INSTRUCTION GUIDE FOR NCAMP FORM 289-3 ENGINEERING ACCEPTANCE

The purposes of NCAMP FORM 289-3:

1. FORM 289-3 should be submitted by an AER to NCAMP for engineering documentation.

2. Documenting the AER's feedback of NCAMP documents such as material property report, material specification, process specification, test plans etc., for the associated NCAMP program.
   - Recommending acceptance – AERs have no authority to accept test plans; AER has the authority to recommend acceptance of test plans.
   - Accepting – AERs have the delegation to accept material property reports, material specification and process specification.
   - Rejecting – AERs have the delegation to reject material property reports, material specification and process specification.

3. Documenting that the designated AER has witnessed the material testing, accepted or rejected the witnessed data for the associated NCAMP program. A list of the witnessed specimens must be listed in FORM 289-3.
   - Recommending acceptance – Not applicable for test witnessing related activities.
   - Accepting – AERs have the delegation authority to accept test witnessing, test data, etc.
   - Rejecting – AERs have the delegation to reject test witnessing, test data, etc.

   Prior to any testing activity, the AER must verify the following but not limited to:
   a. All the panels and specimens have been inspected by the designated NCAMP AIR, this inspection record is documented in Inspection Verification Record NCAMP Form 168-1 paperwork. Panels and specimens with unsatisfied characteristics listed in Form 168-1 will require engineering disposition by the designated NCAMP AER. This will also be documented in the same Inspection Verification Record NCAMP Form 168-1 paperwork, an engineering judgement must be included in some cases.
   b. Appropriate equipment and test fixtures are used in the testing activity per the test plan.
   c. The measuring instruments such as load cell, extensometer, thermocouple etc. have certified calibrations that are current and valid within the range of interest.
   d. For testing with strain gages: the strain gage indicator(s) is(are) calibrated using an NIST-traceable calibrator that is current and valid within the range of interest (note: internal shunt calibration alone is inadequate). Since strain gage indicator settings can be altered easily, this verification must be performed for every test setup with the correct strain gage factor.
   e. For "ETW/WET" specimens: the moisture equilibrium criterion has been met as specified in the test plan.
   f. For cold and elevated test temperatures: specimens are tested with the ramp-up and soak time per the test plan and thermocouples are placed on the surface of the specimens.
   g. For specimens with fasteners: the type of fastener, fastener torque, and installation procedure are in accordance with the test plan. The torque wrench(es) should be calibrated with traceable calibration.

h. For modulus measurements: load cell, extensometer, and strain gage calibration range encompasses the range of interest. Typically, tensile/compressive modulus range is 1,000 – 3,000 microstrain and in-plane shear modulus range is 2,000 – 6,000 microstrain.
i. For strength measurements: load cell is calibrated with traceable calibration. One exception to this requirement is Poisson's ratio measurements where transverse strain range may be below the calibrated range.
j. For certain tests that require an alignment verification check such as ASTM D3039: the alignment must be verified within 30 days from the test witnessing events. Alignment must be verified whenever the grips are removed or reinstalled. Verifying the system alignment prior to test will be necessary in some cases.
   Note: most mechanical grips with universal joints will not be able to meet system alignment requirement. Grips with fixed joints are typically required to meet the system alignment requirement. The mating surfaces of the fixed joints must be clean, free of oil, and secure to maintain the origin state of the alignment after testing each specimen.
k. For certain tests that require a platens parallelism verification such as ASTM D695 and ASTM D6641: platens parallelism must be verified within 30 days from the test witnessing event. Platens must be verified whenever they are removed or reinstalled. Verifying the system alignment prior to testing will be necessary in some cases. The loading surfaces must be clean, free of oil, and secure to maintain the origin state of the parallelism after testing each specimen.
l. Review specimen failure modes, graphs (load vs. strain, load vs. displacement, etc.) as to ensure failure modes are acceptable and documented by the testing facility per the associated test standards listed in the test plan. In any circumstances that unacceptable failure modes are observed on the witness specimen, NCAMP AER should witness the next specimen until acceptable failure modes are observed.
   A data point with an unacceptable failure mode should never be reported. NCAMP AER may choose to accept the data point with unacceptable failure modes with an engineering explanation, which needs to be well documented in Form 289-3. However the final decision will be made by NCAMP after reviewing the provided documentation.
   For example: ABC-RTD-1 Compression specimen was tested at RTD with D6641 test method using 50 in-lbs of torque and slight (very minimal) end crush was visible on one of the loading ends but the primary failure mode was at the gage section. To ensure the validity and acceptability of ABC-RTD-1 strength, ABC-RTD-2 was also witnessed with a higher torque value. Both strengths are found to be comparable so ABC-RTD-1 strength is acceptable.
m. AER may elect to witness more specimens and this is at the sole discretion of the AER.
n. Low and high data points with acceptable failure modes cannot be discarded without probable cause and AER/NCAMP's approval.

Test Witnessing Frequency:

AERs are required to witness the testing of at least one specimen per test property, per test condition, per test program.

For example: 1 specimen out of 18 Longitudinal Tension D3039 specimens at ETD condition of ABC AS4 Unitape Test Plan is to be witnessed by the NCAMP AER. This scenario is applicable if all of the 18 Longitudinal Tension D3039 specimens from all batches and cures for the specific test property and

condition are ready for testing at the same time and to be tested on the same load frame continuously without any interruption to the test setup. These interruptions may include calibration, replacing grips, test fixtures, load cell etc. If there is any interruption while testing the specimens, another test witnessing will be required as the test setup has changed.

Frequently Asked Questions (FAQ):

1. Question: The AER just witnessed a Longitudinal Tension D3039 ETD specimen. Does the AER need to witness a Transverse Tension D3039 ETD specimen even though both properties are tested same load frame per D3039?

   Answer: YES

2. Question: The AER just witnessed Longitudinal Tension D3039 ETD specimen for AS4 Fiber/123 resin. Does the AER also need to witness Longitudinal Tension D3039 ETD specimen for IM7 Fiber/123 resin even though all specimens from both materials will be tested at the same time on the same load frame?

   Answer: YES

3. Question: The testing facility is testing Longitudinal Tension D3039 ETD specimens per batch as the material and specimens become available for testing. There will be 3 testing occurrences to test 3 batches per the test plan with a few months gap between batches. Do I need to witness this testing for each occurrence (per batch)?

   Answer: YES

4. Question: The testing facility is testing 18 specimens (3x2x3 test matrix) of Longitudinal Tension D3039 ETD condition with 2 load frames. Do I need to witness the testing on both load frames?

   Answer: YES

5. Question: The testing facility is testing 18 specimens (3x2x3 test matrix) of Longitudinal Tension D3039 ETD condition on the same load frame but the testing is interrupted and stopped before all of the specimens are tested for load cell calibration. Does the AER need to witness the testing again after load cell calibration is complete even though it is still the same load frame?

   Answer: YES

6. Question: The testing facility tested 18 specimens (3x2x3 test matrix) of Longitudinal Tension D3039 ETD condition a few months ago but anomalies with the data were found and the testing facility decided to test extra specimens. Does the AER need to witness the testing of the extra specimens?

   Answer: YES

7. Question: The testing facility tested the first Longitudinal Tension D3039 ETD specimen and it maxed out the load frame. The testing is now moved to larger load frame. Does AER need to witness the testing with a larger load frame?

   Answer: YES

8. Question: Is it possible have multiple to NCAMP AERs for test witnessing in the same program?

   Answer: YES, however it will be at risk and is not recommended since NCAMP AERs may make different engineering judgments. This may require investigations and/or retest when the data is reviewed by NCAMP.

9. Question: Does the testing facility need to contact the NCAMP AER if anything unexpected happens such as changes in failure mode(s), significant changes in failure load, etc.?

   Answer: YES

Instructions to Fill Out FORM 289-3:

1. "DATE": Enter the date of the event.

2. "NCAMP PROJECT NO.": Enter the unique project number established by NCAMP. This is typically listed in the test plan.
   For example:
   - "NPN 123456"

3. "SUBMITTER OF THE DATA OR DOCUMENT": Enter the contact information of the data or report submitter. The submitter may not necessarily be the creator of the data or report.

4. "IDENTIFICATION": Enter the document numbers of the test plan, specification, or report, including the revision and release date.
   For example:
   - "NTP 654321 Rev -, January 1st, 2021"
   - "NMS 123 Rev A, February 28th, 2021"
   - "CAM-RP-2020-950 Rev B, March 2nd, 2021"

5. "TITLE": Enter the document titles of the item 4 (i.e. documents titles or data).
   For example:
   - "Material Property Data Acquisition and Qualification Test Plan for ABCD IM7 Unitape Gr 190 RC 33%"
   - "Longitudinal Tension D3039 ETD test witnessing: NTP654321-8-LT-A-C1-ETD-1 & NTP654321-8-LT-A-C1-ETD-2"

6. "PURPOSE OF THE DATA OR DOCUMENT": Enter the purpose of issuing FORM 289-3.
   For example:
   - "Qualification documents review"
   - "Test Witness"

7. "COMMENTS": Provide additional comments, if any.
   For example:
   - "NTP654321-8-LT-A-C1-ETW-1 was soaked twice due to strain gage issue so NTP654321-8-LT-A-C1-ETW-2 was also witnessed, the strength and modulus of specimen #2 are comparable to specimen #1 therefore strength and modulus of specimen #1 are acceptable."

8. "ACCEPTANCE": To check the appropriate box, highlight the box, right-click, select "Properties," then select "checked".

9. "SIGNATURES OF AER(s)": AER will sign and print his/her name.

Sample 1 of completed FORM 289-3:

National Center for Advanced Materials Performance	**NCAMP FORM 289-3 ENGINEERING ACCEPTANCE**	1. DATE September 10, 2021

IDENTIFICATION

2. NCAMP PROJECT NO.	3. SUBMITTER OF DATA OR DOCUMENT
NPN 123456	ABCD Composites

LIST OF DATA

4. IDENTIFICATION	5. TITLE
NTP 654321 Rev -, January 1st, 2021	Material Property Data Acquisition and Qualification Test Plan for ABCD IM7 Unitape Gr 190 RC 33%"

6. PURPOSE OF DATA OR DOCUMENT

Qualification documents review

7. COMMENTS

8. ACCEPTANCE

I (We)

- ☒ **Recommend acceptance of these documents (note: AER cannot accept test plans)**
- ☐ **Accept these data (or documents containing data)**
- ☐ **Reject these data or documents**

9. SIGNATURE(S) OF AER(S)	AER NAMES
Great Guy	Great Guy

Sample 2 of completed FORM 289-3:

National Center for Advanced Materials Performance	**NCAMP FORM 289-3 ENGINEERING ACCEPTANCE**	1. DATE: September 10, 2021

IDENTIFICATION

2. NCAMP PROJECT NO.	3. SUBMITTER OF DATA OR DOCUMENT
NPN 123456	ABCD Composites

LIST OF DATA

4. IDENTIFICATION	5. TITLE
NTP 654321 Rev -, January 1st, 2021	Longitudinal Tension D3039 ETD test witnessing: NTP654321-8-LT-A-C1-ETW-1 & NTP654321-8-LT-A-C1-ETW-2

6. PURPOSE OF DATA OR DOCUMENT

Test Witness

7. COMMENTS

NTP654321-8-LT-A-C1-ETW-1 was soaked twice due to strain gage issue so NTP654321-8-LT-A-C1-ETW-2 was also witnessed, the strength and modulus of specimen #2 are comparable to specimen #1 therefore strength and modulus of specimen #1 are acceptable.

8. ACCEPTANCE

I (We)

- ☐ **Recommend acceptance of these documents (note: AER cannot accept test plans)**
- ☒ **Accept these data (or documents containing data)**
- ☐ **Reject these data or documents**

9. SIGNATURE(S) OF AER(S)	AER NAMES
Great Guy	Great Guy