

# PRODUCT DATA SHEET



TENCATE ADVANCED COMPOSITES

## SF-5 Syntactic Film

### PRODUCT TYPE

350°F (177°C) Cure  
Cyanate Ester Syntactic Film

### TYPICAL APPLICATIONS

- Aerospace Structures
- Radomes

### SHELF LIFE

#### Out Life

14 days out life 77°F (25°C)

#### Frozen Storage Life

6 months storage life at <0°F (-18°C)

Out Life is the time during which the material retains enough tack, drape and handling for easy component lay-up.

### PRODUCT DESCRIPTION

SF-5 is a cyanate ester based syntactic film developed to be compatible with various cyanate ester matrices, including RS-3. SF-5 is available in unsupported and supported continuous film form in thicknesses from 10 mils to 300 mils. SF-5 has been evaluated and qualified in aerospace and dielectric structures.

### PRODUCT BENEFITS/FEATURES

- Minimum ambient work life of 4 weeks
- Good handleability, drape, and processing
- Good moisture resistance
- Good toughness
- Low dielectric and loss tangent over wide thermal and electrical ranges
- Oven, autoclave, and compression consolidation capable

### NEAT RESIN PROPERTIES

|                             |   |
|-----------------------------|---|
| Density .....               | 38 pcf, nom. (0.61 g/cc)  |
| Dry Tg (by DMA) .....       | 490°F (254°C) cured 2 hours at 350°F (177°C)<br>and post cured 2 hours at 450°F (232°C) |
| Wet Tg (by DMA) .....       | 480°F (249°C) determined after exposure to<br>95% RH at 160°F (71°C) for 20 days        |
| Moisture Absorption** ..... | 3.5%  |
| Dielectric Constant .....   | 1.70 (at 18 GHz)  |
| Loss Tangent .....          | 0.004 (at 18 GHz)   |

\*\* Equilibrated at 95% relative humidity and 160°F (71°C)

### PRODUCT FORMS

- Film to 50 Inches Wide

### SF-5 SYNTACTIC FILM MECHANICAL PROPERTIES

| Properties       | Condition (Temperature) | Method    | Results  |          |
|------------------|-------------------------|-----------|----------|----------|
| Tensile Strength | 75°F (24°C)             | ASTM D638 | 2.93 ksi | 20.2 MPa |
| Tensile Modulus  | 75°F (24°C)             | ASTM D638 | 0.42 Msi | 2.9 GPa  |
| Tensile Strength | 167°F (75°C)            | ASTM D638 | 3.19 ksi | 22.0 MPa |
| Tensile Modulus  | 167°F (75°C)            | ASTM D638 | 0.39 Msi | 2.7 GPa  |
| Tensile Strength | 450°F (232°C)           | ASTM D638 | 3.90 ksi | 26.9 MPa |
| Tensile Strength | 167°F (75°C) WET        | ASTM D638 | 2.93 ksi | 20.2 MPa |
| Tensile Modulus  | 167°F (75°C) WET        | ASTM D638 | 0.38 Msi | 2.6 GPa  |
| Tensile Strength | 350°F (177°C) WET       | ASTM D638 | 2.10 ksi | 14.5 MPa |
| Tensile Strength | -80°F (-62°C)           | ASTM D638 | 2.18 ksi | 15.0 MPa |
| Tensile Modulus  | -80°F (-62°C)           | ASTM D638 | 0.47 Msi | 3.2 GPa  |
| Poisson's Ratio  |                         |           | 0.33     |          |

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### SF-5 SYNTACTIC FILM MECHANICAL PROPERTIES

| Properties                    | Condition (Temperature) | Method     | Results   |            |
|-------------------------------|-------------------------|------------|-----------|------------|
| Flexural Strength             | 77°F (25°C)             | ASTM D790  | 7.00 ksi  | 48.3 MPa   |
| Flexural Strength             | 450°F (232°C)           | ASTM D790  | 8.70 ksi  | 60.0 MPa   |
| Flexural Strength             | 350°F (177°C) WET       | ASTM D790  | 4.20 ksi  | 29.0 MPa   |
| Flatwise Compressive Strength | 77°F (25°C)             | ASTM C365  | 11.50 ksi | 79.3 MPa   |
| Notched Shear Strength        | 75°F (24°C)             | ASTM D5379 | 2.52 ksi  | 17.4 MPa   |
| Notched Shear Modulus         | 75°F (24°C)             | ASTM D5379 | 0.14 ksi  | 1.0 GPa    |
| Notched Shear Strength        | 167°F (75°C)            | ASTM D5379 | 1.86 ksi  | 12.8 MPa   |
| Notched Shear Modulus         | 167°F (75°C)            | ASTM D5379 | 0.14 Msi  | 1.0 GPa    |
| Notched Shear Strength        | 167°F (75°C) WET        | ASTM D5379 | 1.98 ksi  | 13.7 (MPa) |
| Notched Shear Modulus         | 167°F (75°C) WET        | ASTM D5379 | 0.14 Msi  | 1.0 GPa    |
| Notched Shear Strength        | -80°F (-62°C)           | ASTM D5379 | 1.58 ksi  | 10.9 MPa   |
| Notched Shear Modulus         | -80°F (-62°C)           | ASTM D5379 | 0.14 Msi  | 1.0 GPa    |

### TYPICAL CURE PARAMETERS

- \* Apply vacuum. For autoclave or press applications, pressurize to 45-100 psi.
- \* Heat to 350°F (177°C) ( $\pm 10^\circ\text{F}/5^\circ\text{C}$ ) at  $5^\circ\text{F} \pm 3^\circ\text{F}/\text{min}$ . ( $3^\circ\text{C} \pm 2^\circ\text{C}/\text{min}$ .)
- \* Hold at 350°F (177°C) for 2 hours ( $\pm 15$  min). Cool. May be post cured at 450°F (232°C) if higher temperature service is required.

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All data given is based on representative samples of the materials in question. Since the method and circumstances under which these materials are processed and tested are key to their performance, and TenCate Advanced Composites has no assurance of how its customers will use the material, the corporation cannot guarantee these properties.

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