



MTC521FR

Flame Retardant Component Material

Introduction

MTC521FR is a clear, flame-retardant epoxy prepreg system designed for high-quality cosmetic carbon fibre components. This system is supplied on a wide range of woven fabrics and unidirectional reinforcements, providing excellent visual fibre definition and consistent laminate quality.

Formulated for a cure temperature of 250°F (120°C), MTC521FR combines outstanding cosmetic clarity with robust fire-performance characteristics, achieving UL94 V1 and passing CS/FAR 25.853 12-second and 60-second vertical burn tests. Typical applications include cosmetic-grade panels, interior components, and general-purpose flame-retardant structures requiring both appearance and fire-safety compliance.

Typical applications: *Flame retardant – Cosmetic & General purpose*

Key Features & Benefits

- Cure temperature of **250°F (120°C)**
- **Flame retardant:** Rated UL94 V1
- **Flame retardant:** Passes CS/FAR 25.853 12s and 60s vertical burn tests
- Work life at 70°F (20°C): **21 days**
- Storage life at 0°F (-18°C): **12 months**
- Very low VOC content – no added solvents during manufacture

Storage & Out Life

This material should be kept frozen at 0°F (-18°C). 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.

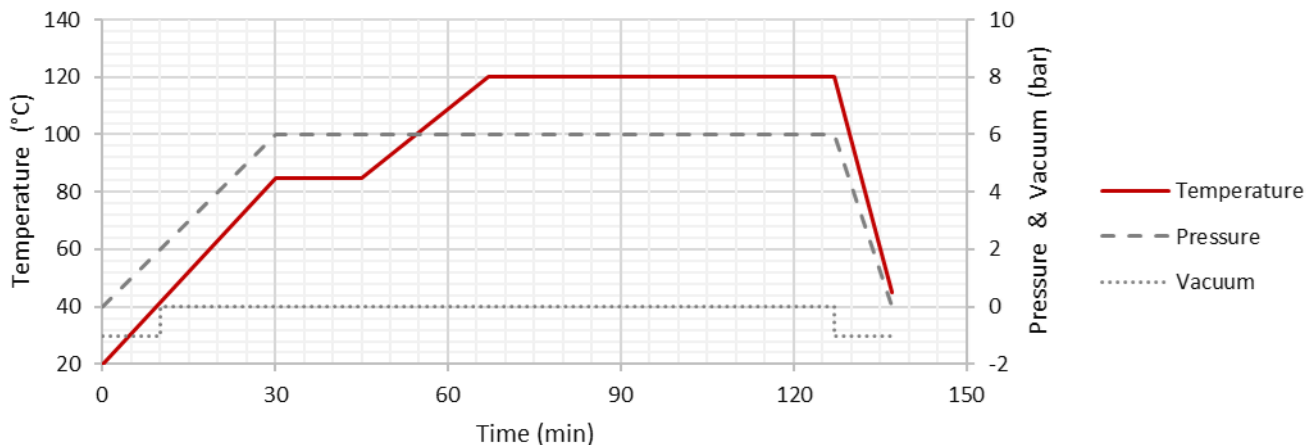


Processing, Cure Cycles & Properties

RECOMMENDED CURE CYCLE:

Do not exceed the recommended cure temperature to ensure cured resin clarity

- Cure steps:
 - Ramp up to **185°F (85°C)** ($\pm 9^\circ\text{F} / 3^\circ\text{C}$) at a rate of **4-5°F (2-3°C) /min**
 - 1st dwell at **185°F (85°C)** ($\pm 9^\circ\text{F} / 3^\circ\text{C}$) for **15mins**
 - Ramp up to **250°F (120°C)** ($\pm 9^\circ\text{F} / 3^\circ\text{C}$) at a rate of **4-5°F (2-3°C) /min**
 - 2nd dwell at **250°F (120°C)** ($\pm 9^\circ\text{F} / 3^\circ\text{C}$) for **1hr**
- Ensure full pressure (90 psi / 6 bar) is reached prior to the 1st dwell.
- Maintain full vacuum until 30 psi / 2 bar pressure is reached, then vent vacuum to atmosphere.



- The above 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 **5.0°F (3.0°C)** per minute during cure

TYPICAL TG:

DMA – Dry Tg	Cure: 250°F (120°C) for 1hr	Tg E' Onset Tg Peak Tan δ	273°F (134°C) 318°F (159°C)	<i>Modified ASTM D7028 (Single Cantilever)</i>
DMA – Wet Tg <i>14 days in water at 160°F (70°C)</i>	Cure: 250°F (120°C) For 1hr	Tg E' Onset Tg Peak Tan δ	201°F (94°C) 226°F (108°C)	<i>Modified ASTM D7028 (Single Cantilever)</i>

Tests performed on **MTC521FR-C205T-3K-HS-42%RW** laminates



Cured Material Properties

Mechanical properties

Tests performed on **MTC521FR-C205T-HS-3K-42%RW** laminates (205gsm 2x2 twill, T300 3k carbon fabric)

Test	Results	StDev.	Standard	
Vf	Fibre volume fraction	49.4 %	-	BS EN ISO 14127 Method B
CPT	Cured ply thickness	0.235 mm	0.02	BS EN ISO 14127 Method B
Tensile 0°	Tensile strength	583 MPa	24.4	BS EN ISO 527-4
	Tensile modulus	54.7 GPa	2.5	
	Poisson's ratio	0.06 -	0.00	
Tensile 90°	Tensile strength	638 MPa	15.8	
	Tensile modulus	55.6 GPa	0.5	
	Poisson's ratio	0.06 -	0.00	
Compressive 0°	Compressive strength	821 MPa	26.1	prEN 2850 Type B
	Compressive modulus	54.3 GPa	0.5	
Compressive 90°	Compressive strength	764 MPa	39.8	
	Compressive modulus	53.4 GPa	0.5	
In-Plane Shear ±45°	In-Plane shear strength (5% strain)	85 MPa	1.3	BS EN ISO 14129
	In-Plane shear strength (ultimate)	124 MPa	3.5	
	In-Plane shear modulus	4.07 GPa	0.01	
Interlaminar Shear 0°	Interlaminar shear strength	80.9 MPa	1.9	BS EN ISO 14130
Interlaminar Shear 90°	Interlaminar shear strength	79.3 MPa	3.9	
Flexural 0°	Flexural strength	790 MPa	40.0	BS EN ISO 14125
	Flexural modulus	53.0 GPa	0.4	
Flexural 90°	Flexural strength	763 MPa	33.7	
	Flexural modulus	51.5 GPa	0.5	

Mechanical testing carried out at 70±4°F (21±2°C). 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.



Flame, Smoke and Toxicity properties – CS/FAR 25.853

Test	Results	Limit			
60s vertical burn	Burn length	47.3	152	mm	PASS
	After flame	5.5	15	s	
	Drip time	0	3	s	
15s horizontal burn	Burn length	4.3	203	mm	PASS
	After flame	1	15	s	
	Drip time	0	5	s	
Toxic gas emission	CO	285.5	1000		PASS
	HCN	20	150		
	HF	0	100		
	HCl	10	150		
	SO2	0	100		
	NOx	21.1	100		

Material tested:

MTC521FR-C205T-3K-HS-42%RW, 9 plies (approx. 2.1mm cured thickness)
Autoclave cured 1h@250°F (120°C), 90psi (6bar)

Flame propagation properties – UL94 vertical burn

UL94 vertical burn test ratings and requirements:

Conditions	V0	V1	V2
Afterflame time for each individual specimen A or B	≤ 10 s	≤ 30 s	≤ 30 s
Total afterflame time for any condition set (A+B) for 5 specimens	≤ 50 s	≤ 250 s	≤ 250 s
Afterflame plus afterglow time for each individual specimen after the second flame application (B+C)	≤ 30 s	≤ 60 s	≤ 60 s
Afterflame or afterglow of any specimen up to the holding clamp	No	No	No
Cotton indicator ignited by flaming particles or drops	No	No	Yes

Test results:

MTC521FR-C205T-3K-HS-42%RW 9 plies (approx. 2.1mm cured thickness) Autoclave cured 1h@250°F (120°C), 90psi (6bar)					
Specimen	A	B	C	D	E
1	4	5	0	No	No
2	6	13	0	No	No
3	7	13	0	No	No
4	2	11	0	No	No
5	7	14	0	No	No

Rating: **UL94 V1**

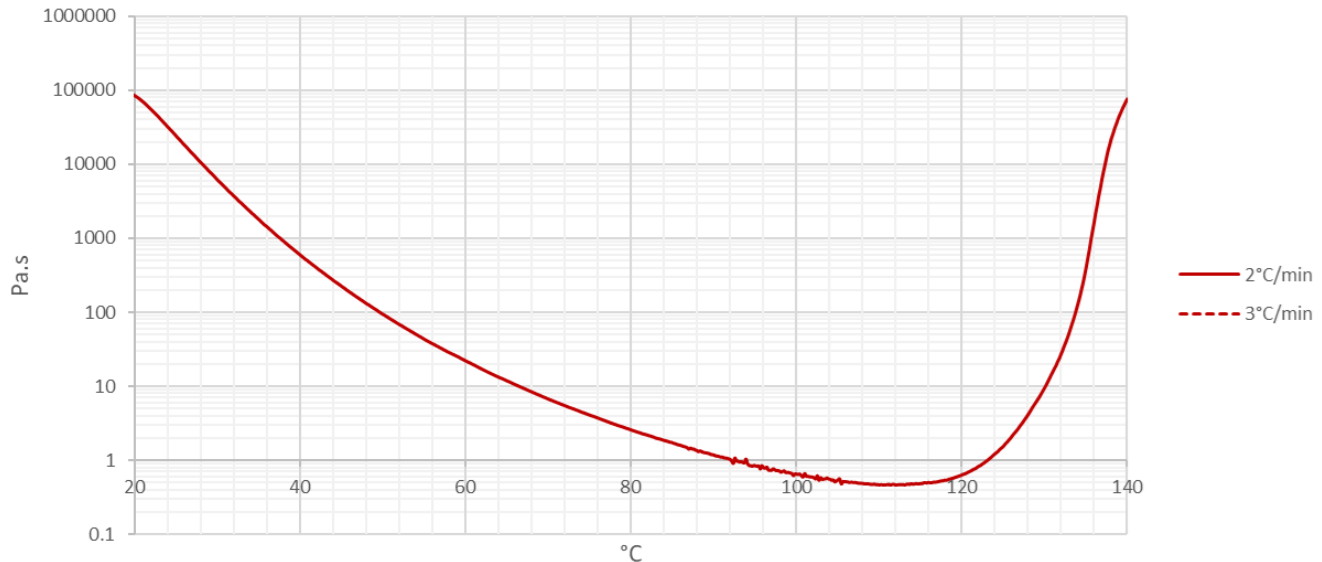
MTC521FR-C205T-3K-HS-42%RW 5 plies (approx. 1.2mm cured thickness) Autoclave cured 1h@250°F (120°C), 90psi (6bar)					
Specimen	A	B	C	D	E
1	8	9	0	No	No
2	8	10	0	No	No
3	10	11	0	No	No
4	10	7	0	No	No
5	10	12	0	No	No

Rating: **UL94 V1**



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 5.0°F (3.0°C) /min during cure.

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