NTPT THINPREG™ 380CE
DATA SHEET

INTRODUCTION

ThinPreg™ 380CE is a Uni-Directional tape made of Carbon fibers impregnated with a thermoset cyanate ester resin system.

ThinPreg™ 380CE uses a high Tg resin well adapted to autoclave molding at 180°C (350°F) with post-curing.

The Fiber Areal Weight of ThinPreg™ 380CE ranges from 30g/m² to 300g/m² and the standard resin content ranges from 32 to 42% by weight. The North Thin Ply Technology process allows for the adjustment of the fiber / resin ratio upon request.

FEATURES
- Wide range of Fiber Areal Weight, including extremely light tapes
- Cyanate ester resin with Tg of 350°C (660°F)
- Low coefficient of Thermal Expansion
- Out life of 30 days at 21°C (70°F)

BENEFITS
- Almost unlimited possibilities of composite structure design
- Ideal for high temperature applications
- Very good dimensional stability of composite part in a wide range of temperature of use
- Possibility of making large and/or complex parts with long mold dressing time before curing

Light weight prepreg tapes (<75gsm) should be handled carefully.

For parts larger than 1m² (1.2sq yd), North Thin Ply Technology strongly recommends to use a complex made of ThinPreg™ 380CE laid down with an Automated Tape Laydown system as shown above.

This solution minimizes mold dressing time and thus total cycle time, ensures an accurate lay down of every single piece of tape, in every designed direction and eliminates human errors.
**INSTRUCTIONS FOR USE**

**Curing cycle**

ThinPreg™ 380CE offers its best performances when molded in autoclave at 180°C (350°F) and post-cured at 260°C (500°F).

Dress ThinPreg™ 380CE in the mold and cover the laminate with appropriate vacuum bag (adapted to high temperature molding). Apply vacuum progressively and place the mold and laminate in the autoclave. Do not hesitate to let the laminate under vacuum for several hours before heating up. Then ramp up the temperature of the oven to 120°C (250°F) at maximum 2°C/minute.

Stabilize the temperature at 120°C (250°F) for approximately 2 hours. At the beginning of this plateau apply the pressure of the autoclave. After 2 hours at 120°C(250°F) ramp up the temperature again at maximum 2°C/min to reach 180°C (350°F)

Stabilize the temperature for 2 hours at 180°C (350°F)

Cool down at maximum 2°C/min to reach room temperature. Keep the vacuum during cooling down and release after complete curing cycle to reach ThinPreg™ 380CE maximum Tg and best properties. In order to reach ThinPreg™ 380CE maximum Tg, post curing has to be performed just after the curing. To do so, ramp up to 260°C (500°F) and cool down to room temperature at maximum 0.5°C/min.
## INTRODUCTION

NTPT (North Thin Ply Technology) offers a range of Automated Tape Laying equipment for the efficient incorporation of prepreg into molded parts. This unique technology, offered at an economical price, allows users looking to reduce labor costs, reduce material wastage, and increase part quality.

A new generation of ATL machine, marketed at an ‘everyday’ price is affordable to smaller molding companies. The benefits of NTPT’s ATL equipment brings. High quality, efficient part production, reduced part contamination, and reduced exposure of uncured polymeric and no possibility of prepreg backers being left within the laminate.

NTPT estimates that a single ATL can handle the work of eight to ten composite laminators, with full traceability, a daily basis. Detailed product information is below:

### FUNCTIONALITIES

- **Auto-mation at an Affordable Price**
- **Everyday Price**
- **Reduced Material Wastage**
- **Increased Part Quality**

### TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Cured Matrix Properties (after the above mentioned curing cycle has been applied)</th>
<th>International System of Units</th>
<th>American System</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>1.30 g/cm³</td>
<td>81.15 lb/ft³</td>
<td>ISO 1183 - 3</td>
</tr>
<tr>
<td>Color</td>
<td>Light beige</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Tensile modulus</td>
<td>4055 MPa</td>
<td>589 Ksi</td>
<td>ISO 527 - 2</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>2845 MPa</td>
<td>412 Ksi</td>
<td>ISO 527 - 2</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>0.71%</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Flexural modulus (mean value)</td>
<td>4223.2 MPa</td>
<td>612 Ksi</td>
<td>ISO 178</td>
</tr>
<tr>
<td>Flexural strength (mean value)</td>
<td>87.6 MPa</td>
<td>12.7 Ksi</td>
<td>ISO 178</td>
</tr>
<tr>
<td>Strain at maximum load (mean value)</td>
<td>2.30%</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Maximum Tg after post-cure</td>
<td>&gt;350°C</td>
<td>&gt;660°F</td>
<td>/</td>
</tr>
<tr>
<td>Water absorption (boiling water)</td>
<td>0.15%</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Heat deflection temperature</td>
<td>161°C</td>
<td>321°F</td>
<td>ISO 75 – 2</td>
</tr>
<tr>
<td>Fracture toughness G1C</td>
<td>0.062 kJ/m²</td>
<td>0.35in.lb/in²</td>
<td>ISO 13586</td>
</tr>
<tr>
<td>Fracture toughness K1C</td>
<td>0.443 MPa.m¹/²</td>
<td>0.40ksi.in¹/²</td>
<td>ISO 13586</td>
</tr>
</tbody>
</table>

### Cured ThinPregTM180 CE/CF properties on a UD laminate (after the above mentioned curing cycle has been applied)

<table>
<thead>
<tr>
<th>With Toray Fiber M55J</th>
<th>With Toray Fiber M55J</th>
</tr>
</thead>
<tbody>
<tr>
<td>International System of Units</td>
<td>American System</td>
</tr>
<tr>
<td>Fiber volume / weight fraction</td>
<td>55 / 66 %</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>1649 MPa</td>
</tr>
<tr>
<td>Tensile modulus</td>
<td>315 GPa</td>
</tr>
<tr>
<td>Interlaminar Shear Strength for the laminate structure: 100%@0°</td>
<td>33.9 MPa</td>
</tr>
</tbody>
</table>
GENERAL INFORMATION

Storage
ThinPreg™ 380CE should be stored at -18°C (0°F) to reach the maximum shelf life of 24 months. At 21°C (70°F), the out life is 30 days.

Packaging
ThinPreg™ 380CE is wound into 300 mm (11.8 inches) wide rolls on a 76 mm (3 inches) or 150mm (6 inches) inner diameter cardboard tube. ThinPreg™ 380CE is supported on a bottom silicon paper. The standard roll length is 150 linear meters (164 yards).

Health and safety
ThinPreg™ 380CE contains cyanate ester resins which can cause allergic reaction. When uncured, ThinPreg™ 380CE should be handled with appropriate gloves. When cured, a composite laminate made of ThinPreg™ 380CE should be cut, drilled or machined in a room equipped with an exhaust ventilation and filtration system, by operators wearing protective clothing and masks. Refer to Material Safety Data Sheet for further information.

Notice and disclaimer
The Company strongly recommends that Customers make test panels and conduct appropriate testing of any goods or materials supplied by the Company to ensure that they are suitable for the Customer’s planned application. Such testing should include testing under conditions as close as possible to those to which the final component may be subjected. The Company specifically excludes any warranty of fitness for purpose of the goods other than as set out in writing by the Company.

All advice, instruction or recommendation is given in good faith but the Company only warrants that advice in writing is given with reasonable skill and care. No further duty or responsibility is accepted by the Company. All advice is given subject to the Terms and Conditions of sale (the Conditions) which are available on request from the Company.

The Company reserves the right to change specifications and prices without notice and Customers should satisfy themselves that information relied on by the Customer is that which is currently published by the Company on its website. Any queries may be addressed to the Technical Services Department.

NTPT continuously reviews and updates its literature. Please ensure that you have the current version, by contacting your NTPT sales contact and quoting the revision number.

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