Understanding Structural Performance Testing

What are the Performance Classes?

R = Residential: commonly used in 1 and 2 family dwellings

LC = Light Commercial: commonly used in low-rise and mid-rise multi-family dwellings and other buildings where larger sizes and higher loading requirements are expected

CW = Commercial Window: commonly used in low-rise and mid-rise building where larger sizes, higher loading requirements, limits on deflection and heavy use are expected

AW = Architectural Window: commonly used in high-rise and mid-rise buildings to meet increased loading requirements and limits on deflection, and in buildings where frequent and extreme use of the fenestration products is expected

Reading the charts below.

PG = Performance Grade - Entry Level (minimum) pressures allowable for each Performance Classification. Optional Performance Grades may be specified for each Performance Class (accept AW) in 5 psf increments above the class minimum, up to a maximum of 100 psf.

Minimum Test Sizes - based on window type, the smallest size allowable for each Performance Class. Additional testing is required to report larger sizes within a Performance Class.

Air Infiltration - Window specimen closed and locked, is subjected to 1.57 psf (25 mph wind) positive air pressure. Air leakage cannot exceed 0.30 cfm/ft ^{2}.

Water Penetration - 23 minute test with window specimen closed and locked, subjected to a 4 cycle test. Each cycle consists of a 5 minute duration with positive pressure applied and 1 minute with pressure released for drainage, but with water spray continuously applied. The minimum test pressure for all R, LC, CW and AW windows shall be 15% of the design pressure for the Performance Grade (PG). No water is allowed inside the inner most vertical plane of the test specimen.

Uniform Load - minimum uniform Design Pressure (DP) as specified for each window classification. Specimen is subjected to both positive and negative loads with deflections recorded during each load.

Overload - 150% of DP, based on window classification. In addition, there shall be no permanent deformation of any sash or frame part in excess of L/175 where L = the longest, unsupported span of a sash, either stile or rail, measured to the nearest 0.01".

Minimum Test Requirements for Each Window Type by Class	**Minimum Window Load**	**Minimum Test Size By Window Type**			
Performance Classification	**PG (PSF)**	**DH**	**HS**	**CA**	**Fixed**
Residential - R	15	40 x 63	63 x 44	24 x 60	48 x 48
Light Commercial - LC	25	44 x 75	71 x 56	32 x 60	56 x 56
Commercial Window - CW	30	56 x 91	71 x 60	36 x 60	60 x 60
Architectural Window - AW	40	60 x 99	99 x 79	36 x 60	60 x 99

ProStar and ECOSTAR Structural Test Results

	Size Tested	**Performance Class**	**Air Infiltration (Allowed/Actual) unit of measure - cfm/ft^2**	**Water Penetration unit of measure - psf**	**Uniform Load 45.11 psf +/-**	**Overload 67.67 psf +/-**
Double Hung*	44" x 75"	LC-PG45**	0.30/0.20	7.52 - DP50	Pass	Pass
2-Lt Slider*	71" x 60"	CW-PG45**	0.30/0.13	7.52 - DP50	Pass	Pass
Casement*	36" x 80"	AW-PG45**	0.30/0.03	10.66 - DP70	Pass	Pass

*** All ProStar and ECOSTAR window types pass the Performance Grade (PG) PG45 for the size tested and the window class specified above.**
The Performance Grade is determined by the lowest value achieved for windows tested to Structural Test conditions as specified under AAMA/WDMA/CSA 101/I.S.2/A440-05.
**** The Performance Class is determined by the window size and window type tested under the same specification above.**