

Test report
DD 4617/1/2012E

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Client

Bostik Türkiye

Tekbau Yapı Malz. Mad. San. A.Ş.

Tavşantepe Mevkii Yulaflı Köyü Çorlu

Tekirdağ – Türkiye

Receipts book No.: G430/2009**Order date:** 28.07.2009 / 05.09.2012**Receipt of test specimens:** 28.07.2009**Subject of application:** Testing of KMB**"Bostik AquaRoll"**

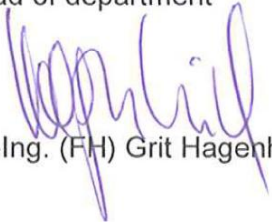
according to DIN 18195 / Part 2, Table 9 and the principal test requirements for normally flammable, polymer modified bitumen thick film sealant (PG-KMB) designed for use in conformity with DIN 18195, Parts 4-6.

Specimen material: packaging „Bostik AquaRoll“2 m² "glass fibre mesh"

Dresden, 10 September 2012

(Hag / Han)

Head of department



Dipl.-Ing. (FH) Grit Hagenhenrich

Deputy head of testing agency



Dipl.-Ing. Frank Pohle

The test report has 7 pages and - annex.

The test results relate to the specimen material submitted. The specimen material has been consumed.

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Opinions and interpretations of the testing agency are given in *italic letters* in accordance with DIN EN ISO / IEC 17 025 item 5.10.5.

Normative references

DIN 52005 (2004-07); Determination of ash

DIN 52123 (1985-08); Testing of bitumen and polymer bitumen sheeting and felts

DIN 52461 (2000-02); Rain strength of just applied sprayable jointing products

DIN EN 23270 (1991-09); Temperatures and humidities for conditioning and testing

DIN EN ISO 2812-2 (2007-05); Determination of resistance to liquids

EN ISO 3251 (2008-06); Determination of non-volatile-matter content

DIN EN ISO 11925-2 (2009-01); Reaction to fire tests - Ignitability of building products when subjected to direct impingement of flame - Part 2: Single-flame source test

Test order / test specimen construction

The submitted two-component bitumen thick film sealant (KMB) "Bostik AquaRoll" was to be tested according to DIN 18195, Part 2, Table 9, and the principal test requirements for normally flammable, polymer modified bitumen thick film sealants (PG-KMB).

The liquid component was homogeneously mixed with the powder component in the as-delivered condition. The mixing ratio was 8 : 24.

For constructing the test specimen, the KMB "Bostik AquaRoll" was applied in two operations. For testing for resistance to water, impermeableness to water and for pressure testing, the "Armierungsgewebe" (glass fibre mesh) was embedded in the middle of the sealant. Following application of the sealant, the test specimen was stored under standard climatic conditions as per DIN EN 23270 for 28 days.

The total quantities applied were chosen as follows:

- DIN 18195-4, 5, 6: ca. 5 mm wet layer

Deviating layer thicknesses were used in accordance with the principal test requirements.

Individual tests

1 Composition of liquid component

Solid content according to EN ISO 325: 61.3 %

Fillers according to DIN 52005: 8.5 %

Water 37.7 %

Binder content 52.8 %

Desired: $\geq 35\%$

The binder content was determined by differential calculation.



2 Properties of dry film

2.1 Bulk density of solid, DIN 53 479, method A

Individual values: 1.14 / 1.15 g/cm³

Mean value: 1.15 g/cm³

2.2 Thermal resistance, PG-KMB, item 4.2

The test was carried out on the dry film in conformity with DIN 52123, item 12. KMB "Bostik AquaRoll" was applied onto a metal carrier in a quantity envisaged for non-pressurised water and stored before the start of the test in a standard climate as per DIN EN 23270 for 28 days.

Test condition: 70 °C, 2 hours suspended perpendicularly: no sagging

Result: passed

2.3 Cold bending behaviour, PG-KMB, item 4.2

The test was carried out on a dry film in conformity with DIN 52123, item 13. "Bostik AquaRoll" was applied onto a sheet in a quantity envisaged for non-pressurised water and stored before the start of the test in a standard climate as per DIN EN 23270 for 28 days. The test was carried out on the separated film.

Test condition: 0 °C, bending plate R = 15 mm: no cracks when being bent

Result: passed

2.4 Impermeableness to water in slit pressure test, 1 mm slit width, PG-KMB, item 4.4

Three test specimens were prepared with a mass per unit area of approx 5 mm using the "Armierungsgewebe". The test specimens were stored at 23 °C / 50 % relative humidity for 28 days. Then the test specimens were placed into the slit pressure test device and sealed in an appropriate manner. Testing was performed at a water pressure of 0.075 N/mm² for a period of 72 hours each.

Result: passed;

The seal can be designated as being tight under the conditions described above.

2.5 Resistance to water, PG-KMB, item 4.7

The test was carried out based on DIN EN ISO 2812. The test specimen was constructed with a dry film thickness of 4 mm, the reinforcing mesh being inserted centrally. The completed test specimen was stored at 23 °C / 50 % for 28 days. Testing was performed on the separated film after the specimen had been stored at room temperature in slightly stirred water for 28 days.

Assessment of test specimens after 28 days: minor formation of bubbles, no change in colour of the layer, slight bloating of layer.

Assessment of water: no discolouration

Result: passed; the sealant can be designated as being resistant to the action of water in accordance with DIN EN ISO 2812-2.

2.6 Resistance to rain, PG-KMB, item 4.8

Test specimens were applied with a wet film thickness of 3 mm onto the concrete plates and stored at 23 °C / 50 % relative humidity up to the start of testing. The temperature of the water used for testing was 18.7 °C.

Test after storing specimens for 4 hours after the end of sealant application:

Assessment: passed

No washing-out of bitumen, no damage to the surface and clear run-off of water.

Desired: ≤ 8 hours

2.7 Bridging of cracks at + 4 °C, PG-KMB, item 4.5

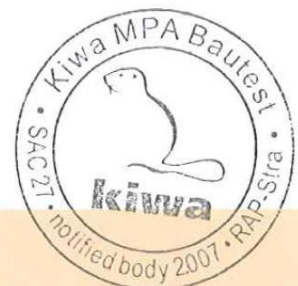
KMB "Bostik AquaRoll" was applied onto an area measuring 12.0 x 12.0 cm of the concrete test plates with a wet film thickness of 4.0 mm in accordance with the test instructions. The temperature of the test specimens was equalized prior to the test at + 4 °C for 24 hours. Then the test specimens were pulled in a centric tensile test at a feed rate of 0.1 mm/min at a temperature of + 4°C until a 2 mm crack was achieved in the test plate.

No negative changes to the sealant were visible during this phase. The crack produced was fixed, the test specimens were removed and immediately stored again at + 4 °C in a cooling room.

A final assessment was carried out after 24 hours.

The specified 2 mm crack was bridged.

Result: passed



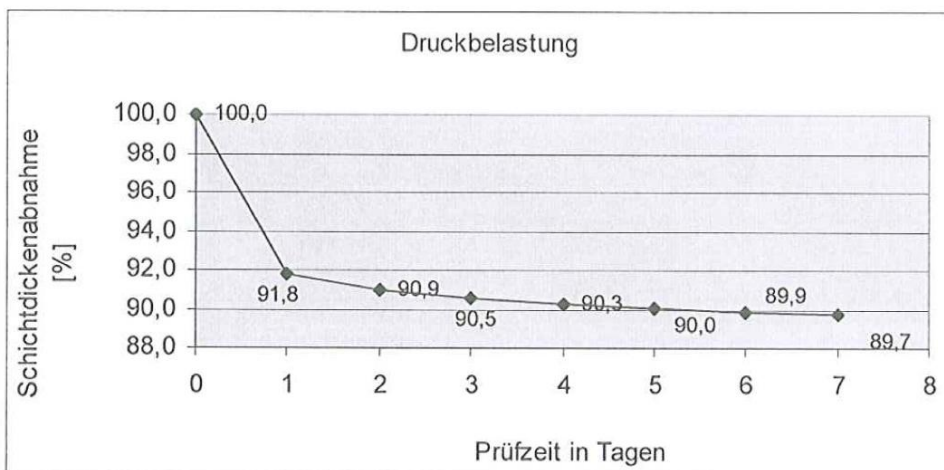
2.8 Pressure loading, PG-KMB, item 4.6

The test was applied for in conformity with the conditions of use as per DIN 18195, Part 6. For carrying out the test, an area measuring 200 x 200 mm of the concrete test plates was coated in 2 operations with "Bostik Aquaroll" using the "Armierungsgewebe". Before testing was started, the coated test plates were stored in a normal climate as per DIN EN 23270 for 28 days.

Test:

The layer thickness was measured at various points distributed over the test specimen in accordance with ZTV-SIB 90. Then the coated concrete plates were installed in the fatigue test stand and loaded at a preload of 0.01 MN/m².

Then the plates were loaded (main load) at 0.3 MN/m² for use as per DIN 18195-6. The decrease in the layer thickness determined is shown in the diagram.



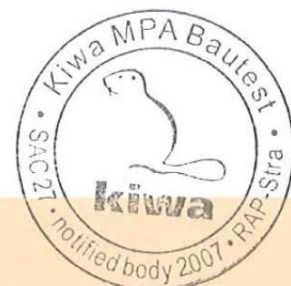
Schichtdickenabnahme = Decrease in layer thickness; Schichtdicke = Layer thickness; Prüfstage = Test days

A decrease in the layer thickness s_n after 6 days of 10.1 % and a three-day change between the 3th and 6th day of 0.6 % was determined.

Desired: decrease in thickness $s_n \leq 50 \%$, thickness loss between the last day and the last day but two of the cycle $\leq 3 \%$.

Result: passed;

The requirements existing for "Bostik AquaRoll" after 6 days were satisfied.



2.9 Behaviour in fire, PG-KMB, item 4.10

Proof of normal flammability (E) was furnished as per DIN EN ISO 11925-2 the test report PB-Hoch-090930 and classification report KB-Hoch-090931, dated 20.10.2009.

2.10 Wasserdampfdiffusion

Test conditions: humidity 0/75 %; temperature 23 °C

	Sample 1	Sample 2	Sample 3	mean value
coat thickness [m]	0,0031	0,0034	0,0034	0,0033
sampleweight [g]	0,25	0,23	0,23	0,24
Sample aerea [m ²]	0,0063	0,0063	0,0063	0,0063
Wasserdampfdiffusionszahl μ	8753	8779	8789	8774
Diffusionsäquivalente Luftschichtdicke sd [m]	27,1	29,9	29,9	29,0

3 Properties of ready-to-use liquid product

3.1 Decrease in layer thickness in through-drying, PG-KMB, item 5.1

A degreased metal plate made from stainless steel was coated with a wet film thickness of 5 mm. The wet film thickness was determined immediately after coating with a penetrometer at various points distributed over the test specimen. After the measurement, the specimen was stored in a normal climate as per DIN EN 23270 for 28 days.

The layer thickness of the drying layer was determined after 7, 14, 21 and 28 days from 15 partial values with an inductive measuring instrument.

Result: passed

Measuring period	Layer thickness [mm]	Decrease in layer thickness [%]	Desired decrease in layer thickness [%]
immediately after application	5,7		
after 7 days	4,1		
after 14 days	4,1		
after 21 days	4,0		
after 28 days	3,9	31,5	≤ 50, limit deviat. ± 5

