## THERMOPLASTIC PIPE PILE AND SLEEVE COMPARISON

<table>
<thead>
<tr>
<th>Specification Test Requirement</th>
<th>Standard Title</th>
<th>SUPERPILE®</th>
<th>CPI Supplied HDPE Sleeve (when applicable)</th>
<th>Required Properties for FRP Composite Lumber (SCL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM D792</td>
<td>Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement</td>
<td>Density = 122.3 pcf Void Content &lt; 1%</td>
<td>59.9 pcf (tested D1505)</td>
<td>55-63 pcf</td>
</tr>
<tr>
<td>ASTM D570</td>
<td>Standard Test Method for Water Absorption of Plastics</td>
<td>0.15% (24hrs) (From <a href="http://www.matweb.com">www.matweb.com</a> HDPE Extruded)</td>
<td>.01-.1% 2hrs &lt;1.0% weight increase 24hrs &lt;3.0% weight increase</td>
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<tr>
<td>ASTM D746</td>
<td>Standard Test Method for Brittleness Temperature of Plastics and Elastomers by impact</td>
<td>Test using ASTM D7028 (DMA) Tan Delta Peak = 132°C G’ (-50°C) = 6.5 GPa G’ (25°C) = 5.29 GPa1</td>
<td>&lt; -75-deg C Brittleness Temp &lt; -40-deg C</td>
<td></td>
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<tr>
<td>ASTM D256</td>
<td>Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics</td>
<td>90 ft-lb/in</td>
<td>1.47-11.0 ft-lb/in (From <a href="http://www.matweb.com">www.matweb.com</a> HDPE Pipe Grade)</td>
<td>&gt; 0.55ft-lb/in</td>
</tr>
<tr>
<td>ASTM D2240</td>
<td>Standard Test Method for Rubber Property—Durometer Hardness</td>
<td>85 Shore D</td>
<td>62 Shore D</td>
<td>44-75 (Shore D)</td>
</tr>
<tr>
<td>ASTM D4329</td>
<td>Standard Practice for Fluorescent UV Exposure of Plastics</td>
<td>No measurable hardness change after 1344hrs UV exposure</td>
<td>500 hours &lt; 10% change in Hardness</td>
<td></td>
</tr>
<tr>
<td>ASTM D4060</td>
<td>Standard Test Method for Abrasion UV Exposure of Plastics</td>
<td>0.0035 oz</td>
<td>0.002 oz (web search)</td>
<td>Weight Loss &lt; 0.02oz Cycles = 10,000 Wheel = CS17 Load - 2.2lb</td>
</tr>
<tr>
<td>ASTM D756</td>
<td>Practice for Determination of Weight and Shape Changes of Plastics Under Accelerated Service Conditions (Sea Water, Gasoline, No. 2 Diesel)</td>
<td>Sea Water = 0.32% Wt Increase2 Gasoline = 0.33% Wt Increase2 No. 2 Diesel = 0.14% Wt Increase2</td>
<td>Sea Water &lt; 1.5% Weight Increase Gasoline &lt; 9.5% Weight Increase No. 2 Diesel &lt; 6.0% Weight Increase</td>
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<tr>
<td>ASTM D638</td>
<td>Standard Test Method for Tensile Properties of Plastics</td>
<td>136000 psi</td>
<td>&gt; 3,500psi [yield]</td>
<td>Min. 2,200 psi @ Break (Strength)</td>
</tr>
<tr>
<td>ASTM D695</td>
<td>Standard Test Method for Compressive Properties of Rigid Plastics</td>
<td>6.40E+06 psi</td>
<td>&gt; 175,000 psi (Tested D638 Tension)</td>
<td>Min. 40,000 psi @ Break (Modulus)</td>
</tr>
<tr>
<td>ASTM D1894</td>
<td>Standard Test Method for Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting</td>
<td>Static 0.152 dry; 0.227 wet Kinetic 0.139 dry; 0.140 wet</td>
<td>0.2-0.25</td>
<td>Max. 0.25 Wet</td>
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<tr>
<td>ASTM D6117</td>
<td>Standard Test Methods for Mechanical Fasteners in Plastic Lumber and Shapes</td>
<td>1,728 lb (1/4&quot;-14 x 1.5&quot; Long SS Hex Head Self Drilling Screw)</td>
<td>Min. 60lb</td>
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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.

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

2 Parts were submerged in the fluid for 2 weeks before checking absorption.

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