

PRODUCT Phantom 5000 Zero Sightline Casement

TEST RESULTS

AAMA/WDMA/CSA 101/I.S.2/A440-11 (NAFS 11) CLASS-GRADE		AW-PG90
Air Infiltration and Exfiltration	ASTM E283	0.10 cfm/ft² @ 6.24 psf
Static Pressure Water Resistance	ASTM E331	15 psf
Cyclic Static Pressure Water Resistance	ASTM E547	15 psf
Structural – Design Load	AAMA E330	90 psf
Structural – Overload	AAMA E330	135 psf
Forced Entry	ASTM F588	Grade 40
Life Cycle Testing	AAMA 910-10	4000 hardware cycles Thermal Cycling (6 cycles 0^o – 180^o)
Test Unit: Single lite - 36" x 60"		

TEST LAB

Exova
 Mississauga, Ontario

Report Number	17-06-M0067-1N-T
Test Date	05/05/17
Report Date	05/25/17

Reference Exova report #17-06-M0067-1N-T, dated May 25, 2017, for complete test specimen description and data.

Tubelite Representative:



(sign) 7/17/2017 (date)

Tim Fookes - Vice President of Engineering (title)

TEST METHODS

AAMA/WDMA/CSA 101/I.S.2/A440-11 (NAFS 11): *North American Fenestration Standard/Specification for Windows, Doors, and Skylights.* Testing was conducted for the Architectural Window (AW) class at Performance Grade (PG) 90: AW-PG90

Air Leakage Resistance: *ASTM E283, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.* Testing was conducted at 6.24 psf positive and negative static air pressure difference.

Static Pressure Water Resistance: *ASTM E331, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, Curtain Walls by Uniform Static Air Pressure Difference.* Testing was conducted at 15 psf positive static air pressure difference for 15 minute duration. Water applied at a minimum rate of 5 gal/ft²/hr.

Cyclic Pressure Water Resistance: *ASTM E547, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.* The test was performed at 15 psf positive pressure differential and a water spray rate of at least 5.0 US gal/ft² per hour. Each cycle consisted of five minutes with the pressure applied and one minute with the pressure released, during which the water spray was continuously applied.

Structural Performance: *ASTM E330, Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.* Testing was conducted at +/- 90 psf design loads and +/- 135 psf overloads. Allowable Criteria: Design – No deflection of unisupport L in either positive or negative direction at design pressure. Overload – No glass breakage, permanent damage to make windows inoperable, or permanent deformation of main frame or sash member in excess of 0.2% of its clear span.

Life Cycle Testing: *AAMA 910-10, Voluntary "Life Cycle" Specifications and Test Methods for Architectural Class Windows and Doors.*

Forced Entry Resistance: *ASTM F588, Standard Methods for Measuring the Forced Entry Resistance of Window Systems, Excluding Glazing Impact.* Testing was conducted at a Grade 40 resistance level.