

Building Testing

TEST	SPECIFICATION	METHODOLOGY	RESULT
Salt Spray Resistance	ASTM B117-16	1000 Hours of exposure	No deleterious effects
Density of Sandwich Core	ASTM C271/C271M-16	12" X 12" X 0.6'	327 kg/m3 (20.42 Ibs/ft3)
Shear Stress and Shear Modulus	ASTM C273/C273M-18	Compressive force applied until rupture	Ultimate Core shear strength = 1.01 MPa (147 psi) Core shear Modulus = 10.9 MPa (1583 psi)

Flatwise Tensile Bond Strength	ASTM C297/C297M-16	Load was applied to the top and bottom layers of the composite panel	1.52 MPa (220 psi)
Edgewise Compressive Strength	ASTM C364/C364M-16	Compressive load was applied at a rate of 0.02 in/min	Ultimate Compressiv e Strength = 37.85 MPa (5490 psi)
Flatwise Tensile Bond Strength	ASTM C365	Load was applied to the top and bottom layers of the composite panel	1.52 MPa (220 psi)

Shear Strength by Beam Flexure	ASTM C393/C393M-16	Loaded in flexure with facing side in tension at a cross head speed of 0.025 in/min.	Maximum Core Shear Strength = 0.94 MPa (137 psi) Facing Bending Stress = 8.14 MPa (1180 psi)
Flexure Creep Evaluation	ASTM C480/C480M-16	Midspan loading setup was used with facing side in tension at a cross head speed of 0.025 in/min. until achieved.	Net Creep (in/day) Facing – 0.029.

Laboratory Aging of Sandwich Construction	ASTM C481-99 (Reapproved 2016)	Procedure A, for six repetitions of following load cycle is applied: Immerse in water at 50 °C for 1h Spray with steam at 95 °C for 3h Store at -12 °C for 20h Heated at 100 °C for 3h Spray with steam at 95 °C for 3h Heat in dry air at 100 °C for 18h	ASTM C273; C297; C364; C393 tests were reconducted after aging: the variation was +1.36 %, -5.90%; +2.55%; -7.95% Note: Positive variation indicates no decrease in strength after aging.
Resistance to Rapid Freezing and Thawing	ASTM C666/C666M-15	200 cycles of rapid freeze and thaw (4 °C to – 18 °C)	No visible change to facing, aluminium, or adhesive

Flexural Strength	ASTM C880/C880M-15	Tested a Composite panel with Mitrex panel	22.83 MPa (3311.21 psi)
Tensile Properties of Adhesive Bond	ASTM C897-08 (2016)	The adhesive bond never failed	No Failure
Screw Withdrawal Test	ASTM D1761	Testing Speed: 2.5 mm/min	2124 N
Damage Resistance Testing of Sandwich Construction s	ASTM D7766/D7766M- 16	Load was applied at the specimen midpoint through a 0.5 in. diameter hemispherical steel indenter at a constant rate of 0.01 in/min until a drop-in load was observed.	No panel deformation

Air Leakage Resistance	ASTM E283-04 (2012)	Air infiltration and exfiltration tests were performed using test pressure of 75 Pa (1.57 psf). The maximum air leakage rate was calculated and compared to the allowable air leakage.	Passed the test infiltration rate = 0.00 L/s.m2 (0 cfm/ft2) & exfiltration rate = 0.01 L/s.m2 (0.002 cfm/ft2) at 75 Pa test pressure
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Static Pressure	ASTM E330-00 (2016)	The test specimen was also tested to failure with both positive and negative loads. The specimen only showed a permanent deflection of 0.10 mm with a test load of + 5760 Pa (120 psf). The specimen failed at -5006 Pa, the rivets at the backside of the specimen failed.	All the panels tested met or exceeded requirement s
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Uniform Static Deflection	ASTM E330-02	The test specimen was tested to ±3840 Pa (80.2 spf) to examine the deflection of 2440 mm panel, the specimen showed a maximum net deflection of 4.14 mm under positive test pressure and 4.93 mm under negative load.	No failure or permanent damage
Large Missile Impact Test	ASTM E1996-14a	Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.	Passed the test. A weighted 2×4 was fired at the Mitrex panel at 50 fps.

Fluorescent Ultraviolet Radiation Exposure	ASTM G154 -16	2000 hours of UV exposure	No visible change to Glass, aluminium, or adhesive
Thermal Resistance	ASTM 1363-11	Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus	0.20 m2 °C/W (1.12 hr-ft2-oF/BT U)
Linear Thermal Expansion	ISO 10545-8	Tested from room temperature to 100 °C	11.28 × 10-6 per °C

Cyclic Pressure Loading	ASTM E1886-13a	Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials	Passed the test. Over 3,500 positive and negative pressure cycles were applied at ± 2880 Pa (60 psf), equivalent wind load of 165 mph.
Water Penetration Resistance	ASTM E331-00(2016)	During the 15-minute test period, using a pressure differential of 720 Pa (15.0 psf), there was no water leakage observed.	No water leakage