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Deutsche
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Test report

project: **P 11577-E**

order: Tests on **Bitarel Typ N2** according to **DIN EN 14188-1**

sample description: hot applied joint sealant

order date: 2018-07-13

sampling or sample
receipt date: 2019-02-09

test period: 2019-09-16 – 2019-10-10

This test report
comprises: 7 pages

Flörsheim, 2019-12-05



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1 SUBJECT

Polymer Institute was charged by Bitarel GmbH, Minsk (BY), to carry out tests of the hot applied joint sealant

Bitarel Typ N2

in accordance with **DIN EN 14188-1:2004-04** "Joint fillers and sealants – Part 1: Specification for hot applied sealants".

2 RECEIPT OF SAMPLES

The following samples were delivered to Polymer Institute on 09-02-2019:

Overview 1: receipt of samples

no. 11577	material	description	batch	quantity
1	Bitarel Typ N2	hot applied joint sealant	3	ca.5 kg

3 TESTS

The test program is summarized in the following overview.

Overview 2: test program

test	test method	standards
Preparation of samples for testing	DIN EN 13880-6	04-2004
Bitumen and bituminous binders - Determination of the softening point - Ring and Ball method	DIN EN 1427	09-2015
Test method for the determination of density at 25 °C	DIN EN 13880-1	11-2003
Test method for the determination of cone penetration at 25 °C	DIN EN 13880-2	11-2003
Test method for the determination of penetration and recovery (resilience)	DIN EN 13880-3	09-2003
Test method for the determination of heat resistance - cone penetration - resilience	DIN EN 13880-4	09-2003
Test method for the determination of flow resistance	DIN EN 13880-5	08-2004
Test method for the determination of compatibility with asphalt pavements	DIN EN 13880-9	08-2013
Determination of discontinuous extension, with water immersion	DIN EN 13880-13	08-2018
Determination of adhesion and cohesion following continuous extension and compression	DIN EN 13880-10	07-2018

3.1 Preparation of samples for testing

The preparation of samples was determined in accordance with DIN EN 13880-6 - *"Hot applied joint sealants - Part 6: Method for the preparation of samples for testing"*.

3.2 Ring and ball method

The softening point was determined in accordance with DIN EN 1427 *"Bitumen and bituminous binders - Determination of the softening point - Ring and Ball method"*.

3.3 Density

The density was determined in accordance with DIN EN 13880-1 – *"Hot applied joint sealants - Part 1: Test method for the determination of density at 25 °C"*.

3.4 Cone penetration

The cone penetration was determined in accordance with DIN EN 13880-2 – *"Hot applied joint sealants - Part 2: Test method for the determination of cone penetration at 25 °C"*.

Heat resistance: The specimens was stored at 70°C for 7d.

3.5 Resilience

The penetration and recovery were determined in accordance with DIN EN 13880-3 – *"Hot applied joint sealants - Part 3: Test method for the determination of penetration and recovery (resilience)"*.

Heat resistance: The specimens was stored at 70°C for 7d.

3.6 Flow resistance

The flow resistance was determined in accordance with DIN EN 13880-5 – *"Hot applied joint sealants - Part 5: Test method for the determination of flow resistance"*.

Heat resistance: The specimens was stored at 70°C for 7d.

3.7 Compatibility with asphalt pavements

The compatibility with asphalt pavements was determined in accordance with DIN EN 13880-5 - *"Hot applied joint sealants - Part 9: Test method for the determination of compatibility with asphalt pavements"*.

3.8 Preparation of the test specimens

processing temperature:	160 °C - 170 °C
substrates:	mortar prisms (250 x 60 x 30) mm ³ with sealant dimension (200 x 30 x 15) mm ³ for EN 13880-13
	mortar prisms (75 x 50 x 50) mm ³ with sealant dimension (24 x 50 x 50) mm ³ for EN 13880-10

3.9 Determination of discontinuous extension

The discontinuous extension was determined in accordance with DIN EN 13880-13 *"Hot applied joint sealants – Part 13: Test method for the determination of the discontinuous extension, with water immersion (adherence test)"* at -20 °C.

3.9.1 Test parameters

test apparatus:	universal test machine 1445, Zwick, according ISO 5893
storage:	2 specimens for 14d in H ₂ O and 6 h at -20 °C
total extension:	5 mm (33 %)
test temperature:	-20 °C
test procedure:	discontinuous test according to EN 13880-13

3.10 Determination of adhesion and cohesion following continuous extension and compression

The adhesion and cohesion following continuous extension and compression was determined in accordance with DIN EN 13880-10 *"Hot applied joint sealants – Part 10: Test method of the determination of adhesion and cohesion following continuous extension and compression"* at 0 °C.

3.10.1 Test parameters

test apparatus:	universal test machine 1445, Zwick, according ISO 5893
storage:	3 specimens for 6 h at 0 °C
total extension:	18 mm (75 %)
test temperature:	0 °C
test procedure:	continuous test according to EN 13880-10

4 RESULTS

The summary of the results in chapter 3 can be found in the following table:

Table 1: test results

test	unit	other parameters	require- ment*	result	
				single value	mean value
homogeneity	-	-	homo- genous	homogenous	
softening point - Ring and Ball method	°C	-	≥ 85 °C	89,0; 89,5	89,5
density at 25 °C	g•cm ⁻³	-	Ü.H. ⁶	1,145; 1,155; 1,155	1,152
cone penetration at 25 °C	1/10 mm	-	40 – 100	84; 84; 83	84
penetration and recovery (resilience)	mm mm %	P ¹ F ² res ³	≤ 60 %,	1,3; 0,8; 1,0 5,8; 5,1; 5,5 55; 58; 55	1,0 5,5 56
heat resistance - cone penetration	1/10 mm	-	40 – 100	98; 94; 98	97
flow resistance before and after 7d 70°C	mm	-		0; 0 1; 1	0 1
heat resistance - resilience	mm mm %	P ¹ F ² res ³	≤ 60 %,	1,4; 1,4; 1,4 6,5; 6,2; 6,3 50; 52; 51	1,4 6,3 51
compatibility with asphalt pavements	-	-after 24 h -after 48 h -after 72 h	no adhesion failure no exudation	no alteration	no alter- ation

sequel table 1: test results

test	unit	other parameters	require- ment*	result	
				single value	mean value
bonding strength (discontinuous method) after water immersion at -20 °C	N/mm ²	maximum tension	≤ 0.75	0.40; 0.39	0.40
	mm ²	adhesion failure			
	mm ²	-separation block face	none	none	none
	mm	-depth of separation	none	none	none
	mm ²	cohesion failure			
	mm ²	-totally superficial area of cracks	none	none	none
cohesion (continuous test) at 0 °C	mm	-depth of cracks	none	none	none
	N/mm ²	maximum tension	≤ 0.48	0.07; 0.07; 0.09	0.08
	mm ²	adhesion failure			
	mm ²	-separation block face	< 50	none	none
	mm	-depth of separation	< 3	none	none
	mm ²	cohesion failure			
	mm ²	-totally superficial area of cracks	< 20	none	none
	mm	-depth of cracks	<3	none	none

*according to EN 14188-1

¹ penetration at the beginning

² penetration at the end

³ resilience

5 SUMMERY

Polymer Institute was carried out tests of the hot applied joint sealant

Bitarel Typ N2

according to **DIN EN 14188-1**.

The test results are in conformity with DIN EN 14188-1.



Flörsheim-Wicker, 2019-12-05