

Brick Category	Cleaning Method	Remarks
Red and red flashed	<ul style="list-style-type: none"> • Bucket and brush hand cleaning • High-pressure water • Sandblasting 	<ul style="list-style-type: none"> • Hydrochloric (muriatic) acid solutions, proprietary compounds, and emulsifying agents may be used. • <i>Smooth texture:</i> Mortar stains and smears are generally easier to remove; less surface area exposed; easier to presoak and rinse; unbroken surface, thus more likely to display poor rinsing; acid staining, poor removal of mortar smears. • <i>Rough texture:</i> Mortar and dirt tend to penetrate deep into textures; additional area for water and acid absorption; essential to use pressurized water during rinsing.
Red, heavy sand finish	<ul style="list-style-type: none"> • Bucket and brush hand cleaning • High-pressure water 	<ul style="list-style-type: none"> • Clean with plain water and scrub brush, or <i>lightly</i> applied high-pressure and plain water. Excessive mortar stains may require use of cleaning solution. <i>Sandblasting is not recommended.</i>
Light-colored units (white, tan, buff), gray, pink, specks, brown and black	<ul style="list-style-type: none"> • Bucket and brush hand cleaning • High-pressure water • Sandblasting 	<ul style="list-style-type: none"> • <i>Do not use hydrochloric (muriatic) acid!!!</i> Clean with plain water, detergents, emulsifying agents, or suitable proprietary compounds. Manganese colored brick units tend to react to muriatic acid solutions and stain. Light-colored brick are more susceptible than darker units to "acid burn" and stains.
Same as light-colored units, etc., plus sand finish	<ul style="list-style-type: none"> • Bucket and brush hand cleaning • High-pressure water 	<ul style="list-style-type: none"> • Lightly apply either method. (See remarks for light-colored units, etc.) <i>Sandblasting is not recommended.</i>
Glazed brick	<ul style="list-style-type: none"> • Bucket and brush hand cleaning 	<ul style="list-style-type: none"> • Wipe glazed surface with soft cloth within a few minutes of laying units. Use soft sponge or brush plus ample water supply for final washing. Use detergents where necessary and acid solutions only for <i>very difficult</i> mortar stain. Do not use acid on salt glazed or metallic glazed brick. Do not use abrasive powders.
Colored mortars	<ul style="list-style-type: none"> • Method is usually controlled by the brick 	<ul style="list-style-type: none"> • Many manufacturers of colored mortars do not recommend chemical cleaning solutions. Most acids tend to bleach colored mortars. Mild detergent solutions are generally recommended.

Figure 16-1 Cleaning guide for new brick masonry. (From BIA Technical Note 20 Rev.)

16.1.3 Cleaning Fresh Mortar Smears

Although hydrochloric acid solutions are highly effective in removing mortar stains, they are not recommended for concrete masonry. Acid solutions remove the stain by dissolving the cement, but they also dissolve the cement matrix in the unit and etch the surface, leaving it porous and highly absorptive. As the cement is dissolved, more aggregate is exposed, changing both the color and the texture of the block.

Dry rubbing is usually sufficient for removing mortar stains from concrete masonry. To prevent smearing, mortar droppings and splatters should be almost dry before being removed. Large droppings can be pried off with a trowel point, putty knife, or chisel. The block surface can then be rubbed with another small piece of block, and finally with a stiff fiber-bristle or stainless steel brush.

On brick and other clay masonry units, the mortar must be thoroughly set before it can be properly removed. Trying to clean uncured mortar from the surface presses the cement paste into the unit pores, making it harder to

clean. Wooden paddles or nonmetallic scrapers should be used to remove large mortar droppings. For small splatters, stains, or the residue from larger pieces, a medium-soft fiber-bristle brush is usually sufficient.

Mortar that cures too long is harder and more expensive to remove than fresh splatters, and may require acid cleaning. Mild acid solutions easily dissolve thin layers of mortar. Large splatters should be scraped off first and, if necessary, the residue removed with acid. Hydrochloric acid (commonly known as muriatic acid) is suitable for cleaning clay masonry if it is diluted to a 5 or 10% solution (1 part acid to 20 parts water or 1 part acid to 9 parts water).

Mud, dirt, and soil can usually be washed away with a mild detergent solution consisting of $\frac{1}{2}$ cup dry measure of trisodium phosphate (TSP) and $\frac{1}{2}$ cup dry measure of laundry detergent to 1 gal of clean water. Dried mud may require the use of pressurized water or a proprietary "restoration" type cleaner containing hydrofluoric acid and phosphoric acid. Hydrofluoric acid, however, etches polished surfaces such as glass, marble, and granite, so adjacent materials must be protected from accidental contact. Hydrofluoric acid is not suitable for cleaning mortar stains and splatters because it cannot dissolve portland cement products.

All cleaning solutions, even detergent, should be tested for adverse effects on a small, inconspicuous area of the wall. Some detergents contain soluble salts that can contribute to efflorescence. Muriatic acid can leave a white scum on the wall if the residue of dissolved cement is not thoroughly rinsed after a brief dwell time and light scrubbing. White scum can be removed only with special proprietary compounds, or it may have to simply wear off. Detergent and acid solutions usually are applied by bucket and brush, but large jobs may require low-pressure spray application. The masonry should be thoroughly saturated from the top down before cleaning to prevent absorption of the acid or the dissolved mortar particles. Failure to adequately prewet a wall, or using an acid solution that is too strong will cause acid burn—a chemical reaction that changes the color of the masonry. Nonmetallic buckets, brushes, and tools must always be used with acid cleaners because the metals react with acid, leaving marks on the wall that can oxidize and leave stains. Muriatic acid can also "bleach" colored mortars.

16.2 EFFLORESCENCE AND STAINS ON UNIT MASONRY

White, brown, and green stains can appear on unit masonry surfaces because of excessive moisture in the wall, or improper cleaning methods. Stains can also be caused by other materials such as paint or welding splatter. Each type of stain has an appropriate cleaning method.

16.2.1 Efflorescence and Calcium Carbonate Stains

Efflorescence and calcium carbonate stains are the two most common forms of surface stains on masonry. Both are white and both are activated by excessive moisture in the wall, but beyond that, there are no similarities. Efflorescence is a powdery salt residue, while calcium carbonate stains are hard, sometimes shiny, and much more difficult to remove.

Efflorescence occurs when soluble salts in the units or mortar are taken into solution by water entering through joint separation cracks, faulty copings, leaky window flashing, or other construction defects. As the wall begins to dry, the salt solution migrates toward the surface through capillary pores. When the water evaporates, the salts are deposited on the face of the wall (see *Fig. 16-2*).