

Test report no. 172916

English version

1st copy of 9 June 2017

Ordering party: Schomburg GmbH & Co. KG
Aquafinstrasse 2 - 8
32760 Detmold

Date of commission: 02.03.2016 / Mr Beyer

Subject of commission: Tests regarding the efficiency of water resisting admixture
for concrete - Deep of penetration of water under pressure

Product: BETOCRETE CL 210-WP

The test report contains 6 pages.

The testing material is used up.



Remark: This test report is the English version of original German version of 9 June 2017.

In case of any dispute the German version is decisive. The test report shall be published unabridged. Any partial publishing requires written allowance by the testing institute. The test results refer only to the tested material.

1. General

The ordering party has assigned MPA HANNOVER to perform tests regarding the efficiency of water resisting admixture for concrete in comparison to a reference concrete. The scope of the tests to be carried out has been determined by the ordering party and is set out in section 3. This test report states the results of the tests.

2. Delivery of samples

On 19 September 2016 by an employee of the ordering party:

250 kg Cement CEM I/52,5R typ „Milke Classic“ in 5 drums à 50 kg
5 kg BETOCRETE F4 (SP), in a canister, produced by Schomburg

and on 25 January 2017:

1 kg BETOCRETE CL 210-WP, in a can, produced by Schomburg

The aggregate for manufacture the concrete was provided from the stock of MPA HANNOVER.

Weser sand 0/2
Weser gravel 2/8
Weser gravel 8/16

3. Scope

The scope of performed tests is listed in Table 1. The tests were performed each at the reference concrete (reference) and at the concrete produced with the water resisting admixture (CL 210-WP).

Table 1: Scope of testing

Test ID	Type of test	Standard	Age of sample	No. of samples
1	Bulk density of fresh concrete, Air content and Flow table test	DIN EN 12350-6:2011-03	20 min	1
		DIN EN 12350-7:2009-08	20 min	1
		DIN EN 12350-5:2009-08	5 min, 30 min	1
2	Deep of penetration of water under pressure	DIN EN 12390-8:2009-07	30 d	2

4. Results

4.1 Manufacture of samples

The samples were produced according to DIN EN 12390-2:2009-08. A forced mixer Zyklos ZK 150 was used for the mixing. The mixing time was 2 min after water addition. The superplasticizer was added together with the water; the water resisting admixture was added separately. The water content of the admixtures was taken into account with 70 M.-% for the calculation. The compositions of mixtures are listed in Table 2. From this mixture, all test specimens were prepared for the solid concrete tests, as well as the fresh concrete tests were carried out.

Table 2: Composition of mixtures

Raw material		Reference		CL 210-WP	
		Quantity	Mass kg/m ³	Quantity	Mass kg/m ³
Cement	-	-	350	-	350
Water	-	-	175	-	176
w/c-ratio	-	-	0.50	-	0.50
Sand 0-2 mm	M.-% of aggregate	35	630	35	630
Gravel 2-8 mm		30	526	30	536
Gravel 8-16 mm		35	627	35	627
Betocrete F 4 (SP)	M.-% of cement	0.7	2.45	1.15	4.03
Betocrete CL 210-WP		-	-	1.8	6.30

4.2 Bulk density of fresh concrete, air content and flow table test

The properties of fresh concrete were determined according to DIN EN 12350-5 (flow table test), DIN EN 12350-6 (bulk density) and 12350-7 (air content). The results are listed in Table 3.

Table 3: Results of test on fresh concrete

		Reference		CL 210-WP	
Air temperature	°C		20		20
Flow table test A after water addition in mm	5 min		450		460
	30 min		370		390
Fresh concrete temperature	°C		22.1		21.1
Bulk density of fresh concrete	kg/dm ³		2.35		2.36
Air content	Vol.- %		2.0		1.8

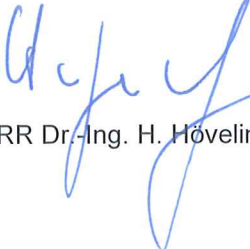
4.4 Deep of penetration of water under pressure

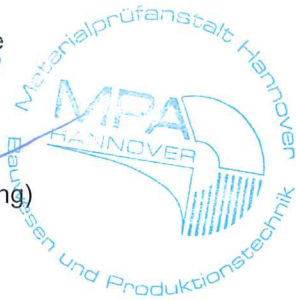
The deep of penetration of water were carried out according to DIN EN 12390-8 at 2 cubes each with the dimensions of 150 x 150 x 150 mm. The age of samples was 30 days at the begin of testing. The results of the tests are shown in Table 4. The spread of water at the cracking surfaces are shown in Appendix A1.

Table 4: Results of deep of penetration of water according to DIN EN 12390-8

Sample no.	Reference maximal deep of penetration mm	CL 210-WP maximal deep of penetration mm
1	20	10
2	23	8
<i>Mean value</i>	22	9

Hanover, 9 June 2017
Head of Testing Institute


(ORR Dr.-Ing. H. Höveling)

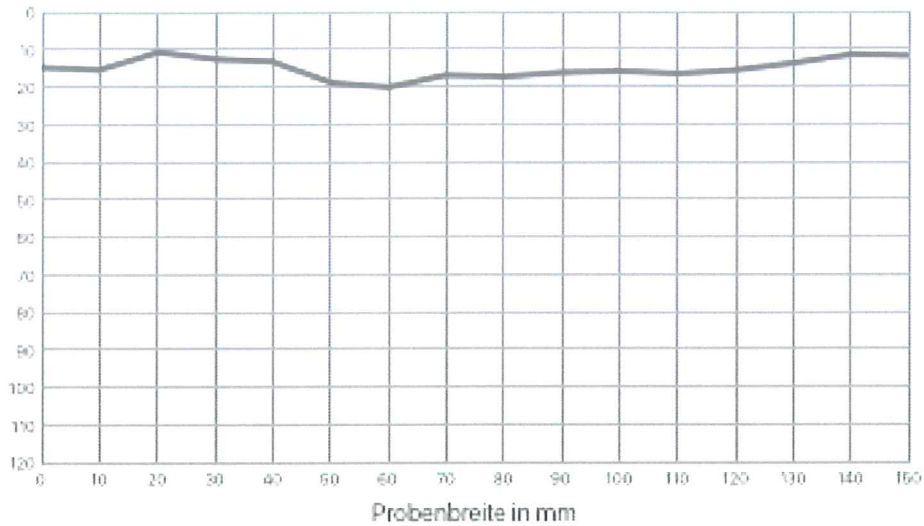


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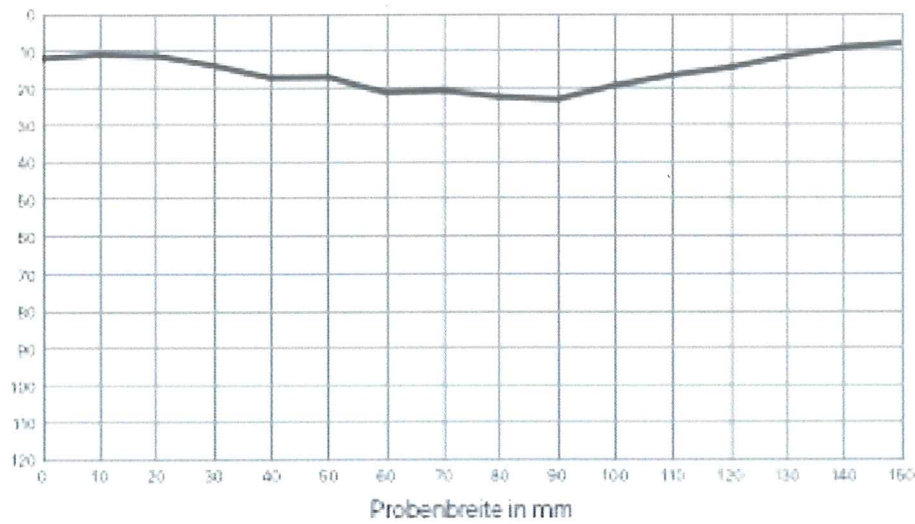

(Dipl.-Ing. A. Giese)

APPENDIX

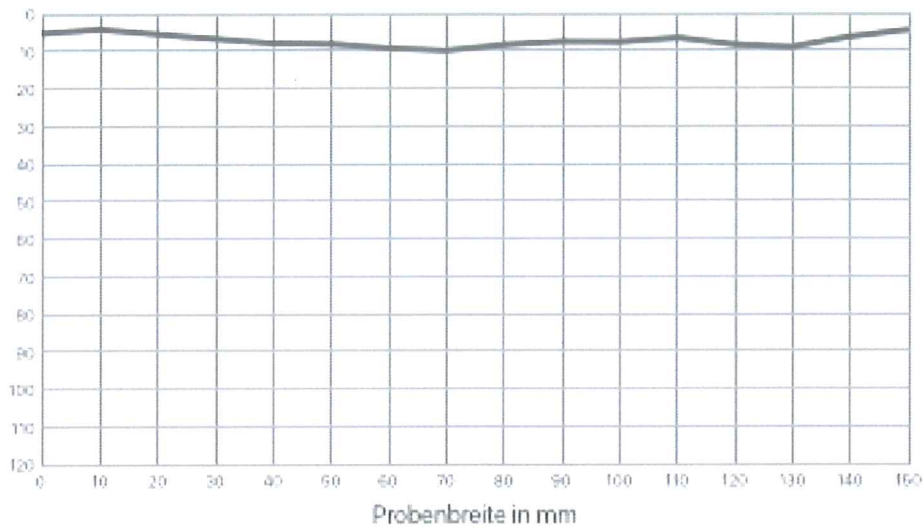
Appendix A1: Deep of penetration of water



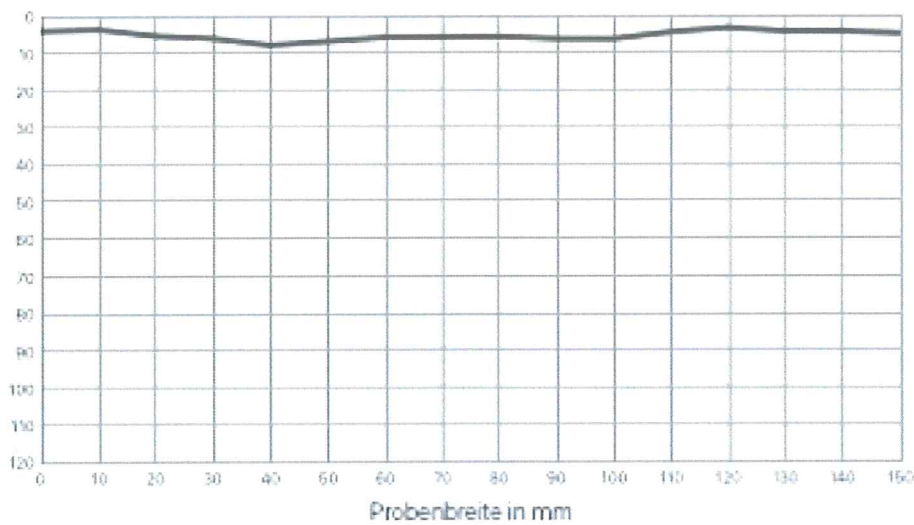
Appendix A1-1: Deep of penetration of water, reference: 1, max. deep of penetration $t = 20$ mm



Appendix A1-2: Deep of penetration of water, reference: 2, max. deep of penetration $t = 23$ mm



Appendix A1-3: Deep of penetration of water, CL 210-WP: 1, max. deep of penetration $t = 10$ mm



Appendix A1-4: Deep of penetration of water, CL 210-WP: 2, max. deep of penetration $t = 8$ mm