

Common Issues Associated With New Masonry Cleaning

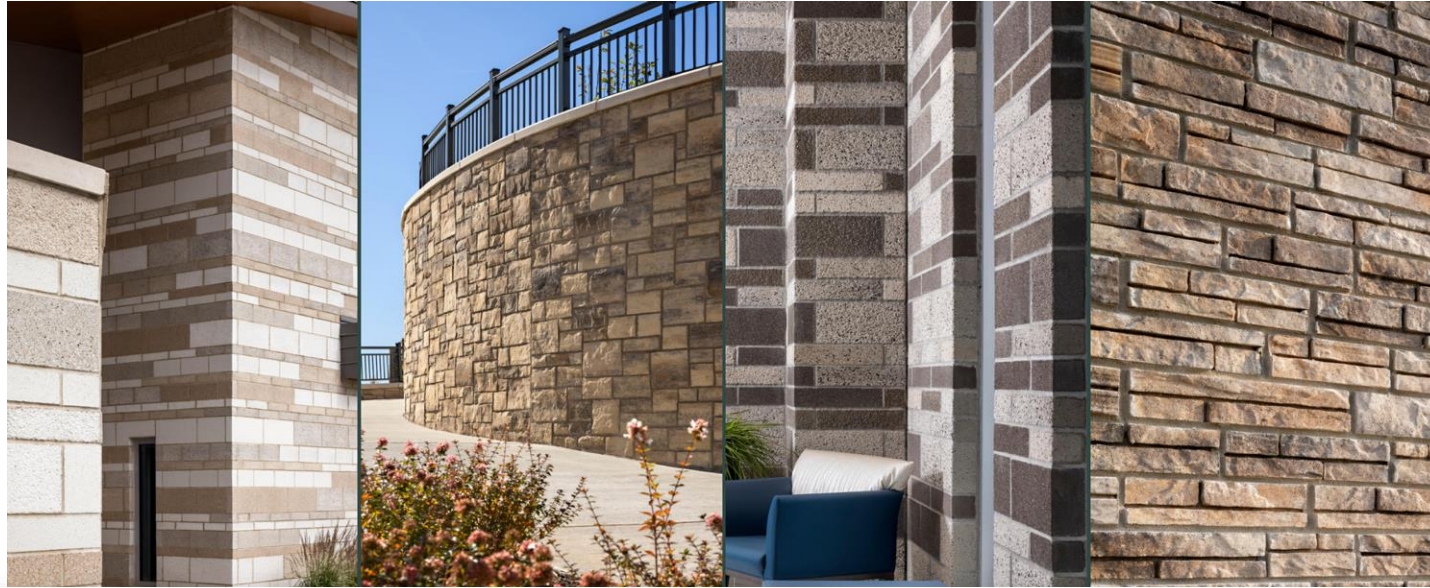
Offered by:

EaCo Chem, Inc.

765 Commerce Ave New Castle, PA 16101
(724-656-1055) www.EACOCHEM.COM

Sponsored by...





OLDCASTLE APG
UNIVERSITY

Common Issues Associated with New Masonry Cleaning Procedures



Chris Bettinger – Oldcastle APG

Architectural Product Specifications - Coastal

- chris.bettinger@oldcastle.com
- Cell: (321) 302-4505



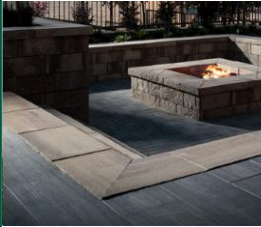









Deborah R. Spik – Eaco Chem

Chemist

- Debbie@eacochem.com
- Cell: (724) 622-2490

Product Lines at-a-Glance

Global Family of Brands Across Five Major Product Lines

Hardscapes	Packaged Products	Masonry	Lawn & Garden	Composite Decking
				
 ANCHOR® EHL WESTILE Polbruk Techniseal PERMACON	 AMERIMIX™	 ECHELON™	 SOIL DOCTOR TIMBERLINE	
Pavers Retaining Walls Patio Products	Dry-Mix Concrete Mortar Sand	Architectural Block Grey Block Veneers	Mulch Soils Decorative Stone	Composite Decking Railing OEM Products



Upcoming 2022 APG U Courses

- 7/14 *PCA Roadmap(1LU/HSW)*
- 8/11 *A New Design Solution to Reduce the Cost and Time of Bridge Construction: GRS-IBS (1LU/HSW)*
- 9/8 *Masonry Best Practices – Clay Brick*

<https://www.echelonmasonry.com/oldcastle-apg-university-online>

Common Issues Associated With New Masonry Cleaning

Offered by:

EaCo Chem, Inc.

765 Commerce Ave New Castle, PA 16101
(724-656-1055) www.EACOCHEM.COM




- ▶
- ▶ **EaCo Chem** is a Registered Provider with The American Institute of Architects Continuing Education System (AIA/CES). Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members will be made available upon request.
- ▶ This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.


We are proud members of :



The Lasting Result on Masonry Projects is what matters!

- ▶ The last step to any successful masonry project should be to “clean” the project using the predetermined means and methods that have been approved on the Sample Panel during the Pre-Construction phase of the project.
 - ▶ How to best achieve this “Clean” is the subject of this program.
 - ▶ The many components that are required for a successful end result include construction and approval of a Pre-Construction Sample Panel. Using “Best Practice” rules. Wall Access, Identification of Substrate, identifying project specific issues such as adjacent substrates, mixed substrates, types of mortar, etc.
- 

Goal of New Masonry Cleaning

1. Remove mortar smears and general dirt from construction projects effectively without damage or harm to the substrate.
 2. Use and Understand industry leading products and process' that are safe and effective in a wide range of situations leaving the Cleaner confident and worry free when applying proprietary products used as directed.
 3. Use products that have been recommended by the manufacturer of the substrate.
- 


Building Code Requirements Specific to “Clean”

- ▶ TMS 602 “Building Code Requirements and Specifications for Masonry Structures” states:
 - “Clean exposed masonry surfaces of stains, efflorescence, mortar and grout droppings and debris using methods that do not damage the masonry.”
- ▶ TMS 602 “Specifications for Masonry Structures” states:
 - “The acceptable standard for the work is established by the accepted sample panel.”


Sample Panel

- ▶ Always build the sample panel as soon as the project starts so that the cleaning tests can be completed well before the actual job is completed.
- ▶ Most manufacturers recommend waiting five to seven days before applying the cleaning solution to the surface.

The sample panel allows the following concerns to be addressed:

- Does the cleaner react with minerals in the brick and cause an adverse reaction to occur?
 - Does the cleaner cause the joints to etch or bleach the mortar or both?
 - Determine the proper dilutions and pressure needed to successfully remove the mortar smears.
- 

Recommendations for Cleaning Using Regular Methods

1. Decide when to clean.
 - Mortar must harden prior to clean. Best 4–7 days after brick work is completed. Waiting 1 month or more should be avoided.
 2. Remove larger clumps of mortar using wooden paddles or non-metallic tools.
 3. Select proper cleaning solution. Be careful to select cleaning products suitable for the brick, mortar and adjacent materials.
 4. Protect adjacent materials and nearby plants. Don't create a dead zone around the building.
 5. Prewet area to be cleaned. Flush with water from the top down. Keep area below wet until final rinse to prevent streaking and absorption of run off. Do not allow product to dry on the surface.
- 

Cleaning masonry is an essential piece of the construction process. Many contractors or masons will subcontract this type of work, but this can be a fatal mistake if the wrong person is hired and the wrong product or process is used. The final clean down of your building can result in an exceptional appearance or can end up in litigation.



Masonry Practices



Common Pre-Cleaning Issues include non-color matched mortar on block (left) and laying it clean (below). The block below left is a poor example of laying it clean, while the block to the below right is a good example of laying it clean.





Tool mortar joints when they are thumbprint hard for best results. Mortar is thumbprint hard when the image of your thumbprint can be left in the mortar.



Example of Mortar tooled too early. Don't tool mortar early when it is too wet.

Masonry Practices

Adjacent Surfaces, such as glass can easily be cleaned using some proprietary cleaners. Some cleaners require windows to be covered. The mortar on the window to the left was easily removed using a certain cleaner while the brick surrounding the window below left was cleaned without damaging the already installed windows. Below right is an example of what an acid based product can do to titanium dioxide fused glass.



Masonry Practices



Adjacent Surfaces like stainless steel hardware (above left) should always be covered. Flashing (below left) can sometimes be damaged prior to cleaning and should be noted to prevent unwanted issues for the cleaner. Other issues to note (below right) are the placement of weep holes above sills. The damage to this sill had nothing to do with the cleaning.



Application/Rinse Equipment

Pressure Washers:

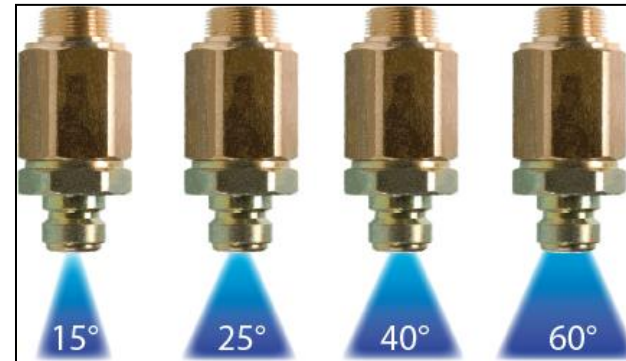
Gas vs. Electric;

Hot vs. Cold;

Direct Drive vs. Belt Drive;

Nozzles;

Orifice Size



Nozzle Spray Patterns

Proper Rinsing

- ▶ One essential component to new masonry cleaning is properly rinsing the chemical and mortar smears once they have been softened. Proper rinsing will determine the finished quality of the job. Generalized rules of rinsing include:
 1. Using a wide tip nozzle, no less than 25 degrees. A 40 degree tip is preferred. *A rotating zero degree nozzle should never be used.*
 2. Any pressure from 500 to 2,000 psi is acceptable in the hands of a trained professional. The type of surface being cleaned will ultimately determine the rinse pressure, i.e. sand faced or color sensitive surfaces will require a low pressure rinse (standard garden hose with nozzle will work, about 50 PSI). Always follow the manufacturer's recommendations when specified.

Proper Rinsing

Craftsmanship determines the appropriate pressures for rinsing. A thorough rinse job is always recommended. Pressures that mark or damage the surface should be avoided. When in doubt, follow the manufacturer's recommended P.S.I. for the substrate you are working on.

Note: Concrete brick, synthetic masonry and surface dyed substrates should be rinsed at low pressures (Ex. Standard garden hose with spray nozzle).

Here you can see an example of poor craftsmanship by a cleaning contractor hired by a masonry company. The person used an improper cleaning agent with a flawed process.



Safety and Required Protection

(Always consult the SDS of the cleaning product prior to start of any cleaning operation.)



Gloves and Goggles are typically required when applying proprietary cleaners.



In some instances, a respirator may also be required. Always make sure adequate ventilation is available.

Safety Data Sheets (SDS) should be used to identify hazardous components of each product used during the cleaning process

Safety Data Sheet

- | | |
|--|--|
| 1. Identification of Preparation and the Supplier | 9. Physical and Chemical Properties |
| 2. Composition | 10. Stability & Reactivity |
| 3. Hazards Identification | 11. Toxicological Information |
| 4. First Aid Measures | 12. Ecological Information |
| 5. Fire Fighting Measures | 13. Disposal Considerations |
| 6. Accidental Release Measures | 14. Transport Information |
| 7. Handling & Storage | 15. Regulatory Information |
| 8. Exposure Controls/Personal Protection | 16. Other Relevant Information |

questions?

Possible Substrates

- | | | |
|---------------------|-----------------|----------------|
| ▶ Clay Brick | Windows | Concrete Brick |
| ▶ Stone Veneer | Burnished Block | Colored Mortar |
| ▶ Precast | Metal Panels | Colored Block |
| ▶ Split Faced Block | | |

Substrates



Multiple Substrates

Substrates



Concrete Brick/ Block



Synthetic Stone and Clay

Substrates



Glazed Brick



Clay Brick and Precast Concrete

Substrates



- ▶ Color Sensitive Block (left) can be one of the more difficult surfaces to clean. It is most important to use very low pressure for rinsing to avoid major color change. Synthetic Stone (below left/right) can also present the same challenge.



Wall Access



Scaffolding



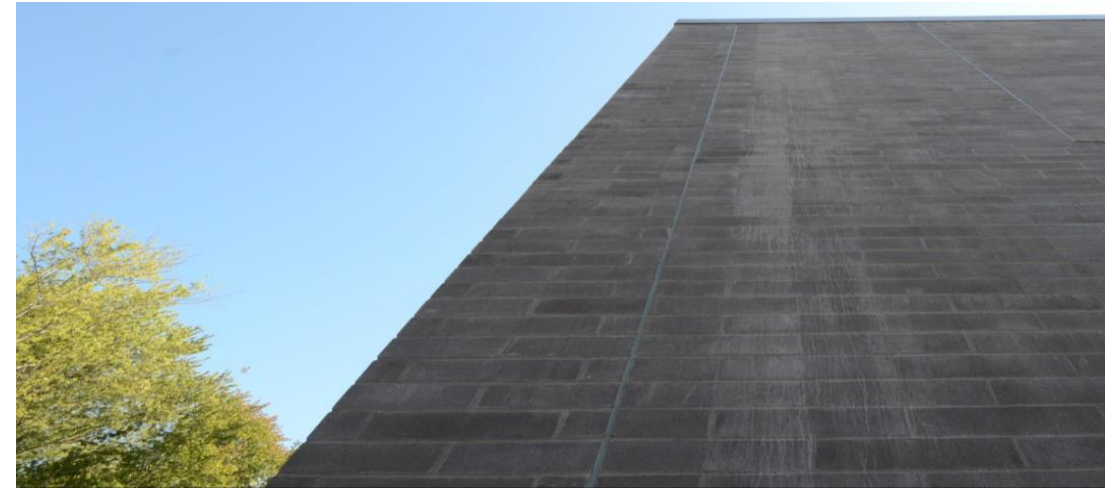


Mortar Smears

Interior Cleaning



Best Practice: Keep the top of your work covered.
Examples of what can happen if you don't.



- ▶ “It is required by code that the top of walls be protected from moisture entering until the permanent coping is in place. Failing to protect the top of wall has resulted in the most severe moisture related staining of the masonry. Un-covered walls are likely the number one source of staining and jobsite disputes.

Improper Cleaning Issues

Color Bleed. (Brushing a Sensitive Surface or Chemical too Harsh)



Improper Cleaning Issues

Discoloring the masonry units. (Brushing or Chemical too harsh)



Improper Cleaning Issues

Sandy mortar joints. (Improper use of Pressure and/or Chemical)



Cleaned Improperly



Cleaned Correctly



Reaction Based Stains

Experienced mason contract cleaners understand the importance of selecting the proper cleaning chemical and method of cleaning to achieve a uniform finish appearance. If either is done improperly the following stains may result.

These types of stains include:


- Efflorescence
 - Calcite
 - Lime Run
 - White Scum
 - Vanadium
 - Manganese
- 

Identifying Reaction Based Stains



A simple way to begin identifying a reaction based stains is with the water test (shown above). This is a good starting point to determine if the stain is efflorescence or something else.

Efflorescence

- ▶ Efflorescence is a common problem with new masonry. Often described as a white or ivory chalky-like deposit on masonry walls. Cleanup efflorescence is generally caused by chlorine ions left on the masonry surface by unbuffered acids used in the cleaning process. These ions react with moisture, a calcium chloride substance rises to the surface and efflorescence is created.
 - ▶ It can also appear as an extremely hard, salt residue carried to the face of the surface by cycles of wetting and evaporation. If efflorescence appears as a powdery residue, it will likely disappear over time but is particularly troubling for new masonry contractors who are especially concerned about the finish appearance of their work.
- 

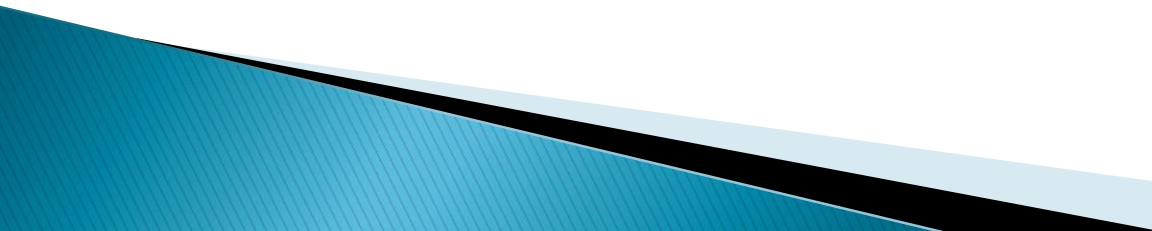


Efflorescence

New Building Bloom Efflorescence




Lime Run

- Result of the formation of calcium carbonate.
 - Requires extended flow of moisture, which contains calcium based compounds.
 - Occurs where pinholes or small cracks exist in CMU's or in mortar joints where water exists and is being trapped in the masonry unit.
 - Can be found in walls made out of:
 - 1. Hard dense Brick (which are cored)
 - 2. CMU veneers
- 



Lime Run

White Scum

- ▶ A reaction based stain where silicate compounds are formed on the face of the masonry. In most cases, the formation of these compounds can be triggered by the reaction of free chlorine in unbuffered hydrochloric acid which reacts with sodium and calcium compounds that naturally occur in masonry units forming sodium chloride and calcium chloride. These compounds then bond to the silica in the masonry units.
 - ▶ White Scum (silicate deposits) is white or gray in color and usually occurs in masonry units that are both porous and have a high silica content thus resulting a generous amount of the surface area of the silica being exposed to the air as well as the moisture carrying the sodium and calcium chlorides.
 - ▶ These stains are difficult to remove. Unlike efflorescence water does not generally rinse them away.
- 



Before



After

White Scum - Calcium Silicate

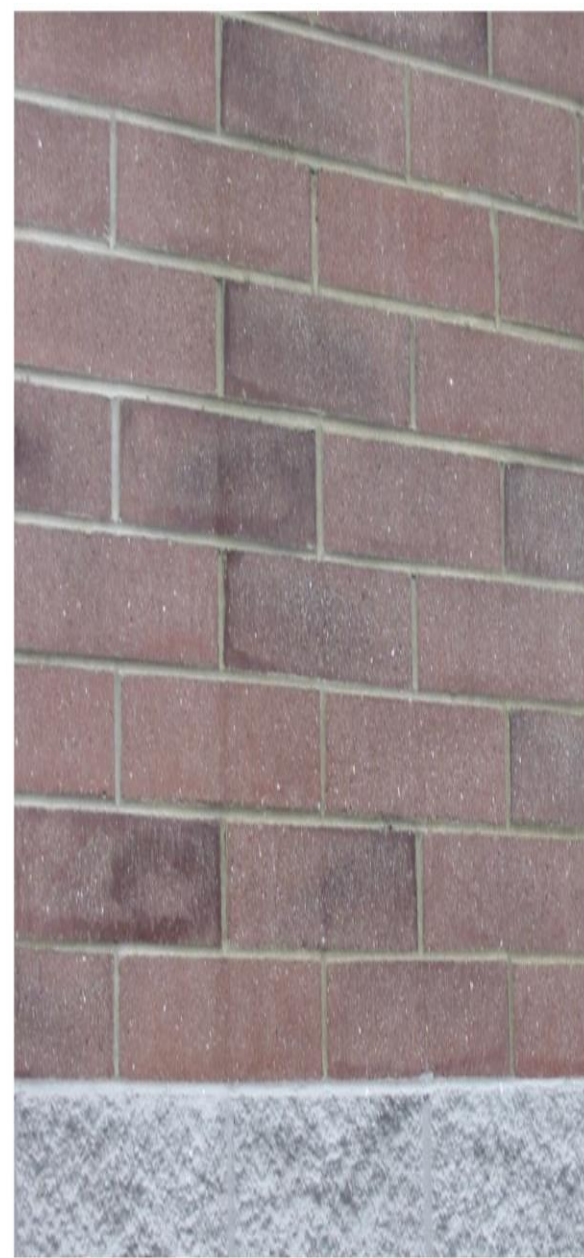


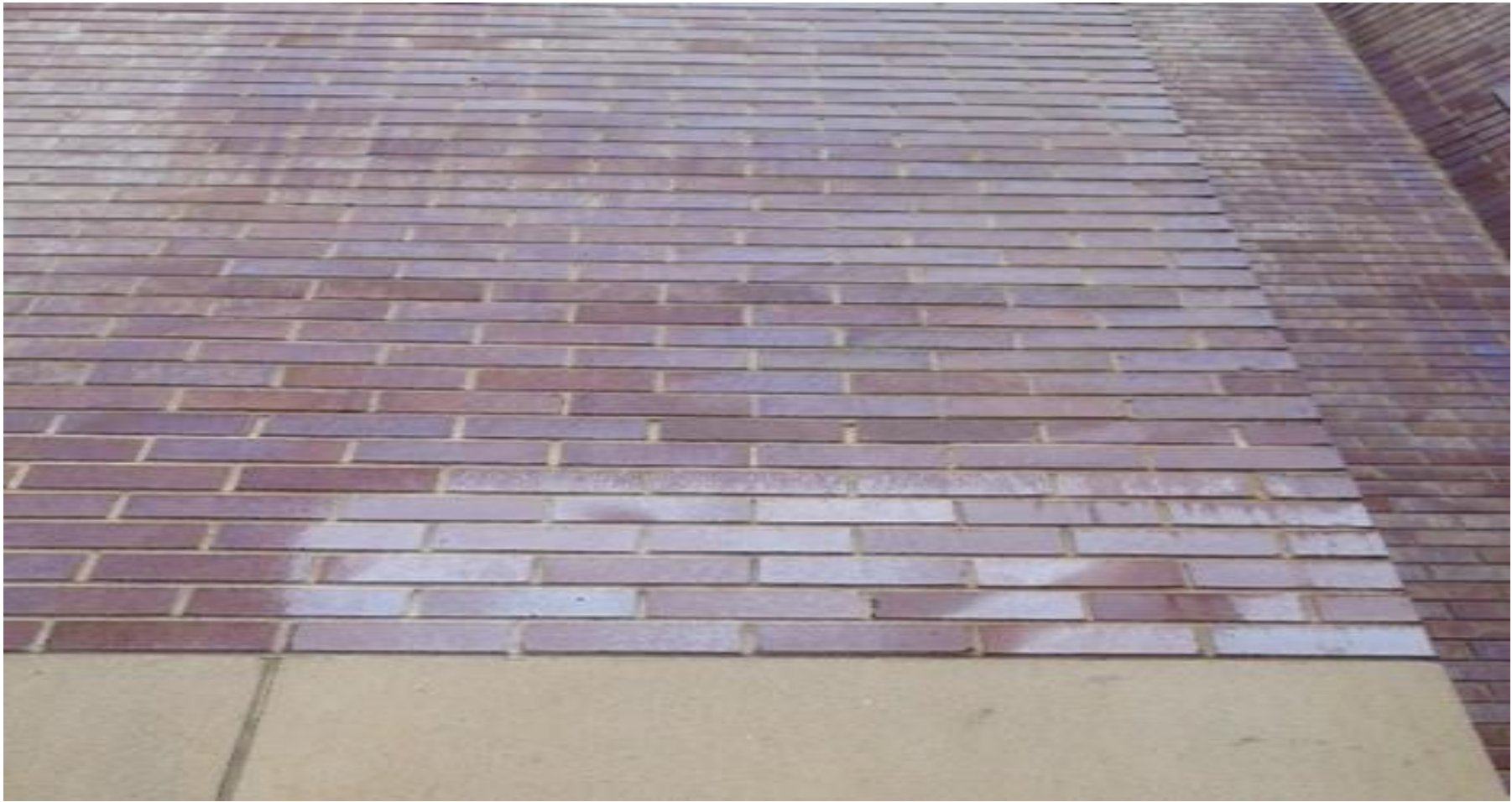
Integral Water
Repellant stains



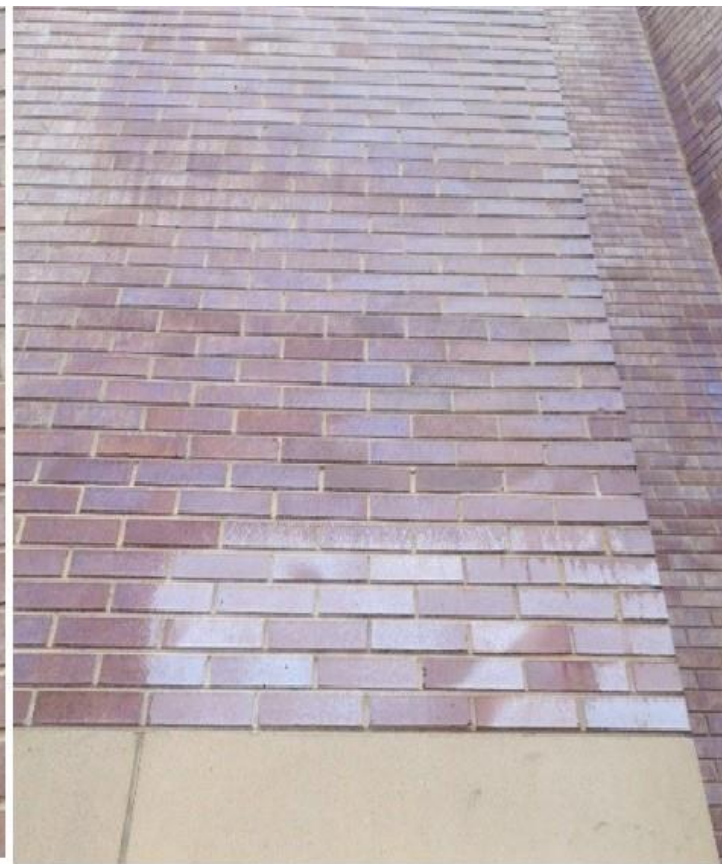
Admixture Stain







Burned Ironspot Brick



Iron Spot improperly cleaning restored with OneRestore



Vanadium Stains



Maganese Stains

Water collection and treatment methods upon completion of Cleaning process.

1. Need to ask what is required at this job site in terms of environmental regulations?
2. What method can be used that will comply with local, state, and federal regulations and is it cost effective?
3. Who is ultimately responsible for the wastewater generated during the cleaning process?
- ▶ 4. Determine the collection process and where the generated waste stream is to be collected and disposed of.
- ▶ 5. Determine cost/ volume of estimated generated waste stream.
- ▶ 6. Add this cost and analysis to final quote determining the cost to do the clean down.
- ▶ 7. Determine how the collected rinse water is to be tested prior to sending it to the approved collection stream. (pH testing may be required along with the necessary adjustments to provide the target that is usually between 5.5 – 10.5)

questions?

Common Issues Associated with New Masonry Cleaning Procedures



Chris Bettinger – Oldcastle APG

Architectural Product Specifications - Coastal

- chris.bettinger@oldcastle.com
- Cell: (321) 302-4505



Deborah R. Spik – Eaco Chem

Chemist

- Debbie@eacochem.com
- Cell: (724) 622-2490