

Report

Inopaz H₂O

Order number: 0353-L-10/2 Ref.: ARH/GZ

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Subject : indicative investigation on external fire exposure
to roofs according to ENV 1187, test 1

Date of order : 2011.02.22

Date of report : 2011.03.14

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Authorisation : prof. ir N.A. Hendriks

Initials :



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1 Introduction

By order of Pazkar Ltd., BDA Keuringsinstituut B.V. has investigated indicatively the external fire exposure to roofs according to ENV 1187, test 1, on a insulated roof waterproofing system with a roof waterproofing sheet, **Inopaz H₂O**.

On 15 February 2011 a sample of the liquid roof waterproofing system has been set at disposal by Pazkar Ltd. On request of the principal the supporting deck, the thermal insulation and the separation layer have been set at disposal by BDA Keuringsinstituut B.V.

For further product information see also the package data in annex C.



2 Test specimens

On 22 February 2011 one test specimen has been built up by Mr P. Golverdingen of BDA Keuringsinstituut B.V.

From below upwards according to the prescription of the principal the test specimen (type 3 according to ENV 1187 § 4.4.3.1) has been built up using the following products.

- * Supporting deck : trapezoidal steel deck, 106 profile, thickness 0,75 mm;
- * Thermal insulation : unfinished expanded polystyrene, EPS 100 according to EN 13163; class E (EN 13501-1); thickness 100 mm, density 20 kg.m⁻³;
- * Separation layer : uncoated glass fleece, 100 g.m⁻², not treated with fire retardants;
- * Top layer : Inopaz H₂O
 - material : liquid roof waterproofing system
 - thickness : 1,29 mm
 - mass : 1577 g.m⁻²

The top layer and the thermal insulation have been fastened to the supporting deck with metal fasteners with the corresponding load distribution plates (see photo's in annex A).

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

The build-up is according to the Dutch national guideline BRL 1511:2004-1/Wijzigingsblad:2008 – Baanvormige dakbedekkingssystemen, Deel 1 – Algemene bepalingen (*translation: Roof waterproofing systems, Part 1 – General stipulations*), as well as according to the standard test roof according to the Dutch standard NEN 6063:2008 – Bepaling voor het brandgevaarlijk zijn van daken (*translation: Test method for external fire exposure to roofs*).



3 Test

On 23 February 2011 the test has been performed in the fire laboratory of BDA Keuringsinstituut B.V. by Mr P. Golverdingen of BDA Keuringsinstituut B.V. (NL-4202 MS / 35) in the presence.

The test has been performed in accordance with ENV 1187:2002 – Test methods for external fire exposure to roofs, test 1 – Method with burning brands.

At the start of the test the temperature and the relative humidity in the fire laboratory has been determined at 15 °C and 40%.

At the request of the principal the test has been performed at a slope of 15°.

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

During the test the following parameters are observed measured and recorded:

- the time when the sustained flaming has progressed upwards 100 mm, 300 mm, 500 mm and 700 mm, measured from the upper edge of the brand;
- the time when the sustained flaming has progressed downwards 100 mm, 300 mm and 500 mm, measured from the lower edge of the brand;
- the time when the sustained flaming has reached the measuring zone (see annex B figure 1);
- the time of occurrence and description of any burning material falling from the exposed surface;
- the time and nature of fire penetration;
- the time of occurrence and description of any burning material falling from the underside of the specimen.



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.



After the test the following parameters are measured and recorded:

- the maximum internal damage upwards, downwards and lateral, measured from the edges of the brand;
- the maximum length of burnt material upwards and downwards in each layer, measured from the edges of the brand;
- the damaged area, internally and externally;
- the time at which the test specimen is opened.

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





4 Results

4.1 Fire behaviour during the test

Description	Result [min:s]				
Roofing burning after	0:47				
Fire gone out	10:08				
Fire spread ¹⁾	100 mm	300 mm	500 mm	700 mm	MZ ²⁾
• upwards	-	-	-	-	-
• downwards	-	-	-	n.a.	-
• lateral (left)	-	n.a.	n.a.	n.a.	-
• lateral (right)	-	n.a.	n.a.	n.a.	-
¹⁾ Length of damage area measured from the edge of the basket. ²⁾ Edge measuring zone.					



4.2 Special observations made during the test

Description	Results
Smoke coming out of the edges	after 3 minutes and 41 seconds
Occurrence of explosion	none
Flaming droplets or debris falling from the exposed surface	none
Fire penetration of the specimen	none
Test specimen opened	after 50 minutes
Presence of glowing parts 60 minutes after the start of the test	no

4.3 Measurements made after the test

Description	Results
External fire spread ¹⁾	
• upwards	30 mm
• downwards	55 mm
• lateral (left)	25 mm
• lateral (right)	55 mm
Internal fire spread glass fleece ¹⁾	
• upwards	30 mm
• downwards	55 mm
Internal fire spread insulation ¹⁾	
• upwards	135 mm
• downwards	110 mm
Through openings	
• number of openings (> 25 mm ²)	0
• number of cracks (> 2 mm wide)	0
• total area (openings and cracks)	0 mm ²
Damaged area	
• external	0,11 m ²
• insulation	0,24 m ²
Damaged length (internal) glass fleece ¹⁾	
• upwards	30 mm
• downwards	55 mm
Damaged length (internal) insulation ¹⁾	
• upwards	140 mm
• downwards	140 mm

¹⁾ Length of damaged area measured from the edge of the basket.



5 Field of application

Because only one test specimen has been tested, no field of application can be given.

Remark

It shall be emphasized that this investigation is only an indication at a given moment of the properties of the investigated products and/or systems and it does not provide information on the scope of the variations over the course of time.

These results shall be interpreted:

- either in the framework of a certain project, applying for the tested batch;
- or in the framework of an admission procedure for certification for a general indication in which the quality management of the manufacturer is involved.

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Gorinchem, 2011.03.14

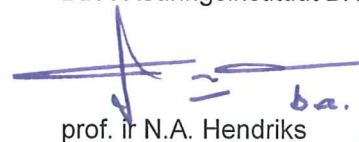
The laboratory

A.R. Hameete



BDA Keuringsinstituut B.V.

prof. ir N.A. Hendriks



Member



Photo 1

The specimen is ready to be tested.

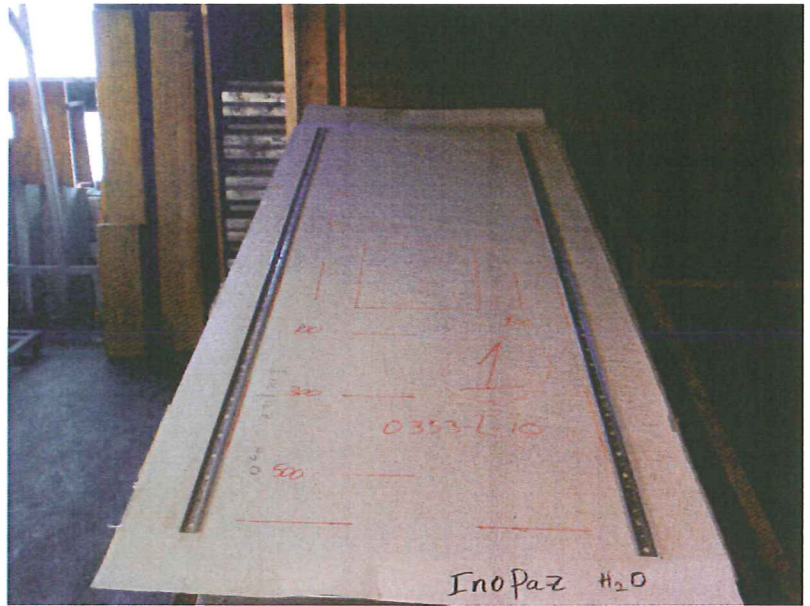


Photo 2

The wood wool in the basket has been placed on the test specimen and has been ignited.

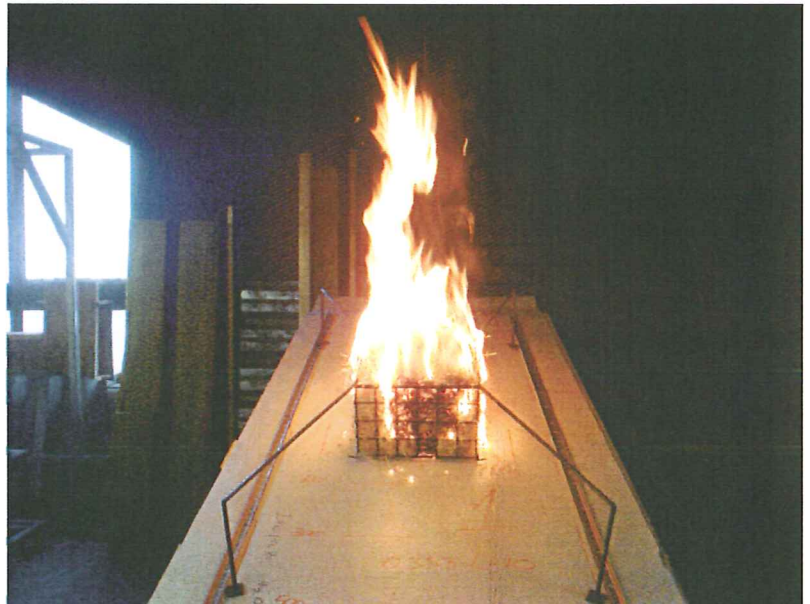


Photo 3

The wood wool and the roofing are burning.



Photo 4
Smoke comes out of the edges.

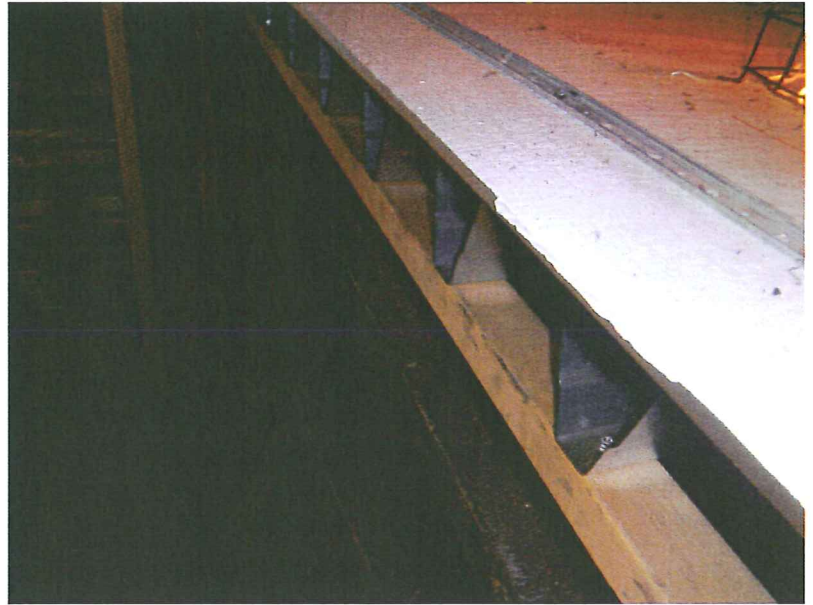


Photo 5
The fire is spreading downwards.



Photo 6
The burnt section of the roofing of the test specimen.

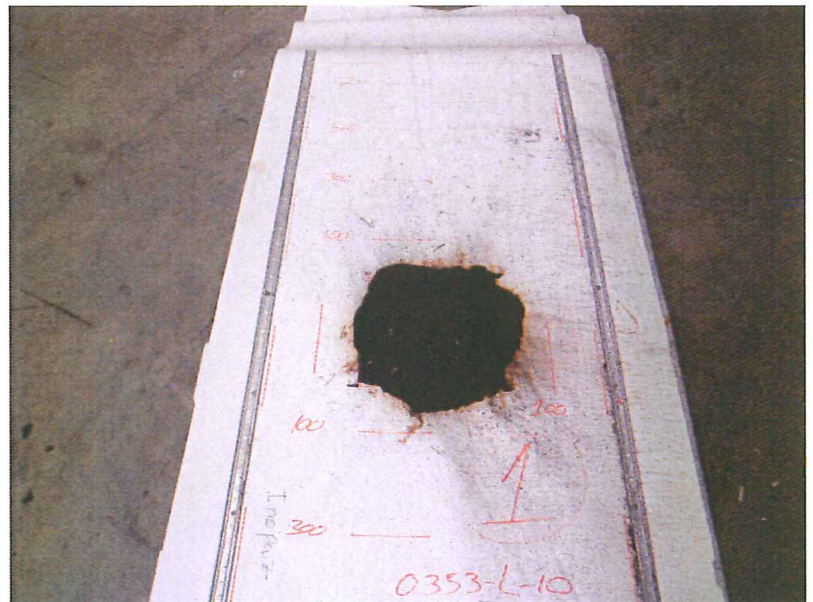


Photo 7
The burnt section of the insulation
of the test specimen.





Package data and sampling form

Supporting deck

van Delft
Kunststof Dakbedekking

ordernummer 84 533 pakketnr. 2/5

BIJLBOUW B.V. 2008

EN 14782

uw referentie : 27340 - Gorinchem

CE

produkt : Warmdakplaten
type : VD 106R/750
dikte : 0,75 mm
uitvoering A : Sendzimir verzinkt
uitvoering B : Sendzimir verzinkt
brandklasse : klasse A1

gewicht : 1.001,0 kg hoeveelheid : 102,00 m²

aantal	lengte	aantal	lengte
40	3400		



Thermal insulation

<h1 style="margin: 0;">IsoBouw PolyTop</h1>			<h2 style="margin: 0;">EPS 100-SE</h2>	
Dikte / Epaisseur	Lengte / Longueur	Breedte / Largeur	R_D m²K/W	Inhoud / Conteneur
100 mm	1000 mm	1200 mm	2,75	
<div style="font-size: 8px; margin-left: 5px;"> EN 13163 EPS 100-SE Brandklasse E R_D = 2,75 m²K/W λ_D = 0,036 W/mK d = 100 mm </div>		<p>CTG 060 CVP 481 ATG 2235</p>		
<p>Innovatie in isolatie</p>		<p>www.isobouw.nl</p> <p>IsoBouw Systems bv Postbus 1 NL-5710 AA Someren Tel +31-(0)493-498111 Fax 031-(0)493-495971</p>		

De gegevens voor de standaarddikte van een vlakke plaat zijn hierboven vermeld, voor andere dikten en afschot: zie tabel hieronder.

Vlak		Afschot 1 %		Afschot 1,5 %		Afschot 2 %	
d	R _D	d	R _D gem	d	R _D gem	d	R _D gem
(mm)	(m ² K/W)	(mm)	(m ² K/W)	(mm)	(m ² K/W)	(mm)	(m ² K/W)
40	1,10	30-40	0,95	30-45	1,00	40-60	1,35
50	1,35	40-50	1,25	45-60	1,45	60-80	1,90
60	1,65	50-60	1,50	60-75	1,85	80-100	2,50
70	1,90	60-70	1,80	75-90	2,25	100-120	3,05
80	2,20	70-80	2,05	90-105	2,70	120-140	3,60
90	2,50	80-90	2,35	105-120	3,10	140-160	4,15
100	2,75	90-100	2,60	120-135	3,50	160-180	4,70
110	3,05	100-110	2,90	135-150	3,95	180-200	5,25
120	3,30	110-120	3,15	150-165	4,35		
130	3,60	120-130	3,45	165-180	4,75		
140	3,85	130-140	3,75	180-195	5,20		
150	4,15	140-150	4,00				
160	4,40	150-160	4,30				
170	4,70	160-170	4,55				
180	5,00	170-180	4,85				
190	5,25	180-190	5,10				
200	5,55	190-200	5,40				



Separation layer

PRODUCT NAME: GLASS FIBRE REINFORCEMENT 100 GR		DATE OF ISSUE: 03/01/07		
ITEM NUMBER: 77000160				
1. GENERAL PRODUCT INFORMATION				
Fiber-glass membrane support for bituminous waterproofing materials.				
2. PURCHASING REQUIREMENTS:				
<p>1) -Delivered on pallets (2 rolls on one pallet). -Core inside diameter: 150mm. -Rolls must be wrapped in plastic and closed on both sides. -Labeling of the rolls (product description and roll number). -This information can change depending on a specific situation.</p> <p>2) -Jumbo rolls: free stored in container. -Core inside diameter: 305mm. -Roll must be wrapped in plastic. -Labeling of the rolls (product description and roll number). -This information can change depending on a specific situation.</p>				
3. SPECIFICATION:				
Properties	Unit	Raw material Parameters IKO		
Square weight	gr/m ²	min. 90 max. 110		
Tensile strength				
-length	N/50mm	min. 300		
-width	N/50mm	min. 200		
Binder content	%	max. 30		
Roll with	mm	min. 1002 max. 1007		
4. AGREEMENTS:				
<p>-A supplier specification sheet has to be provided by the supplier. -The supplier agrees to deliver corresponding this specification sheet. -Modification in the specifications must be provided immediately by the supplier. -Every delivery is provided with a packing list (with roll numbers) and a quality certificate/report.</p>				
5. EXTRA SAFETY AND ENVIRONMENTAL PRECAUTIONS:				
-Always wear gloves during handling.				