Test Report no. A1842050-01 (eng)

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Project / Plant:	Water tightness test of the universal wall entry Hauff-UDM DN100/WS 200mm, cast in a concrete test block with exterior waterproofing PCI Pecimor 2K (waterproofing class W2.1E according to DIN 18533-1)
Order date:	19 June 2018
Product description:	Universal wall entry Hauff-UDM DN100/WS 200mm
Order:	Water tightness test ≥ 1,0 bar for 28 days
Number of samples / tests:	1 test
Sampling:	on: - / by: Applicant
Date of delivery:	19 June 2018
Testing period:	20 June - 18 July 2018
Contact:	B. Eng. David Röck Tel. +49 821 72024-14
Number of annexes:	The test report contains 1 annex
Remark:	Translation of Test Report A1842050-01, 2 August 2018

Gersthofen, 2 August 2018
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Amtsgericht Hamburg, HRB 130568, St.Nr.: 46/736/03268

CONTENTS

1. General

Kiwa GmbH, Bautest Augsburg, was contracted by Hauff-Technik GmbH & Co. KG to test the water tightness of the universal wall entry Hauff-UDM DN100/WS 200mm, cast in a concrete test block with the exterior waterproofing 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 concrete test block with a universal wall entry Hauff-UDM DN100/WS 200mm 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 the exterior waterproofing polymer modified bituminous coating (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 universal wall entry Hauff-UDM DN100/WS 200mm, a hook-and-loop tape was glued on the outer side of the wall entry as well as the underside of the flange and on the KG-pipe to create a gap for possibly penetrating water (see Figure 3).

Figure 1. Assembled test setup.

2. References

[1] Hauff-Technik GmbH & Co. KG - „Montageanweisung - Universal-Wanddurchführung UDM 100/X. Ma_udm100_150_udm-e_afr_afr-e_de_en_180417. Rev.: 00/2018-04-17.

[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 Polska sp. z o.o. sp. k - "Inspection certificate according to EN 10204 - 3.1. Order No. WC006950. Edition 19 March 2018".

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 universal wall entry at Kiwa GmbH in Gersthofen, Germany. According to information given by the manufacturer the test setup was assembled as follows:

The pointed end of the KG-pipe was provided with a bevelled spigot as specified by the manufacturer. Then the KG-pipe was inserted with the pointed end into the rubber sleeve of the universal wall entry Hauff-UDM DN100/WS 200mm as far as possible (see Figure 2) and the clamp was tightened with a torque of 3 Nm.

The universal wall entry Hauff-UDM DN100/WS 200mm was modified with a hook-and-loop tape which was glued on the outer side of the universal wall sleeve to create a gap for possibly penetrating water when it is cast in (see Figure 3).

Afterwards the universal wall entry Hauff-UDM DN100/WS 200mm was nailed with the integrated patch flange through the nail holes in the sleeve cover centric to the bottom of the wooden formwork (dimensions 500 x 500 200 mm) for the concrete test block (see Figure 4).

After hardening of the concrete test block the formwork was removed and the concrete surface at the side of the patch flange was burnished and cleaned.

To create an exterior waterproofing the burnished and cleaned surface of the concrete test block was treated with two layers of the PMBC PCI Pecimor 2K [4] according to DIN EN 15814 [5].

After hardening of the PMBC the opening of the universal wall entry Hauff-UDM DN100/WS 200mm was closed with a blind cover Hauff HRD100-1F-0 and Hauff Technik GmbH & Co. KG attached a pressure bell with manometer above the sealing system. The sealing of the pressure bell was performed with the help of an EPDM sealing and clamping pressure.

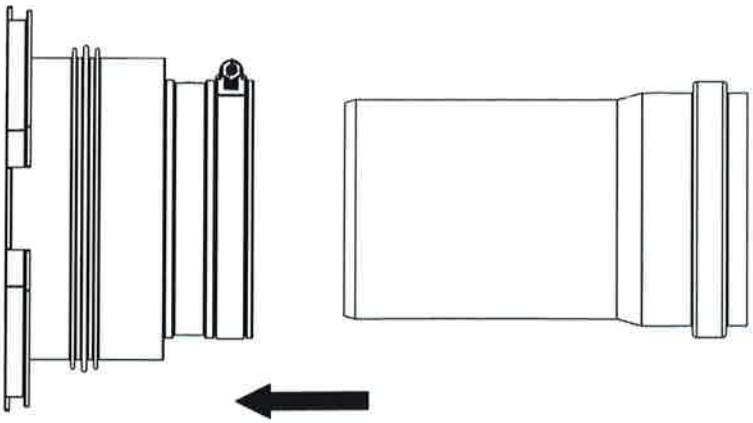

Figure 2. Connection between the universal wall entry Hauff-UDM DN100/WS 200mm and the KG-pipe (manufacturer`s drawing).

Figure 3. Universal wall entry Hauff-UDM DN100/WS 200mm and KG-pipe modified with a hook-and-loop tape (picture of the manufacturer).

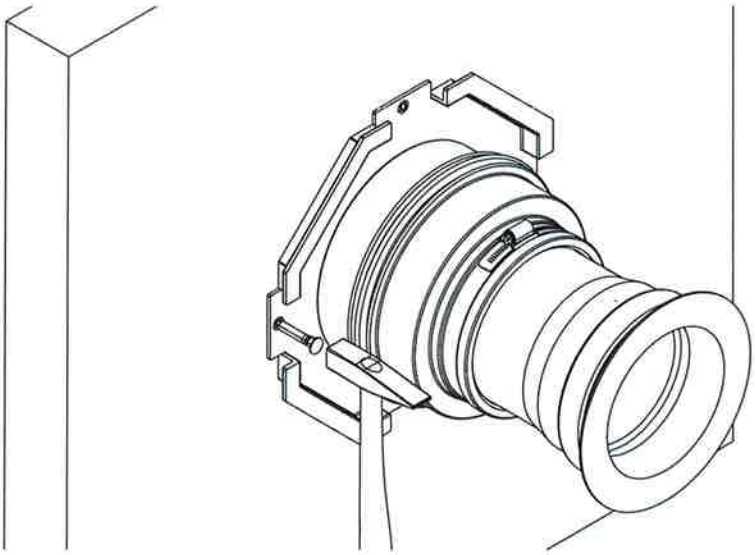

Figure 4. Nailing the universal wall entry on the bottom of the wooden frame (manufacturer`s drawing).

3.2 Water tighness 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. 5400TD8N [6]) was performed by WIKA Polska sp. z o.o. sp. k (see Section 6).

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

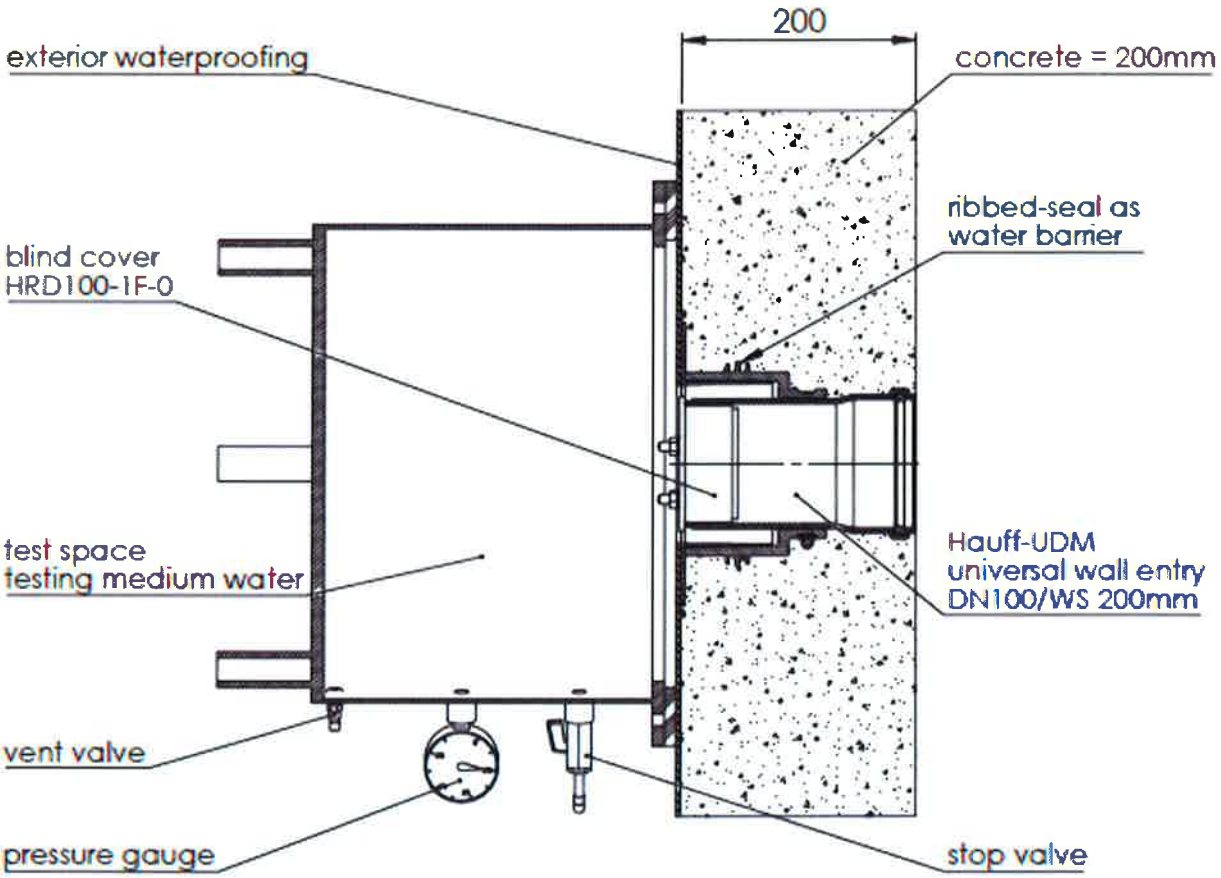

Figure 5. Detail of the test setup (manufacturer`s drawing).

4. Test results

During the water tightness test no pressure drop as a result of leakages was detected (see Table 1). The water pressure depending on the test period 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
UDM DN100/WS 200mm	≥ 1,0	≥ 1,0	28	no pressure drop as a result of leakages

5. Summary

During the water tightness test of the universal wall entry Hauff-UDM 100/WS 200mm *which was cast in a concrete test block with exterior waterproofing PMBC PCI Pecimor 2K according to DIN EN 15814 [5] 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

450H

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

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

				Page Seite	1 / 2
Customer Kunde	Hauff Technik GmbH & Co. KG Robert Bosch-Straße 8 Hermaringen 89568 DE			Certificate No Zeugnis-Nr	WC006950
				Date Datum	19.03.2018
Customer Order No Kundenbestellnummer	175211375	Customer Part No Kunden Artikel Nr		Order Date Bestelldatum	
Order No / Item Auftrags-Nr / Pos	2266660/2 32210713	Part No Artikel-Nr	14225186		
Model Typ	111.10.063	Serial number Seriennummer	5400TD8N	Scale range Anzeigebereich	0 2.5 bar rel
Class Klasse	2.50 %	Tag No Messstellen Nr			
Reference Referenzgerät				Calibration No Kalibriernummer	
CPG2500 0.01% -1 2.7 bar rel				SW 102.1.17 WPL 17.04	
Article text Artikeltext	Bourdon tube pressure gauges,model 111				

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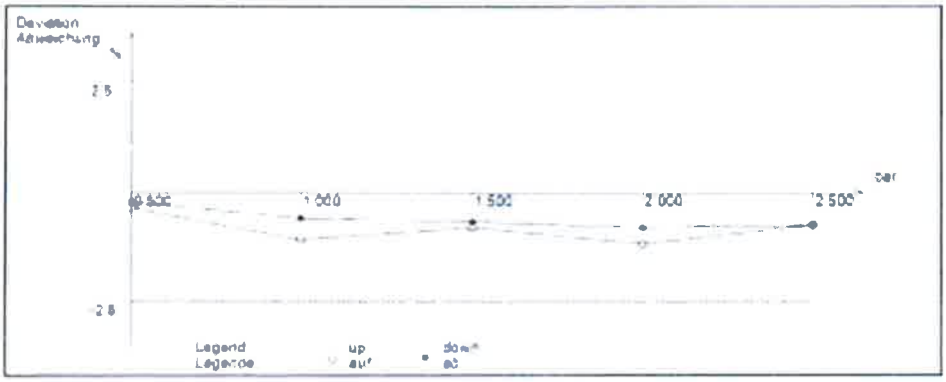
Customer Kunde	Hauff-Technik GmbH & Co. KG Robert Bosch Straße 9 Hermaringen 89568 DE	Certificate No Zeugnis-Nr	WC006950
		Date Datum	19.03.2018

Result Ergebnis		Temperature Temperatur	20°C +/- 5 K

Test item Prüfling bar	Standard Referenz bar		Measured value Mittelwert bar	Deviation Abweichung bar	Deviation Abweichung %	Hysteresis Hysterese %
0.520	0.509	0.505	0.507	-0.007	0.27	-0.15
1.020	1.036	1.014	1.020	0.020	0.81	0.48
1.500	1.520	1.516	1.518	-0.018	-0.71	-0.13
2.000	2.029	2.020	2.024	-0.024	-0.97	-0.36
2.500	2.518	2.518	2.518	-0.018	-0.73	0.00



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

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

Remarks / Bemerkung

Inspection Representative Abnahmebeauftragter	N/A Daniel Kollewski	Examiner Prüfer	S. Piekarski

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QMF P A 101 b/R.0

Gersthofen, 2 August 2018

Figure A1. Water tightness test with ≥ 1,0 bar water filled test cylinder (manometer at the beginning of testing on 20.06.2018).

Figure A2. Water tightness test with ≥ 1,0 bar water filled test cylinder (manometer after 28 days on 18.07.2018).