

## WASHING OF MASONRY WALLS

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The installation of brick, block, or stone can often leave undesirable mortar spills, smudges, stains, and/or efflorescence on the surface of newly-installed walls. This frequently raises the question of when and how to clean masonry walls following completion of a project, as well as how to prevent issues from happening in the first place.

### Prevention: Choosing Appropriate Mortar

Although cleaning can affect all mortars, the result of improper cleaning is most apparent on colored mortar joints since the pigmented cement paste is needed to create the desired color. When choosing a mortar color, the National Concrete Masonry Association suggests choosing a color close to that of the masonry unit whenever possible in order to simplify the process of cleaning the wall.

When smooth or burnished masonry units are used, choosing a mortar color as close to the unit color as possible is even more critical as these types of CMUs can be difficult to clean without altering the appearance.

Walls with contrasting mortar and masonry unit colors may require more aggressive cleaning to remove visible mortar. The cleaning agent and procedure should be carefully planned, based on the type of contaminant and desired results. The cleaning method chosen should be the least aggressive that will effectively clean the wall.

### Prevention: Building & Washing a Sample Panel

Preparing a good sample panel prior to building your wall is highly recommended, and often required on larger projects. Not only is a sample panel an excellent indicator of what the wall and colors will look like when installed, but can also catch any potential issues you may have throughout the installation process.

To ensure consistency throughout the project, the same construction detailing practices used on the actual wall should be used on the sample panel several weeks before construction of the actual wall. It is recommended to first clean the sample panel using the same cleaning products and techniques planned for use on the actual wall. This will give an accurate resemblance of what the final product will look like. **Be sure to construct and clean the sample panel before starting the construction of the actual wall.** Wait until the mortar joints are cured so the cleaning procedure doesn't damage them. After cleaning, the sample panel should be viewed in indirect or diffused light from a distance of 20 ft. (6 m) to evaluate the results.

If you do not plan to clean the actual wall, it is recommended to keep the sample panel intact throughout the installation process in case cleaning becomes necessary due to unforeseen circumstances. At that point, you can clean the sample panel prior to attempting cleaning of the actual wall.

### Prevention: Proper Construction Techniques

Many issues with stained walls can be prevented simply by using proper precautionary steps during construction.

Locate potential water sources including drains, ledges, rooflines, and downspouts which could allow water to come into contact with the masonry wall. Consider areas where water will splash onto walls in addition to areas of direct contact. Address these problem areas by redirecting water or by planning on treating the finished wall with an appropriate silane or siloxane sealer once the mortar has full cured (14-28 days).

During construction, masons should mix and use mortar at the proper consistency. If mortar is too wet, it will tend to smear on to the masonry units. Before tooling, brushing, or retooling, make sure mortar is thumbprint hard. If mortar is too soft when tooled, it will smear on the wall and require more cleaning. As you finish each section, review the area and clean or scrape any mortar excess, smears, or drips.

Brick, architectural CMU, or tile walls should be covered at the end of each work day to prevent excessive moisture from entering the cavity of the unit. Eventually, that moisture may leach out towards the exterior, drawing soluble salts to the face of the brick and causing efflorescence.



### How Cleaning Can Affect Masonry

**Mortar Joints:** The Portland Cement Association has given the subject of cleaning of masonry walls repeated attention, stating that cleaning or washing procedures can alter the appearance of a mortar joint by changing the texture and color. Some cleaning techniques and solutions can dissolve the cement paste from the surface of the mortar joint which would cause the colored appearance to no longer be visible in the hardened cement paste. The appearance reflects sand particles, which would be exposed on the surface of the mortar joint following cleaning. Improper cleaning of mortar joints can also affect the walls ability to resist water penetration by damaging the cement paste and potentially causing other more issues down the line.

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**CMU's:** Cleaning methods may alter the appearance of the finished masonry, typically by removing some cement paste from the surface of the units. When this happens, more aggregate is exposed to view, which can alter the color. In general, the more aggressive the cleaning method, the more paste is removed and the greater the potential for altering the wall's appearance. For example, acid washing can be expected to alter the appearance to a greater degree than cleaning by hand with a masonry detergent and water.

**Brick & Stone:** Consider the type of brick or stone requiring cleaning. Concrete or solid-color clay brick will stand up to harsher cleaning methods than brick or stone with only a colored façade will. Some cleaners will not only remove the stain, but take some of the paint off, as well, affecting the original or intended look of the brick.

Note also the same cleaning method may have different results based on the specific procedures used. Acid washing with pressure equipment will produce different results depending on temperature, mix ratio, spray pressure, and spray distance. Again, the mildest cleaning method that will satisfy should be chosen.

### Cleaning Principals & Practices

Before cleaning the masonry wall, it is essential to plan, prepare, and apply proper cleaning practices in order to avoid damaging the masonry wall. The Brick Industry Association has highlighted the key principals of the cleaning process. They state that cleaning methods and materials will vary depending on the type of brick, mortar, application, and reason for cleaning. For example, cleaning efflorescence from newly constructed brickwork of an entire building requires a different approach than removing graffiti from an isolated portion of an existing wall.

- Identify the cause of the stain or discoloration and select appropriate cleaning materials and methods that will produce desired results. Always choose the least aggressive cleaning procedure that will be effective.
- Consider the substrate type including mortar, block, or brick. Keep in mind that some brick have a painted facade which could easily be altered by too harsh of a cleaner.
- Locate and repair any leaks or other sources of moisture contributing to staining.
- Account for any special considerations, such as coatings or finishes, water repellents, mortar type, mortar color, or historic significance.
- Ensure that mortar joints are fully cured (14-28 days) before attempting to clean.
- Clean a sample test area or panel, carefully following brick manufacturer's directions, and allow to dry before evaluating and applying to larger areas.

### Cleaning Methods

There are four general cleaning methods for cleaning masonry:

**Hand Cleaning:** Cleaning by hand includes using a simple tool like a trowel, chisel, or brush and does not involve the use of water. This method is general used during construction to clean up excess mortar which has achieved initial set. Steel-wire brushes or other brushes which can leave metal particles behind to rust or stain are not recommended.

**Water Cleaning:** Water cleaning includes scrubbing with water alone or soaking, water with mild detergents, steam cleaning, or pressure washing. No matter which method is chosen, use the least amount of water necessary to effectively clean the area. Excess water which enters the wall could promote efflorescence. Walls should be brushed free of clay, dirt, or debris prior to water cleaning.

### Chemical Cleaning:

A variety of chemical solutions are available for cleaning including ProSpec Restoration Cleaner and Akona Concrete & Masonry Cleaner. These types of chemical agents will provide a more aggressive cleaning method than hand or water cleaning. Chemical cleaning is generally the most cost-effective type of cleaning. Proper care must be taken while applying a chemical cleaner including the wearing of protective clothing/eyewear/

gloves, applying in a properly ventilated area, and strictly following the manufacturers instructions.

**Abrasive Cleaning:** The intention of abrasive cleaning is not to wash away surface contaminant(s), but to actually remove the outer portion of the masonry where the stain exists. Abrasive cleaning is the most aggressive cleaning method and is not intended for use on burnished block, most brick, or any other substrate with a smooth surface, but will work on rough surfaces such as split face block. Abrasive cleaning is a dry process which can include grinding, sanding, and blasting. Protective clothing and equipment including gloves, eye protection, and an approved respirator with hood.



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### **Common Pitfalls to Avoid**

Since cleaning is often the last operation performed on a newly constructed masonry wall, appropriate attention during construction and post construction planning are commonly overlooked. Common pitfalls to avoid during cleaning are:

- **Using the wrong cleaning procedure for the specific materials being cleaned:** Additional recommended cleaning procedures can often be found at the local or national associations. If using a cleaning solution, follow the manufacturer's directions.
- **Incorrect execution:** If you are unclear of the correct cleaning practice, hire a reputable masonry cleaning company that will clean the masonry wall the correct way.
- **Cleaning too much:** Minor smears and efflorescence related to masonry construction will most likely weather away as time goes on. Damage from over cleaning or improper cleaning can be irreversible.
- **Cleaning too soon:** Give mortar joints time to fully cure before attempting to clean will lessen the possibility that the mortar joints might be etched or that color might be removed from the joints.
- **Not using enough water during cleaning:** Be sure to use plenty of water. The walls to be cleaned should be saturated with clean water prior to placing any cleaning solution on them. If the walls are not wet, the solution may dissolve the mortar stains and deposit them within the pores of the masonry units, making them very difficult or impossible to remove. After the wall is cleaned, it needs to be thoroughly rinsed. If the wall is not properly rinsed, it may leave unpleasant streaking.
- **Not maintaining consistency:** Whichever cleaning method is chosen, it is important that all of the masonry be cleaned in the exact same manner (including dilution rate, brushing/scraping method, dwell time, reapplication, rinse procedure, etc.) to maintain a uniform appearance. Similarly, care should be taken to avoid overlap of areas being cleaned, as this may lead also to a non-uniform appearance.

### **References**

1. *Cleaning Concrete Masonry*, TEK 8-4A. National Concrete Masonry Association, 2005
2. *Trowel Tips: Cleaning Masonry*, [www.cement.org](http://www.cement.org), Portland Cement Association, 2016
3. *Cleaning New Brick*, [troweltrades.com](http://troweltrades.com), 2016