CONCRETE PRODUCTS GROUP
INNOVATIVE CONCRETE MASONRY SYSTEMS

DESIGN NOTE

Best Practices for Successfully Cleaning Architectural Concrete Masonry Walls

Cleaning concrete masonry walls is a key step to achieving a beautiful end result. Care must be taken however to assure that the cleaning method itself does not damage the wall.

More than any other task performed by a mason contractor, cleaning is a "means and methods" function. Building codes and contract documents spell out performance requirements, however in most instances it should be left to the mason contractor to determine the process to follow to achieve the requirements.

Masonry producers, chemical manufacturers and equipment companies can all provide valuable suggestions. However. there are many variables and only the mason is in a position to evaluate conditions and make adjustments. **Only one step should never be varied: test your means and methods before you start**. The consequences of not testing first can cost a mason contractor a tremendous amount of money if the wall is damaged.

Listed below are some considerations to combine with your experience that we hope will help you successfully clean concrete masonry walls.

QUICK POINTS

- Clean off droppings and stains as the wall is built to minimize post--construction cleaning.
- Protect masonry materials from water intrusion and mud stains during construction.
- Clean the walls promptly for easiest and best results.
- Use the gentlest available cleaning method.
- Always demonstrate and gain acceptance for cleaning methods on the sample panel first.
- If cleaning is done later than ideally it should be, test first and explore alternatives to aggressive cleaning with acid based cleaners.

Code Requirements

When we reference Code in this document, we are referring to **TMS 402/602 "Building Code Requirements and Specifications for Masonry Structures."** It is very telling that the Specification Language in TMS 602 does not suggest the use of any particular cleaning method, but instead is direct and results-based:

Clean the exposed masonry surfaces of stains, efflorescence, mortar, grout dropping and debris using methods that do not damage the masonry.

Specifiers should follow this example, because experience teaches us that strictly defining a cleaning method in the specification typically will not be able to address the multitude of variables that occur in the field (e.g., the type of architectural concrete masonry, the condition of the masonry walls, timing of the cleaning, weather conditions, etc.)

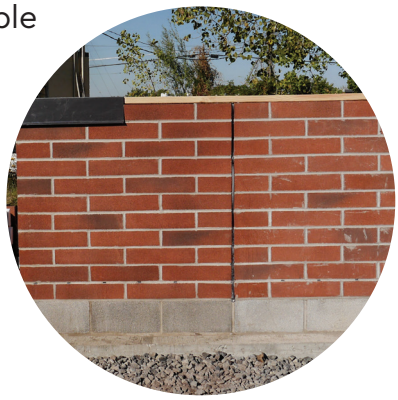
The sample panel, which serves as the basis for acceptance of the masonry work, is the best place to test the cleaning means and methods prior to using them on the masonry walls. A sample panel is required by Code, and as the commentary to TMS 602 states:

. . .Each procedure, including cleaning and application of coatings and sealants, should be demonstrated on the sample panel. The effect of these materials and procedures on the masonry can then be determined before large areas are treated. . .

The Jobsite Sample Panel

The question of whether a wall has been adequately cleaned can become tricky if there is no agreed standard of reference for what that means. This is where the sample panel comes into play. TMS 602 "Specifications for Masonry Structures" states: "The acceptable standard for the work is established by the accepted panel."

One of the functions of a sample panel is setting the standard for the aesthetics for the finished walls. The sample panel establishes the acceptable standard of quality for the project and defines what clean means. Therefore if the walls of the project will have insignificant stains when you are done, the sample panel should reflect the finished wall and also have insignificant stains. This can be addressed with the project team during a pre-construction meeting before the sample panel is built. A key goal of the pre-construction meeting where the sample panel is accepted is to establish a standard for acceptance of cleaning results.



Why is it so important to test first?

Unfortunately, even successful results on past projects using a specific cleaning product and method do not mean that success can be repeated unless the variables influencing cleaning are the exactly the same. Many variables influence whether a particular method will work on a given project. Concrete masonry units and mortar joints react differently to various cleaning methods. Weather conditions, including hot or cold weather, humidity and wind can all influence cleaning results. The texture, color, shape and surface strength of the masonry you are attempting to clean all contribute to the sensitivity of the surface to damage from the cleaning process.

The cost of testing the cleaning means and methods first is a fraction of the time and money it will take to wash the walls a second time if the first attempt wasn't successful. Or worse, your cleaning method was too aggressive and the wall was damaged. There are too many variables to take this risk and not test first. If you want to test your methods early, most masonry manufacturers will provide units free for you to test your cleaning process even before the sample panel is built. Starting early facilitates evaluating a variety of products for both labor and cleaning efficiency.

Even after the sample panel results have been accepted it is wise to consider whether the actual walls are in similar condition. Sample panels are typically cleaned before the stains have fully cured or hardened. If the stains on the actual walls have cured a longer period than those demonstrated on the sample panel, a new test section on the wall should be demonstrated and approved before attempting to clean the entire wall.

Minimizing the Risk of Cleaning Damage

Experience teaches that there are some approaches and situations that are more likely to result in cleaning related damage:

Use of Unregulated High Pressure Water: Use of high pressure water from pressure washers in an unregulated fashion can result in uneven results, excess water penetration (and resulting efflorescence formation), "wand" marks, and loss of cement paste from the masonry and mortar. Particularly where the wall is already covered with an acid based cleaning solution, pressure should be kept as low as practical, and care should be taken especially not to scour the wall or blast it from close range with high pressure.

Cleaning Wall Sections that are too large: Limiting the size of the area that is cleaned as a section will result in more even results and better control over dwell times and rinse off. In the picture at left, the area is kept narrow enough that control can be maintained.

Not having adequate control over dilution rate or timing of cleaner application (dwell times): There is no method if the dilution rate is not controlled. A set amount of time should be tracked for each stage in the cleaning process, and particularly for the amount of time the cleaner dwells on the surface of the wall. Keep tabs on timing when the method is tested and follow that timing throughout the work. Use a timer to assure repeatable results.

Basing evaluations on walls that are still wet: To be able to properly evaluate cleaning results, the walls must be allowed to dry adequately.

Cleaning walls during adverse weather conditions: Cleaning products will act differently in hot or cold conditions and drying times are influenced by wind conditions. Application of an acid based cleaner on a hot windy day requires reducing the area cleaned per section to allow proper removal of the cleaner. This can be a cause of staining if not addressed.

Waiting too long to clean: The longer mortar stains are allowed to stay on the concrete masonry, the more bonded they become, and the risk of damage increases as more aggressive means are needed to remove them.

Unprotected Walls (excessive efflorescence formation): One of the primary causes of excessive staining is allowing the masonry walls to be soaked by rain during or after masonry construction. Avoiding this problem by taking steps to protect the walls by covering the top simplifies the task of cleaning and reduces the need for aggressive cleaning methods.

How to Handle Difficult Cleaning Situations

Following the standard sample panel process and cleaning the walls promptly after construction is the best way to assure good results. But what if something goes wrong on the job? For example, what if mortar or grout stains are allowed to fully harden on the wall contrary to specified cleaning requirements? When significant mortar, grout and stains are left on the wall, and allowed to fully harden before cleaning, the mason must often resort to aggressive chemicals to clean the wall. This can lead to problems.

Unless applied by experts, aggressive chemical cleaners can damage and change the appearance of the wall. Aggressive application of cleaners can etch and scar, or change the color or texture of architectural masonry. Acid-based cleaners may actually remove significant amounts of cement paste from the concrete – which may have detrimental effects on both appearance and long-term moisture protection of the wall system.

BEFORE this happens, investigate the use of alternate cleaning materials and methods including baking soda blasting. Such methods can remove difficult mortar and grout stains without damaging the wall.

Conclusion

The cleaning method always should be tested on the sample panel, or if that is not possible on an inconspicuous portion of the wall to avoid damaging the aesthetics of the main wall sections – The last thing you want to do is expose the entire wall to a cleaning method before knowing that it is not damaging.

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Questions?

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