



# PETER GREVEN

Your partner for construction additives



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As a family-owned company with over 100 years of experience, we are known for quality, customer focus, innovation and sustainability. We are experts for oleochemistry and produce additives based on natural, renewable raw materials. Our focus on high-performing, innovative and sustainable products characterizes the entire portfolio and our corporate philosophy.

For us, sustainability is not just a buzzword, but an integral part of our business. We use renewable raw materials, implement sustainability certifications and optimize our processes to minimize our ecological footprint.

In this brochure, we highlight our hydrophobing agents for the construction industry. We are aware of the specific challenges in this sector and have developed our LIGAPHOB® product line with the aim of providing functional and long-term solutions for the hydrophobization of building materials. Whether for plasters, mortars, or concrete – we can offer the right product. You have the choice between metal soaps, alkaline soaps, combination products, dispersions and liquid soaps. Discover our hydrophobing agents!





Fig. 1: Successful reconstruction of a chapel in Gnigl (municipal district of Salzburg, AT). With special plaster systems even damp masonry can be reconstructed in a way which ensures a durable protection against further negative influences of moisture.



## ALKALINE SOAPS – reactive additives

Alkaline soaps are considered reactive additives. They are water-soluble and the hydrophobic effect occurs with a slight delay after mixing, as the alkaline soap reacts with calcium compounds from the building material. Alkaline soaps are characterized by their high flexibility and the numerous possible combinations with other additives. They are known as the most effective oleochemical hydrophobing agents and can be used at a low dosage of 0.1 % to 0.3 %.

### LIGAPHOB N 90

A reactive hydrophobing agent with a broad range of applications. In addition to plasters, it can also be used in special applications such as waterproofing slurries and concrete to achieve excellent long-term results.

### LIGAPHOB N 90 PLUS

An alkaline soap used in specific application areas. As a result of its special fatty acid combination, LIGAPHOB N 90 PLUS provides an excellent water-repellent effect.

### LIGAPHOB NT 90

A reactive hydrophobing agent for chalky plaster systems. The product is particularly suitable for restoration plasters as it does not significantly affect the formation of air voids.

### LIGAPHOB N 91

A reactive hydrophobing agent based on an unsaturated fatty acid. This product was developed focusing on economic and application aspects and is based on the beneficial properties of LIGAPHOB N 90.

### LIGAPHOB K 90 PLUS

An alkaline soap that offers excellent performance with regard to open times. Because of its special combination of fatty acids, LIGAPHOB K 90 PLUS offers outstanding hydrophobic properties.



### THE ADVANTAGES:

- Very good cold-water solubility
- Very good wetting of the building materials
- No gelation effect due to the high content of unsaturated fatty acids
- Very good distribution of alkaline soaps in mortar
- Effective after reaction with the components of the building material
- Numerous possible combinations with other additives



## METAL SOAPS – non-reactive additives

Due to the high specific surface area and the strong water-repellent effect, metal soaps are used as hydrophobing agents for a variety of building materials. With this type of hydrophobization, the inner surfaces, meaning the capillaries and cavities, are coated with a water-repellent agent. This ensures effective and long-lasting protection against moisture penetration. The dosage is between 0.3 % and 0.5 %.

### LIGAPHOB CA 6 PLUS

Due to the special fatty acid used, LIGAPHOB CA 6 PLUS has excellent hydrophobic properties. It is particularly suitable for mineral plasters. The special features of this product include low impact on the formation of air voids during the mixing of the dry mortar.

### LIGASTAR CA 350

A non-reactive hydrophobing agent with a high specific surface area for mineral plasters, synthesized by precipitation process. It offers advantages during the mixing of dry mortar.

### LIGASTAR CA 860

A calcium stearate that is a proven choice with excellent water-repellency for mineral plasters, characterized by good flowability and efficient dosing capabilities.

### LIGASTAR ZN 101

A non-reactive hydrophobing agent produced by the precipitation process with a high specific surface area and excellent long-term effect. It is mainly used for lime-cement plasters. Sufficient mixing times of the dry mortar are necessary to ensure ideal effectiveness. Zinc stearates have a slightly algicidal effect in mortars.

### LIGAPHOB MG 53

A magnesium stearate that offers the same positive properties as LIGAPHOB MG 700. It is characterized by very fine particle size so that a lower dosage is possible.

### LIGAPHOB MG 700

A standard quality magnesium stearate with very good hydrophobic properties. This product is very suitable for most cementitious building materials and is characterized by very good flowability and very good dosing properties.

### LIGASTAR AL D2

An aluminium stearate used as a slightly reactive hydrophobing agent, primarily for insulating and restoration plasters. It has good dispersability in dry mortar.



### THE ADVANTAGES:

- Immediate hydrophobing effect
- Very low interaction with other additives
- Metal soaps show hardly any influence on the hardening behaviour
- Very effective and durable form of hydrophobization
- High flexibility regarding formulation and dosage
- Numerous possible combinations with other additives

## COMBINATION PRODUCTS

Combination products bring the advantages of metal soaps and alkaline soaps together. They exhibit short mixing times and rapid effectiveness. Depending on the ratio used, either the reactive or the non-reactive properties can be enhanced. The dosage is between 0.3 % and 0.5 %.

### LIGAPHOB CK 5 PLUS

LIGAPHOB CK 5 PLUS is characterized by a unique formulation that enables rapid and strong hydrophobization in dry mortar systems, as well as reducing efflorescence and offering good performance regarding open times.

### LIGAPHOB CN 5 PLUS

LIGAPHOB CN 5 PLUS is based on a special fatty acid mixture that ensures high effectiveness in dry mortar systems. A unique manufacturing process enables improved dosing and very good mixing behaviour. The product does not tend to segregate even with pneumatic conveying. It has improved flowability and causes less irritation than traditional hydrophobic agents.

It can be applied universally and effectively in dry mortar systems due to the balanced ratio of the ingredients. It is suitable for base and finishing plasters as well as for ETICS.

### LIGAPHOB CN 75

This product utilizes a higher content of reactive hydrophobing agents. In addition to plaster, it can be used in special applications such as sealing slurries and concrete.

### LIGAPHOB MN 20

This combination product stands out due to its homogeneity, which arises from the special manufacturing process. It is especially well-suited for cement-bound building materials.

### LIGAPHOB NF 50

Formulated as a mixture of reactive and non-reactive hydrophobing agents the product is characterized by very good flowability. It is particularly effective in base and finishing plasters.

### THE ADVANTAGES:

- Very good wetting of the building materials
- Excellent effectiveness
- Minimal influence on the setting behaviour
- Formulations and dosages can be easily varied and adjusted individually.
- Total homogeneity and uniformity
- Numerous possible combinations with other additives



## LIQUID PRODUCTS

Liquid hydrophobing agents are mainly used in concrete and cement production. They are perfectly suitable for mixing into the building material and ensure hydrophobization of the entire surface. The dosage is between 0.7 % and 1.5 %.

### LIGA KA 40

The specific fatty acid combination of this potassium soap enables a strong liquefying effect in concrete production. The high content of saturated fatty acids also ensures that the product remains stable in storage.

### LIGA PMO K

LIGA PMO K is a liquid potassium soap based on a specially developed combination of fatty acids and is preferably used for the hydrophobization of concrete. The product lowers the air void content due to its liquefying effect and can reduce efflorescence.

### LIGA SOFT HB

This liquid potassium soap was designed for the hydrophobization of concrete. It reduces the air void content, acts as a liquefier and can reduce efflorescence.

### LIGAFLUID CA 50 F

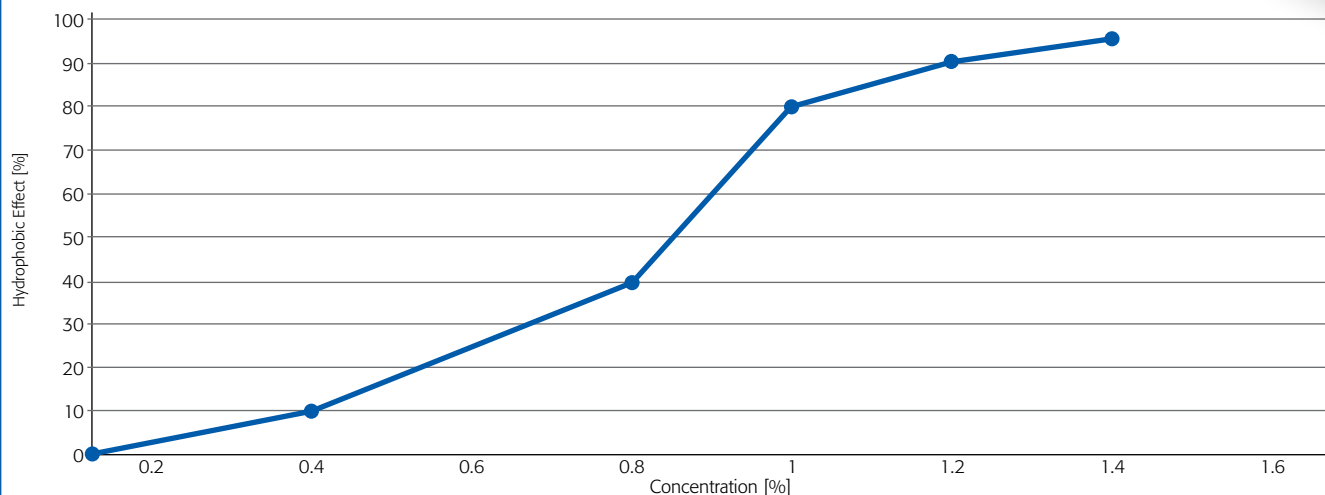
Calcium stearate dispersions are used for the hydrophobization of concrete. In addition to offering effective hydrophobing properties and its well-known surface properties, it prevents efflorescence and has a liquefying effect on the concrete.

### LIGAFLUID FS 30

This aqueous dispersion of special monocarboxylic acids was developed based on the requirements of the construction industry. LIGAFLUID FS 30 shows its strength as a reactive water repellent in particular in concrete and cement mixtures.



Fig. 2: Influence of the calcium stearate concentration on the hydrophobic effect of concrete



## APPLICATION TECHNOLOGY

In addition to the high quality of our products, we focus on performance in the end application. In order to be able to offer a product portfolio tailored to all requirements of the construction industry and our customers, we are constantly working on optimizing existing products and developing new solutions. In addition to analytical quality control, all products undergo comprehensive application testing, including long-term weathering tests.

### PERFORMANCE TESTING

To determine the performance of our products, we use various test procedures, including:

- Air void content according to DIN EN 1015-7
- Capillary water absorption according to DIN EN ISO 15148
- Capillary water absorption according to DIN EN 1015-18
- Flow spread according to DIN EN 1015-3
- Bulk density according to DIN EN 1015-6

### OUTDOOR WEATHERING TEST SERIES

Many different products were evaluated on a standard plaster in a series of tests. A lime-cement plaster with a total binder content of 17 % and 10 % limestone powder was used. The mixture also contained a surfactant air-entraining agent and methyl cellulose. Throughout the series, various hydrophobing agents were each tested at a dosage of 0.3 %.

The test specimens for outdoor weathering were oriented towards the southwest. A visual assessment of the discs and documentation of the weather data were carried out on a monthly basis. Capillary water absorption was determined every six months in accordance to DIN EN ISO 15148. The results are shown in figure 3 and 4.

Various product types were compared in the test series: Metal soaps produced by a precipitation process (LIGASTAR CA 350, LIGASTAR ZN 101) and products from direct process (LIGAPHOB MG 53, LIGAPHOB MG 700, LIGAPHOB CA 6 PLUS, LIGASTAR CA 860), alkaline soaps (LIGAPHOB N 90, LIGAPHOB N 91, LIGAPHOB N 90 PLUS, LIGAPHOB K 90 PLUS) as well as combination products (LIGAPHOB CK 5 PLUS, LIGAPHOB CN 5 PLUS).

The data clearly show that, with the same dosage, reactive hydrophobing agents and combination products offer a better water-repellent effect than non-reactive hydrophobing agents.

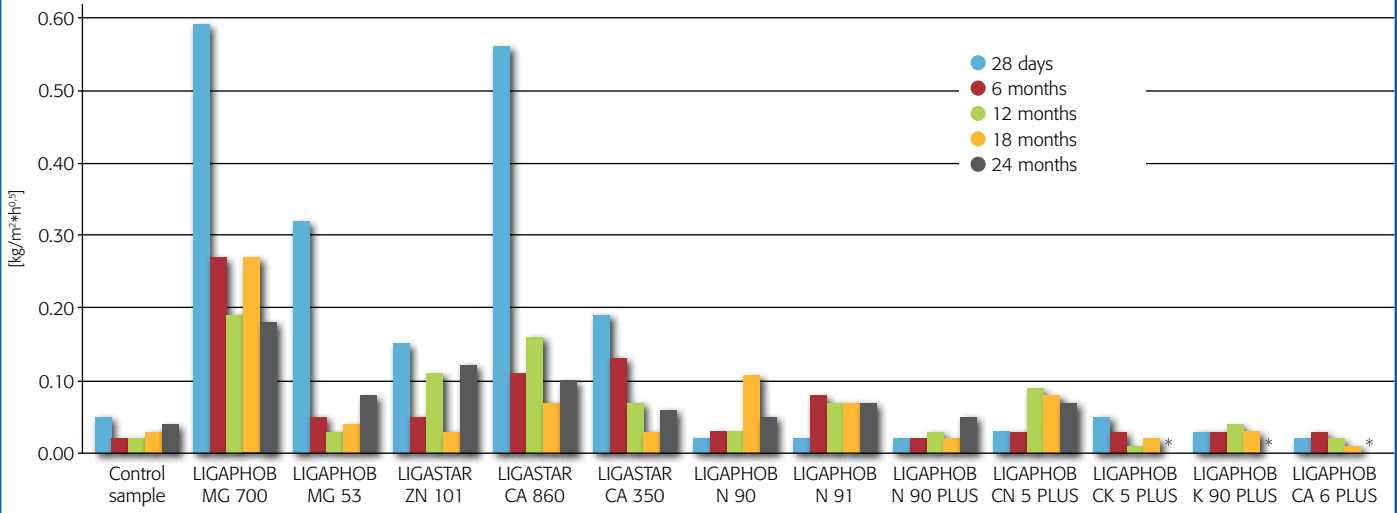
Notably, the water absorption coefficient for the control sample without hydrophobing agent is quite good. This is primarily caused by a very strong initial suction. Within a few minutes, the used type of plaster absorbs so much water that the capillary system becomes saturated. As a result, the line in the graphical evaluation of water absorption has a low gradient leading to a small water absorption coefficient. Therefore, both the water absorption coefficient ( $w$ ) and the total water absorption ( $W_{24}$ ) are crucial for the assessment of a hydrophobing agent.

The results of the test series confirm that all hydrophobing agents exhibit very good long-term stability even when exposed to weather. Impairments could be found neither in the surface texture nor in the measured values for the water absorption coefficient.

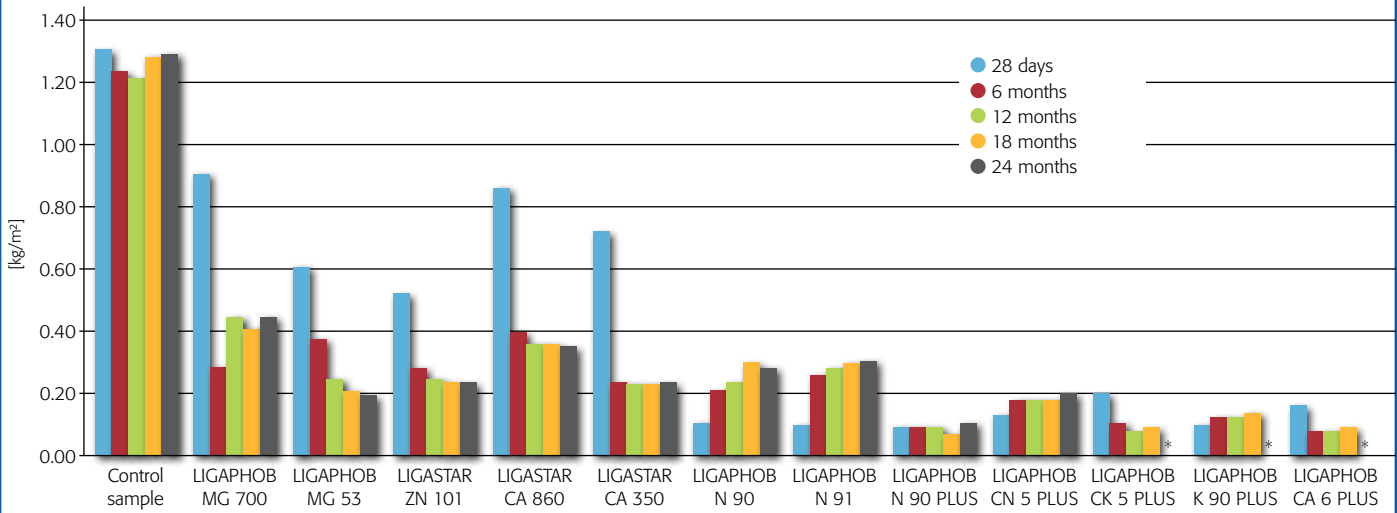




**Fig. 3: Water absorption coefficient** dosage 0.3 %



**Fig. 4: Total water absorption (24h)** dosage 0.3 %

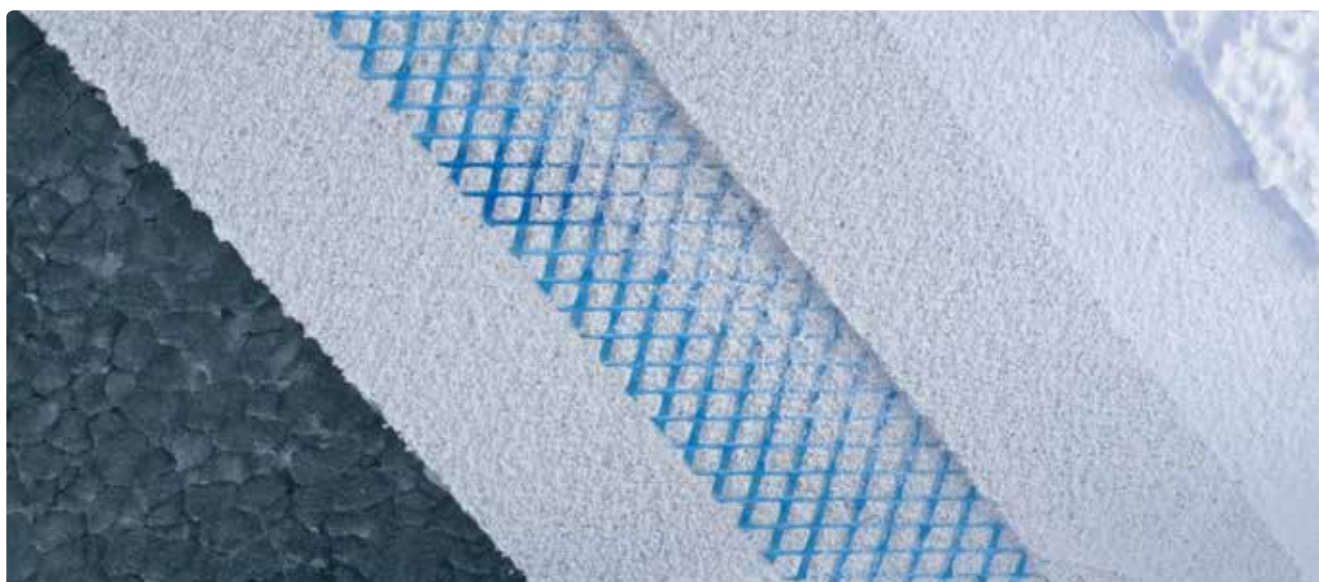


\* Value has not yet been determined



## TYPICAL PARAMETERS OF SELECTED PRODUCTS

| Product            | Description         | Ash [%]     | Humidity [%] | FFA [%]   | Free alkali [%] | Bulk weight [g/L] |
|--------------------|---------------------|-------------|--------------|-----------|-----------------|-------------------|
| LIGAPHOB N 90      | Alkaline soap       | /           | 1.0 - 4.0    | /         | 0.20 - 0.49     | 200 - 300         |
| LIGAPHOB N 90 PLUS | Alkaline soap       | /           | max. 6.0     | /         | 0.01 - 0.30     | 280 - 380         |
| LIGAPHOB NT 90     | Alkaline soap       | /           | max. 2.5     | /         | 0.05 - 0.25     | 190 - 290         |
| LIGAPHOB N 91      | Alkaline soap       | /           | 1.0 - 4.0    | /         | 0.20 - 0.49     | 180 - 280         |
| LIGAPHOB K 90 PLUS | Alkaline soap       | /           | max. 6.0     | /         | max. 0.49       | 250 - 350         |
| LIGAPHOB CA 6 PLUS | Metal soap          | 13.0 - 15.0 | max. 3.0     | max. 1.0  | /               | 250 - 350         |
| LIGASTAR CA 350    | Metal soap          | 8.8 - 9.8   | max. 3.5     | max. 0.8  | /               | 145 - 195         |
| LIGASTAR CA 860    | Metal soap          | 9.1 - 9.7   | max. 3.0     | max. 0.8  | /               | 240 - 340         |
| LIGASTAR ZN 101    | Metal soap          | 13.1 - 13.7 | max. 0.5     | max. 1.0  | /               | 125 - 175         |
| LIGAPHOB MG 53     | Metal soap          | 7.8 - 8.8   | max. 5.0     | max. 1.5  | /               | max. 200          |
| LIGAPHOB MG 700    | Metal soap          | 6.3 - 8.3   | max. 6.0     | max. 2.0  | /               | max. 200          |
| LIGASTAR AL D2     | Metal soap          | 10.0 - 11.0 | max. 2.0     | 3.0 - 5.0 | /               | 180 - 280         |
| LIGAPHOB CK 5 PLUS | Combination product | 5.6 - 7.7   | max. 3.0     | /         | /               | 250 - 350         |
| LIGAPHOB CN 5 PLUS | Combination product | /           | max. 3.0     | /         | /               | 280 - 380         |
| LIGAPHOB CN 75     | Combination product | 10.0 - 15.0 | max. 2.5     | /         | /               | 250 - 350         |
| LIGAPHOB MN 20     | Combination product | 7.0 - 9.5   | max. 4.0     | /         | /               | 270 - 370         |
| LIGAPHOB NF 50     | Combination product | 12.0 - 15.0 | max. 2.0     | /         | /               | 200 - 350         |



## PERFORMANCE PARAMETERS OF SELECTED PRODUCTS

| Product            | Flow spread [mm] | Air void content [%] | Bulk density [g/cm <sup>3</sup> ] | w-value [kg/m <sup>2</sup> *h <sup>0.5</sup> ] | W <sub>24</sub> -value [kg/m <sup>2</sup> ] |
|--------------------|------------------|----------------------|-----------------------------------|--|---|
| LIGAPHOB N 90      | 165              | 19.5                 | 1.7611                            | 0.02   | 0.17  |
| LIGAPHOB N 90 PLUS | 160              | 21.0                 | 1.6379                            | 0.02   | 0.07  |
| LIGAPHOB N 91      | 165              | 19.0                 | 1.6504                            | 0.02   | 0.19  |
| LIGAPHOB K 90 PLUS | 160              | 19.0                 | 1.6919                            | 0.02   | 0.11  |
| LIGAPHOB CA 6 PLUS | 165              | 23.5                 | 1.6044                            | 0.08   | 0.15  |
| LIGASTAR CA 350    | 165              | 22.5                 | 1.6219                            | 0.19   | 0.18  |
| LIGASTAR CA 860    | 170              | 24.0                 | 1.6534                            | 0.22   | 0.28  |
| LIGASTAR ZN 101    | 135              | 16.0                 | 1.8027                            | 0.15   | 0.20  |
| LIGAPHOB MG 53     | 160              | 20.0                 | 1.6265                            | 0.32   | 0.21  |
| LIGAPHOB MG 700    | 165              | 19.5                 | 1.6825                            | 0.54   | 0.29  |
| LIGAPHOB CK 5 PLUS | 180              | 18.0                 | 1.7721                            | 0.05   | 0.20  |
| LIGAPHOB CN 5 PLUS | 160              | 20.5                 | 1.6293                            | 0.09   | 0.14  |
| LIGAPHOB NF 50     | 175              | 13.5                 | 1.8022                            | 0.10   | 0.33  |

To assess the product performance, the hydrophobing agents were mixed into a mineral base plaster and the shown parameters were determined. These values correspond to the average performance data.





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