

0418-L-20/4

1 June 2023

Test report

Techriet / wood particle board deck



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expertise in façades and roofs



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20 February 2023

0418-L-20/4

R.J. de Jongh

test on external fire exposure to roofs according to CEN/TS 1187, test 1

Contact person

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Date of order

Project number

Author

Subject

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1 Introduction

By order of Techriet Holding B.V., Kiwa BDA Testing B.V. has determined the performance of roofs to external fire exposure according to CEN/TS 1187, test 1, on a roofing system consisting of:

- supporting deck of a **wood particle board deck without gaps**;
- mechanically fastened multilayer roofing system consisting of **Techriet**.

The suppliers and the delivery dates of the products used are mentioned below.

Table 1 – Specifications of the products used

Product	Supplier		Delivery date
	company	person	
Supporting deck	Kiwa BDA Testing B.V.	-	02-03-2023
Artificial reed	Techriet Holding B.V.	H.J. Straver	21-03-2023

See annex IV for photos of the products and further package data.

2 Test specimens

According to the prescription of the principal the test specimens (according to CEN/TS 1187, § 4.4.3.1) have been built using the following products from the bottom up.

By request of the principal, Kiwa BDA Testing B.V. did not supervise the fabrication of the test specimens.

- Supporting deck : wood particle board, constructed from planks, 250 mm wide × 16 mm thick, density 651 kg.m⁻³, not treated with fire retardants, with plain edges and tightly butt joined so that the gaps between planks do not exceed 0,5 mm.

- Top layer : Techriet
 - material : artificial reed
 - thickness applied system : circa 180 mm
 - reed length : 700 mm - 1120 mm
 - reed wall thickness¹ : 0,7 mm
 - product code : not applicable
 - manufacturer/supplier : Techriet Holding B.V.
 - production code/date : not revealed
 - product standard : not applicable

Kiwa BDA Testing is not responsible for the product data revealed by the principal and/or found on the samples.

The apparent mass, density or thickness where applicable, has indicatively been determined.

The top layer has been fastened to the supporting deck with a binding system (metal wire and metal point fasteners).

No actions have been taken to prevent the flames passing around the edges of the specimen.

¹ The apparent mass, density or thickness where applicable, has indicatively been determined by Kiwa BDA Testing B.V.

3 Investigation

The investigation has been performed in accordance with CEN/TS 1187:2012 – Test methods for external fire exposure to roofs, test 1 – Method with burning brands. By request of the principal the test has been performed at a slope of 45°.

The test is performed on four test specimens of type 3 according to CEN/TS 1187, § 4.4.3.1.

A metal basket filled with 600 grams of wood wool, previously conditioned at 23 °C and 50% relative humidity, is placed on a test specimen, after which the wood wool is ignited.

During and/or after the test the following parameters are observed, measured and recorded.

External fire spread

- The time when the sustained flaming has progressed upwards 100 mm, 300 mm, 500 mm and 700 mm from the upper edge of the projection of the brand on to the exposed specimen surface and when reaching the upper edge of the measuring zone (see annex II).
- The time when the sustained flaming has progressed downwards 100 mm, 300 mm and 500 mm from the lower edge of the projection of the brand on to the exposed specimen surface and when reaching the lower edge of the measuring zone (see annex II).
- The fire spread lateral to the edges of the measuring zone (see annex II).
- The time of occurrence and description of any burning material (flaming droplets or debris) falling from the exposed surface.
- The extent during the test of the external fire spread upwards downwards, to the right and to the left, expressed as the maximum burnt length from the edges of the projection of the brand onto the exposed surface, measured at the end of the test.
- The extent of external damage.

Fire penetration and openings

- The time of fire penetration, if this has occurred.
- The time of occurrence and description of any burning material (flaming droplets or debris) falling from the visible underside of the specimen.
- The time of occurrence of openings and their dimensions.

Damage

- The extent of internal damage upwards and downwards, measured after the test from the edges of the projection of the brand.
- The maximum length of burnt material upwards and downwards in each layer, measured after the test from the edges of the projection of the brand.
- The extent of internal damage.

At 60 minutes after the start of the test, after all the fire symptoms are gone or the fire has been extinguished (30 minutes after the beginning of the test), the roof is opened and checked for non-flaming fire propagation.

On 7 April 2023 and 21 April 2023 the investigation has been performed by Mr W.J.B. Middag and Mr R.J. de Jongh of Kiwa BDA Testing B.V. in the fire laboratory of Kiwa BDA Testing B.V.

In annex I a photo report of the test and the test results is given.

4 Results

4.1 Test specimen 1 (type 3)

4.1.1 Fire behaviour during the test

Description	Result [min:s]				
Roofing burning after	0:35				
Fire gone out after	16:49				
Fire spread ¹⁾	100 mm	300 mm	500 mm	700 mm	MZ ²⁾
▪ upwards	- ³⁾	- ³⁾	- ³⁾	- ³⁾	- ³⁾
▪ downwards	- ³⁾	- ³⁾	- ³⁾	n.a.	- ³⁾
▪ lateral (left)	n.a.	n.a.	n.a.	n.a.	- ³⁾
▪ lateral (right)	n.a.	n.a.	n.a.	n.a.	- ³⁾
¹⁾ Length of damage area measured from the edge of the basket. ²⁾ Edge measuring zone. ³⁾ Not been reached.					

4.1.2 Special observations made during the test

Description	Results
Temperature in the test room before the start of the test	18 °C
Smoke coming out of the edges	none
Occurrence of explosion	none
Flaming droplets or debris falling from the exposed surface	none
Fire penetration of the specimen	none
Flaming droplets or debris falling from the underside of the surface	none
Test specimen opened	after 60 minutes
Presence of glowing parts 60 minutes after the start of the test	no

4.1.3 Measurements made after the test

Description	Results
External fire spread / burnt length ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards ▪ maximum burnt length ▪ lateral (left) ▪ lateral (right) 	<p>30 mm</p> <p>75 mm</p> <p>105 mm</p> <p>15 mm</p> <p>0 mm</p>
Internal fire spread supporting deck ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards ▪ maximum burnt length 	<p>0 mm</p> <p>0 mm</p> <p>0 mm</p>
Through openings <ul style="list-style-type: none"> ▪ number of openings (> 25 mm²) ▪ number of cracks (> 2 mm wide) ▪ total area (openings and cracks) 	<p>0</p> <p>0</p> <p>0 mm²</p>
Damaged area <ul style="list-style-type: none"> ▪ external 	<p>0,12 m²</p>
Damaged length (internal) supporting deck ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards 	<p>0 mm</p> <p>0 mm</p>
Damaged depth ²⁾ <ul style="list-style-type: none"> ▪ internal (reed) 	<p>40 mm</p>
<p>¹⁾ Length of damaged area measured from the edge of the basket.</p> <p>²⁾ Damaged depth measured from the surface of the reed.</p>	

4.2 Test specimen 2 (type 3)

4.2.1 Fire behaviour during the test

Description	Result [min:s]				
Roofing burning after	0:44				
Fire gone out after	16:20				
Fire spread ¹⁾	100 mm	300 mm	500 mm	700 mm	MZ ²⁾
▪ upwards	- ³⁾	- ³⁾	- ³⁾	- ³⁾	- ³⁾
▪ downwards	- ³⁾	- ³⁾	- ³⁾	n.a.	- ³⁾
▪ lateral (left)	n.a.	n.a.	n.a.	n.a.	- ³⁾
▪ lateral (right)	n.a.	n.a.	n.a.	n.a.	- ³⁾
¹⁾ Length of damage area measured from the edge of the basket. ²⁾ Edge measuring zone. ³⁾ Not been reached.					

4.2.2 Special observations made during the test

Description	Results
Temperature in the test room before the start of the test	16 °C
Smoke coming out of the edges	none
Occurrence of explosion	none
Flaming droplets or debris falling from the exposed surface	none
Fire penetration of the specimen	none
Flaming droplets or debris falling from the underside of the surface	none
Test specimen opened	after 60 minutes
Presence of glowing parts 60 minutes after the start of the test	no

4.2.3 Measurements made after the test

Description	Results
External fire spread / burnt length ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards ▪ maximum burnt length ▪ lateral (left) ▪ lateral (right) 	<p>10 mm</p> <p>45 mm</p> <p>55 mm</p> <p>0 mm</p> <p>0 mm</p>
Internal fire spread supporting deck ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards ▪ maximum burnt length 	<p>0 mm</p> <p>0 mm</p> <p>0 mm</p>
Through openings <ul style="list-style-type: none"> ▪ number of openings (> 25 mm²) ▪ number of cracks (> 2 mm wide) ▪ total area (openings and cracks) 	<p>0</p> <p>0</p> <p>0 mm²</p>
Damaged area <ul style="list-style-type: none"> ▪ external 	<p>0,10 m²</p>
Damaged length (internal) supporting deck ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards 	<p>0 mm</p> <p>0 mm</p>
Damaged depth ²⁾ <ul style="list-style-type: none"> ▪ internal (reed) 	<p>35 mm</p>
<p>¹⁾ Length of damaged area measured from the edge of the basket.</p> <p>²⁾ Damaged depth measured from the surface of the reed.</p>	

4.3 Test specimen 3 (type 3)

4.3.1 Fire behaviour during the test

Description	Result [min:s]				
Roofing burning after	0:48				
Fire gone out after	13:37				
Fire spread ¹⁾	100 mm	300 mm	500 mm	700 mm	MZ ²⁾
▪ upwards	- ³⁾	- ³⁾	- ³⁾	- ³⁾	- ³⁾
▪ downwards	- ³⁾	- ³⁾	- ³⁾	n.a.	- ³⁾
▪ lateral (left)	n.a.	n.a.	n.a.	n.a.	- ³⁾
▪ lateral (right)	n.a.	n.a.	n.a.	n.a.	- ³⁾
¹⁾ Length of damage area measured from the edge of the basket. ²⁾ Edge measuring zone. ³⁾ Not been reached.					

4.3.2 Special observations made during the test

Description	Results
Temperature in the test room before the start of the test	18 °C
Smoke coming out of the edges	none
Occurrence of explosion	none
Flaming droplets or debris falling from the exposed surface	none
Fire penetration of the specimen	none
Flaming droplets or debris falling from the underside of the surface	none
Test specimen opened	after 60 minutes
Presence of glowing parts 60 minutes after the start of the test	no

4.3.3 Measurements made after the test

Description	Results
External fire spread / burnt length ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards ▪ maximum burnt length ▪ lateral (left) ▪ lateral (right) 	<p style="text-align: right;">5 mm</p> <p style="text-align: right;">95 mm</p> <p style="text-align: right;">100 mm</p> <p style="text-align: right;">20 mm</p> <p style="text-align: right;">5 mm</p>
Internal fire spread supporting deck ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards ▪ maximum burnt length 	<p style="text-align: right;">0 mm</p> <p style="text-align: right;">0 mm</p> <p style="text-align: right;">0 mm</p>
Through openings <ul style="list-style-type: none"> ▪ number of openings (> 25 mm²) ▪ number of cracks (> 2 mm wide) ▪ total area (openings and cracks) 	<p style="text-align: right;">0</p> <p style="text-align: right;">0</p> <p style="text-align: right;">0 mm²</p>
Damaged area <ul style="list-style-type: none"> ▪ external 	<p style="text-align: right;">0,12 m²</p>
Damaged length (internal) supporting deck ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards 	<p style="text-align: right;">0 mm</p> <p style="text-align: right;">0 mm</p>
Damaged depth ²⁾ <ul style="list-style-type: none"> ▪ internal (reed) 	<p style="text-align: right;">35 mm</p>
¹⁾ Length of damaged area measured from the edge of the basket. ²⁾ Damaged depth measured from the surface of the reed.	

4.4 Test specimen 4 (type 3)

4.4.1 Fire behaviour during the test

Description	Result [min:s]				
Roofing burning after	0:56				
Fire gone out after	12:23				
Fire spread ¹⁾	100 mm	300 mm	500 mm	700 mm	MZ ²⁾
▪ upwards	- ³⁾	- ³⁾	- ³⁾	- ³⁾	- ³⁾
▪ downwards	- ³⁾	- ³⁾	- ³⁾	n.a.	- ³⁾
▪ lateral (left)	n.a.	n.a.	n.a.	n.a.	- ³⁾
▪ lateral (right)	n.a.	n.a.	n.a.	n.a.	- ³⁾
¹⁾ Length of damage area measured from the edge of the basket. ²⁾ Edge measuring zone. ³⁾ Not been reached.					

4.4.2 Special observations made during the test

Description	Results
Temperature in the test room before the start of the test	18 °C
Smoke coming out of the edges	none
Occurrence of explosion	none
Flaming droplets or debris falling from the exposed surface	none
Fire penetration of the specimen	none
Flaming droplets or debris falling from the underside of the surface	none
Test specimen opened	after 60 minutes
Presence of glowing parts 60 minutes after the start of the test	no

4.4.3 Measurements made after the test

Description	Results
External fire spread / burnt length ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards ▪ maximum burnt length ▪ lateral (left) ▪ lateral (right) 	<p>10 mm</p> <p>70 mm</p> <p>80 mm</p> <p>10 mm</p> <p>15 mm</p>
Internal fire spread supporting deck ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards ▪ maximum burnt length 	<p>0 mm</p> <p>0 mm</p> <p>0 mm</p>
Through openings <ul style="list-style-type: none"> ▪ number of openings (> 25 mm²) ▪ number of cracks (> 2 mm wide) ▪ total area (openings and cracks) 	<p>0</p> <p>0</p> <p>0 mm²</p>
Damaged area <ul style="list-style-type: none"> ▪ external 	<p>0,11 m²</p>
Damaged length (internal) supporting deck ¹⁾ <ul style="list-style-type: none"> ▪ upwards ▪ downwards 	<p>0 mm</p> <p>0 mm</p>
Damaged depth ²⁾ <ul style="list-style-type: none"> ▪ internal (reed) 	<p>35 mm</p>
<p>¹⁾ Length of damaged area measured from the edge of the basket.</p> <p>²⁾ Damaged depth measured from the surface of the reed.</p>	

5 Field of application

This result is valid for the following conditions:

Range of pitches

- $\geq 20^\circ$.

Range of decks

- Any wooden continuous deck with a minimum thickness of 16 mm and with gaps not exceeding 0,5 mm;
- Any non-combustible continuous deck with a minimum thickness of 10 mm.

Remarks:

The results are only related to the investigated samples, products and/or systems. Kiwa BDA Testing B.V. is not liable for interpretations or conclusions that are made in consequence of the results obtained.

The uncertainty of measurement is given in annex III.

Sampling was not performed by Kiwa BDA Testing B.V., so no judgement can be given with regard to the origin and representativeness of the samples.


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Gorinchem, 1 June 2023

The laboratory


R.J. de Jongh
laboratory technician 

Kiwa BDA Testing B.V.


N.W.J. Haanappel BSc
manager testing

Designated as Notified Body NB 1640 pursuant to the
Construction Products Regulation (EU, No 305/2011)



Member

I Photo report of the test

Photo 1

The specimen is ready to be tested.



Photo 2

The basket filled with wood wool has been placed on test specimen 1.



Photo 3
The wood wool has been ignited.



Photo 4
The wood wool and the roofing are burning.



Photo 5
The fire is spreading upwards.



Photo 6
The fire is spreading downwards.



Photo 7
The burnt section of the roofing of test specimen 1.



Photo 8
The undamaged section of the supporting deck of test specimen 1.



Photo 9
The burnt section
of the roofing of
test specimen 2.



Photo 10
The undamaged section of
the supporting deck of
test specimen 2.



Photo 11
The burnt section
of the roofing of
test specimen 3.



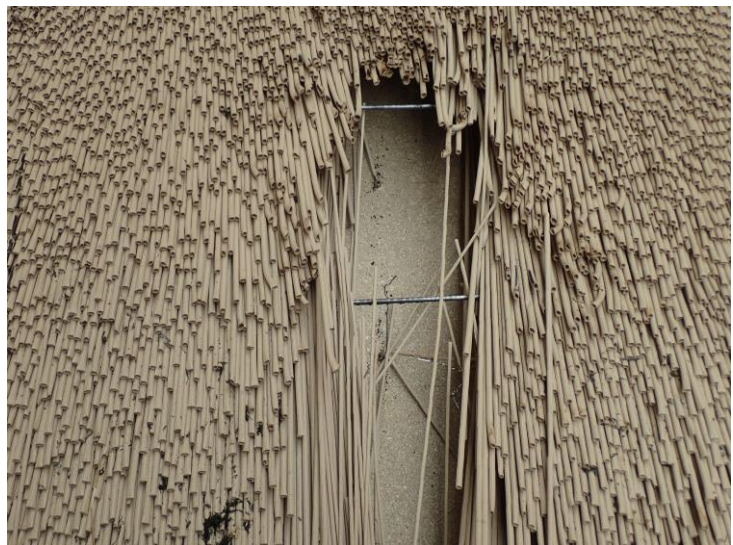
Photo 12
The undamaged section of
the supporting deck of
test specimen 3.



Photo 13
The burnt section
of the roofing of
test specimen 4.

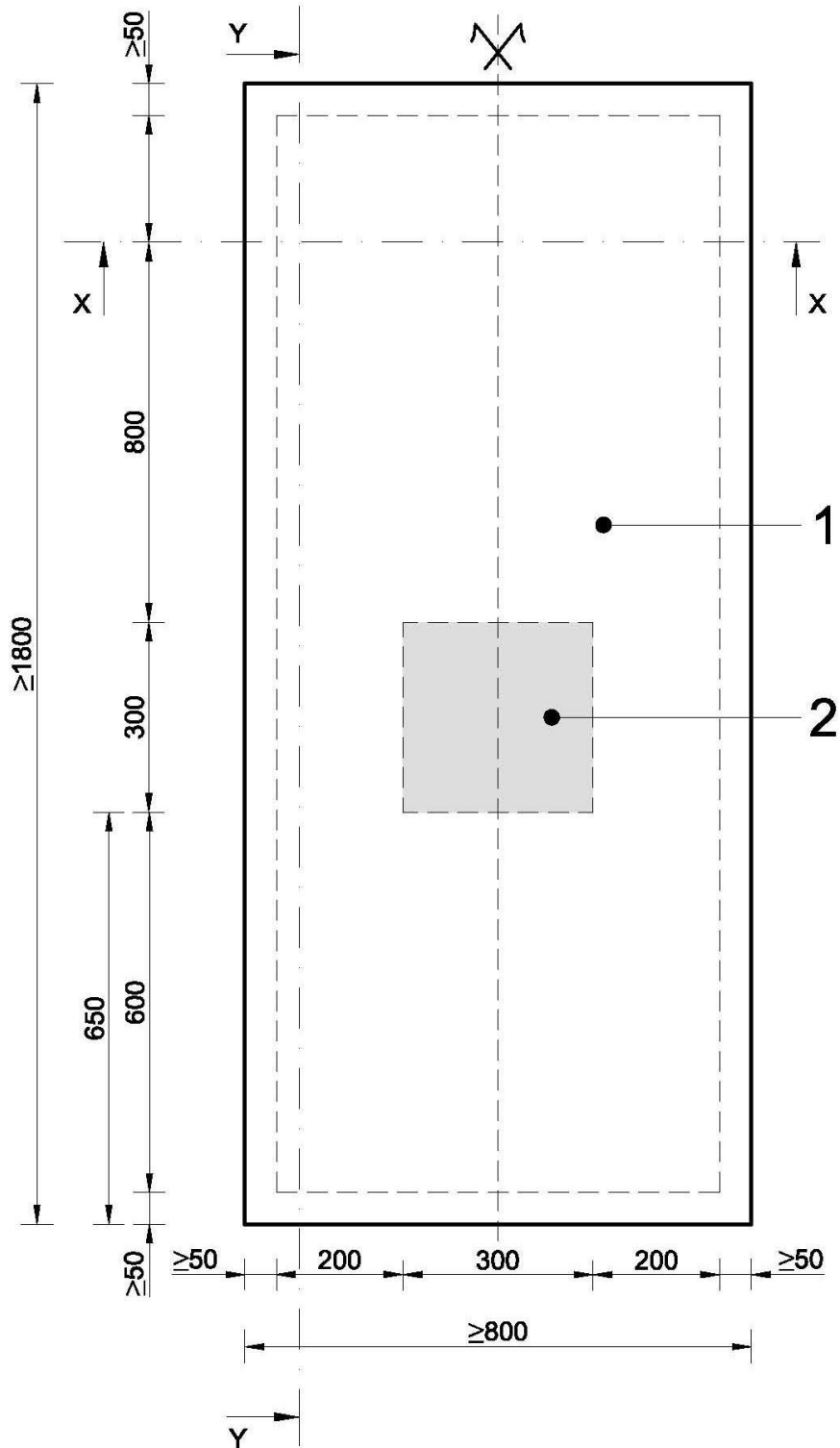


Photo 14
The undamaged section of
the supporting deck of
test specimen 4.



II Measuring zone and position of the brand

Dimensions in millimetres



- 1 Measuring zone
- 2 Basket filled with wood wool

III Uncertainty of measurement

CENTS 1187, T1

Measurement equipment	Kiwa ID	Measurement uncertainty
Measuring tape	3027	$(5000 \pm 0,23)$ mm
Balance	2034B	$(400 \pm 0,056)$ g
Timing device	1008	$(1 \pm 0,24)$ s. $(24 \text{ h})^{-1}$
Inclinometer	1087	$15,00 \pm 0,21$
Vane-wheel anemometer	1012F	$(4,01 \pm 0,068)$ m.s ⁻¹
Thermohygrometer (temperature)	1099	$(25 \pm 0,321)$ °C
Thermohygrometer (humidity)	1099	$(70 \pm 1,489)$ % RH

IV Photos of the products and further package data

Technische Produktinformation Kundenspezifisch Techriet Materialinformation für Reet Bunde



Reet Bunde bestehen aus hochwertigem Hart-PVC.
Es werden ausschließlich PVC-Granulate namhafter deutscher Chemie-Unternehmen verarbeitet.
Unsere Produkte können für den Innen- und Außenbereich verwendet werden. Für Reet Bunde wird Hochleistungsgranulat eingesetzt, das grundsätzlich keine Weichmacher enthält. Durch entsprechende Rezeptierung und Zugabe von Additiven und 10 % Holzmehl lassen sich die geforderten Eigenschaften der Produkte einstellen, wie z.B.:

- hohe mechanische Festigkeit, Steifigkeit und Härte
- schwer entflammbar und außerhalb der Flamme selbstverlöschend
- gute Chemikalien- und Witterungsbeständigkeit
- ausgezeichnete UV-beständigkeit

Der verwendete Materialtyp spiegelt die derzeit bestmögliche Witterungsbeständigkeit in der Produktgruppe Hart- PVC wieder und ist somit Stand der Technik.

Das Hart PVC Granulat (Gemisch) zur Herstellung ist nicht als gefährlich eingestuft im Sinne der Verordnung (EG) Nr. 1272/2008.

Produktinformation:

- Reetbunde haben ein Gewicht von 1,7kg
- Ein Bund beinhaltet ca. 300 Halme
- Die Halme haben eine Höhe von 70 cm bis 112cm
- Der Durchmesser eines Bundes beträgt 12cm
- Reet Bunde werden mit 3 Umreifungsbändern gebündelt

Physikalische Daten / Physical data	Testmethode / testing method	Einheit / Unit	Wertebereich / Value
Dichte / density	DIN EN ISO 1183-1	g/ cm ³	1,38 +/- 0,05
E-Modul / modulus of elasticity	DIN EN ISO 178 A	N/ mm ²	>2000
Thermostabilität / thermostability	DHC Leitwert 200°C	min	>20
Farbe / color	:	natur, beige / nature, beige	
Verarbeitung	:	Extrusion / extrusion	
Stabilisierung / stabilisation	:	CaZn	
Anwendung / application	:	wood filled technical profiles, medium impact	
Bemerkung / Notes	:	Material is free of lead, cadmium, barium, selene and chrome beinhaltet Holzmehl / contains wood-flour as filler	

Diese technischen Informationen gelten für Lieferungen ab dem 01.01.2023 und setzten alle bisherigen technischen Lieferbedingungen außer Kraft.

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Roof covering



Supporting deck

