TEMA srl sheetmetal division

Guide to selection and use of three dimensional spacers under clip fastened metal roofs

KROOF

KROOF EASY PREMIUM

21/04/08-REV. 5

INDEX

1 RHEINZINK® CRITERIA FOR STRUCTURED UNDERLAY (TAKEN FROM RHEINZINK® - ANWENDUNG IN DER ARCHITEKTUR, 2ND EDITION. (2005))

- Rainproof roof characteristics (Regensichere Eigenschaften einer Montagedeckung)
- 10 cm selvage, preferably self-adhesive (Nahtüberlappung 10 cm, möglichst selbstklebend)
- Glueable waterproof membrane as a lamination layer (Verklebbare, wasserdichte Folie als unterseitige Kaschierung)
- Non capillary waterproof membrane as a join cover (Regensichere, nicht kapilierende Nahtüberdeckung)
- Options for glueable waterproof joins and diagonal cutting (Möglichkeit der Ausführung von regensicheren und verklebbaren Anschlüssen und Schrägschnitten)
- 6-8mm drainage layer thickness (Höhe der Drainaebene ca. 6-8 mm)
- UV resistance during roof construction (UV-beständig während der Montagezeit der Dachdeckung)
- Analysis of resistance of standard clip fastenings (Statischer Nachweis für die Haftbefestigung)
- Resistance to fatigue of mat fibres (Dauerstandsfestigkeits-Nachweis des Abstandshalters)
- Sound improvement characteristics (Verbesserte Schalleigenschaften)
- Low water retention capacity (< 400 ml/m²) (Geringes Wassereinbaupotential) ***
- Good grip capacity (Günstiges Abrutschverhalten)
- Standard clip use (Einsatz von Normalhaften)

2 TEMA SOLUTIONS : KROOF B, KROOF F, KROOF EASY PREMIUM

Vittorio Veneto, 31 July '07

The writing company **TeMa Technologies and materials s.r.l.** with seat in Via dell'Industria, 21 - 31029 Vittorio Veneto (TV),

DECLARES

that the products:

- **K Roof**
- **K Roof Free**
- **K Roof Easy Premium**

fulfil Rheinzink criteria for roof underlay as described in the book "RHEINZINK®-Applications in Architecture", 2° ed. (2005) that are briefly reported:

1. Rainproof properties of the installation covering
2. A seam overlap of 10cm, self-adhesive if at all possible (see our technical data sheet)
3. A watertight foil, which can be glued, should be used as the bottom laminate (see our t.d.s.)
4. A watertight, non capillary seam overlap (see our t.d.s.)
5. The possibility of designing and implementing connections and diagonal cuts that are rainproof and can be glued (see our installation instructions)
6. Height of drain level – ca.6-8mm (see our t.d.s.)
7. UV resistant while the roof is being installed (see our t.d.s.)
8. Compressive strength resistance for cleat fastening and load distribution (cfr. report 1.1/11180/207.0.2.1-2006 and 1.1/11180/237.0.2-2006)
9. Long term durability (cfr. report 1.1/11180/237.0.2-2006)
10. Improved acoustical properties (cfr. Internal report)
11. Low potential of water inflow (<400ml/m^2)
12. Resistance to slipping is good
13. Utilization of standard clips

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The following documentation is enclosed to the declaration:

1. Part of the book "RHEINZINK®-Applications in Architecture", 2° ed. (2005)
2. CE certificate for the products (fire behaviour and water penetration test are available upon request)
3. CE conformity declaration
4. Installation instructions
5. Test report 1.1/11180/237.0.2-2006 by TBU
6. Test report 1.1/11180/207.0.2.1-2006 by TBU
7. Internal acoustical test report
8. Test report for resistance to free flame according to DIN
9. Technical data sheet (t.d.s.)

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3 KROOF B, KROOF F, KROOF EASY PREMIUM INSTALLATION INSTRUCTIONS

K Roof

INSTALLATION INSTRUCTIONS

- **Step 1: First roll**

K Roof has to be installed with the tridimensional mesh upwards. Make sure the material is installed by unrolling it parallel to the eaves, making sure the overlap edge with the butyl adhesive strip 10 cm (3.94") is on the side closest to the ridge.

Thanks to its non-directional structure, K Roof can also be installed non parallel to the eaves, should the particular roof structure require it.

K Roof has to be fastened to the structure below using wide-head nails applied along sheet borders.

picture 2

- **Step 2: Further rolls**

Further rolls are installed in the same way as outlined in Step 1, simply paying attention that the overlap seam 10 cm (3.94") covers the edge of the previous installed roll (picture 2).

Once the second roll is laid down, remove the paper backing that protects the butyl strip on the first roll so the two rolls are jointed together.

If you have to join two rolls together end to end to cover a longer area, just remove a 10 cm (3.94") strip of the tri-dimensional mesh from one of the mats (55.12" or 1.4m side) to create an overlapping area (picture 3). Before placing the two ends togheter, apply a strip of butyl tape across the fabric overlap to waterproof the junction.

picture 3

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4 KROOF B, KROOF F, KROOF EASY PREMIUM TECHNICAL DATA

K ROOF C 10 B

STRUCTURE: Bond of a three part waterproof separating layer and a monofilament wire mat

WATERPROOFING/BREATHABLE MEMBRANE

Raw material			Polypropylene	
Weight	EN 1849-2	g/m^2	150	±5
Width		m	1,4	±2%
Tensile strenght MD	EN 12311-1	N/5cm	280	±40
Elongation at max load MD	EN 12311-1	%	50	±20
Tensile strenght CMD	EN 12311-1	N/5cm	230	±40
Elongation at max load CMD	EN 12311-1	%	60	±20
Tearing resistance (nail shank) MD/CMD	EN 12310-1	N	190/200	±30
Diffusion equivalent (Sd)	EN ISO 12572	m	0,02	(23°C)
Vapour permeability (WDD)	DIN 53122	g/m^2 24h	1500	±15% (23 °C)
Waterproofing	EN 1928 met. A		W1	
	EN 20811		> 3	

WIRE MAT

Raw material			Polypropylene	
Weight		g/m^2	300	±5%
Width		m	1,3	±2%

COMPOSITE

Weight	EN 965	g/m^2	450	±5%
Thickness	EN 964-1	mm	9	±10%
Fire resistance classification	EN 13501-1		E	
Working temperature		°C	-20/+100	
UV Stability		months	4	
Adhesive tape for overlapping			Butylic adhesive 2cm	
Overlapping		cm	10	
Roll's Width x Lenght		m	1,4 x 25	±2%

The information given in this data sheet is to the best of our knowledge true and correct, however new research results and practical experience can make revisions necessary. No guarantee or liability can be drawn from the information mentioned herein. Furthermore, is not our intention to violate any patents or licences.

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Mar-08 Rev. 0

K ROOF C 10 F

STRUCTURE: Bond of a three part waterproof separating layer and a monofilament wire mat

WATERPROOFING/BREATHABLE MEMBRANE

Raw material			Polypropylene	
Weight	EN 1849-2	g/m^2	150	±5
Width		m	1,4	±2%
Tensile strenght MD	EN 12311-1	N/5cm	280	±40
Elongation at max load MD	EN 12311-1	%	50	±20
Tensile strenght CMD	EN 12311-1	N/5cm	230	±40
Elongation at max load CMD	EN 12311-1	%	60	±20
Tearing resistance (nail shank) MD/CMD	EN 12310-1	N	190/200	±30
Diffusion equivalent (Sd)	EN ISO 12572	m	0,02	(23°C)
Vapour permeability (WDD)	DIN 53122	g/m^2 24h	1500	±15% (23°C)
Waterproofing	EN 1928 met. A		W1	
	EN 20811		> 3	

WIRE MAT

Raw material			Polypropylene	
Weight		g/m^2	300	±5%
Width		m	1,3	±2%

COMPOSITE

Weight	EN 965	g/m^2	450	±5%
Thickness	EN 964-1	mm	9	±10%
Fire resistance classification	EN 13501-1		E	
Working temperature		°C	-20/+100	
UV Stability		months	4	
Adhesive tape for overlapping			-	
Overlapping		cm	10	
Roll's Width x Lenght		m	1,4 x 25	±2%

The information given in this data sheet is to the best of our knowledge true and correct, however new research results and practical experience can make revisions necessary. No guarantee or liability can be drawn from the information mentioned herein. Furthermore, is not our intention to violate any patents or licences.

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Mar-08

Rev. 0

KRoof C 10
Easy Premium

STRUCTURE: Three dimensional mesh of Polypropylene synthetic monofilaments, UV stabilized, tangled and welded where they cross.

MESH

Raw material			Polypropylene	
Weight	EN 965	g/m²	350	±5%
Width		m	1,3	±2%
Thickness	EN 964-1	mm	9	±10%
Tensile strenght MD	EN ISO 10319	kN/m	0,5	±10%
Extension at max load MD	EN ISO 10319	%	11	±15%
Tensile strenght CMD	EN ISO 10319	kN/m	0,4	±10%
Extension at max load CMD	EN ISO 10319	%	7	±15%
Fire resistance classification			E	
Working temperature		°C	-20/+100	
UV Stability		months	4	
Roll's Width x Lenght		m	1,3 x 30	±2%
Rolls per pallet		n	9	

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Feb-08

Rev. 0

5 NAIL RESISTANCE: TEST CARRIED OUT BY INDEPENDENT LAB. (TBU)

Institut für textile Bau- und Umwelttechnik GmbH

Gutenbergstr. 29
48268 Greven
Germany

Prüfbericht Nr. 1.1 / 11180 / 207.0.2.1-2006

Allgemeines

Erstellt am : 9.5.2006

Antragsteller : **Tema Technologies and Materials srl**
Via dell´Industria 21
31029 Vittorio Veneto (TV), Italy

Material : Konstruktionsholz: **Fichte, d= ca. 25 mm**
Verbundstoff: **K Roof C 15S**
Haften, d=0,35 mm
Schrauben: **Edelstahl, 4 x 20**
Aufbau: Konstruktionsholz - Verbundstoff aus einer dreilagigen, diffusionsoffenen Trennlage und monofilem Wirrgelege (Trennlage zum Holz) - Haften, befestigt mit 2 Schrauben
(Bezeichnung des Antragstellers)

Auftrag vom : 31.3.2006

Probeneingang : 18.04.2006 und 28.04.2006

Prüfungen	Norm	Ausgabe	Ergebnisse als Anlage Nr.
1. Ausziehtragfähigkeit von Holzverbindungsmitteln	in Anlehnung an DIN EN 1382	03.00	A1

Die Prüfwerte gelten ausschließlich für die verwendeten Messproben.
Der Zeitpunkt der Prüfung ist dem jeweiligen Anlagenblatt zu entnehmen.
Prüfwerte werden - soweit Normen dies vorschreiben - mit der diesen Normen entsprechenden Genauigkeit angegeben. Für statistische Auswertungen werden alle gemessenen Stellen verwendet.

Dieser Prüfbericht umfasst 2 Seiten und 1 Anlage/-en (Seite/-en A1)
Der Prüfbericht darf nicht in Teilen veröffentlicht werden, nur die Kurzfassung der Ergebnisse darf als "Auszug aus dem Prüfbericht Nr. 1.1/11180/207.0.2.1-2006 " wiedergegeben werden.
\\Ncc1701d\GemeinsameDaten\tBU\KUNDEN\11180\2006\207-2006\207.0.2.1-2006pbv

tBU GmbH, Sitz Greven, AG Steinfurt HRB 2375
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USt-IdNr.: DE 153 338 395
USt-Nr.: 327/5993/0329

Akkreditierung:

Institut für textile Bau- und Umwelttechnik GmbH

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Germany

Kurzfassung der Ergebnisse Prüfbericht Nr. 1.1 / 11180 / 207.0.2.1-2006

Datum/Aktenzeichen : 9.5.2006 / tb

Antragsteller : **Tema Technologies and Materials srl, Via dell´Industria 21, 31029 Vittorio Veneto (TV), Italy**

Material : **Konstruktionsholz: Fichte, d= ca. 25 mm**
Verbundstoff: K Roof C 15S
Haften, d=0,35 mm
Aufbau: Konstruktionsholz - Verbundstoff aus einer dreilagigen, diffusionsoffenen Trennlage und monofilem Wirrgelege (Trennlage zum Holz) - Haften, befestigt mit 2 Schrauben
(Bezeichnung des Antragstellers)

Prüfung	Norm	Einheit	Mittelwert $\bar{x}$	Standard-abweichung s	Variations-koeffizient v in %
Ausziehtragfähigkeit von Holzverbindungsmitteln	in Anlehnung an 03.2000 DIN EN 1382				
Ausziehfestigkeit, Schrauben radial - Kernholz		N	2274	232,6	10,2
Ausziehfestigkeit, Schrauben tangential - Stammholz, außen		N	2397	57,8	2,4
Bemerkung: Die Prüflast wurde rechtwinkelig zur Faserrichtung aufgebracht.					

Prof. Dr.-Ing. Müller-Rochholz

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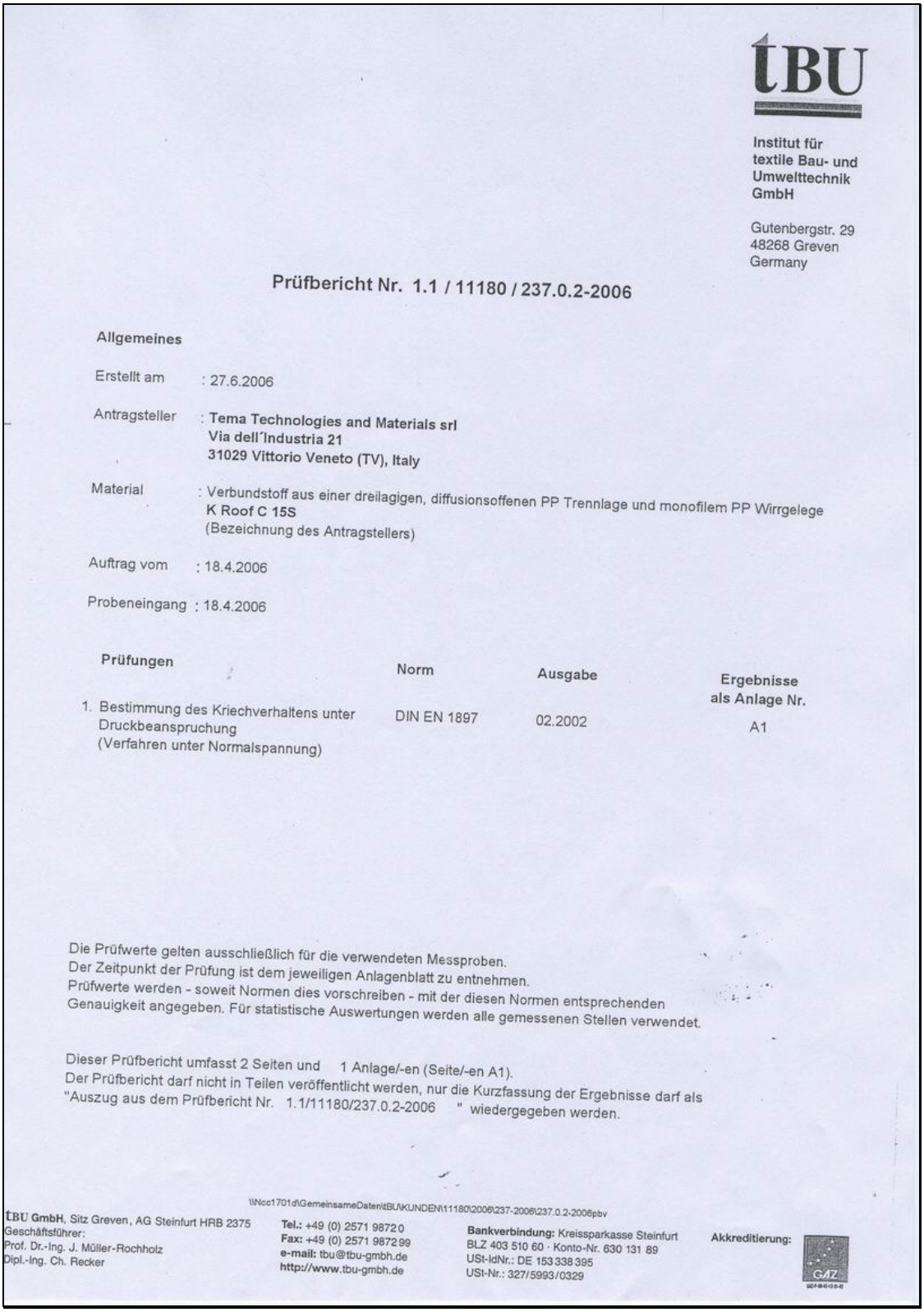
USt-Nr.: 327/5993/0329

Akkreditierung:

6 CREEP RESISTANCE: TEST CARRIED OUT BY INDEPENDENT LAB. (TBU)



tBU

Institut für
textile Bau- und
Umwelttechnik
GmbH

Gutenbergstr. 29
48268 Greven
Germany

Prüfbericht Nr. 1.1 / 11180 / 237.0.2-2006

Allgemeines

Erstellt am : 27.6.2006

Antragsteller : **Tema Technologies and Materials srl**
Via dell´Industria 21
31029 Vittorio Veneto (TV), Italy

Material : Verbundstoff aus einer dreilagigen, diffusionsoffenen PP Trennlage und monofilem PP Wirrgelege
K Roof C 15S
(Bezeichnung des Antragstellers)

Auftrag vom : 18.4.2006

Probeneingang : 18.4.2006

Prüfungen	Norm	Ausgabe	Ergebnisse als Anlage Nr.
1. Bestimmung des Kriechverhaltens unter Druckbeanspruchung (Verfahren unter Normalspannung)	DIN EN 1897	02.2002	A1

Die Prüfwerte gelten ausschließlich für die verwendeten Messproben.
Der Zeitpunkt der Prüfung ist dem jeweiligen Anlagenblatt zu entnehmen.
Prüfwerte werden - soweit Normen dies vorschreiben - mit der diesen Normen entsprechenden Genauigkeit angegeben. Für statistische Auswertungen werden alle gemessenen Stellen verwendet.

Dieser Prüfbericht umfasst 2 Seiten und 1 Anlage/-en (Seite/-en A1).
Der Prüfbericht darf nicht in Teilen veröffentlicht werden, nur die Kurzfassung der Ergebnisse darf als "Auszug aus dem Prüfbericht Nr. 1.1/11180/237.0.2-2006 " wiedergegeben werden.

\\Ncc1701d\GemeinsameDaten\tBU\KUNDEN\11180\2006\237-2006\237.0.2-2006pbv

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Akkreditierung: GMZ

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Kurzfassung der Ergebnisse Prüfbericht Nr. 1.1 / 11180 / 237.0.2-2006

Datum/Aktenzeichen : 27.6.2006 / br

Antragsteller : **Tema Technologies and Materials srl, Via dell´Industria 21, 31029 Vittorio Veneto (TV), Italy**

Material : Verbundstoff aus einer dreilagigen, diffusionsoffenen PP Trennlage und monofilem PP Wirrgelege
K Roof C 15S
(Bezeichnung des Antragstellers)

Prüfung	Norm	Einheit	Mittelwert $\bar{x}$	Standard-abweichung s	Variations-koeffizient v in %
Kriechverhalten bei Druckbeanspruchung	DIN EN 1897 02.2002				
Normalspannung 20,0 kPa					
Scherspannung -					
Dicke nach 1 h Belastung		mm	6,06	-	-
Dicke nach 1008 h Belastung		mm	5,25	-	-

Prof. Dr.-Ing. Müller-Rochholz

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Akkreditierung: GAZ

Determination of the compressive creep properties DIN EN 1897 (02.2002)

UBU

Test Report No.	:	**1.1/11180/237.0.2-2006**
Company	:	**Tema Technologies and Materials srl**
Material	:	**K Roof C 15S**
Operator	:	

Test parameters

Normal stress	:	20 kPa
Shear stress	:	-
Shear direction	:	-

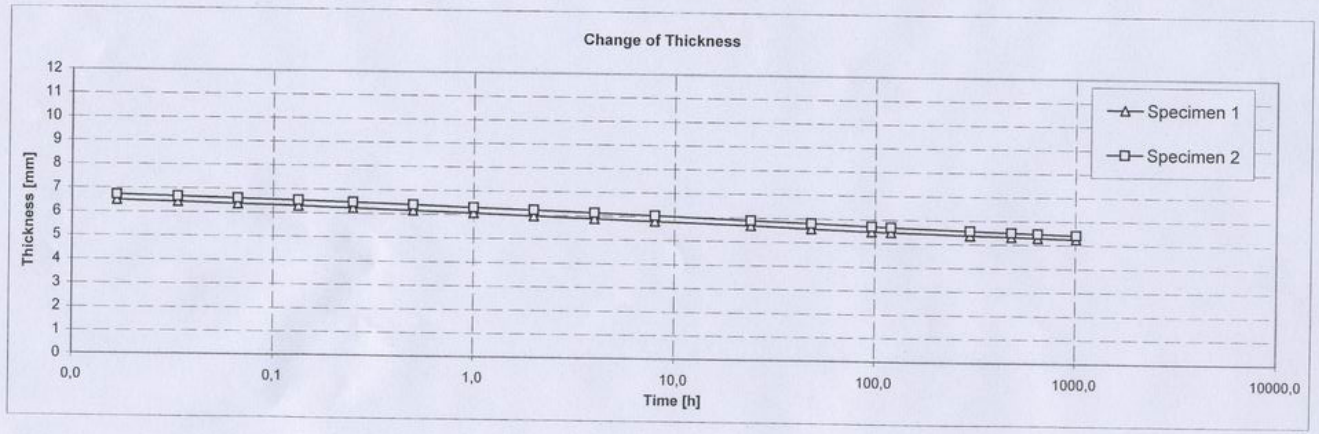
MD - machine direction, CMD - cross machine direction

Specimen No.	:	Specimen 1 / Specimen 2
Specimen size [mm x mm]	:	200 x 200 = 0,04 m²
Thickness after 1 h [mm]	:	6,06 / 6,30
Test temperature	:	20°C ± 2°C

Results: Thickness [mm]

Begin of the test: 3.5.2006

Specimen No.		Time [h] 0,017	0,033	0,067	0,13	0,3	0,5	1	2	4	8	24	48	96	120	297	480	650	1008			
Specimen 1	mm	6,48	6,42	6,35	6,29	6,22	6,14	6,06	5,97	5,88	5,80	5,67	5,57	5,48	5,46	5,36	5,32	5,29	5,25			
Spesimen 2	mm	6,70	6,65	6,59	6,52	6,46	6,38	6,30	6,22	6,13	6,04	5,89	5,80	5,70	5,67	5,56	5,50	5,46	5,41			



Note: -

\\Ncc1701d\GemeinsameDaten\tBU\KUNDEN\11180\2006\237-2006\237.0.2-2006drk-20kPa

1.1/11180/237.0.2-2006 A1

7 RESISTANCE TO H2O PENETRATION: TEST CARRIED OUT BY INDEPENDENT LAB. (SKZ)

SKZ
International akkreditiert

Test report no.: 72873/06

Client: TEMA Technologies & Materials S.r.l.
Via dell' Industria 21
31029 Vittorio Veneto (TV)
ITALY

Order: Initial tests on the underlay for discontinuous roofing "K Roof C 15S", determination of resistance to water penetration according to EN 1928 with modifications according to EN 13859-1: 2005-5

Letter of: 2006-05-15 **Ref.:** Graziano Peterle

Sample received: 2006-05-08 **Sample taken:** -

Test period: 2006-05-22 **till** 2006-06-06

This test report comprises 3 **pages.**

Würzburg, 2006-06-20
Za/Nem/mo

SKZ – TeConA GmbH International akkreditiert

i. V.
Dr. Anton Zahn

i. A.
Dr.-Ing. Ernö Németh

Die ungekürzte oder auszugsweise Wiedergabe, Vervielfältigung und Übersetzung dieses Berichtes zu Werbezwecken bedarf der schriftlichen Genehmigung der SKZ – TeConA GmbH. Die Ergebnisse beziehen sich auf die geprüften Produkte.

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DAP PL 2005.20
DAP-IS-2005.20

1 Order

The company TEMA Technologies & Materials S.r.l., Via dell' Industria 21, 31029 Vittorio Veneto (TV), Italy, ordered the SKZ – TeConA GmbH with letter dated 2006-05-15 with initial tests on the underlay for discontinuous roofing "K Roof C 15S", determination of resistance to water penetration according to EN 1928 with modifications according to EN 13859-1: 2005-5.

2 Test material

On 2006-05-08 SKZ – TeConA GmbH received the following sample for testing:

- underlay for discontinuous roofing "K Roof C 15S", consisting of a grey/white coloured nonwoven (flexible sheet) and on one side a black coloured three-dimensional, permeable structure, made of polymeric monofilament.
  Specimen size: 2.0 m length in machine direction (MD) and 1.4 m width in cross machine direction (CMD)

SKZ – TeConA GmbH had no influence on the selection of the test material.

3 Execution of test

Usually we carry out tests according to standards for which we have an accreditation. The list of all standards for which we are accredited is shown on the homepage at www.skz.de.

If not otherwise mentioned, the tests were carried out in standard atmosphere 23/50-2 according to DIN 50014: 1985 after a minimum of 48 hours storage.

The determination of resistance to water penetration was carried out according to EN 1928: 2000 "Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing – Determination of watertightness", method A, with modifications according to EN 13859-1: 2005-05 "Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing".

The following test parameters have been submitted:

Water pressure:	2 kPa
Testing fluid:	water dyed with 0.05 % eosin
Tested side:	side without monofilament
Test period:	2 h
Number of specimens:	3

4 Test results

The test results are summarised in table 1.

Table 1: Test results

Characteristic	Test basis	Unit	Result
Resistance to water penetration (2 kPa, 2 h)	EN 1928: 2000 EN 13859-1: 2005-05, clause 5.2.3	-	watertight Class W1

8 FIRE REACTION: TEST CARRIED OUT BY INDEPENDENT LAB. (HOCH)

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notified body no.: 1508 Mitglied der
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Hoch
Fladungen

Prüfinstitut für das Brandverhalten von Bauprodukten, Dipl.-Ing. (FH) Andreas Hoch
Bauaufsichtlich anerkannte Prüf-, Überwachungs- und Zertifizierungsstelle

KLASSIFIZIERUNGSBERICHT
CLASSIFICATION REPORT

KB-Hoch-06414

Klassifizierung des Brandverhaltens nach DIN EN 13501-1
Reaction to fire classification according to DIN EN 13501-1

Auftraggeber: *company:*	**TEMA Technologies & Materiala s.r.l.** **Via dell , Industria, 21** **I-31029 VITTORIO VENETO (TV)**
Auftragsdatum: *date of request:*	**22. Mai 2006** *May 22nd 2006*
Art des Prüfmaterials: *description of the samples:*	**Unterspannbahn mit Dränschicht** *ceiling underlay with filter layer*
Bezeichnung des Prüfmaterials: *name of the material:*	**„K ROOF C 15S"**
Klassifizierung: *classification:*	**E (freihängend)** E *(freely suspended)*
Geltungsdauer: *validity:*	**31. Mai 2011** *May31st 2011*

ANERKANNTE PRÜF-, ÜBERWACHUNGS- UND ZERTIFIZIERUNGSSTELLE Hoch FLADUNGEN

Dieser Bericht umfasst 4 Seiten.
The report includes 4 pages.

Hinweise/Warnings:

Dieses Dokument dient nicht der Typzulassung oder Zertifizierung des Bauproduktes.
This dokument does not represent type approval or certification of the product.

Dieser Klassifizierungsbericht gilt nicht, wenn der geprüfte Baustoff als Bauprodukt im Sinne der Landesbauordnungen verwendet wird (MBO §17 Abs.3).
This classification report is not valid, if the tested material is used as a construction product according to German building regulations (MBO §17 Abs.3).

Dieser Klassifizierungsbericht ersetzt nicht einen ggf. notwendigen baurechtlichen/bausufsichtlichen Nachweis nach Landesbauordnung.
This classification report is in no case a substitute for any required certification according to German building regulations.

Dieser Bericht ist zweisprachig. Im Zweifel gilt der deutsche Wortlaut.
This report has been issued bilingually. In case of doubt, the German wording is valid.

Der Klassifizierungsbericht darf ohne vorherige Zustimmung des Prüfinstitut Hoch nur innerhalb des Geltungszeitraumes und nur nach Form und Inhalt unverändert veröffentlicht oder vervielfältigt werden.

Prüfinstitut Hoch
Lerchenweg 1
D-97650 Fladungen

1. Angaben zum klassifizierten Bauprodukt
Details of the classified construction product

1.1. Art und Anwendundsbereich
Nature and end use application

Die Klassifizierung in diesem Bericht gilt für das Bauprodukt für folgende Anwendungsbereiche: - freihängend -
The classification given in this classification report is valid for the construction products's following end use application: - freely suspended -

Unterspannbahn mit Dränschicht
ceiling underlay with filter layer

1.2 Beschreibung des Bauproduktes
Description of the construction product

Das Produkt wird in den in Abschnitt 2 aufgeführten Prüfbericht, die der Klassifizierung zugrunde liegen, vollständig beschrieben.
The product is fully described in the test report in support of this classification listed in clause 2.

Das Produkt erfüllt angabengemäß keine europäische Produktspezifizierung.
According to the owner of this report, the product complies with no european product specification.

2. Prüfberichte und Prüfergebnisse für die Klassifizierung
Test reports and test results in support of this classification

2.1. Prüfberichte
Test reports

Name des Labors *Name of laboratory*	Auftraggeber *Sponsor*	Prüfverfahren *Test method*	Prüfbericht Nr. *Test report no.*
Prüfinstitut Hoch	TEMA Technologies & Materiala s.r.l. Via dell `Indstria, 21 I-31029 Vittorio Veneto	EN ISO 11925-2	PB-Hoch-06413

2.2. Prüfergebnisse
Test results

Prüfverfahren *Test method*	Parameter *Parameter*	Prüfergebnis (Maximalwert) *maximum value*
DIN EN ISO 11925-2	Fs	110 mm
	Brennendes Abtropfen *flaming droplets*	nein *no*

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3. Klassifizierung und direkter Anwendungsbereich
Classification and direct field of application

Die Klassifizierung erfolgte nach DIN EN 13501-1: 2002, Abschnitt 10.3.
This classification has been carried out in accordance with DIN EN 13501-1: 2002, clause 10.3.

3.1. Klassifizierung
Classification

Das Produkt **„K ROOF C 15S"** wird nach seinem Brandverhalten klassifiziert:
The product **„K ROOF C 15S"** *in relation with it's reaction to fire behaviour is classified:*

E

Die zusätzliche Klassifizierung zum brennenden Abtropfen/Abfallen ist:
The additional classification in relation to flaming droplets/paticles is:

Das Format der Klassifizierung des Brandverhaltens für Bauprodukte außer Bodenbeläge ist:
The format of the reaction to fire classification for construction products except floorings is:

Brandverhalten *Fire behaviour*	BrennendesAbtropfen/Abfallen *Flaming droplets/parts*
E	---

3.2 Anwendungsbereich
Field of application

Diese Klassifizierung ist nur für folgende Endanwendungsbedingungen gültig:
This classification is valid solely for the following end use conditions:

- **freihängend**
- *freely suspended*

Diese Klassifizierung ist weiter für die folgenden Produktparameter gültig:
This classification is also valid for the following product parameters:

Vliesdicke / *thickness of fleece*	**≈0,7**	**mm**
Gesamtdicke / *overall thickness*	**≈5,0**	**mm**
Gesamtflächengewicht / *overall area weight*	**≈500**	**g/m²**

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4. Einschränkungen –
Limitations –

4.1 Geltungsdauer **siehe Seite 1**
Validity ***see page 1***

4.2 Hinweise
Warnings

In Verbindung mit anderen Baustoffen, mit anderen Abständen, Befestigungen, Fugenausbildungen/Verbindungen, Dicken-oder Dichtenbereichen, Beschichtungen als in Abschnitt 3.2 angegeben, kann das Brandverhalten so ungünstig beeinflusst werden, dass die Klassifizierung in Abschnitt 3.1 nicht mehr gilt. Das Brandverhalten von anderen als den oben angegebenen Parametern ist gesondert nachzuweisen.

Used in connection with other materials, esp. other substrates/backings, air gaps/voids, types of fixation joints, thickness or density ranges, coatings than those given in clause 3.2, the fire performance is likely to be influenced negatively, so that the classification given in clause 3.1 would no longer be valid. The fire performance of other than the parameters given above has to be tested and classified separately.

Dieses Dokument ist keine Typzulassung oder Zertifizierung des Produktes.
This dokument does not represent type approval or certification of the product.

Fladungen, den 09. Juni 2006
Fladungen, June 09th 2006

Sachbearbeiterin:
clerk in charge:
(Ing.Diana Günzel)

ANERKANNTE PRÜF-, ÜBERWACHUNGS- UND ZERTIFIZIERUNGSSTELLE Hoch FLADUNGEN

Leiter der Prüfstelle:
Head of the test laboratory:
(Dipl.-Ing.(FH) Andreas Hoch)

9 IMPACT SOUND PERFORMANCE: INTERNAL LAB. TEST

Laboratorio RS

Test report n° 070304

Subject: Reduction of impact noise on roofs

Material tested: Different multilayer assembly for copper sheets coverings

Assembly description:

External layer:

- Copper sheets

Internal layers:

a) Wooden boards

b) K roof (wire mat coupled with a breathable membrane) as underlayment between copper sheets and wooden boards

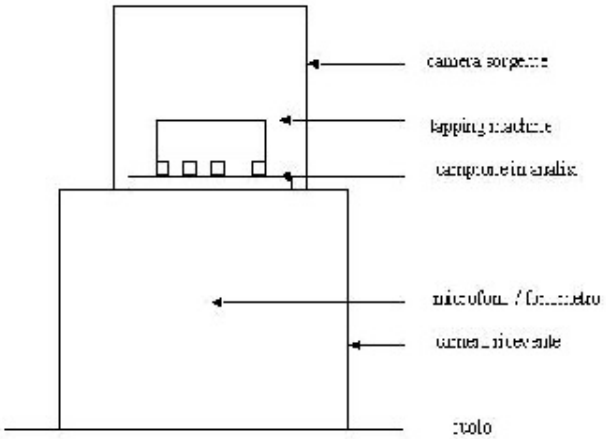
Customer: TeMa

Rapporto di Prova n° 070304 LAB RS

Test description

At the moment there is no ISO referring norm about reduction of impactive noise on roofs, so the standard evaluation procedure for impactive noise reduction on floors was used.
Measuring was done in accordance with Tema Research and Development lab internal procedure: the tested sample has squared shaped (60cm side length), while the testing system is built like this:

- Receiving chamber: it's a masonry "box" with a base of 1,5x1,5m and a height of 1,2m. The top part is made with a concrete slab of 20+4cm. Internal walls are covered with a pyramidal sound absorbing material, while external ones are covered by a plaster layer on which a noise reduction polyester mat (10cm thick) is applied. Inside the chamber there is a receiving microphone connected to a phonometer that records the data (instruments fulfil UNI EN ISO 717/2 requirements).
- Tested samples: a 60x60cm square sample made with different layers. The sample is put on the top centre of the receiving chamber. The machine that generates "walking" noise (tapping machine designed as requested by UNI EN ISO 717/2) is positioned on the sample. The remaining top area is covered with the same noise reduction mat that covers chamber's sides.
- **Source chamber:** it is a wooden box with dimensions 1x1m that contains both the sample and the tapping machine. The internal surfaces are covered with noise absorbing polyester mat.



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Rapporto di Prova n° 070304 LAB RS

Three measures were done for each assembly.

Mean values of equivalent level **(La,eq)** and **noise reduction** with respect to a blank measure (made on wooden boards alone) were reported.

La,eq represents the mean value on all the frequencies of noise level registered in the receiving chamber (being a measure of sound pressure its measuring unit is the dB), while **noise reduction ΔL** is the difference between La,eq measured with one assembly and the referring level obtained with wooden boards.

Materials:

- Plywood boards (19,5mm thick) for the blank test
- Copper sheets (thickness 0,6 mm)
- K roof C8 (thickness 8 mm, weight 470 g/m^2)

Test results:

Results are described in the following chart:

Assembly	NOISE LEVEL IN THE RECEIVING CHAMBER (dB)	NOISE REDUCTION REFERRING TO THE BLANK MEASURE dB)
BLANK TEST (BOARDS ONLY)	80,10	0
COPPER SHEET ON BOARDS	78,67	1,43
BOARDS+ K ROOF + COPPER SHEET	53,80	26,31

Here are the graphs of the results:

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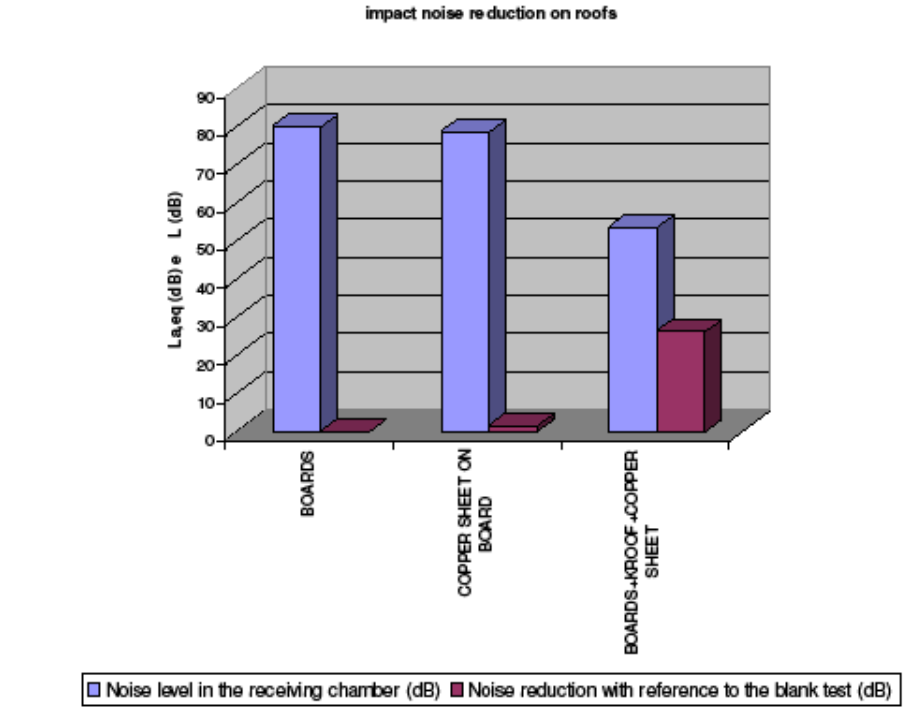
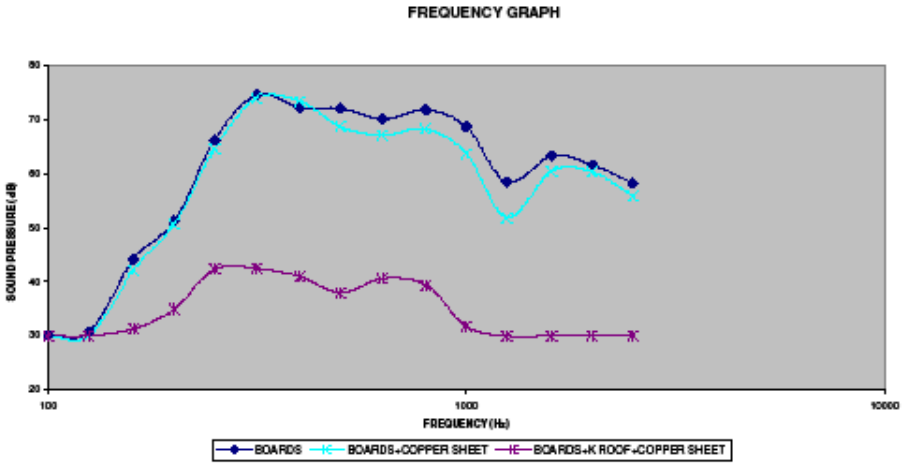
Rapporto di Prova n° 070304 LAB RS





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Rapporto di Prova n° 070304 LAB RS

Conclusions:

The presence of the resilient mat K Roof helps in reducing vibrations and oscillations so that there is a good lowering in sound pressure on all spectrum frequencies, specially on medium and high ones.

It is important to evidence that decibel is a logarithmic measuring unit and so a difference on only 3dB has to be considered a good reduction, while a 6dB difference means a 50% decrease in sound intensity.

Level of noise reduction is also good considering that the noise generation machine simulate walking impact which is a harder condition with reference to normal impact noise produced by rain or hail.

Vittorio Veneto, li 28/02/07

Test made by: lab RS

Written by: Ing. Federico Cais

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10 CE MARKINGS: KROOF B, KROOF F

CE

K ROOF C 10 B 15S

TeMa

TE.MA TECHNOLOGIES & MATERIALS s.r.l.
Via dell'Industria, 21- 31029 Vittorio Veneto (TV) ITALY

NORMA DI RIFERIMENTO UNI EN 13859-1 2005

FUNZIONE: SOTTOSTRATO PER COPERTURE

Proprietà della stuoia di monofilamenti

Massa areica	EN ISO 13859-1	g/m²	450 (-42 g/m²)
Classificazione della resistenza al fuoco	EN 13501-1		E

(Report di classificazione KB-Hoch-06414 eseguito in data 22 Maggio, 2006)

Proprietà della membrane traspirante S

Resistenza a trazione longitudinale	EN ISO 13859-1	kN/m	5.6 (-0.84 kN/m)
Resistenza a trazione trasversale	EN ISO 13859-1	kN/m	5 (-0.75 kN/m)
Trasmissività al vapore (WDD)	EN ISO 13859-1	g/m²die	940 (+/-15%)
Trasmissività al vapore (s_d)	EN ISO 13859-1	m	0.02
Resistenza alla penetrazione dell'acqua	EN ISO 13859-1:2005-5		Class W1
Resistenza alla penetrazione dell'acqua	EN ISO 1928-2000		Watertight

(Report SKZ 72873/6 del 20 Giugno, 2006)

Rev.01, 28 aprile '08

CE

K ROOF C 10 F 15S

TeMa

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Via dell'Industria, 21- 31029 Vittorio Veneto (TV) ITALY

NORMA DI RIFERIMENTO UNI EN 13859-1 2005

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(Report SKZ 72873/6 del 20 Giugno, 2006)

Rev.01, 28 aprile '08

11 CE DECLARATION OF CONFORMITY

Vittorio Veneto, 28 aprile 2008

DICHIARAZIONE CE DI CONFORMITA'

(In accordo all'allegato III della direttiva 89/106/CEE)

La scrivente società TeMa Technologies and Materials s.r.l., Via dell'Industria,21- 31029 Vittorio Veneto (TV), dichiara che i prodotti

SOTTOSTRATO PER COPERTURE

identificati con la denominazione

- **K Roof C 10 B 15S**
- **K Roof C 10 F 15S**

soddisfano i requisiti della direttiva 89/106/CEE con riferimento alla norma specifica

UNI EN 13859-1: Membrane flessibili per impermeabilizzazione - Definizioni e caratteristiche dei sottostrati - Parte 1: Sottostrati per coperture discontinue

per le seguenti funzioni: sottostrato per coperture.

R&S Manager

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Registro imprese di Treviso Cod. Id. IT02469900266 - Cod. Fisc. e Part. IVA 02469900266
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PRODUCT SPECIFICATIONS

- **K ROOF B**

Supply and installation of three-dimensional PP geospacers combined with a vapour breathing, waterproof membrane, type KROOF C10 B. The geospacer must include a butyl seam joining the overlapping sections, with a width greater than or equal to 2 cm. The geospacer must have a longitudinal nail resistance of not less than 2397N, transverse not less than 2274N, in accordance with DIN EN 1382, which must be certified by an independent laboratory. The geospacer's creep resistance under load must be 20kPa such that after 60 min the thickness is not less than 6 mm in accordance with standard DIN EN 1897; the residual thickness after 1000 hours must in any case not be less than 5.25 mm under the same standard. Performance must be certified by tests through an independent laboratory. The geospacer must have a H2O penetration resistance classified as *water tight* under standard EN 1928, and *W1* under standard EN 3859-1. The geospacer must be EC labelled and must be accompanied by sound tests carried out under standard UNI EN ISO 717/2 (internal laboratories acceptable), which show a reduction of 24.88db using a 19.5 mm plywood panel and a 0.6 mm metal sheet. The geospacer must be class E fire reaction under standard DIN EN 13501-1 once again certified by testing through an independent laboratory.

- **K ROOF F**

Supply and installation of three-dimensional PP geospacers combined with a vapour breathing waterproof membrane, type KROOF C10 F. The geospacer must have a longitudinal nail resistance of not less than 2397N, transverse not less than 2274N in accordance with DIN EN 1382 and this must be certified by an independent laboratory. The geospacer's creep resistance under load must be 20kPa such that after 60 min the thickness is not less than 6 mm in accordance with standard DIN EN 1897; the residual thickness after 1000 hours must in any case not be less than 5.25 mm under the same standard. Performance must be certified by tests through an independent laboratory. The geospacer must have a H2O penetration resistance classified as *water tight* under standard EN 1928, and *W1* under standard EN 3859-1. The geospacer must be EC labelled and must be accompanied by sound tests carried out under standard UNI EN ISO 717/2 (internal laboratories acceptable), which show a reduction of 24.88db using a 19.5 mm plywood panel and a 0.6 mm metal sheet. The geospacer must be class E fire reaction under standard DIN EN 13501-1 once again certified by testing through an independent laboratory.

- **K ROOF EASY PREMIUM**

Supply and installation of three-dimensional PP geospacer, type KROOF C10 EASY PREMIUM. The geospacer's creep resistance under load must be 20kPa such that after 60 min the thickness is not less than 6 mm in accordance with

standard DIN EN 1897; the residual thickness after 1000 hours must in any case not be less than 5.25 mm under the same standard. Performance must be certified by tests through an independent laboratory. The geospacer must be EC labelled and must be accompanied by sound tests carried out under standard UNI EN ISO 717/2 (internal laboratories acceptable), which show a reduction of 24.88db using a 19.5 mm plywood panel and a 0.6 mm metal sheet. The geomat must be at least 1.3 m wide.

13 REFERENCES

KROOF EASY PREMIUM	Italy	2007
KROOF EASY PREMIUM	Japan	2007
KROOF EASY PREMIUM	Italy	2007
KROOF B	Italy	2007
KROOF EASY PREMIUM	Japan	2007
KROOF EASY PREMIUM	Japan	2007