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NCAMP Material Specification

This specification is generated and maintained in accordance with NCAMP Standard Operating Procedures, NSP 100

Medium Temperature, Out-of-Autoclave, Oven-Vacuum-Bag Cure Epoxy Resin Impregnated Fiber Reinforced Composite Materials, Type 32, Class 1, Grade 145 (Solvay (formerly Cytec & Advanced Composites Group) MTM45-1 IM7 Tape)

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1. SCOPE:

1.1 Form:

This detail specification along with the base specification NMS 451 establishes the requirements for continuous unidirectional carbon fiber impregnated with a modified B-staged epoxy resin (“unidirectional tape prepreg”). The prepreg is produced using a hot-melt process.

This detail specification follows the section and table numbering scheme of the base specification. It contains additiona

- (1) Specific procedures should be identical to those used in the original material qualification program.
- (2) Three specimens should be taken across the width of the prepreg; left, center, right.
- (3) "ind." refers to individual measurements. "avg" refers to the average measurements per roll. / L P L W V F R P S X W H G D W . D Q G P R G L I L H G & 9
- (4) Optional to perform HPLC and/or FTIR; Two specimens should be tested per sampled roll.

3.2 Constituent Material Requirements:

3.2.2 Reinforcement: Efforts to qualify the carbon fiber to NCAMP carbon fiber material specification, NMS 818, are ongoing. In the meantime, Solvay will continue to provide aerospace-grade carbon fiber for this prepreg per the prepregger's carbon fiber procurement specification and Solvay's internal aerospace-grade PCD. In addition, the following change control is implemented on the carbon fiber:

The carbon fiber tow product manufacturer shall establish control factors which will yield

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3.5 Laminate (Cured Prepreg) Requirements:

3.5.2 Cured Laminate Physical Properties:

TABLE 3 - Cured Laminate Physical Properties

Property	Test Method ⁽¹⁾	Requirements ⁽²⁾
Cured Ply Thickness ⁽³⁾	SACMA SRM 10R-94	0.00521 and 0.00588 inch, avg.
Dry Glass Transition Temperature, Tg by DMA	SACMA SRM 18R-94	332.2 and 382.5 °F, ind.

⁽¹⁾ Specific procedures should be identical to those used in the original material qualification program.

⁽²⁾ "ind." refers to individual measurements. "avg." refers to the average measurements per panel.

⁽³⁾ Computed from actual qualification panel thicknesses and theoretical nominal CPT.
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3.5.3 Cured Laminate Mechanical Properties:

TABLE 4 - Required Cured Laminate Tests for Mechanical Properties (Class 1)

Property	Test Method ⁽¹⁾	Requirements ⁽³⁾
0/90° Tension Strength and Modulus, Room Temperature Dry Layup: [0/90] _{4S}	ASTM D3039	Strength ⁽²⁾ : Min. Ind. • 145.50 ksi Strength ⁽²⁾ : Average • 168.10 ksi Modulus ⁽²⁾ : 10.6 and 12.6 msi, avg.
90/0° Compression Strength, Room Temperature Dry Layup: [90/0] _{4S}	ASTM D6641	Strength ⁽²⁾ : Min. Ind. • 69.98 ksi Strength ⁽²⁾ : Average • 88.61 ksi, avg.
0° Short Beam Strength, Room Temperature Dry Layup: [0] ₁₆	ASTM D2344	Strength: Min. Ind. • 11.80 ksi Strength: Average • 13.47 ksi

⁽¹⁾ Specific procedures should be identical to those used in the original material qualification program.

⁽²⁾ Normalize the properties to a nominal cured ply thickness (CPT) value of 0.0055 inch based on theoretical nominal CPT, using the following equation:
Normalized_Value = Measured_Value x Measured_CPT / Nominal_CPT.

⁽³⁾ "ind." refers to individual measurements. "avg" refers to the average of 5 replicates.
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