

Cytec Cyply® 1002 Epoxy Fiberglass Composite, Unidirectional

Category : Polymer , Thermoset , Epoxy

Material Notes:

CYPLY® 1002 is a cured epoxy composite material based on a unique non-woven parallel filament construction. This type of construction minimizes filament stress abrasion that can shorten fatigue life in conventional reinforced plastics. CYPLY® 1002 uses type E continuous filament fiberglass. It is supplied as cured panels or cut to size shapes. CYPLY 1002 is available in unidirectional, crossply, or isotropic fiber orientation, each offering a different balance of properties. Features and benefits include: high impact strength, chemical and corrosion resistance, high strength-to-weight ratio, excellent fatigue life and high strain capability, low notch sensitivity, increased design options (springs to rail joints), resistant to solvents and cleaning fluids, less downtime in harsh environments, weight reduction, greater capacity to store energy than 1060 spring steel. Information provided by Red Seal Electric Company.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Cytec-Cyply-1002-Epoxy-Fiberglass-Composite-Unidirectional.php

| Physical Properties | Metric | English | Comments |
|---------------------|-----------|-----------|----------|
| Specific Gravity | 1.85 g/cc | 1.85 g/cc | |
| Filler Content | 64 % | 64 % | |

| Mechanical Properties | Metric | English | Comments |
|----------------------------|----------|------------|------------------|
| Hardness, Barcol | 70 | 70 | |
| Tensile Strength, Ultimate | 20.0 MPa | 2900 psi | 90° stress angle |
| | 24.1 MPa | 3500 psi | 45° stress angle |
| | 965 MPa | 140000 psi | 0° stress angle |
| Tensile Modulus | 9.65 GPa | 1400 ksi | 45° stress angle |
| | 9.65 GPa | 1400 ksi | 90° stress angle |
| | 39.3 GPa | 5700 ksi | 0° stress angle |
| Flexural Strength | 75.8 MPa | 11000 psi | 90° stress angle |
| | 145 MPa | 21000 psi | 45° stress angle |
| | 1150 MPa | 167000 psi | 0° stress angle |
| Flexural Modulus | 11.0 GPa | 1600 ksi | 90° stress angle |
| | 13.8 GPa | 2000 ksi | 45° stress angle |
| | 38.6 GPa | 5600 ksi | 0° stress angle |
| Compressive Strength | 193 MPa | 28000 psi | 90° stress angle |

| Mechanical Properties | Metric | English | Comments |
|-----------------------|----------------------|----------------------|--|
| | 883 MPa | 128000 psi | 0° stress angle |
| Fatigue Strength | 228 MPa | 33000 psi | Flexural Fatigue (SN) |
| | @# of Cycles 1.00e+8 | @# of Cycles 1.00e+8 | |
| | 255 MPa | 37000 psi | Flexural Fatigue (SN) |
| | @# of Cycles 1.00e+7 | @# of Cycles 1.00e+7 | |
| | 324 MPa | 47000 psi | Flexural Fatigue (SN) |
| | @# of Cycles 1.00e+6 | @# of Cycles 1.00e+6 | |
| | 414 MPa | 60000 psi | Flexural Fatigue (SN) |
| | @# of Cycles 100000 | @# of Cycles 100000 | |
| | 462 MPa | 67000 psi | Flexural Fatigue (SN) |
| | @# of Cycles 10000 | @# of Cycles 10000 | |
| | 496 MPa | 72000 psi | Flexural Fatigue (SN) |
| | @# of Cycles 1000 | @# of Cycles 1000 | |
| Shear Modulus | 75.8 GPa | 11000 ksi | Short Beam; 0° stress angle; span/depth 5:1; ASTM D2344-76 |

| Thermal Properties | Metric | English | Comments |
|---------------------------------|--|--|---|
| CTE, linear | 8.64 $\mu\text{m}/\text{m}\cdot\text{C}^\circ$ | 4.80 $\mu\text{in}/\text{in}\cdot\text{F}^\circ$ | parallel to all filaments; ASTM D696-42T |
| | @Temperature -34.4 - 93.3 $^\circ\text{C}$ | @Temperature -30.0 - 200 $^\circ\text{F}$ | |
| CTE, linear, Transverse to Flow | 22.1 $\mu\text{m}/\text{m}\cdot\text{C}^\circ$ | 12.3 $\mu\text{in}/\text{in}\cdot\text{F}^\circ$ | perpendicular to all filaments; ASTM D696-42T |
| | @Temperature -34.4 - 93.3 $^\circ\text{C}$ | @Temperature -30.0 - 200 $^\circ\text{F}$ | |
| Specific Heat Capacity | 0.879 J/g- $^\circ\text{C}$ | 0.210 BTU/lb- $^\circ\text{F}$ | |
| Thermal Conductivity | 0.334 W/m-K | 2.32 BTU-in/hr-ft 2 - $^\circ\text{F}$ | on 1 inch thick isotropic laminate |
| | @Temperature 7.22 $^\circ\text{C}$ | @Temperature 45.0 $^\circ\text{F}$ | |
| | 0.336 W/m-K | 2.33 BTU-in/hr-ft 2 - $^\circ\text{F}$ | on 1 inch thick isotropic laminate |
| | @Temperature 2.22 $^\circ\text{C}$ | @Temperature 36.0 $^\circ\text{F}$ | |
| | 0.342 W/m-K | 2.37 BTU-in/hr-ft 2 - $^\circ\text{F}$ | on 1 inch thick isotropic laminate |
| | @Temperature 51.7 $^\circ\text{C}$ | @Temperature 125 $^\circ\text{F}$ | |
| | 0.346 W/m-K | 2.40 BTU-in/hr-ft 2 - $^\circ\text{F}$ | on 1 inch thick isotropic laminate |
| | @Temperature 85.6 $^\circ\text{C}$ | @Temperature 186 $^\circ\text{F}$ | |

| Thermal Properties | Metric | English | Comments |
|-----------------------|---|---|----------------------|
| Electrical Properties | Metric | English | Comments |
| Volume Resistivity | 4.90e+17 ohm-cm | 4.90e+17 ohm-cm | 50% RH and at 90% RH |
| Insulation Resistance | 5.30e+15 ohm | 5.30e+15 ohm | 50% RH |
| | 6.80e+10 ohm | 6.80e+10 ohm | 50% RH |
| | @Temperature 150 °C | @Temperature 302 °F | |
| | 6.20e+11 ohm | 6.20e+11 ohm | 50% RH |
| | @Temperature 120 °C | @Temperature 248 °F | |
| | 9.70e+12 ohm | 9.70e+12 ohm | 90% RH |
| | @Temperature 60.0 °C | @Temperature 140 °F | |
| | 2.70e+14 ohm | 2.70e+14 ohm | 50% RH |
| | @Temperature 60.0 °C | @Temperature 140 °F | |
| | 3.30e+14 ohm | 3.30e+14 ohm | 90% RH |
| | @Temperature 23.0 °C | @Temperature 73.4 °F | |
| Dielectric Constant | 4.8 | 4.8 | 50% RH |
| | @Frequency 1e+6 Hz | @Frequency 1e+6 Hz | |
| | 5.2 | 5.2 | 50% RH |
| | @Frequency 1000 Hz | @Frequency 1000 Hz | |
| | 4.4 | 4.4 | 50% RH |
| | @Frequency 3.00e+7 Hz, Temperature 23.0 °C | @Frequency 3.00e+7 Hz, Temperature 73.4 °F | |
| | 5.1 | 5.1 | 50% RH |
| | @Frequency 100000 Hz, Temperature 23.0 °C | @Frequency 100000 Hz, Temperature 73.4 °F | |
| | 5.3 | 5.3 | 50% RH |
| | @Frequency 60.0 Hz, Temperature 23.0 °C | @Frequency 60.0 Hz, Temperature 73.4 °F | |
| | 5.5 | 5.5 | 90% RH |
| | @Frequency 1.00e+6 Hz, Temperature 23.0 °C | @Frequency 1.00e+6 Hz, Temperature 73.4 °F | |
| | 5.7 | 5.7 | 50% RH |
| | @Frequency 1000 Hz, | @Frequency 1000 Hz, | |

| Electrical Properties | Temperature 60.0 °C Metric | Temperature 140 °F English | Comments |
|----------------------------|--|--|---------------|
| | 6.1 | 6.1 | |
| | @Frequency 1000 Hz, Temperature 120 °C | @Frequency 1000 Hz, Temperature 248 °F | 50% RH |
| | 6.5 | 6.5 | |
| | @Frequency 1000 Hz, Temperature 23.0 °C | @Frequency 1000 Hz, Temperature 73.4 °F | 90% RH |
| | 6.8 | 6.8 | |
| | @Frequency 1000 Hz, Temperature 60.0 °C | @Frequency 1000 Hz, Temperature 140 °F | 90% RH |
| | 7.0 | 7.0 | |
| | @Frequency 60.0 Hz, Temperature 23.0 °C | @Frequency 60.0 Hz, Temperature 73.4 °F | 90% RH |
| | 7.3 | 7.3 | |
| | @Frequency 1000 Hz, Temperature 150 °C | @Frequency 1000 Hz, Temperature 302 °F | 50% RH |
| Dielectric Strength | 24.4 kV/mm | 620 kV/in | 50% RH |
| Dissipation Factor | 0.0060 | 0.0060 | 50% RH |
| | @Frequency 1000 Hz | @Frequency 1000 Hz | |
| | 0.017 | 0.017 | 50% RH |
| | @Frequency 1e+6 Hz | @Frequency 1e+6 Hz | |
| | 0.0033 | 0.0033 | 50% RH |
| | @Frequency 1000 Hz, Temperature 120 °C | @Frequency 1000 Hz, Temperature 248 °F | |
| | 0.0052 | 0.0052 | 50% RH |
| | @Frequency 60.0 Hz, Temperature 23.0 °C | @Frequency 60.0 Hz, Temperature 73.4 °F | |
| | 0.0087 | 0.0087 | 50% RH |
| | @Frequency 1000 Hz, Temperature 60.0 °C | @Frequency 1000 Hz, Temperature 140 °F | |
| | 0.014 | 0.014 | 50% RH |
| | @Frequency 100000 Hz, Temperature 23.0 °C | @Frequency 100000 Hz, Temperature 73.4 °F | |
| | 0.019 | 0.019 | 90% RH |
| | @Frequency 1.00e+6 Hz, Temperature 23.0 °C | @Frequency 1.00e+6 Hz, Temperature 73.4 °F | |

| Electrical Properties | Metric | English | Comments |
|-----------------------|---|---|--|
| | @Frequency 3.00e+7 Hz, Temperature 23.0 °C | @Frequency 3.00e+7 Hz, Temperature 73.4 °F | 50% RH |
| | 0.036 | 0.036 | 90% RH |
| | @Frequency 60.0 Hz, Temperature 23.0 °C | @Frequency 60.0 Hz, Temperature 73.4 °F | 90% RH |
| | 0.050 | 0.050 | 90% RH |
| | @Frequency 1000 Hz, Temperature 23.0 °C | @Frequency 1000 Hz, Temperature 73.4 °F | 90% RH |
| | 0.054 | 0.054 | 90% RH |
| | @Frequency 1000 Hz, Temperature 60.0 °C | @Frequency 1000 Hz, Temperature 140 °F | 90% RH |
| | 0.13 | 0.13 | 50% RH |
| | @Frequency 1000 Hz, Temperature 150 °C | @Frequency 1000 Hz, Temperature 302 °F | 50% RH |
| Arc Resistance | 20 sec | 20 sec | with filaments; 50% RH and at 90% RH |
| | 80 sec | 80 sec | across filaments; 50% RH and at 90% RH |

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