

1. SCOPE:

1.1 Form:

This detail specification along with the base material specification NMS 201 establishes the requirements for quartz yarns fabric impregnated with a modified epoxy resin (“fabric 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 additional or superseding requirements. The base specification shall govern where no additional requirement is specified; in such cases, the applicable sections are omitted from this detail specification.

1.3 Classification: All products qualified to this detail specification have the following classification: Type 38, Class 2, Grade 286, Style 8HS

3. TECHNICAL REQUIREMENTS:

Table 1 – Prepreg Physical and Chemical Properties

Property	Test Method ⁽¹⁾	Number of Replicates	Requirements ⁽³⁾
Resin Content	ASTM D3529-16	Every roll ⁽²⁾	

Differential Scanning Calorimetry (DSC) exotherm peak temperature	ISO 11357-1	First and last rolls of every batch	137 to 145 °C
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- (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 mother roll; left, center, right
- (3) "ind." refers to individual measurements. "avg." refers to the average of measurements per roll.
- (4) Limits computed at $\sigma = 0.01$ with ModCV.

3.2 Constituent Material Requirements:

- 3.2.2 Reinforcement: Yarns shall be qualified to AMS3846D §3.1.2 quartz. In addition, the following change control is implemented on the quartz yarns:

The quartz yarns manufacturer shall establish control factors which will yield product meeting the technical requirements of this specification. The factors which are used in the production of yarn shall constitute the approved factors; they shall be used for manufacturing production quartz yarns tow product. Control factors are Controlled Process Equipment and Controlled Process Parameters for producing the product. Control factors include, but are not limited to, the following:

- a) Quartz yarns processing parameters (e.g. temperature and speed),
- b) Quartz yarns manufacturing equipment, line, or site,
- c) Quartz yarns acceptance requirements,
- d) Quartz yarns acceptance test methods,
- e) Quartz yarns acceptance sampling plan,
- f) Quartz yarns surface treatment methods and levels,
- g) Quartz yarns
- h) Quartz yarns finish application and drying methods.

If it is necessary to make any change in the above control factors, the quartz yarns tow product manufacturer shall submit for re-approval to Renegade in accordance with NRP 101 Prepreg Process Control Document (PCD) Preparation and Maintenance Guide. The change shall not be incorporated prior to the receipt of re-approval notice, typically in the form of a signed Advanced Change Notice (ACN).

3.4 Visual and Dimensional Requirements:

- 3.4.4 Roll characteristics -

TABLE 3 - Cured Laminate Physical Properties

Property	Test Method⁽¹⁾	Requirements⁽²⁾
Cured Ply Thickness, CPT ⁽³⁾⁽⁶⁾	ASTM D3171-15	0.0106 to 0.0118 inch, avg.
Dry Glass Transition Temperature, Tg by DMA ⁽⁴⁾⁽⁵⁾	Single Cantilever per ASTM D7028-07 (2015) ⁽¹⁾	300 to 336 °F, ind.
	3-point bend per ASTM D7028-07 (2015) ⁽¹⁾	276 to 312 °F, ind.

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3.5.3 Cured Laminate Mechanical Properties:

TABLE 4 - Required Cured Laminate Tests for Mechanical Properties (Class 2)

Property⁽⁴⁾	Test Method⁽¹⁾	Requirements⁽³⁾
0° (warp) Tension Strength and Modulus Room Temperature, Ambient		

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