2020 WHITE PAPER

THE TRUTH ABOUT WATER RESISTANT GLAZING

Ray Crawford
President, Crawford-Tracey Corporation

FLL Terminal 1, Ft. Lauderdale, FL
Architect: Corgan Associates / Gresham Smith & Partner
General Contractor: Hunt Construction / Moss & Associates
Photographer: Issac Baird

ABSTRACT

All commercial glazing systems are not created equal! In hurricane-prone regions such as Florida, the building envelope is exposed to the most extreme weather conditions. Although industry test standards in hurricane-prone regions are some of the most stringent in the world, the reality is, they are often exceeded by hurricane forces, thus causing water infiltration, aka “water leaks.”

When selecting a glazing system, consideration should be made for performance criteria that exceed the minimum code requirements. Code requirements for water resistance are typically 12 to 15 percent of maximum positive design pressure, well short of what is needed in a hurricane or significant weather event. Studies have proven that these minimum standards do not perform when exposed to these extreme conditions. There are a few glazing systems that are capable of weathering the storm. The Pro-Tech glazing systems by Crawford-Tracey are designed to perform for all levels of hurricane impact resistance and extreme weather conditions with a water resistance rating of 100psf.

CRAWFORD-TRACEY CORPORATION

Over 40 years of projects with face barrier seals and no failures.

801 Lincoln
Miami Beach, FL >

Architect:
Shulman+Associates

General Contractor:
Miller Construction

Photographer:
Emilio Collavino

THE AFTERMATH

In the aftermath of many Hurricanes including Irma, Michael, Francis, Wilma, etc., we are faced with the realization that the tested industry standard for glazing systems can be exceeded by hurricane forces. Variables like storm duration, wind and water pressure, glazing system fabrication and installation determine how fenestrations perform both during and after an event. So, what happens when a window or door’s design and performance are compromised by an actual hurricane or severe windstorm? The answer is plain and simple, they leak.

September, 2017
Hurricane Irma - Miami, FL

Now, this is not to say that all building leaks source back to the glazing system. There are multiple areas of adjoining building envelope components where water intrusion can occur, such as the roof, wall cladding systems, weatherproofing elements, and the like. In terms of this white paper, let’s focus on some of the reasons why leaks occur in “water resistant” glazing.

THE ROLE OF THE GLAZING SYSTEM

The glazing system design, installation method and the application and use of sealants play a significant role in keeping a structure dry during and after a weather event. Window system joinery is a critical area that can be problematic, particularly if there are exposed framing joints, improper joint construction, or incorrect application of joinery sealants. Perimeter sealant perforation or failure also contributes to unimpeded water intrusion. Older mindsets have been to try and incorporate dual beads of sealants on the systems to try and mitigate the continuous failures of poorly designed systems. The #1 problem with that approach is that instead of improving the design, the second bead acts as a “band aid” and can be a formula for bigger problems. The development of a leak and the failure of the exterior sealant bead will result in delayed or masked indication of the failure. The second bead/sealant can divert water into concealed cavities within the surrounding materials where it can collect and get trapped. Over time the wet conditions can likely develop mold and sick building issues. Not a preferred or ideal approach.

Installing Crawford-Tracey's Pro-Tech pre-glazed unitized glazing system.

The Pro-Tech glazing systems offer a water resistant rating of **100psf** - the industry standard is 15psf.

WHICH GLAZING SYSTEM IS BEST

When determining which glazing system is best for a project, we must consider other defining factors beyond code requirements and general architectural specifications. Code requirements typically only require a very low level of water resistance. The code required water resistance is typically only 15 percent of maximum positive design pressure. This is in no way going to provide an adequate level of protection during hurricanes or major weather events. Specifications typically go very little above the code requirements. Next to impact protection, controlling water infiltration is one of the most critical areas in choosing the right glazing system. This concern is most prevalent in tropical and subtropical climates, where hurricanes and storms are common.

WATER INFILTRATION IN OLD & NEW BUILDINGS

After Hurricane Irma, older buildings suffered more structural damage; but surprisingly both old and new buildings (those with impact glazing systems) suffered some water infiltration and damage. Irma was a wide, slow moving storm that brought on a lot of wind driven rain. In a recent webinar “Hurricane Irma: Lessons Learned,” Chris Matthews, a glazing consultant from GCI, stated that, “They had systems that had never leaked before the hurricane. They had leakage during the Hurricane, but then, several months later, they experienced leaks during common thunderstorms that were not occurring prior to the storm.”

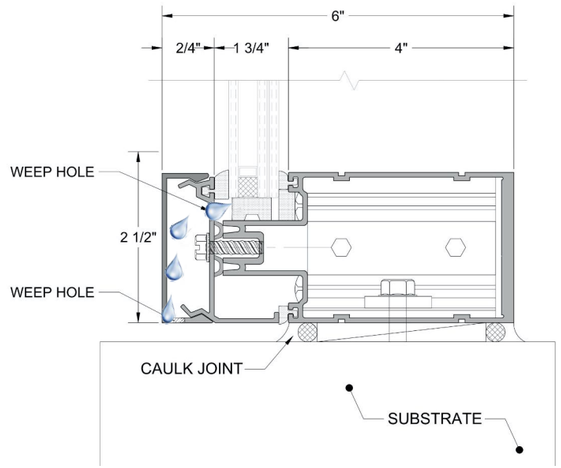
BEST PERFORMANCE FOR BOTH IMPACT & WATER

So, which glazing systems perform best in both impact resistance and water infiltration? One product that stands well above the rest is the Pro-Tech SG system. Crawford-Tracey Corporation designs, develops, and installs Pro-Tech, the highest quality fixed glazing system that has kept many structures in Florida and the Caribbean strong and dry before and since Hurricane Andrew back in ’92. The Pro-Tech structurally glazed (SG) systems are unique designs that have yet to fail or to be challenged in their performance. Their unique four-sided, structurally glazed systems incorporate a face-seal barrier wall condition and design. Developed and originated by Crawford-Tracey Corporation, this design provides both a sustainable and long-lasting water resistance performance and rating. Where industry standards typically test to 12-15psf, the Pro-Tech SG systems surpass to a water test pressure of 100psf.

THE FACE-SEAL BARRIER SYSTEM

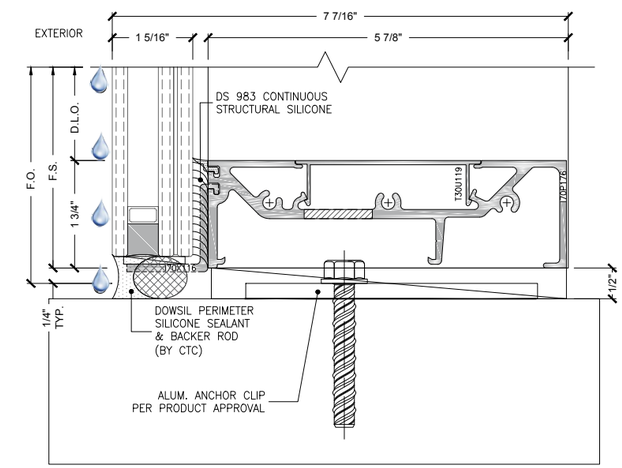
Unlike the older designs of the conventional pressure-equalized and/or rain screen systems, the face-sealed barrier wall performs leaps and bounds above the rest in terms of water resistance and endurance. In comparison, the pressure-equalized system utilizes exposed joinery, exposed anchors, captured glazing, gaskets, weeps, and sill pans that must work together in “perfect harmony” to preclude water intrusion. The four-sided structurally glazed system, particularly the face-sealed barrier wall concept, has its framing components entirely on the dry side of the system. The glass and silicone sealant at the exterior face serve as the principal drainage plane – no weeps, joints, or pressure bars, just silicone and glass. Though the face-sealed barrier wall concept is not as prevalent or age-old as the pressure-equalized model, it serves to be simpler, durable, and more easily maintained for a much longer period.

Pressure-Equalized Systems



Pressure-equalized systems rely on pressure equalization, gaskets, seals, and weeps to control the infiltration of water. The interior interface of the glass and the frame establishes the difference between the wet side and dry side. When the system is exposed to wind driven rain and a pressure difference, water may penetrate past the first gasket into the drained cavity.

Face-Sealed Barrier Wall Systems



The principal drainage plane of face-sealed barrier systems consists of glass and silicone and does not allow water past the exterior plane of the system.

Ironically, when the rain screen or pressure-equalized systems typically fail, the common approach is to repair the system by using applied sealants in an attempt to convert it to a face-seal barrier wall system. However, due to the immense number of joints and exposed union of materials, it is very difficult.

Mount Sinai Medical Center
Miami, FL >

Architect:
Cannon Design

General Contractor:
Robins & Morton

Why choose a glazing system in hurricane prone regions that will fail?

TYPICAL FAILURES

Recent hurricanes have proven that most of the typical failures of the conventional pressure-equalized system design is its exposed metal joinery. During extreme wind events, the continued cyclic movement of the framing components dislodges the seals at the assembly joints. Unfortunately, the joints are prepared and sealed during manufacturing and installation, and do not typically have access or reasonable means for repair or remediation of those failed conditions.

CONCLUSION

Crawford-Tracey's unique face-sealed barrier wall design allows for elongation and aggressive movement during the continued maximum stresses of a storm or strong wind event. In addition to the phenomenal performance and longevity of the system design and weather seal, the system requires and utilizes only a single line of sealant. If by a slim chance, during the life of the system, a sealant joint is damaged, the face-sealed design can easily be accessed and 100% renewed and repaired to original condition and performance. Even if the applied caps are in place, they can be removed, and the face-sealed can be accessed for simple repair.

It looks as if the search is over. Why choose a system that by the nature of its design allows water to pass within it as part of its diversion process? It is far more likely to have water intrusion under these conditions. Amongst a variety of other design performance failures in comparison, the conventional pressure-equalized systems have an undefeated challenger in the face-sealed barrier wall design.

About Crawford-Tracey
Crawford-Tracey Corporation was founded in 1956 and has become the largest contract glazier & window manufacturer based in the state of Florida. The company offers a complete line of impact and non-impact-resistant window and door products. For more information visit **www.crawfordtracey.com**