

## PRODUCT DATA SHEET

### DESCRIPTION

Toray MicroPly™ SF-5 is a cyanate ester based syntactic film developed to be compatible with various cyanate ester matrices, including Toray RS-3. Toray MicroPly™ SF-5 is available in unsupported and supported continuous film form in thicknesses from 0.25–6.35 mm (10–250 mils). Toray MicroPly™ SF-5 has been evaluated and qualified in aerospace and dielectric structures.

### 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**
- ▶ **Out of autoclave/vacuum bag. Press forming, post curable autoclave**

### PRODUCT TYPE

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

### PRODUCT FORMS

- ▶ Film to 127 cm (50") wide

### TYPICAL APPLICATIONS

- ▶ Aerospace structures
- ▶ Radomes

### SHELF LIFE

<b>Out Life:</b>	14 days out life $\leq 21^{\circ}\text{C}$ (70°F) and $\leq 60\%$ RH
<b>Frozen Storage Life:</b>	6 months at $\leq -18^{\circ}\text{C}$ ( $\leq 0^{\circ}\text{F}$ )

Out life is the maximum time allowed at 21°C (70°F) or below and 60% or less RH before cure, after a single frozen storage cycle in the original unopened packaging at -18°C (0°F) or below for a period not exceeding the frozen storage life noted above.

### TYPICAL NEAT RESIN PROPERTIES

Density	38 pcf, nom. (0.61 g/cc)
Dry $T_g$ (by DMA)	254°C (490°F) cured 2 hours at 177°C (350°F) and post cured 2 hours at 232°C (450°F)
Wet $T_g$ (by DMA)	249°C (480°F) determined after exposure to 95% RH at 71°C (160°F) 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 71°C (160°F)



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**MicroPly™**

TORAY\_MicroPly\_SF-5\_PDS\_v3.0\_2020-02-28

Page 1/2

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### SYNTACTIC FILM MECHANICAL PROPERTIES

Property	Condition (Temperature)	Method	Results	
Tensile Strength	24°C (75°F)	ASTM D 638	20.2 MPa	2.93 ksi
Tensile Modulus	24°C (75°F)	ASTM D 638	2.9 GPa	0.42 Msi
Tensile Strength	75°C (167°F)	ASTM D 638	22.0 MPa	3.19 ksi
Tensile Modulus	75°C (167°F)	ASTM D 638	2.7 GPa	0.39 Msi
Tensile Strength	232°C (450°F)	ASTM D 638	26.9 MPa	3.90 ksi
Tensile Strength	75°C (167°F) WET	ASTM D 638	20.2 MPa	2.93 ksi
Tensile Modulus	75°C (167°F) WET	ASTM D 638	2.6 GPa	0.38 Msi
Tensile Strength	177°C (350°F) WET	ASTM D 638	14.5 MPa	2.10 ksi
Tensile Strength	-62°C (-80°F)	ASTM D 638	15.0 MPa	2.18 ksi
Tensile Modulus	-62°C (-80°F)	ASTM D 638	3.2 GPa	0.47 Msi
Poisson's Ratio				0.33
Flexural Strength	25°C (77°F)	ASTM D 790	48.3 MPa	7.0 ksi
Flexural Strength	232°C (450°F)	ASTM D 790	60.0 MPa	8.70 ksi
Flexural Strength	177°C (350°F) WET	ASTM D 790	29.0 MPa	4.20 ksi
Flatwise Compressive Strength	25°C (77°F)	ASTM D 365	79.3 MPa	11.50 ksi
Notched Shear Strength	24°C (75°F)	ASTM D 5379	17.4 MPa	2.52 ksi
Notched Shear Modulus	24°C (75°F)	ASTM D 5379	1.0 GPa	0.14 ksi
Notched Shear Strength	75°C (167°F)	ASTM D 5379	12.8 MPa	1.86 ksi
Notched Shear Modulus	75°C (167°F)	ASTM D 5379	1.0 GPa	0.14 Msi
Notched Shear Strength	75°C (167°F) WET	ASTM D 5379	13.7 MPa	1.98 ksi
Notched Shear Modulus	75°C (167°F) WET	ASTM D 5379	1.0 GPa	0.14 Msi
Notched Shear Strength	-62°C (-80°F)	ASTM D 5379	10.9 MPa	1.58 ksi
Notched Shear Modulus	-62°C (-80°F)	ASTM D 5379	1.0 GPa	0.14 Msi

### CURE PARAMETERS

- ▶ Apply vacuum. For autoclave or press applications, pressurize to 45–100 psi
- ▶ Heat to 177°C ± 5°C (350°F ± 10°F) at 3°C ± 2°C/min (5°F ± 3°F/min)
- ▶ Hold at 177°C (350°F) for 2 hours (±15 min). Cool. May be post cured at 232°C (450°F) if higher temperature service is required

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TORAY\_MicroPly\_SF-5\_PDS\_v3.0\_2020-02-28 Page 2/2

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