

# Masonry Cleaning Practices Can Erode Window Performance

Industry sees improper use of jobsite cleaning chemicals producing both short- and long-term problems

By Cynthia Fusco

High-performance windows should offer homeowners decades of energy efficiency and other performance benefits. Some problems are emerging, however, in regards to the way these windows are treated immediately after installation. Corrosive masonry cleaning chemicals are often decreasing or destroying window performance before owners have even moved in.

Just as the fenestration industry has collaborated over the past 25 years to create and encourage the use of high-performance windows, today it is embarking on a new effort to educate the construction community about the post-installation care and handling of these energy-efficient windows.

For decades, builders and subcontractors have used a variety of chemicals—including muriatic acid, as well as proprietary solutions—to clean masonry and other materials following construction. Applied in appropriate concentrations and used with caution around all wood and metal housing components, these chemicals have helped to ensure a clean, attractive building façade for generations of homeowners and tenants.

## INCREASING CONCENTRATIONS

But, in recent years, some builders and subcontractors have responded to cost and time pressures by increasing the concentration of muriatic acid in their masonry cleaning solutions, failing to adequately protect windows and doors, or hiring laborers who are untrained in the responsible use of corrosive chemicals. The result increasingly is being seen in new construction across the United States. The high-performance windows that the fenestration industry has worked so diligently to create are being destroyed during the final phase of the construction process.

“Today’s escalated construction schedules often result in fenestration materials not being properly protected during construction,” states Greg Carney, technical director for the Glass Association of North America. “From the moment they arrive on a construction site, windows, doors, and skylights are frequently exposed to harmful chemicals, construction debris, and damage from other

construction trades—with muriatic acid exposure certainly being a critical problem.”

The first sign that an insulating window unit has been exposed to muriatic acid or other corrosive cleaning chemicals is the deterioration of the low-emissivity coatings on the window glass—which can turn black and spread from the perimeter inward, according to Tom Mewbourne, director of customer technical services for AFG Industries. “It can take anywhere from 24 hours to a week to notice this visible change in the coating. The initial reaction from the builder

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or property owner may be that there’s something wrong with the glass, but, in fact, this change means that the entire insulating glass unit has failed and must be replaced.”

Mewbourne points out that the problem of jobsite acid exposure has existed, to some degree, for decades, but that new high-performance low-emissivity coatings may show signs of damage more quickly. This has made window unit damage more quickly apparent to both builders and property owners, making this issue an urgent priority for both the fenestration and residential construction communities.

Leading fenestration manufacturers concur that changes in the glass are only the first sign of trouble, and that, eventually, every part of the window will be destroyed by jobsite exposure to muriatic acid and other corrosive agents. Carl Wagus, technical director of the American Architectural Manufacturers Association, points out that anodized aluminum finishes and paint on the window’s framing materials will show immediate blisters, holes, and other permanent damage shortly after acid exposure. “The manufacturers of framing materials have worked diligently to develop innovative materials which can withstand acid washing—if acids are used at appropriate concentrations, and if the frame is flushed with water immediately afterward,” says

Wagus. “The problem is that a few masonry cleaning contractors, whether because of ignorance or time pressures, may unknowingly be taking shortcuts which are ultimately very destructive for the entire window unit.”

PPG Industries has been issuing warnings to customers about acid exposure for more than 20 years, reports Albert F. Lutz, Jr., director of technical services for the glass manu-

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facturer. “What we’ve seen is that acid runoff will initially stream off the outside surface of the glass and framing, creating immediate stains there. Then the cleaning liquid will collect on the windowsill—creating a permanent stain there as well—eventually migrating to the inside of the insulating unit. At that point, the low-emissivity coating on the inside surface of the glass will begin to deteriorate, as will all the unit’s individual components.”

Manufacturers can use product labeling to help draw attention to the need to protect high-performance glass and other materials during construction processes such as masonry cleaning, and some manufacturers have already implemented the use of labels printed with handling instructions. But the ultimate responsibility for the correct handling of windows and doors must rest with the builders and contractors who manage the daily construction process.

#### **RANGE OF OPTIONS FOR BUILDERS**

The good news is that builders and subcontractors today have a wide range of alternatives to protect high-performance windows during masonry cleaning. In commercial buildings, it is often possible to clean masonry before doors and windows are installed, eliminating the dangers of acid exposure altogether. Another obvious solution is simply to use caution in applying cleaning products around windows and doors.

GANA has published a series of guidelines that recommend covering fenestration with plywood or a heavy tarpaulin, as well as flushing windows and doors with clean water afterward to prevent damage, notes Carney. “Contractors are typically aware of the potential for damage to windows and doors, but they do not stress protection. Contractors need to begin projects by stressing the importance of protection to all trades and have a plan for enforcement throughout the construction process.”

To foster education, GANA is working with the International Window Cleaning Association to develop additional resources to stress proper jobsite protection and cleaning of fenestration materials. The goal of this col-

laborative effort is to call attention to the need for increased protection of fenestration materials during construction and to ensure that they are properly cleaned by trained professionals.

The Brick Institute of America (BIA) also has published written guidelines on the protection of doors and windows during masonry cleaning. “Physical protection is key, but there always will be some degree of runoff during cleaning,” says Gregg Borchelt, vice president of research and engineering for the organization. “Damage to windows and doors can be mitigated by ensuring that muriatic acid is being applied in an appropriate concentration, which our guidelines define as 10 percent.” Borchelt

believes that many contractors are increasing the acid concentration, causing damage not only to fenestration, but also to bricks and mortar. BIA also stresses that brickwork should be saturated with water before cleaning chemicals are applied, as well as thoroughly rinsed with water afterward. This practice should help to reduce damage to window and door components.

The organization also recommends that builders discontinue the use of muriatic acid for masonry cleaning altogether. “Muriatic acid is an industrial chemical that is not well-suited for masonry cleaning,” notes Borchelt. “Our organization recommends a proprietary cleaning solution that includes buffering agents to increase the effectiveness of the acid content, while also protecting bricks, mortar, and ancillary materials from corrosion.”

“Proprietary cleaning solutions (applied within recommended concentrations) have a number of significant benefits over muriatic acid,” says Gary Henry of Prosoco, a supplier of one such product. “Unlike muriatic acid—which is an impure by-product of steel making—proprietary products like ours are consistently formulated to address the specific task of masonry cleaning. They also are backed by free technical support in the event that a builder or contractor has questions, or is facing a special cleaning challenge.”

Henry points out that Prosoco and other companies can offer builders yet another way to protect fenestration: they market liquid vinyl coatings that can be painted onto doors and windows prior to masonry cleaning, then simply removed afterward, leaving fenestration in its original state.

#### **CONTRACTOR EDUCATION THE SOLUTION**

William Lingnell, technical consultant for the Insulating Glass Manufacturers Alliance, believes that the North American fenestration and construction industries may have only seen the beginning of the impact of misuse of corrosive chemicals and that the problem has the potential to grow as energy-efficient windows become even more popular.

“There is already a well-established market for energy-efficient glass coatings and other leading-edge window components,” points out Lingnell. “As market demand for these products increases, the misuse of cleaning chemicals has the potential to be a major problem for both the fenestration and construction industries.”

Lingnell and others believe that the key to preventing a widespread problem is collaboration within the fenestration industry, with manufacturers and suppliers of all types partnering to educate construction professionals and their subcontractors.

“I’ve seen many builders change their own cleaning practices—or monitor their subcontractors more closely—after they’ve been educated about this issue,” says Lingnell. “That’s why I’ve been delighted recently to see manufacturers coming together to partner on these kinds of critical educational efforts. It’s that kind of collaboration that will eventually make this issue a thing of the past.” ☐

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