

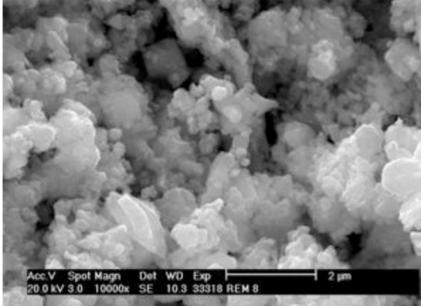


NANOCALCE CaLoSiL®

E5 - Art.25704

E25 - Art.25702

E50 -Art.25705



Colloidal nano-particles
of lime

Strengthening of
porous stones, mortars
and plaster



Properties

CaLoSiL® contains nano-particles of lime hydrate $[Ca(OH)_2]$ suspended in Ethanol. Typical concentrations are 5/25/50 g/L. The average particle size is 150 nm. The extremely fine size of the synthetic nano-lime results from its preparation, which is based on chemical synthesis. Due to the low particle size stable sols are formed which do not sediment for a long time.

CaLoSiL® is a ready-to-use stone and plaster consolidate. Treatment of stone, mortar or plaster with CaLoSiL® results in the formation of solid calcium hydroxide after evaporation of the alcohol, that converts into calcium carbonate in a way similar to traditional lime mortars by reaction with atmospheric carbon dioxide. The alcohol evaporates without any residues so they do not harm the stone or plaster. Chemicals or residues deteriorating stone or mortar are not formed. CaLoSiL® can be applied using either a flow coating procedure, by dipping, spraying or injection. It is important that the complete weathered zone of the stone down to the sound is treated.

Properties of formed calcium hydroxide / calcium carbonate

The calcium hydroxide particles formed after evaporation of the alcohol cover the surface of treated cracks, pores or joints. Dense films of calcium hydroxide films are formed, depending on the number of treatment cycles and the concentration of the used sols. Typical particle sizes are in the range of few hundred nano-metres. Their detection by means of standard optical microscopy may be difficult, the use of SEM is recommended.

Calcium carbonate formation by reaction with atmospheric carbon dioxide requires the presence of humidity. Depending on the conditions and the amount of calcium hydroxide brought into stone, mortar or plaster carbonation takes place within few days and weeks. After spraying the treated materials with water the carbonation process can be accelerated.

Penetration behaviour

The penetration into mortar, stone or plaster depends on the following factors:

- Characteristics of the CaLoSiL type applied
- Structure and surface characteristics of the materials to be treated,
- Porosity and capillary rise,



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- Moisture content of the material
- Air temperature and air humidity during the application

When dense materials are treated with highly concentrated CaLoSiL products the penetration behaviour may be only slow, especially if there are dense surface layers such as gypsum crusts which prevent its penetration.

High moisture content also inhibits penetration so when necessary pre-wetting with ethanol may help to reduce the moisture content of the material.

White haze formation

The formation of a white haze on the surface of the treated material depends not only on the penetration behaviour of CaLoSiL but also on the evaporation conditions of the alcohol, which can re-transport nano-particles back to the surface. In addition if too little time is allowed for carbonation of the nanolime within the treated material it will not be fixed in place and can be transported to the surface. General rules to prevent / reduce the formation of white haze are:

- Start the treatment with low concentrated products, increase the calcium hydroxide concentration step by step
- Avoid the treatment of wet materials, reduce the moisture content by pre-treatment with ethanol or ethanol-water mixtures (1:1).
- In the case of sensitive surfaces try to use CaLoSiL grey, which has a special consistency allowing deep penetration without white haze formation
- Avoid an "oversaturation" of the treated stone, plaster or mortar. Remove all CaLoSiL which could not penetrate into the treated material for example, with a sponge.
- Test the addition of small amounts of acetone or heptane.

Times

The alcohols evaporate within a few hours. The carbonation process itself requires between few days to several weeks, depending on the amount of calcium hydroxide formed and the environmental conditions (humidity, possibility of carbon dioxide migration).

CaLoSiL® and silicic acid esters

The combination of CaloSiL with silicic acid esters allows the successful consolidation and strengthening of materials in which pure silicic acid esters do not work satisfactorily alone. In these cases it is recommended to treat the materials with CaloSiL first and then apply silicic acid esters after the evaporation of the alcohol. The calcium hydroxide formed from CaLoSiL acts as an adhesion promoter as well as catalyst accelerating the hydrolysis of the silicic acid ester. The final strength is in many cases much higher than can be achieved by single treatment with silicic acid esters. All commercially available silicic acid esters can be used. Detailed information are summarised in a special technical leaflet.

Mixability with other materials

All CaLoSiL®-products can be intermixed. Blending with ethanol, n- or iso-propanol is also possible without any difficulties. However, the addition of water can result in the formation of a gel because



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of flocculation of calcium hydroxide particularly when the amounts of water is greater than 10% by weight.

Storage

All materials have to be stored between + 5°C and +30°C. When CaLoSiL remains in unopened, original containers, storage for at least three months is possible. After that time, agglomeration and sedimentation may occur. The settled particles, however, can be re-dispersed by shaking the closed bottle or by ultrasonic treatment. The properties of the nano-sols remain unaffected.

Safety

CaLoSiL® is flammable/combustible. Keep away from oxidizers, heat, sparks and flames. Avoid spilling, skin and eye contact. Ventilate well, avoid breathing vapours. CaLoSiL® reacts strongly alkaline. Do not breathe vapour or mist. Do not smoke. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Further information concerning safety during transport, storage and handling as well as for disposal and ecology can be found in our latest Material Safety Data Sheet. Before using in large scale we recommend to treat a small test field with CaLoSiL® in order to find out the most favourable application method and the required volumes of CaLoSiL.

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Burada sunulan bilgiler, bilgimiz dâhilinde doğru ve güvenilir olmakla birlikte, açıkça belirtilmedikçe herhangi bir garanti teşkil etmez. Kullanım koşulları kontrolümüz dışında olduğundan, bu ürünlerin verilerinin veya önerilerinin kullanımından doğabilecek her türlü sorumluluk (patent ihlali dâhil) tarafımızca reddedilir.

Yalnızca profesyonel kullanım içindir.