Toray TC203

Toray Advanced Composites

PRODUCT DATA SHEET

DESCRIPTION

Toray TC203 is a clear-curing epoxy prepreg designed for applications where surface appearance is critical, including exposed weave components. It offers strong mechanical performance and process flexibility. TC203 is suitable for curing at 120 °C (248 °F), with alternative cure schedules available, and is available on a range of fabric reinforcements.

FEATURES

- **Resin cures clear – ideal for exposed weave applications**
- **Passes FMVSS 302: 1991 – Flammability of Interior Materials at 1 and 3mm**
- **Optimised handling characteristics – adheres to mold tool yet allows easy repositioning**
- **Good tack and drape**
- **Cure schedule - 1 hour at 120°C (248°F) autoclave cure**
- **T_g (DMA onset) of 112°C (234°F) after 120°C (248°F) autoclave cure cycle**

SHELF LIFE

Out Life:	30 days at 20°C (68°F)
Frozen 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 (ASTM D792-13)	1.20 g/cm³ (74.9 lbs/ft³)
Dry T_g (DMA Onset) after 1 hr at 120°C (248°F) at 2°C/min (ASTM D7028)	112°C (234°F)

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MECHANICAL PROPERTIES

High Strength T300B 3K Carbon 245gsm 2x2T 40% RC									
Property	**Method**	**RTD as Tested**		**RTD Normalized**		**ETD as Tested**		**ETD Normalized**	
Tensile Strength 0°	ASTM D3039	653 MPa	94.7 Ksi	731 MPa	106 Ksi	726 MPa	105.3 Ksi	812 MPa	117.8 Ksi
Tensile Modulus 0°	ASTM D3039	59.7 GPa	8.7 Msi	66.8 GPa	9.7 Msi	59.2 GPa	8.6 Msi	66.3 GPa	9.6 Msi
Poisson's Ratio 0°	ASTM D3039	0.04		-		-		-	
Tensile Strength 90°	ASTM D3039	633 MPa	91.8 Ksi	708 MPa	102.7 Ksi	716 MPa	103.8 Ksi	801 MPa	116.2 Ksi
Tensile Modulus 90°	ASTM D3039	59.2 GPa	8.6 Msi	66.2 GPa	9.6 Msi	59.2 GPa	8.6 Msi	62.2 GPa	9.6 Msi
Poisson's Ratio 90°	ASTM D3039	0.04		-		-		-	
Compression Strength 0°	ASTM D6641	612 MPa	88.8 Ksi	689 MPa	99.9 Ksi	514 MPa	74.5 Ksi	578 MPa	83.8 Ksi
Compression Modulus 0°	ASTM D6641	56 GPa	8.1 Msi	63 GPa	9.1 Msi	54.2 GPa	7.9 Msi	61 GPa	8.8 Msi
Compression Strength 90°	ASTM D6641	549 MPa	79.6 Ksi	704 MPa	102.1 Ksi	549 MPa	79.6 Ksi	617.8 MPa	89.6 Ksi
Compression Modulus 90°	ASTM D6641	56.7 GPa	8.2 Msi	63 GPa	9.1 Msi	56.7 GPa	8.2 Msi	63.8 GPa	9.3 Msi
Property	**Method**	**RTD as Tested**				**ETD as Tested**		**CTD as Tested**	
In-Plane Shear Strength @ 5%	ASTM D3518	63.6 MPa	9.2 Ksi	-		37.4 MPa	5.4 Ksi	84.2 MPa	12.2 Ksi
In-Plane Shear Modulus	ASTM D3518	3.35 GPa	0.5 Msi	-		2.52 GPa	0.4 Msi	3.67 GPa	0.5 Msi
Cured Ply Thickness	0.271mm								

Cured 1 hr at 120°C (248°F) at 2°C (3.6°F)/min ramp with 60psi pressure.
Room Temperature Dry (RTD) 22°C (71.6°F); Elevated Temperature Dry (ETD) 85°C (185°F), Cold Temperature Dry (CTD) -40°C (-40°F).
All data is the average of 3 batches.

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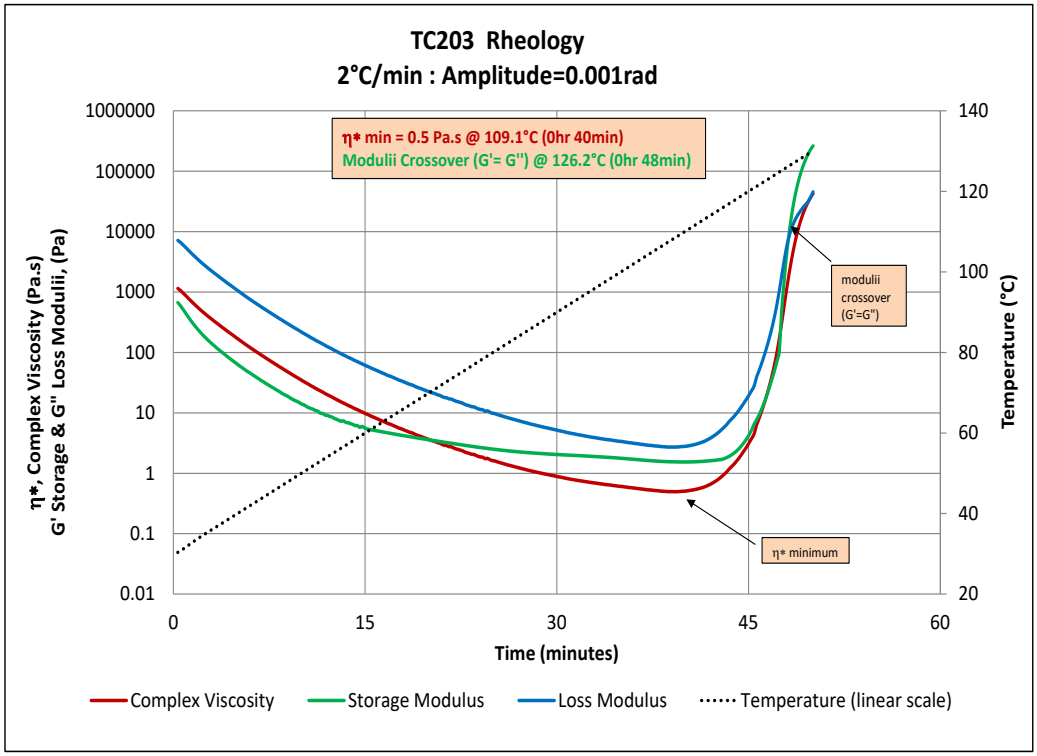
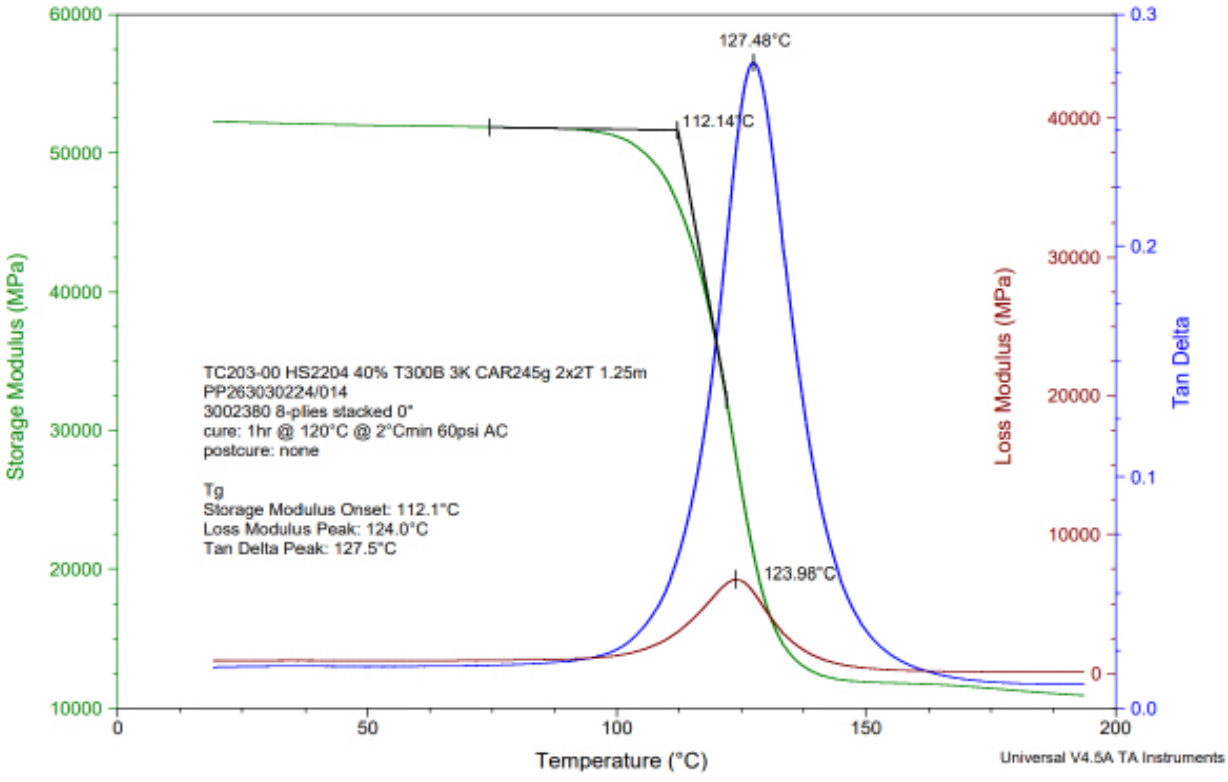
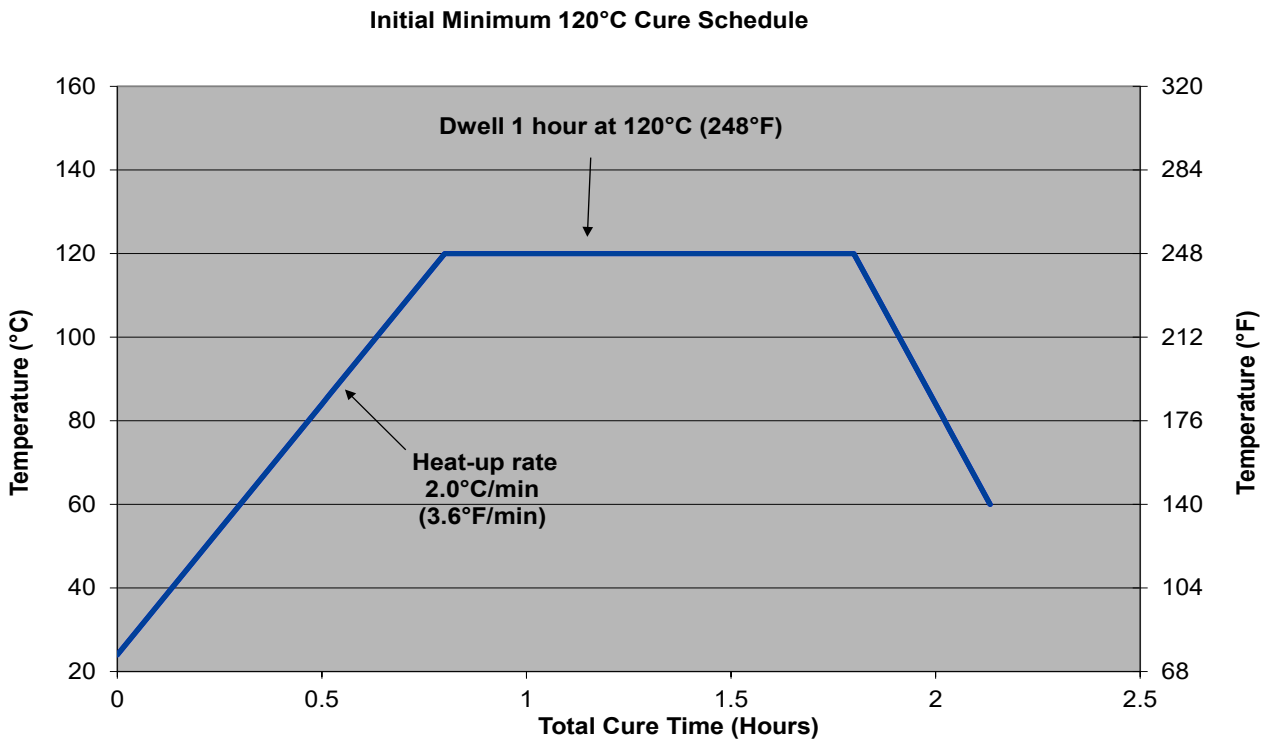
RHEOLOGY



PHYSICAL PROPERTIES—DMA



CURE SCHEDULE



120°C (248°F) Cure Temperature with 60psi Pressure		
Ramp	2.0°C (3.6°F)/min to 120°C (248°F)	Dwell for 1 hour
Cool	3.0°C (5.4°F)/min to 60°C (140°F)	Followed by demold
Total time: 2 hours 10 minutes		

PRODUCT DATA SHEET

ALTERNATIVE CURE CYCLES

Dwell Temperature	Dwell Time (Hours)
80°C (176°F)	16
100°C (212°F)	4
150°C (302°F)	0.5

EXOTHERM

In certain circumstances, e.g., the production of thick section laminates, rapid heating rates or highly insulating masters, Toray TC203 can undergo exothermic heating. A rapid temperature rise can lead to component degradation in extreme cases. Where this is considered likely, a cure incorporating an intermediate dwell is recommended to mitigate the risk. Note that the risk of thermal runaway increases with lay-up thickness and cure temperature.

HANDLING SAFETY

Observe established precautions for handling epoxy resins and fibrous materials. Ensure adequate ventilation, wear gloves, eye-protection and protective clothing. For further information please refer to our Safety Data Sheet.

PROCESSING

To avoid moisture condensation: Following removal from cold storage, allow prepreg to reach room temperature before opening the polythene bag. Cut prepreg 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, vacuum of 948 mbar (28"Hg) is applied for 10 minutes.

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

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