

# THERMOPLASTIC PIPE PILE AND SLEEVE COMPARISON

Specification Test Requirement	Standard Title	SUPERPILE®	CPI Supplied HDPE Sleeve (when applicable)	Required Properties for FRP Composite Lumber (SCL)
ASTM D792	Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement	Density = 122.3 pcf Void Content < 1%	59.9 pcf (tested D1505)	55-63 pcf
ASTM D570	Standard Test Method for Water Absorption of Plastics	0.15% (24hrs)	.01-.1% (From www.matweb.com HDPE Extruded)	2hrs <1.0% weight increase 24hrs <3.0% weight increase
ASTM D746	Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact	Test using ASTM D7028 (DMA) Tan Delta Peak = 132°C G' (-50°C) = 6.5 GPa G' (25°C) = 5.29 GPa <sup>1</sup>	< -75-deg C	Brittleness Temp < -40-deg C
ASTM D256	Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics	90 ft-lb/in	1.47-11.0 ft-lb/in (From www.matweb.com HDPE Pipe Grade)	> 0.55ft-lb/in
ASTM D2240	Standard Test Method for Rubber Property—Durometer Hardness	85 Shore D	62 Shore D	44-75 (Shore D)
ASTM D4329	Standard Practice for Fluorescent UV Exposure of Plastics	No measurable hardness change after 1344hrs UV exposure		500 hours < 10% change in Hardness
ASTM D4060	Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser	0.0035 oz	0.002 oz (web search)	Weight Loss < 0.02oz Cycles = 10,000 Wheel = CS17 Load - 2.2lb
ASTM D756	Practice for Determination of Weight and Shape Changes of Plastics Under Accelerated Service Conditions (Sea Water, Gasoline, No. 2 Diesel)	Sea Water = 0.32% Wt Increase <sup>2</sup> Gasoline = 0.33% Wt Increase <sup>2</sup> No. 2 Diesel = 0.14% Wt Increase <sup>2</sup>		Sea Water < 1.5% Weight Increase Gasoline < 9.5% Weight Increase No. 2 Diesel < 6.0% Weight Increase
ASTM D638	Standard Test Method for Tensile Properties of Plastics	136000 psi	> 3,500psi (yield)	Min. 2,200 psi @ Break (Strength)
ASTM D695	Standard Test Method for Compressive Properties of Rigid Plastics	6.40E+06 psi	> 175,000 psi (Tested D638 Tension)	Min. 40,000 psi @ Break (Modulus)
ASTM D1894	Standard Test Method for Static and Kinetic Coefficients of Friction of Plastic Film and Sheet	Static 0.152 dry; 0.227 wet Kinetic 0.139 dry; 0.140 wet	0.2-0.25	Max. 0.25 Wet
ASTM D6117	Standard Test Methods for Mechanical Fasteners in Plastic Lumber and Shapes	1,728 lb (1/4"-14 x 1.5" Long SS Hex Head Self Drilling Screw)		Min. 60lb

SUPERPILE® Specification:

**Resin:** Resin shall be a low VOC two component polyol/isocyanate polyurethane. The minimum resin content shall be 47% by volume and shall not contain fillers.

**Reinforcements:** The reinforcement shall be E or Ncr glass providing reinforcement in the lengthwise, transverse and bias directions. The profile shall contain 38% by volume of reinforcements in the lengthwise direction and 14% minimum in the transverse directions. The outermost layer of the composite pile shall be encompassed with 10 mil polyester veil, providing a resin rich UV protective layer.

<sup>1</sup> The material is established to be non brittle at -50°C due to the relatively low change in G' compared to 25°C.

<sup>2</sup> Parts were submerged in the fluid for 2 weeks before checking absorption.

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