

WHY WE TEST WINDOWS?

By: David L. May, Jr., AIA

Coastal areas have unique air and moisture infiltration conditions that other, more sheltered areas of the country don't experience. In addition, the Atlantic Coast is frequently battered in the winter months by long duration storms called Nor'easters which bring large quantities of wind driven moisture. As a result, the smallest gaps in building exteriors can admit large quantities of water over the duration of the storm.

Testing windows has become a very important quality control aspect in specifying windows for multi-family residential projects located in coastal areas. DLM Architects has established a very good testing protocol that replicates the conditions found along coastal communities in the eastern United States. We developed this test protocol because we discovered that most "standard" tests for air and water infiltration were designed for comparative performance results only. These standard tests actually allow a certain amount of leakage, and the rate of leakage is used to determine the window rating. In coastal locations, with their intense long duration winds, a small amount of water leakage becomes a large accumulation of water inside the window. This is of serious concern to condominium management and condominium dwelling unit owners because many of these intense wind storms occur during the winter when the dwelling unit is uninhabited. Without an occupant to mop up the leaks, the accumulated water creates long term damage to window stools and the wall beneath the windows.

Air leakage is equally vexatious. Cold air leaking around windows caused severe condensation problems on the interior face of the window. Furthermore, many coastal dwelling units are very hard to heat on the windward side of the building because of air leakage. Air leakage is especially magnified in high-rise condominium and apartments which have unit entry doors directly off an exterior walkway or hallway. In those buildings, the negative pressure on the leeward side of the building increases the rate at which air leaks in around windows and balcony doors making the dwelling unit very uncomfortable.

We have had very good "real world" correlation between the performance of windows which passed our air and water leak testing protocol and their actual performance in the coastal applications. Until recently, most of the windows which have passed our tests have been aluminum commercial double-hung and sliding windows. About 2½ years ago we began to test vinyl windows in order to help our clients meet a budget price somewhat less than the price of aluminum windows. Since that time we have tested approximately 15 vinyl window manufacturers and we have found just two that has passed all air and water infiltration tests. Based on our tests, we have specified these windows in four multi-family renovation projects (about 1800 window units) in the last two years. During that time we have continued to monitor their installed performance. This window has been subjected to several Nor'easters and one hurricane (Isabel on 9/18/03). We have experienced less than one percent "in the field" failure with this window, which was blamed on and installation defect in half of the failed locations and a manufacturing defect with a compression seal

was blamed the remaining failures. Both defects were corrected in the field and since then there hasn't been any other failures.

Selecting replacement windows are more than just its air and water infiltration performance however. Other window concerns of our condominium building owners:

1. The depth of the replacement frame is less than the original wood window it replaces requiring more interior work around the window opening to fill the gap. This raises the cost of installation.
2. Many replacement window installers do not remove the original window frame, preferring instead to use a "panning system" to wrap the existing window frame. The replacement window then sits inside the new panning, significantly reducing the sight-line (area of glass). This is of special concern in waterfront locations where the occupants paid more for their dwelling because of the view to the water.
3. It is for these reasons we recommend we air and water test residential windows before they are specified.

