

Arovex[®] 180 Prepreg System

Zyvex Nano-Engineered Composite

Technical Data Sheet

September 2013

Description

Arovex[®] 180 Prepreg is a 180°F (82°C) curing carbon nanotube strengthened epoxy prepreg suitable for numerous composites applications.

Arovex 180 resin contains an optimum level of carbon nanotubes for additional toughness and enhanced mechanical properties. The carbon nanotubes use molecular dispersion technology to ensure enhancements are evenly distributed throughout the resin.

Prepreg Availability

Prepreg is available in widths up to 50 inches (127 centimeters) for standard woven fabrics. Unitape widths are available up to 24 in (61 cm) in 100 gsm to 300 gsm Fiber Areal Weights (FAW).

Prepreg Processing

Arovex 180 processes as easily as conventional prepregs and has a long out-life for easier handling and processing. The prepreg is available in low, medium, and high tack levels. It has excellent retention of tack and drape with a 21 day tack-life and 30 day out-life at 72°F (22°C), and 1 year storage shelf life at 0°F (-18°C).

Features

- Very high toughness
- High strength
- High stiffness
- Enhanced mechanical properties
- Excellent retention of tack and drape

Table 1 | Manufacturing

| Manufacturing Processes | Fiber Applications |
|---------------------------|--------------------------|
| Vacuum bagged, oven cured | Carbon |
| Autoclaved | E-Glass |
| Hot Press | S-Glass |
| | Aramid |
| | Other fabrics on request |

Mechanical Properties

Table 2 | Mechanical Characteristics – Arovex 180 Resin with Toho UTS50 E13 12K 800tex Carbon Fiber Unitape

| Test ¹² | Test Method | 0° Value | 90° Value |
|------------------------------|---|--|---------------------|
| Flexural Strength | ASTM D 790 | 230 (ksi) 1586 (Mpa) | 11.2 (ksi) 77 (Mpa) |
| Flexural Modulus | ASTM D 790 | 18.8 (Msi) 130 (Gpa) | 1.51 (Msi) 10 (Gpa) |
| Compressive Strength | SACMA SRM 1R-94 | 190 (ksi) 1310 (Mpa) | -- |
| Compressive Modulus | SACMA SRM 1R-94 | 18.5 (Msi) 128 (Gpa) | -- |
| Tensile Strength | ASTM D 3039 | 281 (ksi) 1937 (Mpa) | -- |
| Tensile Modulus | ASTM D 3039 | 20.8 (Msi) 143 (Gpa) | -- |
| Poisson's Ratio | ASTM D 3039 | 0.32 | -- |
| Short Beam Shear Strength | ASTM D 2344 | 11.5 (ksi) 79 (Mpa) | -- |
| Glass Transition Temperature | ASTM D 7028-07 Peak Tan Delta by DMA | 248 (°F) 120 (°C) | -- |
| Glc Strain Energy Release | ASTM D 5528-07 | 3.0 (in-lb/in ²) 525 (J/m ²) | -- |

¹**Fiber and cure cycle:** Arovex tested with Toho UTS50 E13 12K 800tex carbon fiber with a resin content of 38% and cured at 180°F (82°C) and vacuum bag pressure for 10 hours (others available).

²**Testing:** Mechanical Data obtained by independent third party testing. Values normalized to 60% fiber volume. Values are typical and are not intended as a specification value.

Prepreg Storage Life

- Tack life – 21 days @ 72°F (22°C)
- Out life – 30 days @ 72°F (22°C)
- Shelf life – 1 year @ 0°F (-18°C)

Cure Timing

1. Ramp temperature 3-5°F (1-4°C) per minute to 180°F (82°C).
2. Hold at 180°F (82°C) for 12-16 hours.
3. Cool to below 140°F (60°C) before de-molding.
4. Minimum vacuum molding pressure is 14 psi (21 inches Hg).

Figure 1 | Rheology Characteristics

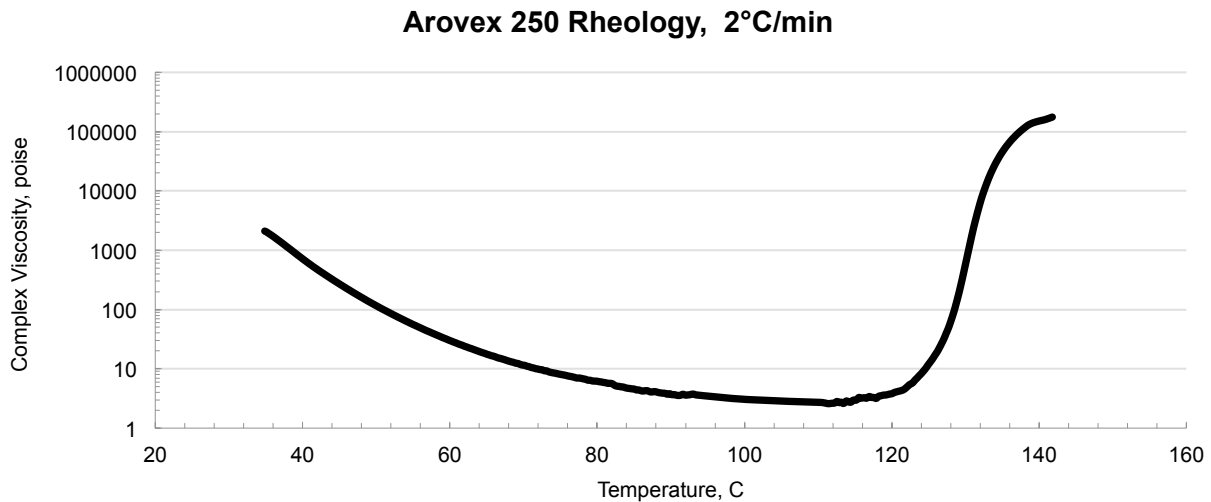


Figure 2 | Vacuum Cure Cycle

Typical Arovex 180 Vacuum Oven Cure

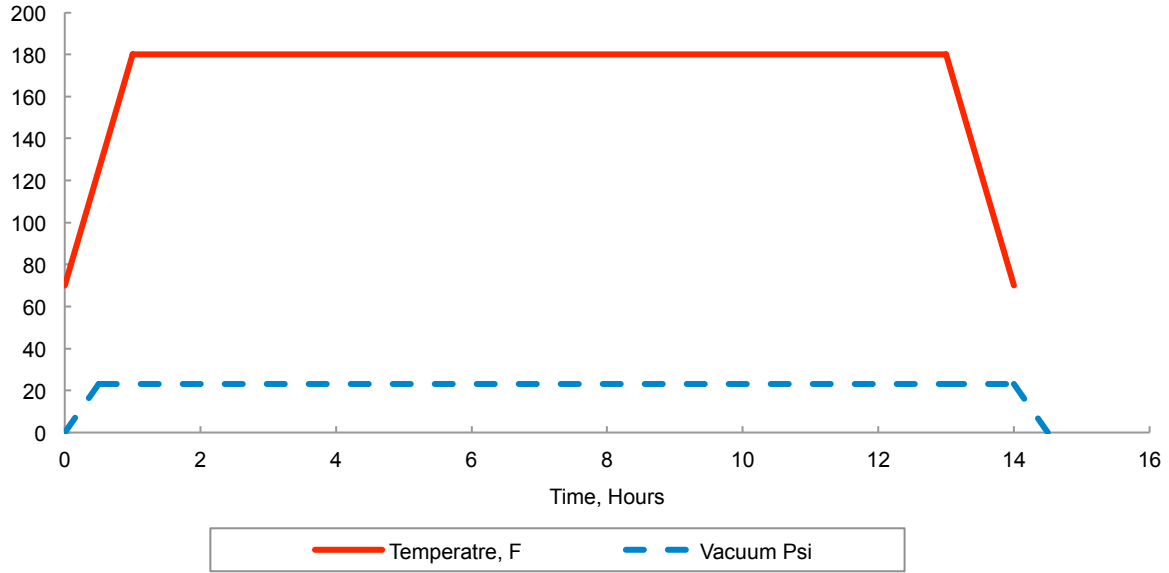
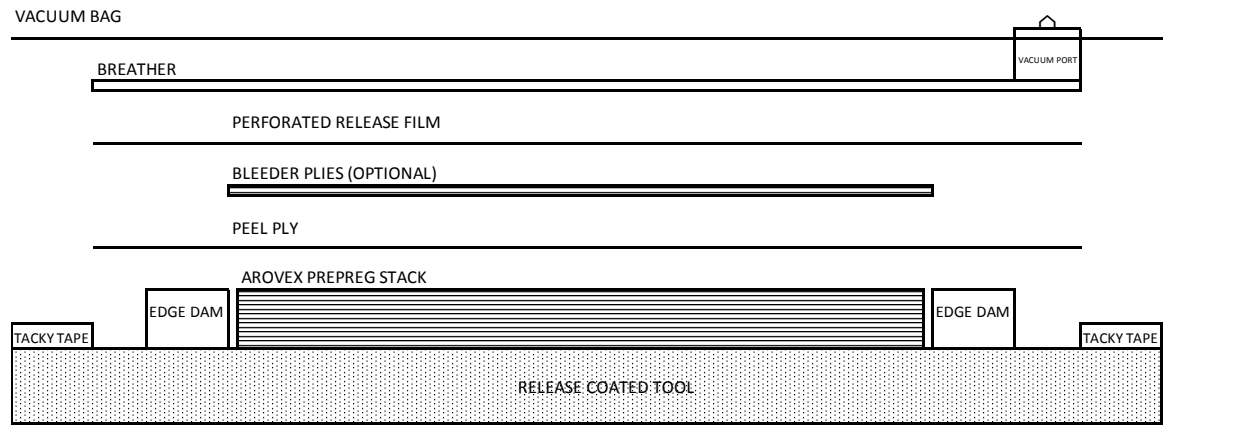


Figure 3 | Standard Lay-Up



Safety Handling

Zyvex Technologies provides its customers with a product specific Material Safety Data Sheet (MSDS) to cover potential health effects, safe handling and use information.

Zyvex encourages its customers to review all relevant MSDS prior to use.

Disclaimer

Zyvex Technologies believes that the technical data provided is accurate as of the published date. Performance values are considered representative but are not intended as a specification.

Contact Zyvex

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