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NCAMP Material Specification

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

Medium Toughness Polyaryletherketone (PAEK) Thermoplastics
Toray (Formerly TenCate) Cetex® TC1225 Low Melt (LM) Polyaryletherketone (PAEK)

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1. SCOPE:

1.1 Form:

This specification and its associated detail specifications establish the requirements for continuous fiber unidirectional tape impregnated with a Polyaryletherketone (PAEK) thermoplastic resin ("unidirectional tape prepreg").

1.2 Application:

These composite prepreg material systems are intended for use in the fabrication of aerospace structures and tooling substrate.

1.3 Classification:

Each detail specification has a unique classification. Example specification callout is provided in the qualified products list of every detail specification. Prepregs shall be classified to the following Types, Classes, and Grades or Styles:

1.3.1 Type shall specify nominal prepreg resin content. For example,
Type 34 – Nominal resin content 34 percent by weight
Type 38 – Nominal resin content 38 percent by weight

1.3.2 Class shall specify prepreg product form. For example,
Class 1 – Unidirectional carbon fiber prepreg tape
Class 2 – Woven carbon fiber fabric prepreg

1.3.3 Grade shall specify nominal fiber areal weight in grams per square meter (gsm). For example,
Grade 145 – 145 gsm nominal fiber areal weight
Grade 193 – 193 gsm nominal fiber areal weight
Grade 370 – 370 gsm nominal fiber areal weight

1.3.4 Style shall specify the woven fabric style (not applicable to Class 1). For example,
Style 3K-PW - 3K yarn, plain weave
Style 3K-8HS - 3K yarn, 8 harness satin weave

1.4 Safety – Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address all the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

1.5 Rounding of Values:

The following applies to all specified limits or requirements in this specification. For purposes of determining conformance with this specification, an observed value or a calculated value shall be rounded “to the nearest unit” in the last right-hand digit used in expressing the specification limit, in accordance with the rounding method of ASTM E29.

1.6 Qualified Products:

This specification requires qualified products. Qualified products are listed in the Qualified Products List (QPL) of each detail specification. In accordance with the requirements of this specification, the specific fiber material and source(s), weaver(s), and the specific resin components and source(s) shall be qualified as a prepreg material system. Any other combinations not listed on the QPL of the detail specification are not qualified. In addition, the production of the qualified products is controlled by an NCAMP approved process control document (PCD) as specified in 3.11.

1.7 Detail Specification:

This base specification contains basic fiber reinforced thermoplastic prepeg material requirements that apply to every product. The detail specifications contain additional or superseding properties and requirements that apply to a specific product.

1.8 Change Control Approval:

Prepreg product shall be produced in accordance with an NCAMP approved Process Control Document (PCD). Formal change notification and approval is required before a change may be implemented. In general, level 1 through level 3 changes per DOT/FAA/AR-07/3 are considered major changes. NCAMP approval is required for major changes, and is granted through Advance Change Notices (ACN). Prior to implementing a major change, the material supplier shall contact NCAMP with the following information:

a. A detailed description of the change,
b. A draft test plan to substantiate that the change will not affect the prepreg material properties, and
c. A list of material users

NCAMP staff will communicate the proposed change(s) and obtain necessary suggestions and/or approvals from the material users and certification agencies. In general, DOT/FAA/AR-07/3 will be used as guidelines. The ACN along with test results will be reviewed by the material users and certification agencies. NCAMP staff will sign the ACN when a consensus is reached.

2. APPLICABLE DOCUMENTS

The latest issue of the NCAMP publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order unless otherwise

specified. When a referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 NCAMP Publications:

NRP 101	Prepreg Process Control Document (PCD) Preparation Guide
NMS 122/1	Medium Toughness Polyaryletherketone (PAEK) Thermoplastics Toray (Formerly TenCate) Cetex® TC1225 Low Melt (LM) Polyaryletherketone (PAEK) T700 Unidirectional 145 gsm 34% RC
NPS 81225	Fabrication of NMS 122 Qualification, Equivalency, and Acceptance Test Panels Medium Toughness Polyaryletherketone (PAEK) Thermoplastics Toray (Formerly TenCate) Cetex® TC1225 Low Melt (LM) Polyaryletherketone (PAEK)

2.2 ASTM Publications (available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, http://www.astm.org)

ASTM D790	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D792	Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D3039	Tensile Properties of Polymeric Matrix Composite Materials
ASTM D3171	Standard Test Methods for Constituent Content of Composite Materials
ASTM D3418	Standard Test Method for Transition Temperatures and Enthalpies of Fusion and Crystallization of Polymers by Differential Scanning Calorimetry
ASTM D3529	Standard Test Method for Matrix Solids Content and Matrix Content of Composite Prepreg
ASTM D3776	Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
ASTM D3878	Standard Terminology Composite Materials
ASTM D6641	Standard Test Method for Compressive Properties of Polymer Matrix Composite Materials Using a Combined Loading Compression (CLC) Test Fixture
ASTM E29	Using Significant Digits in Test Data to Determine Conformance with Specifications
ASTM E168	General Techniques of Infrared Quantitative Analysis
ASTM E1252	Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis

2.4 ISO Publications:

AS 9100	Quality Management Systems

2.5 SACMA Publications (available from American Composites Manufacturers Association, 1010 N Glebe Rd., Suite 450, Arlington, VA 22201, http://www.acmanet.org):

SACMA SRM 23R-94	Resin Content and Fiber Areal Weight of Thermoset Prepreg with Destructive Technique
SACMA SRM 25R-94	Onset Temperature and Peak Temperature for Composite System Resins Using Differential Scanning Calorimetry (DSC)

2.6 US Government Publications:

29 CFR 1910.1200	Hazard Communication, Occupational Safety and Health Standards
DOT/FAA/AR-06/10	Guidelines and Recommended Criteria for the Development of a Material Specification for Carbon Fiber/Epoxy Fabric Prepregs
DOT/FAA/AR-07/3	Guidelines and Recommended Criteria for the Development of a Material Specification for Carbon Fiber/Epoxy Unidirectional Prepregs Update
MIL–D–3464	Desiccants, Activated, Bagged, Packaging Use and Static Dehumidification
CMH-17	Composite Materials Handbook (formerly MIL-HDBK-17)

3. TECHNICAL REQUIREMENTS:

3.1 Detail Specification:

The requirements for a specific fiber reinforced unidirectional prepreg tape Polyaryletherketone (PAEK) product shall consist of all requirements specified herein in addition to requirements specified in the applicable detail specification. In case of conflict between requirements of this basic specification and an applicable detail specification, requirements of the detail specification shall govern.

3.2 Constituent Material Requirements:

Material supplied in accordance with this specification shall consist of thermoplastic resin and fiber.

3.2.1 Polyaryletherketone (PAEK) Resin polymer:

The polymer shall be a thermoplastic-based resin that is capable of meeting the requirements of this specification; no separate specification exists for the resin system. Any changes to the thermoplastic resin system since qualification shall be re-approved by NCAMP. No more than one resin lot shall be included in any single prepreg batch unless allowed by the detail specification or accepted by the purchaser in the purchase order.

3.2.2 Reinforcement: The reinforcement requirements shall be specified in the applicable detail specifications.

3.3 Prepreg Physical and Chemical Property Requirements:

3.3.1 Prepreg physical and chemical properties:

The prepreg material shall meet the physical and chemical property requirements of Table 1 and as specified below. The material shall be capable of being cut without disarray of the filaments and without other visible damage.

Table 1 – Prepreg Physical and Chemical Properties

Property	Product Form	Test Method[1]	Number of Replicates
Resin Content	Prepreg	ASTM D3529	Each Batch[2]
Fiber Areal Weight	Prepreg	ASTM D3776/D3766M-09(a)2017 Option C or SACMA SRM 23R-94	Each Batch[2]
Differential Scanning Calorimetry (DSC) Melt Temp. (Peak) Hot Crystallization Temp. (Peak)	Prepreg	ASTM D3418 or SACMA SRM 25R-94	Each Batch[3]

[1] Specific procedures should be identical to those used in the original material qualification program.
[2] Three specimens minimum should be taken across the width of each prepreg batch.
[3] Three specimens minimum should be taken for each prepreg batch.

3.4 Visual and Dimensional Requirements:

3.4.1 General:

The prepreg shall be uniform in quality and shall not contain defects detrimental to handling, layup, cure or structural properties.

3.4.2 Visual Requirements (Class 1):

3.4.2.1 The prepreg material shall be free from foreign material, cut or broken fibers, wrinkles, polymer-dense areas and indications of moisture visible to the unaided eye.

3.4.2.2 Fuzz balls shall be acceptable provided:

a. The fuzz balls cause no apparent fiber distortion. This shall be determined without removing the fuzz balls.
b. Any fuzz ball shall not exceed 1.5 inches in any direction.
c. The accumulated number of fuzz balls shall not exceed 6 in any 10 square feet of one side of prepreg material.

d. The overall thickness change due to fuzz ball is no more than 50 percent of the prepreg material nominal thickness.

3.4.2.3 The edge of the prepreg tape shall not deviate from a straight line by more than 0.025 inch per foot of length and shall be flush with the separator paper, if separator paper is used.

3.4.2.4 All fiber tows shall be collimated and parallel, within 0.025 inch per foot of length, to the centerline of the material.

3.4.2.5 Splits of up to 36 inch long and 0.010 inch wide are acceptable, Windows (resin-bridged fiber gap) of up to 36 inch long and 0.040 inch wide are acceptable

3.4.2.6 The prepreg shall be free from crimped fibers and fiber tow crossovers visible to the unaided eye.

3.4.3 Roll characteristics:

The total weight or length of material shall be specified by the purchaser. Unless otherwise specified by the purchaser, individual roll net weight shall not exceed 269 pounds. The standard roll length is at 200m. Width shall be as specified by the purchaser. Unless otherwise specified by the purchaser, tolerances on the width of the prepreg shall be:

a. For slit unidirectional tape widths equal or greater than 6.0 inches: +/-0.060 inch
b. For unslit unidirectional tape widths equal or greater than 6.0 inches: +/-0.250 inch

3.4.4 Material not conforming to the visible defect limitations and dimensional requirements:

3.4.4.1 In cases where foreign material can be removed without causing any apparent deformation of the prepreg surface, they may be removed by spatula or adhesive tape. The spatula or adhesive tape shall not transfer any contaminants to the prepreg product.

3.4.4.2 Areas not conforming to Section 3.4.1, 3.4.2, or 3.4.3 shall be identified along the edge of the prepreg roll by markers. Markers shall be distinguishable from the prepreg and carrier release paper and removable without damaging the prepreg material. An alternative to identifying defects with a marker on the edge of the material, the prepreg manufacture has the option of removing the defects from the roll. The material will then be spliced together with adhesive tape of a contrasting color to the prepreg material so the splice can be easily identified. The location of the splice will be documented on the defect batch.

3.4.4.3 For single-point defects, use a single marker.

3.4.4.4 Successive single-point defects 3 feet or less apart shall be considered as one continuous defect. For continuous defective areas, markers shall be placed at the beginning, at each 2-foot maximum interval, and at the end of the continuous defect.

3.4.4.6 Prepreg material roll shall have a maximum defect content of 15 percent by weight or length. The defect weight limit shall be based on full-width weight.

3.4.4.7 The type, location, and length (for continuous defect) of each marked defect, and the location of the splices shall be indicated on a defect log accompanying each roll of prepreg material.

3.5 Laminate (Consolidated) Requirements:

3.5.1 Test Laminate Fabrication and Baseline Cure Process:

The test laminate fabrication and baseline cure process shall be in accordance with NCAMP Process Specification NPS 81225 Fabrication of NMS 122 Qualification, Equivalency, and Acceptance Test Panels. In order to facilitate individual specimen traceability, individual specimen numbering and/or skewed lines must be written or drawn across each sub-panel as shown in Figure 1.

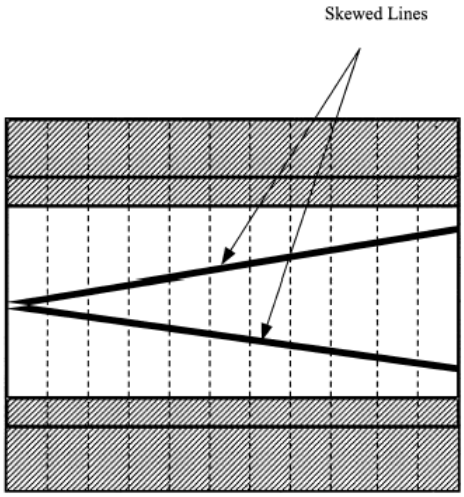

Figure 1 – Specimen Traceability Line

3.5.2 Consolidated Laminate Physical Properties:

The consolidated laminate physical properties listed in Table 2 shall conform to the values and limits listed on the corresponding detail specification.

TABLE 2 - Consolidated Laminate Physical Properties

Property	Test Method	Number of Replicates
Consolidated Ply Thickness	ASTM D3171	10 measurements per panel
Laminate Density	ASTM D792	2 per batch minimum
Fiber Volume, % by Volume	ASTM D3171	2 per batch minimum
Resin Content, % by Weight	ASTM D3171	2 per batch minimum
Void Content, % by Volume	ASTM D3171	2 per batch minimum
Differential Scanning Calorimetry (DSC) Melt Temp. (Peak) Cold Crystallization Temp. (Peak) Hot Crystallization Temp. (Peak)	ASTM D3418 or SACMA SRM 25R-94	1 per batch minimum

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

3.5.3 Consolidated Laminate Mechanical Properties:

The consolidated laminate mechanical properties listed in Table 3, shall conform to the values and limits listed on the corresponding detail specification.

TABLE 3 - Consolidated Laminate Mechanical Properties (Class 1)

Property	Test Temperature	Test Method(1)	Number of Replicates
0° Tension Strength and Modulus	RT	ASTM D3039	5
90/0° Compression Strength and Modulus	RT	ASTM D6641	5
90° Flex Strength	RT	ASTM D790	5

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

3.6 Storage and Handling Requirements:

3.6.1 General Requirements:

3.6.1.1 Release Paper/poly Film (Optional):

A non-transferring separator paper with differential release may be used on the inside

of the roll. Release paper or poly film shall be used on the outside of the roll to permit easy removal of the preimpregnated material from the roll without tearing, shredding, fiber realignment, or other damage. The material shall be capable of being cut cleanly without other visible damage. The release paper shall not contaminate the prepreg.

3.6.1.2 Material Handling:

All rolled material shall be packaged in a cardboard box or equivalent. The fiberboard tube does not require to extend past the prepreg. The material shall not be allowed to rest in a vertical position. Core size shall be 3.0” diameter minimum.

3.6.2 Prepreg Life Requirements:

3.6.2.1 Shelf Life: The prepreg rolls shall be placed into a poly bag, and then placed within a suitable box to prevent UV light degradation in a clean and dry area. The prepreg rolls shall be kept horizontal, and shall not have any heavy objects resting on top of it.

3.6.2.1.1 The prepreg shall have a shelf life of ten years when stored in accordance with the conditions above at the temperature recommended by the manufacturer. It must be stored in a manner to prevent exposure to UV light sources in an environment 40-122°F (5-50°C) and less than an 85% relative humidity. Direct exposure to sunlight or rain shall also be avoided to prevent loss in performance.

3.6.2.1.2 The prepreg does not require any special environmental condition prior to the consolidating molding process; normal shop floor conditions 40-122°F (5-50°C), and less than 85% relative humidity are acceptable. The prepreg work life is 10 years under normal shop floor conditions, with proper storage and no UV exposure.

3.6.2.1.3 For purposes of tracking the shelf life, the time shall be measured from the date of manufacture, unless otherwise specified in the purchase order. Material that has been stored for a time period longer than the maximum shelf life shall not be used until tests have been performed to extend the shelf life as defined by user’s process specifications.

3.6.3 Distributors:

A material distributor shall perform the same documentation of shelf life as the purchaser. If the original packaging is opened to allow for re-spooling into smaller units, the time when the package is opened will count against the shelf life of the materials.

3.7 Environmental, Health, and Safety:

3.7.1 Equipment, materials, solutions, and emissions (if applicable) shall be controlled, handled, used, and disposed of in accordance with all local, State, and Federal Government Safety, Health, and Environmental Affairs (SHEA).

3.7.2 The delivered prepreg system shall fulfill the local requirements of the health and safety laws of the country of the purchaser. When processing the prepreg in the composite

shop, there shall be no health hazards or emissions that require special measures to be taken to protect the environment.

3.7.3 The manufacturer shall inform the purchaser about the safe handling procedures of the material. The Safety Data Sheet (SDS) shall be made available to the purchaser.

3.8 Defects During Usage:

3.8.1 Defects, as defined by this specification, found in the prepreg material after acceptance shall be cause for rejection and the defective material shall be returned to the supplier. Defects caused by user mishandling or improper storage are not the responsibility of the supplier and shall not be cause for rejection back to the supplier.

3.9 Qualification Requirements:

Materials shall be qualified in accordance with an NCAMP test plan.

3.10 Material Re-Qualification and Equivalency:

3.10.1 If any change occurs relevant to this specification or the PCD, NCAMP reserves the right to require a re-qualification by the prepreg manufacturer to validate that the changed material is equivalent to the material in the initial qualification. The extent of the re-qualification program will depend on the nature of the change of the material or the material processing. DOT/FAA/AR-06/10 and DOT/FAA/AR-07/3 provide guidance in this area.

3.10.2 Equivalency is limited to the evaluation of minor changes in a material's constituents, manufacturing process, or fabrication (e.g. curing) process used with a material. Significant changes to the prepreg material will require a full qualification program and a separate specification.

3.10.3 It is the responsibility of the material supplier to conduct testing to demonstrate that the current material, when processed to the baseline process specification, will generate composite properties statistically equivalent to the properties of the original materials.

3.11 Process Control Document:

3.11.1 The supplier shall prepare and control a Process Control Document (PCD) in accordance with NRP 101. The PCD shall be considered proprietary and shall be protected in accordance with disclosure agreements signed by the supplier and NCAMP. The established Process Control Document (PCD) shall be presented to NCAMP upon request. NCAMP shall treat any information contained in the PCD as proprietary.

3.11.2 Changes to the PCD of a qualified material (as defined by DOT/FAA/AR-06/10, DOT/FAA/AR-07/3, and NRP 101) are subject to the written approval of NCAMP. Such changes may require substantial testing.

3.12 Traceability:

Each individual material and its constituents as defined by the PCD shall be identifiable at all stages of manufacture and delivery. The material manufacturer shall present evidence of the material traceability upon request.

3.13 Manufacturer's Responsibility:

3.13.1 The manufacturer is responsible for the development and manufacture of any material submitted in accordance with this specification. Quality control by the manufacturer shall be in accordance with this specification.

3.13.2 Changes to the prepreg require review and approval by NCAMP in accordance with 1.8. Any testing required to validate the changes or adjustment of manufacturing materials, techniques and/or procedures is the manufacturer's responsibility.

3.14 Quality Management System:

The manufacturer's quality system shall be approved as defined in AS 9100 or equivalent.

4. QUALITY ASSURANCE:

4.1 Responsibility for Inspection:

Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all batch release inspection and test requirements specified herein and the purchaser is responsible for the performance of all receiving inspection tests specified herein. The supplier may use their own facilities or any commercial laboratory acceptable to NCAMP. The purchaser or NCAMP reserves the right to perform additional tests to assure that the material furnished conforms to the prescribed requirements.

4.2 Classification of Tests and Inspections:

4.2.1 Qualification Tests:

The preproduction tests performed for material qualification are those tests performed on representative samples of each specific form of material to establish a qualified product in accordance with this specification. Qualification testing shall be in accordance with an NCAMP test plan.

4.2.2 Batch Release Tests:

Batch release tests shall be those tests performed by the supplier on representative samples taken from each production batch of each type of material submitted by the supplier for acceptance under contract or purchase order. Specification limits are specified in the detail specification. Data and certification of data generated shall accompany each shipment of material.

4.2.2.1 Additional Testing:

The purchaser reserves the right to perform additional testing to confirm the supplier's certification data, and to approve incoming material for use in the fabrication of production parts. Each roll of material may be examined by the purchaser for appearance, color uniformity, imperfections which would be detrimental for use in the fabrication of parts, and for quality of workmanship.

4.2.3 Receiving Inspection Tests:

The receiving inspection tests shall be those tests performed by the purchaser or approved test lab on representative samples taken from each production batch of each type of material delivered by the supplier.

4.3 Supplier Statistical Process Control:

The supplier shall establish and maintain procedures and requirements for an SPC system based on Key Characteristics (KC) and Controlled Process Parameters (CPP). The KC are the material properties required for batch release per 4.4.1. The KC monitoring, typically using control charts, must be provided to material users, certification agencies, and NCAMP staff upon request. The CPP monitoring must also be provided to material users, certification agencies, and NCAMP staff upon request, but proprietary information may be coded or normalized. Alternatively, supplier may send the KC data to NCAMP for inclusion in the NCAMP's control charts which are available to the public.

4.4 Product Certification:

4.4.1 Batch Release Tests:

The supplier shall perform batch release tests on each batch of prepreg as specified in this section and the detail specification.

4.4.1.1 Prepreg Physical and Chemical Properties: Test in accordance with the requirements of Table 1 and the detail specification.

TABLE 4 - Supplier Quality Control Sampling Plan for Prepreg Properties

Pounds In Batch	Frequency
1-500	Test One Roll
501-1000	Test from one roll within the first 100 lbs of production and one roll within the last 100 lbs of production
1001 and greater	Test from one roll within the first 100 lbs of production and one roll within the last 100 lbs of production plus One Roll for Each Additional 1000 lbs. or Part Thereof

4.4.1.2 Laminate Physical Properties: Test in accordance with the requirements of Table 2 and the detail specification.

4.4.1.3 Laminate Mechanical Properties: Each batch of prepreg shall be tested to verify compliance with the mechanical property requirements in Table 3 and/or Table 3 of the applicable detail specification. Each Batch will be mechanically tested, in accordance with the Table 4 sampling plan.

4.4.2 Certification of Conformance

The supplier shall furnish with each shipment one copy of a Certification of Conformance including certified test reports, confirming that all the material in the shipment complies with the requirements of this specification. The Certificate of Conformance shall include the following information:

a. Manufacturer's identification.
b. Manufacturer's material designation.
c. Specification number, title, revision.
d. Purchase order number.
e. Date, type, roll numbers and results of batch release tests, including actual individual test data and average values.
f. Results of any retests.
g. Prepreg batch numbers.
h. Lot numbers of fiber, fabric, and resin used in the manufacturer of the prepreg materials.
i. Date of manufacture (date of impregnation).
j. Fiber lot certification test data and certificate of conformance.
k. List of roll numbers for each batch and the quantity (length or weight) of each roll.
l. Roll defect logs.

4.4.3 Records: The following records shall be available for inspection by NCAMP and purchasers

4.4.3.1 The supplier shall keep on permanent file all records pertaining to the qualification of the candidate material.

4.4.3.2 The supplier shall keep the following records on file, for each prepreg batch, for a minimum period of 10 years:

a. Full prepreg batch traceability. This traceability shall extend to the particular resin and resin component lots, and fiber yarn lot(s) employed, where applicable.
b. All records pertaining to raw material receiving inspection and certification, in–process records, and product testing specified in the supplier PCD.
c. All records pertaining to the SPC requirements which are specified in the supplier PCD.

4.5 Receiving Inspection: Before the prepreg material is accepted, the purchaser shall perform the following:

4.5.1 Verification: Material shall be inspected to assure that:

a. The material identification is correct.
b. The quantity is correct.
c. The required test data is received.
d. The Certificate of Conformance is received.

4.5.2 Testing:

The purchaser shall repeat the supplier batch release test per 4.4.1 as part of the receiving inspection tests on each batch of prepreg. As use and confidence increase, the receiving inspection testing many be modified based on proven performance in cooperation with the material supplier, customer (if purchaser is supplying composite parts to another aircraft company), and appropriate certification agency.

4.5.3 Re-Testing:

One retest is allowed for each test property. Additional re-test(s) is allowed only when one or more of the following conditions exist:

a. The initial test was performed in significant deviation to the appropriate procedure. Significant deviations are those expected to affect the measured response.
b. In the course of layup, cure, machining, or testing, there was an occurrence known to cause or contribute to the observed test result(s).
c. Standard statistical analysis procedures establish the suspect individual data point(s) as an outlier and there is a probable, if not provable, relationship to a deviation from required procedure.

5. PREPARATION FOR DELIVERY:

5.1 Packaging:

5.1.1 The prepreg shall be rolled onto a core suitable for use at the purchaser. Suppliers uncertain as to core suitability shall direct their inquiries through the purchaser prior to fabrication of material.

5.1.2 Each spool/roll of material shall be placed in a poly bag and within a designated box to prevent UV light degradation. The prepreg rolls shall be supported at all times by the ends of the internal fiberboard tube and kept horizontal.

5.1.3 The individual spool or roll shall be packed in a shipping container that will be acceptable for safe transportation by common carriers and shall include a packing list. The core shall be supported on ends to avoid damage to the prepreg. The container shall be of such design as to prevent damage or degradation to the prepreg during shipment.

5.1.4 The outside of each container and the inside of the roll core shall be clearly marked with the following information:

a. Title, number and revision letter of this specification, (and the PCD if required by the detail specification).
b. Date of manufacture (or date of shipment if specified by the detail specification)
c. Linear feet of acceptable prepreg
d. Purchase order number and/or sales order number (not required on roll core)
e. Supplier's name
f. Supplier's prepreg batch and spool/roll number
g. A statement (not required on roll core) to indicate that the container should not stand on end
h. All material labeling shall comply with OSHA Hazard Communication, 29 CFR 1910.1200.

5.1.5 If spools/rolls are reused, all information not applicable to the current shipment shall be removed.

5.2 Shipping Requirements:

5.2.1 The prepreg shall be packaged in a suitable cardboard box, or equivalent that has provisions internally to support the rolled core on both ends. Due to weight of the standard product length (250 meters), the box shall be strapped to a typical wooden pallet (skid) for lifting and protection. Corners of the box shall not extend beyond the pallet to prevent damage.

5.2.3 Normal ground shipment temperature not exceeding 122°F.

5.3 Receipt at Purchaser:

5.3.1 The prepreg shall be stored in a manner to prevent exposure to UV light sources in an environment 40-122°F (5-30°C) and less than a 85% relative humidity. Direct exposure to sunlight or rain shall also be avoided to prevent loss in performance.

5.3.2 If requested by the supplier and documented on the purchase order, retain the shipping container, spools, and temperature recording instruments for return to the supplier.

6. ACKNOWLEDGEMENT:

A vendor shall mention this specification number and the applicable detail specification number and their revision letters, if any, in all quotations and when acknowledging purchase orders.

7. REJECTION:

Product not conforming to this specification and the applicable detail specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES:

This section of the specifications is reserved for explanatory and other notes.

8.1 Definitions:

For definitions that are not provided in this specification or other applicable NCAMP specifications, the definitions in DOT/FAA/AR-06/10 and DOT/FAA/AR-07/3 shall apply. For definitions not provided in DOT/FAA/AR-06/10 and DOT/FAA/AR-07/3, the definitions in ASTM D3878 shall apply. For definitions not provided in ASTM D3878, the definitions in CMH-17 (formerly MIL-HDBK-17) shall apply. The document listed may or may not be used in their entirety.

9. REVISIONS

Rev	By	Date	Description
-	Rachael Andrulonis, Royal Lovingfoss, John Tomblin	11/20/2017	Initial Release.
A	Rachael Andrulonis, Royal Lovingfoss, John Tomblin	12/7/2017	• Removed Class 2 information. • Updated reviewers. • Updated material trade name. • Updated lot acceptance tests.
B	Rachael Andrulonis, Royal Lovingfoss, John Tomblin	8/3/2018	Updated to new fiber (T700) – fiber callout and PCD number.
C	Rachael Andrulonis, Royal Lovingfoss, Vinsensius Tanoto, John Tomblin	2/21/2020	• Formatting. • Renamed “TenCate” with “Toray”. • Added LM and PAEK definition on cover page and Section 1.1. • Removed T700 Fiber from the document. • Updated Cover Page from “High Toughness” to “Medium Toughness” per Toray’s product description. • Updated DSC properties in Table 1 and 2. • Replaced SBS and 0 degree Flex with 90 degree Flex in Table 3. • Removed “Toray Publications: PCD 053 Toray Advanced Composites Process Control Document, T700GC” from Section 2. • Replaced “Storage Life” with “Shelf Life”. • Replaced “ISO 9000” with “AS 9100” in Section 2. • Numbering is fixed in Section 3.4. • Replaced Material Safety Data Sheet (MSDS) to Safety Data Sheet (SDS) in Section 3.7.3. • Updated “7 years” to “10 years” in Section 4.4.3.2. • Removed consolidated laminate shipping requirements, Section 5.2.2.