

PRODUCT DATA SHEET

DESCRIPTION

Toray E760 is a highly toughened epoxy component prepreg with exceptional high temperature performance. It has been designed for use in mechanically demanding structural applications exposed to elevated temperature environments, such as Formula 1 and high performance automotive.

FEATURES

- ▶ Highly toughened resin system
- ▶ Excellent retention of properties at elevated temperature
- ▶ T_g above $> 200^\circ\text{C}$ (392°F) after 180°C (356°F) cure
- ▶ Excellent mechanical properties
- ▶ Controlled flow

PRODUCT TYPE

180°C (350°F) Cure System Highly Toughened Epoxy Component Prepreg

TYPICAL APPLICATIONS

- ▶ Structural applications within Formula 1
- ▶ High temperature automotive

SHELF LIFE

Out Life:	21 days at 18°C (64°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	1.21 g/cm ³ (75.5 lbs/ft ³)
T_g (DMTA) after 2 hrs at 180°C (356°F)	Onset: 204°C (399°F); Peak tan δ : 216°C (421°F)



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TYPICAL LAMINATE PROPERTIES

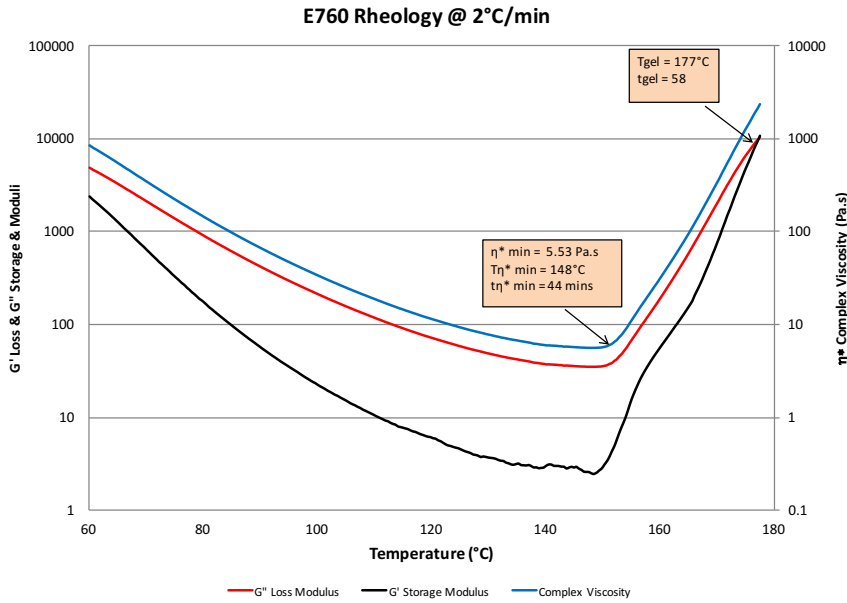
High Modulus M46JB 6K Carbon 285gsm 5HS 42% RC			
Property	Method	Test Temperature	
		RT	120°C (248°F)
Tensile Strength 0°	ISO 527-4	627 MPa	744 MPa
Tensile Modulus 0°	ISO 527-4	98 GPa	99.3 GPa
Tensile Strength 90°	ISO 527-4	604 MPa	689 MPa
Tensile Modulus 90°	ISO 527-4	95.3 GPa	97.3 GPa
Poisson's Ratio	ISO 527-4	0.02	
Compression Strength 0°	prEN 2580	445 MPa	392 MPa
Compression Modulus 0°	prEN 2580	85.7 GPa	86.1 GPa
Compression Strength 90°	prEN 2580	431 MPa	397 MPa
Compression Modulus 90°	prEN 2580	85.3 GPa	84.3 GPa
In-Plane Shear Strength	prEN 6031	73 MPa	55.6 MPa
In-Plane Shear Modulus	prEN 6031	3.7 GPa	2.9 GPa
Poisson's Ratio	prEN 6031	0.9	
Interlaminar Shear Strength 0°	ISO 14130	49 MPa	39.4 MPa
Interlaminar Shear Strength 90°	ISO 14130	51.0 MPa	38.8 MPa
Bearing Strength	prEN 6037	698 MPa	-
Mode I Interlaminar Fracture Toughness (G _{IC} Strain Energy Release Rate)	prEN 6033	607 J/m ²	-

Property	Method	Test Temperature				
		RT	80°C (176°F)	120°C (248°F)	150°C (302°F)	180°C (356°F)
Compression Strength 0°	prEN 2580	445	420	418	392	404
Compression Modulus 0°	prEN 2580	431	430	404	397	378
Interlaminar Shear Strength 0°	ISO 14130	49	47.8	44	39.4	31.5
Interlaminar Shear Strength 90°	ISO 14130	51	47	44	38.8	30.5

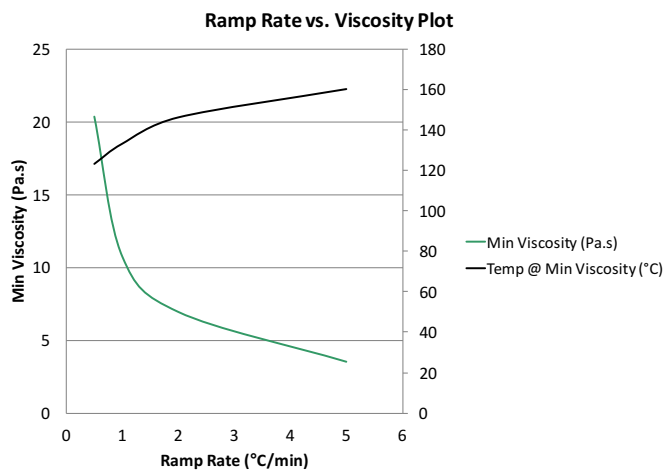
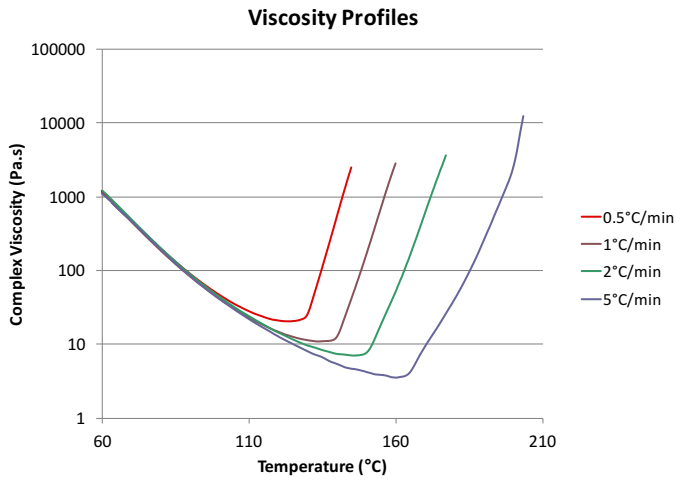
Cured 2 hrs at 180°C (356°F)

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RHEOLOGY



VISCOSITY



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CURE PROPERTIES: VISCOSITY PROFILE (60°C TO 200°C OR 140°F TO 392°F)

Ramp rate [°C (°F)/min]	Minimum Viscosity (Pa.s)	Temperature at Minimum Viscosity
0.5 (0.9)	13.54	122°C (251°F)
1.0 (1.8)	7.02	7.02°C (271°F)
2.0 (3.6)	4.96	144°C (291°F)
5.0 (9)	2.33	157°C (314°F)

TYPICAL CURE PROFILES

180°C (356°F) Cure Temperatures		
Ramp	2.0°C (3.6°F)/min to 180°C (356°F)	Dwell for 2 hours
Cool	2.0°C (3.6°F)/min to below 60°C (140°F)	Followed by demold
Total time: 4 hours		

POST CURE

After the initial cure, a post cure up to 200°C may be required to maximize the end use temperature as follows:

- ▶ Ramp temperature at 2°C/min (3.6°F/min) to 200°C (392°F)
- ▶ Hold at 200°C (392°F) for 2 hours
- ▶ Cool oven to 60°C (140°F) at 3°C/min (5.4°F/min)

CURE CYCLE COMPARISON

Cure Cycle	T _g Onset °C (°F)
3 hours at 135°C (275°F)	162°C (324°F)
3 hours at 135°C (275°F) plus 2 hours at 180°C (356°F)	200°C (392°F)
2 hours at 180°C (356°F)	204°C (399°F)
2 hours at 180°C (356°F) plus 2 hours at 200°C (392°F)	216°C (421°F)

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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 E760 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.