Fibertex A/S

Formtex
Water Retention Capacity of Fibre Liner

Data report

November 2002

COWI

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1 Introduction

One large piece of the material Formtex from Fibertex A/S, Denmark was received on 1 November 2002 at COWI's Concrete Laboratory. The material is to be used for an experiment of the water retention capacity.

The present report is a data report giving the results of a water retention test.

1.1 Background

At the webside www.formtex.dk the following is informed about the test material with the fabric name Formtex.

"Formtex® is a CPF (Controlled Permeability Formwork) liner. The fabric is made from polypropylene fibres. It is two-sided with a permeable side allowing water and air to pass through and a filter side retaining concrete particles. The pore size has been designed to be slightly smaller than the size of the particles in the concrete.

The main function of Formtex® CPF liner is to drain surplus water and air from the surface of freshly placed concrete during compaction. When water is drained off the surface, the water/cement (w/c) ratio in the concrete cover is reduced which improves the strength and durability of the concrete.

The risk of cracks and micro cracks is minimised as Formtex® ensures a high level of humidity during curing."

1.2 Objective

The objective of the experiment is to establish how much water the material Formtex is able to retain within its structure after drainage. The ability of retaining water is important as the water retained in the material ensures further hydration during curing.

1.3 Samples

Two samples were cut from the piece received. The samples were marked 1 and 2. The sample size is 400 mm x 400 mm.

1.4 Test method

The experiment has been conducted according to the test method specified by Fibertex. The description of the test method is given in appendix 1.

Tap water was used. The samples were soaked in tap water for 15 minutes.

In dry condition the fibres in the material were difficult to see, but in wet condition the fibres become more visible. During testing of both samples the fibres were kept vertically. The samples were hold in the vertical position until time between drops exceeded 1.5 minutes.

2 Summary of results

2.1 Test results

The water retention capacity is calculated according to the test method. The result of the experiment is given in Table 1.

Sample no.	Sample size [mm]	Mass of sample [g]		Water retention capacity [l/m^2]
	l_{sample} x W_{sample}	$m_{sample, dry}$	$m_{sample, wet}$	
1	400 x 400	42.55	116.10	0.46
2	400 x 400	46.12	130.70	0.53

Table 1. Water retention capacity of samples

The time for exceeding drops per 1.5 minutes was 27 minutes and 10 seconds for sample 1 and 28 minutes and 45 seconds for sample 2.

2.2 Comments to results

When conducting the experiment, it was noted that the samples tested were practically dry at the top and soaking wet at the bottom. This indicates that the sample size has a large impact on the result.

At least the following is considered to have an impact on the test result:

- Size of sample
- Interval before no dripping occurs
- Orientation of fibres
- Alteration of pressure
  (test method conducted at pressure of 1 atmosphere)

Appendix 1: Water retention capacity experiment

Test method specified by Fibertex A/S:

1. The dimensions of a Formtex sample is measured and weighed.
   l_{sample}: length of sample
   W_{sample}: width of sample
   $m_{sample,\ dry}$: mass of dry sample

2. The sample is soaked in water, and held vertically until it no longer drips.

3. The sample is weighed in wet condition
   $m_{sample,\ wet}$: mass of wet sample after it no longer drips

4. The water retention capacity is calculated as:
$$\frac{m_{sample,wet} - m_{sample,dry}}{l_{sample} \cdot W_{sample}}$$

5. The result is expressed in l/m^2