

PRODUCT DATA SHEET

DESCRIPTION

Toray E732 is a snap cure toughened epoxy resin matrix optimized for press curing (compression molding) prepreg applications. With a cure time of 4 minutes at 160°C (320°F), an onset T_g of 170°C (338°F) is achieved. At this higher temperature, medium-to-high production rates can be accomplished, with customers able to produce beyond 50,000 parts per year.

Toray E732 is a versatile matrix with a range of processing options allowing a variety of automotive and industrial applications to be realized.

FEATURES

- ▶ Hot-in hot-out press processing
- ▶ Good surface finish and aesthetics
- ▶ Controlled resin flow for ease of processing
- ▶ Full T_g of 170°C (338°F) reached in 4 minutes at 160°C (320°F)
- ▶ Short cure cycles between 120°C (248°F) to 160°C (320°F)
- ▶ Low tack for easy lay-up

PRODUCT TYPE

120°C (248°F) to 160°C (320°F) Cure

Compression Molding Toughened Epoxy Component Prepreg

TYPICAL APPLICATIONS

- ▶ Compression molding
- ▶ Automotive accessories
- ▶ Sport and recreation components e.g., bicycle frames and parts

TYPICAL NEAT RESIN PROPERTIES

Density (ASTM D792-13)	1.24 g/cm ³ (77.4 lbs/ft ³)
Flow at 100 psi (ASTM D3531 M)	26.3% at 140°C (293°F)
T_g (DMTA) after 4 mins at 160°C (320°F)	Onset: 170°C (338°F) Peak tan δ : 190°C (374°F)
T_g (DMTA) after 5 mins at 150°C (302°F)	Onset: 163°C (325°F) Peak tan δ : 189°C (372°F)
T_g (DMTA) after 10 mins at 140°C (293°F)	Onset: 159°C (318°F) Peak tan δ : 193°C (379°F)

SHELF LIFE

Out Life: 21 days at 18°C (64°F)

Frozen Storage Life: 6 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 prepreg to reach room temperature before opening the polythene bag.



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TYPICAL LAMINATE PROPERTIES

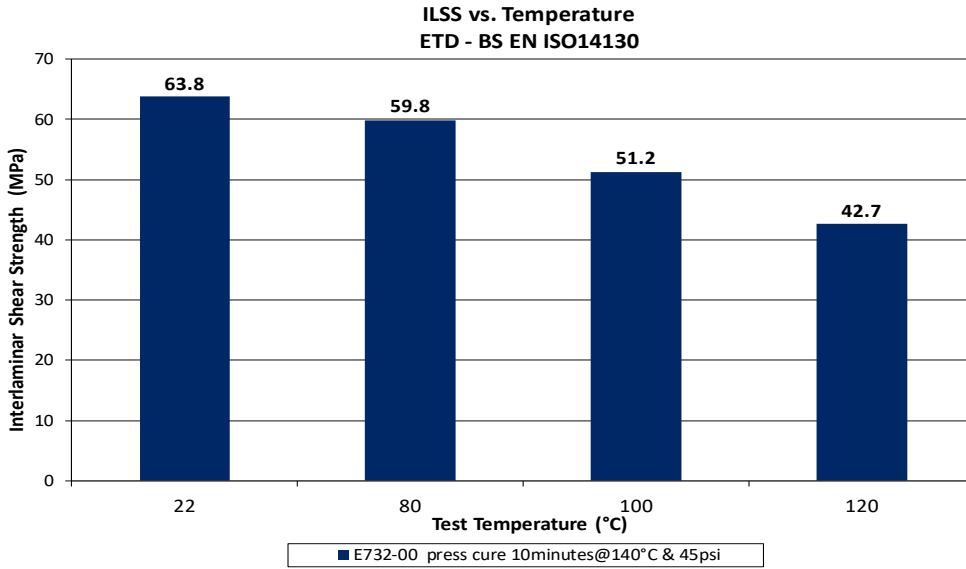
Standard Modulus 3K Carbon 205gsm 2x2 Twill 42% RC				
Property	Condition	Method	Laminate	
Tensile Strength 0°	RTD	BS EN ISO 527-4	713 MPa	103.4 ksi
Tensile Modulus 0°	RTD	BS EN ISO 527-4	59.8 GPa	8.7 Msi
Poisson's Ratio	RTD	-	0.04	-
Tensile Strength 90°	RTD	BS EN ISO 527-4	586 MPa	85.0 ksi
Tensile Modulus 90°	RTD	BS EN ISO 527-4	58.4 GPa	8.5 Msi
Poisson's Ratio 90°	RTD	-	0.06	-
Compressive Strength 0°	RTD	prEN 2850 B1 & B2	660 MPa	95.7 ksi
Compressive Modulus 0°	RTD	prEN 2850 B1 & B2	50.6 GPa	7.3 Msi
Compressive Strength 90°	RTD	prEN 2850 B1 & B2	675 MPa	97.9 ksi
Compressive Modulus 90°	RTD	prEN 2850 B1 & B2	51.2 GPa	7.4 Msi
Flexural Strength 0°	RTD	BS EN ISO 14125	847 MPa	122.8 ksi
Flexural Modulus 0°	RTD	BS EN ISO 14125	51.9 GPa	7.5 Msi
Flexural Strength 90°	RTD	BS EN ISO 14125	897 MPa	130.1 ksi
Flexural Modulus 90°	RTD	BS EN ISO 14125	52.5 GPa	7.6 Msi
In-Plane Shear Strength	RTD	prEN 6031	105 MPa	15.2 ksi
In-Plane Shear Modulus	RTD	prEN 6031	3.86 GPa	0.56 Msi
Poisson's Ratio 0°	RTD	prEN 6031	0.8	-
In-Plane Shear Strength 0°	RTD	BS EN ISO 14130	63.8 MPa	9.3 ksi
In-Plane Shear Strength 90°	RTD	BS EN ISO 14130	59.2 MPa	8.6 ksi
Mode I Interlaminar Fracture Toughness (G _{IC} Strain Energy Release Rate)	RTD	prEN 6033	420 J/m ²	-

Press cured 10 minutes at 140°C (284°F) at 45 psi
Data at Vf 50.9%. Test conditions were at room temperature

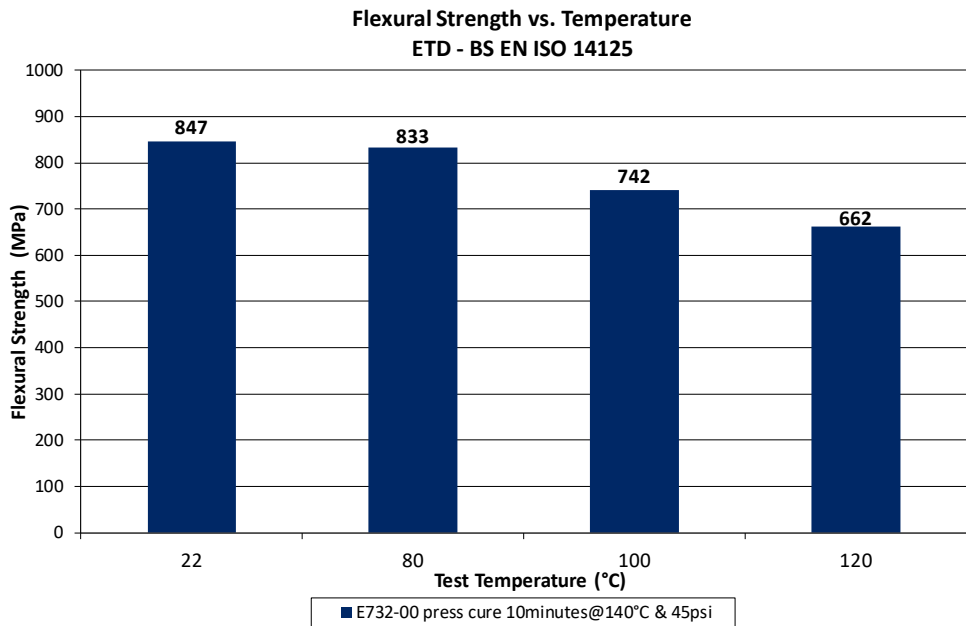
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RETENTION OF MECHANICAL PROPERTIES

Elevated Temperature Dry (ETD) Press Cured 10 Minutes at 140°C (284°F) at 45 psi



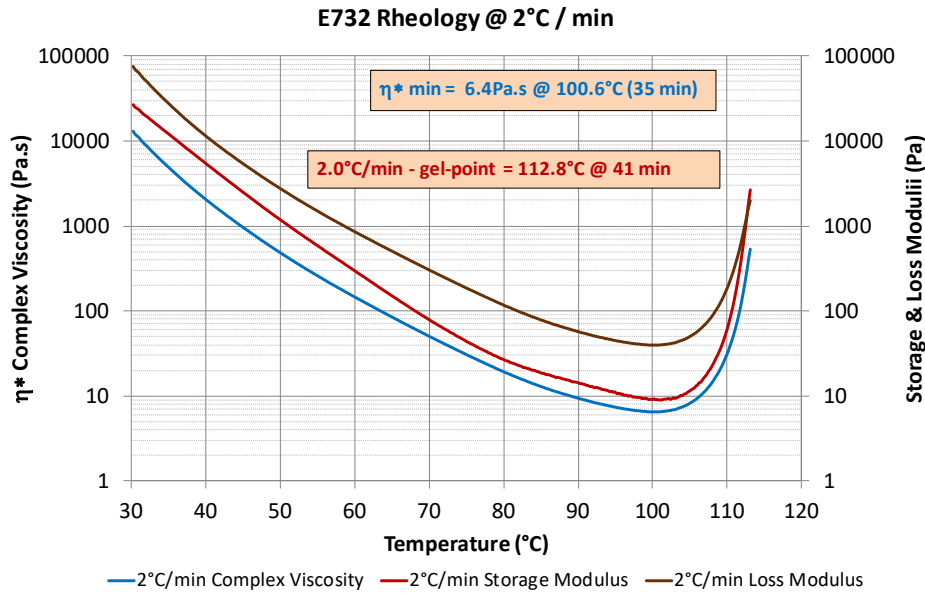
Interlaminar Shear Strength (ILSS) vs. Temperature of Standard Modulus 3K Carbon 205gsm 2x2T 42% RC E732 Laminate



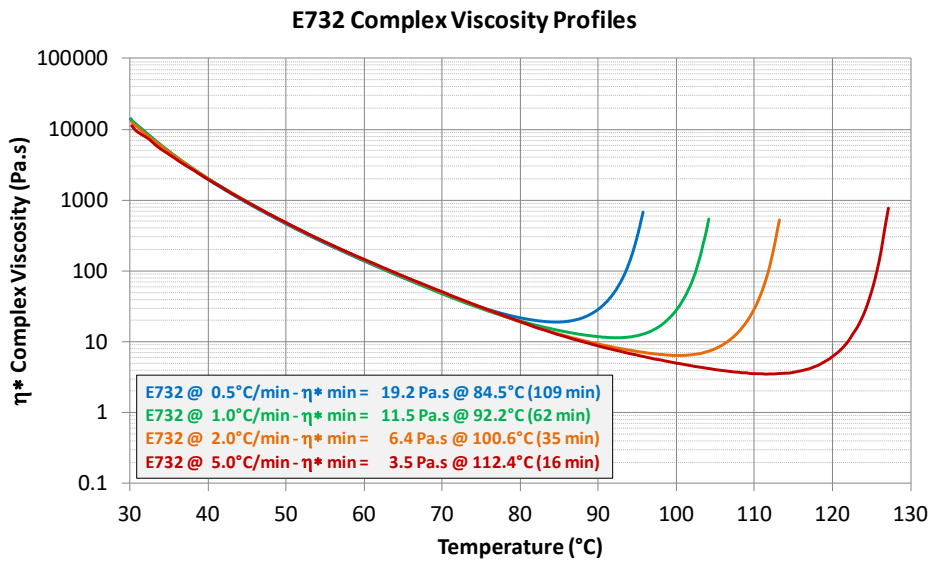
Flexural Strength vs. Temperature of Standard Modulus 3K Carbon 205gsm 2x2T 42% RC E732 Laminate

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RHEOLOGY



VISCOSITY



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PROCESSING

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.

CURE CYCLES

During compression molding, the resin will flow until the gel-point. After the recommended cure time, a 2-mm (0.78 inch) thick part will have generated a T_g in excess of the cure temperature. The table below provides information regarding gel times and cure times. The absence of cool-down and heat-up rates has obvious benefits for part throughput, facilitating part fabrication efficiency.

Dwell Temperature	Gel Time (Seconds)	Minimum Dwell Time (Minutes)	Recommended Dwell Time (Minutes)
120°C (248°F)	240	-	20
130°C (266°F)	150	-	15
140°C (284°F)	90	6	10
150°C (302°F)	60	4	5
160°C (320°F)	45	3	4

Alternative cure cycles and molding techniques may be employed. Please consult a member of our expert services team at our Langley Mill address for advice on specific cure requirements.

TYPICAL HOT-IN HOT-OUT CURE PROFILES

160°C (320°F) Cure Temperature

Dwell	160°C (320°F)	Hold for 4 minutes followed by demold
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Total time: 4 minutes

150°C (302°F) Cure Temperature

Dwell	150°C (302°F)	Hold for 5 minutes followed by demold
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Total time: 5 minutes

140°C (284°F) Cure Temperature

Dwell	140°C (284°F)	Hold for 10 minutes followed by demold
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Total time: 10 minutes

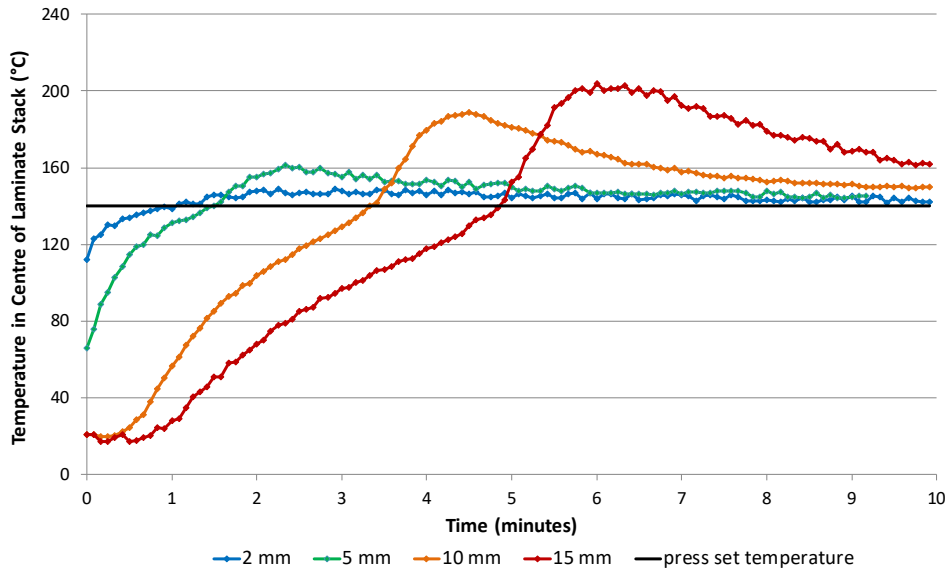
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EXOTHERM

In certain circumstances, such as the production of thick section laminates rapid heat-up rates or highly insulating masters, Toray E732 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.

Caution must be exercised in ensuring safe dwell temperatures and lay-up procedures are adhered to, especially when molding solid laminates in excess of 5 mm (0.20 in) thickness. Note that the risk of thermal runaway increases with lay-up thickness and cure temperature.

E732 Exotherm Study Hot-loaded @ 140°C & 45 psi



HANDLING SAFETY

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

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