

PRODUCT DATA SHEET

DESCRIPTION

Toray 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 0.25–6.35 mm (10–250 mils). 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

Out Life:	14 days at 25°C (77°F)
Frozen Storage Life:	6 months at -18°C (< 0°F)

Out life is the maximum time allowed at room temperature before cure.

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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SF-5 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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