

P<sup>2</sup>SI<sup>®</sup> NRPE is a high-temperature, structural thermosetting polyimide with a low-melt viscosity. It displays exceptional hot/wet mechanical properties suitable for 550°F-600°F service temperature applications. P<sup>2</sup>SI<sup>®</sup> NRPE was developed specifically to address the shortcomings of current market place polyimides, such as marginal hot/wet performance at elevated temperatures and processing limitations due to intrinsic matrix chemistry. P<sup>2</sup>SI<sup>®</sup> NRPE provides significantly improved hot/wet durability, lower manufacturing costs and faster processing times. Key attributes include:

- Less than 100 psi processing pressure
- De-sized carbon reinforcement cost savings compared to polyimide finished fibers/textiles
- ~110°F higher operational safety margin compared to other polyimides
- Less than 100 Poise melt viscosity
- No post cure required

With a melt viscosity of 96 Poise at 608°F, P<sup>2</sup>SI<sup>®</sup> NRPE polyimide resin exhibits the lowest melt viscosity in the industry. Compared to PMR-15, developed by NASA in the mid-1970s and widely used by today's aerospace industry, P<sup>2</sup>SI<sup>®</sup> NRPE has a melt viscosity that is 80 times lower. This enables processing with less than 100 psi, resulting in higher part yield potential by reduction in bag failures.

**TYPICAL DRY PROPERTIES (TEXTILE LAMINATE THICKNESS ≈ 0.14 INCHES)**

PROPERTY	VALUE	TEST METHOD
<b>Glass Transition Temperature (°F)</b> Onset Temperature, E'	705	ASTM D7028
<b>Tensile Strength (ksi)</b> Room Temperature	130±6.82	ASTM D3039
<b>Tensile Modulus (msi)</b> Room Temperature	11.0±0.15	ASTM D3039
<b>Compressive Strength (ksi)</b> Room Temperature	99.1±5.77	ASTM D6641
<b>Compressive Strength (ksi)</b> 550°F	77.5±2.46	ASTM D6641
<b>Compressive Modulus (msi)</b> Room Temperature	9.74±0.16	SACMA SRM-1
<b>Compressive Modulus (msi)</b> 550°F	9.51±0.14	SACMA SRM-1
<b>Flexural Strength (ksi)</b> Room Temperature	130±2.80	ASTM D6272
<b>Flexural Strength (ksi)</b> 550°F	112±3.55	ASTM D6272
<b>Flexural Modulus (msi)</b> Room Temperature	9.92±0.13	ASTM D6272
<b>Flexural Modulus (msi)</b> 550°F	10.3±0.12	ASTM D6272
<b>Interlaminar Shear Strength (ksi)</b> Room Temperature	7.33±0.20	ASTM D2344
<b>Interlaminar Shear Strength (ksi)</b> 550°F	5.98±0.81	ASTM D2344

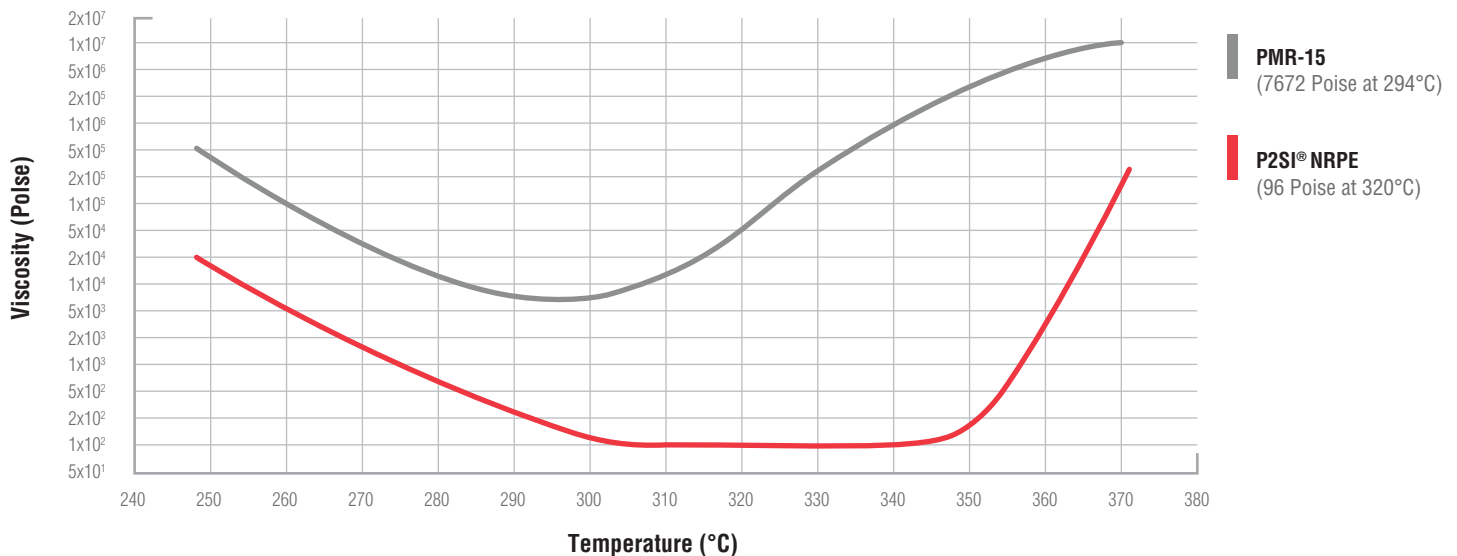
- P<sup>2</sup>SI<sup>®</sup> NRPE de-sized T650-35/8HS carbon textile laminates

TYPICAL WET PROPERTIES (TEXTILE LAMINATE THICKNESS ≈ 0.14 INCHES)

PROPERTY	VALUE	TEST METHOD
<b>Tensile Strength (ksi)</b> Room Temperature	121±4.78	ASTM D3039
<b>Tensile Modulus (msi)</b> Room Temperature	11.0±0.11	ASTM D3039
<b>Compressive Strength (ksi)</b> Room Temperature	96.5±5.23	ASTM D6641
<b>Compressive Strength (ksi)</b> 500°F	36.9±2.14	ASTM D6641
<b>Compressive Modulus (msi)</b> Room Temperature	9.75±0.12	SACMA SRM-1
<b>Compressive Modulus (msi)</b> 500°F	9.08±0.13	SACMA SRM-1
<b>Flexural Strength (ksi)</b> Room Temperature	121.5±6.68	ASTM D6272
<b>Flexural Strength (ksi)</b> 500°F	62.2±1.00	ASTM D6272
<b>Flexural Modulus (msi)</b> Room Temperature	10.5±0.05	ASTM D6272
<b>Flexural Modulus (msi)</b> 500°F	9.24±0.07	ASTM D6272
<b>Interlaminar Shear Strength (ksi)</b> Room Temperature	7.78±0.11	ASTM D2344
<b>Interlaminar Shear Strength (ksi)</b> 50°F	3.21±0.52	ASTM D2344

- P<sup>2</sup>SI<sup>®</sup> NRPE de-sized T650-35/8HS carbon textile laminates
- Test Coupons were saturated at 140°F with 95% relative humidity

MELT VISCOSITY



**TYPICAL HOT/WET PROPERTIES (THICK LAMINATES)**

PROPERTY	LAMINATE THICKNESS (in.)	VALUE (ksi.)	TEST METHOD
Pin Bearing Strength 450°F / Wet	0.261	53.1±2.38	ASTM D5961
Pin Bearing Strength 500°F / Wet	0.261	60.2±4.57	ASTM D5961
Pin Bearing Strength 550°F / Wet	0.261	48.7±1.62	ASTM D5961
Flexural Strength 450°F / Wet	0.261	90.7±4.38	ASTM D6272
Flexural Strength 500°F / Wet	0.261	92.6±3.75	ASTM D6272
Flexural Strength 450°F / Wet	0.348	79.2±2.35	ASTM D6272
Flexural Strength (ksi) 500°F / Wet	0.348	51.9±3.69	ASTM D6272
Compression Strength 450°F / Wet	0.261	55.5±6.40	ASTM D6641
Compression Strength 500°F / Wet	0.261	35.0±1.61	ASTM D6641
Compression Strength 550°F / Wet	0.261	27.2±3.12	ASTM D6641
Interlaminar Shear Strength 450°F / Wet	0.348	5.93±0.11	ASTM D2344
Interlaminar Shear Strength 500°F / Wet	0.348	5.26±0.50	ASTM D2344
Interlaminar Shear Strength 550°F / Wet	0.348	2.90±0.10	ASTM D2344

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- Test Coupons were saturated at 140°F with 100% relative humidity

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