

## Test Report

Applicant

Hauff-Technik GmbH & Co. KG  
Mr Egritepe  
Robert-Bosch-Straße 9  
89428 Hermaringen  
Germany


Order no.

A 9056-1 (eng) / 2016

Product : Floor entry Hauff HMK110 without clamping strap  
Project : Testing of the water tightness of the floor entry Hauff HMK110 without clamping strap  
Sample delivery by : RAU-Betonfertigteile GmbH & Co. KG  
Hauff-Technik GmbH & Co. KG  
Testing period : August 9<sup>th</sup> - October 28<sup>th</sup> 2016  
Tested by : Kiwa GmbH, Bautest Augsburg  
Contact : B. Eng. David Röck  
Tel. +49 821 72024-14  
Remark : Translation of Test Report A 9056-1 / 2016  
Date in preparation

Augsburg, November 22<sup>nd</sup>, 2016  
rö/cl

p. p.

  
Jörg Bölzle  
- Project manager -



p. p.

  
B. Eng. David Röck  
- Project manager -

This Test Report consists of 8 pages and 4 annexes.  
Without our written permission, the test report may only be published unabridged.  
Interpretations and opinions of the testing laboratory have been marked in *Italic* scripts according to DIN EN ISO / IEC 17 025 mark 5.10.5.  
In case of doubt and disagreement, the original version of the Test Report is valid.

## CONTENTS

	Page
<b>1 General.....</b>	<b>3</b>
<b>2 Test procedure .....</b>	<b>4</b>
2.1 Test preparation (Hauff-Technik GmbH & Co. KG and Kiwa GmbH).....	4
2.2 Water tightness test (Kiwa GmbH).....	6
<b>3 Test results .....</b>	<b>7</b>
<b>4 Summary.....</b>	<b>8</b>

## 1 General

Kiwa GmbH, Bautest Augsburg, was contracted by Hauff-Technik GmbH & Co. KG to test the water tightness of the floor entry Hauff HMK110 without clamping strap which was cast into a concrete specimen (concrete strength C25/30 (waterproof concrete)). The test was performed with a permanent connected water pressure of 1,0 bar for 28 days, 1,5 bar for 4 days, 2,0 bar for 3 days and subsequently with 2,5 bar for 28 days. After a replacement of the manometer the testing was extended with a water pressure of 3,0 bar for 3 days, 4,0 bar for 3 days and subsequently 5,0 bar for 3 days.

For the test a floor entry Hauff HMK110 without clamping strap (see Figure 1) was delivered by Hauff-Technik GmbH & Co. KG to our laboratory in Augsburg. The production of the concrete specimen with the cast in floor entry was performed by RAU-Betonfertigteile GmbH & Co. KG. The test setup was built up by employees of Hauff-Technik GmbH & Co. KG at Kiwa GmbH in Augsburg (see Figure 2).

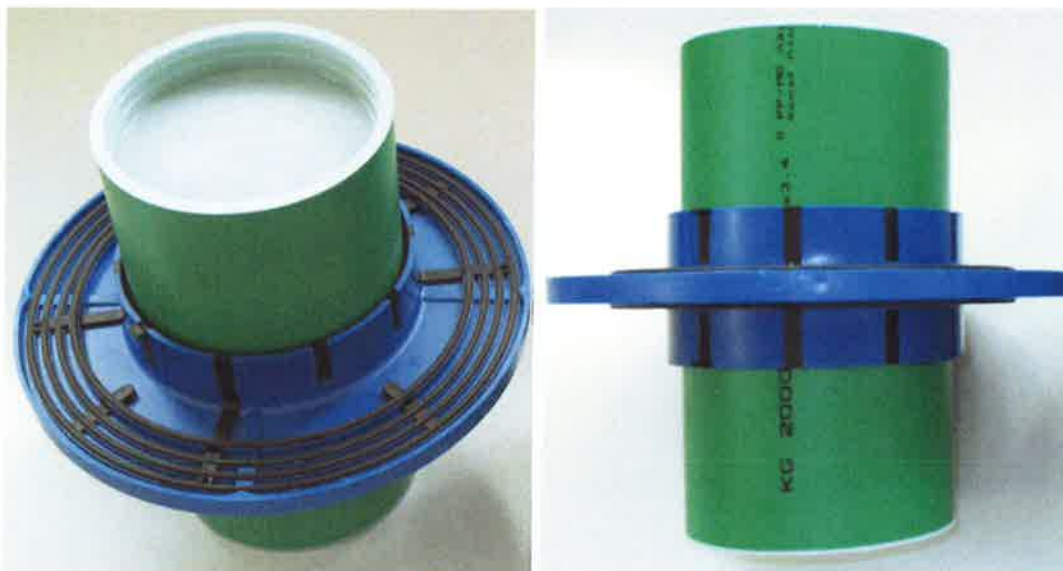


Figure 1. Used floor entry Hauff HMK110 without clamping strap.



Figure 2. Example for a test setup.

## 2 Test procedure

### 2.1 Test preparation (Hauff-Technik GmbH & Co. KG and Kiwa GmbH)

The concrete specimen used for the water tightness test was cast by RAU-Betonfertigteile GmbH & Co. KG. The concrete parameters of the batch are listed in Table 1.

Table 1. Concrete parameters.

Concrete class	Specimen nomenclature	Dimensions l <sub>x</sub> w <sub>x</sub> h [mm]	Concrete mixture	Concrete strength	W/C-ratio	Date of casting
waterproof concrete with 28 days of water immersion	HMK110 ohne Schelle	500x500x200	C 4242 F	C25/30	0,50	30.06.2016

The production of the concrete specimen, the placing of the floor entry into the formwork and the delivery was performed by RAU-Betonfertigteile GmbH & Co. KG.

The installation of the test setup was performed by the manufacturer of the floor entry at Kiwa Augsburg. The test setup was built up as described below.

The concrete specimen (500x500x200 mm, C25/30 (waterproof concrete)) with the cast in floor entry Hauff HMK110 without clamping strap was stored in water for 28 days after removing the concrete framework.

The opening of the floor entry was sealed on the formwork smooth surface with a Hauff HRD104-0 blind plug (see Figure 3). Afterwards Hauff Technik GmbH & Co. KG attached a pressure bell with pressure reducer and manometer above the blind seal. The sealing of the pressure bell was performed with the help of a 40 mm thick EPDM sealing (see Figure 4) and clamping pressure.



Figure 3. Example for a Hauff HRD104-0 blind plug.



Figure 4. Example for a 40 mm thick EPDM sealing.

## 2.2 Water tightness test (Kiwa GmbH)

The test setup which was assembled by Hauff-Technik GmbH & Co. KG was built up in accordance to Section 2.1 with one manometer (see Figure 5 to Figure 6).

A calibration of the manometers which were delivered by Hauff-Technik GmbH & Co. KG did not take place at Kiwa GmbH.

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, 1,5 bar for 4 days, 2,0 bar for 3 days and subsequently 2,5 bar for 29 days. After a replacement of the manometer the testing was extended with a water pressure of 3,0 bar for 3 days, 4,0 bar for 3 days and subsequently 5,0 bar for 3 days.

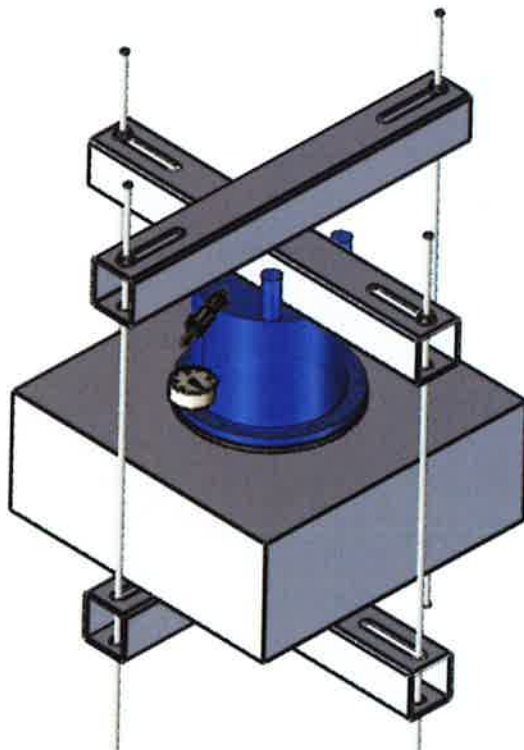


Figure 5. Detail of the test setup - manufacturer's drawing.

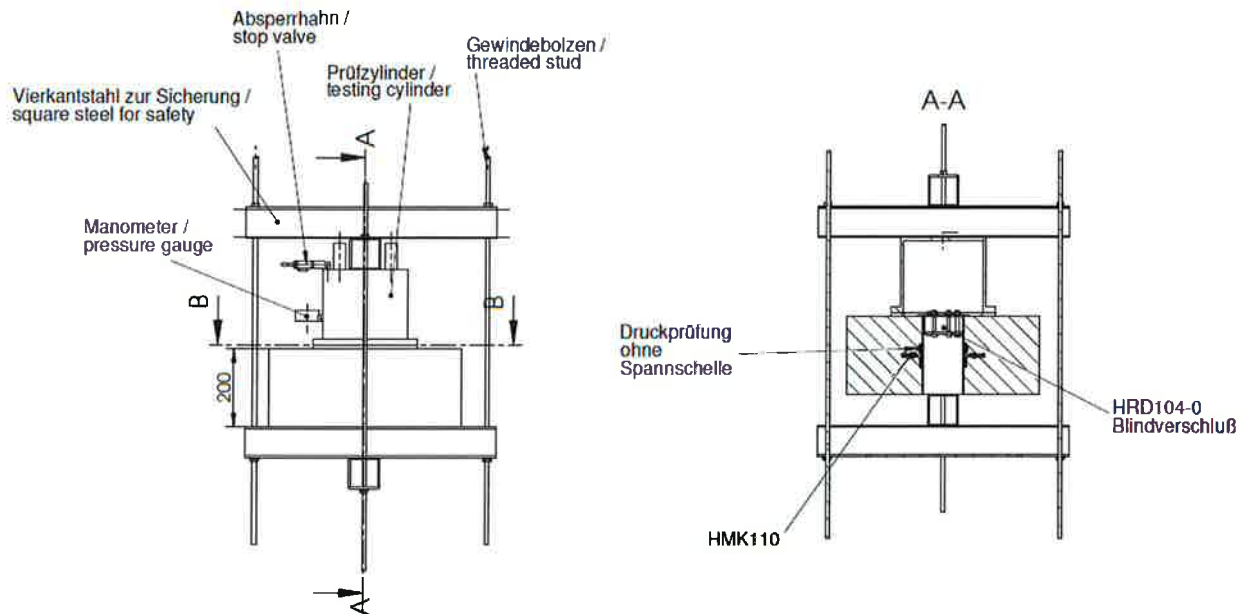


Figure 6. Detail and cross-section through the test setup - manufacturer`s drawing.

### 3 Test results

During the water tightness test no leakages were detected (see Table 2). The water pressure depending on the testing period can be seen at Figure A1 to Figure A4 attached in the annexes.

Table 2. Results of the water tightness test in dependency of the testing period.

Specimen nomenclature	Water pressure [bar]	Testing period [d]	Remark
HMK110 ohne Schelle	>1,0	28	no leakages
	>1,5	4	no leakages
	>2,0	3	no leakages
	>2,5	29	no leakages
	≥ 3,0	3	no leakages
	≥ 4,0	3	no leakages
	≥ 5,0	3	no leakages



#### 4 Summary

*During the water tightness test of the floor entry Hauff HMK110 without clamping strap, cast into a concrete specimen with concrete strength C25/30 (waterproof concrete) and permanently attached water pressure of 1,0 bar for 28 days, 1,5 bar for 4 days, 2,0 bar for 3 days, 2,5 bar for 29 days, 3,0 bar for 3 days, 4,0 bar for 3 days and subsequently 5,0 bar for 3 days no leakages were detected.*

Augsburg, November 22<sup>nd</sup>, 2016





Figure A1. Water tightness test with the 1,0 bar water filled pressure bell (left: manometer at the beginning of testing on August 9<sup>th</sup>, 2016 at 6:06 pm; right: manometer after 28 days on September 7<sup>th</sup>, 2016 at 7:15 am).



Figure A2. Water tightness test with the 1,5 bar water filled pressure bell (left: manometer on September 7<sup>th</sup>, 2016 at 6:36 pm; right: manometer after 4 days on September 12<sup>th</sup>, 2016 at 9:05 am).



Figure A3. Water tightness test with the 2,0 bar water filled pressure bell (left: manometer on September 12<sup>th</sup>, 2016 at 9:25 am; right: manometer after 3 days on September 15<sup>th</sup>, 2016 at 6:30 pm).

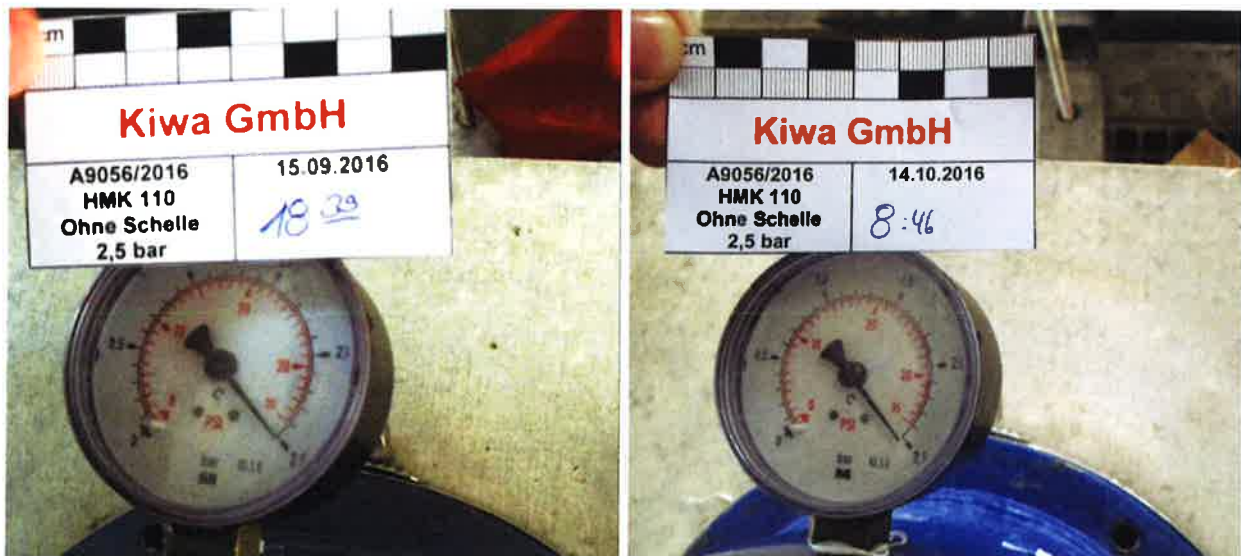


Figure A4. Water tightness test with the 2,5 bar water filled pressure bell (left: manometer on September 15<sup>th</sup>, 2016 at 6:39 pm; right: manometer after 29 days on October 14<sup>th</sup>, 2016 at 8:46 am).





Figure A5. Water tightness test with the 3,0 bar water filled pressure bell (left: manometer on October 19<sup>th</sup>, 2016 at 1:46 pm; right: manometer after 3 days on October 22<sup>nd</sup>, 2016 at 2:45 pm).



Figure A6. Water tightness test with the 4,0 bar water filled pressure bell (left: manometer on October 22<sup>nd</sup>, 2016 at 2:44 pm; right: manometer after 3 days on October 25<sup>th</sup>, 2016 at 2:56 pm).

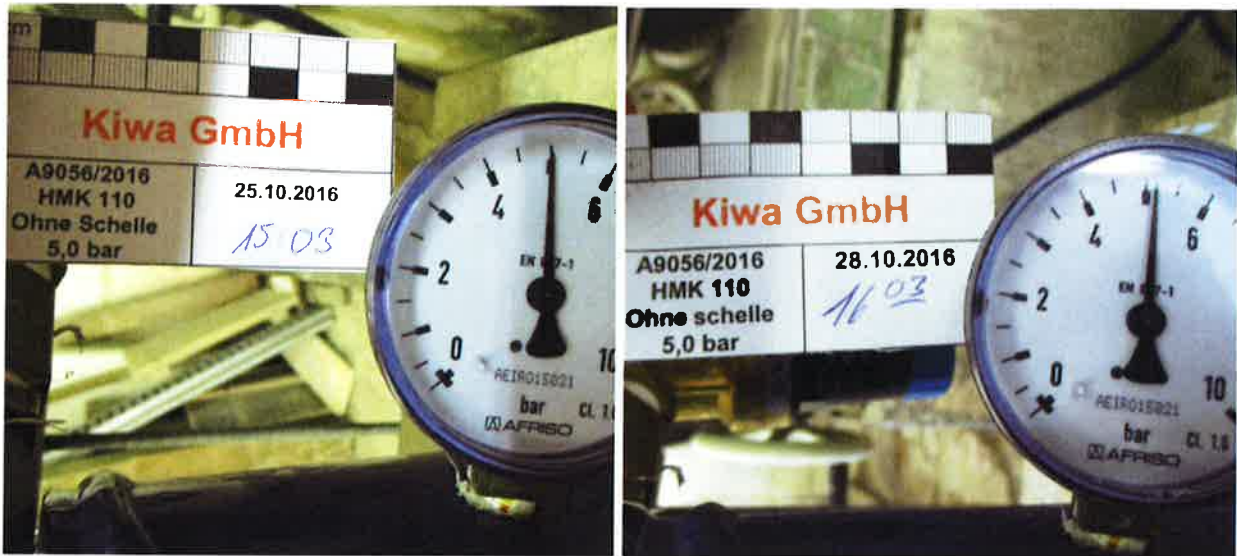


Figure A7. Water tightness test with the 5,0 bar water filled pressure bell (left: manometer on October 25<sup>nd</sup>, 2016 at 3:03 pm; right: manometer after 3 days on October 28<sup>th</sup>, 2016 at 4:03 pm).