

## INSTRUCTION GUIDE FOR NCAMP 168-10 REQUEST FOR INSPECTION VERIFICATION

### PURPOSE

This form should be submitted to an NCAMP AIR under the following circumstances:

1. By an NCAMP AER or NCAMP for the purpose of obtaining inspection verification on test panels created for a material qualification and/or equivalency program utilizing a material which could be used on an aircraft.
2. By an NCAMP AER or NCAMP for the purpose of obtaining inspection verification on test specimens in a material qualification and/or equivalency program which could be utilized on an aircraft.

### INSTRUCTIONS

1. Project No.: Enter the NCAMP project number for the project.
2. Date: Enter the date the form is being filled out.
3. Check the applicable boxes: Test Panels/Test Specimens/Other (specify)
4. Company Name: Enter the name of the supplier, vendor, or test firm where the desired inspection will occur.
5. Address: Enter the physical address of the company named above. A post office box is not acceptable.
6. Contact Person: Enter the name, title (if known), telephone number, and email of the person to contact at either the company or test laboratory to arrange the inspection.
7. NCAMP Project Manager: Enter the name and telephone number of the NCAMP project manager.
8. NCAMP Project Engineer: Enter the name and telephone number of the NCAMP project specialist involved in the pending test.
9. The name of the authorized engineering representative (AER) designated to disposition unsatisfactory conditions found during inspection verification.
10. The name of the authorized inspection representative requested by the company or test laboratory.
11. NOTE: Enter "Please return a copy this request along with the completed NCAMP Form 168-1 to the NCAMP Project Engineer" along with any other instruction.
12. Inspection Verification Instructions: Copy and paste either one of the following set of instructions, depending on the purpose.

For the purpose of lamina and laminate test panel inspection verification, use the following guidance and checklist:

### **Guidance**

- i. The checklist below pertains to Polymer Matrix Composite (PMC) test panels fabricated in accordance with the governing process specification. It is understood that for PMC panels to perform as intended, item n. below is very important. It is further understood that to have the NCAMP AIR physically witness the fabrication of all panels would take more time and resource than are available. In order to alleviate this, it is expected that the NCAMP AIR will check to see that the ply stacking sequence on the planning match the test plan and that the job has been bought off by QA and/or Engineering. In addition, the NCAMP AIR should witness selected fabrication processes of representative panels at a frequency of his/her discretion.
- ii. It is not the intent of these instructions to limit the NCAMP AIR in performing the inspections he/she feels are necessary.
- iii. Where multiple panels are being processed through the same facility in a short period of time it is recognized that some steps could be validated one time and not for each panel.

### **Checklist**

Replace the text in square parenthesis [ ] below with pertinent information.

- a. This inspection will be in accordance with test plan [DOCUMENT DESIGNATION, NAME, REVISION AND DATE] or later NCAMP-approved revision, material specification [DOCUMENT DESIGNATION, NAME, REVISION AND DATE] or later NCAMP-approved revision, and process specification [DOCUMENT DESIGNATION, NAME, REVISION AND DATE] or later NCAMP-approved revision. Appendix 2 of the test plan provides the panel names, stacking sequences, and panel sizes. Some deviations in panel names are allowed to accurately reflect the actual fabrication process used (for example, cure cycle numbers may have C1, C2, C3, C4, etc.)
- b. Verify Controlled Contamination areas is in accordance with governing specification
- c. Verify personnel qualification as applicable.
- d. Verify that the measuring instruments such as temperature, pressure, and vacuum transducers are calibrated. These instruments may be located on larger equipment such as an autoclave or oven.
- e. Verify material used to build panel matches that identified in approved test plan and that there is traceability of material to panel
- f. Check to see that all required tests have been done for each batch of prepreg material used and that results are within acceptance spec limits
- g. Check to see that the certificate of conformance from the vendor shows the material lot/batch number(s) that match those in the prepreg roll(s).
- h. Check to see that temperature recorders (on material storage freezers) are maintained per governing specification
- i. Check to see that all materials used are within their storage temperature and out time limits (if available).

- j. Check to see that frozen materials are protected in sealed bags, have followed specified handling procedures to avoid condensation before use, and that the bags are resealed and water tight before refreezing.
- k. Verify that the tool used matches that required to produce the part specified in the test plan. All the tools should be flat except for interlaminar tension test per ASTM D6415 which requires a curved tool.
- l. Verify that the tool surface quality is acceptable (i.e. smooth and able to hold vacuum)
- m. Verify that thermocouple placement is in accordance with the governing process specification guidelines
- n. Review plan for ply lay up and orientation and verify operations completed satisfactorily and accepted by their internal Quality Assurance and/or Engineering. If not verified satisfactorily, please verify by yourself as follows: Verify that ply orientation, lay-up, and stacking sequence are per test plan (on representative panels only because it may be too time consuming to inspect every panel). Note that ply orientation may not be easily inspected after the panels have been cured. Panels that are warped may have wrong/unsymmetrical layup.
- o. Verify that vacuum bagging meets the requirements of the governing process specification and verify operations completed satisfactorily and accepted by Quality Assurance and/or Engineering.
- p. Verify Cure Time/Temperature/Pressure meet the governing process specification requirements
- q. Verify that the panels for each batch were cured in a minimum of two separate cure cycles
- r. Verify inspection requirements called for in the governing process specification and test plan have been accomplished satisfactorily
- s. Inspect the panels to verify panels meets the test plan dimensional and naming requirements specified in Appendix 2 of the test plan. Minor deviations from the test plan, particularly the codes for panel, cure cycle, and batch numbers, may be intentional in order to accurately define the actual numbers used in the fabrication process.
- t. Review and verify Quality Assurance and/or Engineering has accepted the panels
- u. Review any MRA/MRB documents for engineering acceptance, including NCAMP AER concurrence when necessary.

For the purpose of lamina and laminate test specimen inspection verification, use the following Guidance and Checklist:

### **Guidance**

- i. The checklist below pertains to Polymer Matrix Composite (PMC) test specimens in accordance with the governing test plan.
- ii. For specimen inspection verification, it is understood that for the specimens to perform as intended, item c below is very important. It is further understood that to have the NCAMP AIR physically measure all specimen dimensions would take more time and resource than are available. In order to alleviate this, it is expected that the NCAMP AIR will check to see that the specimen dimensions on planning match the test plan and that the job has been bought off by QA and/or Engineering. In addition, the NCAMP AIR should physically measure selected dimensions of representative specimens at a frequency of his/her discretion.

iii. It is not the intent of these instructions to limit the NCAMP AIR in performing the inspections he/she feels are necessary.

### **Checklist**

Replace the text in square parenthesis [ ] below with pertinent information.

- a. This inspection will be in accordance with test plan [DOCUMENT DESIGNATION, NAME, REVISION AND DATE] or later NCAMP-approved revision, material specification [DOCUMENT DESIGNATION, NAME, REVISION AND DATE] or later NCAMP-approved revision, and process specification [DOCUMENT DESIGNATION, NAME, REVISION AND DATE] or later NCAMP-approved revision. Appendix 2 of the test plan provides the panel names, stacking sequences, and panel sizes. Some deviations in panel names are allowed to accurately reflect the actual fabrication process used (for example, cure cycle numbers may have C1, C2, C3, C4, etc.)
- b. Verify that NCAMP 168-1 Inspection Verification Record was received for the panel fabrication process
- c. For test specimen inspection verification, verify that the specimen dimensions are in accordance with the drawings in the test plan (or the test methods called out by the test plan). At minimum, QA must have inspected at least one specimen per panel per test method for all the dimensions specified in the drawing such as perpendicularity, parallelism, hole size and location, etc. (this assumes that all the specimens are processed at the same time using the same jig setup and technician). In addition, NCAMP AIR should physically measure selected dimensions of representative specimens at a frequency of his/her discretion.
- d. When specimen dimensions fail to meet one or more of the drawing requirements, review any MRA/MRB documents for engineering acceptance, including NCAMP AER concurrence when necessary.