

Technical Information



FINMA

ArmiCell

- Fibrous reinforcement / viscosity control agent -



content

This technical information describes the additives used in construction chemicals, with the aim of improving the shrinkage behavior and bridging cracks, in addition to the rheological properties are improved where possible.

To achieve this, the ArmiCell series was developed, which consists of modified cellulose fibers and inorganic particles. In the following, a brief overview of the effects of using ArmiCell products in different systems is given based on test results.

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1. Shrinkage behavior and crack bridging

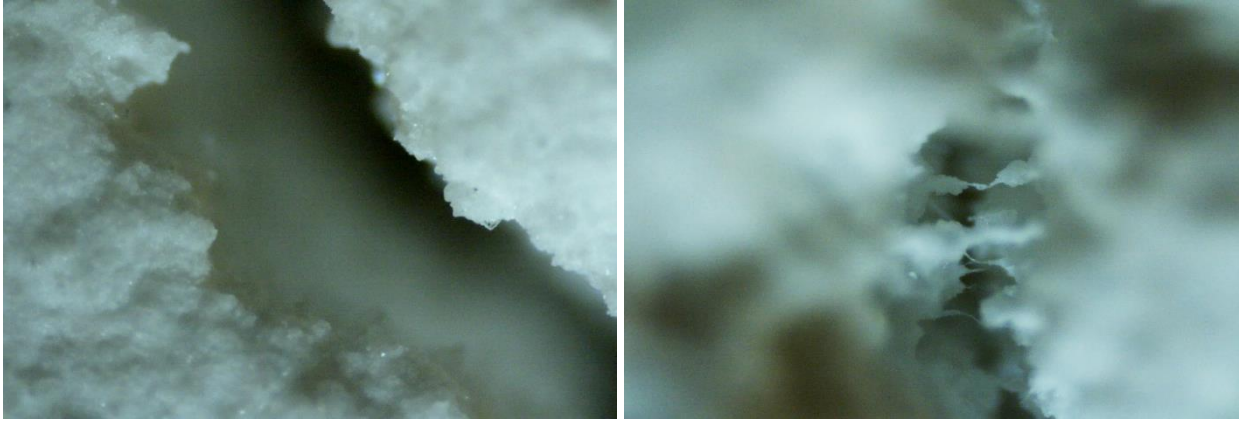
When using construction chemicals, the shrinkage behavior is an important aspect. Because this determines how many application steps are necessary, as well as the adhesion and the probability of cracking can be influenced.

Reinforcement is often used to prevent cracking issues. For this purpose, for example, leveling compounds are applied, then the reinforcement fabric is inserted and leveled over again.

Due to the mentioned aspects, one goal is to minimize the shrinkage to avoid cracking during drying as a result. By using ArmiCell it is possible to minimize the shrinkage during drying and at the same time the formation of cracks and the bridging of cracks compared to the pure commercial filler to improve significantly. This is illustrated by the following comparative Putties.



Comparison of the shrinkage behavior of a commercially available dispersion acrylic filler with a layer thickness of 5 mm, once without the addition of Armicell (left) and once with the addition of 0.5% Armicell (right).

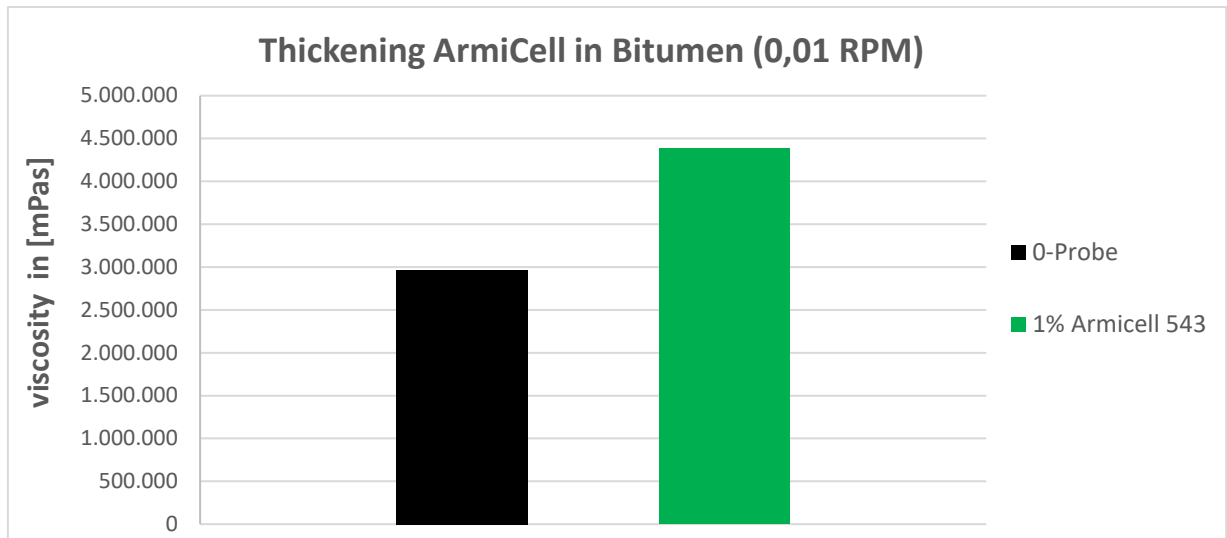


Comparison of the breaking point after the tensile test of a commercially available dispersion acrylic filler, once without the addition of ArmiCell (left) and once with the addition of ArmiCell (right).

2. Rheology

In the case of construction chemicals, their rheological behavior plays a very important role. For their processing it is often necessary that they are pumpable and flowable, at the same time the applied systems should not run off or drip on walls and ceilings. For this it is necessary that the system has a corresponding status capacity and has a thixotropic behavior.

The use of ArmiCell in construction chemical systems enables setting of relevant rheological properties with simultaneous reinforcement of the cured system. An example of the thickening and thixotropic effect of ArmiCell is shown in the test in bitumen with the following measurement results.



Viscosity in mPas at 0.01 RPM with the viscometer Brookfield model LVDV-II + PX and the spindle SC4-29 (cylinder system) in comparison of pure bitumen (black) and bitumen with 1% ArmiCell (green).

Viscosity of bitumen with and without ArmiCell	0.01 RPM [mPas]	0.1 RPM [mPas]	Thixotropic index [mPas at 0.01 RPM / mPas at 0.1 RPM]
0 sample	2,966,555	906.148	3.27
1% ArmiCell 543	4,386,564	961.721	4.56
1% ArmiCell 5153	4,021,017	950.265	4.23

Measurement of the viscosity in the jump test to determine the thixotropy. From a thixotropic index > 1, the system is shear thinning.

The results show that the shear thinning behavior of the bitumen is retained and can even be reinforced by the ArmiCell, while at the same time the stability increases. This makes it possible to efficiently prevent running or dripping after application.

3. Handling

When adding additives to construction chemicals, different properties of the additive must be observed to avoid problems later and to ensure occupational safety.

For ArmiCell, as a mixture of modified cellulose fibers and inorganic particles, this also applies. It should be noted that the mixture can be easily incorporated into different systems, such as liquid bitumen or dry cement powder, and that a good homogeneous distribution of the additive in the system is guaranteed with the usual methods used. All these aspects have been taken into account and optimized at ArmiCell.

When developing ArmiCell, care was taken to ensure the lowest possible amount of dust during incorporation. This is preferable for occupational health and safety reasons, even if ArmiCell is free from substances that are hazardous to health and therefore there is no labeling requirement. Another advantage of ArmiCell is that the mixing ratio of the inorganic particles with the modified cellulose fibers and the linear increase in viscosity make ArmiCell particularly easy to dose.

4. Areas of application

Because of the good rheological properties, the high-water strength even in an alkaline environment as well as the reinforcing properties due to the reduction in shrinkage and flexible crack bridging, there are many areas of application for ArmiCell in the field of construction chemicals. These are, for example: Floor / leveling compounds, mortar, leveling compounds, flexible seals, tile and surface adhesives, filling compounds, coatings, and much more.

ArmiCell is also available with different fiber lengths, so you can choose the option that best suits your system.

Inorganic particles in [%]	Fiber length in [μm]	400 μm	1500 μm
45	→	ArmiCell 543	ArmiCell 5153

Different types of ArmiCell, defined by the length of the modified cellulose fiber used.

5. Summary

ArmiCell is a reinforcing and viscosity control agent made from modified cellulose fibers with numerous possible uses in the field of construction chemistry. The shrinkage-reducing and crack-bridging effect of ArmiCell saves working time during application and increases the shelf life of the finished product.

At the same time, ArmiCell is not hazardous to health as it is not based on the use of cristobalite. It was dispensed with and ArmiCell is therefore not required to label your later product.

Contact

- Customer-specific requirements need individual solutions.
- We can offer support and advice for the start of your development work.
- Do you need more information?
The FINMA team looks forward to hearing from you.

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