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Project / Plant: Water tightness test of the stainless steel flange Hauff HRD150-F/100 for retrofit dowelling on a concrete test block with exterior waterproofing PCI Pecimor 2K (waterproofing class W2.1E according to DIN 18533-1)

Order date: 20 December 2017

Product description: Stainless steel flange Hauff HRD150-F/100 for retrofit dowelling

Order: Water tightness test $\geq 1,0$ bar for 28 days

Number of samples / tests: 1 test

Sampling: on: - / by: Applicant

Date of delivery: 20 December 2017

Testing period: 20 December 2017 - 17 January 2018

Contact: B. Eng. David Röck
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Number of annexes: The test report contains 1 annex

Remark: Translation of Test Report A1742032-01,
15 June 2018

Gersthofen, 15 June 2018
dö/rö

p. p.



Dr.-Ing. Massimo Sosoro
- Technical director -



p. p.



B. Eng. David Röck
- 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 stainless steel flange Hauff HRD150-F/100 [1] for retrofit dowelling on existing core drill installed on 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 the already installed stainless steel flange Hauff HRD150-F/100 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).



Figure 1. Assembled test setup.

2. References

- [1] Hauff-Technik GmbH & Co. KG - „Assembly instruction - Hauff HRD-F/FG – split/closed flange“. Rev.: 00/2018-01-26.
- [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. 22392920/1“.

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 stainless steel flange at Kiwa GmbH in Gersthofen, Germany. According to information given by the manufacturer the test setup was assembled as follows:

A core drill $\varnothing 150$ mm was placed through the middle of a concrete test block with the dimensions (l x w x h) 500 x 500 x 200 mm.

The uncast surface of the concrete test block was levelled and cleaned.

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 [4] to DIN EN 15814 [5] to create an exterior waterproofing.

After hardening of the PMBC the aluminium flange was placed over the core drill and aligned horizontally for marking the dowel holes.

Subsequently the dowel holes ($\varnothing 10$ mm, 80 mm deep) for the plastic expansion dowels Fischer SXRL 10x80 were drilled and cleaned.

The adhesive and sealant EGO MS 805 was applied to the concrete test block and around the holes in the form of a spider web.

Then the flange was pressed onto the wall and the pre-installed screws with sealing disc and insert fastening dowels were hit in until the dowels were flush with the shaft (see Figure 2).

The screws were tightened to max 14 Nm.

The opening of the stainless steel flange Hauff HRD150-F/100 was closed with a press seal Hauff HRD150-2F-0.

Afterwards 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.

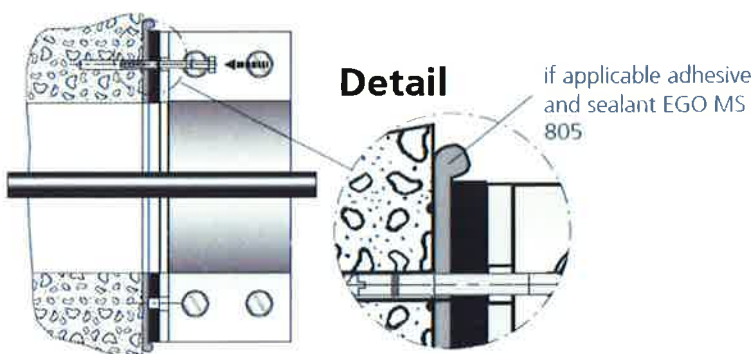


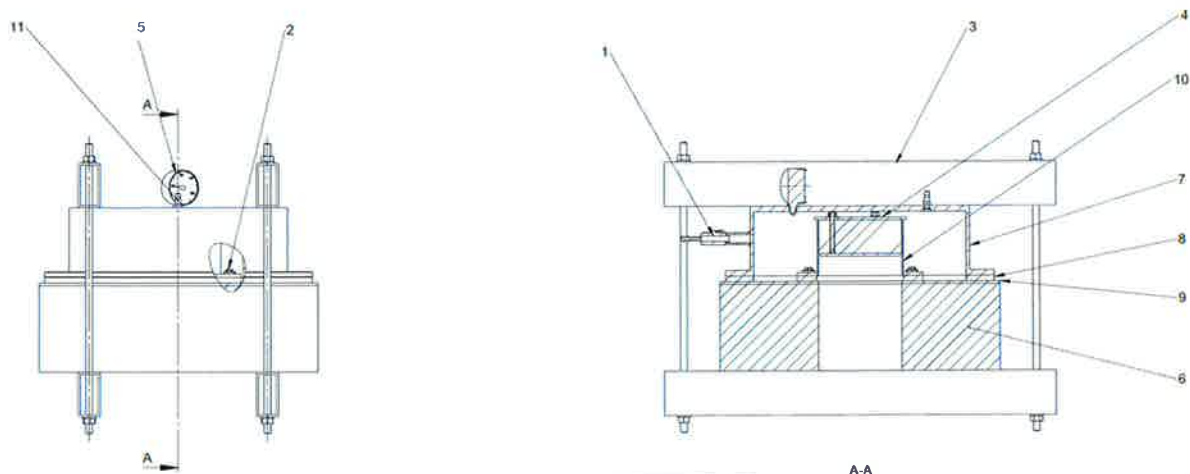
Figure 2. Example of installation of the stainless steel flange Hauff HRD150-F/100 (picture of the manufacturer).

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 3).

A calibration of the assembled manometer (serial no. 54604164 [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 |
|----------|--|
| 1 | stop valve |
| 2 | fixing plugs |
| 3 | security bar |
| 4 | press seal „HRD150-2F-0“ |
| 5 | pressure gauge manometer |
| 6 | touchstone |
| 7 | test cylinder |
| 8 | test cylinder seal |
| 9 | polymer modified bituminous coating (PMBC) |
| 10 | stainless steel flange “HRD150-F/100” |
| 11 | air bleed valve |

Figure 3. 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 |
|---------------|--|--|--------------------|--|
| HRD150-F/100 | ≥ 1,0 | ≥ 1,0 | 28 | no pressure drop as a result of leakages |

5. Summary

During the water tightness test of the stainless steel flange Hauff HRD150-F/100 which was installed 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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Seite

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

Certificate No. WC003875
Zeugnis-Nr.

Date 2017-05-05
Datum

Customer Order No 175202179 Customer Part No. Order Date 2017-03-23
Kundenbestellnummer Kunden Artikel-Nr. Bestelldatum

Order No. / Item 22392920/1 Part No. 14225185
Auftrags-Nr. / Pos. 31977545 Artikel-Nr.

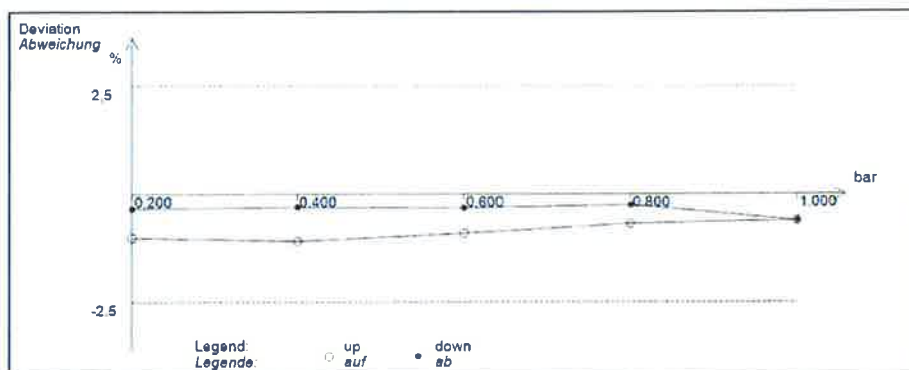
Model 111.10.063 Serial number 54604164 Scale range 0 ... 1 bar rel.
Typ Seriennummer Anzeigebereich

Class 2,50 % Tag No.
Klasse Messstellen-Nr.

Reference CPG2500 0,01% -1 ... 2,7 bar rel. Calibration No. SW-102-1-17 WPL 17-04
Referenzgerät Kalibriernummer

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

| Test item Prüfung bar | Standard Referenz bar | Meanvalue Mittelwert bar | rel. Deviation rel. Abweichung bar | Devial on Abweichung % | Hysteresis Hysterese % |
|-----------------------------|-----------------------------|--------------------------------|--|------------------------------|------------------------------|
| 0,200 | 0,210 | 0,203 | 0,207 | -0,007 | -0,68 |
| 0,400 | 0,411 | 0,403 | 0,407 | -0,007 | -0,70 |
| 0,600 | 0,609 | 0,603 | 0,606 | -0,006 | -0,62 |
| 0,800 | 0,807 | 0,802 | 0,805 | -0,005 | -0,48 |
| 1,000 | 1,006 | 1,006 | 1,006 | -0,006 | -0,61 |
| | | | | | 0,00 |
| | | | | | |
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| | | | | | |
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Wika Polska sp. z o.o. sp. k.

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



| | | | |
|-----------|-----------------------------|-----------------|------------|
| Customer: | Hauff-Technik GmbH & Co. KG | Page | 2 / 2 |
| Kunde: | Robert-Bosch-Straße 9 | Certificate No. | WC003875 |
| | Herrmaringen | Zeugnis-Nr. | |
| | 89568 | Date | 2017-05-05 |
| | DE | 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 | (NJD) | Examiner | J. Glodowski |
| Abnahmebeauftragter | Daniel Kollowski | Prüfer | |

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Gersthofen, 15 June 2018



Figure A1. Water tightness test with $\geq 1,0$ bar water filled test cylinder (manometer at the beginning of testing on 20.12.2017).



Figure A2. Water tightness test with $\geq 1,0$ bar water filled test cylinder (manometer after 28 days on 17.01.2018).