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Calcium carbonate efflorescence on façade surfaces

Description

Calcium carbonate efflorescence on mineral-based coating systems is visible as a bright haze and/or as bright spots, particularly on dark surfaces. These generally occur on surfaces that are newly applied. The trigger for these optical effects is the hydrated lime that is transferred from the coating interior to the exterior, and which carbonises on the surface due to the effect of moisture assisted by CO₂ to form limestone and becomes evident on the surface purely by the differences in the colour. The function of the coating system is not impaired.

All mineral-based top coats and basecoats contain either lime or cement as a binder, and often they contain both. These binders are decisive for the properties of the products and particularly for the hardening process of the coatings. High levels of hydrated-lime are found in lime-based products after they have been mixed with water. This reacts under normal conditions within the coating when moisture and carbon dioxide are present and forms calcium carbonate. If the setting process is delayed by high levels of air humidity, temperatures that are too low or too high, the hydrated lime can be transported to the surface by various transport mechanisms and carbonize there.

Cement sets due to hydration. This refers to the reaction of a substance with water. The hydration is temperature-dependent and is accelerated at higher temperatures. However, it slows down as time progresses and ceases completely when there is no longer water present. Hydrated lime is given off during the hydration of cement, which is also carbonized under the influence of moisture and carbon dioxide. The effect of incomplete hydration is ultimately the same as with the previously described lime products.

The setting process is complete when the hydrated lime located in the system has been completely carbonised. The duration of the process depends, as previously stated, on different parameters (e.g. temperature and moisture) and cannot be precisely determined in advance. There bright patches become evident particularly on dark façades and in areas subject to higher levels of moisture (e.g. splash water zones). But the moisture subsequently introduced from external sources (e.g. rain) can trigger this effect should free hydrated lime be present in the coating.

In our experience, this efflorescence is generally washed out of the surfaces exposed to weather by precipitation within a period of 2 years.

Rework of the surfaces affected

The following is recommend should the surfaces exhibit typical efflorescence with a hazy appearance:

The surface should be allowed sufficient time (at least 6 months after the efflorescence has occurred) to complete the setting process of the hydrated lime. Rework before the setting process is completed can lead to subsequent efflorescence on the surface.

After drying, the surfaces affected should subsequently be carefully brushed off with a clean, not too hard road broom to mechanically remove the loose calcium carbonate.

We recommend Grundol Tiefengrund primer to solidify the surface and to regulate the suction properties. After subsequent drying (at least 12 hours at 20 °C and 65 % rel. humidity) the surface can be painted with the same paint already applied.

Pigmented finishing renders should be painted with the same shade of Siliconharz-EG-Farbe paint.

Optionally, apply a preliminary coat of Casiol Grund to the façade surface after mechanical cleaning (brushing off) for timely rework of the surface.

Apply undiluted in a crosswise application action. When completely dry, paint with a façade paint that is matched to the system.



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youtube.com/knauf



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