# **Leaky Split Face Block** – What to do?

*The Best Solution - Install a Rain Screen*

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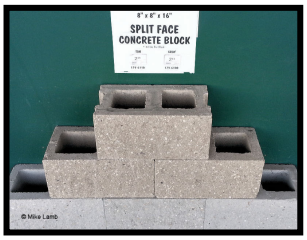
## INTRODUCTION



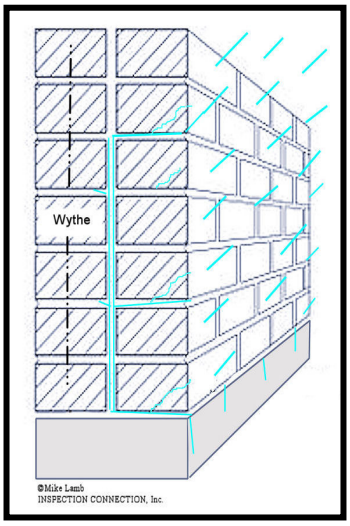

**Split face block (SFB)** is a concrete masonry unit (CMU) that was the rage in condo and home construction in Chicagoland from the early 1990s until the housing bubble burst in 2007. Thousands of these properties were built with face brick at the front, and SFB on the sides and at the back of the structure. Most of these buildings are now experiencing water infiltration through the walls

The attraction to SFB is it looks like stone but is a relatively cheap concrete material which is strong enough to support the outside walls, roof and the interior floors of a multi-story building in just a single wythe and provide a nice looking finish to the exterior. Single wythe (one unit of masonry) construction provided a tremendous savings to the builder in both labor and material costs.



**Split face block construction has a nice face brick in front and usually single wythe masonry block at the sides and back.**

**(below) A double wythe (cavity) wall system. The outside wythe provides a rain screen to protect the interior of the home.**



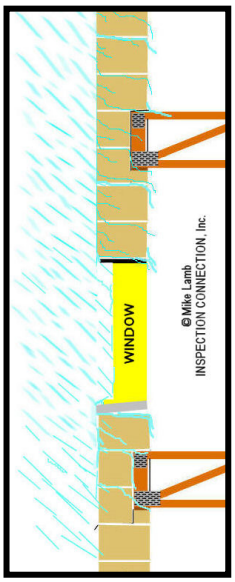


**(above) Older masonry structures used sheer mass, and then later, cavity wall construction to help control water intrusion.**

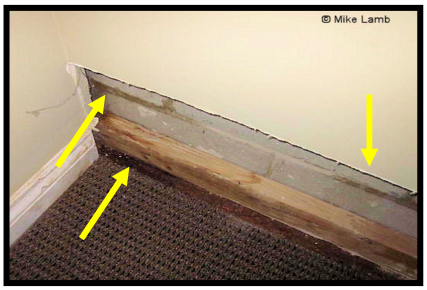
**Single wythe wall construction** is the main problem with the moisture intrusion. Most masonry buildings use cavity wall construction with two exterior wall assemblies (two wythes); one to structurally support the building's interior floors and roof, and another to act as a rain and moisture shield from the outside elements. A gap (cavity) is provided between the two wythes to serve as a capillary break from moisture and also negate pressure differentials between the two assemblies.

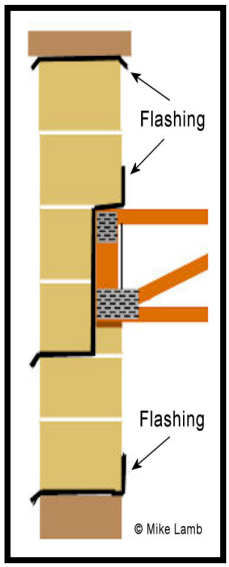
This fundamental building technique is ignored with single wythe construction. Unfortunately, my research has found that only one major manufacturer of SFB specifically states that their product should *only be used in cavity wall construction*.

## IN THEORY, SINGLE WYTHE SFB CONCRETE CONSTRUCTION CAN WORK,



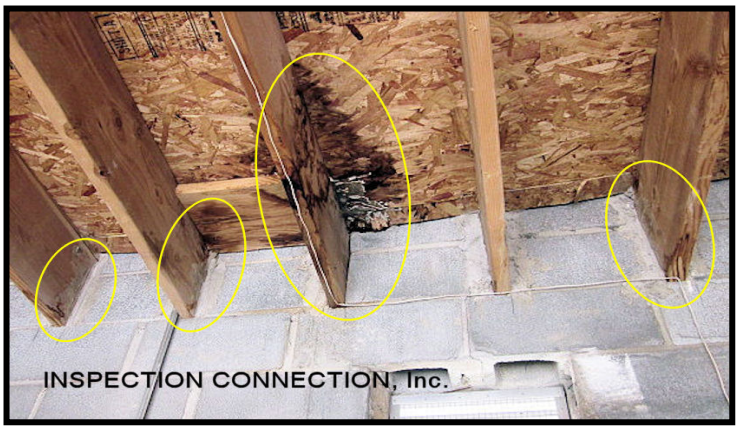

… but it needs meticulous detailing of flashings that even the most skilled mason would find difficult to execute. This coupled with the speed of construction during the housing boom made it nearly impossible to build watertight buildings using this method. The fact that SFB is a very porous material that acts like a sponge only compounds an already flawed design.


**Single wythe design, poorly detailed or omitted flashing, speedy construction, and a porous building material has all led to water infiltration problems in SFB construction.**






## SEALING THE EXTERIOR WILL NOT SOLVE THE PROBLEM

A popular remedy to the water intrusion problem is coating the exterior block with an elastomeric paint (silane/siloxane sealants are not recommend on SFB). This "solution" provides only temporary protection and can cause unintended interior moisture problems down the road.

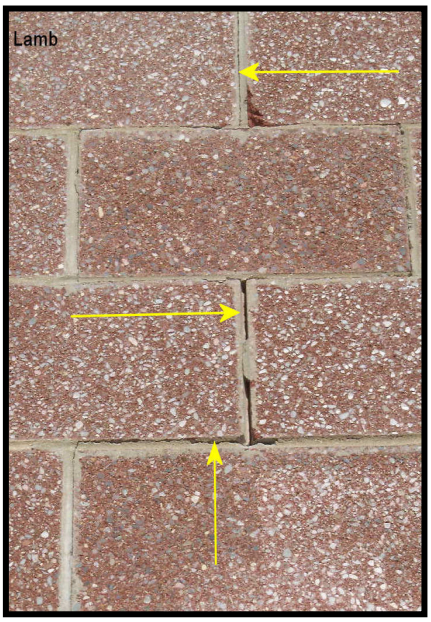

**There are many masonry sealers on the market**

Vapor permeable elastomeric sealants repel water but have the significant disadvantage of not being able to drain condensed moisture that builds up inside the wall cavities of single wythe buildings. Most elastomeric sealants require two or three coats which lowers its vapor permeability with each coat. Interior moisture from cooking, showering, breathing, etc., will inevitably finds its way into wall cavities due to convection at wall openings such as at light fixtures, electrical outlets, and around poorly installed insulation (if there is any). These condensation/moisture problems will occur during the heating season. Exterior sealants can be good at keeping water out but are also good at keeping water in. Trapped water in the wall cavity can lead to mold behind drywall and other moisture related problems.

Another flaw in sealing the exterior as a barrier to moisture intrusion is that construction materials are always moving. Nothing can stop the expansion and contraction of the exterior walls. The brittle nature of the SFB causes cracks throughout the wall assembly and this provides a direct path for water to penetrate the block. Once the water reaches the hollow core of the SFB, it moves to the interior.

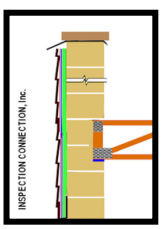
Finally, exterior sealants create a wall that is more air tight which only increases the air pressure drop across the surface from prevailing winds and temperatures. This driving force increases water penetration through exterior cracks and openings. Capillary action provides movement of water through microscopic spaces of 1/8 inch or less. Pressures rise to over one PSI in gaps of less than 1/1000 of an inch and only the tiniest of cracks are needed to accelerate moisture movement into the wall.

In short, sealing the exterior will not solve the problem, and in fact can, in many cases, exacerbate the already poor performance of the material.




**Expansion and contraction of SFB will cause cracks. Mortar head joints are typically the worst detailed areas.**

## BEST SOLUTION – Install a rain screen

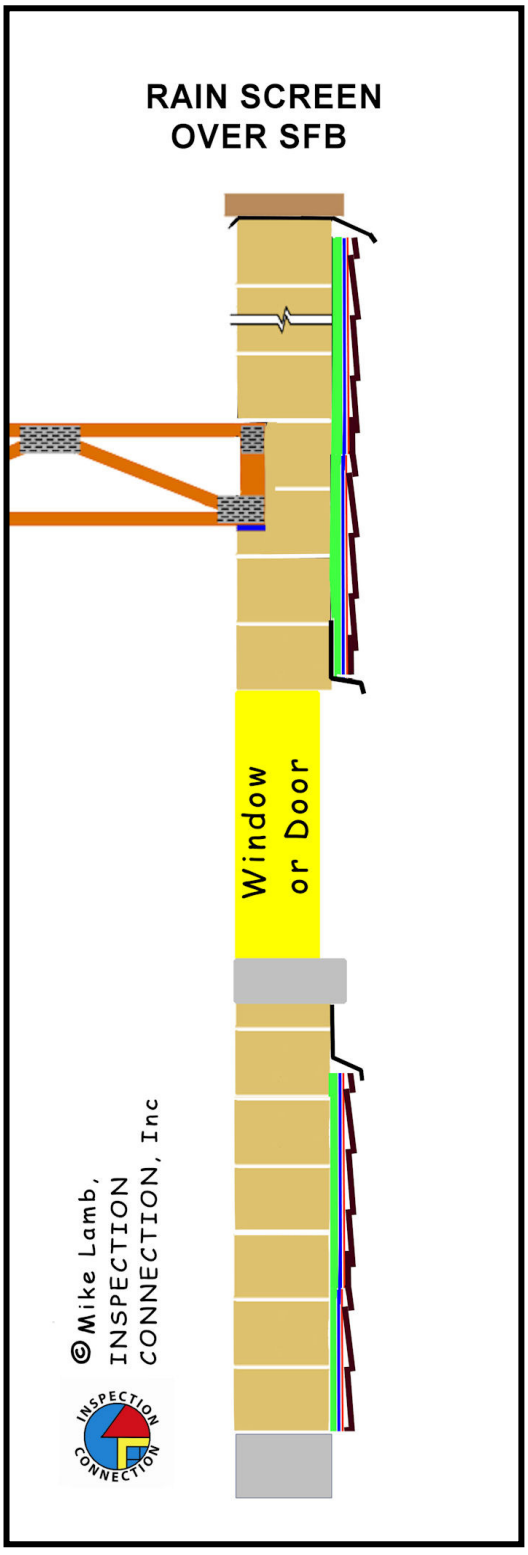



The long term remedy for SFB buildings that have through-wall water infiltration is to build a rain screen to buffer the SFB from the outside elements. A rain screen is a building enclosure moisture control design that allows some water to penetrate the outside surface and diverts this water back to the exterior by gravity through a drainage gap. Typical rain screens can be vinyl siding, drainage plane stucco, architectural panels, brick veneer, fiber cement board, etc.

## RAIN SCREEN

The type of exterior siding/cladding to use depends on your budget and aesthetics. Whatever rain screen you choose will have a common installation protocol based on the principles of rain screen design.

**The following steps are a primer to achieve a competent rain screen using vinyl siding as an example**.



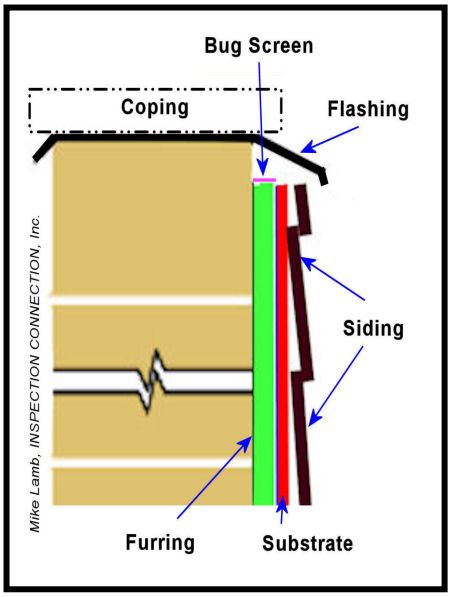

1. Re-point or seal all openings and gaps at the exterior SFB and fenestrations. The mortar head joints between the block are often the most poorly pointed areas of the block.

2. Areas of the SFB wall that are deemed impractical to side behind or around need to be determined at this time (such as at the main electrical service conduit). These areas should be coated with a high quality elastomeric water repellant sealant. All SFB 6" from any fenestrations should also be sealed. Most elastomeric paints require two coats to be effective on SFB; a high quality block filler and then the final elastomeric coating. . Split face block is a troublesome substrate, due to its uneven surface and porosity The manufacturer's instructions should be followed carefully.

3. Install metal flashing against the SFB wall beneath the parapet wall coping (proper coping may need to be installed), and above and below all building fenestrations, such as windows, doors, light fixtures, exterior decks, clothes dryer vents, etc. All flashings should project a 3/8 inch minimum beyond the new finished wall and have a sloped drip edge. The horizontal sides of this flashing should extend 3 inches on both sides of the door or window opening.

4. A heavy screening needs to be stapled horizontally at the top and bottom edges of the furring strip terminations to help keep bugs from getting behind the new siding. This will also maintain a breathable drainage channel. It is best if this is done as the furring strips are being applied so the screening can be installed behind the strip as well as over the front of the furring strip.

5. The exterior walls should be furred out vertically 16" O.C. with pressure-treated/moisture resistant 1 x 3 furring strips. There should be no horizontal furring as this will block moisture and air flow behind the new siding. The air gap also allows quick drying time for any moisture that gets past the siding. Remember, the rain screen siding is not meant to be waterproof.




6. Install a 1/4 inch minimum thickness backer board/substrate of a moisture resistant material such as pressure treated plywood over the furring (or another suitable water resistant substrate).

7. Install vinyl siding with suitable end trim to cover any exposed edges.

While a rain screen offers the best above ground protection from water infiltration it cannot prevent damp rise from the ground into the foundation. Floor joists near grade that are not properly installed and separated from the masonry with a capillary break may still absorb unwanted moisture. To deal with this, an additional ground water source management system may be needed.

## CONCLUSION

Split face block is an extremely porous material that should not have been used in single wythe construction. Sealing the exterior with an elastomeric paint is a temporary solution at best, and can create unintended moisture problems within the building envelope. An exterior rain screen system installed over the SFB offers the best above ground protection from moisture penetration.



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