DELIVERING THE FUTURE OF COMPOSITE SOLUTIONS

COMPOSITE MATERIALS FOR THE AUTOMOTIVE INDUSTRY
INTRODUCTION

Gurit is renowned as one of the leading global manufacturers and suppliers of composite materials and engineering. Gurit’s unique approach integrates structural design, materials science and process engineering to offer a complete turnkey composite solution.

Gurit offers a combination of innovative, durable, industry-leading composite products with unrivalled in-house technical expertise, ensuring best-in-class operation wherever it is applied. The versatility and durability of Gurit’s products and in-depth engineering knowledge means every project delivers a performance that is finely tuned to individual specifications and needs. Gurit’s long history of development and innovation has increased part quality and durability while continual streamlining of processes have improved productivity and reduced costs.

Gurit’s experience in the automotive market has led to the development of a range of composite materials for the industry and its suppliers, designed for a variety of applications, both structural and cosmetic. These materials offer class leading performance along with the recognised benefits of composites; strength, lightness and the ability to fashion complex shapes.

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>EXAMPLE COMPONENT</th>
<th>PROCESS</th>
<th>PRODUCT NAME</th>
<th>ATTRIBUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Visual Carbon</td>
<td>Dashboards, door cards, trim, steering wheels</td>
<td>Autoclave</td>
<td>SC 110(T2)</td>
<td>White spot free high clarity resin for cosmetic parts</td>
</tr>
<tr>
<td>Exterior Visual Carbon</td>
<td>Spoiler, front and rear splitter, door mirror caps, side skirts, exhaust tips, engine covers</td>
<td>Autoclave</td>
<td>SC 110(T2)</td>
<td>High clarity resin Optional higher temperature resistance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Press</td>
<td>SC 160</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Smartcure™ SC 160</td>
<td></td>
<td>Rapid cure for high volume manufacturing</td>
</tr>
<tr>
<td>Body Panels</td>
<td>Simple geometry: Hoods, roofs</td>
<td>Press</td>
<td>SF 80, SF 80FROBL, SF 85W, SF 96, SY 100, ST 110</td>
<td>Cost effective body panel system ideal for prototyping and low to medium volume manufacturing</td>
</tr>
<tr>
<td></td>
<td>Complex geometry: Fenders, boot-lids</td>
<td>Vacuum Bag</td>
<td>SF 80, SF 160</td>
<td></td>
</tr>
<tr>
<td>Structural</td>
<td>Chassis components and bulkheads</td>
<td>Autoclave</td>
<td>Smartcure™</td>
<td>Rapid curing combined with good thermal and mechanical property retention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PRIME™ 180</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wheels, driveshaft</td>
<td>RTM Filament Winding</td>
<td>SE 300</td>
<td>High clarity combined with good thermal and mechanical property retention</td>
</tr>
<tr>
<td></td>
<td>Heat-shields, brake ducts, engine components</td>
<td>Autoclave</td>
<td></td>
<td>Extremely high temperature resistance</td>
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</tbody>
</table>
# GURIT'S RANGE OF PERFORMANCE & STRUCTURAL PREPREGS

<table>
<thead>
<tr>
<th>Format</th>
<th>System</th>
<th>Main Features</th>
<th>Lowest Cure</th>
<th>Fastest Cure</th>
<th>Toughened</th>
<th>Recommended Processing Method</th>
<th>Max Tg1 by DMA (°C)</th>
<th>Shelf Life @ -18°C</th>
<th>Typical Applications</th>
<th>Typical Reinforcements</th>
<th>Ancillary Products</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Prepreg</td>
<td>SC 110(T2)</td>
<td>- White spot free high clarity resin for cosmetic parts</td>
<td>85</td>
<td>10</td>
<td>150</td>
<td>20</td>
<td>No</td>
<td>125</td>
<td>18</td>
<td>21</td>
<td>Ideal for high visual quality components without white-wash or white spots</td>
<td>Carbon, E-Glass</td>
</tr>
<tr>
<td>Prepreg</td>
<td>SC 160</td>
<td>- Class leading resin clarity</td>
<td>130°</td>
<td>1.5</td>
<td>160</td>
<td>15</td>
<td>Yes</td>
<td>180</td>
<td>18</td>
<td>21</td>
<td>Suitable for use in high temperature applications</td>
<td>Carbon</td>
</tr>
<tr>
<td>Prepreg</td>
<td>Smartcure™</td>
<td>- Rapid cure in less than 5 minutes</td>
<td>130</td>
<td>15</td>
<td>150</td>
<td>5</td>
<td>Yes</td>
<td>175</td>
<td>18</td>
<td>42</td>
<td>High volume component manufacture KTL capable</td>
<td>Carbon</td>
</tr>
<tr>
<td>Prepreg</td>
<td>SC 300</td>
<td>- Modified Cyanate Ester resin system</td>
<td>135°</td>
<td>120</td>
<td>180°</td>
<td>60</td>
<td>No</td>
<td>300</td>
<td>6</td>
<td>15</td>
<td>Structures for high temperature applications such as engine cowlings etc.</td>
<td>Carbon, E-Glass</td>
</tr>
<tr>
<td><strong>Ancillaries</strong></td>
<td></td>
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</tr>
<tr>
<td>Adhesive Film</td>
<td>SA 80</td>
<td>- Consistent bond-line thickness and weight</td>
<td>80</td>
<td>12</td>
<td>120</td>
<td>60</td>
<td>Yes</td>
<td>100</td>
<td>24</td>
<td>58</td>
<td>Co-cure with 80°C prepregs for core and high strength adhesive bonding applications</td>
<td>E-Glass</td>
</tr>
<tr>
<td>Surface Films</td>
<td>SF 80</td>
<td>- Surface film to generate a resin rich surface</td>
<td>80</td>
<td>12</td>
<td>120</td>
<td>60</td>
<td>Yes</td>
<td>100</td>
<td>24</td>
<td>14</td>
<td>Co-cure with 80°C prepregs for resin rich surface</td>
<td>None, E-Glass</td>
</tr>
<tr>
<td></td>
<td>SF 96</td>
<td>- Pinhole free surface for the application of paint systems</td>
<td>85</td>
<td>10</td>
<td>120</td>
<td>60</td>
<td>No</td>
<td>115</td>
<td>24</td>
<td>5</td>
<td>Body panels Prototype, part manufacture</td>
<td>E-Glass</td>
</tr>
<tr>
<td></td>
<td>SF 8FROBL</td>
<td>- Surface film to generate resin-rich surface</td>
<td>85</td>
<td>10</td>
<td>120</td>
<td>60</td>
<td>No</td>
<td>120</td>
<td>24</td>
<td>14</td>
<td>Engine bulkhead Motor sport</td>
<td>E-Glass</td>
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<tr>
<td></td>
<td>SF 95VH</td>
<td>- Silicon Carbide filled film to generate very hard wearing surfaces</td>
<td>85</td>
<td>10</td>
<td>120</td>
<td>60</td>
<td>Yes</td>
<td>130</td>
<td>24</td>
<td>3</td>
<td>Ideal for applications that require a highly toughened system such as car body undertrays</td>
<td>E-Glass</td>
</tr>
<tr>
<td>Syntactic Core</td>
<td>SY 110</td>
<td>- Lightweight, drapable core material</td>
<td>85</td>
<td>10</td>
<td>130</td>
<td>30</td>
<td>No</td>
<td>110</td>
<td>24</td>
<td>56</td>
<td>Produces ultra light and stiff panels</td>
<td>None</td>
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<tr>
<td><strong>Performance</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SPRINT</td>
<td>ST 110</td>
<td>- Drape and tackiness optimised for excellent handling</td>
<td>85</td>
<td>10</td>
<td>130</td>
<td>30</td>
<td>No</td>
<td>115</td>
<td>24</td>
<td>14</td>
<td>Body and closure panels for automotive applications</td>
<td>Carbon, E-Glass</td>
</tr>
<tr>
<td>RTM</td>
<td>PRIME™ 180</td>
<td>- High Clarity</td>
<td>80°</td>
<td>2</td>
<td>120°</td>
<td>20</td>
<td>Yes</td>
<td>195</td>
<td>18 months @ 21°C</td>
<td>Wheels, Driveshaft</td>
<td>Carbon, E-Glass</td>
<td>9</td>
</tr>
</tbody>
</table>

* Will require post cure to maximise thermal properties, please refer to TDS.
INTRODUCTION
SE 300 is an ideal prepreg resin for high temperature composite applications, as it combines the ease of processing and handling convenience of epoxy resins, high temperature stability of polyimides, and flame and fire resistance of phenolics.

A 135°C cure for 120 minutes combined with a post-cure, enables SE 300 to generate a Tg in excess of 300°C, making SE 300 ideal for applications in composite structures, which are exposed to very high temperatures for short durations.

TYPICAL APPLICATIONS
Structures for high temperature applications such as engine cowlings.

INTRODUCTION
Smartcure™ Prepreg has been specifically developed for high volume press moulding applications and enables users to perform cycle times of 5 minutes. The product’s characteristics facilitate simple preforming prior to moulding and the ability to fill edged detail during moulding, allowing net shaped parts to be manufactured.

TYPICAL APPLICATIONS
High volume component manufacture. KTL capable.

SC 110(T2) is ideally suited to achieve visual surface quality. This cosmetic grade prepreg utilizes a high clarity, versatile, hot-melt epoxy resin formulation. This specifically developed, unique formulation produces truly white-wash-free parts resulting in increased production output and scrap cost savings of up to 20%. SC 110(T2) can be cured at temperatures as low as 80°C or even faster cures are achievable using press moulding technologies at temperatures up to 150°C. QUV SE Accelerated Weathering Test has revealed that Gurit SC 110(T2) carbon prepreg offers superior weathering performance compared with the current market range.

TYPICAL APPLICATIONS
Gurit’s SC 110(T2) is suitable for automotive applications where a high clarity finish is required.

SC 160 is a visual grade prepreg that utilizes a high clarity, versatile, hot-melt epoxy resin formulation. The unique formulation is ideal for manufacturing visual quality components using autoclave and press moulding. It can be cured at temperatures as low as 130°C (266°F), or it can be used for rapid press moulding of components at 160°C (320°F). A maximum resin Tg of 180°C (356°F) can be achieved from an autoclave cure. The product has high tack which aids the moulding of complex components in metal and carbon tooling, whilst maintaining a good out-life of up to 3 weeks at 21°C (70°F). SC 160 is a toughened system and offers excellent mechanical properties on a wide variety of reinforcing fabrics and fibres.

TYPICAL APPLICATIONS
SC 160 is suitable for interior and exterior automotive applications where a high clarity finish is required in conjunction with a high Tg.
**INTRODUCTION**

SF 80FROBL surfacing material is a Fire Retardant Obliterated Black (FROBL), filled epoxy film. It provides an effective fire retarding layer capable of withstanding exposure to fire, while preventing the epoxy substrate from combustion. SF 80FROBL can be cured with vacuum only processing.

**TYPICAL APPLICATIONS**

Co-cure with 85°C prepregs for resin rich surface ideal for sanding / priming prior to painting.

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**SA 80**

Toughened Epoxy Film Adhesive

- Low temperature cure
- Designed for bonding prepreg skins to honeycomb and certain foam cores
- Controlled flow for maximum bond integrity
- Toughened for impact resistance and peel strength

**INTRODUCTION**

SA 80 is a film adhesive that is designed for secondary bonding, core-bonding and for co-curing with the range of Gurit prepregs. It can be cured at temperatures as low as 80°C, or can be more quickly cured at temperatures above 120°C. It has an out-life of 56 days at room temperature.

**TYPICAL APPLICATIONS**

Suitable for bonding aluminum, foam and honeycomb cores in conjunction with Gurit’s range of Prepreg or Ampreg laminating systems. See individual Technical Datasheets for further information.

**PACK SIZES & AVAILABILITY**

SA 80 is available in weights up to 300g resin films with or without* a glass carrier.

*150 and 250g only

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**SF 80**

Toughened Surfacing Film

- Toughened System
- Protects underlying laminate
- Reduction in surface film-laminate interfacial voids
- Improved resistance to water ingress
- Suitable for post painting

**INTRODUCTION**

SF 80 surfacing material is a light green, toughened, epoxy film designed to enhance the surface finish of moulded composite components. It allows a good surface finish to be obtained by vacuum-bag moulding processes. It can be used directly against a suitably release treated mould surface, with prepreg or SPRINT™ plies laid up behind it. When fully cured with SPRINT™ or prepreg, SF 80 forms a stable sandable surface which, once lightly sanded to provide a key for painting, provides a pin-hole free laminate. The epoxy system is supplied ready impregnated into a supporting medium and ready catalysed, requiring only a moderate temperature cure.

**TYPICAL APPLICATIONS**

Co-cure with 80°C prepregs for resin rich surface ideal for sanding / priming prior to painting.

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**SF 86**

Sandable Surfacing Film

- Easy to sand
- Significant reduction in print-through
- Improved resistance to water ingress
- Stable surface up to 115°C (depending on cure)

**INTRODUCTION**

SF 96 surfacing material is an epoxy film designed to enhance the surface finish of moulded composite components. It allows a good surface finish to be obtained by vacuum-bag moulding processes. It can be used directly against a suitably release treated mould surface, with prepreg or SPRINT™ plies laid up behind it. When fully cured with SPRINT™ or prepreg, SF 96 forms a stable sandable surface which, once lightly sanded to provide a key for painting, provides a pin-hole free laminate. The epoxy system is supplied ready impregnated into a supporting medium and ready catalysed, requiring only a moderate temperature cure.

**TYPICAL APPLICATIONS**

Co-cure with 85°C prepregs for resin rich surface ideal for sanding / priming prior to painting.
**SF 95VH**
Abraision-Resistant Surfacing Film

- Hard protective coating
- Increases surface longevity by up to 300%
- Reduction in surface film laminate interfacial voids
- Improved opacity

**INTRODUCTION**
SF 95VH surfacing material is a very hard, abrasion-resistant epoxy film. It is designed to protect vulnerable underbody components from damage caused by foreign objects. Typical applications include inner wings, and front wheel diffusers. SF 95VH can be used directly against a suitably release treated mould surface, with prepreg or SPRINT™ plies laid up behind it, or as a final layer in the mould. It can be cured with vacuum only processing. Due to abrasion-resistance of this material, it would not be usual to apply a paint finish. The epoxy system is supplied ready impregnated into a supporting medium and ready catalysed, requiring only a moderate temperature cure.

**TYPICAL APPLICATIONS**
Ideal for applications that require a highly toughened system such as car body undertrays.

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**ST 110**
Car Body Panel System
SPRINT™ Resin

- Drape and thickness optimised for excellent handling
- Ideal for complex or vertical mouldings
- Excellent balance of mechanical performance and toughness
- Suitable for autoclave and vacuum bag processing

**INTRODUCTION**
ST 110 is used alongside a suitable surfacing film (SF 80, SF 80FROBL, or SF98) and SY110 Syntactic Core to build up a CBS panel. The woven carbon and glass reinforcements can be used to lay up various panel combinations to suit the required stiffness and weight targets needed.

**TYPICAL APPLICATIONS**
Structural ST 110 is used to form a multi layered material referred to as CBS Car Body SPRINT™ for body and closure panels for automotive applications.

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**SY 110**
Low Density Syntactic Core

- Lightweight drapable core material
- Produces ultra-light and stiff panels
- Wide process window; curing from 85-130°C (185-266°F)
- Available at 0.7mm and 1.0mm thickness

**INTRODUCTION**
SY 110 is a lightweight, drapable core material that is designed to be co-curable with most Gurit Epoxy Prepreg and SPRINT™ materials, to produce ultra-light and stiff panels.

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**PRIME™ 180**
High Tg RTM System

- Low viscosity designed for RTM processes
- De-mouldable after 20 min at 120°C
- High temperature performance and good surface clarity
- For structural and aesthetic applications

**INTRODUCTION**
PRIME™ 180 is a two-component toughened epoxy system formulated for RTM processes for manufacturing high quality structural carbon components.
PRIME™ 180 has a low mixed viscosity at room temperature and versatile curing, this allows for low temperature injection which can then be followed by a pre-cure between 80-120°C. The resin has low viscosity and a long injection window at low-medium temperatures which allows complex or thick section laminates to be manufactured.

**TYPICAL APPLICATIONS**
Ideal for applications that require a highly toughened system such as car body undertrays, wheels, drivshafts and engine covers.