

PRODUCT DATA SHEET

DESCRIPTION

Toray E745 is a 135°C (275°F) cure toughened epoxy component prepreg. E745 has been developed for impact structures and other mechanically demanding structural applications. E745 can be impregnated into a range of fiber and fabric types.

FEATURES

- ▶ High toughness and impact properties
- ▶ Excellent tack and drape
- ▶ 1 hour at 135°C (275°F) cure
- ▶ 60 days shelf life at ambient temperature
- ▶ Excellent surface finish
- ▶ Low volatile content—no solvents used during processing

PRODUCT TYPE

135°C (275°F) Cure Mid Temperature Curing Toughened Epoxy Component Prepreg

TYPICAL APPLICATIONS

- ▶ Side impact structures
- ▶ Formula 1 nose boxes
- ▶ Mechanically demanding structural applications

SHELF LIFE

Out Life:	60 days at 20°C (68°F)
Storage Life:	12 months at -18°C (0°F)

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

To avoid moisture condensation

Following removal from cold storage, allow the prepreg to reach room temperature before opening the polythene bag. Typically, the thaw time for a full roll of material will be 4 to 6 hours.

TYPICAL NEAT RESIN PROPERTIES

Density	1.24 g/cm ³ (77.4 lbs/ft ³) at 23°C (73°F)
T _g (DMTA) after 1 hr at 135°C (275°F)	Onset: 118°C (244.4°F); Peak tan δ: 131°C (267.8°F)

TYPICAL LAMINATE PROPERTIES

Intermediate Modulus 6K Carbon 200gsm 2x2 Twill 42% RC	
Mode I Interlaminar Fracture Toughness (G _{IC} Strain Energy Release Rate)	1137 J/m ²
SEA (Dynamic Crush Test)	84.0 J/g



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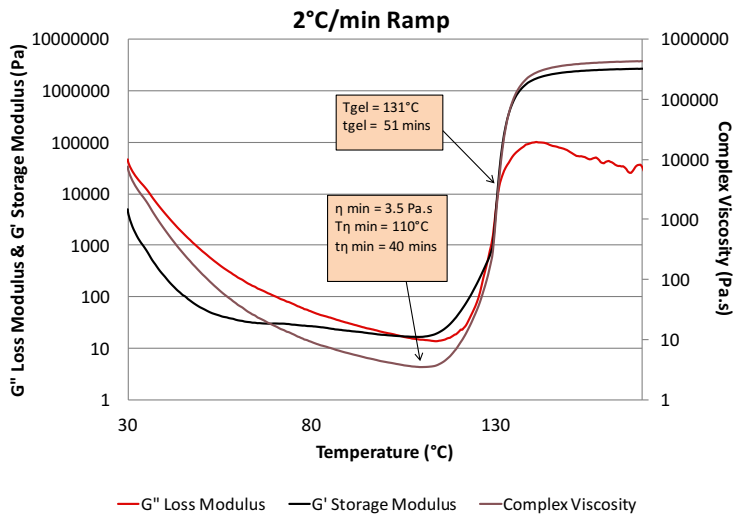
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TYPICAL LAMINATE PROPERTIES

Intermediate Modulus 6K Carbon 200gsm 2x2 Twill 42% RC				
Property	Condition	Method	Results	
Tensile Strength 0°	RTD	ISO 527-4	1072 MPa	156 ksi
Tensile Modulus 0°	RTD	ISO 527-4	75.9 GPa	11.0 Msi
Poisson's Ratio	RTD	ISO 527-4	0.04	
Tensile Strength 90°	RTD	ISO 527-4	1130 MPa	164 ksi
Tensile Modulus 90°	RTD	ISO 527-4	78.9 GPa	11.4 Msi
Poisson's Ratio	RTD	ISO 527-4	0.04	
Compression Strength 0°	RTD	EN 2580	717 MPa	104 ksi
Compression Modulus 0°	RTD	EN 2580	70.6 GPa	10.2 Msi
Compression Strength 90°	RTD	EN 2580	707 MPa	103 ksi
Compression Modulus 90°	RTD	EN 2580	71.4 GPa	10.4 Msi
In-Plane Shear Strength	RTD	ISO 14129	124 MPa	18 ksi
In-Plane Shear Modulus	RTD	ISO 14129	3.9 GPa	0.6 Msi
Interlaminar Shear Strength 0°	RTD	ISO 14130	70 MPa	10 ksi
Interlaminar Shear Strength 90°	RTD	ISO 14130	69 MPa	10 ksi

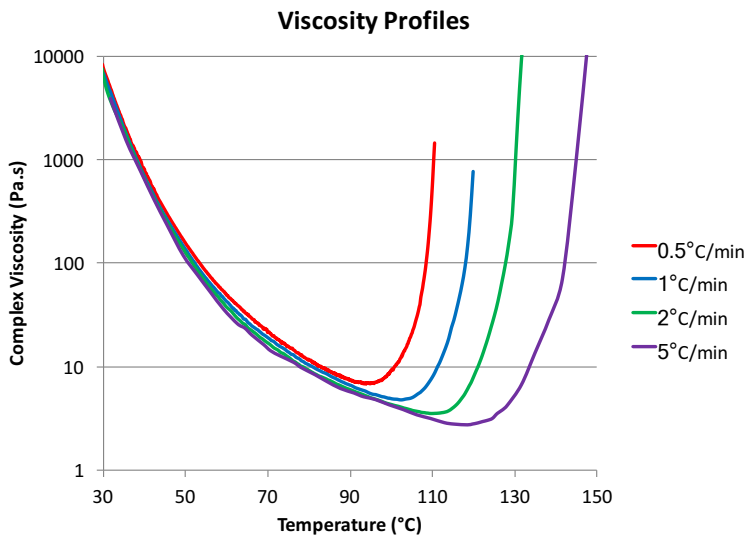
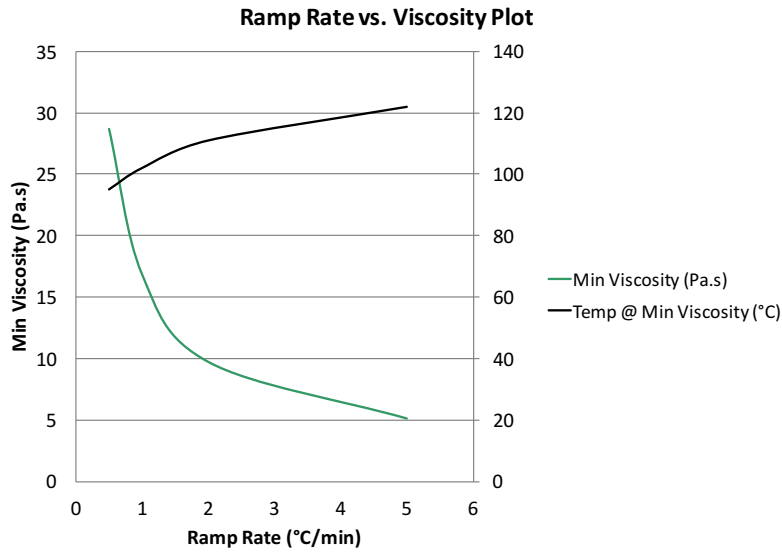
Cured 1 hr at 135°C (275°F)
Results normalized to 55% Vf, otherwise results are at actual 49.3% Vf

RHEOLOGY



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VISCOSITY



CURE PROPERTIES: VISCOSITY PROFILE (30°C TO 170°C OR 86°F TO 338°F)

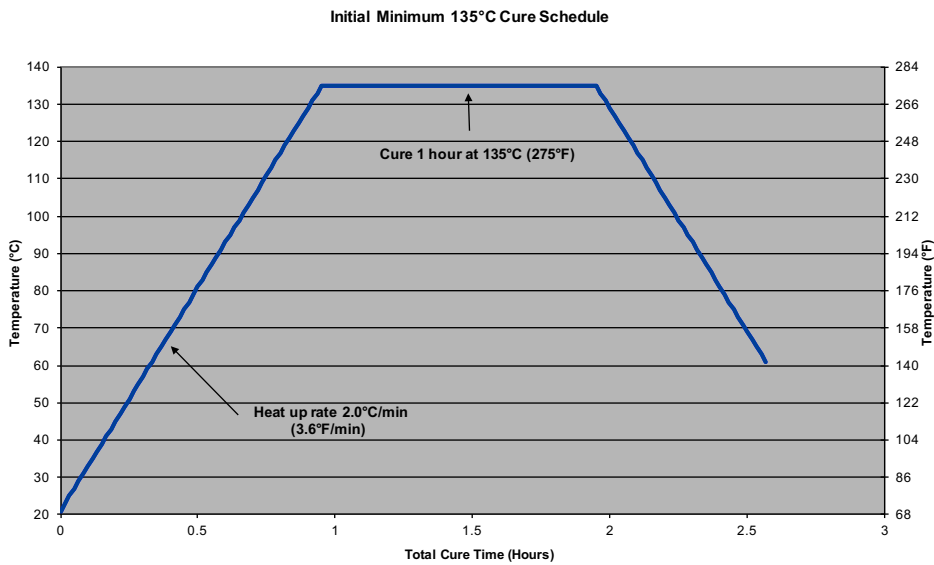
Ramp rate [°C(°F)/min]	Minimum Viscosity (Pa.s)	Temperature at Minimum Viscosity
0.5 (1.0)	6.8	94°C (201°F)
1.0 (1.8)	4.74	102°C (216°F)
2.0 (3.6)	3.5	110°C (230°F)
5.0 (9.0)	2.73	118°C (244°F)

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RECOMMENDED CURE CYCLE

- ▶ Toray E745 can be successfully molded by vacuum bag, autoclave, or matched die molding techniques.
- ▶ Increase autoclave pressure to 1.4 bar (20 psi) with vacuum applied.
- ▶ Vent to atmosphere and raise pressure to 6.2 bar (90 psi) (or max allowed by the core material).
- ▶ Increase air temperature at 2°C (3.6°F)/min and hold for 1 hour at 135°C (275°F).
- ▶ Allow to cool to 60°C (140°F) before removal of pressure.

CURE SCHEDULE



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EXOTHERM

In certain circumstances, such as the production of thick section laminates rapid heat-up rates or highly insulating masters, Toray E745 can undergo exothermic heating leading to rapid temperature rise and component degradation in extreme cases. Where this is likely, a cure incorporating an intermediate dwell is recommended in order to minimize the risk.

HANDLING SAFETY

Observe established precautions for handling epoxy resins and fibrous materials—wear gloves. For further information, refer to Safety Data Sheet.

PROCESSING

Following removal from refrigerated storage, allow the prepreg to reach room temperature before opening the polythene bag, to avoid moisture condensation. Typically, the thaw time for a full roll of material will be 4 to 6 hours. Cut patterns to size and lay-up the laminate in line with design instructions taking care not to distort the prepreg. If necessary, the tack of the prepreg may be increased by gentle warming with hot air. The lay-up should be vacuum debulked at regular intervals using a P3 (pin pricked) release film on the prepreg surface; a vacuum of 980 mbar (29 in Hg) is applied for 20 minutes.

For autoclave cures, use of a nonperforated release film on the prepreg surface trimmed to within 25–30 mm of the prepreg edge is recommended for the cure cycle and a vacuum bag should be installed using standard techniques.

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