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Project / Plant: Building entry system Hauff MSH PolySafe with the outer sealing element module 1.2 installed in a wall sleeve of a test block with exterior waterproofing PCI Pecimor 2K (waterproofing class W2.1E according to DIN 18533-1)

Order date: 22 November 2017

Product description: Building entry system Hauff MSH PolySafe with the outer sealing element module 1.2

Order: ≥ 1,0 bar water tightness test for 28 days

Number of samples / tests: 1 test

Sampling: on: - / by: Applicant

Date of delivery: 22 November 2017

Testing period: 22 November - 20 December 2017

Contact: B. Eng. David Röck
Tel. +49 821 72024-14

Number of annexes: The test report contains 1 annex

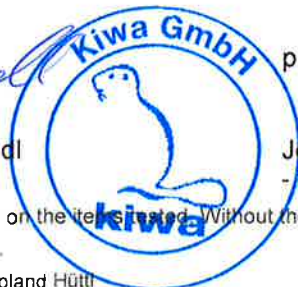
Remark: Translation of Test Report A1742022-01,
11 June 2018

Gersthofen, 11 June 2018
rö/cl

p. p.



Dipl.-Ing. (FH) Kerstin Schedl
- Project manager -



p. p.



Jörg Bölzle
- Project manager -

The test results relate only on the items tested. Without the written approval of the testing laboratory, a duplication in extracts of the test report is not permitted.

Geschäftsführer: Prof. Dr. Roland Hüttl

Amtsgericht Hamburg, HRB 130568, St.Nr.: 46/736/03268



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1. General

Kiwa GmbH, Bautest Augsburg, was contracted by Hauff-Technik GmbH & Co. KG to test the water tightness of the building entry system Hauff MSH PolySafe with the outer sealing element module 1.2 (consisting of outer sealing element module 1 and module 2) [1] installed in a test block with the exterior waterproofing polymer modified bituminous coating (PMBC) PCI Pecimor 2K (waterproofing class W2.1E according to DIN 18533-1 [2] and DIN 18533-3 [3])

Therefore Hauff-Technik GmbH & Co. KG delivered the test block with the already installed building entry system Hauff MSH PolySafe with the outer sealing element module 1.2 together with the components for the test setup to our test laboratory in Gersthofen, Germany. The surface of the test block which was charged with water pressure was already finished with exterior waterproofing PMBC PCI Pecimor 2K [4] according to DIN EN 15814 [5]. The assembly of the test setup was performed by an employee of Hauff-Technik GmbH & Co. KG (see Figure 1).

To test exclusively the sealing function between the PMBC and the outer sealing element module 2 the cast in wall sleeve and the outer sealing element module 1 was cut longitudinal to create a gap for possibly penetrating water.



Figure 1. Assembled test setup.

2. References

- [1] Hauff-Technik GmbH & Co. KG - „Assembly instruction MSH PolySafe – Multiple-service building entry systems for buildings with a basement“. Rev.: 00/2018-01-24.
- [2] DIN 18533-1. Waterproofing of elements in contact with soil – Part 1: Requirements and principles for design and execution. Edition July 2017.
- [3] DIN 18533-3. Waterproofing of elements in contact with soil – Part 3: Waterproofing with liquid-applied waterproofing materials. Edition July 2017.
- [4] PCI technical data sheet 302 - „Bitumen thick coating PCI Pecimor® for external basement walls and foundations. Edition August 2017.
- [5] DIN EN 15814. Polymer modified bituminous thick coatings for waterproofing - Definitions and requirements. Edition March 2015.

- [6] WIKA Alexander Wiegand SE & CO. KG - "Inspection certificate according to EN 10204 - 3.1. Order No. 22392920/2".

3. Test procedure

3.1 Test preparation (Hauff Technik GmbH & Co. KG)

The assembly of the test setup was performed by the manufacturer (Hauff Technik GmbH & Co. KG) of the building entry system at Kiwa GmbH in Gersthofen, Germany. According to information given by the manufacturer the test setup was assembled as follows:

A wall sleeve was cut longitudinal to create a gap before it was cast in a test block with concrete strength C20/25.

The surface of the test block which was charged with water pressure (this corresponds to the outside of a building) was treated with two layers of the PMBC PCI Pecimor 2K according to DIN EN 15814 [5] to create an exterior waterproofing.

After hardening of the exterior waterproofing the sleeve pipes of the MSH building entry system (see Figure 2) were spread with plenty of lubricant and the building entry system was set in the wall sleeve via the side of the test block which is not charged with water pressure. After that the outer sealing element module 1.2 was assembled from the outer sealing element module 1 and module 2 with four internal hex screws (Figure 3) so that the two spacers are mounted on the outer sealing element module 1.

After spreading lubricant on the internal sealing surface of the outer sealing element module 1.2 the sealing module was pushed over the sleeve pipes as far as possible against the side of the test block which is charged with water pressure (see Figure 4). Thereon the four internal hex screws of the outer sealing element module 1.2 were tighten crosswise until the control pins were flush with the front panel of module 1 or a torque of 14 Nm was reached. After removing both spacers the internal hex screws were tighten crosswise again until there was a perceptible tension of the sealing lip around the flange.

Finally the ducts of the MSH PolySafe building entry system were sealed with press seals and a testing cylinder with pressure reducer, manometer and an EPDM sealing was attached above the sealing system. The sealing of the testing cylinder was performed with the help of the EPDM sealing and the clamping pressure of the threaded rods and the security bar.



Figure 2. Example for a MSH PolySafe building entry system basic variant (picture of the manufacturer).

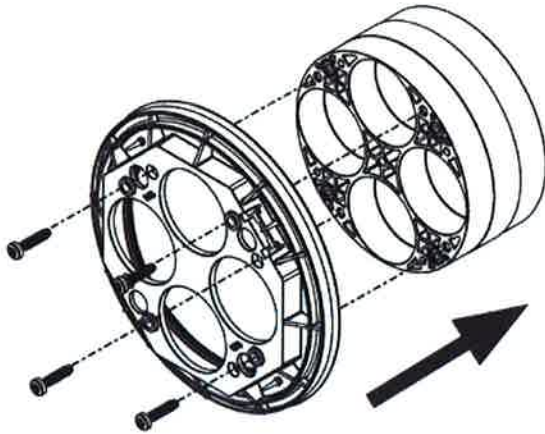


Figure 3. Example of the MSH PolySafe outer sealing element module 1.2 (consisting of MSH PolySafe outer sealing element module 1 and 2) (picture of the manufacturer).

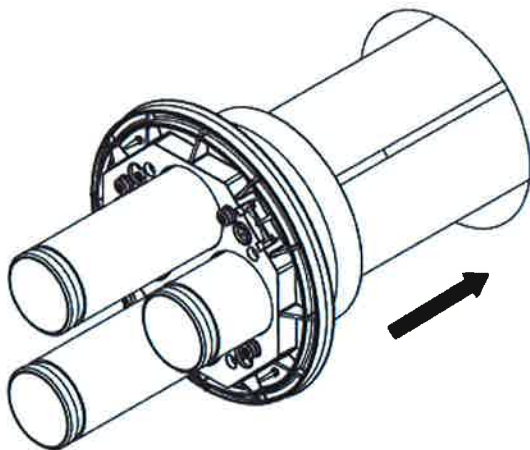


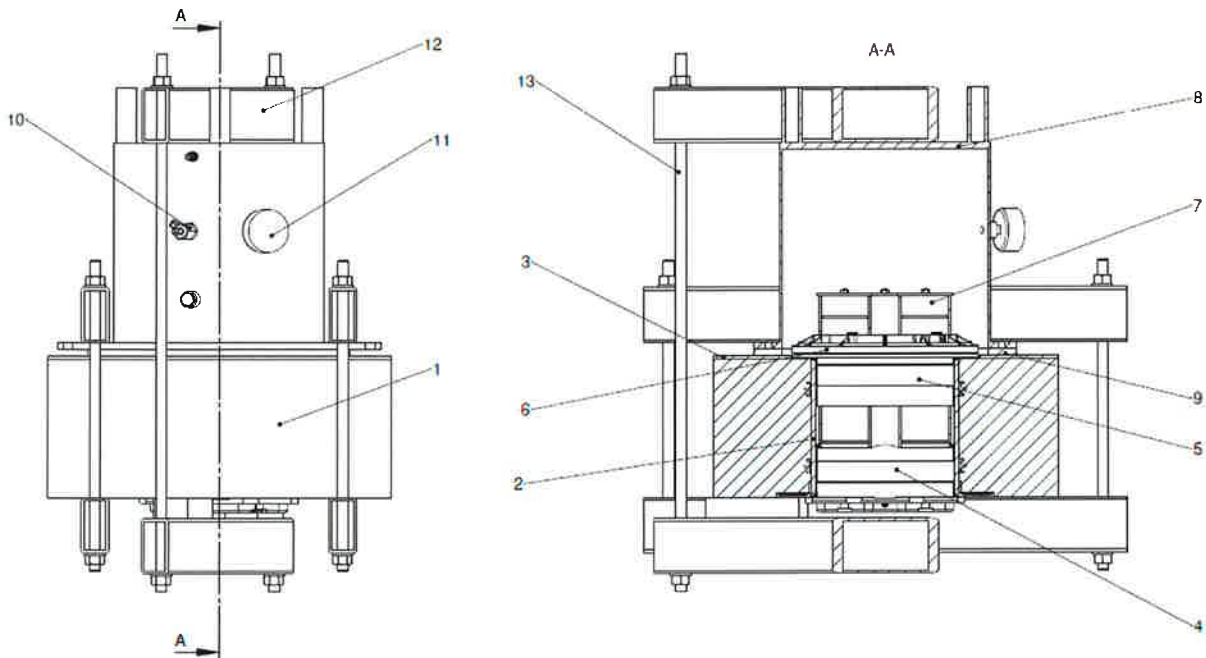
Figure 4. Example for pushing the outer sealing element module 1.2 over the sleeve pipes against the outside wall (picture of the manufacturer).

3.2 Water tightness test (Kiwa GmbH)

The test setup which was assembled by Hauff-Technik GmbH & Co. KG was built up in accordance to Section 3.1 with one manometer (see Figure 5).

A calibration of the assembled manometer (serial no. 54604162 [6]) was performed by WIKA Alexander Wiegand SE & Co. KG (see Section 6).

After prior consultation with the manufacturer the test of the water tightness with permanently attached water pressure was performed with $\geq 1,0$ bar for 28 days.



Position	Designation
Pos. 1	test block
Pos. 2	wall sleeve
Pos. 3	polymer modified bituminous coating (PMBC)
Pos. 4	MSH building entry system
Pos. 5	MSH PolySafe outer sealing element module 1
Pos. 6	MSH PolySafe outer sealing element module 2
Pos. 7	press seal for pipe sealing
Pos. 8	test cylinder
Pos. 9	test cylinder seal
Pos. 10	stop valve
Pos. 11	pressure gauge manometer
Pos. 12	security bar
Pos. 13	threaded rod

Figure 5. Detail of the test setup - manufacturer's drawing.

4. Test results

During the water tightness test no pressure drop as a result of leakages was detected (see Table 1). The test results can be seen at Figure A1 and Figure A2 attached in the annex.

Table 1. Results of the water tightness test.

Test specimen	Water pressure at the beginning of testing [bar]	Water pressure at the end of testing [bar]	Testing period [d]	Remark
MSH PolySafe	≥ 1,0	≥ 1,0	28	no pressure drop as a result of leakages

5. Summary

During the water tightness test of the building entry system Hauff MSH PolySafe with the outer sealing element module 1.2 (consisting of module 1 and module 2) which was installed in a wall sleeve that was cast in a concrete test block with exterior waterproofing PMBC PCI Pecimor 2K according to DIN EN 15814 no pressure drop as a result of leakages was detected during the testing period of 28 days with a permanent attached water pressure of ≥ 1,0 bar.

6. Calibration certificate

Wika Polska sp. z o.o. sp. k.

Inspection certificate according to EN 10204 - 3.1

Abnahmeprüfzeugnis nach EN 10204 - 3.1



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Customer:
Kunde: Hauff-Technik GmbH & Co. KG
Robert-Bosch-Straße 9
Hermaringen
89568
DE

Certificate No
Zeugnis-Nr. WC003864

Date
Datum 2017-05-05

Customer Order No.
Kundenbestellnummer 175202179

Customer Part No.
Kunden Artikel-Nr. 14225186

Order Date
Bestelldatum 2017-03-23

Order No. / Item
Auftrags-Nr. / Pos. 22392920/2
31977547

Part No.
Artikel-Nr. 14225186

Model
Typ 111.10.063

Serial number
Seriennummer 54604162

Scale range
Anzeigebereich 0 ... 2,5 bar rel.

Class
Klasse 2,50 %

Tag No.
Messstellen-Nr.

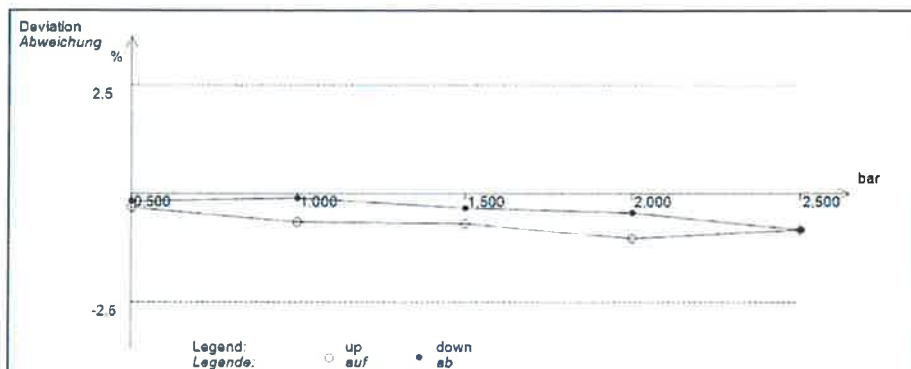
Reference
Referenzgerät CPG2500 0,01% -1 ... 2,7 bar rel.

Calibration No.
Kalibriernummer SW-102-1-17 WPL 17-04

Result
Ergebnis

Temperature
Temperatur 20°C +/- 5 K

Test Item Prüfung bar	Standard Referenz bar	Meanvalue Mittelwert bar	rel. Deviation rel. Abweichung bar	Deviation Abweichung %	Hysteresis Hysterese %
0,500	0,508	0,504	0,506	-0,006	-0,25
1,000	1,016	1,002	1,009	-0,009	-0,37
1,500	1,517	1,508	1,513	-0,013	-0,36
2,000	2,026	2,011	2,018	-0,018	-0,59
2,500	2,521	2,521	2,521	-0,021	0,00



Wika Polska sp. z o.o. sp. k.

Inspection certificate according to EN 10204 - 3.1
Abnahmeprüfzeugnis nach EN 10204 - 3.1



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Seite

Customer: Hauff-Technik GmbH & Co. KG
Kunde: Robert-Bosch-Straße 9
Hermaringen
89568
DE

Certificate No. WC003864
Zeugnis-Nr.

Date 2017-05-05
Datum

Object keeps the specification.
Der Kalibriergegenstand hält die Fehlergrenzen nach Herstellerangaben ein.

Calibration was carried out according to the following norm: DIN EN 837-1
Die Kalibrierung erfolgte auf der Grundlage der folgenden Norm:

Remarks / Bemerkung:

Inspection Representative (NJO)	Examiner
Abnahmebeauftragter Daniel Kotlewski	Prüfer J.Glodowski

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Gersthofen, 11 June 2018



Figure A1. Water tightness test with $\geq 1,0$ bar water filled test cylinder (manometer at the beginning of testing on 22.11.2017).



Figure A2. Water tightness test with $\geq 1,0$ bar water filled test cylinder (manometer after 28 days on 20.12.2017).