Associated Plastering & Lathing Contractors of San Diego

TECHNICAL BULLETIN #4

EFFLORESCENCE

Efflorescence is naturally occurring condition that manifests itself on porous wall materials such as concrete, masonry and cement plaster (stucco). Efflorescence should not be confused with mold or algae.

Efflorescence appears as a white, crystalline powder on the material's surface. It is actually alkaline salts that are a natural integral component of Portland cement, sand and other aggregates that make up the base materials. The salt compounds can be sodium, calcium, chloride, potassium and other water soluble minerals. Water must be present to dissolve and carry the salts to the surface. Sources of water can be rain, sprinklers spraying water on the wall, improper roof drainage or simply the water used to mix the plaster. Salt-bearing water, upon reaching the surface, evaporates leaving the salt deposits, sometimes called whiskers. These whiskers will continue to grow as long as there is moisture present to carry the salts to the surface or until removed.

Efflorescence can appear and reappear throughout the life of the structure and there is no assurance that removal of the initial deposits will eliminate future efflorescence. It must be emphasized that water will dissolve salts within the cementitious materials and transport them to the surface. Humidity and foggy weather can both be a contributing factor. Design factors such as roof drainage or landscape sprinklers should be considered to eliminate as much exterior water penetration as possible. Care should be taken that landscaping does not cover the weep screed at the base of the plaster. Runoff is also an uncontrollable factor.

Efflorescence is not considered a defect in the system nor is it a phenomenon which is controllable by or the responsibility of the plastering contractor or manufacturer. The contractor can, however assist in the remedy. Walls can be pressure washed with water or a mild solution of vinegar or citric acid. Note, however, that washing adds water back to the surface which was contributing factor in the first place. Stubborn areas can be brushed (do not use a wire brush). After the removal, a fog coat may be applied, if needed, to bring the stucco color to uniformity. Removal of efflorescence is never included in a plastering contractor's or manufacturer's original bid price or guarantee. Therefore the owner should expect to compensate the contractor for such services rendered. Occasionally after re-stuccoing a house, efflorescence may appear in some areas especially along the foundation. This is not the fault of the plastering contractor and sometimes takes weeks or even months to dry out and evaporate.

SOURCES OF EFFLORESCENCE

Salts also leach from the soil and migrate into a building substrate

*The words stucco and plaster are used interchangeably in this document

When the condition appears on stucco it is important to realize that the white crystalline bloom is not the result of faulty stucco or improper application by the plastering contractor, but rather a deposit of mineral salts from a variety of possible sources most probably from soil laden with salt.

There are many sources for water-soluble salts with some salts more soluble than others. The movement of groundwater into building foundations by capillary action, wicking upwards into the stucco walls and foundations are very often the cause of efflorescence. In the case where soil conditions exhibit water soluble sulfates, precautions should be taken to preclude the passage of this sulfate-bearing water to the structure. Low absorption (water control) is the best assurance against efflorescence. Controlling the amount of water is the most important thing a home owner can do to help combat the ground laden salts.

Hydrostatic pressure may also be present under below-grade slabs and behind below grade walls. If no vapor barrier is installed, ground water can move upward by the process of capillary action. This migration of water is also referred to as wicking. Ground water may carry salt crystals leached from the soil. These salt crystals, within the stucco substrate, will then be released into crystal form causing deterioration of your stucco walls.

Evaporation of the salt bearing water usually takes place before reaching the surface when exposed to a drying atmosphere. The hydroxides are converted by reaction with the carbon dioxide of the air to alkali and calcium carbonates. Efflorescence in the form of alkali chlorides and sulfates are formed when the structure is surrounded, exposed, or in contact with salt-bearing soil and appears as white or whisker-like crystals we know as efflorescence.

The alkali sulfates in salt laden soils are dissolved by water then absorbed up into the stucco walls in a liquid state, creating a solution of alkali sulfates (salts) which then moves through the natural pores in the stucco walls. The solution migrates to the surface of the wall where the water evaporates, depositing the salts on the wall and generates the white powder we know as efflorescence.

Some sources of efflorescence or (salt) may be deposited on stucco walls. Practically any building materials in direct contact with the earth are potential sources for water-soluble salts. This fact has been recognized by the various producer of building materials and steps have been taken to reduce their presence to a great degree.

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