General Shale Brick

Technical Bulletin – Efflorescence Information

The following guidelines are intended to help homebuilders and homeowners understand the factors that cause efflorescence on masonry walls. These guidelines also include recommendations for minimizing the potential of efflorescence on a new home.

The Mechanics of Efflorescence

Efflorescence is a crystalline deposit of a water soluble salt on the surface of masonry. Efflorescence may have a powdery appearance and is normally white in color.

Efflorescence is often unsightly and can detract from the appearance of a beautiful masonry home. In order for efflorescence to occur two conditions must be present:

1. There must be a soluble salt in the masonry.
2. There must be a significant source of free water to dissolve the soluble salt and allow the solution to migrate to the surface where it evaporates and crystallizes.

Efflorescing salts can originate from rain water, construction water sources, cleaning chemicals, concrete or concrete masonry back-up materials, cement in the mortar, and mortar additives, as well as in the brick itself. However, there are certain brick coatings that can mask the efflorescence since they are mainly white in nature and resemble the efflorescence in color. Since the efflorescing salts can originate in so many sources it is virtually impossible to build a brick wall without some soluble salts present. The key to controlling efflorescence is to eliminate sources of moisture entry and migration.

All masonry materials are derived from naturally occurring materials which are mined from the earth. Regardless of where you buy your masonry products the potential they may contain efflorescing salts will always exist.

Efflorescence is generally only a cosmetic or aesthetic problem and has no effect on the performance of the masonry from a structural or durability standpoint. However, on older buildings it can also be a warning for more serious problems in the future if sources of water entering the wall are not stopped. If left unchecked, freeze thaw damage and spalling may occur.

"New Construction Bloom"

A common efflorescence phenomenon referred to as "new building bloom" or "new construction bloom" is caused by the presence of elevated amounts of water entering the masonry during construction. This water requires a period of time to dry out during which soluble salts from the various masonry components dissolve, migrate to the surface, dry and crystallize into white residue called efflorescence. This type of efflorescence will normally occur during the winter and spring months when precipitation occurs followed by slow drying conditions. Efflorescence, especially if it is "new building bloom", will normally disappear on its own with the advent of warm rain and good drying conditions of the summer and should not require cleaning. If the efflorescence persists beyond the new building bloom stage, it may be a sign that excessive moisture is still entering the wall. Patience is recommended during this "new building bloom" period, which can last from 1 to 3 years depending on weather conditions. Attempts to clean the efflorescence with water and chemicals will often only aggravate and prolong the problem. If the homeowners wish to clean the efflorescence it should be done by dry brushing followed by light rinsing with a garden hose. The use of a high-pressure washer is not recommended.

Control of Moisture Migration

The first step in the control of efflorescence should be to minimize moisture from entering the masonry.

To minimize the potential for efflorescence you should insist on good masonry workmanship: the use of proper design details and the use of proper cleaning methods and chemicals. Please refer to BIA Technical Note 20 on Cleaning Brick Masonry. You should also ensure masonry materials and open masonry walls are kept covered during construction. Required details such as weep holes, flashing, copings, chimney caps, etc. must be properly installed and any condensation conditions must be eliminated. Please refer to General Shale's ***Recommended Details Essential to Durable Brick Home Construction*** (attached) for more information.

The following is a checklist of some of the more common design details, which are essential in controlling moisture migration efflorescence. The homeowner should inspect his home thoroughly to ensure the following details are included:

- Base flashing and weep holes in masonry walls.
- Properly designed chimney cap, flashing below cap, drip edge, caulk around skirt board.
- Properly sloped window sills and flashing below window sills.
- Drainage tiles, weep holes, and waterproofing behind retaining walls.
- Properly tooled and filled mortar joints.
- Adequate frieze board coverage and caulk (Consider that a wind driven rain can be driven vertically upwards 1" for each 10mph increment in wind speed.)

Additional information regarding efflorescence and efflorescence control can be found in the following references:

1. ASTM C1400 – Standard Guide for Reduction of Efflorescence Potential in New Masonry Walls.
2. ASTM C270 – Standard Specification for Mortar For Unit Masonry – Appendix Section X2. Efflorescence
3. BIA Technical Note 23 – Efflorescence Causes and Mechanisms Part I of II.
4. BIA Technical Note 23A – Efflorescence Causes and Mechanism Part II of II