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Who Is Presenting Today?

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Holding Company
Dublin, Ireland



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North America's Largest Concrete
Building & Hardscapes Manufacturer
Atlanta, GA



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National Reach, Local Support

186

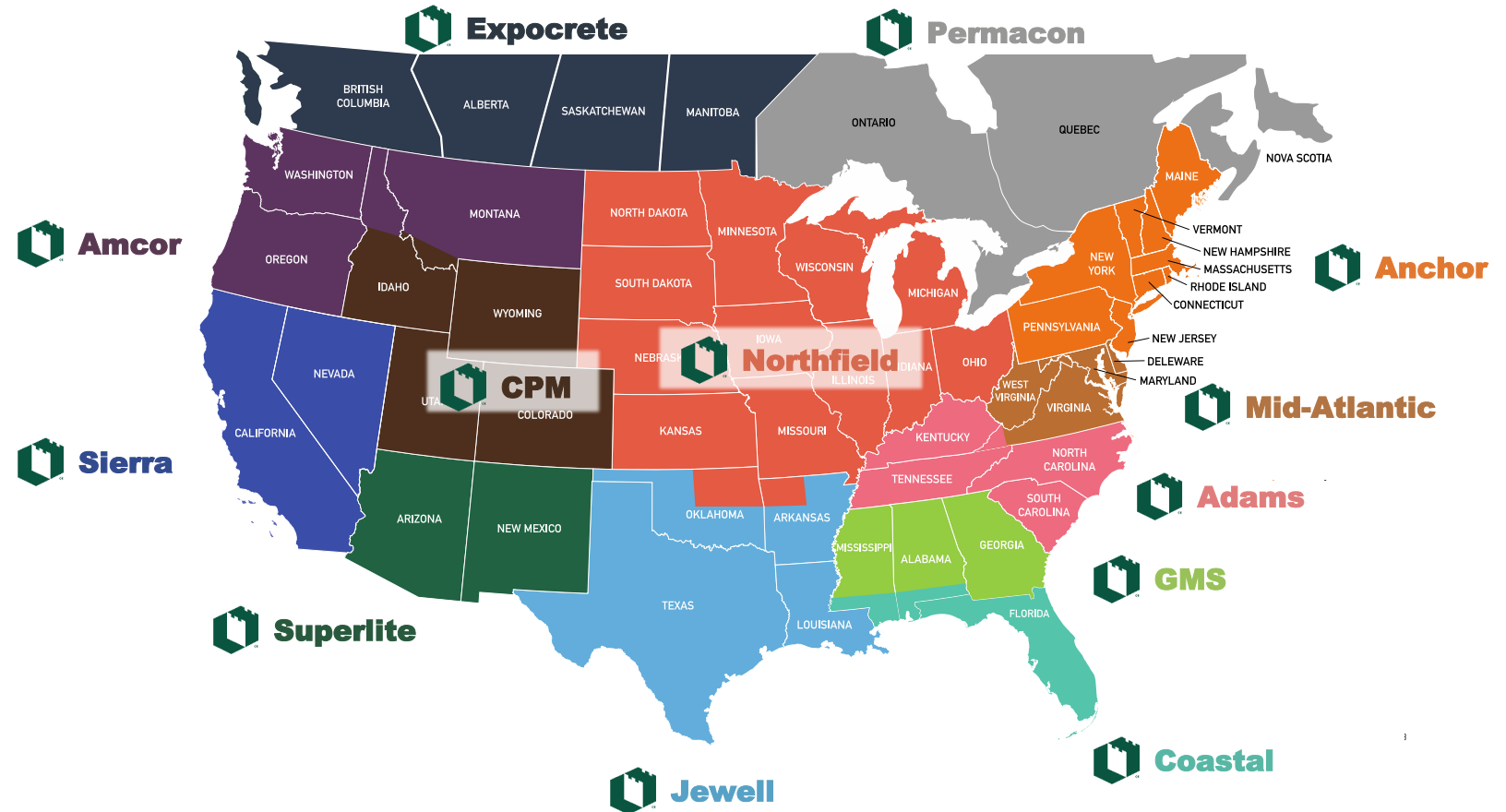
Locations

6,000+

Employees

ONE

Oldcastle APG



Controlling Moisture in Masonry

TREN-02

Approved for 1 HSW Credit Hour

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Learning Objectives

Discuss

Discuss flashing and other proper masonry installation strategies to manage moisture in a masonry wall

Explain

Explain the advantages of complete masonry systems that mitigate water penetration and provide backup moisture management

Describe

Describe water repellent admixture advances and uses in concrete block and mortar that help control moisture and meet building codes

Specify

Specify a masonry solution that delivers superior moisture control and an environmentally sound structure

What is a Concrete Masonry Unit?

Comprised of the following materials:

- Sand
- Cement
- Stone / Aggregate
- Color Pigment
- Admixture
- Recycled Material



How Water Enters a Structure

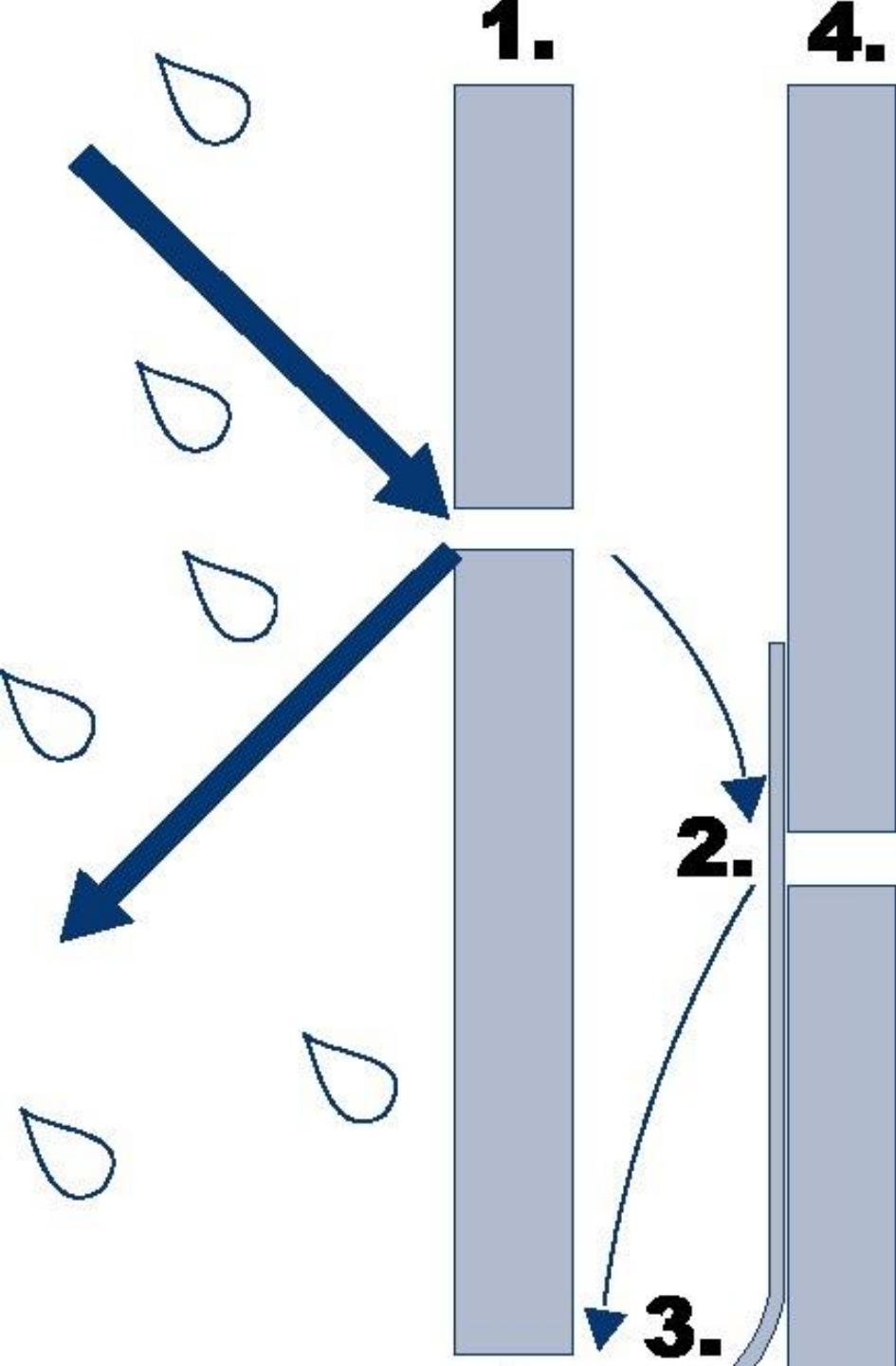
- ✓ Hairline or shrinkage cracks
- ✓ Parapet details
- ✓ Door and window details
- ✓ Structural break in the wall
- ✓ Vapor condensation
- ✓ Poor workmanship
- ✓ Lack of proper drainage



Addressing Moisture issues:


- Designing walls with moisture penetration in mind
- Designing walls with multiple lines of defense
- Protecting occupants from moisture penetration
- A 'belt & suspenders' approach





"Rainscreen Principle" Wall System

- Protection
- Collection
- Drainage
- Back-up



Apply Rain- Screen Principle to Single Wythe CMU

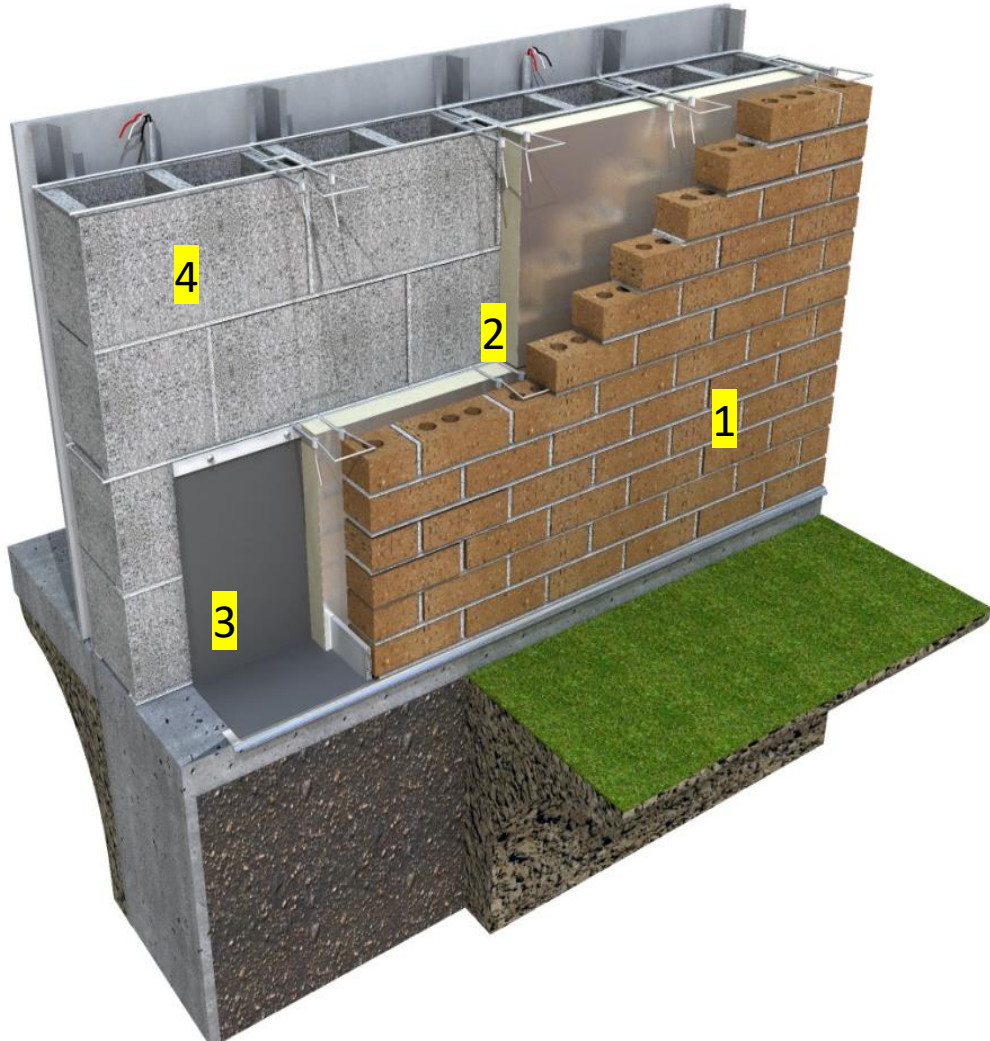


Proper Masonry Practice to Manage Moisture Mitigation

- Flashing and counter flashing, weeps, vents, sealants, water repellents, post applied surface treatments, vapor retarders and crack control measures
- Redundant use
- A four-level line of defense: surface protection, internal protection, and drainage and drying
- Proper techniques vary by type of masonry unit



Cavity Wall Lines of Defense



1. Veneer

2. Cavity

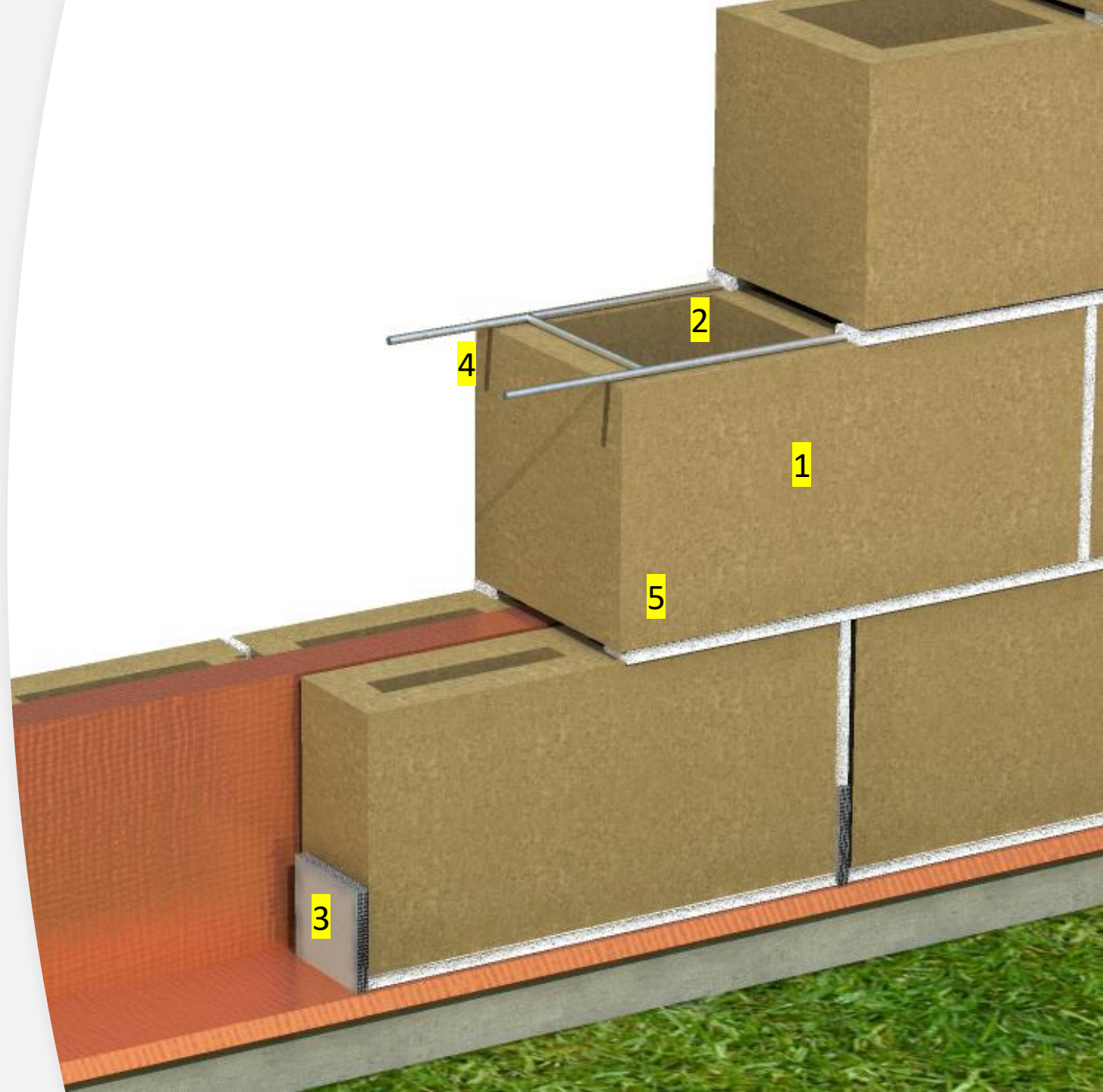
3. Flashing and Weeps

4. Backup

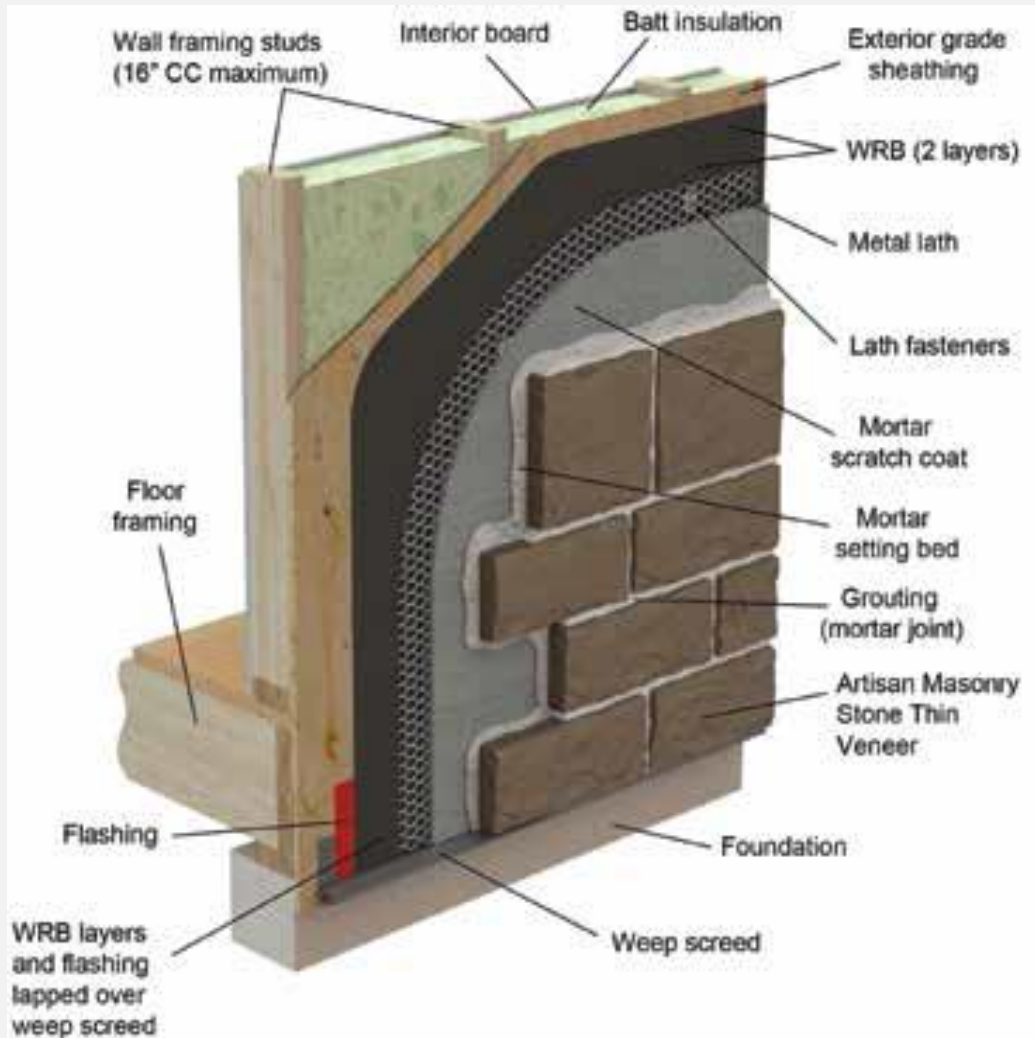
Single Wythe Lines of Defense

- 1 – Integral Water Repellant
- 2 – Drainable Cores
- 3 – Flashing & Weeps
- 4 – Interior Face Shell
- 5- Post Applied Water Repellent

Single Wythe walls don't require the back up of a cavity wall but must be properly detailed to avoid moisture intrusion.



Thin Veneer Lines of Defense



- Oriented Strand Board (OSB) sheathing and two layers of building paper.
- A drainage mat
- A galvanized expanded metal lath
- A parging backing

Flashing: Unseen but Extremely Important!

Goal is to reduce water penetration/ divert back out to protect the structure.

- Attributes:
 - Durable
 - Water imperviousness
 - Corrosion resistance
 - User Friendly- easy to form, join, and retains it given shape
 - Compatible with adjoining adhesives and movement control adhesives
 - Should not cause discoloration of the masonry unit
 - Expected lifetime that exceeds or matches life of building

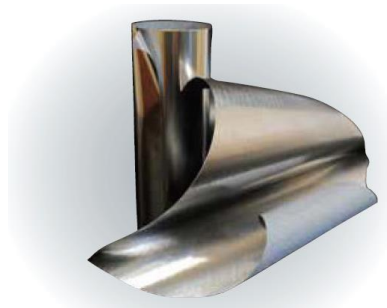




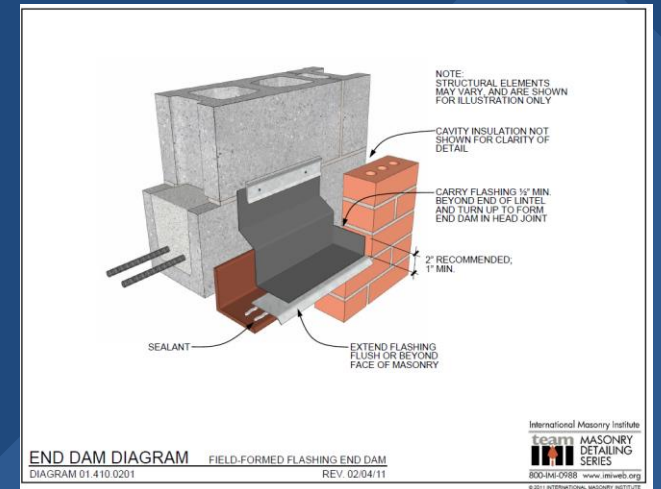
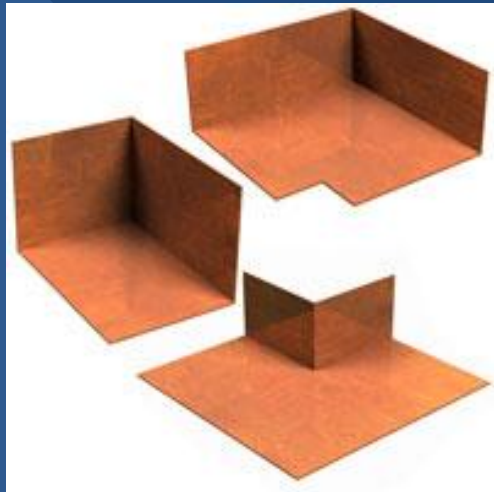
Flashing Types

- Metals
- Copper Composites
- Loose Laid/PVC
- Self-Adhering Membranes

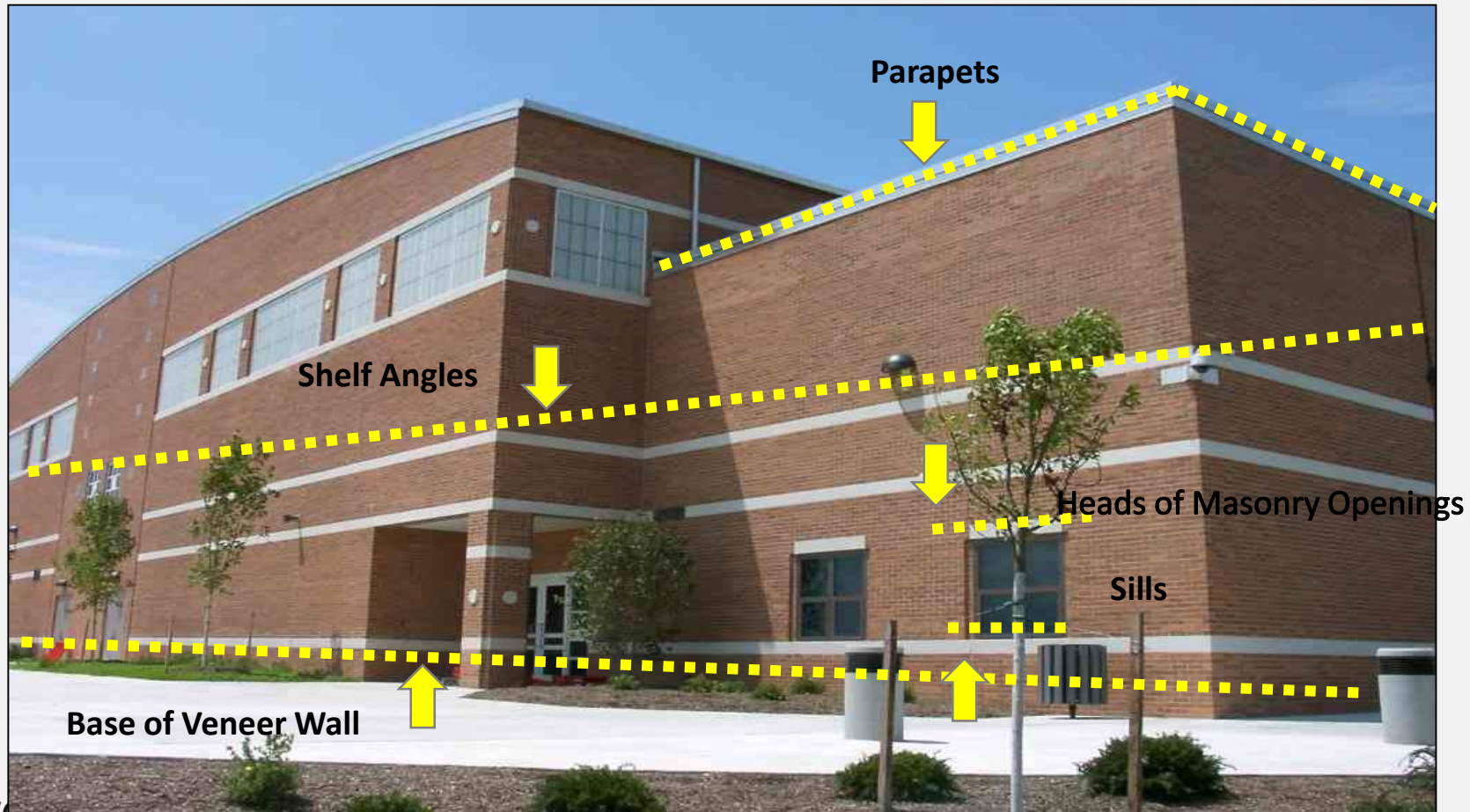
Choose components that will last the life of the building.



Flashing: End Dams, Pre-formed Corners, Termination Bars, and Drips



Required Flashing Locations



The Best Formula for Mold Free Buildings

- A systems approach
- Quality materials
- A tight wall interior construction with proper operating ventilation and dehumidification



Complete Masonry Systems: Two Approaches

A systems approach incorporating several elements gaining popularity

- Complete high performance masonry systems with admixtures mitigate water penetration and provide backup moisture management
- Efficiencies, installation and cost saving advantages



Complete Masonry Systems: ICMS Insulated Concrete Masonry System

- Foams with Class III Vapor Permeability rating of between 2.5 and 5.5 perms--more easily transport water vapor, minimizing mold, mildew and structural damage
- Stainless steel ties don't corrode, rust, or stain, so effective in coastal environments
- Horizontal gaskets with drainage holes channel water down and away from the building

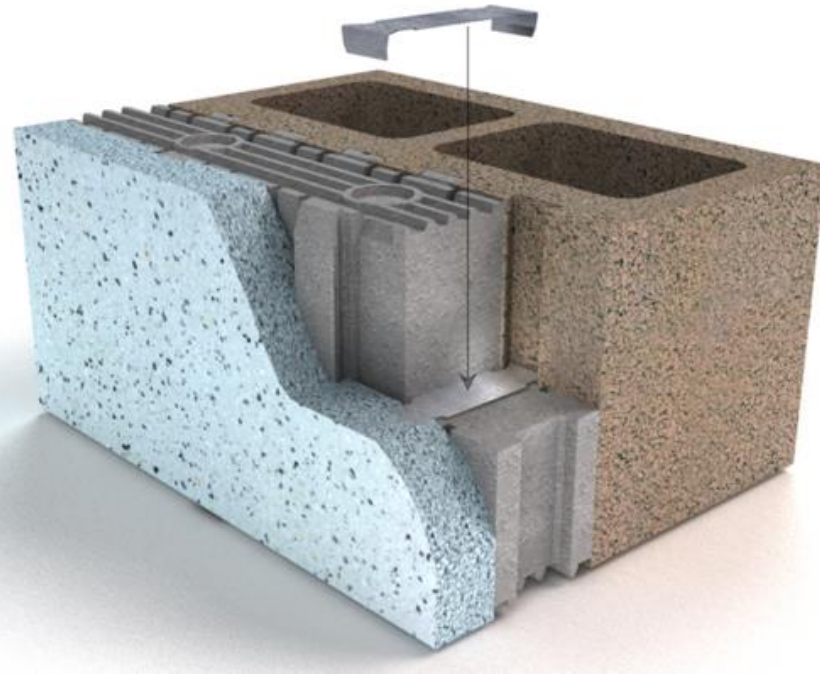


Complete Masonry Systems: ICMS Insulated Concrete Masonry System

- Can achieve R-value targets in a thickness-constrained application
- Adaptable in size, shape and density—no gluing of multiple boards to achieve the desired insulation thickness



Insulated Concrete Masonry Systems



CHARACTERISTICS + PERFORMANCE

Three-part, pre-assembled structural unit:
CMU + insulation insert + thin veneer face

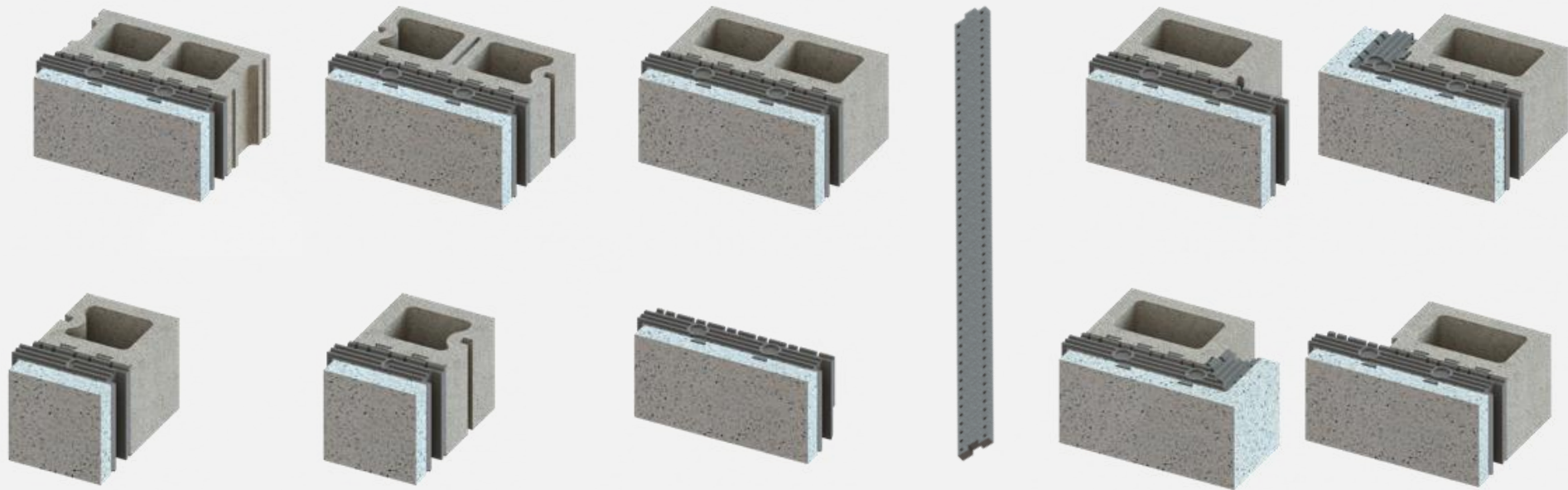
High-performance EPS molded insulation inserts deliver
R-value of 16.2 at 75°F

Vertical shiplap and close—cell foam gasket on
horizontal joint to eliminate air leakage

Meets IECC Energy Code from Zones 1 through 7

4-Hour Fire Rating

ICMS Components and Shapes



Insulated Concrete Masonry Systems



STREAMLINED INSTALLATION

Custom **Gasket Bridge Tool** allows masons to easily lay mortar at **two different depths simultaneously**

Keepings horizontal gasket and drainage channels clear.

Eliminates learning curve and minimizes waste.



Complete Masonry Systems: Foam Panel

- Foam Panels
- Anchors and Screws
- Stones and Bricks
- Mortar

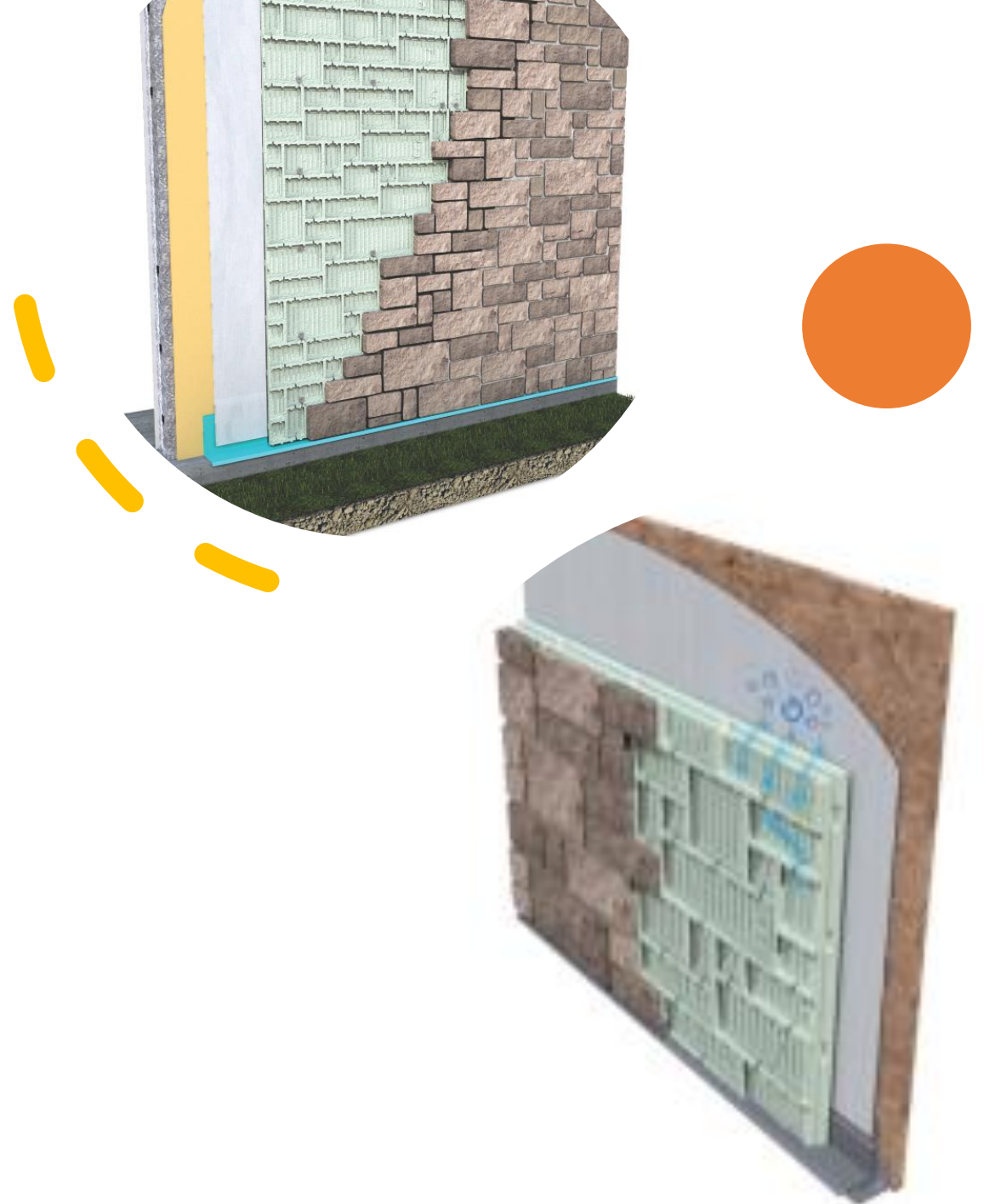


How the System is Installed:



Complete Masonry Systems: Foam Panel

- Drainage channels on both sides of the panel
- Channels divert any moisture downwards and outwards to prevent water build-up within the system
- Drainage channels built in to both sides of the foam panel control moisture by allowing it to drain down and away from the structure.



Complete Masonry Systems: Foam Panel

- CI outside framing for up to R-13
- Resist wind speeds of 110 mph+
- STC rating of 51
- Per NFPA 285 and ASTM E119 standards, can withstand hour-long exposure to over 1,700°F



Field Panel:



Goodberry's
Wake Forest, NC

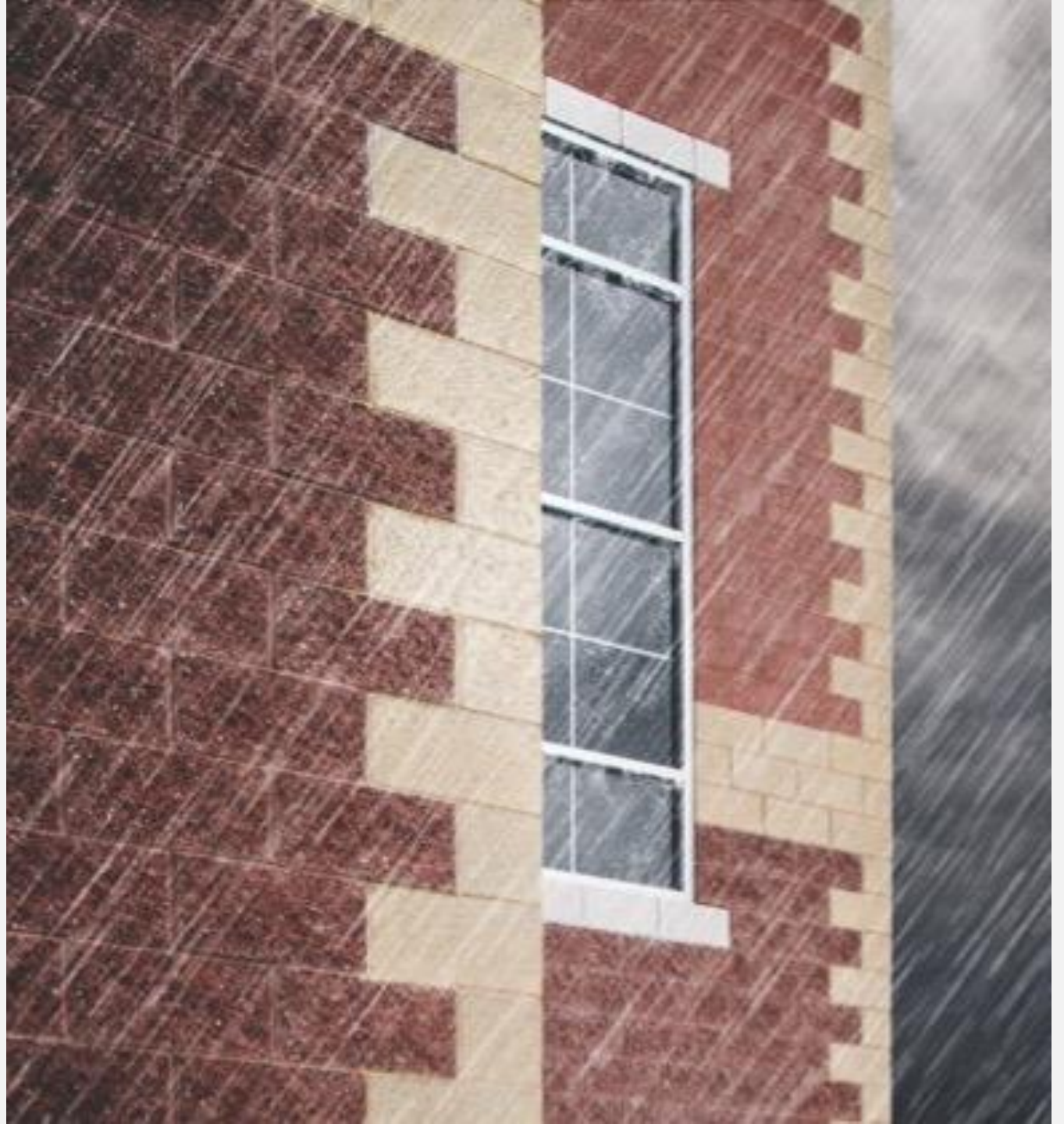
Complete Masonry Systems: Installation Advantages

- Single pass installation simplifies process
- No need for added insulation
- Includes moisture management and finishing materials
- Save labor costs
- Improves accuracy



Advances in Water Repellent Admixtures

- Liquid used in the manufacture of the CMU and Mortar
- Permanent Performance – lasts the lifetime of the unit
- Entire unit is treated providing a back-up layer of protection
- Helps with efflorescence



Integrated Water Repellents

With WR



Without WR



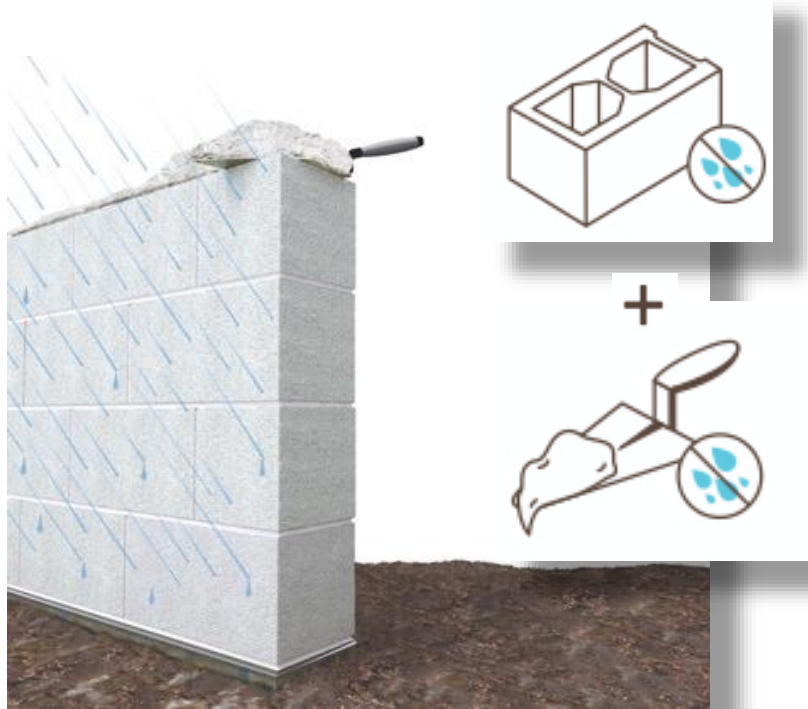
Wind Driven Rain Test E514 after 72 hours Untreated CMU/Mortar.



Wind Driven Rain Test E514 after 72 hours CMU/Mortars with Integral Water Repellent



Advanced Mortar Admixtures



INTEGRAL WATER REPELLANT

“Secret sauce”: anti-wicking action to **minimize water absorption** and drain toward flashing and weep holes.

Contrast with untreated masonry that **absorbs water** through capillary suction or wicking.

Admixtures **not entirely moisture impervious** to allow “breathing”.

Applied to both block and mortar for complete protection.

Integrated Water Repellents-Mortars

- Integral water repellents were designed to address the problems common with job site applied repellents
- Especially effective in lightweight CMUs and single Wythe walls to prevent water infiltration and wind-driven rain
- Assures specified product execution in proper proportion for maximum protection



Integrated Water Repellents-Mortars

- Introduced in the early 1980s
- Available in liquid and powder form
- Available in Type M, S, and N mortars
- In compliance with ASTM C270
- Engineered as a pre-blended mortar for consistency, workability and yield
- Formulated for extended board life, reducing the need to re-temper in hot or windy climates
- Special applications: high moisture environments, coastal climates, or where cement based mortar is the preferred material



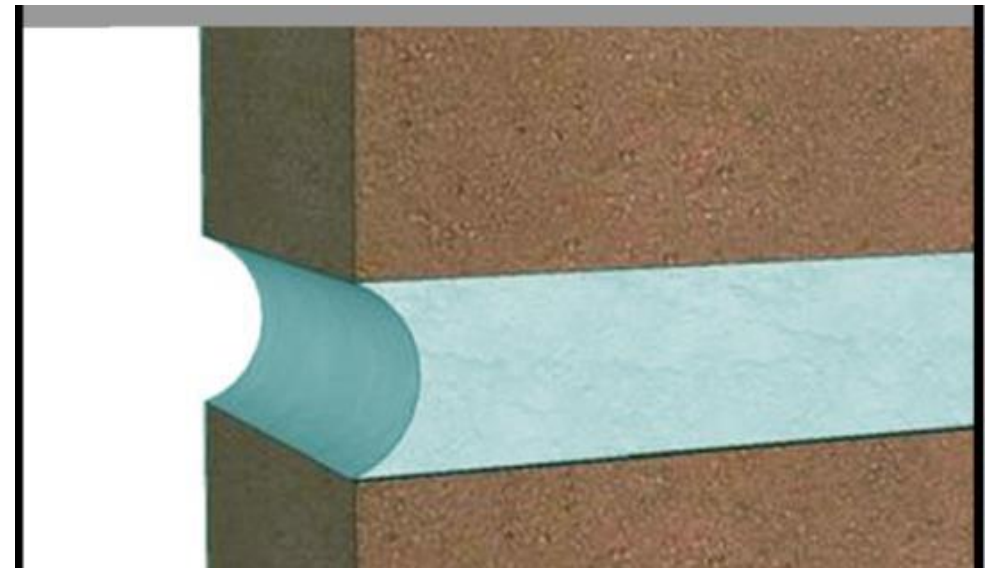
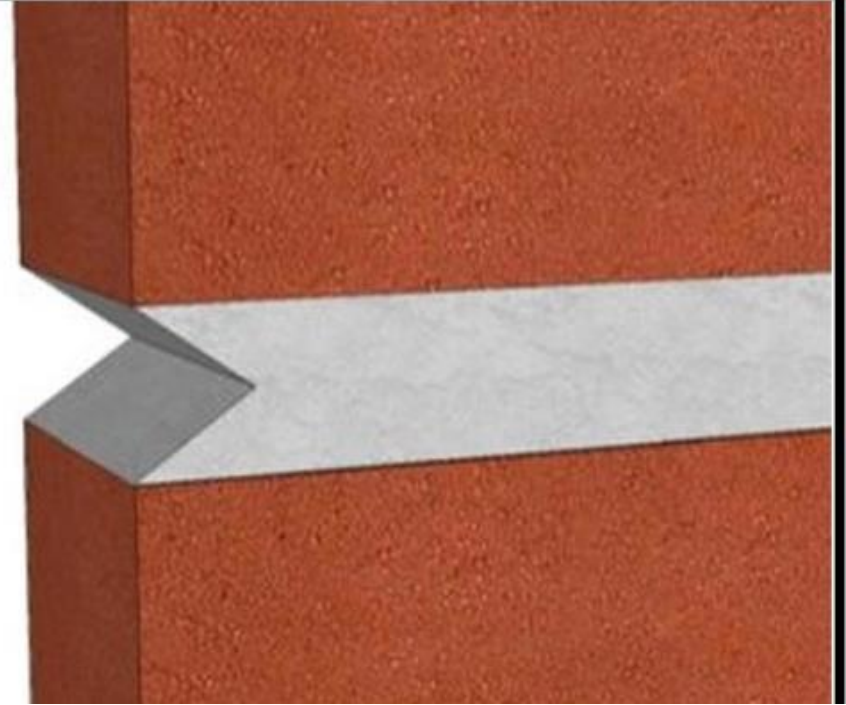
Integrated Water Repellents-Mortars

- Colored mortars meet aesthetic goals
- Available in Portland/lime-based or masonry cement based
- Available in standard and custom
- Colored block kits can be used with water repellent masonry units for joint warranty wall system approaches to water repellency
- Confirm the compatibility of water repellent masonry products with products of other manufacturers
- Advisable to use approved mock ups or sample panels



Recommended Mortar Joints

VEE JOINT



Water Repellent Admixture Advances in Block and Mortar

- Used together in block and mortar the latest water repellent admixtures provide protection against many types moisture infiltration
- Anti-wicking action: minimizes water absorption; drains moisture towards flashing and weep holes
- No film on masonry surface
- Masonry remains breathable
- Water repellent is fully integrated into these materials and won't wear off/wash off



Post-Applied Sealants: The 100% Solution

A clear, solvent-based silicone elastomer can:

- Weatherproof custom masonry units
- Fill pores to prevent water infiltration
- Provide UV stability and graffiti protection
- Control surface stains, efflorescence, mildew
- Allow the surface to “breathe”



Post-Applied Water Repellents

Sprayed or rolled post construction.

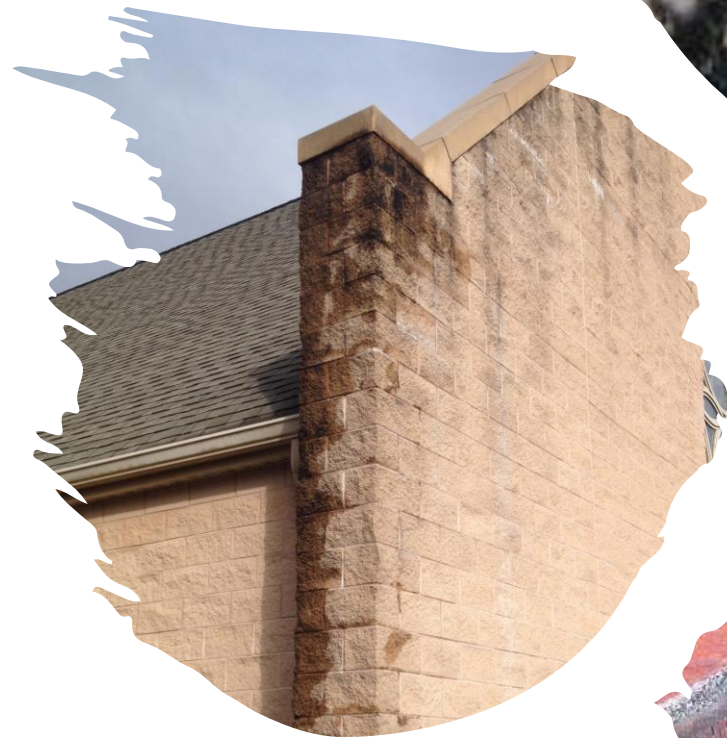
Approximately 7-10 years of surface life

Hi-sheen to low sheen options available

Some post-applied water repellents have anti-graffiti characteristics

Moisture and Masonry: What Can Happen?

- Structural Problems
- Aesthetic Degradation
- Health and Safety Issues



Structural Problems

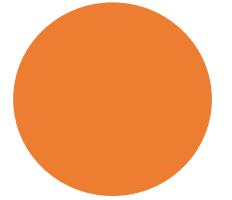
- Spalling
- Wall Rot
- Deterioration/corrosion of wood/steel backup studs, cladding, ties and reinforcements
- Spread of water intrusion causes more structural degradation and possible structural failure



Aesthetic Degradation

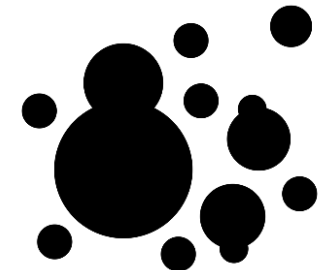
Efflorescence

The result of a salt within the masonry unit dissolved by excess moisture which migrates to surface forming that unmistakable white bloom as the water evaporates



Health and Safety Issues

- Excess moisture causes bacteria growth (mold) that results in:
 - Odors
 - Gases
 - Worsening asthma and allergies
 - Cancer and birth defects in extreme cases

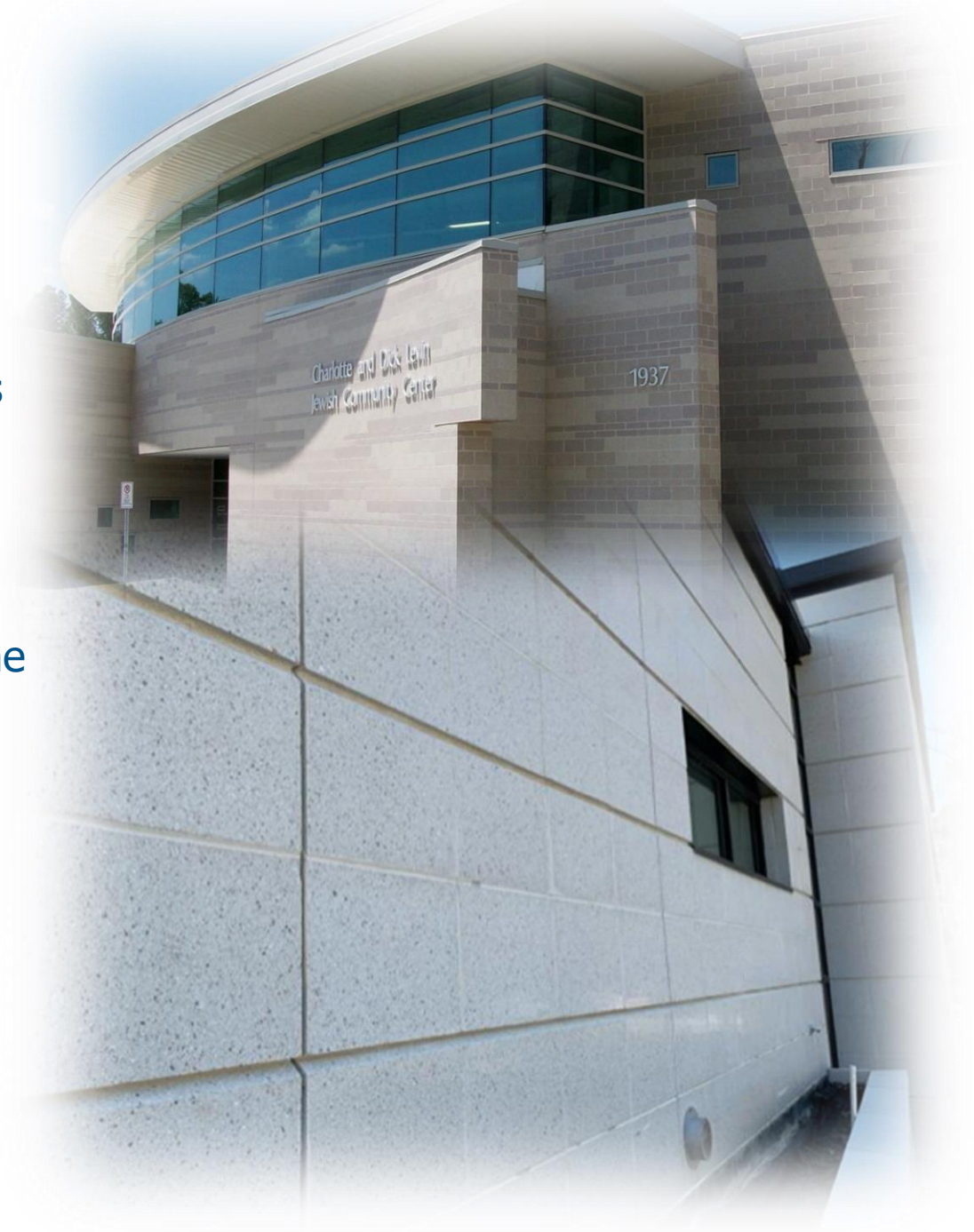


By controlling moisture in masonry, your concrete masonry structure will elicit permanence and stability for years to come.



Key Takeaways

- Proper detailing and execution of flashing and weeps are proven methods to combat moisture mitigation.
- A systems approach to masonry can offer moisture management, thermal efficiencies and often reduce noise and wind resistance.
- Advanced block and mortar admixtures, as well as the “belt and suspenders” approach create a seamless moisture prevention solution.
- If moisture does penetrate to the interior, the intrusion can cause structural degradation, uncontrolled efflorescence and even health issues.
- Architectural concrete masonry units speak the balance of strength and beauty.



Thank you!

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