# WINDOW/DOOR
## PROTOTYPE PRE-TESTING:

How to Save Time & Cost
Getting Your Product AAMA-Certified

Ultrafab® inc.

As the head OEM design engineer it's up to you to make sure your manufacturing process is operating at a competitive pace. To stay competitive, your products need to be built faster or at a lower cost than your competition. One way window and door OEMs are doing this is by choosing subassembly vendors who can guarantee product performance prior to production.

In this resource, we provide an example of a sliding glass door OEM that saved time and money by pre-testing and optimizing their product in our prototype test lab. How were we able to save them time and cost? Here's how:

# AAMA Test vs Vendor Pre-Testing

All windows and sliding glass doors need to be tested for AAMA certification. Let's take a look at the average time and cost difference between testing your product with AAMA and pre-testing it with a sealing supplier that tests to AAMA standards like Ultrafab:

## AAMA Testing: 2 Months; Thousands of Dollars

In order to officially test your window or door product at an AAMA-accredited laboratory, it takes about two months and costs thousands of dollars. This becomes very expensive if you don't know what to expect from your product. If your product doesn't achieve AAMA certification during the first test you will have to spend even more time and money to correct the issue and resend the product to be certified.

## Ultrafab Pre-testing: 2 Weeks; FREE

Pre-testing your windows and doors in our lab takes 1-2 weeks and is completely free. And as a weatherstripping manufacturer and sealing supplier, we can optimize the air and water resistance and operating force of your product during our pre-testing. While we can't provide testing on all AAMA standards, clearing these quality standards will still provide significant time and cost savings.

# Is Pre-testing Reliable?

You might question whether our test is reliable enough to get your product through AAMA's certification with regards to air, water, and operating force. As an AAMA-certified manufacturer, we perform the same tests for window and door products as AAMA. We also provide optimization reports (as you will see below) to give you a strong understanding of what your product needs to meet compliance. Prior testing like this can knock out a LOT of problems related to air/water infiltration and operating forces. Let's examine a real life example.

# Case Study

## Problem

An OEM customer wanted to improve the performance of their 70.5” X 81” sliding glass door. They were looking to improve upon their current air infiltration, water penetration, and operational force results. Instead of trying to improve these results on their own, they saved themselves from retesting a solution that still might not have passed AAMA by partnering with a sealing solution manufacturer that offered pre-testing and optimization expertise.

## Solution

### 1. Analyze Benchmark

Ultrafab started with an analysis of their current product. The chart below displays the original test results for the door.

| TEST DOOR AS RECEIVED | |
|---|---|
| Air infiltration (0.30 iwc.) test pressure | 0.25 L/S/M2 (0.05 cfm/ft²) |
| Water penetration (1.36 iwc.) test pressure | Pass @ 330 Pa (6.89 psf) PG45 |
| Force to breakaway | Open: 102 N (23 lbf ); Close: 58 N (13 lbf) |
| Force to maintain motion | Open: 40 N (9 lbf); Close: 40 N (9 lbf) |

### 2. Test to ASTM Standards

After documenting these benchmarks, Ultrafab tested the door in accordance with:

- ASTM E-547 for water penetration
- ASTM E-2068 for operational forces
- ASTM E-283 for air infiltration

## Water Testing

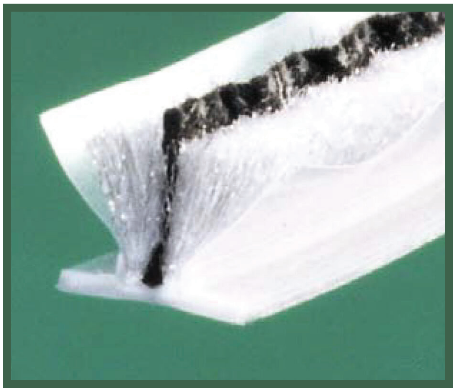
The initial testing gave good results. During the water testing the sill pocket in front of the fixed panel filled partially with water to a level where air coming in around the perimeter of the interior weep slot caused percolation that sent water droplets past the imaginary interior plane of the window, constituting a failure at a water test pressure of 360 Pa (7.52 psf).

## Operational Testing

The operable panel needed a slight roller adjustment to level it. That also meant realignment of the lock keeper height to insure positive locking. The weight of the operable panel was 36.3 kg (80 lbs). The operational forces all fell nicely within the allowable tolerances of AAMA/WDMA/CSA 101/I.S.2/A440-11.

An inspection of the distances between the operable panel and frame showed that the pile height originally in use was a good choice, as it was giving a nominal 25% compression when shut and locked.

## Air Testing



The pads and gaskets had good placement and were of sufficient size dimensioning. They did not interfere with operation but gave good protection in terms of air and water infiltration resistance.

## 3. Weaterstripping Optimization

A variety of different styles of weatherstripping, close to the present pile height of (0.25”), were used and retested. Ultrafab tested a total of (8) substitutions and delivered their results for the customer (as listed below).

* Items show an improvement from the original test results

| **0.23” INTERNAL CLEAR TRIPLE FIN** | |
|---|---|
| Air infiltration (0.30 iwc.) test pressure | 0.30 L/s/*m2 (0.06 cfm/ft²) |
| Water penetration (1.36 iwc.) test pressure | Pass @ 330 Pa (6.89 psf) PG45 |
| Force to breakaway | Open: 111 N (25 lbf); Close: *40 N (9 lbf) |
| Force to maintain motion | Open: *31 N (7 lbf); Close: *31 N (7 lbf) |

| **0.25” INTERNAL SOFT TRIPLE FIN** | |
|---|---|
| Air infiltration (0.30 iwc.) test pressure | 0.25 L/s*m2 (0.05 cfm/ft²) |
| Water penetration (1.36 iwc.) test pressure | Pass @ 330 Pa (6.89 psf) PG45 |
| Force to breakaway | Open: 142 N (32 lbf); Close: 62 N (14 lbf) |
| Force to maintain motion | Open: 40 N (9 lbf); Close: 40 N (9 lbf) |

| **0.23” CLEAR CENTER FIN** | |
|---|---|
| Air infiltration (0.30 iwc.) test pressure | 035 L/s*m2 (0.07 cfm/ft²) |
| Water penetration (1.36 iwc.) test pressure | Pass @ 330 Pa (6.89 psf) PG45 |
| Force to breakaway | Open: 116 N (26 lbf); Close: 58 N (13 lbf) |
| Force to maintain motion | Open: 40 N (9 lbf); Close: 40 N (9 lbf |

| 0.23 INTERNAL SOFT TRIPLE FIN | |
|---|---|
| Air infiltration (0.30 iwc.) test pressure | 0.40 L/s*m2 (0.08 cfm/ft²) |
| Water penetration (1.36 iwc.) test pressure | Pass @ 330 Pa (6.89 psf) PG45 |
| Force to breakaway | Open; 102 N (25 lbf); Close: *45 N (10 lbf) |
| Force to maintain motion | Open: *36 N (8 lbf); Close: *36 N (8 lbf) |

## Halted Water Testing

When we do testing with a variety of materials, results sometimes indicate something new about your product. In this case, after testing with a few of our weatherseals, we halted the water testing. The reason for this is because results appeared to be limited by the weep slot, not the weatherseals.

| 0.27" EXTERNAL SOFT TRIPLE FIN | |
|---|---|
| Air infiltration (0.30 iwc.) test pressure | 0.30 L/s*m2 (0.06 cfm/ft²) |
| Force to breakaway | Open: 156 N (35 lbf); Close: 67 N (15 lbf) |
| Force to maintain motion | Open: 45 N (10 lbf); Close: 45 N (10 lbf) |

| 0.27" SOFT ULTRA REACH | |
|---|---|
| Air infiltration (0.30 iwc.) test pressure | 0.35 L/s*m2 (0.07 cfm/ft²) |
| Force to breakaway | Open: 116 N (26 lbf ); Close: 58 N (13 lbf) |
| Force to maintain motion | Open: *36 N (8 lbf); Close: *36 N (8 lbf) |

| 0.25" CLEAR CENTER FIN | |
|---|---|
| Air infiltration (0.30 iwc.) test pressure | 0.45 L/s*m2 (0.09 cfm/ft²) |
| Force to breakaway | Open: 125 N (28 lbf ); Close: 58 N (13 lbf) |
| Force to maintain motion | Open: 40 N (9 lbf); Close: 40 N (9 lbf) |

| 0.22" INTERNAL SOFT TRIPLE FIN | |
|---|---|
| Air infiltration (0.30 iwc.) test pressure | 0.25 L/s*m2 (0.05 cfm/ft$^2$) |
| Water penetration (1.51 iwc.) test pressure | Pass @ 360 Pa (7.52 psf) PG50 |
| Force to breakaway | Open: 120 N (27 lbf ); Close: *53 N (12 lbf) |
| Force to maintain motion | Open: *36 N (8 lbf); Close: *36 N (8 lbf) |

## Resolving Weep Slot Issue

In later testing the internal weep slot was sealed into place with silicone and passed a water grade design pressure of 2400 Pa (50.0 psf). It eventually developed a leak in the silicone seal and began to percolate yet again, causing a failure at a water grade design pressure of 2400 Pa (50.0 psf).

The weep slot was cleaned up and a dual sided adhesive tape was added to the backside of the weep slot before reinserting it back into the opening. The dual sided adhesive tape performed better and passed a water grade design pressure of 2400 Pa (50.0 psf) with the 0.22" internal soft triple fin weatherseal in place. A great deal of water filled the interior sill track eventually coming over and causing the failure at a water grade design pressure of 2640 Pa (55.0 psf).

At that point the original weatherseal (0.25" soft center fin) was put back into the door and the door passed a water grade design pressure of 2640 Pa (55.0 psf). The interior track once again filled high with water but did not come over.

## Results

Although we were able to match the original air results and remain close with some weatherstrip options, there were no substitutions that were able to better the air infiltration results. The operational performance at times were slightly bettered.

A positive seal between the internal weep slot and the opening in the frame sill with a dual sided adhesive tape proved beneficial to the water test results. This did away with the percolation problem, which in turn allowed the door to pass at a test pressure of 400 Pa (8.35 psf), water grade DP55.

# Ready to Increase Business?

We hope this case study inspired you with the possibilities to reduce time and cost in developing your next window or door product. We're confident that you can guarantee product performance faster and meet AAMA compliance if you select subassembly vendors that test to industry standards. If this is important or interesting to you, contact us. During our conversation we can discuss feasibility, potential business return, and determine if we are the best fit to manufacture and test your window and door seals.