

# Efflorescence on Masonry Walls

Efflorescence is a crystalline deposit, usually white, that may develop on the surfaces of masonry construction. Often it appears just after the structure is completed – when builder, architect, and owner are most concerned with the appearance of the new structure. Although unattractive, efflorescence is often – though not always – harmless.



## Causes

A combination of three common circumstances causes efflorescence:

- soluble compounds in the masonry
- moisture to pick up the compounds and carry them to the surface
- evaporation or hydrostatic pressure that causes the solution to move

If any one of these conditions is eliminated, efflorescence will not occur.

All masonry and concrete materials are susceptible to efflorescence. The amount and character of the deposits vary according to the nature of the soluble materials and the atmospheric conditions.

Efflorescence is particularly affected by temperature, humidity, and wind. Usually it is more common in the winter when a slower rate of evaporation allows migration of salts to the surface. Efflorescence decreases in severity over time unless there is recurrent moisture movement through the wall.

One source of soluble compounds is the chemical reaction between the lime/cement and water, inherent in any masonry construction. Another is the soil in contact with basement and retaining walls. Other sources of efflorescence may be seawater exposure or previous attempts at cleaning that did not remove contaminants from the surface.

## Prevention

Since so many factors influence its formation, it is difficult to predict if and when efflorescence will appear. There is no accepted standard test to determine the potential of a masonry construction. Most efflorescence is temporary and harmless, often termed “new building bloom,” indicating its link to the exposure and excess moisture that accompany all new masonry constructions. Persistent deposits, however, indicate a chronic moisture problem, which should be corrected prior to any attempts at removal of the efflorescence.

### Recommendations to avoid recurring efflorescence:

- Proper drainage – waterstops, flashing, weepholes and copings per design details
- Good mortar joints – tool with a V- or concave jointer. Weeping, rakes, and untooled struck joints are not recommended in exposed conditions. Repoint deteriorated joints to keep moisture out of the wall
- Ensure proper curing of cementitious materials
- Limit water entry – apply paint, caulk openings, use through-wall flashing at ground level, install vapor barriers on interior surfaces
- Provide adequate venting of wall cavities to equalize pressure and limit moisture driving forces.

### For new construction:

- Keep masonry units dry – cover and store on pallets in well-drained locations
- Cover the top course of masonry at the end of each day
- Use clean mixing water free of acids, alkalis, minerals, organic material, and salts
- Avoid masonry units known to effloresce while stockpiled
- Use low-alkali mortar materials

## Removal

It is not advisable to immediately wash off efflorescence with water or a masonry cleaning solution, since this may only serve to introduce more moisture into the wall. Given time, “new building bloom” will often disappear by itself or at most require mild measures such as dry brushing. If that fails to produce satisfactory results, it may also be necessary to wash the surface with a proprietary masonry cleaner or a 1-10% diluted solution of muriatic acid. First verify the compatibility of any cleaning agent with the masonry unit manufacturer. For colored concrete and mortars, use a 1-2% acid solution or a proprietary cleaner recommended for that particular application. Care should be taken to assure the masonry will not be etched by the cleaner or the technique.

It is often helpful to determine the chemical makeup of the efflorescence so that a cleaning solution can be found that readily dissolves the deposits without adversely affecting the masonry. Alkali sulfates, calcium sulfates, and non-adherent calcium carbonates can be cleaned off with a stiff brush, and brief water washing if necessary. Calcium carbonate, if adherent, will likely require an acid solution or proprietary cleaner for removal.

information from the Portland Cement Association [www.portcement.org](http://www.portcement.org)



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