Impact-Resistant Windows: An Overview

Impact-resistant windows are evaluated in two ways for design pressure (DP). The first test evaluates a window’s structural performance (air infiltration, water resistance and resistance to wind loading, among other criteria) and is written jointly by the American Architectural Manufacturers Association (AAMA), the Window & Door Manufacturers Association (WDMA) and the Canadian Standards Association (CSA). Only windows that achieve a baseline rating of DP50 may move onto the second test standard; applicable to impact-resistant windows: the very stringent ASTM E1996, “Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes.” This test evaluates the product’s ability to resist the impact of flying debris. It also requires that the window be subjected to thousands of cycles of severe wind loading after the impact to ensure it will hold up to both positive and negative pressures.

When Viwinco launched its impact-resistant OceanView® product line, we tested to the industry standard of DP50. Now with the introduction of fortified housing (which necessitates windows that meet a higher DP standard) and increasingly tougher codes being imposed on coastal communities, Viwinco has taken the leadership role by designing products that meet a higher DP standard. Windows that meet this higher DP requirement will perform better in hurricanes and other severe weather conditions.

Viwinco tests all its products in-house at our state-of-the-art R & D facility. Third-party technicians certify our results. Viwinco tests all its products in-house at our state-of-the-art R & D facility. Third-party technicians certify our results.

American Architectural Manufacturers Association (AAMA) Design Pressure (Structure)

A rating that identifies the load induced by wind and other dynamic pressures. The higher a DP rating, the more resistant the window is to the effects of wind and other pressures.

**Performance Grade**

A numeric designation that defines the performance of a product in accordance with AAMA standards. The performance grade is determined upon successful completion and verification of all applicable tests (air, water, structure).

ASTM Impact DP

A numeric designation that defines the performance of our windows impacted by a “missile” (for our testing purposes, a 9-lb 2x4) and subjected to 4,500 positive and 4,500 negative static pressure differentials. The number represents pounds per square foot (psf). ASTM International was known until 2001 as the American Society for Testing & Materials.

Wind-Speed Equivalent (DP Rating)

In the testing environment, windows are subjected to positive and negative wind cycles, with wind speeds simulated by air-blowing mechanisms and vacuums. The wind-speed equivalent for a DP50 window is 139.5 mph. In order to be certified at DP50 however, the window must remain intact in the testing environment at 1.5 times this speed. The added speed ensures the window’s structural integrity in the field.

Enhanced Sill Riser

Viwinco’s enhanced sill riser elevates the height of the sill dam to 1-5/8”, providing superior protection against water penetration and enabling the window to achieve a DP70 rating. See chart.

Glossary of Terms

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**Design Pressure Ratings Guide**

At-a-glance DP ratings chart and explanation of associated terminology

Impress the Weather

January 2015

A Word About This Guide

We created this guide as a quick reference to help you understand the products Viwinco offers at various DP ratings and sizes. It also allows you to objectively compare our product line to other window manufacturers’ offerings. As much as we tried to simplify this guide, there are some areas that might cause confusion. We aim to explain them here:

- The vast majority of our S-Series/Cambridge windows have been rated for both commercial and residential uses. Performance Grades with an “R” before them stand for residential; those with “C,” “LC,” or “CW,” designate commercial ratings. The results displayed inside this document are accurate based on the sizes and reinforcement required to obtain the DP ratings in each performance class (e.g., residential, commercial).
  
  For example, a commercial window size 48x72 has a higher DP rating than our Cambridge 48x72. This is because we tested our commercial window at this size with the required reinforcement to pass the commercial test and achieve a higher DP.

- Gateway sizes for residential and commercial windows are different. Commercial gateways are larger than residential ones and require a minimum DP30; residential gateways are smaller than commercial ones and require only a minimum DP15. A 56x91 double-hung was tested as our commercial gateway window, to satisfy the requirements, additional reinforcement was necessary at this size.

Viwinco Windows

www.Viwinco.com

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Missile Level D Impact Testing. In the initial part of the impact test, the window is shot with a 9-lb, 8-foot-long 2x4 projected out of a canon.
### S-Series, Cambridge Residential

<table>
<thead>
<tr>
<th>SIZE</th>
<th>AAMA DP Structure</th>
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<td>R70</td>
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<td>C60*</td>
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### S-Series, Cambridge Commercial

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*Qualifies because tested and certified at larger size
**Overall DP dependent on lowest DP value of style selected
†Sidelite/Transom

CR = Commercial Reinforcement
C = Commercial
CW = Low and mid-rise commercial
LC = Light Commercial—low and mid-rise multi-family
OCEANVIEW with Enhanced Sill Riser, Double- and Single-Hung 36 x 72
ASTM Impact: DP70 DP Rating: 165.4 mph Structure Rating: 202.5 mph

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**Notes:****

- DP Ratings Guide
- OceanView with Enhanced Sill Riser, Double- and Single-Hung 36 x 72
- ASTM Impact: DP70 DP Rating: 165.4 mph Structure Rating: 202.5 mph

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**Legend:**

- DP = Design Pressure
- R = Resistance
- C = Commercial
- CW = Low and mid-rise commercial
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- *Qualifies because tested and certified at larger size
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