

LABORATOIRE PHYSICO-MECANIQUE

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Brussels, 27th June 2001**TEST REPORT N° EM-01-111**

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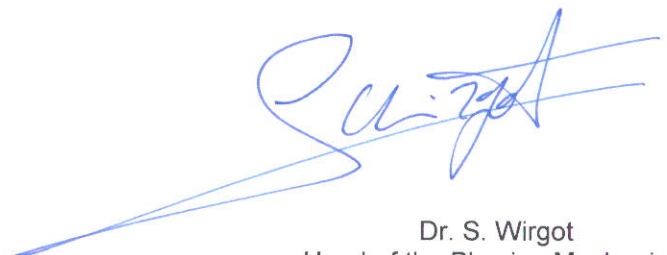
Kind of material : - impregnation product for concrete surface treatment : REWAH INDUSIL SRM
- de-icing chemical : KILLFROST
- de-icing chemical : HVI-FORM

Receipt date : 2001-03-26

Tests : Determination of scaling resistance of surfaces exposed to de-icing chemicals.

Test asked by : REWAH N.V.
Mr. Johan BAETEN
Letter dated 2001-03-19

f.o. E. Debourse

Ing. P. Van Audenhove
Responsible for Technical AidDr. S. Wirgot
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Laboratory

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1. Materials – instructions

Following the manufacturer's recommendations, the soaked product INDUSIL SRM is applied on dry concrete in two coats. The second one must be applied 2 hours after the first one.
The quantity for one coat is 200 ml/m² (160 g/m²).

De-icing chemicals are used in 10 % concentrated water solution (100 g. de-icing salt for 1000 g. water).

The witness solution is 3 % of CaCl₂.

2. Test goal

The goal is to assess the efficiency of the surface treatment.

The assessment of the efficiency is measured by the scaling resistance of the surface exposed to de-icing chemicals.

3. Characteristics of the tested concrete

Test specimen are cylinders (section = 100 cm³) from the laboratory stock (stored in the humid cabinet : R.H. > 90%).

The cylinders were drilled in a concrete slab manufactured in 1996 by slip form.

The concrete contains sandstone aggregates and has the following properties (measured in 1996) :

- wet specific weight : 2 445 kg/m³
- dry specific weight : 2 445 kg/m³
- water absorption : 5,5 %
- compressive strength : 83,0 N/mm²

The top surface of the concrete was slightly brushed just after the casting.
Surface protection of the concrete by curing compound has disappeared.

4. Scaling resistance of surfaces exposed to de-icing chemicals test

Scaling resistance of surfaces exposed to de-icing chemicals is measured in accordance with ISO/DIS 4846.2 (draft) :

«Concrete –Determination of scaling resistance of surfaces exposed to de-icing chemicals ».

Test specimens are the upper slices (45 mm height) of sawed cylinders. The top surface is tested.

A metal ring with rubber joint (waterproof) holds the cylinder and allows to pour the de-icing solution on the test surface.

A 24 hours cycle is applied to the specimens : they are kept for 16 to 18 hours in the freezer at $-(18 \pm 2)$ °C and for 6 to 8 hours in the laboratory (defrost period).

The surface scaling is measured every 5 cycles. To remove loosely adhering scaled material from the test surface, test specimens are rinsed with water.

The solution containing the scaled material is filtered. The paper filter is subsequently dried at 105 °C in order to determine the mass of the scaled material which is given in g/dm² of test surface.

5. Preparation of specimens

After keeping the test specimens 7 days in the laboratory (T = 20 °C and R.H. = 35 %), the soak product is applied as mentioned in § 4 in accordance with instruction from the producer (§ 1). Afterwards, specimens are kept 14 days in the laboratory.

For every de-icing product, two series of 3 specimens were tested : one with the surface treatment and one without.

The first cycle started on 2001-04-19.

6. Test results

Total amount of scaled material after « n » cycles (g/dm²)

Specimen	No surface treatment			Surface treatment with REWAH INDUSIL SRM			
	De-icing product	CaCl ₂ (3 %)	KILLFROST (10 %)	HVI-FORM (10 %)	CaCl ₂ (3 %)	KILLFROST (10 %)	HVI-FORM (10 %)
n = 5		0,1	0,0	0,1	0,0	0,0	0,0
		1,1	0,1	0,6	0,0	0,1	0,4
		0,4	0,1	0,1	0,0	0,0	0,0
	Av.	0,5	0,1	0,3	0,0	0,0	0,1
n = 10		0,6	0,1	0,5	0,0	0,0	0,0
		2,8	0,1	0,8	0,0	0,3	1,2
		0,5	0,2	0,4	0,1	0,1	0,0
	Av.	1,3	0,1	0,6	0,0	0,1	0,4
n = 15		3,2	0,2	4,1	0,0	0,0	0,0
		5,5	0,5	2,1	0,0	0,9	2,7
		2,3	1,4	5,2	0,1	0,2	0,0
	Av.	3,6	0,7	3,8	0,0	0,3	0,9
n = 20		10,5	1,0	14,7	0,2	0,1	0,0
		11,2	1,7	6,2	0,1	1,6	5,0
		6,9	1,5	20,1	0,1	0,2	0,2
	Av.	9,5	1,4	13,7	0,1	0,6	1,7
n = 25		19,3	2,5	28,9	0,2	0,1	0,0
		18,1	5,1	21,1	0,2	3,8	7,3
		15,0	3,8	37,9	0,1	0,2	0,2
	Av.	17,5	3,8	29,3	0,2	1,4	2,5
n = 30		27,0	6,2	43,9	0,2	0,1	0,4
		28,0	12,1	47,6	0,5	8,1	12,3
		22,7	8,1	56,1	0,4	0,3	0,4
	Av.	25,9	8,8	49,2	0,3	2,8	4,4

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