

Efflorescence, Lime Staining and Good Site Practice

Common efflorescence is the visible occurrence of salts on the face of the brickwork. Soluble salts are left on the surface of the brickwork by water which has passed through the face of the brickwork and evaporated. The salts are carried in solution by the water but do not of course evaporate. The most common salts are sulphates of sodium, magnesium and calcium. These salts are common in the environment and are not harmful, however visually unacceptable they are.

Lime staining is completely different but is often confused with efflorescence. Both can occur simultaneously. Lime staining is free lime, generally from mortar, which has been washed from the mortar joints on to the face of the brick.

Both efflorescence and lime staining can be minimised and should not occur providing good site practice. Lime staining can occur with any brick as it generally comes from the mortar. Brick efflorescence comes from salts within the clay which have a higher concentration in some clay types.

Both undesirable occurrences result in unsightly white deposits which need to be dealt with in different ways. Both symptoms can be prevented by protective details in the design such as overhangs, drips, copings and sills that stop copious amounts of water reaching the face of the brickwork.

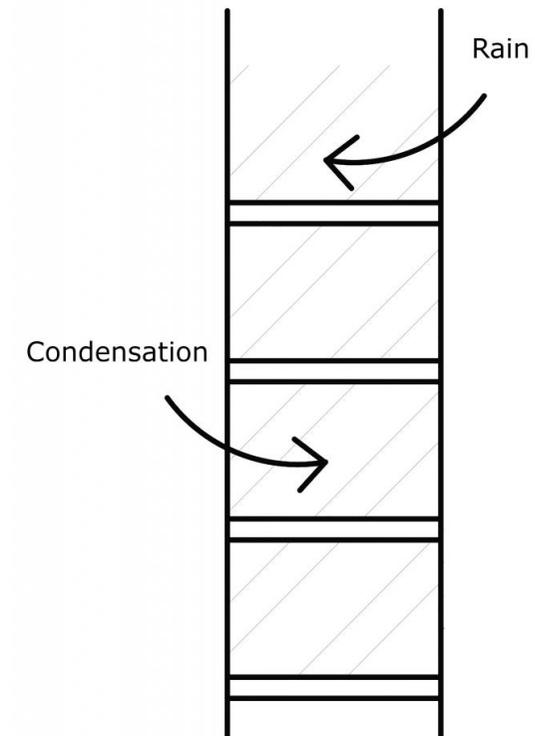
Good Practice

Both efflorescence and lime staining are virtually eliminated with good site practice. If they occur, the remedy for normal efflorescence is brush off and remove. For lime staining it is important to clean off quickly. Both problems are generally eliminated within two seasons as free lime is eliminated by the passage of water and the outer skin of bricks are cleared from the salts close to the surface.

Prevention

Contractors and Contract Administrators should ensure the following steps are taken – this will minimise the rain penetrating the brickwork.

- Bricks should not be placed directly on the ground but should be kept clear by pallets. This avoids contamination and saturation. Protection should extend to bricks stacked out on scaffolding or mastclimbers.
 - Mortar should also be kept protected from damp and contamination. On larger sites in the UK this is in silos which provide more certainty and protection
 - Newly built brickwork is vulnerable while the mortar cures; it should be protected by boards and hessian for at least the first seven days. The brickwork must not only be kept dry and free from rain, but allowed to breathe with the protective shielding applied, so that air can circulate and condensation does not occur.
- The scaffolding boards adjoining the wall must be turned back when work ceases so that rain does not saturate the brickwork by splashing on the boards.
 - Mortar must be kept clear from the inside cavity which could otherwise deflect water into the brickwork. Internal snots and mortar which has not been cleaned is unacceptable and may lead to efflorescence. Mortar droppings on wall ties can also cause water to run on the rear of the brick skin.
 - Weep holes need to be clear of debris which will collect during and after completion. Cavity trays need to be clear of droppings. If droppings have accumulated, bricks may have to be removed locally to gain access to the cavity.



Efflorescence

Good site practice will largely eliminate efflorescence and lime staining. If these conditions occur it is due to detail or supervision issues.

The solutions are different; efflorescence should be allowed to weather away naturally and no spraying is advised. The salts may be brushed away with a bristle brush and taken away from the wall. High pressure washing will make the issue worse as when the bricks dry, more salts are drawn out and redeposited.

- Fired clay may contain soluble salts.
- Brickwork when saturated dissolves salts.
- When the brick dries the moisture moves to the surface.
- The moisture evaporates leaving the salts as efflorescence.



Lime Staining

Lime staining is the deposit of calcium carbonate by reacting to the atmosphere on to the face of the brickwork. Lime staining can be distinguished by the flat top to the staining stemming from the bedjoint, or alternatively fanning out from the cross joint, clearly associated with the horizontal or vertical joints.

Lime is normally removed by proprietary acid brick cleaner. Unlike efflorescence speed is vital and if the calcium carbonate is allowed to solidify back into limestone only specialists will be able to remove it.

- The wall is unprotected and becomes saturated.
- Free lime released by the mortar seeps out of the joints.
- Calcium hydroxide is formed on the surface turning into Calcium Carbonate or Limestone which is impervious to water.



Brick Education notes provided by Simon Hay, Chartered Architect, Building Expertise Ltd.