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NCAMP Process Specification

Fabrication of NMS 125 Qualification, Equivalency, and Acceptance Test Panels with Automated Fiber Placement.

Prepared by: Michelle Man (NIAR), Claire Steggall-Murphy (Victrex), Kilian Nedelec (Daher), Ivain Lemoine (Daher)

Reviewed by: Vincent Tanoto (NIAR), Kalon Lasater (Victrex), Petros Karapapas (Victrex), Kilian Nedelec (Daher), Ivain Lemoine (Daher), Lauren Rezac (NCAMP AER)

REVISIONS

Rev	By	Date	Description
-	Michelle Man	07/03/2023	Initial Release
-	Michelle Man	09/23/2025	Updated Victrex branding in Section 1 and 2.1

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1 SCOPE

This process specification describes the methods of fabricating test panels using VICTREX LMPAEK (low melt polyaryletherketone) reinforced with unidirectional carbon fibers. These composite prepreg material systems are intended for use in the fabrication of aerospace structures and tooling substrate using various lay-up and consolidation techniques. Specifically, this specification covers definitions, general processing, and procedural automated fiber placement layup requirements including bagging schemes, materials, and consolidation cycles for use with out-of-oven consolidation.

This specification does not contain all the necessary information typically required in a composite process specification for the fabrication of composite structures, such as personnel qualification requirements. Users should refer to their existing company process specification for such information. DOT/FAA/AR-02/110 provides guidance for the development of composite process specifications.

1.1 Purpose

The purpose of this process specification is to provide processing information for the automated fabrication of test panels for use in material qualification, equivalency and acceptance testing. This process specification may also be used as a baseline by material users to develop a process specification for the fabrication of aerospace composite parts.

1.2 Health and Safety

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 the hazards that 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.

1.3 Abbreviations and Acronym

ACN	Advanced Change Notification
AFM	Automated Fiber Placement Machine
AFP	Automated Fiber Placement
ATL	Automated Tape Laying
FOD	Foreign Object Debris
ipm	Inches Per Minute
Lap	Overlap
MFP	Manual Fiber Placement
NCAMP	National Center for Advanced Materials Performance
NMS	NCAMP Material Specification
NPS	NCAMP Process Specification

2 APPLICABLE DOCUMENTS

The latest issue of 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

NMS 125	High Performance, Low Melt Polyaryletherketone Thermoplastics Victrex LMPAEK™
NMS 125/3	High Performance, Low Melt Polyaryletherketone Thermoplastic VICTREX LMPAEK™ UDT, Hexcel AS7 12k Unidirectional 192 gsm 34% RC

2.2 SAE and ISO Publications

AS9100	Quality Management Systems - Requirements for Aviation, Space and Defense Organizations
ISO 14644-1	Cleanrooms and associated controlled environments — Part 1: Classification of air cleanliness by particle concentration

3 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.

3.1.1 **Automated Fiber Placement Machine**: Any automated robotic machine or gantry system capable of deposition of prepreg or bindered dry fiber materials.

3.1.2 **Automated Fiber Placement**: Use of any AFM for deposition of material 2 inches wide or less.

3.1.3 **Automated Tape Laying**: Use of any AFM for deposition of material 2 inches wide or greater.

3.1.4 **Course**: Multiple tows laid up in a single, continuous AFM head movement.

3.1.5 **Manual Fiber Placement**: The placement of AFP tows or ATL tapes by hand.

3.1.6 **Slit Tape**: Unidirectional prepreg or dry fiber that has undergone the slitting process.

3.1.7 **Tape**: A single strip of prepreg or dry fiber with a width 2 inches wide or greater used in automated tape laying.

3.1.8 **Tow**: A single narrow strip of prepreg or dry fiber with a width less than 2 inches used in automated fiber placement.

3.1.9 **Controlled Environment**: Any environment in which processing of unconsolidated material occurs.

4 MATERIALS

4.1 Expendable Materials

Materials noted in this section shall be used when manufacturing NMS 125 Test Panels using automated fiber placement methods (i.e. Form 3).

4.1.1 Polyimide Film

a. THERM532250
    i. Airtech International, Inc., 5700 Skylab Road, Huntington Beach, CA 92647
    ii. Thickness: 5 mil (127µm)
    iii. Qualified for use up to 800°F (426°C) or above.
b. THERM260255
    i. Airtech Europe SARL, 18, ZI Haneboesch, L-4562 Differdange, Luxembourg
    ii. Thickness: 2 mil (50µm)
    iii. Width: 60’ (1.56m)
c. THERM260340
    i. Airtech International, Inc., 5700 Skylab Road, Huntington Beach, CA 92647
    ii. Thickness: 2 mil (50µm)
    iii. Release Coated on Both Sides (RCBS)
    iv. Qualified for use up to 800°F (426°C) or above.
d. THERM2850255RCBS
    i. Airtech International, Inc., 5700 Skylab Road, Huntington Beach, CA 92647
    ii. Thickness: 2 mil (50µm)
    iii. Release Coated on Both Sides (RCBS)
    iv. Qualified for use up to 761°F (405°C) or above.
e. Upilex – S
    i. Ube Corp, Seavans North Building,1- 2-1, Shibaura, Minato-ku, Tokyo 105-8449, Japan
    ii. Thickness 25µm
    iii. Width: 350mm

4.1.2 Heavy Fiberglass Breather/Drainage Mattress/Drainage Fabric

a. Hexcel 7500
    i. Hexcel, 1913 North King Street, Senguin, Texas 78155
b. Hexcel 7628
c. Hexcel 2165 Z6040

4.1.3 High Temperature Fiberglass Mat for Contour Wedge

a. UHT800
    i. Airtech International, Inc., 5700 Skylab Road, Huntington Beach, CA 92647
    ii. Airtech Europe SARL, 18, ZI Haneboesch, L-4562 Differdange, Luxembourg
b. UHT450

4.1.4 Sealant Tape

a. SM5160
    i. Solvay Cytec AERIVAC North America, 955-10 National Parkway Schaumburg, IL 60173
b. A800-3G
    i. Airtech International, Inc., 5700 Skylab Road, Huntington Beach, CA 92647
c. GS800
    i. Airtech Europe SARL, 18, ZI Haneboesch, L-4562 Differdange, Luxembourg

4.1.5 Pressure (Caul) Plates

a. Steel
    i. Thickness 10 gauge (0.1345 $\pm$0.01 inches)
    ii. Open source
    iii. Flat (32-64 Ra)
    iv. Smooth (0.01 inch to the design surface)
b. Titanium
    i. Thickness 0.019 in (0.5mm)
    ii. Open source
    iii. Roughness 32 -64 Ra

4.1.6 Consolidation Tooling Material (Mold)

a. Steel
    i. Open source
    ii. Minimum 0.5 inches thick
    iii. Flat (32-64 Ra)
    iv. Smooth (0.01 inch to the design surface)

5 EQUIPMENT REQUIREMENTS

5.1 Automated Fiber Placement Machine (AFM)

Automated fiber placement and automated tape laying machines may be used. For this qualification the machine used for lay-up is an 8 fiber Coriolis C1.

5.1.1 AFM environment meets the controlled environment requirements (6.1)

5.1.2 AFP and ATL unconsolidated material maintain handling and process requirements (6.2 and 7.1.1) throughout layup and fabrication

5.1.3 AFM is capable of maintaining ply orientation and layup requirements (6.4)

5.1.4 Machine Maintenance and Control

5.1.4.1 Preventative Maintenance (PM)

The schedule below is based on a 3-shift schedule. Scheduled maintenance intervals may be adjusted for less machine usage. The items below should be performed in accordance with the most recent maintenance manual provided by the equipment manufacturer and only by trained personnel.

Additional annual (or a predetermined period) maintenance of the machine as required by the manufacturer may be necessary to maintain optimal operating conditions. A complete inspection and replacement of parts (as needed or on intervals) may be done at this time. Consult the equipment manufacturer to ensure any necessary updates and maintenance in completed.

Hereunder the preventive maintenance being executed on the AFP machine:

PM	Every Day	Every Monday	Every Friday	Once a month
Check deposition head	**X**			
Creel check		**X**		
Working Ventilation		**X**		
Laser coolant level		**X**		
No laser passthrough/leaks		**X**		
Cleaning			**X**	
Run a calibration program				**X**

5.1.4.2 Modifications or Repairs to Major Sub-Systems

Major sub-systems are defined as those only to be modified, repaired, or replaced by the equipment manufacturer. Such actions must be performed by the equipment manufacturer according to their internal specifications or requirements.

5.1.4.3 Maintenance Record

A maintenance record of all PM and changes to major sub-systems must be kept. The record shall include the completed line item, date of completion, and initials of any personnel that worked on the item.

5.1.5 Software Control

Specific software versions utilized for the qualification of the material will be controlled for that material. Any version changes to software used in this process shall include a change log by the software provider and shall be approved via ACN through NCAMP.

5.2 Consolidation Equipment

Autoclave or oven consolidation equipment capable of maintaining the consolidation cycle requirements (Section 7.10) shall be used.

5.3 Laser Projection Equipment

Laser projection equipment utilized for the purpose of prepreg placement and ply or panel cutting may be used provided ply orientation and layup requirements (6.4) are maintained.

5.4 Ultrasonic Cutting Equipment

Ultrasonic cutting equipment may be used provided defect requirements (6.3) and ply orientation and layup requirements (6.4) are maintained.

5.5 Thermal Analysis Equipment

Thermal cameras, thermocouple wires and temperature recording devices shall be calibrated according to NIST specification if one exists, otherwise the equipment shall be calibrated to manufacturer specifications.

The thermocouples weld point is visually inspected, and the thermocouples are tested before use.

5.6 Miscellaneous Equipment

Any miscellaneous equipment utilized in the fabrication of NMS 125 test panels that are not included in Section 5 shall not break the fulfillment of any requirements herein.

6 PROCESS AND PRODUCT REQUIREMENTS

6.1 Controlled Environment Requirements

Controlled Contamination Area (CCM) has an ISO Cleanroom Classification of 8. The temperature is set to 20.5°C with a range from 18-24°C. Humidity is set to 45% with a range of 30-55%.

6.2 Material Handling Requirements

6.2.1 Material Storage

Prepreg material shall be stored according to specifics in the detail specification.

6.3 Defect Requirements

The classification, determination and disposition requirements of defects that may occur throughout the automated manufacturing of laminates in the following sections shall be followed.

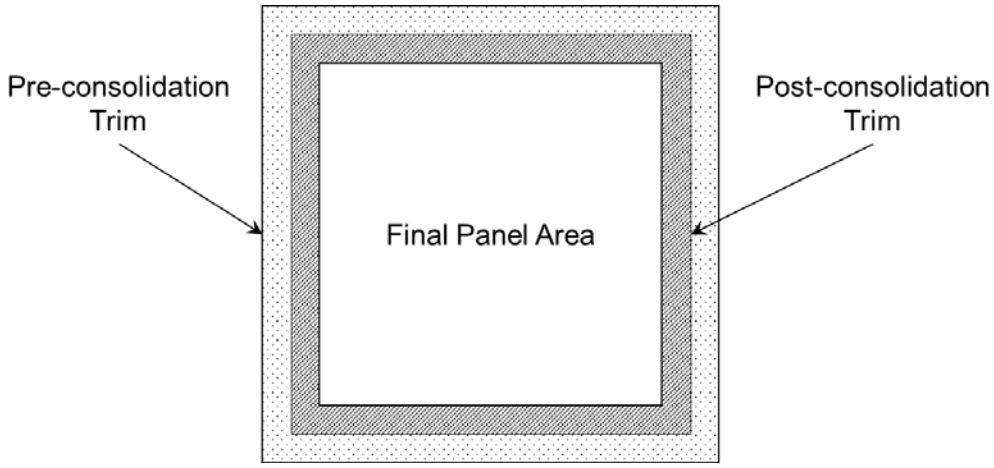


Figure 6.1 – Panel or Ply Area Definitions

6.3.1 Defects

The following defects shall be determined per 6.3.2 and rectified per 6.3.3. Records of all defects that occur, their location relative to the reference edge, and their disposition or corrective action shall be maintained. Defects that occur within the pre-consolidation trim area of a panel need not be corrected. Material defects must meet the requirements of the applicable material specification or purchasing agreement. Areas marked by the material manufacturer as defective must not be used.

6.3.1.1 Gap: space between adjacent tows or courses. Gaps are allowable defects provided:

a. Gaps are smaller or equal to 0.04 inches
b. Gaps of the same direction are not aligned through the laminates thickness in any of the previous or subsequent four consecutive plies of the same orientation.

c. No more than six gaps are within a one-foot section of a ply transverse to the ply orientation.
d. Ply orientation requirements are within specification (6.4)

6.3.1.2 Overlap (Lap): a tow that overlays an adjacent tow or course. Laps are allowable defects provided:

a. Laps are smaller or equal to 0.04 inches
b. Laps of the same direction are not aligned through the laminates thickness in any of the previous or subsequent four plies of the same orientation.
c. No more than six laps are within a one-foot section of a ply transverse to the ply orientation.
d. Ply orientation requirements are within specification (6.4)

6.3.1.3 Twisted Tow: a tow that completes half or more turns along its length. Corrective action must occur.

6.3.1.4 Folded Tow: a tow that bends and doubles onto or under itself along its length. Corrective action must occur.

6.3.1.5 Pucker/Blister: out of plane deformation traverse to the tow direction. Corrective action must occur.

6.3.1.6 Missing Tow: nonexistent or omitted tow in programmed tow position. Corrective action must occur.

6.3.1.7 Loose Tow: a tow that is not properly adhered to the previous ply. Corrective action must occur.

6.3.1.8 Position Error: a tow that starts or ends within the final panel area. Corrective action must occur.

6.3.1.9 Foreign Object Debris: any material on or between plies that is not in accordance with Sections 4 or 7.7 (i.e. fuzz ball or backing material). Corrective action must occur.

6.3.1.10 Splice: two tows joined along their length via an overlap. Corrective action must occur.

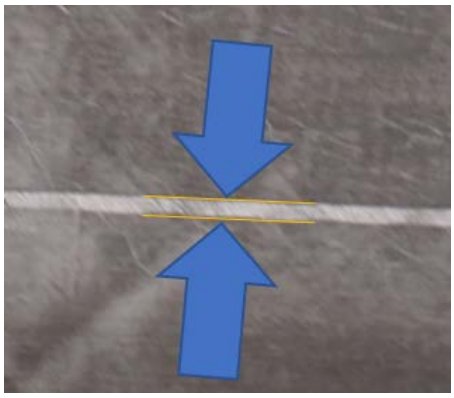
6.3.2 Determination of Defect

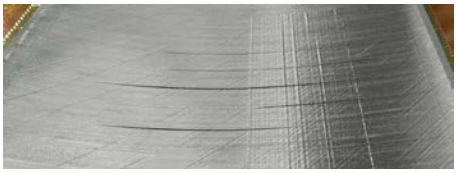
List of defects:

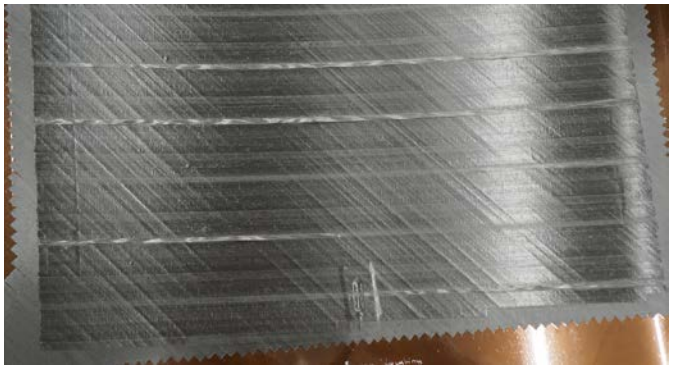
a. Gaps
b. Overlaps
c. Position Errors
d. Twisted Tow
e. Folded Tow
f. Pucker/Blister
g. Missing Tow
h. Loose Tow
i. Tow Splice
j. Dry fibers

Every ply shall be visually inspected. If a defect mentioned above is detected a picture of the ply shall be taken and fiber(s) may be repaired/corrected.

6.3.3 Representative Examples of Defects

Defect	Example
Gaps	
Overlaps	
Position Errors on feeding	
Twisted Tow (Tow Deviation)	

Folded Tow	
Pucker/Blister (excess laser heat)	
Missing Tow (half fiber/full fiber)	 
Loose Tow (lack of adhesion)	
Tow Splice	

Dry Fibers	

6.3.4 Rectification (Corrective Action) of Defects

Corrective action of defects must not cause visible damage to the tow or tape being corrected, previous plies, or surrounding tows/tapes. Visible damage is defined in 6.3.5.

6.3.4.1 Gap

Adjacent tows or tapes that produce gaps not within 6.3.1.1 shall be removed manually and replaced by AFP/ATL.

6.3.4.2 Overlap (Lap)

Adjacent tows or tapes that produce laps not within 6.3.1.2 shall be removed manually and replaced by AFP/ATL.

6.3.4.3 Twisted Tow

Twisted tows or tapes shall be removed manually and replaced by AFP/ATL.

6.3.4.4 Folded Tow

Folded tows or tapes shall be removed manually and replaced by AFP/ATL.

6.3.4.5 Pucker/Blister

Tows or tapes containing puckers or blisters shall be removed manually and replaced by AFP/ATL.

6.3.4.6 Missing Tow

Missing tows or tapes shall be placed by AFP/ATL.

6.3.4.7 Loose Tow

Loose tows or tapes shall be either removed manually and replaced by AFP/ATL or manually adhered to the previous ply.

6.3.4.8 Position Error

Tows or tapes with position errors shall be removed manually and replaced by AFP/ATL.

6.3.4.9 Foreign Object Debris (FOD)

FOD shall be removed by manual or automated means.

6.3.4.10 Splice

Tows or tapes with a splice must be removed manually and replaced by AFP/ATL.

6.3.5 Visible Damage

Visible damage because of corrective action of defects is characterized by the defects listed in 6.3.1 and as the following:

6.3.5.1 Fiber Separation / Pull

Loose fibers lifted and pulled from the previous or surrounding prepreg.

6.4 Ply Orientation Requirements

The fiber orientation of a panel or part shall be inspected to ensure it has been laid out correctly and is within ±3°. This may be inspected visually or may be part of an automated process. When using an automated process to maintain alignment, the feature/component on the machine that monitors this measurement shall be calibrated and inspected as any other measuring tool to ensure proper functionality.

In material qualification and equivalency programs, for panel identification purpose, place a label on the outermost layup ply within ½-inch from the panel edge with the following information: “0º direction →, Test Plan Document Number -Prepreg ID - Material Code - Fabricator ID - Test Type - Batch ID - Consolidation Cycle ID -Test Panel ID.” Make sure that the “0º direction →” marking is near to the reference edge and points in the 0º direction or warp direction. The appendix of the test plan contains the panel identification information.

7 PROCEDURE

7.1 Setup

7.1.1 Material Control and Traceability

Install VICTREX LMPAEK™ unidirectional carbon fiber tape material on the AFM per equipment manufacturers training.

Qualified material shall have passed the receiving inspection tests. Material must be within the storage/handling/shelf life requirements. For traceability, roll or spool numbers and applicable prepreg batch/lot/expiration date shall be recorded on every panel's corresponding manufacturing instructions.

7.1.2 Layup Tool Preparation

Demolding agents shall not be used. A non-contaminating thermalimide film shall be placed and secured on the tool with vacuum or suitable tape. The film shall be secured to the tooling to ensure that no creases or wrinkles form when the first ply of prepreg is applied. The unconsolidated panel shall be transferred to a prepped tool per 7.4.

7.1.3 AFM Programming Procedures

Programming shall be completed by trained personnel only utilizing applicable parameter values. Program traceability must be recorded according to internal traceability traveler sheets. The following procedure includes steps that are important for traceability and may not include intermediate steps that are required to complete every program.

The main programming information are:

- 1st ply feed/lay/cut speed
- Subsequent plies feed/lay/cut speed
- Roller compaction force
- Short fiber length
- Ply stagger
- Tape gap

7.1.3.1 Setup (in modelling software)

a. Import appropriate layup surface corresponding to the planned layup tool.
b. Create ply boundaries with dimensions according the test plan.
c. Ensure correct machine configuration and heater is selected.
d. Use an appropriate material thickness to ensure proper contact with the tool and subsequent plies (typical value is measured prepreg ply thickness $\pm$30%)

7.1.3.2 Laminate Program

a. A single sequence or program entity must be used for every required ply and must be created in order. For example, a laminate requires 24 plies so 24 unique program entities in the correct order must be created to avoid traceability issues with running a ply multiple times or non-sequentially.

b. Set ply directions according to the test plan.
c. Create plies offset from the tool according to the material thickness.
d. Blanket (oversized) plies may be programmed for tool adhesion purposes according to trained personnel judgment.
e. Layup speed and compaction shall be set within the operating ranges defined in 7.3.3 and 7.3.4.

7.1.3.3 Course and Tow/Tape Strategies

a. Stagger between the centerline of each course (often called ply stagger) must be 20%-45% of the tow/tape width to maintain 6.3.1.1 and 6.3.1.2.
b. Guide curves shall be linear (no steering) for flat laminates.
c. Nominal tape gap programmed is 0.02 in (0.5 mm).

7.1.3.4 Export

a. Produce, post process, and export the program with an identifiable name or the file name required by the applicable test plan or traceability traveler sheet if a name exists.
b. The exported program must be transferred to the corresponding operator station and placed in a recorded file location.

7.1.3.5 Simulation

a. Each ply and course must be simulated and checked for errors, warnings, and machine collisions. Warnings must be recorded in the export log and errors must be resolved prior to final export.

7.2 Equipment Calibration

Perform calibration of the AFM according to the equipment manufacturers recommended procedures to ensure that the machine is capable of maintaining required ply orientation, tow placement, course gap, and roller compaction tolerances.

7.3 Layup

7.3.1 Temperature

Nominal temperatures produced on NMS 125 prepreg during automated layup is 600-800°F. Heater power may be varied to produce varying temperature throughout the layup depending on part geometry, tack/melt, and defect avoidance.

7.3.2 Head Temperature

Head temperature shall be set safely above ambient dew temperature resulting in no visible moisture condensation on or in the head of an AFM.

7.3.3 Roller Compaction

Nominal compaction force of NMS 125 material is 112 lbf (500 N). Resulting compaction pressure may be varied throughout the layup depending on part geometry, tack/melt, and defect avoidance.

The maximum force exerted on the material shall not exceed 270 lbf (1200 N) and shall not cause visible resin squeeze (flow) out, fiber/tow distortion, spread, or waviness of the material.

7.3.4 Layup Speed

Layup speed must not exceed speed at which the heating system achieves max power output to avoid current overdraw or heat shutdown during a layup. Layup speed must be monitored congruently with layup temperature to ensure all applicable ranges are achieved.

7.3.4.1 First Ply

Nominal first ply feed/lay/cut speed of NMS 125 material is 235.8 ipm(0.1 m/s)/235.8 ipm(0.1 m/s)/235.8 ipm(0.1 m/s) respectively. First ply speed may exceed this range provided prior trials on the same program (panel dimensions and stacking sequence) display no adhesion issues or panel lift off on the tool. Layup speed may be varied throughout the first ply depending on part geometry, tack/melt, and defect avoidance.

7.3.4.2 Subsequent Plies

Subsequent (non-first ply) feed/lay/cut speed may be any value and may be varied throughout the layup dependent on part geometry, tack/melt, and defect avoidance.

7.4 Unconsolidated Panel Transfer

Unconsolidated panels may be removed from the layup tool and transferred to a curing tool provided there are no defects per 6.3. The panel must be supported during transferring to ensure no bending, folding, or creasing occurs. Unconsolidated parts may be transported to a consolidation facility using any suitable means. Care shall be taken to ensure that the panels do not deform (during the transport process) and is not contaminated by any foreign object debris that would alter the quality of the panels.

7.5 Unconsolidated Panel Cutting Procedures

Unconsolidated panels, subpanels, or individual plies and tows may be cut using an ultrasonic cutter, blade/scissors, or other non-contaminating cutting device provided no defects defined per 6.3 occur. Cutting must maintain reference edge and ply orientation (6.4) requirements. Single or multiple cutting passes can be used based on operator judgement. Ultrasonic cutting shall be done according to equipment training and operation manual.

7.6 Thermocouples

A minimum of two thermocouple wires should be used to monitor and record the panel temperature of each consolidation cycle run. One method is to place the thermocouple junctions at the laminate mid-plane and near the edge of the laminate where they will be trimmed off after the panels have been consolidated. An alternative method is to place the thermocouple junctions on the part about 0.25-0.50 inch away from the edge.

7.7 Bagging

Figure 7.1 shows the bagging arrangement that will be used for the manufacture of mechanical test panels.

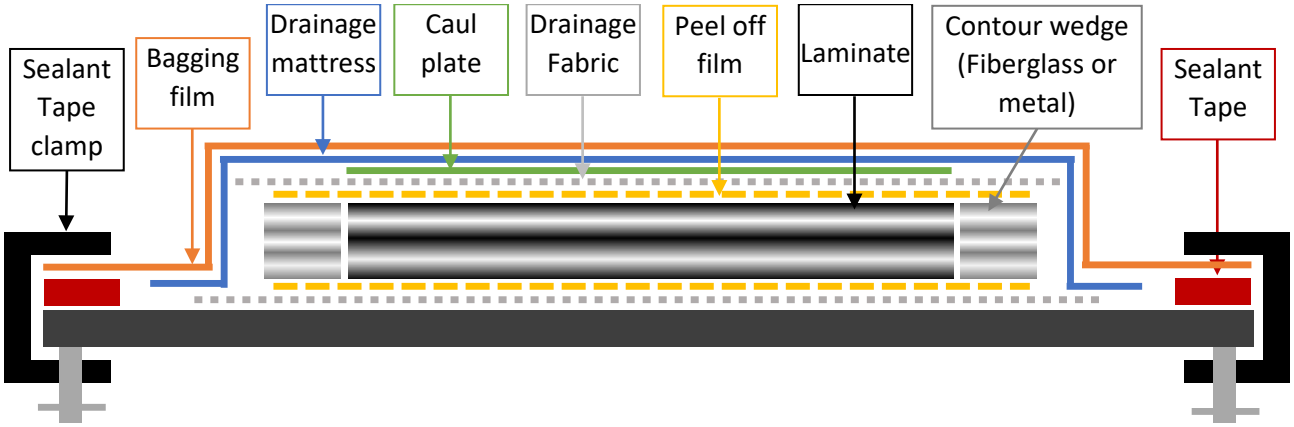


Figure 7.1 - Bagging Technique for NMS 125 AFM materials

7.8 Vacuum Leak Check

Apply a minimum vacuum of 28 inHg (950mBar) (or within 2 inHg (68mBar) of the local atmospheric pressure) and hold the layup under vacuum for a minimum of 5 minutes. Isolate the system by closing the vacuum source valve. Perform leak check by taking an initial reading after 5 minutes of isolation and then take a final reading after an additional 5 minutes. The difference between the two readings is the leak rate. The vacuum must not fall more than 2 inHg (68mBar) in 5 minutes. If this rate is exceeded, repair the leak and recheck the leak rate.

7.9 Storage and Transportation of Bagged Assemblies Prior to Consolidation

It is preferable to avoid any major transportation of the bagged assembly before consolidation. Panel bagging must be done as close as possible to the consolidation area. If transportation is needed, a forklift may be used to elevate the consolidation tool and transport it with reduced speed.

7.10 Consolidation Cycle

7.10.1 Baseline Oven Consolidation Cycle (C)

The baseline consolidation cycle must be in accordance with the following process. For the purpose of specimen naming, this consolidation cycle is designated as “C.” The material qualification panels are processed in accordance with the baseline consolidation cycle.

Check each vacuum bag assembly for leak before beginning the consolidation cycle per 7.8. All temperatures are panel temperatures based on the lagging thermocouple. The vacuum and temperatures shall be recorded at 5-minute intervals maximum.

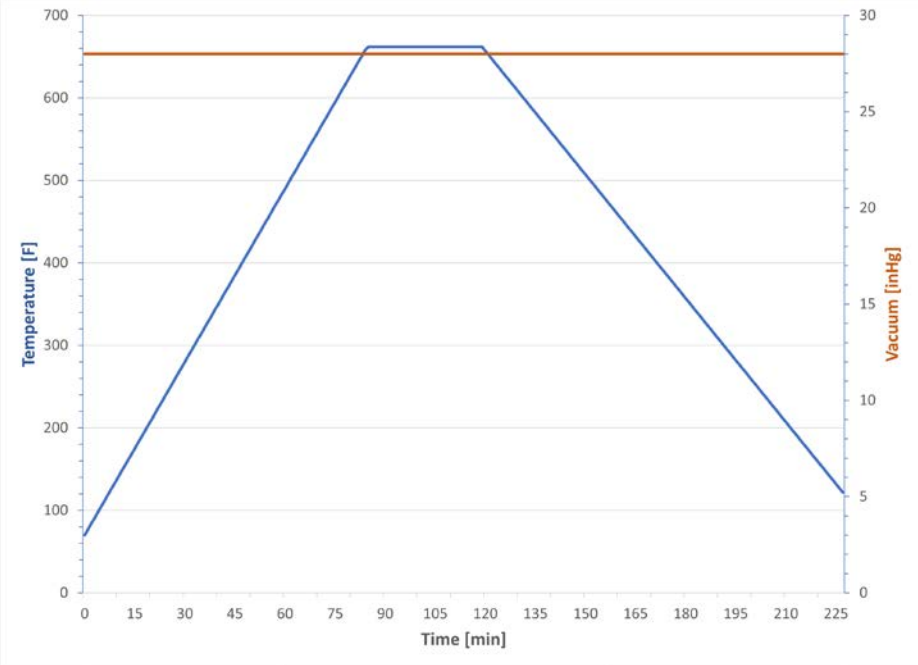


Figure 7.2 Consolidation Cycle

a. Check each vacuum bag assembly for leak before beginning the consolidation cycle per 7.8.
b. Apply an oven temperature ramp to 662 ± 10 °F (350±5 °C) at rate of 5-9 °F/min (3-5 °C/min)
c. Once laminate temperature reaches 662 ± 10 °F (350±5 °C) maintain the oven temperature for 20 to 35 minutes.
d. Cool the oven to 122°F (50 °C) or lower at a maximum rate of 9 °F/min (5 °C/min) before venting the vacuum.
e. Remove the bagged panels from the oven and de-bag for inspection.

8 QUALITY ASSURANCE

8.1 Process Control

In-process monitoring data such as nip-point temperature (heating rate, dwell, cooling rate, etc.), pressure readings through the consolidation cycle should be in accordance with user's applicable company process specification or an approved shop practice. For material qualification and equivalency purposes, the in-process monitoring data should be provided to the appropriate organizations in accordance with the applicable test plan. Process control testing is not required for the fabrication of test panels.

8.2 Ultrasonic Non-Destructive Inspection

Panel fabricator need not perform ultrasonic non-destructive inspection on the test panels. For material qualification and equivalency purposes, the panels may be ultrasonically inspected by the testing lab in accordance with the applicable test plan.

8.3 Visual Inspection

Demold the part and verify that there are no obvious defects such as warpage or dry spots. Panels for material qualification and equivalency purposes should be labeled in accordance with the applicable test plan for identification purposes.

9 SHIPPING

For material qualification and equivalency purposes, it may be necessary to send the panels to a designated test lab. The panel shipping instruction is typically included in the applicable test plan.