

# SUPERPILE® - 10" Dock Pile (TU440)

## Data Sheet



The mechanical and physical data detailed herein is provided for the structural engineer. The mechanical data is published in terms of average and characteristic design values based on a 5% lower exclusion limit.

The characteristic value accounts for statistical uncertainty due to a finite sample size. The characteristic value is the reference strength that should be used for design purposes. In terms of Allowable Stress Design (ASD), the pultrusion industry uses a 3.0 safety factor for compression members, 2.5 for flexural members, 3.0 for connections and 3.0 for shear. The published average E-modulus shall be used for serviceability calculations.

SUPERPILE® Mechanical Properties	Round FRP Pipe Pile TU440 Polyester 10"x3/8" Metric (254mm x 9.52mm)	
Average Flexural Strength per ASTM D1036 psi (Mpa)	65,722	(453)
5% LEL Flexural Strength per ASTM D1036 psi (Mpa) <sup>1</sup>	59,585	(411)
Average Compression Strength per ASTM D1036 psi (Mpa)	65,722	(453)
5% LEL Compression Strength per ASTM D1036 psi (Mpa) <sup>1</sup>	59,585	(411)
Average In-Plane Shear Strength psi (Mpa)	10,792	(74)
Characteristic In-Plane Shear Strength psi (Mpa)	9,456	(65)
Average Shear Capacity lbs (Kg)	61,185	(27,753)
Characteristic Shear Capacity lbs (Kg)	53,611	(24,317)
Average Torque Strength lb-ft (kN•m)	49,076	(67)
Characteristic Torque Strength lb-ft (kN•m)	43,001	(58)
Average Axial Compression Strength psi (Mpa)	65,722	(453)
5% LEL Axial Compression Strength psi (Mpa) <sup>1</sup>	59,585	(411)
Average Axial Compression Capacity (Short Column) lb (kg)	745,222	(338,027)
5% LEL Axial Compression Capacity (Short Column) lb (kg) <sup>1</sup>	675,634	(306,463)
Average Modulus of Elasticity per ASTM D1036 psi (Gpa)	6.31E+06	(43.5)
Bending Stiffness (EI) per ASTM 1036 lbs•in <sup>2</sup> (kg•mm <sup>2</sup> )	8.30E+08	(2.43E+11)
Average Moment Capacity per ASTM D1036 kip-ft (kN•m)	144	(195)
5% LEL Moment Capacity per ASTM D1036 kip-ft (kN•m) <sup>1</sup>	131	(177)
Average Pin Bearing Strength Crosswise psi (Mpa)	19,155	(132)
Characteristic Pin Bearing Strength Crosswise psi (Mpa)	16,577	(114)
Average Pin Bearing Strength Lengthwise psi (Mpa)	31,824	(219)
Characteristic Pin Bearing Strength Lengthwise psi (Mpa)	27,755	(191)
Average Washer Pull Through Strength lb (kg) using a 6"x3/8" square/radius washer	17,377	(7,882)
Characteristic Washer Pull Through Strength lb (kg) using a 6"x3/8" square/radius washer	14,812	(6,719)
Allowable torque permitted on a bolted connection with a 4"x3/8" square washer lb-ft (N•m)	50	(68)

## MECHANICAL AND PHYSICAL PROPERTIES

<b>SUPERPILE® Physical Properties</b>	<b>Round FRP Pipe Pile TU440 Polyester 10"x3/8" Metric (254mm x 9.52mm)</b>	
Diameter in (cm)	10	(25.40)
Wall thickness in (mm)	0.375	(9.5)
Moment of Inertia in <sup>4</sup> (cm <sup>4</sup> )	131.51	(5,474)
Section Modulus in <sup>3</sup> (cm <sup>3</sup> )	26.30	(431)
Radius of Gyration in (mm)	3.41	(87)
Weight lb/ft (Kg/m)	10.3	(15)
Coefficient of Thermal Expansion (CTE) Lengthwise in/in/°F (mm/mm/°C)	5.00E-06	(9.00E-06)
Water Absorption ASTM D570	2.0% (24hrs)	2.0% (24hrs)
Fiber Volume Fraction %	≥50%	≥50%
Cross Sectional Area in <sup>2</sup> (cm <sup>2</sup> )	11.3	(73)
Surface Area ft <sup>2</sup> /ft (m <sup>2</sup> /m)	2.62	(0.80)

<b>SUPERPILE® Fire Properties</b>	<b>Round FRP Pipe Pile TU440 Polyester 10"x3/8" Metric (254mm x 9.52mm)</b>	
Flame Rating (UL 94)	V0 Self Extinguishing	
Flame Spread ASTM E-84	Class A 25 or less	

1. 5% Lower Exclusion Limit (LEL) was used as a statistical knockdown in instances where the sufficient number of data points was not available to calculate the characteristic value.
2. All connection testing was conducted utilizing 3/4" hardware.