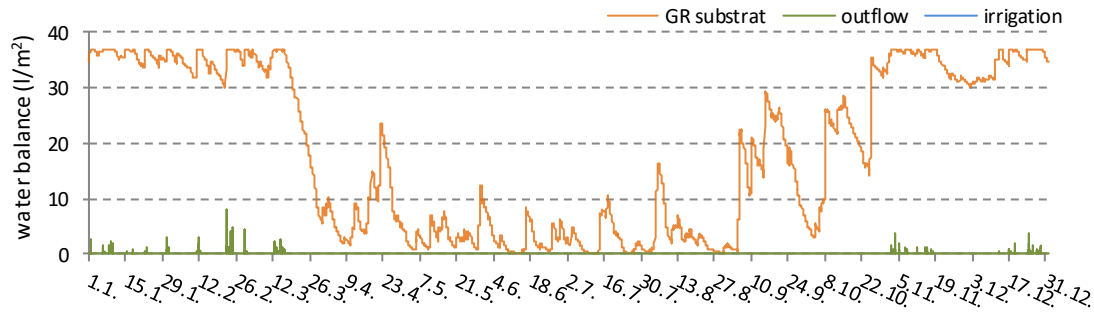
URBANSCAPE GREEN ROOF SYSTEMS

Results - water



	Irrigation (l/m²)	outflow (l/m²)	retained water (l/m²)	(%)
jan	0	34	17	33
feb	0	46	18	28
mar	0	24	18	42
apr	0	0	45	99
may	0	0	40	99
jun	0	0	25	100
jul	0	0	21	96
aug	0	0	33	98
sep	0	0	59	99
oct	0	0	62	100
nov	0	29	12	29
dec	0	27	17	39
Year	0	160	367	70





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URBANSCAPE GREEN ROOF SYSTEMS

Annex 2: Airborne sound insulation for Urbanscape Green Roof Systems

Evidence of Performance
Airborne sound insulation of flat roofs

Test Report
No. 15-002251-PR01
(PB X01-F01-04-en-01)

ift ROSENHEIM

Client	**Knauf Insulation, D.O.O.** Trata 32 4220 Skofja Loka Slovenia
Product	Flat roof as green roof
Designation	Urbanscape Green Roof
Cover	20 – 40 mm Vegetation mat, m' = 23.0 kg/m²
Insulation	40 mm Green roof substrate of mineral wool fibre, m' = 4.9 kg/m²
2nd separation layer	12.5 mm Drainage system, m' = 0.72 kg/m²
1st separation layer	0.5 mm LD PE- film, m' = 0.5 kg/m²
Vapour barrier	2.5 mm EPDM, m' = 3.4 kg/m²
Supporting construction	160 mm Reinforced concrete floor, m' = 400 kg/m²
Overall dimensions	5,000 mm × 5,270 mm
Total thickness	236 – 256 mm
Area related mass	432.5 kg/m²
Result	Weighted sound reduction index R_w Spectrum adaptation terms C and C_{tr}

$R_w\ (C;\ C_{tr})$ = 57 (-3; -8) dB

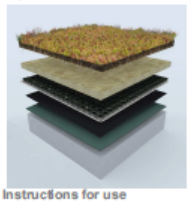
ift Rosenheim
16.10.2015

Dr. Joachim Hessinger, Dipl.-Phys.
Head of Testing Department
Building Acoustics

Stefan Bacher, Dipl.-Ing. (FH)
Operating Testing Officer
Building Acoustics

Basis
EN ISO 10140-1: 2010
+A1: 2012 + A2:2014
EN ISO 10140-2 : 2010
EN ISO 717-1 : 2013
15-002251-PR01 (PB X01-F01-de-01) dated 16th of October 2015

Representation



Instructions for use
This test report serves to demonstrate the sound insulation of a flat roof. As set out by the German Bauregelliste (Construction Products List), evidence of compliance in Germany is possible only in the form of an AbP (national technical test certificate). This test report cannot be used as a subtest to be included in a national technical test certificate (AbP).

Validity
The data and results given relate solely to the tested and described specimen.
Testing the sound insulation does not allow any statement to be made on further characteristics of the present construction regarding performance and quality.

Notes on publication
The **ift** Guidance Sheet "Conditions and Guidance for the Use of **ift** Test Documents" applies.
The cover sheet can be used as abstract.

Contents
The test report contains a total of 9 pages
1 Object
2 Procedure
3 Detailed results
4 Instructions for use
Data sheet (1 page)

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Inspektion – EN ISO/IEC 17020
Zertifizierung Produkte – EN ISO/IEC 17065
Zertifizierung Managementsysteme – EN ISO/IEC 17021

Notified Body 0757
PCB-Stelle: BAY 18

Vo-PrüI-1324-de / 01.12.2014

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URBANSCAPE GREEN ROOF SYSTEMS

Evidence of Performance
Airborne sound insulation of flat roofs

Test Report
No. 15-002251-PR01
(PB X03-F01-04-en-01)

ift ROSENHEIM

Client	**Knauf Insulation, D.O.O.** Trata 32 4220 Skofja Loka Slovenia
Product	Flat roof as green roof
Designation	Urbanscape Green Roof
Cover	20 – 40 mm Vegetation mat, m' = 23.0 kg/m²
Insulation	20 mm Green roof substrate of mineral wool fibre, m' = 2,3 kg/m²
2nd separation layer	12.5 mm Drainage system, m' = 0.72 kg/m²
1st separation layer	0.5 mm LD PE-film, m' = 0.5 kg/m²
Vapour barrier	2.5 mm EPDM, m' = 3,4 kg/m²
Supporting construction	160 mm Reinforced concrete floor, m' = 400 kg/m²
Overall dimensions	5,000 mm × 5,270 mm
Total thickness	216 – 236 mm
Area related mass	429,9 kg/m²
Result	Weighted sound reduction index R_w Spectrum adaptation terms C and C_{tr}

$$R_w\,(C;\,C_{tr}) = 55\ (-3;\,-7)\ \text{dB}$$

ift Rosenheim
16.10.2015

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Head of Testing Department
Building Acoustics

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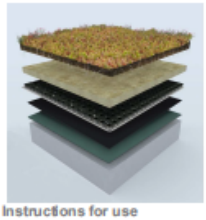

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Vs-Prü-1324-de / 01.12.2014

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