BTCy-2 Resin System

PRODUCT TYPE
350°F (177°C) Cure Cyanate Ester

TYPICAL APPLICATIONS
• Aircraft
• Spacecraft
• Ultra Low Loss Radomes and Antennae
• Radar Transparent Structures
• Low Outgassing Applications
• Low Loss Castings for Horns and Lenses
• High Performance Electronic Substrates

SERVICE TEMPERATURE
300°F (149°C) (Continuous)
360°F (182°C) (Short Term)

SHELF LIFE
Tack Life
14 days tack life at 77°F (25°C)
Out Life
14 days out life 77°F (25°C)
Frozen Storage Life
6 months storage life at <0°F (-18°C)

Tack life is the time during which the prepreg retains enough tack, drape and handling for easy component lay-up.
Out life is the maximum time allowed at room temperature before cure.

PRODUCT DESCRIPTION
BTCy-2 is TenCate’s lowest dielectric cyanate ester prepreg resin system. This resin system is valued in high energy microwave applications as a result of it’s low loss tangent.

PRODUCT BENEFITS/FEATURES
• Low microcracking and outgassing
• TenCate’s lowest dielectric resin
• Ideal for high energy radome structure

TYPICAL NEAT RESIN PROPERTIES
Polymer Tg .............................................................. 375°F (191°C)
Moisture Absorption ............................................. 0.6% at 212°F (100°C) saturation*
Dielectric Constant .................................................. 2.60 (1 MHz), 2.70 (10 GHz)
Loss Tangent ........................................................... 0.0004 (1 MHz), 0.001 (10 GHz)
G, C Value ............................................................. 1.4 in-lb/in²

* Moisture Absorption: 0.2%-0.3% (Quartz at 60% Vf) at saturation in boiling water

ELECTRICAL PROPERTIES OF COMPOSITE LAMINATES

<table>
<thead>
<tr>
<th>BTCy-2 / 4581 Quartz</th>
<th>C / X Band 8 - 18 GHz</th>
<th>Ku / K Band 18 - 26.5 GHz</th>
<th>Ka Band 26.5 - 40 GHz</th>
<th>Q &amp; U Band 40 - 60 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric Constant</td>
<td>3.17</td>
<td>3.13</td>
<td>3.14</td>
<td>3.12</td>
</tr>
<tr>
<td>Loss Tangent</td>
<td>&lt;0.010*</td>
<td>&lt;0.010*</td>
<td>&lt;0.010*</td>
<td>&lt;0.010*</td>
</tr>
</tbody>
</table>

* The loss tangent under focused beam testing is only accurate to 0.010. This material is less than 0.010. This material represents one of TenCate’s best for high energy radome applications.

<table>
<thead>
<tr>
<th>BTCy-2 / 7781 Fg</th>
<th>1 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric Constant</td>
<td>4.40</td>
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<tr>
<td>Loss Tangent</td>
<td>0.002</td>
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</tbody>
</table>

LAMINATE DATA - 7781 Fg REINFORCEMENT, 300 gsm FAW.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Condition</th>
<th>Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength 0°</td>
<td>RTD</td>
<td>ASTM D3039</td>
<td>71 ksi</td>
</tr>
<tr>
<td>Tensile Modulus 0°</td>
<td>RTD</td>
<td>ASTM D3039</td>
<td>3.2 Msi</td>
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<tr>
<td>Compressive Strength 0°</td>
<td>RTD</td>
<td>ASTM D695</td>
<td>68 ksi</td>
</tr>
<tr>
<td>Compressive Modulus 0°</td>
<td>RTD</td>
<td>ASTM D695</td>
<td>3.2 Msi</td>
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<tr>
<td>Flexural Strength 0°</td>
<td>RTD</td>
<td>ASTM D7264</td>
<td>88 ksi</td>
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<tr>
<td>Flexural Modulus 0°</td>
<td>RTD</td>
<td>ASTM D7264</td>
<td>3 Msi</td>
</tr>
<tr>
<td>Short Beam Shear Strength</td>
<td>RTD</td>
<td>ASTM D2344</td>
<td>9 ksi</td>
</tr>
</tbody>
</table>

LAMINATE DATA - 4581 AQIII WOVEN FABRIC REINFORCEMENT, 300 gsm FAW.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Condition</th>
<th>Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength 0°</td>
<td>RTD</td>
<td>ASTM D3039</td>
<td>109 ksi</td>
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<tr>
<td>Tensile Modulus 0°</td>
<td>RTD</td>
<td>ASTM D3039</td>
<td>3.7 Msi</td>
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<tr>
<td>Compressive Strength 0°</td>
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<td>108 kpsi</td>
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<tr>
<td>Compressive Modulus 0°</td>
<td>RTD</td>
<td>ASTM D695</td>
<td>4.1 Msi</td>
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<tr>
<td>Flexural Strength 0°</td>
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<td>ASTM D7264</td>
<td>121 kpsi</td>
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<tr>
<td>Flexural Modulus 0°</td>
<td>RTD</td>
<td>ASTM D7264</td>
<td>3.1 Msi</td>
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<tr>
<td>Short Beam Shear Strength</td>
<td>RTD</td>
<td>ASTM D2344</td>
<td>10.1 kpsi</td>
</tr>
</tbody>
</table>
BTCy-2 Resin System

Cure Cycle

Hold at 350°F/177°C for 90 minutes minimum.
(temperature based on lagging thermocouple)

Heat up at 2°-5°F (1°-3°C)/min.

Cool down at 5°-10°F (3°-6°C)
Below 160°F/71°C, release pressure and remove.
(temperature based on lagging thermocouple)

TIME

• Apply 25 inches Hg vacuum minimum.
• Apply 40-50 psig pressure to autoclave.

Post cure: Heat at 3°-5°F (1.5°-3°C)/min. to 420°F/215°C for two hours minimum, cool at 5°-10°F (3°-6°C) to 180°F/82°C and remove.

COMPOSITE LAMINATE STACKING SEQUENCE

LIST OF MATERIALS

1. Tool – aluminum, steel, Invar, composite
   (tool plates must be release coated or film covered)
2. Release coat or film – Frekote 700NC or 770NC, FEP, TEDLAR
3. Silicone Edge Dams – Thicker than laminate
4. Laminate
5. Release coat or film – Frekote 700NC or 770NC, FEP, TEDLAR
6. Caul plate – aluminum, steel, Invar, silicone rubber sheet
   (metal caul plates must be release coated or wrapped)
7. 2.2 osy polyester breather – 1 or more
8. Vacuum bag
9. Vacuum sealant
10. Glass yarn string - (alternatively or additionally breather may wrap over top of dam to contact edge)

Revised 10/2016

All data given is based on representative samples of the materials in question. Since the method and circumstances under which these materials are processed and tested are key to their performance, and TenCate Advanced Composites has no assurance of how its customers will use the material, the corporation cannot guarantee these properties.

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