



TAKTL is an advanced Ultra High Performance Concrete (UHPC) that is over four times as strong as traditional precast concrete and performs exceptionally well in demanding conditions. The key to TAKTL's strength is the carefully calibrated ratio of engineered ingredients and a mixing sequence that packs molecules together closely and creates very tight bonds. This high packing density yields excellent flexural and compressive strength and virtually eliminates the capillary pores that cause freeze-thaw degradation in pre-cast concrete and GFRC panels.

VECTR facade and wall panels have achieved certification by Architectural Testing Inc (ATI) under ASTM C1186, Grade IV, which is the highest rated category for fiber-cement panels. ASTM C 1186 (Grade II minimum) is the International Building Code referenced standard for exterior fiber cement panels (1405.16).

VECTR facade and wall panels' performance capabilities are tested according to the methods for ASTM C 1185 without sealer or coating of any kind. The products have been certified to meet the standards outlined in ASTM C 1186. Test results have **exceeded** the requirements for classification of Type A, Grade IV material and CAN/ULC S114-05, Standard Method of Test for Determination of Non-Combustibility in Building Materials. The following results reflect testing completed by Architectural Testing, Inc. (York, PA) and Intertek (Coquitlam, BC) on 0.5" panel samples cast at the TAKTL Materials Laboratory (Pittsburgh, PA).

STANDARD	PROPERTY	RESULT	
ASTM C 1185-08	Modulus of Elasticity (Length/Width) - Dry	3,657,727 / 3,712,717 psi	25,219 / 25,598 MPa
ASTM C 1185-08	Modulus of Elasticity (Length/Width) - Wet	3,947,720 / 3,494,684 psi	27,219 / 24095 MPa
ASTM C 1185-08	Density	137 lb/ft ³	2,196 kg/m ³
ASTM C 1185-08 ^{*1}	Flexural Strength - Dry	6,895 psi	48 MPa
ASTM C 1185-08 ^{*2}	Flexural Strength - Wet	6,176 psi	43 MPa
ASTM C 1185-08	Moisture Movement Linear Change	0%	
ASTM C 1185-08 ³	Water Tightness - Movement through Panel	PASS No Droplet Formation	
ASTM C 1185-08 ⁴	Freeze/Thaw Flexural Strength Retention	PASS (97.3%) Ratio of Retained Post -Exposure Strength	
ASTM C 1185-08 ⁵	Warm Water Flexural Strength Retention	PASS (88.5%) Ratio of Retained Post -Exposure Strength	
ASTM C 1185-08	Water Absorption	4%	
ASTM C 1185-08	Moisture Content at Cure	0.9%	
ASTM E 84-09	Surface Burning Characteristics	Flame Spread CLASS A (0); Smoke Development CLASS A (5)	
ASTM E 136-09	Combustibility	PASS NON-COMBUSTIBLE	
CAN/ULC S114-05 ⁶	Combustibility	PASS NON-COMBUSTIBLE	
ASTM E 488-96	Pullout Strength (Tensile/Shear) - Concealed Anchors	386 / 650 lbf	2 / 3 kN
ASTM G 155-05a / ASTM D 2244-09a	Accelerated Weathering Color Change (500 hr) for 0.5" Panel Treated with MicroSeal/T TM	0.37 ΔE	

*ASTM C 1186 classifies products into four grades according to flexural strength. VECTR facade and wall panels are classified as Grade IV.

	Wet Strength Minimum psi (Mpa)	Equilibrium Strength Minimum psi (Mpa)
Grade I	580 (4)	580 (4)
Grade II	1,015 (7)	1,450 (10)
Grade III	1,885 (13)	2,320 (16)
Grade IV	2,610 (18)	3,190 (22)

¹ For Grade IV Classification*: Mean Flexural Strength >3,190 psi. VECTR **exceeds** requirements by 3,705 psi (216%).

² For Grade IV Classification*: Flexural Strength >2,610 psi and >50% of Mean Equilibrium Flexural Strength. VECTR **exceeds** requirements by 3,566 psi (236%) and 2,729 psi (55%).

³ For "PASS": No water droplet formation. VECTR meets requirements with no water droplet formation.

⁴ For "PASS": No visible cracks and >80% Post-Exposure Strength Retention. VECTR **exceeds** requirements by 17.3%.

⁵ For "PASS": VECTR meets requirements with no visible cracks or structural alteration.

⁶ For certification: Specimens must show no flaming during the last 14.5 minutes of the test and the maximum loss of mass of any specimen during test must not exceed 20%. VECTR **exceeds** requirements by 13%.

The following results reflect testing by material **MATRIX ONLY, no mesh reinforcements**, completed by Architectural Testing, Inc. (York, PA) on prism samples cast at the TAKTL Materials Laboratory (Pittsburgh, PA).

STANDARD	PROPERTY	RESULT	
ASTM C 39	Compressive Strength	18,332 psi	126 MPa
DIN EN 196-1 ⁷	Compressive Strength	19,783 psi	136 MPa
ASTM C 293	Flexural Strength	3,045 psi	21 MPa
ASTM C 496	Splitting Tensile Strength	1,319 psi	9 MPa
ASTM C 531-00	Coefficient of Thermal Expansion	6.41E-06 in/(in,°F)	1.15E-05 m/(m,°C)

⁷ This data was collected by MPA BAU Hannover (Germany).