Efflorescence

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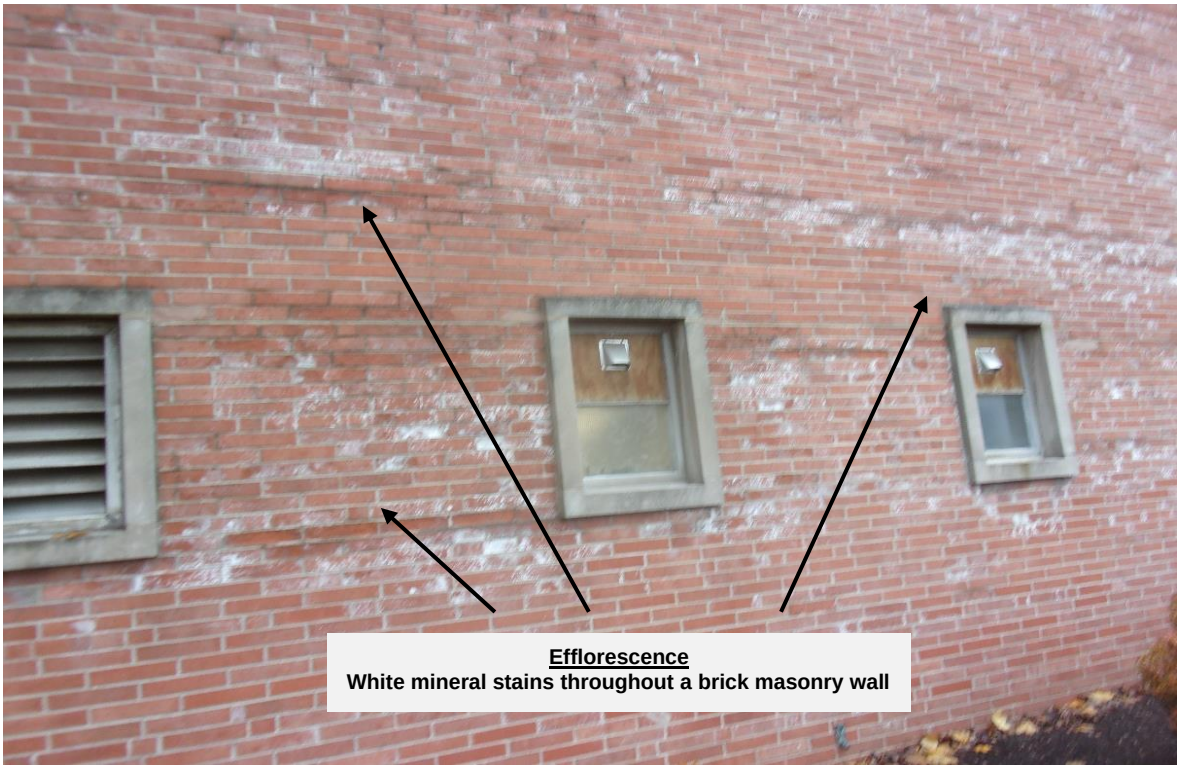
Have you ever been involved with installing a roofing system on a new construction project, or received a call from a building owner that the roofing system you installed many years ago is seriously leaking because there are white stains throughout the lower brick masonry walls? While the building owner may not know what is occurring, the roofer will always get the call that, somehow, the sudden appearance of widespread white stains throughout the lower brick masonry walls must be caused by roof leakage.

Once you have inspected the roofing system to ensure there is nothing wrong with its perimeter edge flashings, it can be very challenging to explain, or even to understand, what is happening other than to say, "The roofing system is not leaking."

What are the white stains, and where did they suddenly come from? The stains are known as Efflorescence, which is a white mineral deposit that may form on a brick wall's interior or exterior surface. The minerals are various soluble salts, e.g., calcium, magnesium, sodium, and potassium, contained in all-natural or engineered masonry products, such as portland cement, clay bricks, and concrete masonry units.



Efflorescence
White mineral stains throughout a brick masonry wall

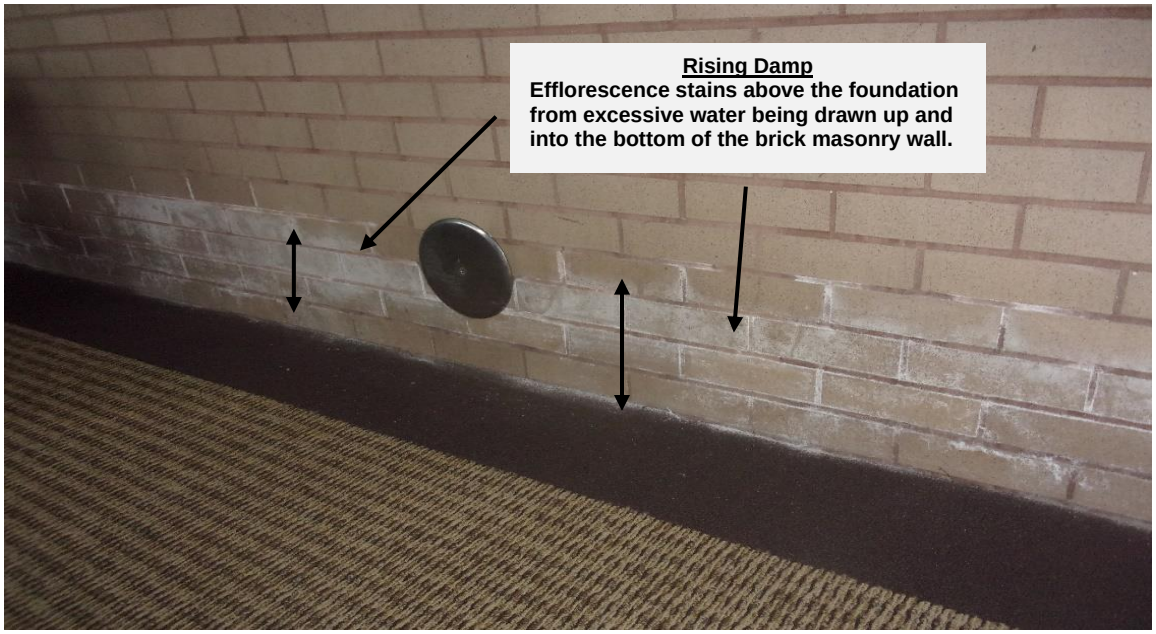
In *new* construction projects, the salts are carried to the surface of brick masonry as internal moisture escapes outward from:
- Excessive mix water is used to create and allow the portland cement mortar to be spread on the bed and head joints of masonry units.
- Water not needed for the cement mortar's permanent curing (chemical hardening).
- Any moisture absorbed into unprotected masonry during construction.

These sources of moisture carry the salts to the surface of the bricks, and once the moisture evaporates, the salts are left behind as white mineral deposits.

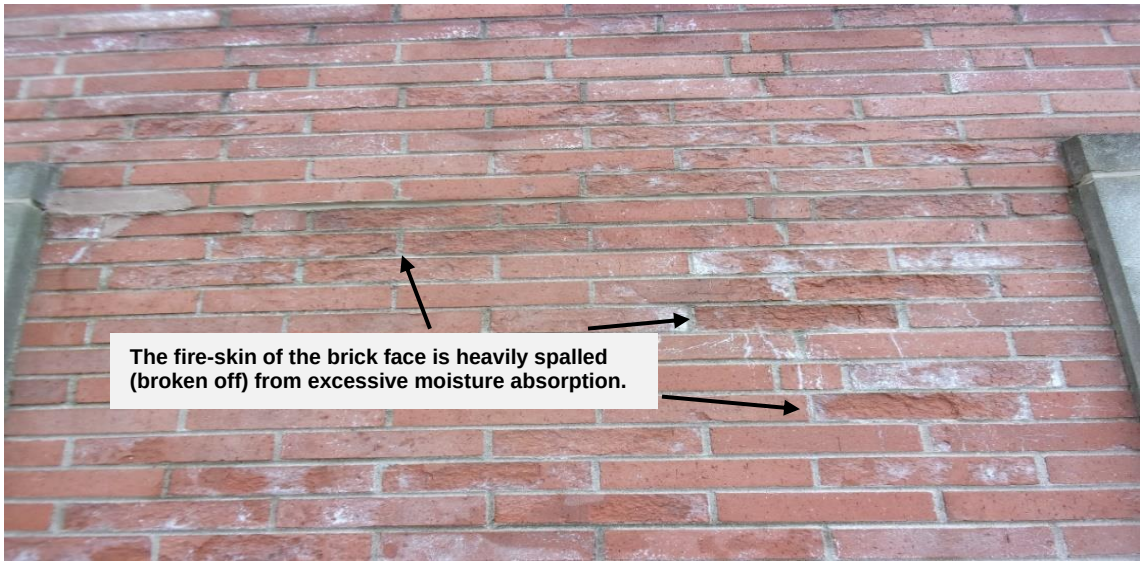
Efflorescence is only a temporary aesthetic problem on newly constructed brick masonry walls. Moreover, any efflorescence formed on the interior or exterior of the wall can be removed with acidic cleaners or naturally weather away – when the internal moisture is no longer present to carry salts to the surface.

On *aged* brick masonry wall constructions, efflorescence indicates that excessive moisture (water) is entering the masonry. It can occur during rainstorms from any of several reasons, including:
- Aging or decay of the mortar joints.
- The brick surface fire skin (hardened face) becomes porous with age.
- Perimeter roof edge flashing or decayed drainage scuppers (outside roof edge drains) are causing leakage into the lower brick wall.
- There is a lack of properly installed wall flashings.

However, excessive moisture within the wall can also occur from
- High interior humidity buildings that create outward moisture vapor drives into the back side of brick walls.
- Rising-damp (moisture) into a brick wall from contact with water-saturated earth (high water table).



Whatever the cause(s), excessive water within an aged brick masonry wall that is causing surface efflorescence can also lead to spalling (breaking apart) of the surface of bricks from either freeze-thaw or an underlying surface condition known as sub-florescence (osmotic pressure), mortar joints decaying and spalling, corrosion of internal steel angle shelves or beams (rust jacking), decay of internal wood framing, peeling of interior or exterior wall paint, mold growth, etc.



So, the appearance of widespread efflorescence on an existing brick wall should not be ignored, and it is generally the first warning sign of a significant amount of destructive moisture in the wall.

Moreover, a roofing contractor should understand and explain to a building owner what the white mineral stains are, the reason for its widespread appearance on a new or aged brick masonry wall, and why it is not a problem with the roofing system.

Source
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