

Sheet Products - Property Comparison

| | | | NP130 | NP130HF | NP500A | NP500CR |
|---|--|------------------------|-----------------|-----------------|-----------------|-----------------|
| | | | Glass Fabric | | | |
| | | | Epoxy | | | |
| PHYSICAL PROPERTIES | | | | | | |
| Specific Gravity (0.500") | | - | 1.80 | 1.95 | 1.77 | 1.80 |
| Rockwell Hardness (0.250" Build-up) | | M Scale | 100 | 110 | 99 | 100 |
| Moisture Absorption (0.062") | Condition D ₁ -24/23 | % | 0.10 | -- | 0.22 | 0.10 |
| Flexural Strength (0.062") | Condition A Lengthwise / Crosswise | psi | 80,000 / 60,000 | -- / -- | 66,000 / 60,000 | 75,000 / 65,000 |
| | Condition E-1/150 T150 Lengthwise / Crosswise | | -- / -- | -- / -- | -- / -- | -- / -- |
| Flexural Modulus (0.062") | Lengthwise / Crosswise | kpsi | 2,700 / 2,400 | -- / -- | 3,400 / 3,300 | 2,700 / 2,400 |
| Tensile Strength (0.125") | Lengthwise / Crosswise | psi | 50,000 / 40,000 | 70,000 / 65,000 | 40,000 / 32,000 | 45,000 / 38,000 |
| Izod Impact Strength (0.500") | Condition E-48/50 Lengthwise / Crosswise | ft-lb/in (notched) | 15.00 / 12.00 | 13.00 / 9.00 | 9.50 / 7.50 | 14.00 / 12.00 |
| Compressive Strength (0.500") | Flatwise | psi | 70,000 | 71,000 | 44,000 | 65,000 |
| Bonding Strength (0.500") | Condition A | lb | 2,200 | 2,500 | 2,500 | 2,200 |
| | Condition D-48/50 | | -- | -- | -- | -- |
| Shear Strength (0.062") | Perpendicular | psi | 22,000 | -- | 19,000 | 22,000 |
| THERMAL PROPERTIES | | | | | | |
| Temperature Index ¹ | Electrical / Mechanical | °C | 130 / 140 | 130 / 140 | 130 / 140 | 130 / 140 |
| Coefficient of Thermal Expansion (0.125") | X-axis / Y-axis | "/"°Cx10 ⁻⁶ | 10.0 / 12.0 | 13.7 / 14.7 | 9.6 / 12.1 | 10.0 / 13.0 |
| Flammability Rating U.L. 94 (0.062") | Condition A | Class | V-0 | V-0 | HB | HB |
| ELECTRICAL PROPERTIES | | | | | | |
| Dissipation Factor (0.062") | Condition D ₁ -24/23 | - | 0.025 | -- | -- | 0.025 |
| Permittivity (0.062") | Condition D ₁ -24/23 | - | 4.80 | -- | -- | 4.80 |
| Breakdown Voltage (0.062") | Condition A | kV | 65 | -- | 48 | 60 |
| | Condition D-48/50 | | 54 | -- | 49 | 50 |
| Electric Strength (0.062") | Condition A | V/mil | 670 | -- | 690 | 670 |
| | Condition D-48/50 | | 650 | -- | 690 | 660 |
| Arc Resistance D495 (0.125") | Condition A | sec | 120 | 75 | -- | 100 |
| Comparative Tracking Index D3638 (0.125") | | V | 150 | 150 | -- | 150 |

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NOTE b: All testing per ASTM D348 unless otherwise noted.

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Sheet Products - Property Comparison

| | | | NP504 | MC507U | NP509 | NP510A |
|---|--|------------------------|-----------------|-----------------|-----------------|-----------------|
| | | | Glass Fabric | | | |
| | | | Phenolic | Silicone | Melamine | Epoxy |
| PHYSICAL PROPERTIES | | | | | | |
| Specific Gravity (0.500") | | - | 1.85 | 1.88 | 1.90 | 1.85 |
| Rockwell Hardness (0.250" Build-up) | | M Scale | 110 | 100 | 115 | 98 |
| Moisture Absorption (0.062") | Condition D ₁ -24/23 | % | 0.65 | 0.19 | 0.50 | 0.10 |
| Flexural Strength (0.062") | Condition A Lengthwise / Crosswise | psi | 55,000 / 50,000 | 24,300 / 21,700 | 70,500 / 63,200 | 65,000 / 52,000 |
| | Condition E-1/150 T150 Lengthwise / Crosswise | | -- / -- | -- / -- | -- / -- | 29,000 / 26,000 |
| Flexural Modulus (0.062") | Lengthwise / Crosswise | kpsi | 1,800 / 1,400 | -- / -- | 2,000 / 1,700 | 2,900 / 2,600 |
| Tensile Strength (0.125") | Lengthwise / Crosswise | psi | 42,000 / 34,000 | -- / -- | 50,000 / 35,000 | 40,000 / 32,000 |
| Izod Impact Strength (0.500") | Condition E-48/50 Lengthwise / Crosswise | ft-lb/in (notched) | 12.00 / 11.00 | 17.00 / 11.50 | 16.50 / 12.50 | 7.90 / 7.30 |
| Compressive Strength (0.500") | Flatwise | psi | 76,000 | -- | 85,000 | 66,000 |
| Bonding Strength (0.500") | Condition A | lb | 1,500 | 750 | 1,900 | 2,300 |
| | Condition D-48/50 | | -- | -- | -- | -- |
| Shear Strength (0.062") | Perpendicular | psi | 18,000 | -- | 18,000 | 21,500 |
| THERMAL PROPERTIES | | | | | | |
| Temperature Index ¹ | Electrical / Mechanical | °C | 140 / 170 | 170 / 220 | -- / 140 | 130 / 140 |
| Coefficient of Thermal Expansion (0.125") | X-axis / Y-axis | "/"°Cx10 ⁻⁶ | 15.0 / 18.0 | -- / -- | 15.0 / 18.0 | 10.0 / 13.0 |
| Flammability Rating U.L. 94 (0.062") | Condition A | Class | HB | V-0 | V-0 | V-0 |
| ELECTRICAL PROPERTIES | | | | | | |
| Dissipation Factor (0.062") | Condition D ₁ -24/23 | - | -- | 0.045 | 0.015 | 0.032 |
| Permittivity (0.062") | Condition D ₁ -24/23 | - | -- | 4.67 | 7.03 | 4.80 |
| Breakdown Voltage (0.062") | Condition A | kV | 55 | 55 | 70 | 66 |
| | Condition D-48/50 | | 40 | 32 | 65 | 65 |
| Electric Strength (0.062") | Condition A | V/mil | 600 | 350 | 540 | 630 |
| | Condition D-48/50 | | 580 | -- | 550 | 670 |
| Arc Resistance D495 (0.125") | Condition A | sec | 100 | 200 | 185 | 130 |
| Comparative Tracking Index D3638 (0.125") | | V | 150 | -- | 600+ | 300 |

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Sheet Products - Property Comparison

| | | | MC511A | MC511AF | MC511SN | NP511 |
|---|--|------------------------|-----------------|---------------|-------------|-----------------|
| | | | Glass Fabric | | | |
| | | | Epoxy | | | |
| PHYSICAL PROPERTIES | | | | | | |
| Specific Gravity (0.500") | | - | 1.91 | 1.91 | 1.80 | 1.80 |
| Rockwell Hardness (0.250" Build-up) | | M Scale | 115 | 110 | 110 | 112 |
| Moisture Absorption (0.062") | Condition D ₁ -24/23 | % | 0.10 | 0.09 | 0.05 | 0.20 |
| Flexural Strength (0.062") | Condition A Lengthwise / Crosswise | psi | 71,500 / 61,000 | 57,000 / -- | 63,000 / -- | 80,000 / 70,000 |
| | Condition E-1/150 T150 Lengthwise / Crosswise | | 37,000 / -- | 30,000 / -- | -- / -- | 40,000 / -- |
| Flexural Modulus (0.062") | Lengthwise / Crosswise | kpsi | -- / -- | -- / -- | -- / -- | 3,000 / 2,700 |
| Tensile Strength (0.125") | Lengthwise / Crosswise | psi | -- / -- | 41,000 / -- | 46,000 / -- | 43,000 / 37,000 |
| Izod Impact Strength (0.500") | Condition E-48/50 Lengthwise / Crosswise | ft-lb/in (notched) | 18.00 / 14.00 | 10.00 / 10.00 | -- / -- | 12.00 / 9.00 |
| Compressive Strength (0.500") | Flatwise | psi | -- | 50,000 | 51,000 | 63,000 |
| Bonding Strength (0.500") | Condition A | lb | 2,200 | 2,200 | 2,500 | 2,200 |
| | Condition D-48/50 | | -- | -- | -- | -- |
| Shear Strength (0.062") | Perpendicular | psi | -- | 21,000 | 22,000 | 22,000 |
| THERMAL PROPERTIES | | | | | | |
| Temperature Index ¹ | Electrical / Mechanical | °C | 170 / 180 | 170 / 180 | 170 / 180 | 170 / 180 |
| Coefficient of Thermal Expansion (0.125") | X-axis / Y-axis | "/"°Cx10 ⁻⁶ | -- / -- | -- / -- | -- / -- | 13.0 / 15.0 |
| Flammability Rating U.L. 94 (0.062") | Condition A | Class | HB | HB | HB | HB |
| ELECTRICAL PROPERTIES | | | | | | |
| Dissipation Factor (0.062") | Condition D ₁ -24/23 | - | 0.028 | 0.019 | -- | 0.020 |
| Permittivity (0.062") | Condition D ₁ -24/23 | - | 4.50 | 4.50 | -- | 4.80 |
| Breakdown Voltage (0.062") | Condition A | kV | 65 | 65 | -- | 60 |
| | Condition D-48/50 | | -- | -- | -- | 55 |
| Electric Strength (0.062") | Condition A | V/mil | 610 | 550 | -- | 700 |
| | Condition D-48/50 | | 650 | -- | -- | 720 |
| Arc Resistance D495 (0.125") | Condition A | sec | 185 | 185 | -- | 120 |
| Comparative Tracking Index D3638 (0.125") | | V | -- | -- | -- | 150 |

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NOTE b: All testing per ASTM D348 unless otherwise noted.

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Global Thermoset Composite Solutions

Sheet Products - Property Comparison

| | | | NP511EM | NP512 | MC514MG |
|---|--|-------------------------|-----------------|-----------------|-----------------|
| | | | Glass Fabric | | |
| | | | Epoxy | | Phenolic |
| PHYSICAL PROPERTIES | | | | | |
| Specific Gravity (0.500") | | - | 1.80 | 1.95 | 1.80 |
| Rockwell Hardness (0.250" Build-up) | | M Scale | 114 | 115 | 110 |
| Moisture Absorption (0.062") | Condition D ₁ -24/23 | % | -- | 0.10 | -- |
| Flexural Strength (0.062") | Condition A Lengthwise / Crosswise | psi | -- / -- | 84,000 / 73,000 | 34,000 / 25,000 |
| | Condition E-1/150 T150 Lengthwise / Crosswise | | -- / -- | -- / -- | -- / -- |
| Flexural Modulus (0.062") | Lengthwise / Crosswise | kpsi | -- / -- | 4,200 / 4,100 | -- / -- |
| Tensile Strength (0.125") | Lengthwise / Crosswise | psi | 55,000 / 50,000 | 40,000 / 32,000 | -- / -- |
| Izod Impact Strength (0.500") | Condition E-48/50 Lengthwise / Crosswise | ft-lb/in (notched) | -- / -- | -- / -- | -- / -- |
| Compressive Strength (0.500") | Flatwise | psi | 89,000 | 44,000 | 48,000 |
| Bonding Strength (0.500") | Condition A | lb | 2,300 | 2,100 | 1,100 |
| | Condition D-48/50 | | -- | -- | -- |
| Shear Strength (0.062") | Perpendicular | psi | -- | 18,000 | -- |
| THERMAL PROPERTIES | | | | | |
| Temperature Index ¹ | Electrical / Mechanical | °C | 170 / 180 | 140 / 140 | -- / 155 |
| Coefficient of Thermal Expansion (0.125") | X-axis / Y-axis | "/"/°Cx10 ⁻⁶ | 12.7 / 16.2 | -- / -- | -- / -- |
| Flammability Rating (0.062") U.L. 94 | Condition A | Class | HB | V-0 | HB |
| ELECTRICAL PROPERTIES | | | | | |
| Dissipation Factor (0.062") | Condition D ₁ -24/23 | - | -- | 0.019 | -- |
| Permittivity (0.062") | Condition D ₁ -24/23 | - | -- | 5.00 | -- |
| Breakdown Voltage (0.062") | Condition A | kV | -- | 60 | -- |
| | Condition D-48/50 | | -- | 56 | -- |
| Electric Strength (0.062") | Condition A | V/mil | -- | 800 | -- |
| | Condition D-48/50 | | -- | 750 | -- |
| Arc Resistance D495 (0.125") | Condition A | sec | 170 | -- | -- |
| Comparative Tracking Index D3638 (0.125") | | V | 600 | -- | -- |

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Global Thermoset Composite Solutions

Sheet Products - Property Comparison

| | | | NP572 | P95 |
|---|--|-------------------------|-----------------|-----------------|
| | | | Glass Fabric | |
| | | | Epoxy | Polyimide |
| PHYSICAL PROPERTIES | | | | |
| Specific Gravity (0.500") | | - | 1.89 | 1.84 |
| Rockwell Hardness (0.250" Build-up) | | M Scale | 108 | 120 |
| Moisture Absorption (0.062") | Condition D ₁ -24/23 | % | 0.02 | 0.35 |
| Flexural Strength (0.062") | Condition A Lengthwise / Crosswise | psi | 68,500 / 53,000 | 78,000 / 66,000 |
| | Condition E-1/150 T150 Lengthwise / Crosswise | | 45,700 / 41,900 | -- / -- |
| Flexural Modulus (0.062") | Lengthwise / Crosswise | kpsi | -- / -- | 3,200 / 2,800 |
| Tensile Strength (0.125") | Lengthwise / Crosswise | psi | 47,300 / 35,000 | 48,000 / 40,000 |
| Izod Impact Strength (0.500") | Condition E-48/50 Lengthwise / Crosswise | ft-lb/in (notched) | 12.50 / 10.30 | 11.50 / 7.50 |
| Compressive Strength (0.500") | Flatwise | psi | 72,100 | 70,000 |
| Bonding Strength (0.500") | Condition A | lb | 1,800 | 1,500 |
| | Condition D-48/50 | | -- | -- |
| Shear Strength (0.062") | Perpendicular | psi | 25,200 | 27,000 |
| THERMAL PROPERTIES | | | | |
| Temperature Index ¹ | Electrical / Mechanical | °C | -- / -- | -- / 200 |
| Coefficient of Thermal Expansion (0.125") | X-axis / Y-axis | "/"/°Cx10 ⁻⁶ | -- / -- | 10.0 / 13.0 |
| Flammability Rating U.L. 94 (0.062") | Condition A | Class | HB | HB |
| ELECTRICAL PROPERTIES | | | | |
| Dissipation Factor (0.062") | Condition D ₁ -24/23 | - | 0.018 | 0.010 |
| Permittivity (0.062") | Condition D ₁ -24/23 | - | 4.10 | 4.80 |
| Breakdown Voltage (0.062") | Condition A | kV | 69 | 65 |
| | Condition D-48/50 | | -- | 55 |
| Electric Strength (0.062") | Condition A | V/mil | 680 | 850 |
| | Condition D-48/50 | | 760 | 750 |
| Arc Resistance D495 (0.125") | Condition A | sec | 185 | 130 |
| Comparative Tracking Index D3638 (0.125") | | V | -- | 240 |

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