K . U . LEUVEN

LABORATORIUM REYNTJENS

RESEARCH AND DEVELOPMENT

CARBONATATION RESISTANCE OF A CONCRETE PAINT

de Croylaan 2
B-3001 Heverlee

K.U.LEUVEN RESEARCH AND DEVELOPMENT
LABORATORIUM REYNTJENS VOOR PROEVEN OP MATERIALEN
Park van Arenberg - de Croylaan 2 - B-3001 Heverlee
Tel.:016/22.09.31 - Sekr.:1654 - Telefax:016/22.52.31 - Telex:ELEKUL25941

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CARBONATATIEREMMING VAN BETONVERF

Op aanvraag van : De heer Rudy Keppens
Technisch Direkteur
Nijverheidsweg 24

en

2240 ZANDHOVEN

Voor rekening van :

Werf :

Bestek :

Aannemer :

Materialen : 2 monsters:
- Indupact, acrylaatprimer
- Inducryl gevel, elastische acrylaatcoating

Proeven : Uitgevoerd volgens uw proefaanvraag

Ir. Caroline Ladang

Prof.dr.ir. Dionys Van Gemert

CARBONATATION RESISTANCE OF CONCRETE PAINT

1.Materials

By REWAH NV, on 1992.12.02, 2 samples have been handled over to Laboratorium Reyntjens.
It concerns the following products:

- Indupact, an acrylic primer
- Inducryl façade, an elastic acrylic coating

2.Tests

There have been asked to compare a non treated concrete and a concrete treated with acrylic coating in correspondance to their carbonatationresistance.

3.Testcriteria

The test was realised on 16 concrete cubes, dimension 60 x 60 x 60 mm3.
The concretecomposition is given in tabel 1.
It concerns a concrete with a W/C (Water/Cement) factor = 0,7 which gives a very low carbonatation resistance.

Component	Weight kg/m3
Sand	795
Gravel 2/7	1270
Cement P40	350
Water	245

Tabel 1: Composition of the tested concrete

After 28 days curing at 20 °C and 95 % relative humidity the samples have been sandblasted.

Afterwards, the samples have been dryed out to equal weight in a area of 20 °C, and 60 % relative humidity.
Samples 9 to 16 have been treated with the coating. The quantitys are noted in tabel 2.

Sample	Surface	Indupact		Inducryl Facade					
				layer 1		layer 2		total	
nr	mm²	g	g/m²	g	g/m²	g	g/m²	g	g/m²
9	17605	2,21	126	6,46	367	6,38	362	12,84	729
10	17491	2,26	129	5,81	332	6,42	367	12,23	699
11	17505	2,83	162	6,41	366	6,36	363	12,77	730
12	17797	2,27	128	6,48	364	6,39	359	12,87	723
13	17687	2,44	138	6,37	360	6,48	366	12,85	727
14	17680	2,18	123	6,36	360	6,41	363	12,77	722
15	17948	2,38	133	6,5	362	6,47	360	12,97	723
16	17208	2,34	136	6,33	368	6,35	369	12,68	737
Average value			134		360		364		724

Tabel 2: Quantity of paint for samples 9 to 16

The recommanded quantity is +/- 150 g/m² for Indupact and +/- 750 g/m² for Inducryl Façade in two layers.
After the application of the coating the 16 samples have been stored in an area of 20 °C, 60 % Relative Humidity and 3% CO2.
After 7, 14, 28 and 56 days each time 2 treated and 2 non treated samples have been controled.
The depth of carbonatation was measured by breaking the samples and by spraying a solution of phenolftaleïne/norvanol on the surface.

4.Results

The results of the tests are given in tabel 3.
The samples 9 to 16, treated with the acrylic coating, don't show any carbonatation.

Time	7 days		14 days		28 days		56 days	
Sample nr.	1	2	3	4	5	6	7	8
Carbona-tation depth(mm)	2,49	3,45	3,12	3,45	4,93	3,05	4,64	3,8
	3,74	4,39	3,10	3,29	3,15	3,50	4,56	5,82
	2,79	5,22	4,39	4,04	3,21	3,93	5,04	5,42
	2,80	3,55	4,63	3,37	5,29	4,20	4,61	5,37
	3,07	3,22	3,52	3,66	6,40	4,38	4,57	5,63
	2,65	2,54	5,01	3,68	5,59	4,11	4,81	6,26
	3,53	3,44	3,00	3,68	5,52	4,01	5,84	5,44
	1,96	2,98	3,30	3,83	6,63	4,61	4,71	4,32
Average value		3,24		3,69		4,53		5,05

Tabel 3: Results of the measurements of the carbonatation depth on the non treated samples

The carbonatation depth is calculated as the average of the thickness of the non colored areas at the 4 sides of the cube.
The changement in carbonatationdepth is givin in figures 2 to 5.

CARBONATATIONDEPTH
REWAH Indupact-Inducryl façade

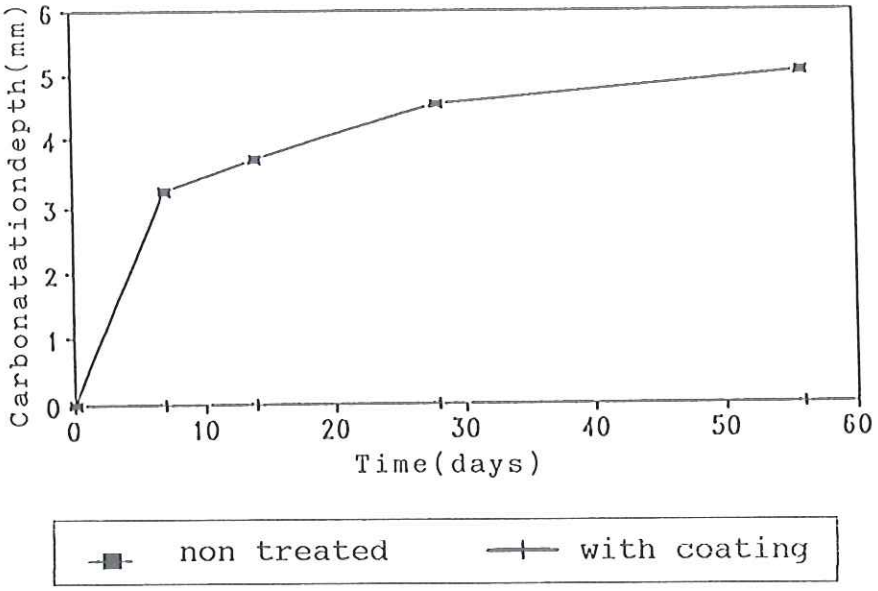

Fig.1: Changement carbonatationdepth in function of the time

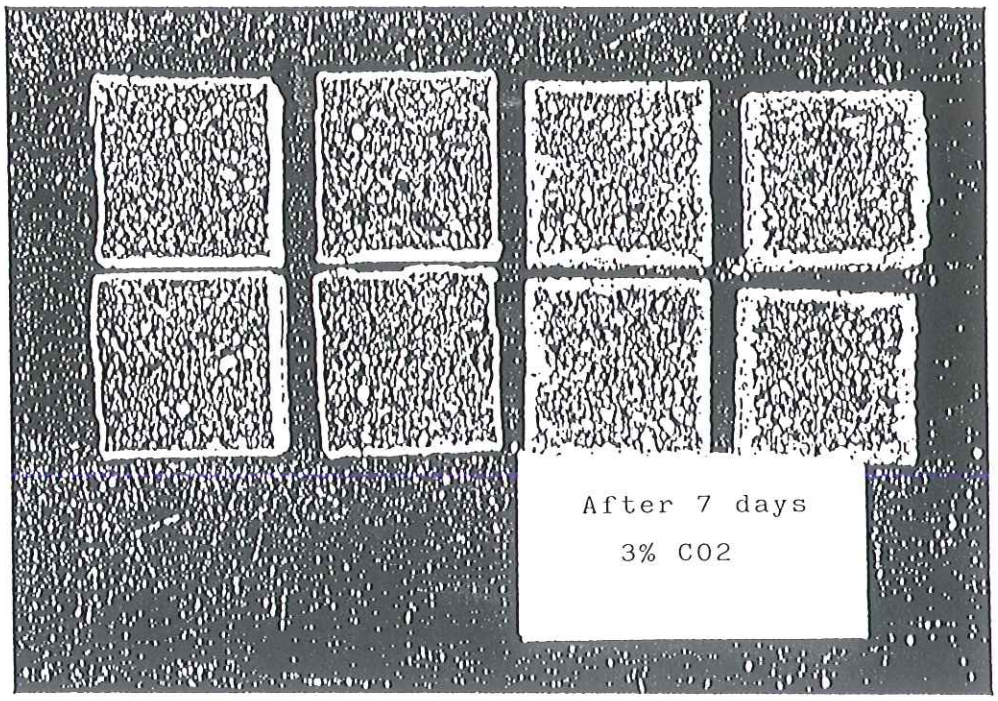

Fig.2: Splitted samples after 7 days
From left to right: Sample 9 and 10 (with coating)
Sample 1 and 2 (non treated)

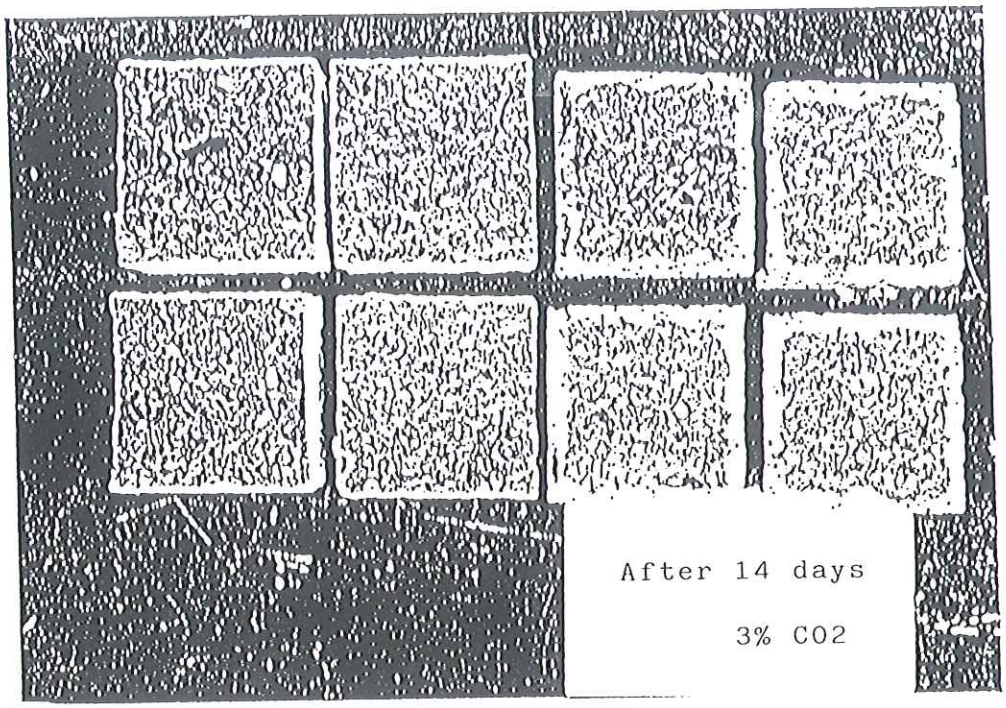

Fig.3: Splitted samples after 14 days treatment
From left to right: sample 11 and 12 (with coating)
sample 3 and 4 (non treated)

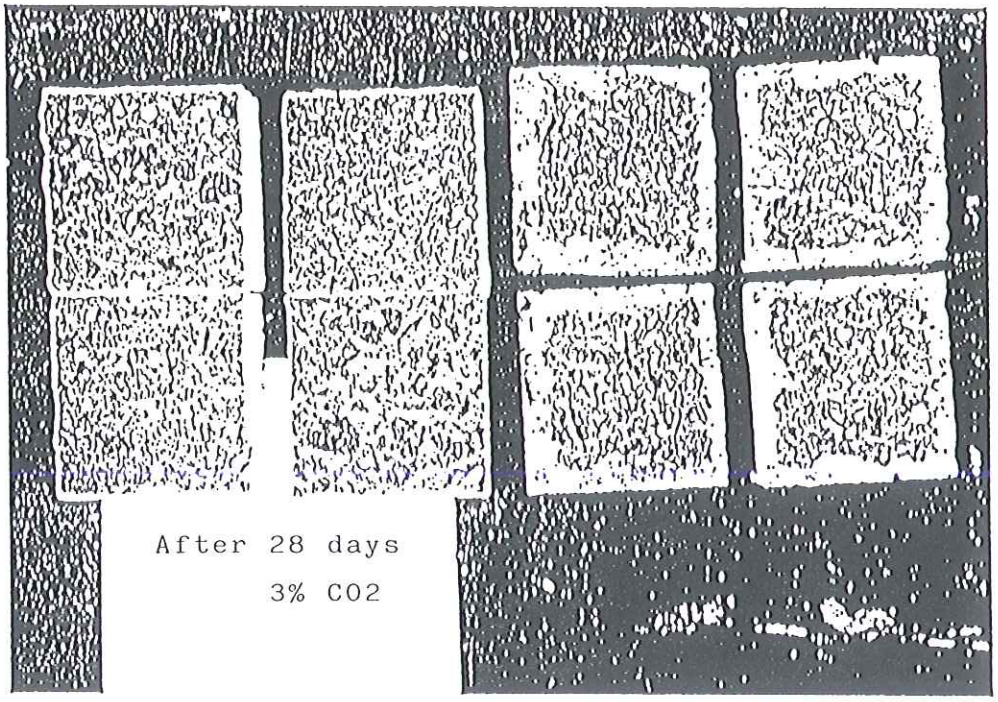

Fig.4: Splitted samples after 28 days treatment
From left to right: sample 13 and 14 (with coating)
sample 5 and 6 (non treated)

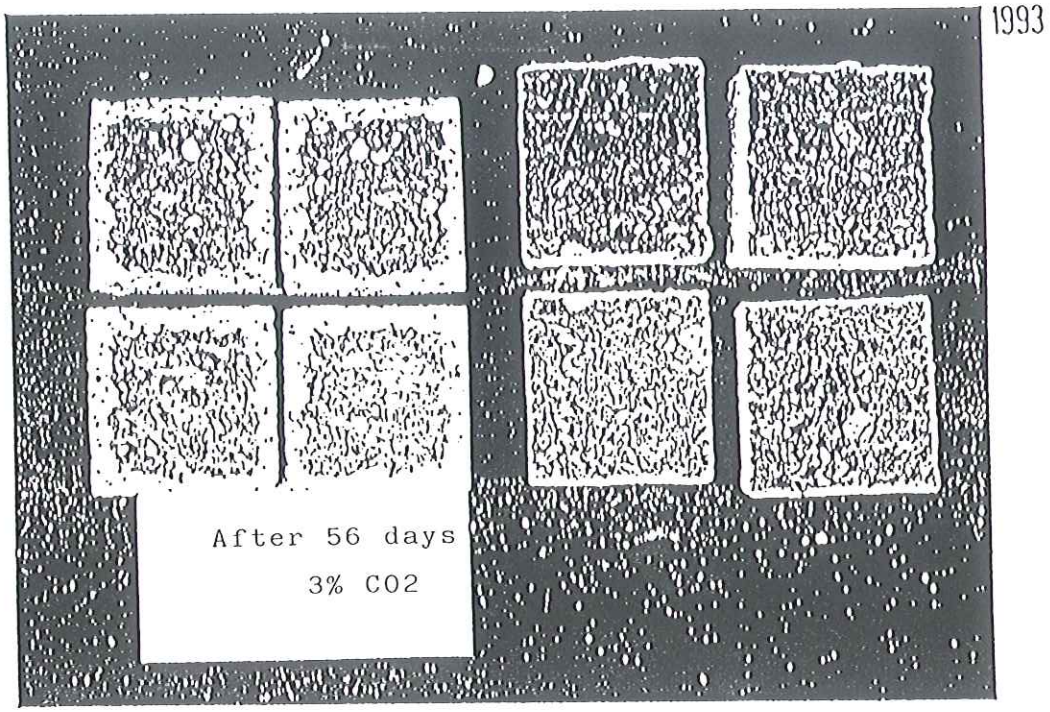

Fig.5: Splitted samples after 56 days treatment
From left to right: Sample 7 and 8 (non treated)
Sample 15 and 16 (with coating)

ORIGINAL PICTURES OF TEST REPORT

CARBONATION RESISTANCE OF A CONCRETE PAINT

TEXT IS IN FRENCH

Fig. 3: Eprouvettes fendées après 14 jours de conservation (3 % CO_2)
De gauche à droîte: Eprouvette 11 et 12 (avec coating)
Eprouvette 3 et 4 (non-traitées)

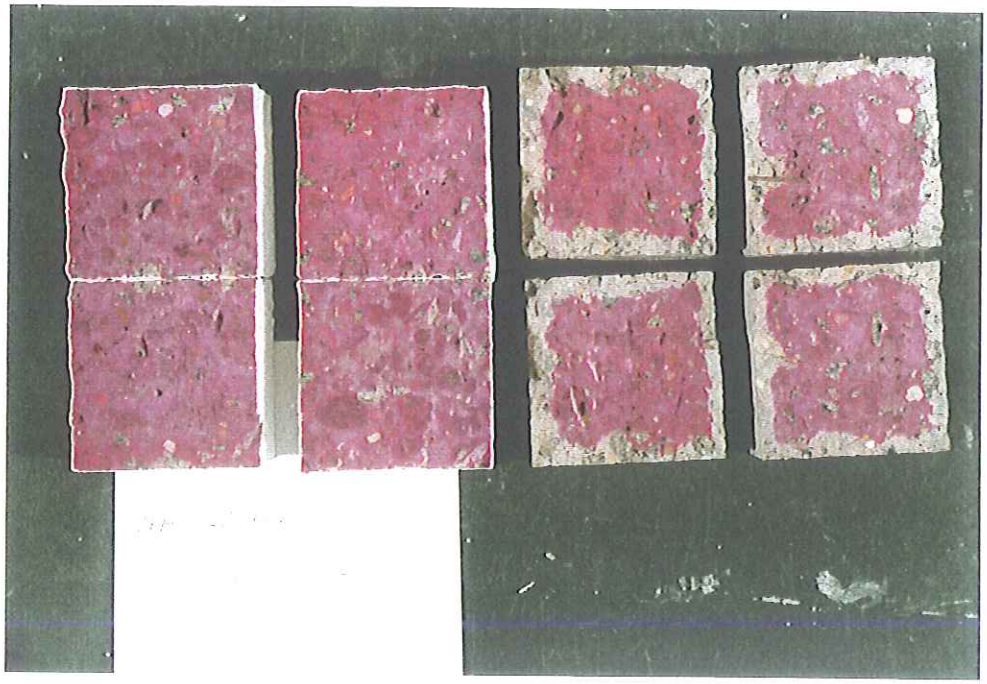

Fig. 4: Eprouvettes fendées après 28 jours de conservation (3 % CO_2)
De gauche à droîte: Eprouvette 13 et 14 (avec coating)
Eprouvette 5 et 6 (non-traitées)

Fig. 5: Eprouvettes fendées après 56 jours de conservation (3 % CO_2)
De gauche à droîte: Eprouvette 7 et 8 (non-traitées)
Eprouvette 15 et 16 (avec coating)