

Test Report Summary

950SG SERIES RIBBON WINDOW

AIR – WATER – STRUCTURAL – THERMAL - SEISMIC



TEST DESCRIPTION	TEST METHOD	TEST RESULTS	
Air Infiltration	ASTM E283	0.3 L/s•m ² @ 300 Pa	0.06 cfm/ft ² @ 6.24 psf
Air Exfiltration	ASTM E283	0.3 L/s•m ² @ 75 Pa	0.06 cfm/ft ² @ 1.57 psf
Air Exfiltration	ASTM E283	0.3 L/s•m ² @ 300 Pa	0.06 cfm/ft ² @ 6.24 psf
Static Water Penetration	ASTM E331	720 Pa	15 psf
Cyclic Water Penetration	ASTM E547	720 Pa	15 psf
Dynamic Water Penetration	AAMA 501.1	720 Pa	15 psf
Vertical Interstory Displacement	AAMA 501.7	+/- 19 mm	+/- 0.75"
Condensation Evaluation	AAMA 501.9	-18 °C ext : 21 °C int 25% RH, 0.5°C dewpoint	0 °F ext : 70 °F int 25% RH, 33 °F dewpoint
Structural Design Load	ASTM E330	+/- 1.9 kPa	+/- 40 psf
Horizontal Interstory Elastic Displacement	AAMA 501.4	+/- 31 mm	+/- 1.20"
Thermal Cycling	AAMA 501.5	-29 °C to 82 °C	-20 °F to 180 °F
Structural Overload	ASTM E330	+/- 2.9 kPa	+/- 60 psf
Horizontal Interstory Inelastic Displacement	AAMA 501.4	+/- 46 mm	+/- 1.80"

TEST LAB

QCT

Mosinee, WI 54455

QCT

Mosinee, WI 54455

REPORT NUMBER	QCT20-6000.10	QCT20-6001.03
TEST DATE	11/8/2021 – 12/9/2021	3/17/2021 – 4/7/2021
REPORT DATE	12/13/2021	4/8/2021

Test results and test methods listed below are from the test reports in the above table. Contact a Tubelite/Alumicor representative for complete test information.

2/18/2022

Tim Fookes - Vice President of Engineering Tubelite/Alumicor

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Air Infiltration: *ASTM E283-12, 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 a 300 Pa (6.24 psf) positive static air pressure differential.

Air Exfiltration: *ASTM E283-12, 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 75 Pa (1.57 psf) and 300 Pa (6.24 psf) positive static air pressure differentials.

Static Water Penetration: *ASTM E331-09, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, Curtain Walls by Uniform Static Air Pressure Difference.* Testing was conducted at 720 Pa (15 psf) positive static air pressure difference for 15 minute duration. Water applied at a minimum rate of 3.4 L/m² •min (5 gal/ft²/hr). No water penetration of water beyond a plane parallel to the glazing (vertical plane) intersecting the innermost projection of the test specimen, not including interior trim and hardware, under the specified conditions of air pressure difference across the specimen.

Cyclic Static Water Penetration: *ASTM E547-16, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, Curtain Walls by Cyclic Static Air Pressure Difference.* Testing was conducted at 720 Pa (15 psf) positive static air pressure difference for 15 minute duration. Water applied to the exterior face of the specimen for the duration of twenty-four (24) minutes at a minimum rate of 3.4 L/m² •min (5 gal/ft²/hr). No water penetration is allowed.

Dynamic Water Penetration: *AAMA 501.1-17, Standard Test Method for Water Penetration of Windows, Curtain Walls, and Doors Using Dynamic Pressure.* Testing was conducted with a dynamic pressure equivalent of 720 Pa (15 psf) for a 15 minute duration. Water applied at a minimum rate of 3.4 L/m² •min (5 gal/ft²/hr). No water penetration of water beyond a plane parallel to the glazing (vertical plane) intersecting the innermost projection of the test specimen, not including interior trim and hardware, under the specified conditions of air pressure difference across the specimen. No water penetration through perimeter detail and is not contained within drained flashing, gutters and sills. No cumulative collection of more than 15 ml (½ oz) of water on top of interior members.

Structural Design and Overload: *ASTM E330-10, Standard Test Method for Structural Performance of Exterior Windows, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.* Testing was conducted at +/- 1.9 kPa (40 psf) design loads and +/- 2.9 kPa (60 psf) overloads. Allowable Criteria: Design : L/175 or 19 mm (3/4") maximum deflection normal to wall plane for clear spans up to 4100 mm (13'-6"). L/240 +6.35 mm (1/4") for spans greater than 4100 mm (13'-6"). Overload – net permanent set shall not exceed 0.2% of the clear span.

Interstory Vertical Movement: *AAMA 501.7, Recommended Static Test Method for Evaluating Windows, Window Wall, Curtain Wall and Storefront Systems Subjected to Vertical Inter-story Movements.* Testing conducted with three complete cycles in the vertical direction parallel to the main elevation at the intermediate simulation. Parallel movement will be 19 mm (3/4") up, back to zero, 19 mm (3/4") down and back to zero (one cycle). There shall be no glass breakage, permanent damage to frame members, or anchors.

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Interstory Horizontal Elastic Displacement: AAMA 501.4-18, *Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts*. Testing was conducted with three complete cycles in the horizontal direction at floor simulation. Horizontal movement is up to 31 mm (1.2”) to the left, then back to zero, 31 mm (1.2”) to the right then back to zero. Allowable criteria: There shall be no visible damage to framing or trim components or assemblies. No glass breakage or glass fallout. Full disengagement of gaskets or weatherseals is not allowed at any location. Air infiltration and water penetration resistance shall remain within specified allowable limits without adjustments or repair. No wall components may fall off.

Thermal Cycling: AAMA 501.5-07, *Standard Test Method for Thermal Cycling of Exterior Walls*. Testing was conducted with three thermal cycles. Each cycle maintained for two hours after establishing the following temperatures and consist of:

- a. Low exterior temperature of -29 °C (-20 °F)
- b. High exterior temperature of 82 °C (180 °F)
- c. Interior temperature maintained at 22 °C (72 °F)
- d. System components shall withstand thermal movements without buckling, distortion, cracking, failure or glass, and failure of joint seals or undue stress on the finished surfaces, materials, or fixing assemblies.

Condensation Resistance Test: AAMA 501.9-19, *Surface Temperature Assessment for Condensation Evaluation of Exterior Wall Systems*. The design dew point temperature representing 21 °C (70 °F) and 25% relative humidity is 0.5 °C (33 °F). Exterior ambient air temperature to be maintained at -18 °C (0 °F) with 6.7 m/s (15 mph) wind speed. Environmental conditions will be maintained for a minimum of 2 hours. Compliance will be determined by thermocouple measurements on the interior surface of the specimen located away from non-representative conditions. Any interior surface temperature falling below the dew point temperature shall be considered non-compliant to performance requirements.

Interstory Horizontal Inelastic Displacement: AAMA 501.4-18. *Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Inducted Interstory Drifts*. Testing conducted with three complete cycles in the horizontal direction parallel to the plane of the wall. Parallel horizontal movement will be up to 46mm (1.8”) left, back to zero, 46 mm (1.8”) right and back to zero (one cycle). All glass is retained in the glazed opening with no glass fallout. No wall components fall off.