

Test Report

Principal
Hauff-Technik GmbH & Co. KG
Giengener Straße 35
89428 Syrgenstein - Landshausen

Order No.:
A 9071-1 / 2011

Order dated : 16th November 2011

Contract : Test of the oil sealing over 90 days with the sealed inserts and concrete built-in parts:
- HEA-IS-M12/100
- HSI 150-DG
- HSI 150K/100 with HSI 150-D
- HSI 150 D3/58 with VS58/60, hot and cold shrink-on sleeve in HSI 150-K 100
- HSI 150 K2-100 with HRD150/160-G-3/20 (NBR)
- HSI 150 K2-100 with HSI 150-D
- Sikaflex Tank N sealing compound

Samples delivery by : Principal

Samples delivery on date : 16th November 2011

Test time period : 16th November 2011 to 16th February 2012

Augsburg, 29. June 2012
di

Head of department



Holger Dietrich



Testing authority manager



Hendrik Zaus

The test report contains 20 pages.
The test results refer to the submitted sample material. The sample material is used.
Any excerpt-related copying and publication of the test report is permissible only with our written authorization.
Opinions and interpretations of the testing authority are identified by *italic print* in accordance with DIN EN ISO / IEC 17 025 Point 5.10.5

CONTENT

	Page
1 General	3
2 Test.....	3
2.1 Test preparation	3
2.2 Test implementation	9
3 Test result	13
4 Summary	19



1 General

Kiwa MPA Bautest GmbH received the order from Hauff-Technik GmbH & Co. KG, represented by Mr. Jasmund, for the implementation of an oil sealing test with different sealing inserts and a sealant mass over a period of ≥ 90 days, with the transformer insulating oil Nytro Taurus of the company Nynas GmbH.

The implementation and monitoring of the sealing test were carried out by personnel of the Kiwa MPA Bautest GmbH laboratory in Augsburg. The delivery of the test specimen and the oil was implemented by the Principal.

2 Test

2.1 Test preparation

A concrete trough with a total of seven built-in sealing inserts and concrete built-in parts and a transverse bulkhead sealed with a sealing compound was delivered by the Principal to our laboratory in



Augsburg

(see

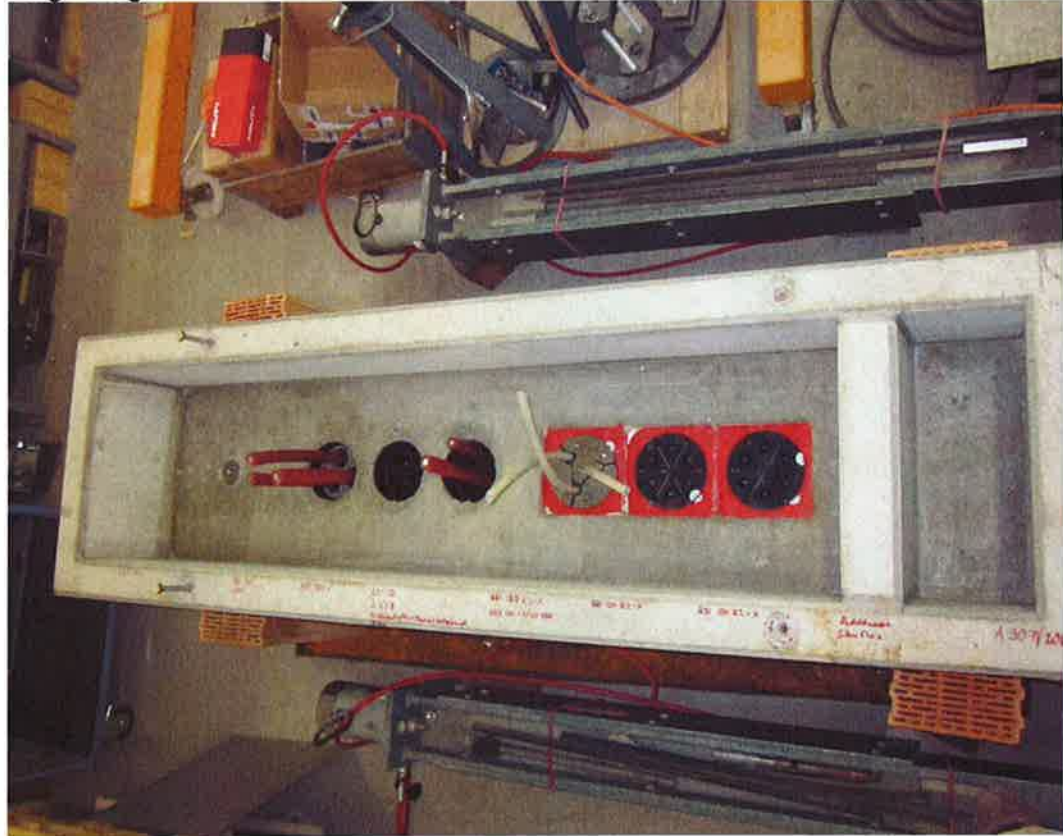


Illustration 1 to Illustration 8). Below are indicated the manufacturer's designations of the individual built-in sealing inserts:

- HEA-IS-M12/100
- 150-DG MAIN SYSTEM INTERFACE
- HSI 150K/100 with HSI 150-D
- HSI 150 D3/58 with VS58/60, hot and cold shrink-on sleeve in HSI 150-K 100
- HSI 150 K2-100 with HRD150/160-G-3/20 (NBR)
- HSI 150 K2-100 with HSI 150-D (2 items in total)

The transverse bulkhead was sealed, according to the specifications of the manufacturer, with a sealant mass of the type Sikaflex Tank N at the impingement contact points (see Illustration 9).



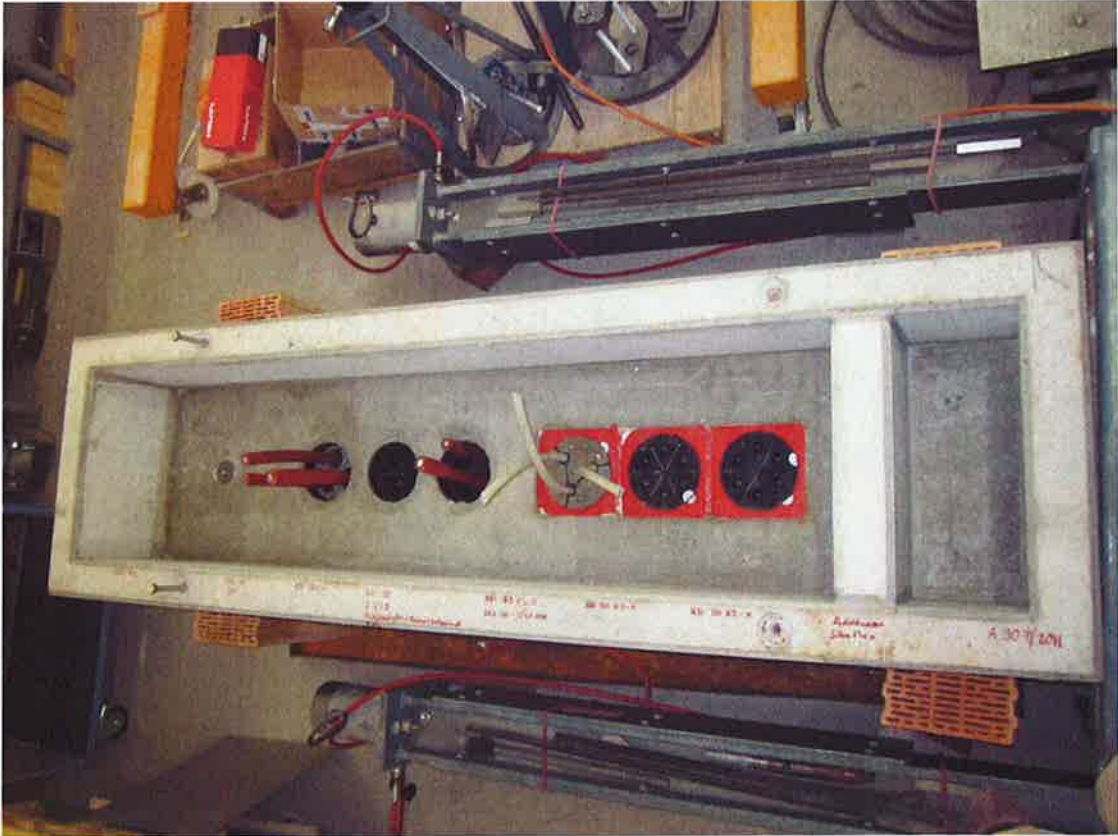


Illustration 1: Experimental setup, concrete trough with built-in sealed inserts and transverse bulkhead



Illustration 2: Grounding penetration passage HEA-IS-M12/100, concrete trough inner side





Illustration 3: HSI 150-DG, concrete trough inner side



Illustration 4: HSI 150K/100 with HSI 150-D, concrete trough inner side





Illustration 5: HSI 150 D3/58 with seal plugs VS58/60, hot and cold shrink-on sleeve 150-K HSI 100, concrete trough inner side

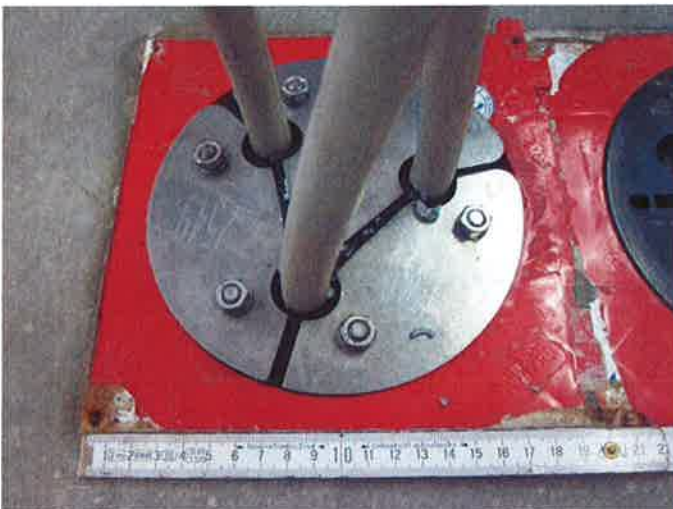


Illustration 6: HSI 150 K2-100 with HRD150/160-G-3/20 (NBR), concrete trough inner side



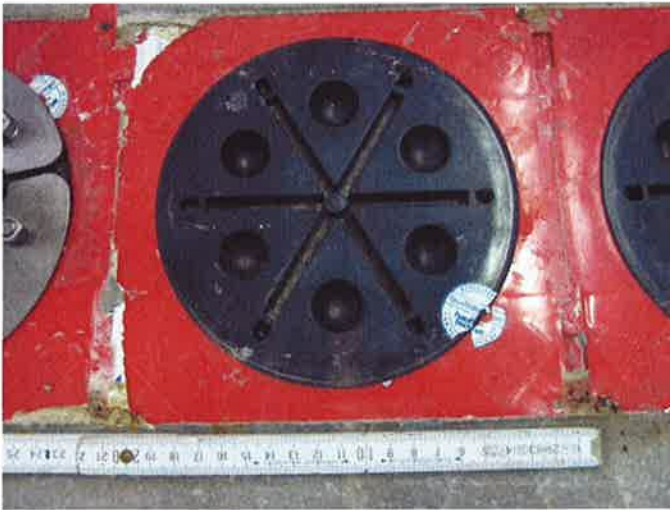


Illustration 7: HSI 150 K2-100 with close-off lid HSI 150-D (Experiment 1), concrete trough inner side

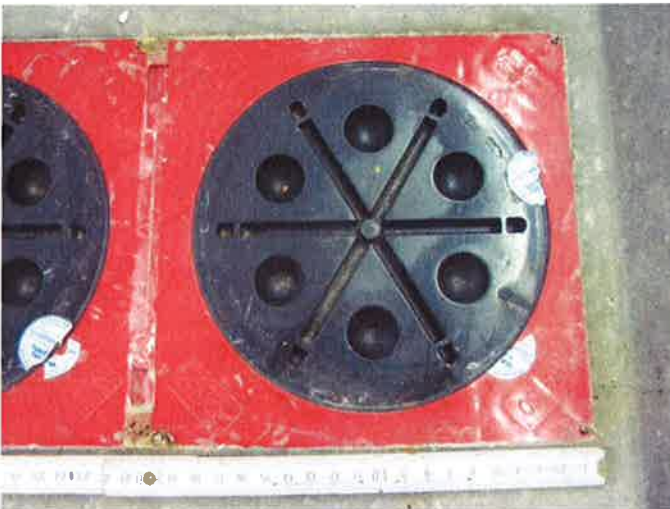


Illustration 8: HSI 150 K2-100 with close-off lid HSI 150-D (Experiment 2), concrete trough inner side





Illustration 9: Transverse bulkhead sealed with sealant mass Sikaflex Tank N
(side view and top view)

2.2 Test implementation

The sealing test of the individual sealed inserts, as well as the sealing joint, was implemented through impingement contact of the concrete trough with transformer insulating oil Nytro Taurus, from 16th November 2011 to 16th February 2012 (92 d).



The implementation of the sealing test was carried out over the entire test period at room temperature. Deviating from this, the oil was heated up to 90.0°C before pouring into the concrete trough, and then cooled down in the concrete trough to room temperature. The concrete temperature of the trough was 12.5°C at the time of the pouring in of the oil.

The pouring in of the oil was implemented using a plate inserted diagonally into the trough. The volume of the oil was selected so that, at every location of the concrete trough, the base was covered with at least 15 mm of oil.

The individual steps are represented below in Illustration 10 to Illustration 15.



Illustration 10: Sheet steel with base recesses as a pouring help for the insertion of the oil





Illustration 11: Sheet steel base recess



Illustration 12: Pouring the heated oil (90.0°C) into the concrete trough





Illustration 13: Oil level in the trough immediately after the insertion of the oil in the area of the sealing joint (approx. 15 mm)



Illustration 14: Oil level in the trough immediately after the insertion of the oil in the area of the pouring location (approx. 16 mm)



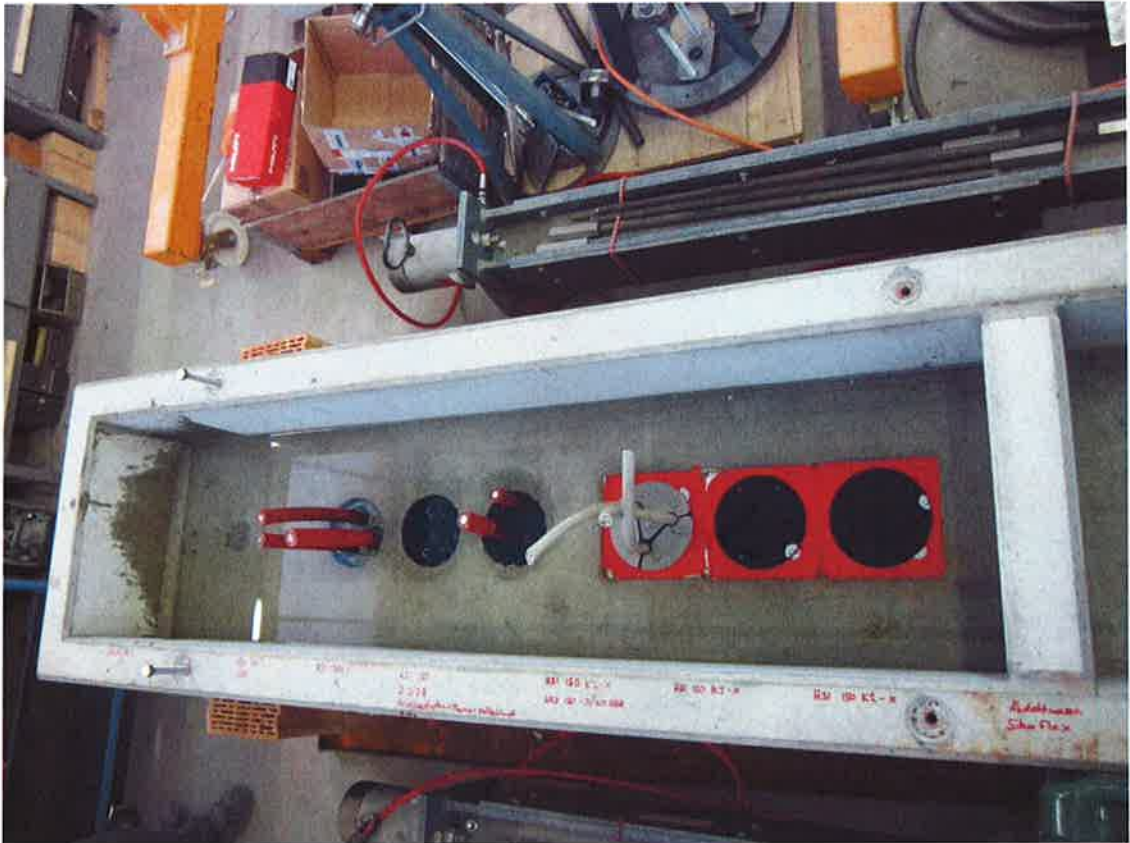


Illustration 15: Concrete trough ready and filled with insulating oil

3 Test result

During entire test time period no leaks could be determined at the underside of the concrete trough or on the side facing the oil of the transverse bulkhead at the sealing joint.



The individual sealing inserts, as well as the sealing joint, are represented



below in

Illustration 16 to Illustration 26.



Illustration 16: Oil level in the trough at trial end after 92 days oil impingement contact in the area of the sealing joint (approx. 15 mm)





Illustration 17: Grounding penetration passage HEA-IS-M12/100, trough under-side after 92 days



Illustration 18: HSI 150-DG, trough under-side after 92 days



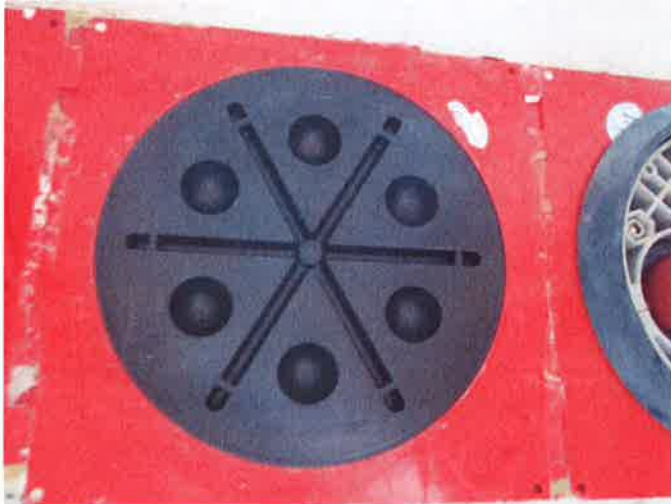


Illustration 19: HSI 150K/100 with HSI 150-D, trough under-side after 92 days



Illustration 20: HSI 150 D3/58 with seal plugs VS58/60, hot and cold shrink-on sleeve in HSI 150-K 100, trough under-side after 92 days





Illustration 21: HSI 150 K2-100 with HRD150/160-G-3/20 (NBR), trough under-side after 92 days



Illustration 22: HSI 150 K2-100 with close-off lid HSI 150-D (1st experiment), trough under-side after 92 days





Illustration 23: HSI 150 K2-100 with close-off HSI 150-D (2nd experiment),
trough under-side after 92 days



Illustration 24: Transverse bulkhead, side facing the oil





Illustration 25: Sealing joint Sikaflex Tank N on the side facing the oil after 92 days



Illustration 26: Sealing joint Sikaflex Tank N on the side facing the oil after 92 days

4 Summary

In case of the oil sealing test carried out in the concrete trough with the transformer insulating oil Nytro Taurus of the company Nynas GmbH, no lack



of sealing could be determined, both at the sealing inserts, as well as at the sealed joint.

Augsburg, 29. June 2012

