



MTB350

Bio-Epoxy Component Prepreg

Introduction

MTB350 is a unique epoxy resin system with 30% bio content derived from a renewable source. It has an outstanding shelf life at room temperature and is designed to cure at 120°C - 140°C, allowing flexibility in component manufacture. MTB350 is a toughened epoxy resin system designed for component manufacturing and can be supplied in a variety of fabric and UD formats. MTB350's inherent low viscosity allows for improved impregnation on natural fibre reinforcements. MTB350 can be stored and transported at ambient temperatures without detriment to the product potentially removing the requirement for cold storage.

Typical applications: General purpose

Key Features & Benefits

- **30%** certified bio-derived content
- Typical cure temperature **120°C**
- Service temperatures up to **140°C** after post cure
- Work life at 20°C: **6 months**
- Storage life at -18°C: **12 months**
- Ideal for impregnation of carbon, flax, and flax hybrid reinforcements
- Very low VOC content – no added solvents during manufacture

Storage & Out Life

This material should be kept frozen at -18°C for extended life. It must be kept sealed in a polythene bag which must not be opened until fully thawed to room temperature. If the material is not fully used, then the material must be resealed in the polythene bag to prevent moisture absorption.



Cure Cycles & performances

- Recommended Cure Cycle:
 - 1st dwell at **85°C** for **15mins**, at a ramp rate of **2-3°C/min** under **6 bar** pressure
 - 2nd dwell at **120°C** for **1hr**, at a ramp rate of **2-3°C/min** under **6 bar** pressure
- Notes:
 - Ensure full pressure (6 bar) is reached prior to the 1st (85°C) dwell
 - Maintain full vacuum until 2 bar pressure is reached, then vented to atmosphere
 - Restore full vacuum on removal of pressure
- Recommended Post cure: **160°C** for **2hrs**, at a ramp rate of **0.3°C/min** (if required to develop Tg)

- Resulting Tg:

DMA – Dry Tg	120°C for 1hr Initial Cure Only	Tg E' Onset	144	°C	<i>Modified ASTM D7028 (Single Cantilever)</i>
		Tg Peak Tan δ	188	°C	
DMA – Dry Tg	160°C for 2hrs Post-cure	Tg E' Onset	171	°C	
		Tg Peak Tan δ	190	°C	

Tests performed on **MTB350-C200T-HS-3K-42%RW** laminates

CURE CYCLE OPTIONS:

Temperature	Duration	Tg
80°C	16 hours	95°C
90°C	8 hours	110°C
100°C	3 hours	120°C
120°C	1 hour	140°C

- Curing Schedule is meant to be a guide only and is subject to local conditions.
- To avoid exotherm particular care must be taken with thick laminates.
Ramp rates must not exceed **3.0°C** per minute during **initial cure**.
Ramp rates must not exceed **0.3°C** per minute during **post cure** (free standing).



Cured Material Properties

Tests performed on **MTB350-C200T-HS-3K-42%RW** laminates

(200gsm 2x2 twill, T300 3k carbon fabric)

Test	Results			Standard
Vf	Fibre volume fraction	50.15	%	<i>BS EN ISO 14127 Method B</i>
CPT	Cured ply thickness	0.232	mm	<i>BS EN ISO 14127 Method B</i>
Tensile 0°	Tensile strength	549	MPa	<i>BS EN ISO 527-4</i>
	Tensile modulus	58.0	GPa	
	Poisson's ratio	0.05		
Tensile 90°	Tensile strength	551	MPa	
	Tensile modulus	57.7	GPa	
	Poisson's ratio	0.05		
Compressive 0°	Compressive strength	819	MPa	<i>prEN 2850 Type B</i>
	Compressive modulus	54.0	GPa	
Compressive 90°	Compressive strength	806	MPa	
	Compressive modulus	54.8	GPa	
Flexural 0°	Flexural strength	791	MPa	<i>BS EN ISO 14125</i>
	Flexural modulus	57.1	GPa	
Flexural 90°	Flexural strength	784	MPa	
	Flexural modulus	55.2	GPa	
In-Plane Shear ±45°	In-Plane shear strength (5% strain)	86.0	MPa	<i>BS EN ISO 14129</i>
	In-Plane shear strength (ultimate)	116.5	MPa	
	In-Plane shear modulus	3.96	GPa	
Interlaminar Shear 0°	Interlaminar shear strength	76.6	MPa	<i>BS EN ISO 14130</i>
Interlaminar Shear 90°	Interlaminar shear strength	76.3	MPa	
Fracture Toughness	G _{1c}	261	J/m²	<i>prEN 6033</i>

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Tests performed on **MTB350-C200T-HS-3K-42%RW** laminates
(continued)

(200gsm 2x2 twill, T300 3k carbon fabric)

DMA – Dry Tg	Tg E' Onset	144	°C	<i>Modified ASTM D7028 (Single Cantilever)</i>
Initial cure	Tg Peak Tan δ	188	°C	
Post-cure	Tg E' Onset	171	°C	
	Tg Peak Tan δ	190	°C	
DMA – Wet Tg	Tg E' Onset	106	°C	
14 days in water at 70°C	Tg Peak Tan δ	135	°C	

Mechanical testing carried out at 21±2°C. Initial cure: 15mins at 85°C followed by 1hr at 120°C, autoclave 6bar. Additional post-cure conducted for "DMA – Dry Tg, Post-cure" above: 2hrs at 160°C, oven free-standing. Wet Tg testing performed on post-cured specimens. All figures in this report are actual test results and have not been normalised. Testing was either completed by SHD Composites laboratories, or independently by UKAS approved organisations. Complete test reports can be supplied independently upon request.



Tests performed on **MTB350-F350T-50%RW** laminates

(350gsm 2x2 twill flax fabric)

Test	Results			Standard
Vf	Fibre volume fraction	44.59	%	<i>BS EN ISO 14127 Method B</i>
CPT	Cured ply thickness	0.511	mm	<i>BS EN ISO 14127 Method B</i>
Tensile 0°	Tensile strength	147	MPa	<i>BS EN ISO 527-4</i>
	Tensile modulus	17.1	GPa	
	Poisson's ratio	0.19		
Tensile 90°	Tensile strength	95	MPa	
	Tensile modulus	13.0	GPa	
	Poisson's ratio	0.14		
Compressive 0°	Compressive strength	188	MPa	<i>prEN 2850 Type B</i>
	Compressive modulus	10.9	GPa	
Compressive 90°	Compressive strength	172	MPa	
	Compressive modulus	8.7	GPa	
Flexural 0°	Flexural strength	207	MPa	<i>BS EN ISO 14125</i>
	Flexural modulus	13.5	GPa	
Flexural 90°	Flexural strength	158	MPa	
	Flexural modulus	11.3	GPa	
In-Plane Shear ±45°	In-Plane shear strength (ultimate)	40.2	MPa	<i>BS EN ISO 14129</i>
	In-Plane shear modulus	2.16	GPa	
Interlaminar Shear 0°	Interlaminar shear strength	24.5	MPa	<i>BS EN ISO 14130</i>
Interlaminar Shear 90°	Interlaminar shear strength	19.6	MPa	
DMA – Dry Tg	Tg E' Onset	140	°C	<i>Modified ASTM D7028 (Single Cantilever)</i>
	Tg Peak Tan δ	164	°C	
DMA – Wet Tg <i>14 days in water at 70°C</i>	Tg E' Onset	97	°C	
	Tg Peak Tan δ	116	°C	

Mechanical testing carried out at 21±2°C. Initial cure: 15mins at 85°C followed by 1hr at 120°C, autoclave 6bar. All figures in this report are actual test results and have not been normalised. Testing was either completed by SHD Composites laboratories, or independently by UKAS approved organisations. Complete test reports can be supplied independently upon request.



Tests performed on **MTB350-FCH300-P2875-45%RW** laminates

(300gsm 2x2 twill flax/carbon hybrid fabric)

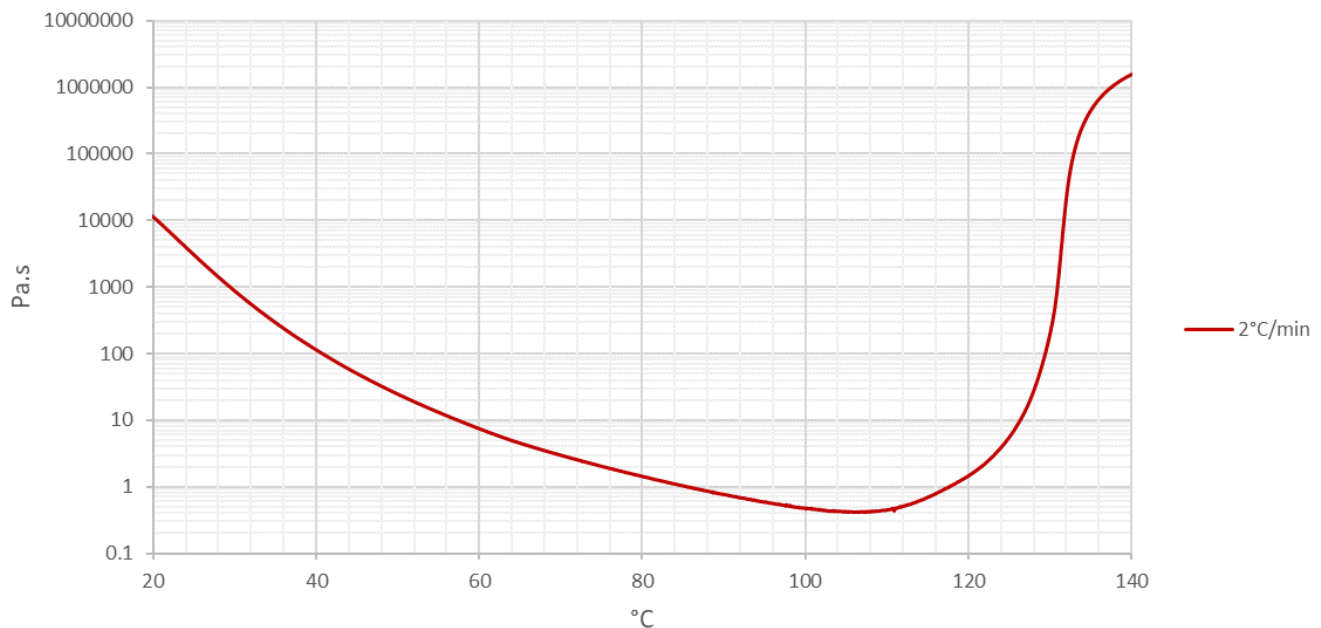
Test	Results			Standard
Vf	Fibre volume fraction	50.12	%	<i>BS EN ISO 14127 Method B</i>
CPT	Cured ply thickness	0.378	mm	<i>BS EN ISO 14127 Method B</i>
Tensile 0°	Tensile strength	290	MPa	<i>BS EN ISO 527-4</i>
	Tensile modulus	33.5	GPa	
	Poisson's ratio	0.07		
Tensile 90°	Tensile strength	270	MPa	
	Tensile modulus	33.1	GPa	
	Poisson's ratio	0.08		
Compressive 0°	Compressive strength	280	MPa	<i>prEN 2850 Type B</i>
	Compressive modulus	28.4	GPa	
Compressive 90°	Compressive strength	263	MPa	
	Compressive modulus	27.4	GPa	
Flexural 0°	Flexural strength	332	MPa	<i>BS EN ISO 14125</i>
	Flexural modulus	31.9	GPa	
Flexural 90°	Flexural strength	317	MPa	
	Flexural modulus	29.6	GPa	
In-Plane Shear ±45°	In-Plane shear strength (5% strain)	62.5	MPa	<i>BS EN ISO 14129</i>
	In-Plane shear strength (ultimate)	69.7	MPa	
	In-Plane shear modulus	3.14	GPa	
Interlaminar Shear 0°	Interlaminar shear strength	38.8	MPa	<i>BS EN ISO 14130</i>
Interlaminar Shear 90°	Interlaminar shear strength	36.2	MPa	
Fracture Toughness (G_{1c})	G _{1c}	812	J/m²	<i>prEN 6033</i>
DMA – Dry Tg	Tg E' Onset	134	°C	<i>Modified ASTM D7028 (Single Cantilever)</i>
	Tg Peak Tan δ	154	°C	

Mechanical testing carried out at 21±2°C. Initial cure: 15mins at 85°C followed by 1hr at 120°C, autoclave 6bar. All figures in this report are actual test results and have not been normalised. Testing was either completed by SHD Composites laboratories, or independently by UKAS approved organisations. Complete test reports can be supplied independently upon request.



Viscosity Profile

Measured using a rotational rheometer



Health and Safety

This material contains epoxy resin which can cause allergic reactions with skin contact and must avoid repeated and prolonged skin contact.

Please refer to the product Safety Data Sheet before using this material. The following precautions must be taken when using epoxy resin prepregs:

- Overalls must be worn.
- Impervious gloves must be worn.
- Curing schedule is meant to be as a guide only and is subject to local conditions.
- To avoid exotherm, particular care must be taken with thick laminates.
- Ramp rates must not exceed 3.0°C/min during initial cure and 0.3°C/min during post cure.

Disclaimer: Technical advice, instruction, data or recommendation, whether verbal or in writing, is given in good faith. The SHD company providing any such advice gives no warranty or guarantee, whether express or implied, in relation to such advice.

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