Unit 4
The Reservation
Sleaford Enterprise Park
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BMI-1SC

Bismaleimide Prepreg

Introduction

BMI-1SC prepreg resin system is designed for use in high temperature tooling or components. It has been formulated to give very high service temperatures without compromising performance and may provide extended tool life compared to lower Tg alternates.

Typical applications: *high service temperature, high stability tooling*

Key Features & Benefits

- Good handling characteristics
- Cure temperature: **185°C (365°F)**
- Potential Tg up to **350°C (662°F)** after post-cure
- Low CTE and shrinkage
- Work life at 20°C (70F): **30 days**
- Storage life at -18°C (0F): **12 months**
- Processable in **autoclave**. Press or oven may be possible depending on requirements, please contact SHD Composites for more information.

Storage & Out Life

This material should be kept frozen at -18°C (-1°F). 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.

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Cure Cycles & performances

Recommended cure cycle:

- Ramp up to 100°C *(212°F)* at 2°C/min *(3.6°F/min)* under vacuum only
- Apply 6 bar pressure and remove vacuum
- Ramp up to 140°C *(284°F)*(1) at 2°C/min *(3.6°F/min)* and hold 140°C *(284°F)*(1) for 1hr
- Ramp up to 185°C *(374°F)*(1) at 2°C/min *(3.6°F/min)* and hold 190°C *(374°F)*(1) for 2hrs
- Cool down below 60°C *(140°F)* before removing for post-cure

(1) ±5°C *(±5°F)*

Recommended post cure cycles:

Option 1:	**Resulting Tg:**
Ramp up to 220°C *(428°F)* at 0.3°C/min *(0.54°F/min)*	235°C *(464°F)*
Hold 220°C *(428°F)* for 2hrs	

Option 2:	**Resulting Tg:**
Ramp up to 260°C *(500°F)* at 0.3°C/min *(0.54°F/min)*	350°C *(662°F)*
Hold 260°C *(500°F)* for 2hrs	

- 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 *(5.4°F)*** per minute during **initial cure**.
  Ramp rates must not exceed **0.3°C *(0.54°F)*** per minute during **post cure** (free standing).

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Cured Material Properties

SURFACE PLY: ***200gsm 3k, 43% resin weight***
Material description: *BMI-1SC-C200T-HS-3K-43%RW-1250 (SHD2251-1250)*

Test	Results			*Standard*
Vf	Fibre volume fraction	**49.08**	**%**	*BS EN ISO 14127 Method B*
CPT	Cured ply thickness	**0.238**	**mm**	*BS EN ISO 14127 Method B*
Tensile 0°	Tensile strength	**609**	**MPa**	*BS EN ISO 527-4*
	Tensile modulus	**55.2**	**GPa**	
	Poisson's ratio	**0.07**		
Tensile 90°	Tensile strength	**665**	**MPa**	
	Tensile modulus	**55.5**	**GPa**	
	Poisson's ratio	**0.06**		
Compressive 0°	Compressive strength	**874**	**MPa**	*prEN 2850 Type B*
	Compressive modulus	**52.7**	**GPa**	
Compressive 90°	Compressive strength	**869**	**MPa**	
	Compressive modulus	**51.0**	**GPa**	
Flexural 0°	Flexural strength	**783**	**MPa**	*BS EN ISO 14125*
	Flexural modulus	**55.3**	**GPa**	
Flexural 90°	Flexural strength	**776**	**MPa**	
	Flexural modulus	**54.1**	**GPa**	
In-Plane Shear ±45°	In-Plane shear strength (ultimate)	**101.2**	**MPa**	*BS EN ISO 14129*
	In-Plane shear modulus	**4.49**	**GPa**	
Interlaminar Shear 0°	Interlaminar shear strength	**78.4**	**MPa**	*BS EN ISO 14130*
Interlaminar Shear 90°	Interlaminar shear strength	**84.5**	**MPa**	
DMA – Dry Tg	Tg E' Onset	**244**	**°C**	*Modified ASTM D7028 (Single Cantilever)*
	Tg Peak Tan δ	**280**	**°C**	

Cure schedule: see "recommended cure cycle" and "recommended post-cure cycle, option 1" on page 2. All figures in this table are actual test results and have not been normalised. Complete test reports can be supplied independently upon request.

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BULK PLY: ***416gsm 6k, 36% resin weight***
Material description: *BMI-1SC-C416T-HS-6K-36%RW-1250 (SHD2852-1250)*

Test	Results			*Standard*
Vf	Fibre volume fraction	**55.04**	**%**	*BS EN ISO 14127 Method B*
CPT	Cured ply thickness	**0.421**	**mm**	*BS EN ISO 14127 Method B*
Tensile 0°	Tensile strength	**620**	**MPa**	*BS EN ISO 527-4*
	Tensile modulus	**63.9**	**GPa**	
	Poisson's ratio	**0.06**		
Tensile 90°	Tensile strength	**580**	**MPa**	
	Tensile modulus	**63.2**	**GPa**	
	Poisson's ratio	**0.05**		
Compressive 0°	Compressive strength	**998**	**MPa**	*prEN 2850 Type B*
	Compressive modulus	**59.0**	**GPa**	
Compressive 90°	Compressive strength	**998**	**MPa**	
	Compressive modulus	**58.5**	**GPa**	
Flexural 0°	Flexural strength	**831**	**MPa**	*BS EN ISO 14125*
	Flexural modulus	**59.0**	**GPa**	
Flexural 90°	Flexural strength	**827**	**MPa**	
	Flexural modulus	**58.8**	**GPa**	
In-Plane Shear ±45°	In-Plane shear strength (ultimate)	**91.6**	**MPa**	*BS EN ISO 14129*
	In-Plane shear modulus	**5.10**	**GPa**	
Interlaminar Shear 0°	Interlaminar shear strength	**79.1**	**MPa**	*BS EN ISO 14130*
Interlaminar Shear 90°	Interlaminar shear strength	**76.2**	**MPa**	
DMA – Dry Tg	Tg E' Onset	**239**	**°C**	*Modified ASTM D7028 (Single Cantilever)*
	Tg Peak Tan δ	**274**	**°C**	

Cure schedule: see "recommended cure cycle" and "recommended post-cure cycle, option 1" on page 2. All figures in this table are actual test results and have not been normalised. Complete test reports can be supplied independently upon request.

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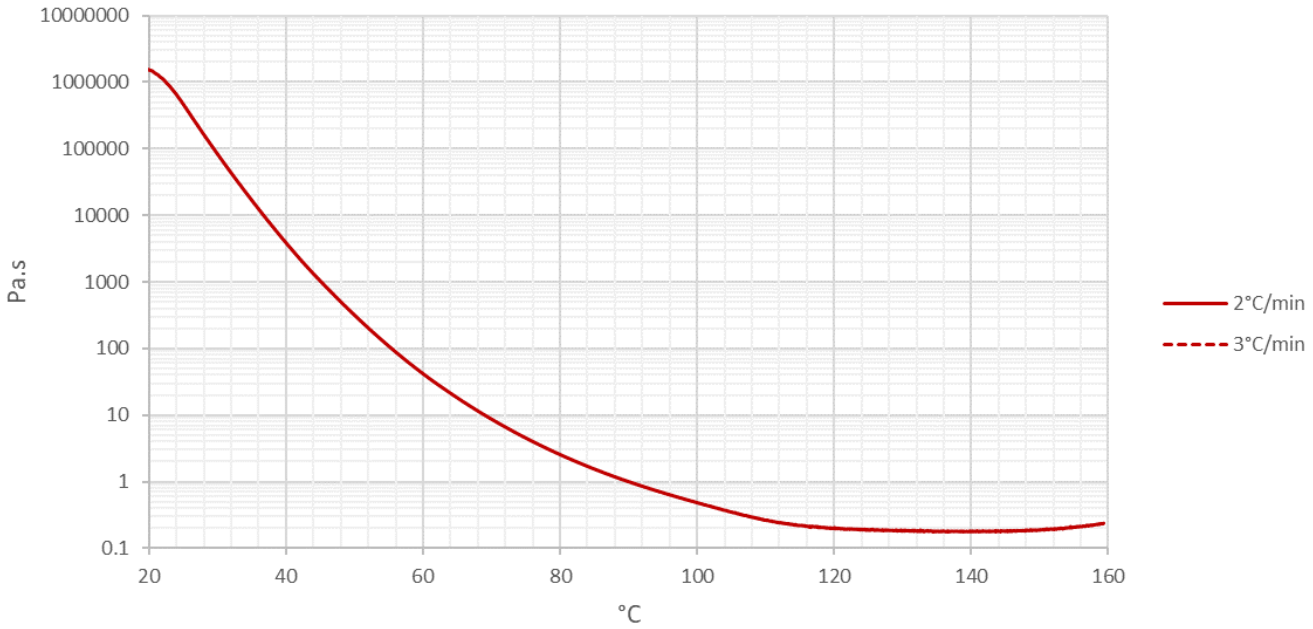
Viscosity Profile

Measured using a rotational rheometer



Health and Safety

This material contains 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.