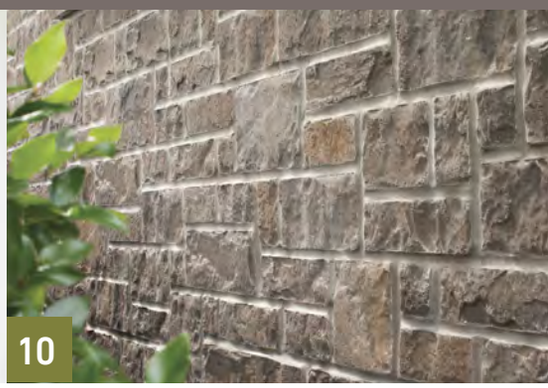
SEPTEMBER 2016 | ISSUE 2

MODERN MASONRY

IN THIS ISSUE: MOISTURE MANAGEMENT & HEALTHIER ENVIRONMENTS

Arizona Architect Fine Tunes Grand Local Theater as Masonry Takes Center Stage



ON THE COVER

The Performing Arts Center at Mesa Community College designed by Jones Studio of Phoenix features masonry for acoustical quality and rich aesthetics.

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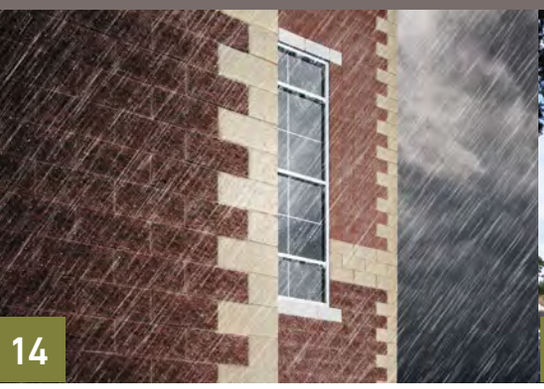
Oldcastle® Architectural

FEATURES



Letter from the Editor

The growing public awareness of mold and other forms of moisture damage places greater scrutiny – and liability – on architects, builders and development professionals. Beyond traditional concerns that a capital investment be protected from mold, mildew and other damage, moisture management is also viewed as a health and safety issue.

This issue of "Modern Masonry" addresses how to combat moisture in a building's interior envelope through a system approach. And since moisture can also affect the exterior aesthetic, we share some tips for reducing the potential for deterioration and efflorescence – those unattractive salt stains that may detract from a beautiful masonry exterior.

We hope you'll find the information in this issue useful. If you'd like to delve into the topic of moisture management more thoroughly, Echelon™ Masonry offers a CEU course on moisture control.

We are always looking for tips and best practices from architects and masons who would love to hear from you if you're willing to be a resource. We'd also like to know what topics or challenges you want to see addressed in future issues of Echelon Modern Masonry.

SUBMIT IDEA

> Installing adhered masonry or thin stone veneers is very rewarding for everyone involved in a project. Everyone benefits from the final appearance that adds to the texture and color of the walls.

The application of adhered veneers should begin with the proper sheathing protection, possibly an air barrier or a weather resistant barrier, placement of a drainage plane, a scratch coat and finally the thin veneer units. The mason's skill at placing the veneer units is where the money is made. When buttering the units, it is imperative that the unit has a full back butter with no voids before placement of the unit. It's also vital that the scratch coat is installed with a proper thickness of mortar, is "scratched" to increase surface bonding area and that the scratch coat doesn't have an excessive surface temperature that can adversely affect the bond and hydration of the mortar.

After segregating the units to be installed, a mason can either begin setting stone at the weep screed or at the top of the wall near the soffit. Reasons to begin at the bottom of the wall and installing the units up the wall are as strong as the reasons to begin at the top of the wall while working down. My preference is to work from the top down for several reasons. I begin with full units at the top, because when using irregular stone, the small tie-in cuts at the base of the wall will not be as noticeable. Also, mortar droppings fall to the ground, not on my completed work, which allows my final cleaning, usually performed with a horse hair brush, to be faster and less aggressive. If I ever can stop dropping mortar, I will try it from the bottom up.

– STEVEN V. FECHINO, ENGINEERING AND CONSTRUCTION MANAGER, MORTAR NET SOLUTIONS, INDIANA

READER FEEDBACK

WE LOVE FEEDBACK. DROP US A LINE.

SUBMIT INPUT

ECHELON™

IDEAS IGNITE

with the next generation of masonry

The Museum at Prairiefire honors the region's most prominent features—its prairie fire burns and rolling landscapes. Hear the vision behind the museum from its designers, and see how Echelon Masonry helped its creators achieve the seemingly impossible.

See the full story at EchelonMasonry.com/Inspiration

PRODUCTS USED

Artisan Masonry Veneers® Cordova Stone | Kansas Limestone | Dichroic Glass

MASONRY PRODUCTS FROM

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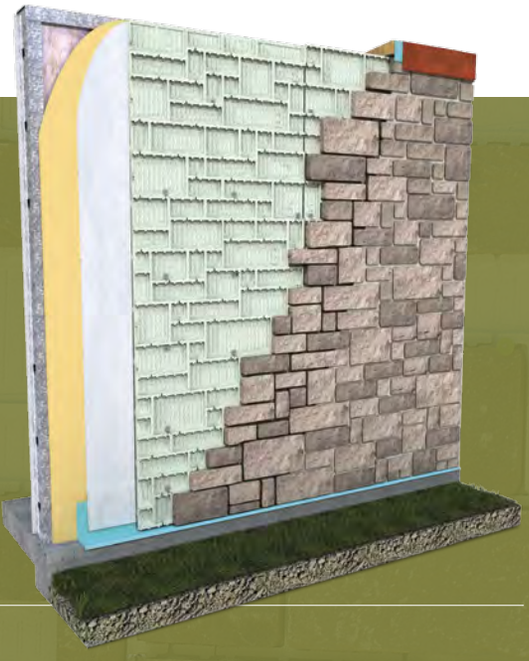
MOISTURE MANAGEMENT'S FRONT LINE

Architects can help prevent moisture buildup with a system-based approach

Advancements in building technologies have produced both lighter-weight materials that help reduce initial construction costs and the ability to create tighter building envelopes, which can lower lifetime energy costs. As beneficial as these overall savings are, using such technologies poses the potential for moisture damage and associated costs down the road. Fortunately, the right combination of building technologies, products and installation techniques can net the benefits of efficiency and economics while also protecting against moisture damage.

> Moisture or water vapor moves in and out of a building with air currents, by diffusion through the building's materials, and through heat transfer. A building's first line of defense is its exterior wall.



Integrated masonry systems , such as Echelon's EnduraMax™ High-Performance Wall System, often include a continuous moisture barrier, helping meet modern moisture management requirements.

Here, masonry is a good choice for moisture control, as long as it is installed in such a way as to both prevent the infiltration of water, and direct any water that does penetrate down the exterior cavity of the building.

Different masonry types will require different installation and moisture-management techniques, but in general the National Concrete Masonry Association (NCMA) recommends the use of: flashing and counter flashing, weeps, vents, sealants, water repellants, post-applied surface treatments, vapor retarders and crack control measures. The association also points to redundancy of components so the wall will remain water tight even if one of the systems fails.

One way to reduce the number of steps and materials necessary to achieve moisture control is for designers and builders to consider using properly-detailed single-wythe walls. These eliminate the need for a cavity wall as backup. Most contain an integral water repellant (IWR), drainable cores, and an interior face shell. Used with flashing and weeps and a post-applied water repellant, they can keep moisture out of the interior envelope.

Another way to install masonry while incorporating redundant moisture management strategies is by using complete masonry systems. These combine structures that more easily transport water vapor to minimize mold, mildew and potential structural damage and incorporate stainless steel ties that won't rust or corrode, and drainage channels that send water down and away from the building. These systems also may be easier to install because of the combination of many products in one.

> Water repellants, which are added to both manufactured stone veneers and mortar, are another high-performance solution to controlling moisture, and a complete moisture management solution should include the final step of sealing after the building's completion.

Also important is the use of a proper ventilation system and avoidance of materials that aid in the growth of bacteria and mold, such as organic and paper-based products and wall-to-wall carpeting.

By using systems that combine water-resistant materials and technology to direct moisture down and away from the building, architects can help safeguard their clients' investments—and health—from the damaging effects of moisture. ■

DESIGN PERSPECTIVE

Brian Farling, AIA & Principal
Jones Studio
Phoenix, AZ

Derelict Theater Finds New Life

Brian Farling, AIA and Principal at the Jones Studio in Phoenix, Arizona, was the lead designer of the newly constructed 44,000 sq. ft. Performing Arts Center at Mesa Community College (MCC). Formerly a derelict five-plex movie theater, the design team had several needs in mind for the rich looking interior as well as the exterior raked stucco and exterior masonry: indoors it was all about acoustical quality and rich aesthetics. For the exterior block, matching colors were needed and surprisingly for an arid climate, water repellent properties. The architects were even able to salvage the five-plex into a lobby and classroom areas as part of the new building.

The new 465-seat theater is comprised of an inner and outer shell, utilizing a variety of masonry for both the structure and exterior finish. Farling designed a sound chamber in which the rich looking Echelon Trenwyth® ground-face masonry, strategically aligned to bump out from the walls, serves as an excellent sound reflector. The side walls of the hall are scalloped in plan, a series of convex curves designed to spray sound waves evenly across the audience chamber.

The interior transitions to the exterior shell in a matching colored concrete block, which features an integrated water repellent, as does the mortar used to install it. When most people think of a dry, sun-drenched geographic area, they typically think of Arizona. But Farling points out,

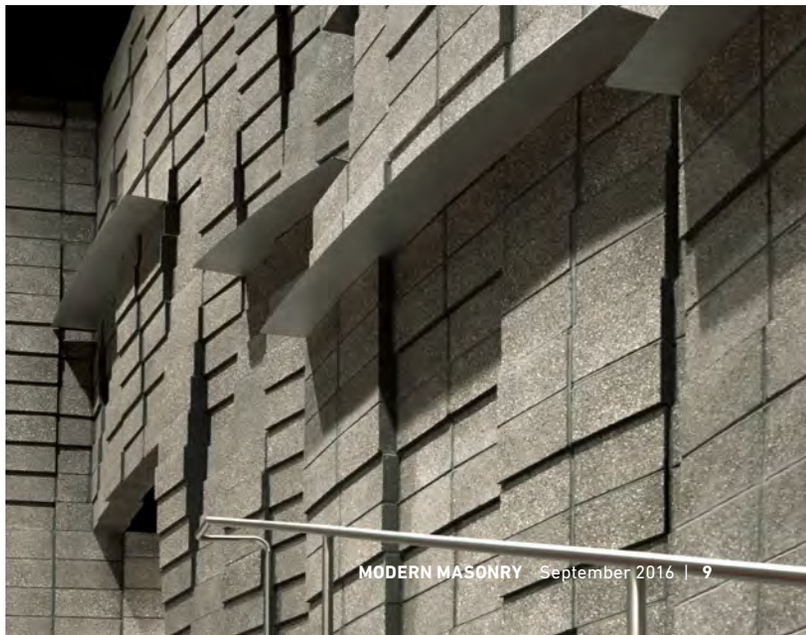
> "When you have heavy, violent and sustained downpours on a building that sits in the sun and bakes most of the time, the results can be rapid degradation.

Unlike buildings in other climates, the sun and rain work together in a dance that can be very hard on the exterior envelope. For that reason, water repellent in both the block and mortar were essential.

Another celebration of the infrequent but powerful Arizona rains are sloped folds that capture and funnel the rainwater into a flowing waterfall. "We passively harvested rain from 17,000 sq ft. of the roof, which drains into a sort of "knuckle" with a hole in it—so with every rainfall you get a waterfall, emphasizing the infrequent occurrence," said Farling. The waterfall's downspout at the northeast corner of the new building is the counterpoint to the vertical marquee sign marking the main entry courtyard.

According to Farling and the Jones Studio design team, the architecture is influenced by musical structure. Each of the patterns within the new masonry, exterior ornamentation, interior lighting, tile, and carpet are developed as visual expressions of influential music derived in early programming meetings by MCC faculty and staff. "We found the variety of musical styles – Gershwin's Rhapsody in Blue, Mozart's Cosi Fan Tutti, YYZ by Rush – to reflect the diversity of the college's character," he said.

The new theater, of which 19,500 is brand new and the other 24,500 sq. ft. containing the old movie house was repurposed, has exceeded the MCC's expectations. In addition to surpassing the program objectives, Jones Studio provided the school with a unique story through the building's elements. Influential music selected by MCC is reflected in structural patterns, repurposed ornaments, lighting, and finishes. "Exceptional elements, such as the entry courtyard carved from an existing theatre, continue the story and masonry was a huge part of making the design work," he said. ■



ECHELON

PRODUCT SPOTLIGHT

InsulTech™ and EnduraMax™ Wall Systems

Today's masonry projects require speed and efficiency to come in on time and on budget. High performance wall systems can do many jobs in a single assembly with moisture control and high R-values while meeting local codes.

Oldcastle Architectural's Echelon Masonry brand features two wall systems that accomplish multiple construction tasks in a single assembly and help control moisture: InsulTech™ insulated concrete masonry system (ICMS), and the EnduraMax™ High Performance Wall System, a total cladding solution that utilizes foam panels.

> InsulTech offers high thermal efficiency with a combination of a pre-assembled structural masonry unit, molded EPS insulation insert and thin veneer face.

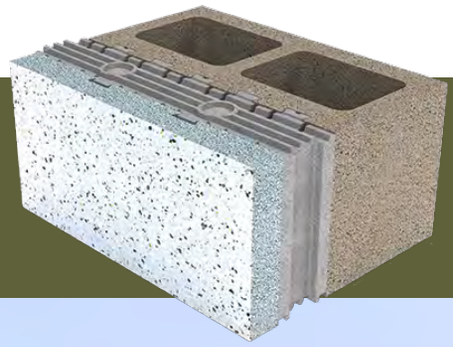
This system provides design flexibility, installation efficiency, moisture management as well as wind and fire resistance. It is available in both standard finishes and Trenwyth® masonry colors and textures.

Among the projects for which the InsulTech system was recently selected was the Banta Bowl sports complex of Lawrence University in Appleton, Wisconsin. With the freeze/thaw cycle of Wisconsin winters, InsulTech provides an effective solution in minimizing related damage from frozen moisture.

The lead architect chose painted CMU for the interior and a variety of Echelon faces, including Trenwyth Mesastone® and ground face Trendstone® block for the exterior. The system installed more quickly and took up less space than a traditional concrete masonry unit wall.

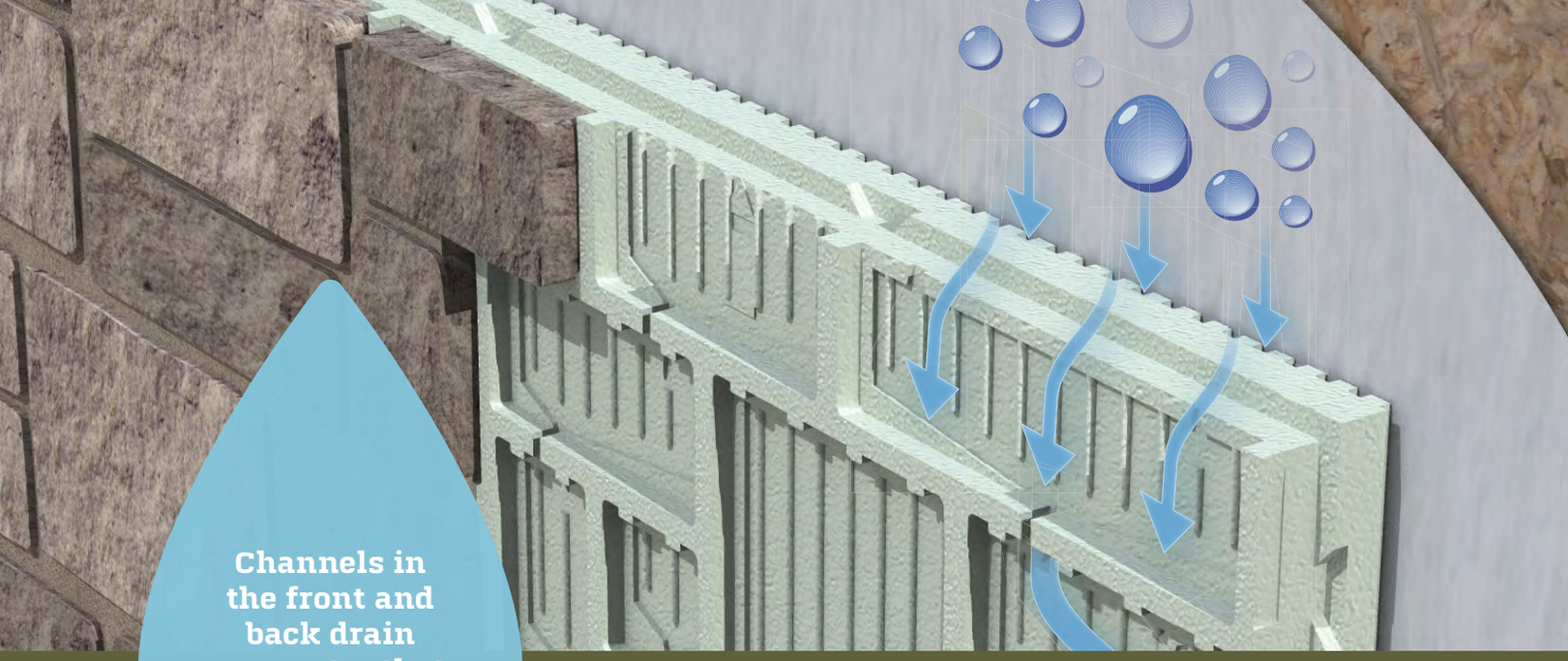
INSULTECH SYSTEM MOISTURE-CONTROL BENEFITS:

- Class III Vapor Permeability rating of between 2.5 and 5.5 perms to more easily transport water vapor.
- Stainless steel ties.
- Horizontal gaskets with drainage holes that channel water down, away from the building.
- Integrated water repellant admixtures.



INSULTECH SYSTEM

Design flexibility, installation efficiency, moisture management



Channels in the front and back drain any water that may infiltrate the wall.

ENDURAMAX WALL SYSTEMS

The EnduraMax High Performance Wall System features installation panels that affix to the studs or steel building with stainless steel anchors and screws to provide a framework for several options of brick or manufactured stone veneers.

It is comprised of a framework of pocketed and profile-molded EPS insulation panels that attach directly to the structure. Masonry stones or bricks and pumped mortar complete the exterior. As a total cladding solution, EnduraMax integrates all components necessary to achieve superior moisture management. Channels in the front and back drain any water that could infiltrate the wall, protecting the structure from damage over a long lifetime of moisture exposure. **Integrated water repellant additives in the block and mortar adds another layer of protection.**

EnduraMax was recently used in the construction of Avenir, a mixed-use development project in downtown Milwaukee's Park East corridor. The project's lead designer specified the use of EnduraMax in conjunction with Harvard-Brik® and Cordova Stone™ veneers from Echelon's Artisan Masonry Stone Veneer® line. ■

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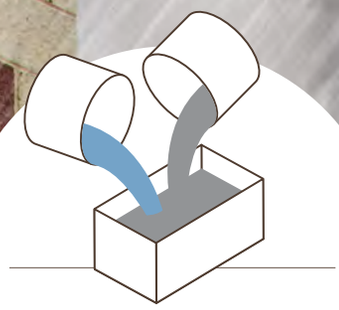


Admixtures are integrated during production

WATER REPELLANT ADMIXTURES: TOTAL MOISTURE PROTECTION

KEEP WATER FROM DAMAGING STRUCTURE, AESTHETICS

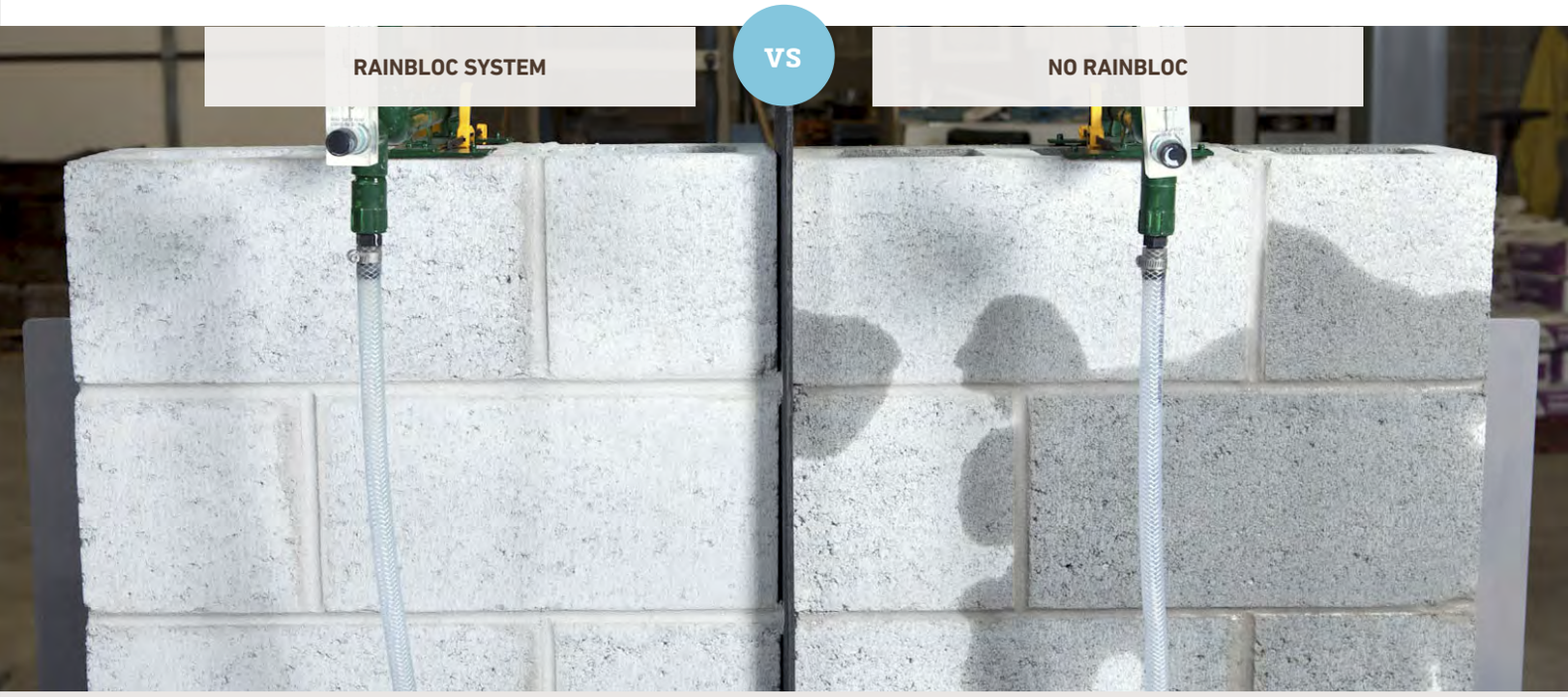
Water repellant admixtures are an integral part of a building's moisture control strategy. They enhance other technologies that direct moisture down and away from a building by working to control the penetration of moisture in the first place.

Various water repellants can be applied to mortar or block, either at the job site or during production, however job-site applications have some limitations. This includes a surface life that averages two to seven years and the fact that they usually require the application of two coats, which can cut into time and budget. Additionally, jobsite applications are subject to human error and nature's wrath: if the blocks become wet prior to sealing there could be future moisture issues.

> On the other hand, IWRs or admixtures, such as the RainBloc® System, are applied during the production of the mortar and/or block and are therefore factory controlled. They leave no surface film, won't wear or wash off, and the masonry is breathable.

Integrated water repellants are particularly effective in lightweight concrete masonry units and in single-wythe walls where additional protection against water and wind-driven rain is needed. ■

(Back of wall shown below)



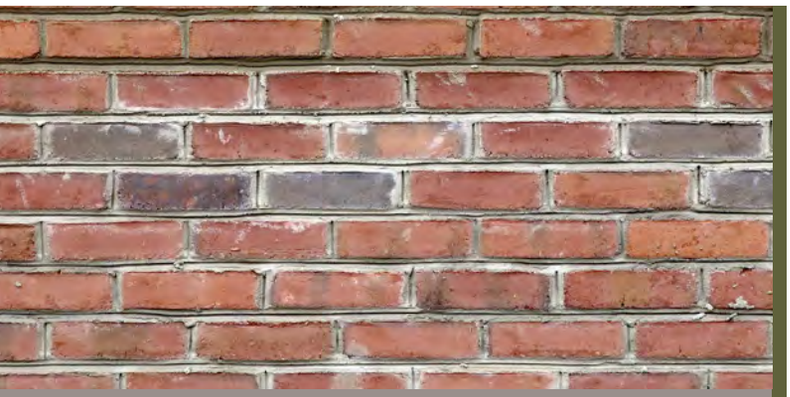
For maximum benefit or extreme conditions,

consider using block and mortar with integrated and applied water repellants together.

VIEW RAINBLOC BROCHURE

REDUCING THE POTENTIAL FOR EFFLORESCENCE

According to the American Concrete Institute efflorescence is “a deposit of salts, usually white, formed on a surface, the substance having emerged in solution from within either concrete or masonry and subsequently been precipitated by reaction, such as carbonation, or evaporation.”



According to the American Concrete Institute (ACI), in order for efflorescence to occur, three conditions must exist:

1. The presence of salts, most commonly calcium carbonate, sodium sulfate, and potassium sulfate. The salt can come from within the masonry unit itself, the mortar, or even the ground surface.
2. Water contact that dissolves the salts so they can travel to the surface. The primary source of moisture that contributes to efflorescence is rain water.
3. The pore structure of the masonry is such that it lets the salt solution travel to the surface where it can dry.

While many steps are taken by masonry and mortar manufacturers to produce materials that reduce the contributing factors to efflorescence, there are some design and job-site actions that can be taken as well. These include:

- **Waterproof** all walls below grade.
- **Use a drainage wall system** that provides an air space between the exterior masonry and other wall elements. When it’s not possible to provide an air space, use a damp-proof coating between the exterior surface and the exterior masonry.
- **Prevent moisture from entering masonry** by directing it away from horizontal surfaces such as sills and tops of walls.
- **Reduce the potential for condensation** (especially in buildings that include pools, kitchens, frequent use of steam, etc.) with a ventilation system and use appropriate vapor barriers.
- **Store masonry units, cementitious materials, sand and water off the ground** to avoid moisture that exists there, as well as contamination by plant life and other organic materials.
- **Use a waterproof cover on the materials** stored at the job site and make sure to cover unfinished walls to prevent water from entering prior to completion.
- **Only use clean, potable water** free of salts, deleterious acids, alkalis or organic materials. The water used on site can be a source of salts.

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