

ELEMENTIS

A global specialty chemicals company

Application Leaflet

## BENTONE<sup>®</sup> OC

Improved performance of self compacting concrete



### Key Benefits

- ❖ Reduced bleeding
- ❖ Positive effect on compressive strength

## Introduction

Self-compacting concrete (SCC) is a special type of concrete to be placed and consolidated under its own weight without any vibrating effort due to its excellent deformability, and which at the same time cohesive enough to be handled without segregation or bleeding.

The influence of our Hectorite clay based rheology modifier BENTONE® OC has been tested in a SCC formula based on portland cement formulated with superplasticizer.

## BENTONE® OC

Composition	Untreated natural Hectorite clay
Form	Free flowing, brownish to creamish powder
Particle size < 74 µm [%]	95
Density [g/cm³]	2.60

## Technical results

	Control	0.07% BENTONE® OC	0.14% BENTONE® OC
All concentrations related to the dry mix			
Density fresh concrete [kg/m³]	2508	2536	2510
Flow table ratio A <sup>10</sup> [cm]	64.5	65.5	67.0

The data shown above are visualizing that the addition of both tested concentrations of BENTONE® OC has only a minor influence on the fresh concretes density in comparison to the control sample, without stabilizers. Also the consistency, measured as flow table value A<sup>10</sup>, is only slightly affected.

However, the main benefits of the BENTONE® OC addition in eliminating the bleeding and enhancing the compressive strength are displayed in the below graph (Figure 1).

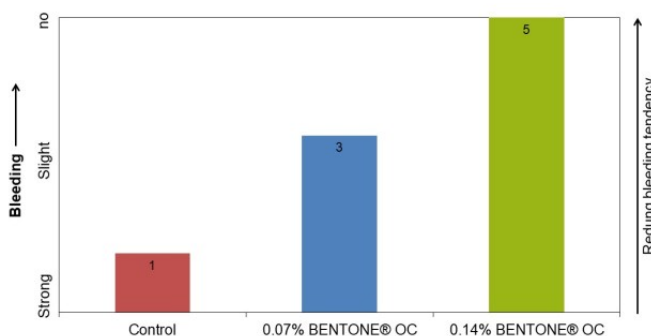


Figure 1: Bleeding

It can be seen that the tendency to show bleeding can be significantly reduced by the use of very low amounts of BENTONE® OC.

The positive influence of BENTONE® OC on the compressive strength of the SCC has been quantified in Figure 2.

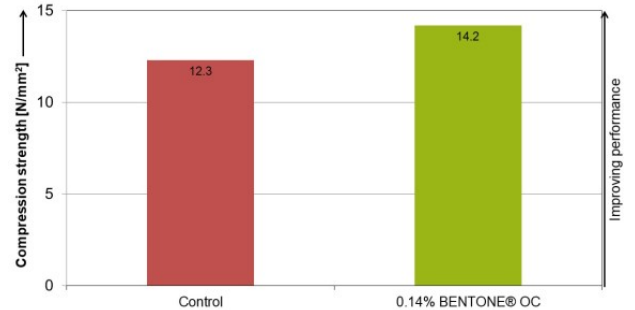


Figure 2: Compressive strength

The displayed enhancement of the strength is caused by the better stability and the consequently improved distribution of the formulated components in the cured concrete.

## Conclusion

BENTONE® OC reduces effectively bleeding and increased the compressive strength without changes in water content or apparent density. On the other hand, only a minor effect of BENTONE® OC on the consistency and therefore on the self levelling and self compacting properties can be measured.

## Appendix

### Test formulation

Raw material	Concentration [%]	[kg/m³]
Composition of addiament		
Sand 0/4 mm	47	942
Gravel 4/8 mm	6	120
Gravel 8/16 mm	21	421
Gravel 16/32 mm	26	522
Total	100.0	2005
Composition of concrete		
Addiament		2005
Portland cement CEM I 42.5 R		320
Water		175

Flow agent 5.8g solids per kg of cement (e.g. Calcium sulphonate based)

### Preparation

- Dry mix aggregates, cement and BENTONE® OC for 2 minutes
- Add powder mix to water and mix for 1 minute
- Add flow agent and mix for 1 minute
- Wait for 6 minutes without mixing
- Determine flow table value (10 minutes after mixing, a<sub>10</sub>)

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