



**Medium Toughness PAEK thermoplastics
Toray (Formerly TenCate) Cetex[®] TC1225
(LM PAEK) T700GC 12K T1E Unidirectional Tape
145 gsm 34% RC
Qualification Material Property Data Report**

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1 Introduction

1.1 Scope

The test methods and results described in this document are intended to provide basic composite properties essential to most methods of analysis and are consistent with CMH-17-1G—Composite Materials Handbook for Polymer Matrix Composites. This report contains material property data of common usefulness to wide range of projects. The lamina and laminate material property data have been generated with NCAMP oversight in accordance with NSP 100 NCAMP Standard Operating Procedures; the test panels and test specimens have been inspected by NCAMP Authorized Inspection Representatives (AIR) and the testing has been witnessed by NCAMP Authorized Engineering Representatives (AER). However, the data may not fulfill all the needs of any specific company's program; specific properties, environments, laminate architecture, and loading situations may require additional testing.

The use of NCAMP material and process specifications do not guarantee material or structural performance. Material users should be actively involved in evaluating material performance and quality including, but not limited to, performing regular purchaser quality control tests, performing periodic equivalency/additional testing, participating in material change management activities, conducting statistical process control, and conducting regular supplier audits.

The applicability of NCAMP material property data, material allowables, and specifications must be evaluated on case-by-case basis by aircraft companies and certifying agencies. NCAMP assumes no liability whatsoever, expressed or implied, related to the use of the material property data, material allowables, and specifications.

This report contains material property data only. Statistical analysis of the data including the calculations of b-basis values is given in a separate report, Medium Toughness PAEK thermoplastics Toray (Formerly TenCate) Cetex TC1225 (LM PAEK) T700GC 12K T1E Unidirectional Tape 145 gsm 34% RC Material Allowables Statistical Analysis Report NCP-RP-2019-011 Rev A. The qualification material was procured to NCAMP Material Specification NMS 122 Rev Initial Release dated November 20, 2017. NCAMP Material Specification NMS 122/1 was created at later date as a supplement material specification for T700GC 12K T1E Unidirectional Tape fiber. The qualification test panels were consolidated in accordance with NCAMP Process Specification NPS 81225 Rev A dated August 3, 2018 Baseline Consolidate Cycle "C". The NCAMP Test Plan NTP 1225Q1 was used for this qualification program.

Part fabricators that wish to utilize the material property data, allowables, and specifications may be able to do so by demonstrating the capability to reproduce the original material properties; a process known as equivalency. More information about this equivalency process including the test statistics and its limitations can be found in Section 6 of DOT/FAA/AR-03/19 and Section 8.4.1 of CMH-17-1G. The applicability of equivalency process must be evaluated on program-by-program basis by the applicant

and certifying agency. The applicant and certifying agency must agree that the equivalency test plan along with the equivalency process described in Section 6 of DOT/FAA/AR-03/19 and Section 8.4.1 of CMH-17-1G are adequate for the given program.

Aircraft companies should not use the data published in this report without specifying NCAMP Material Specification NMS 122/1. NMS 122/1 may have additional requirements that are listed in its prepreg process control document (PCD), fiber specification, fiber PCD, and other raw material specifications and PCDs which impose essential quality controls on the raw materials and raw material manufacturing equipment and processes. *Aircraft companies and certifying agencies should assume that the material property data published in this report is not applicable when the material is not procured to NMS 122/1.* NMS 122/1 is a free, publicly available, non-proprietary aerospace industry material specification.

The data in this report is intended for general distribution to the public, either freely or at a price that does not exceed the cost of reproduction (e.g. printing) and distribution (e.g. postage).

1.2 Symbols

ν_{12}^t	major Poisson's ratio, tension
$\mu\epsilon$	micro-strain
E_1^c	compressive modulus, longitudinal / warp direction
E_1^t	tensile modulus, longitudinal / warp direction
E_2^c	compressive modulus, transverse / fill direction
E_2^t	tensile modulus, transverse / fill direction
F_1^{cu}	ultimate compressive strength, longitudinal / warp direction
F_1^{tu}	ultimate tensile strength, longitudinal / warp direction
F_2^{cu}	ultimate compressive strength, transverse / fill direction
F_2^{tu}	ultimate tensile strength, transverse / fill direction
SBS	short beam strength
ν_{12}^c	major Poisson's Ratio, compression
$F_{12}^{s5\% \text{ strain}}$	in-plane shear strength at 5% strain
$F_{12}^{s0.2\%}$	in-plane shear strength at 0.2% offset
G_{12}^s	in-plane shear modulus

Superscripts

c	compression
cu	compression ultimate
s	shear
su	shear ultimate
t	tension
tu	tension ultimate

Subscripts

1	axis; longitudinal / warp direction (parallel to warp direction of reinforcement)
2	axis; transverse / fill direction (parallel to fill direction of reinforcement)
12	in-plane

Acronyms and Definitions

ASTM	American Society for Testing and Materials
B – Basis	95% lower confidence limit on the tenth population percentile
CV	Coefficient of variation
CTD	cold temperature dry
CPT	consolidated ply thickness
ETD	elevated temperature dry
ETW	elevated temperature wet
Gr/Ep	graphite/epoxy
norm	normalized
RTD	room temperature dry
SACMA	Suppliers of Advanced Composite Materials Association
SRM	SACMA Recommended Method
Tply	thickness divided by the number of plies provides the thickness average per specimen
wet	specimen with an “equilibrium” moisture content
T, RH	temperature, relative humidity

1.3 NIAR–Specimen Naming Format

NIAR NCAMP — TenCate TC1225 NAMING FORMAT

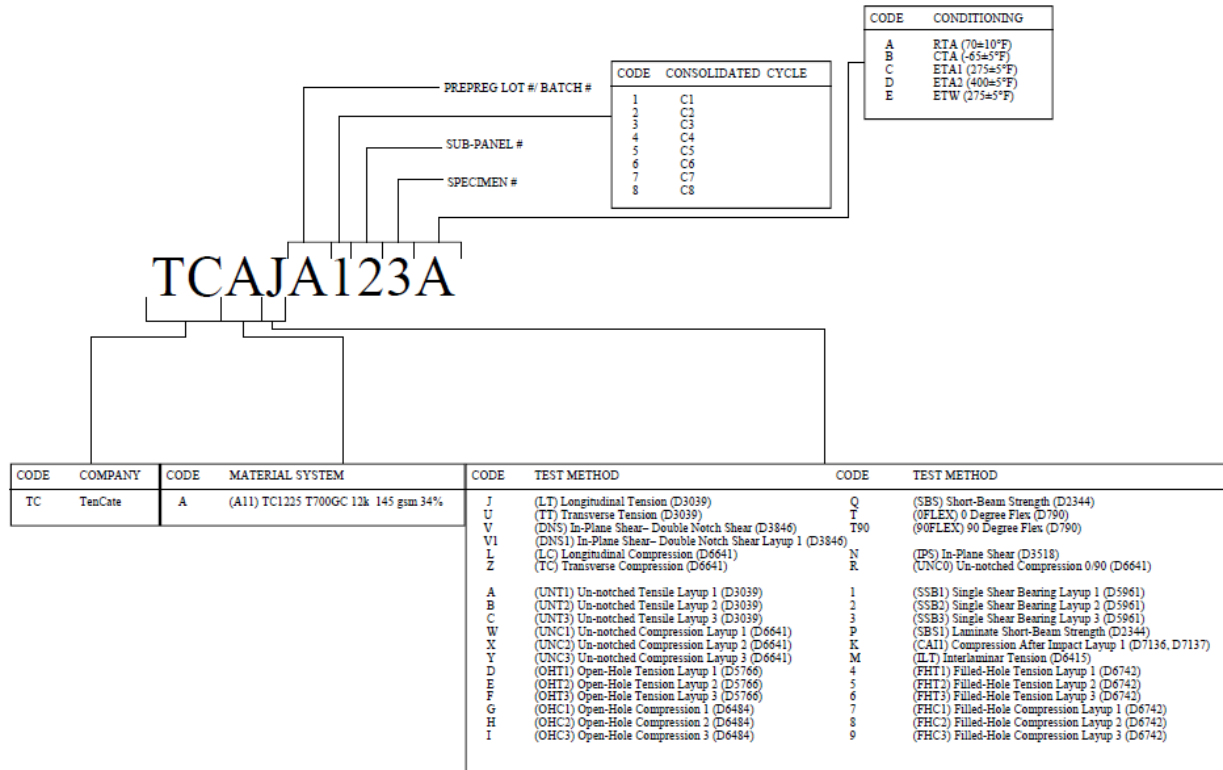


Figure 1-1: Naming Format

1.4 References

ASTM Standards

All testing was in accordance with nationally recognized standards, methods and procedures. Specific mechanical property test methods applicable to the test program in this document include:

- ASTM D790-17 – Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- ASTM D2344/D2344M-16 – Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
- ASTM D3039/D3039M-17 – Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials
- ASTM D3418-15 – Standard Test Method for Transition Temperatures and Enthalpies of Fusion and Crystallization of Polymers by Differential Scanning Calorimetry
- ASTM D3518/D3518M-18 – Standard Test Method for In-Plane Shear Response of Polymer Matrix Composite Materials by Tensile Test of a $\pm 45^\circ$ Laminate
- ASTM D3846-08 (2015) – Standard Test Method for In-Plane Shear Strength of Reinforced Plastics
- ASTM D5766/D5766M-11(2018) – Standard Test Method for Open-Hole Tensile Strength of Polymer Matrix Composite Laminates
- ASTM D5961/D5961M-17 – Standard Test Method for Bearing Response of Polymer Matrix Composite Laminates
- ASTM D6415/D6415M-06a(2013) – Standard Test Method for Measuring the Curved Beam Strength of a Fiber-Reinforced Polymer-Matrix Composite
- ASTM D6484/D6484M-14 – Standard Test Method for Open-Hole Compressive Strength of Polymer Matrix Composite Laminates
- ASTM D6641/D6641M-16e1 – Standard Test Method for Compressive Properties of Polymer Matrix Composite Materials Using a Combined Loading Compression (CLC) Test Fixture
- ASTM D6742/D6742M-17 – Standard Practice for Filled-Hole Tension and Compression Testing of Polymer Matrix Composite Laminates
- ASTM D7028-07(2015) – Standard Test Method for Glass Transition Temperature (DMA Tg) of Polymer Matrix Composites by Dynamic Mechanical Analysis (DMA)

- ASTM D7136/D7136M-15 – Standard Test Method for Measuring the Damage Resistance of a Fiber-Reinforced Polymer Matrix Composite to a Drop-Weight Impact Event
- ASTM D7137/D7137M-17 – Standard Test Method for Compressive Residual Strength Properties of Damaged Polymer Matrix Composite Plates

1.5 Methodology

1.5.1 Process Definition

For each combination of test, batch and condition, the specimens were selected from minimum two separate panels consolidated separately as shown in Figure 1-2 unless otherwise specified.

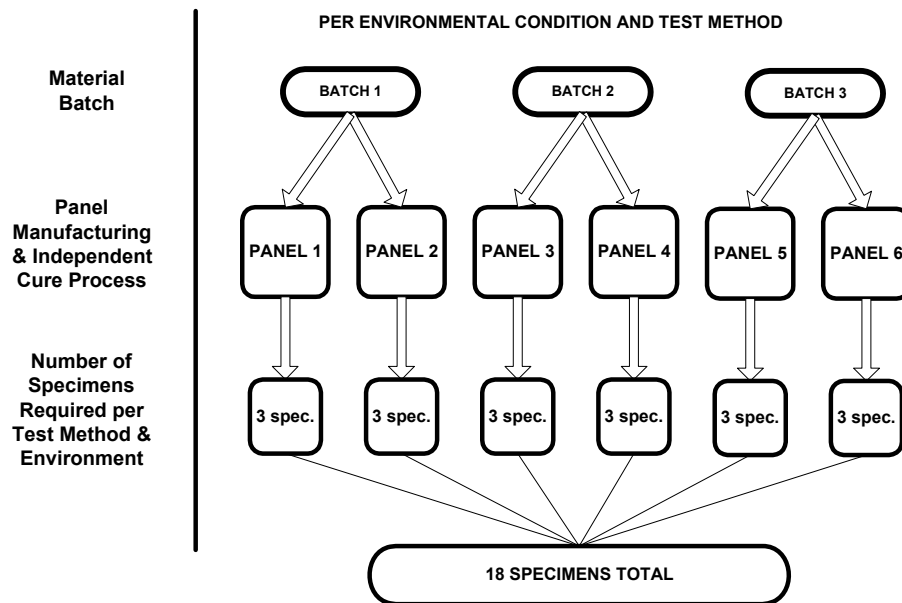


Figure 1-2: Specimen Selection Methodology

All panels were fabricated in accordance with NCAMP Process Specification NPS 81225 Consolidate Cycle “C”.

In order to facilitate individual specimen trace ability, individual specimen numbering and/or skewed lines were written or drawn across each sub-panel as shown in Figure 1-3.

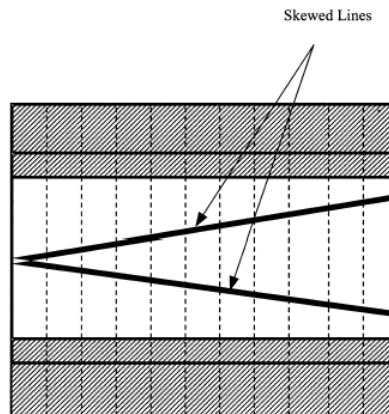


Figure 1-3: Specimen Traceability Line

1.5.2 Specimen & Testing Details

1.5.2.1 Tabbing

Longitudinal Tension coupons were tabbed (unbeveled) with [45/-45/0/45/-45/90/45/-45/45/-45]S UNC2 panels with Duraloc 4703, cured at 250°F for 4 hours followed by a post cure of 350°F for 1.5 hours.

1.5.2.2 Specimen Dimensions & Test Configuration

For SBS specimens, a span of 4T was used where T was the average thickness of six qualification panels. The same T was used to compute the width and length of the specimen.

For filled-hole tension specimens, the fasteners were installed at a torque of 85±5 in-lb beyond the prevailing torque of the fastener. For filled-hole compression and bearing specimens, the fasteners were installed 30±5 in-lb beyond the prevailing torque of the fastener. For moisture conditioned specimens, fasteners were installed after moisture conditioning.

Unless otherwise specified, a tolerance of ±5°F applied to all temperature conditions specified in this document.

For filled-hole and bearing specimens, the hole diameter was 0.25 in -0.000 +0.003 in. The fasteners used for filled-hole and bearing testing are listed in Table 1-1 below.

Test Method	Bolt	Countersink Washer (Head-Side)	Flat Washer (Nut-Side)	Nut
FHT1	NASM21297-04004	MS21206-C4	MS21206-4	MS21084L04
FHT2				
FHT3				
FHC1	NASM21297-04004	MS21206-C4	MS21206-4	MS21084L04
FHC2				
FHC3				
SSB1	NASM21297-04016	MS21206-C4	MS21206-4	MS21084L04
SSB2				
SSB3				

Table 1-1: Fastener Identifications

1.5.2.3 Specimen Strain Device Used

Corresponding Gage ID can be obtained from Appendix 1 of NTP 1225Q1.

Uniaxial gages were used on:

All conditions of Tension specimens except Longitudinal Tension specimens.

All conditions of combined loading compression specimens except Longitudinal Compression specimens.

Two RTD Open Hole Compression specimens for detecting buckling.

One CAI un-impacted specimen for balancing.

Biaxial gages were used on:

All conditions of IPS specimens.

All conditions of Longitudinal Tension specimens.

All conditions of Longitudinal Compression specimens.

1.5.3 Test Matrix

The tables below show the lay-ups and test matrices used for lamina and laminate level testing.

Layup	Test Type and Direction	Property	Number of Batches x Number of Panels x Number of Test Specimens				
			Test Temperature/Moisture Condition				
			CTA (-65°F)	RTA (70°F)	ETA1 (275°F)	ETA2 (400°F)	ETW (275°F)
[0] ₈	ASTM D3039 0° Tension	Strength, Poisson's Ratio, and Modulus	3x2x3	3x2x3 (4)	3x2x3 (4)	1x2x3 (4)	1x2x3
[0] ₂₀	ASTM D6641 0° Compression	Poisson's Ratio and Modulus	3x2x3	3x2x3 (1)(4)	3x2x3 (1)(4)	1x2x3 (1)(4)	1x2x3 (3)
[90] ₁₆	ASTM D3039 90° Tension	Strength and Modulus	3x2x3	3x2x3 (4)	3x2x3	1x2x3 (4)	1x2x3
[90] ₂₀	ASTM D6641 90° Compression	Strength and Modulus	3x2x3	3x2x3 (1)(4)	3x2x3	1x2x3 (1)(4)	1x2x3 (3)
[90/0] _{4s}	ASTM D6641 0/90° Compression (5)	Strength and Modulus	3x2x3	3x2x3 (1)(4)	3x2x3	1x2x3	1x2x3 (3)
[+45/-45] _{4s}	ASTM D3518 In-Plane Shear (2)	Strength and Modulus	3x2x3	3x2x3 (4)	3x2x3	1x2x3 (4)	1x2x3
[0] ₂₂	ASTM D790 0° Flex	Strength	3x2x3	3x2x3	3x2x3	1x2x3	1x2x3
[90] ₂₂	ASTM D790 90° Flex (6)	Strength		3x2x3			
[0] ₃₄	ASTM D2344 Short Beam	Strength	3x2x3	3x2x3	3x2x3	1x2x3	1x2x3
[0] ₃₄	ASTM D3846 In-Plane Shear – Double Notch Shear (7)	Strength	3x2x3	3x2x3	3x2x3	1x2x3	1x2x3

Table 1-2: Lamina Level Test Matrix

Note 1: Back-to-back strain gages are needed on the first two specimens of each environment. If no buckling is observed, the remaining modulus specimens will require a strain gage on one side of the specimens only. An appropriate extensometer may be used in place of the strain gage.

Note 2: Gripped (tab) length is 1.5±0.5" on each end of the 10" long specimen. Once the samples have reached the 5% strain level, the actuator/crosshead displacement rate can be increased by four times the initial rate. Continue testing at the higher strain rate until ultimate failure is observed.

Note 3: If strain gage is used for modulus measurement, a separate un-gaged specimen must be used for strength measurement; because the strain gage and its protective coating may prevent moisture absorption in the gage area.

Note 4: At least two specimens must be gaged to obtain full stress-strain curve to failure. An appropriate extensometer may be used in place of the strain gage for the remaining specimens.

Note 5: Derive the 0° lamina compressive strength $F_{0^\circ \text{ plies}}^{cu}$ as follows

$$F_{0^\circ \text{ plies}}^{cu} = BF \frac{P^f}{wh}$$

$$BF = \frac{E_1[V_0 E_2 + (1 - V_0) E_1] - (\nu_{12} E_2)^2}{[V_0 E_1 + (1 - V_0) E_2][V_0 E_2 + (1 - V_0) E_1] - (\nu_{12} E_2)^2}$$

Where:

- BF = Back-out factor obtained using linear classical lamination theory
- P^f = Peak load carried by the test specimen (usually at failure)
- w = specimen gage width, mm [in.]
- h = specimen gage thickness, mm [in.]
- V_0 = fraction of 0° plies in the cross-ply laminate (1/2 for [0/90]_ns and 1/3 for [90/0/90]_n)
- E_1 = axial tensile or compressive stiffness of 0° plies, from an average of all batches
- E_2 = transverse tensile or compressive stiffness of 0° plies, from an average of all batches
- ν_{12} = major Poisson's ratio of 0° plies, from an average of all batches

Note 6: Specimen may be taken from [0]₂₂ ASTM D790 Flex panels.

Note 7: Round notch configuration, radius target of the notch is 0.03". Specimens may be taken from [0]₃₄ ASTM D2344 SBS panels.



Table 1-3 below summarizes the laminate level tests carried out. The layup angles 0°, 45°, -45°, and 90° refer to the orientation of the warp/longitudinal fiber direction. The laminate stacking sequences in this program are not specific to any design. Therefore, careful consideration should be given to the validity of properties derived from this program based on the design specific laminates in a structure to be certified.

Table 1-3 also emphasizes those properties and test condition combinations believed to constitute the worst case, which in general is cold dry for tension and hot wet for compression and other matrix dominated properties.

(%0°/%±45°/%90°) Actual Test Type	Test Type and Layup (5)	Property	Number of Batches x Number of Panels x Number of Test Specimens				
			Test Temperature/Moisture Condition				
			CTA (-65°F)	RTA (70°F)	ETA1 (275°F)	ETA2 (400°F)	ETW (275°F)
(25/50/25 - QI) UNT1	ASTM D3039 Un-notched Tension [45/0/-45/90]2S	Strength & modulus	3x2x3	3x2x3 (7)	3x2x3 (7)	1x2x3	1x2x3
(10/80/10) UNT2	ASTM D3039 Un-notched Tension [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength & modulus	3x2x3	3x2x3 (7)	3x2x3 (7)		
(50/40/10) UNT3	ASTM D3039 Un-notched Tension [0/45/0/90/0/-45/0/45/0/-45]S	Strength & modulus	3x2x3	3x2x3 (7)	3x2x3 (7)		
(25/50/25 - QI) UNC1	ASTM D6641 Un-notched Compression [45/0/-45/90]3S	Strength & modulus		3x2x3 (4&7)	3x2x3 (4&7)	1x2x3	1x2x3 (6)
(10/80/10) UNC2	ASTM D6641 Un-notched Compression [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength & modulus		3x2x3 (4&7)	3x2x3 (4&7)		
(50/40/10) UNC3	ASTM D6641 Un-notched Compression [0/45/0/90/0/-45/0/45/0/-45]S	Strength & modulus		3x2x3 (4&7)	3x2x3 (4&7)		
(25/50/25 - QI) SBS1	ASTM D2344 Short Beam [45/0/-45/90]3S (specimens may be taken from panels of similar layup)	Strength		3x2x3	3x2x3	1x2x3	1x2x3
(25/50/25 - QI) DNS1	ASTM D3846 In-Plane Shear – Double Notch Shear (9) [45/0/-45/90]3S (specimens may be taken from panels of similar layup)	Strength		3x2x3	3x2x3	1x2x3	1x2x3
(25/50/25 - QI) OHT1	ASTM D5766 Open-Hole Tension (1) [45/0/-45/90]2S	Strength	3x2x3	3x2x3	3x2x3	1x2x3	1x2x3
(10/80/10) OHT2	ASTM D5766 Open-Hole Tension (1) [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength	3x2x3	3x2x3	3x2x3		
(50/40/10) OHT3	ASTM D5766 Open-Hole Tension (1) [0/45/0/90/0/-45/0/45/0/-45]S	Strength	3x2x3	3x2x3	3x2x3		
(25/50/25 - QI) FHT1	ASTM D6742 Filled-Hole Tension (2) [45/0/-45/90]2S	Strength	3x2x3	3x2x3	3x2x3	1x2x3	1x2x3
(10/80/10) FHT2	ASTM D6742 Filled-Hole Tension (2) [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength	3x2x3	3x2x3	3x2x3		
(50/40/10) FHT3	ASTM D6742 Filled-Hole Tension (2) [0/45/0/90/0/-45/0/45/0/-45]S	Strength	3x2x3	3x2x3	3x2x3		
(25/50/25 - QI) OHC1	ASTM D6484 Open-Hole Compression (1) [45/0/-45/90]4S	Strength		3x2x3 (4)	3x2x3 (4)	1x2x3	1x2x3
(10/80/10) OHC2	ASTM D6484 Open-Hole Compression (1) [45/-45/0/45/-45/90/45/-45/45/-45]2S	Strength		3x2x3 (4)	3x2x3 (4)		
(50/40/10) OHC3	ASTM D6484 Open-Hole Compression (1) [0/45/0/90/0/-45/0/45/0/-45]2S	Strength		3x2x3 (4)	3x2x3 (4)		
(25/50/25 - QI) FHC1	ASTM D6742 Filled-Hole Compression (2) [45/0/-45/90]4S	Strength		3x2x3	3x2x3	1x2x3	1x2x3
(10/80/10) FHC2	ASTM D6742 Filled-Hole Compression (2) [45/-45/0/45/-45/90/45/-45/45/-45]2S	Strength		3x2x3	3x2x3		
(50/40/10) FHC3	ASTM D6742 Filled-Hole Compression (2) [0/45/0/90/0/-45/0/45/0/-45]2S	Strength		3x2x3	3x2x3		
(25/50/25 - QI) SSB1	ASTM D5961 Single Shear Bearing (3) [45/0/-45/90]2S	Strength & Deformation		3x2x3	3x2x3	1x2x3	1x2x3
(10/80/10) SSB2	ASTM D5961 Single Shear Bearing (3) [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength & Deformation		3x2x3	3x2x3		
(50/40/10) SSB3	ASTM D5961 Single Shear Bearing (3) [0/45/0/90/0/-45/0/45/0/-45]S	Strength & Deformation		3x2x3	3x2x3		
(100/0/0) ILT	ASTM D6415 Interlaminar Tension Strength [0]30 (note: curved panel)	Strength	1x1x6	1x1x6	1x1x6	1x1x6	1x1x6
(25/50/25 - QI) CAI1	ASTM D7136 & D7137 Compression After Impact (1500 in.lb/in) (8) [45/0/-45/90]4S	Strength		1x1x6	1x1x6	1x1x6	1x1x6

Table 1-3: Laminate Level Test Matrix

- Note 1:** Open-hole configuration: 0.25" hole diameter, 1.5" width.
- Note 2:** Filled-hole test configuration: 0.25" diameter, see section 1.5.2.2 for fastener callout, 1.5" width.
- Note 3:** Single shear bearing test configuration: 0.25" hole diameter, 1.5" width, see section 1.5.2.2 for fastener callout, $e/D=3$, ASTM D5961/D5961M-17 Procedure C.
- Note 4:** Back-to-back strain gages needed on the first two specimens of each environment. If no buckling is observed, the remaining modulus specimens will require strain gage on one side of the specimens only. Appropriate extensometer may be used in place of the strain gage.
- Note 5:** Loading direction is generally along the 0-degree direction.
- Note 6:** If strain gage is used for modulus measurement, a separate un-gaged specimen must be used for strength measurement, because the strain gage and its protective coating may prevent moisture absorption in the gage area.
- Note 7:** At least two specimens must be gaged to obtain full stress-strain curve to failure. An appropriate extensometer may be used in place of the strain gage for the remaining specimens.
- Note 8:** Back-to-back strain gages on two locations (a total of four strain gages) are needed on the first specimen. The specimen should be equivalent to the test specimens in terms of material, layup, and geometry, shall be un-damaged. Alternatively, an instrumented metallic plate, equivalent in thickness to the test specimens to within ± 0.25 mm [± 0.010 in.], may be used.
- Note 9:** Round notch configuration, radius target of the notch is 0.03". Specimens may be taken from [45/0/-45/90]3S ASTM D2344 SBS1 panels.



1.5.4 Consolidated Laminate Physical Testing

The properties in Table 1-4 were determined for each panel used for test coupons with the exception of T_g by DMA and/or DSC which were conducted on one laminate per batch from each consolidate conducted where that batch is present. The tests were performed by the National Institute for Aviation Research (NIAR) Composites Laboratory under the supervision of NCAMP.

Property	Condition/Method (Note 1)	Min Replicates per panel
Consolidated Ply Thickness	ASTM D3171-15	All data from mechanical test specimens
Laminate Density	ASTM D792-13	Per Note 5
Fiber Volume, % by Volume	ASTM D3171-15(Note 2)	3
Resin Content, % by Weight	ASTM D3171-15(Note 2)	3
Void Content, % by Volume	ASTM D3171-15	Per Note 5
Ultrasonic Through Transmission, C-Scan (panels)	ASTM E1316, ASTM E2580 & NAS 410 (Note 3)	1
Differential Scanning Calorimetry (DSC) Glass Transition Temp., T _g Melt Temp. (Peak) Cold Crystallization Temp. Hot Crystallization Temp. (Peak)	ASTM D3418	1 Ambient (Note 4, Dry only)
Dynamic Mechanical Analysis (DMA) Glass Transition Temp., T _g	Dry and Wet – ASTM D7028	1 Ambient, 1 Wet (Note 4)

Table 1-4: Physical Testing Matrix

Note 1: Where the applicable standard allows variations in specimen form or test method, the specific parameters to be used will be specified in the test work instructions and reported in the final test report.

Note 2: Method I.

Note 3: Five MHz is preferred for solid laminates. Panels with anomaly should be segregated. Microscopy images may be taken from questionable areas. NCAMP must be involved in the review of all C-scans.

Note 4: Minimum total of 24 dry and 24 wet for each material system.

Note 5: A minimum of 4 panels per batch, 3 specimens per panel.

1.5.5 Environmental Conditioning

The following tests were performed by the NIAR Composites Laboratory under the supervision of NCAMP.

CTA = -65±5°F, ambient
RTA = 70±10°F, room temperature ambient
ETA1 = 275±5°F, ambient
ETA2 = 400±5°F, ambient
ETW = 275±5°F, wet

Within each test method and test environment, the failure mode was evaluated immediately after each test by an NCAMP staff engineer or NCAMP AER. All tested specimens were digitally photographed after each test in order to pictorially document failure modes.

Ambient laboratory condition is defined as 70°F±10°F. Since moisture absorption and desorption rate is very slow at ambient temperature, there was no requirement to maintain relative humidity levels.

For wet conditioning, specimens were being conditioned to equilibrium at 160°F±5°F and 85% ± 5% RH. Effective moisture equilibrium is achieved when the average moisture content of the traveler specimen changes by less than 0.02% for three consecutive determinations which are 7 ±0.5 days apart and may be expressed by:

$$\frac{W_i - W_{i-1}}{W_b} < 0.0002$$

Where:

W_i = weight at current time
 W_{i-1} = weight at previous time
 W_b = baseline weight prior to conditioning

When representative specimens could not be measured to determine the moisture content (due to size, fastener and tab effects), traveler coupons of at least 1" by 1" by specimen thickness and weighing at least 15 grams were used to establish weight gain measurements. If the specimens or traveler coupons pass the criteria for three consecutive readings which are 7 ±0.5 days apart, the specimens were kept in the environmental chamber for up to an additional 60 days. Alternatively, the specimens may have been removed from the environmental chamber and placed in a sealed plastic bag along with a moist cotton towel for a maximum of 14 days until mechanical testing. Strain-gaged specimens were removed from the controlled environment for a maximum of 2 hours for application of gages in ambient laboratory conditions.

1.5.6 Non-ambient Testing

The chamber was of adequate size so that all test fixtures and load frame grips were contained within the chamber.

For elevated temperature testing, the temperature chamber, test fixture, and grips were preheated to the specified temperature. Each specimen was heated to the required test temperature as verified by a thermocouple in direct contact with and taped to the specimen gage section. The heat-up time of the specimen did not exceed 5 minutes, unless otherwise specified in individual test summary sheets. The test was started 5^{+1}_{-0} minutes after the specimen reached the test temperature. During the test, the temperature, as measured on the specimen, was within $\pm 5^{\circ}\text{F}$ of the required test temperature.

For subzero temperature testing, each specimen was cooled to the required test temperature as verified by a thermocouple in direct contact with and taped to the specimen gage section. The test started 5^{+1}_{-0} minutes after the specimen reached the test temperature. During the test, the temperature, as measured on the specimen, was within $\pm 5^{\circ}\text{F}$ of the required test temperature.

For wet specimens, the moisture loss was determined by subjecting representative specimens to the same amount of time required to heat-up and fail the specimens. For filled-hole or bearing specimens, fasteners were removed prior to conducting moisture loss measurements. For tabbed specimens, representative coupons without tabs and having the same number of plies were used to conduct the moisture loss measurements. A minimum of one specimen or representative coupon was used to measure the moisture loss for every combination of test temperature and stacking sequence.

1.5.7 Fluid Sensitivity Screening

Table 1-5 lists the requirements for fluid sensitivity screening, which requires ASTM D6641 Unnotched Compression testing on [90/0]_{4s} lamina level specimens subjected to the conditions indicated, five replicates per fluid and one consolidate cycle.

Specimens were cleaned with a dry towel prior to the tests. In addition to short beam strength, load versus displacement curves were plotted to aid in the identification of matrix/resin softening. Since load versus displacement curves are influenced by test machine and fixture compliance, all the tests were performed with the identical machine and fixture, through a single setup.

Users must evaluate the applicability of the exposure conditions and time on case-by-case basis. For example, the exposure condition for jet fuel may not fully represent the condition of integral fuel tanks.

Extended Contact:	Exposure	Test Condition	Code
100 Low Lead Aviation Fuel (ASTM D910)	90 days min. @ 70°F±10°F	70°F	FS11RT
	90 days min. @ 70°F±10°F	180°F	FS11ET
ASTM D1655 Jet A Fuel (other jet fuel may be used but its type must be reported)	90 days min. @ 70°F±10°F	70°F	FS12RT
	90 days min. @ 70°F±10°F	180°F	FS12ET
MIL-PRF-5606 Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	FS13RT
	90 days min. @ 70°F±10°F	180°F	FS13ET
MIL-PRF-83282 Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	FS14RT
	90 days min. @ 70°F±10°F	180°F	FS14ET
MIL-PRF-7808 Engine Oil	90 days min. @ 70°F±10°F	70°F	FS15RT
	90 days min. @ 70°F±10°F	180°F	FS15ET
MIL-PRF-23699, Class STD Engine Oil	90 days min. @ 70°F±10°F	70°F	FS16RT
	90 days min. @ 70°F±10°F	180°F	FS16ET
Salt Water (ASTM D1141 or equiv.)	90 days min. @ 70°F±10°F	70°F	FS17RT
	90 days min. @ 70°F±10°F	180°F	FS17ET
Skydrol 5, (SAE AS1241, Type V)	90 days min. @ 70°F±10°F	70°F	FS18RT
	90 days min. @ 70°F±10°F	180°F	FS18ET
50% Water with 50% Skydrol 5, (SAE AS1241, Type V)	90 days min. @ 70°F±10°F	70°F	FS19RT
	90 days min. @ 70°F±10°F	180°F	FS19ET
Short Duration Contact:			
MEK washing fluid. ASTM D740	90 minutes min. @ 70°F±10°F	70°F	FS21RT
	90 minutes min. @ 70°F±10°F	180°F	FS21ET
Polypropylene Glycol Deicer (Type I) SAE AMS 1424	90 minutes min. @ 70°F±10°F	70°F	FS22RT
	90 minutes min. @ 70°F±10°F	180°F	FS22ET
Isopropyl Alcohol Deicing Agent (TT-I-735)	48±4 hours @70°F±10°F	70°F	FS23RT
	48±4 hours @70°F±10°F	180°F	FS23ET
Control Tests:			
Distilled Water	90 days min. at 70°F±10°F	70°F	FS31RT
	90 days min. at 70°F±10°F	180°F	FS31ET
Dry	Dry per section 6.1 Test Plan NTP 1225Q1	70°F	FS32RT
	Dry per section 6.1 Test Plan NTP 1225Q1	180°F	FS32ET
85% Relative Humidity	Per section 6.1 Test Plan NTP 1225Q1	70°F	FS33RT
	Per section 6.1 Test Plan NTP 1225Q1	180°F	FS33ET

Table 1-5: Fluid Sensitivity Matrix

1.5.8 Normalization Procedures

Most lamina level tension and compression strength and modulus properties, and all laminate level properties were normalized according to nominal consolidated ply thickness. Lamina level properties that were not normalized include 90° tensile strength and modulus (unidirectional only), 90° compressive strength and modulus (unidirectional only), in-plane shear strength and modulus, Poisson's ratio, SBS, and ILT. After normalizing, data scatter reduced or remained the same. If data scatter increased significantly after normalizing, the reason was investigated. Wherever properties are normalized, both measured and normalized data were reported.

The theoretical calculated consolidated ply thickness of 0.0054 inches has been used as the nominal consolidated ply thickness (CPT) for normalization purpose. This has been done at the request of the material supplier. The following normalization formula was used:

$$\text{Normalized Value} = \text{Measured Value} \times \text{Measured CPT} / \text{Nominal CPT}.$$

For Medium Toughness PAEK thermoplastics Toray (Formerly TenCate) Cetex TC1225 (LM PAEK) T700GC 12K T1E Unidirectional Tape 145 gsm 34% RC material the anticipated CPT was 0.0054 inches. The average as measured CPT of the qualification panels was 0.0051 inches. The lowest and highest CPT measured were 0.0048 inches and 0.0054 inches respectively.

1.5.9 Inspection Verification

The 3-batch qualification panels have been fabricated according to the requirements of the test plan and conformed by an NCAMP AIR. The test specimens and test setup have also been conformed by an NCAMP AIR.

Testing was witnessed by NCAMP. Test setup and witnessing was delegated to an NCAMP AER. Mechanical testing was carried out at the National Institute for Aviation Research, Wichita State University. The inspection documentation with required approval signatures are stored in hard copy as well as electronically.

1.5.10 Material Pedigree Information

The PMC Data Collection Template includes the material pedigree information required, such as material and batch information, as well as panel fabrication record, environmental conditioning, test equipment, and test procedures. This template in Microsoft Excel file format.

2 Material Property Test Results

2.1 Lamina Level Test Summary

Prepreg Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC Material Specification: NMS 122/1 Process Specification: NPS 81225 Fabric: T700GC-12K-T1E						Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC Lamina Properties Summary					
DMA Tg (ambient): 288.06°F DMA Tg (wet): 272.62°F			Resin: TC1225 PAEK			DSC Tg (ambient): 288.84°F DSC, Melting Temperature (Peak): 582.88°F DSC, Hot Crystallization Temperature (Peak): 474.11°F			Tg METHOD: DMA (ASTM D7028) & DSC (ASTM D3418)		
Fiber Lot Date of fiber manufacture Resin Lot Date of resin manufacture Prepreg Lot Date of prepreg manufacture Date of composite manufacture		Lot #1 A1018E2 5/1/2018 V010848 7/17/2017 070618-1TP4 7/6/2018	Lot #2 F5118F1 6/1/2018 WO019197VIML 2/17/2017 080918-1TP1 8/9/2018	Lot #3 A1018F1 6/1/2018 V010849 7/17/2017 090618-1TP4 9/6/2018	Date of testing Date of data submittal		4/2/2019 - 11/18/2019 12/20/2019				
LAMINA MECHANICAL PROPERTY SUMMARY Data reported as: Normalized & Measured (Normalized by CPT=0.0054 inch)											
Properties	CTA (-65°F) Mean		RTA (70°F) Mean		ETA1 (275°F) Mean		ETA2** (400°F) Mean		ETW (275°F) Mean		
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	
F ₁ ^{tu} [ksi]	358.9	370.7	336.8	351.3	364.6	371.1	301.2	309.8	318.9	340.2	
E ₁ ^t [Msi]	18.49	19.14	18.10	18.93	17.93	18.36	18.33	18.86	17.27	18.43	
ν ₁₂ ^t		0.3331		0.3371		0.3253		0.5033		0.3744	
F ₂ ^{tu} [ksi]		15.29		13.68		6.750		3.093		5.916	
E ₂ ^t [Msi]		1.410		1.318		1.010		0.2574		0.7640	
F ₁ ^{cu} [ksi] from UNC0*	188.5	192.9	177.8	181.3	128.2	129.1	48.93	48.10	120.9	119.4	
E ₁ ^c [Msi]	16.41	17.30	15.81	16.94	16.06	17.13	15.52	16.43	15.85	16.63	
ν ₁₂ ^c		0.3647		0.3633		0.3614		0.3795		0.3423	
F ₂ ^{cu} [ksi]		39.49		30.76		17.20		7.435		15.70	
E ₂ ^c [Msi]		1.413		1.340		1.187		0.3367		1.009	
(0/90) UNC0 Strength [ksi]	102.2	104.2	96.29	97.68	68.78	68.93	24.99	24.54	64.27	63.30	
(0/90) UNC0 Modulus [Msi]	9.307	9.497	9.239	9.364	9.163	9.184	8.839	8.681	9.179	9.037	
F ₁₂ ^{s0.2%} [ksi]		6.834		5.437		1.800		0.5403		1.341	
F ₁₂ ^{s5%strain} [ksi]		13.14		9.505		4.565				3.770	
G ₁₂ ^s [Msi]		0.7326		0.6739		0.4790		0.09234		0.3746	
0FLEX Proc. A 0.2% Offset Strength [ksi]							39.49	41.17			
0FLEX Proc. A 1% Offset Strength [ksi]							45.02	46.94			
0FLEX Proc. A Strength [ksi]	232.2	242.1	201.1	211.2	138.3	145.4			111.1	114.3	
90FLEX Proc. A Strength [ksi]			20.56	21.24							
****SBS 0.2% Offset Strength [ksi]		14.16		10.37		5.277		1.367		4.394	
****SBS 1% Offset Strength [ksi]		17.48		13.06		6.355		2.078		5.470	
****SBS 2% Offset Strength [ksi]		18.85		14.13		7.065		2.511		6.185	
Round Notch DNS In-Plane (Interlaminar) Shear Strength [ksi]		16.77		14.10		8.161		***		7.406	

* Derived from cross-ply using back-out factor.
 ** ETA2 data is for informational purposes only and it may not be substantial enough to be used for design.
 *** ETA2 data not available for Round Notch DNS due to unacceptable failure mode.
 **** Data reported is for reference only due to unacceptable failure mode. The B-basis values were not computed.

Table 2-1: Lamina Summary Data

2.2 Laminate Level Test Summary

Prepreg Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC Material Specification: NMS 122/1 Process Specification: NPS 81225 Fabric: T700GC-12K-T1E Resin: TC1225 PAEK						Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC Laminate Properties Summary	
DMA Tg (ambient): 288.06°F DMA Tg (wet): 272.62°F		DSC Tg (ambient): 288.84°F DSC, Melting Temperature (Peak): 582.88°F DSC, Hot Crystallization Temperature (Peak): 474.11°F		Tg METHOD: DMA (ASTM D7028) & DSC (ASTM D3418)			
Fiber Lot	Lot #1	Lot #2	Lot #3	Date of testing	4/2/2019 - 11/18/2019		
Date of fiber manufacture	A1018E2	F5118F1	A1018F1	Date of data submittal	12/20/2019		
Resin Lot	V010848	W0019197/VIML	V010849				
Date of resin manufacture	7/17/2017	2/17/2017	7/17/2017				
Prepreg Lot	070618-1TP4	080918-1TP1	090618-1TP4				
Date of prepreg manufacture	7/6/2018	8/9/2018	9/6/2018				
Date of composite manufacture	8/28/2018 - 3/28/2019						
LAMINATE MECHANICAL PROPERTY SUMMARY Data reported as: Normalized & Measured (Normalized by CPT=0.0054 inch)							
Layup		25/50/25 (Quasi)		10/80/10 (Soft)		50/40/10 (Hard)	
Properties	Test Condition	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT Strength [ksi]	CTA (-65°F)	70.30	71.72	58.03	57.23	97.90	104.5
	RTA (70°F)	68.52	69.82	51.03	52.45	95.06	102.8
	ETA1 (275°F)	66.18	67.24	42.06	43.20	98.05	105.2
	ETA2** (400°F)	58.03	60.12				
	ETW (275°F)	63.11	65.00				
OHC Strength [ksi]	RTA (70°F)	45.79	47.33	43.12	45.10	55.04	57.59
	ETA1 (275°F)	34.00	34.96	31.95	33.14	40.82	42.47
	ETA2** (400°F)	17.38	17.77				
	ETW (275°F)	29.19	29.93				
UNT Strength [ksi]	CTA (-65°F)	148.9	153.9	83.72	86.37	198.0	206.5
	RTA (70°F)	141.0	147.5	74.96	77.82	204.6	214.3
	ETA1 (275°F)	132.4	137.1	59.68	61.63	188.1	198.0
	ETA2** (400°F)	103.4	107.3				
	ETW (275°F)	124.0	129.7				
UNT Modulus [Msi]	CTA (-65°F)	7.030	7.270	4.565	4.707	10.46	10.91
	RTA (70°F)	6.651	6.955	4.188	4.346	10.23	10.71
	ETA1 (275°F)	6.447	6.674	3.433	3.545	9.746	10.23
	ETA2** (400°F)	6.028	6.255				
	ETW (275°F)	6.020	6.294				
UNC Strength [ksi]	RTA (70°F)	77.07	81.18	58.17	60.77	98.06	102.8
	ETA1 (275°F)	59.29	62.31	39.47	40.92	74.81	78.41
	ETA2** (400°F)	21.41	22.24				
	ETW (275°F)	56.06	58.82				
	UNC Modulus [Msi]	6.180	6.511	4.193	4.379	9.351	9.818
FHT Strength [ksi]	RTA (70°F)	6.183	6.503	3.740	3.879	9.501	9.961
	ETA1 (275°F)	4.982	5.176				
	ETA2** (400°F)	5.959	6.249				
	ETW (275°F)	77.60	79.60	61.81	63.41	97.61	103.0
	RTA (70°F)	71.02	73.54	53.66	55.37	93.20	99.81
FHC Strength [ksi]	ETA1 (275°F)	70.14	72.31	44.55	45.93	95.04	102.1
	ETA2** (400°F)	60.64	61.96				
	ETW (275°F)	68.21	70.26				
	RTA (70°F)	73.88	77.79	55.99	58.03	89.48	93.74
	ETA1 (275°F)	55.47	57.94	41.88*	43.17*	69.17	72.23
0.2% Offset Strength [ksi]	ETA2** (400°F)	24.01*	24.79*				
	ETW (275°F)	66.69*	68.44*				
	RTA (70°F)		11.11				
	ETA1 (275°F)		5.95				
	ETA2** (400°F)		1.574				
1% Offset Strength [ksi]	ETW (275°F)		4.492				
	RTA (70°F)		13.25				
	ETA1 (275°F)		6.888				
	ETA2** (400°F)		2.346				
	ETW (275°F)		5.938				
Round Notch DNS1 In-Plane (Interlaminar) Shear Strength [ksi]	RTA (70°F)		12.09				
	ETA1 (275°F)		6.964				
	ETA2** (400°F)		**				
	ETW (275°F)		6.265				
	SSB Proc. C 2% Offset Strength [ksi]	RTA (70°F)	100.9	107.2	106.5	112.7	109.3
SSB Proc. C Ultimate Strength [ksi]	ETA1 (275°F)	84.98	89.28	87.29	89.76	82.90	88.85
	ETA2** (400°F)	50.58	52.32				
	ETW (275°F)	88.12	91.08				
	RTA (70°F)	126.9	134.9	134.3	142.1	132.7	142.8
	ETA1 (275°F)	101.8	106.9	105.4	108.4	96.12	103.1
*****CBS [lb]	ETA2** (400°F)	69.35	71.80				
	ETW (275°F)	95.82	99.04				
	CTA (-65°F)		607.7				
	RTA (70°F)		537.9				
	ETA1 (275°F)		289.1				
*****LT [ksi]	ETA2** (400°F)		***				
	ETW (275°F)		236.2				
	CTA (-65°F)		18.61				
	RTA (70°F)		16.66				
	ETA1 (275°F)		8.821				
CAI Strength [ksi] (1500 in.lb/in)	ETA2** (400°F)		***				
	ETW (275°F)		7.036				
	RTA (70°F)	45.38	46.10				
	ETA1 (275°F)	34.04	34.44				
	ETA2** (400°F)	13.77	14.14				
ETW (275°F)	31.86	32.56					

* In some cases of FHC>UNC, FHC data is for informational purposes only and is not appropriate to be used for design.
 ** ETA2 data is for informational purposes only and it may not be substantial enough to be used for design.
 *** ETA2 data not available for ILT, CBS and Round Notch DNS1 due to unacceptable failure mode.
 **** Data reported is for reference only due to unacceptable failure mode. The B-basis values were not computed.
 ***** The actual layup for ILT/CBS is [0]30, (100/0/0).

Table 2-2: Laminate Summary Data

2.3 Individual Test Summaries

2.3.1 Longitudinal Tension Properties (LT)

Material:		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC									
Resin content:		33.07 %wt		Comp. density:		1.576 g/cc		Tension, 1-axis Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0]8			
Fiber volume:		58.93 %vol		Ply count:		8					
Test method:		ASTM D3039-17		Modulus calculation:		1000-3000 microstrain					
Normalized by:		0.0054		in. CPT							
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F, 85%	
Source code		TCAJX XXXB		TCAJX XXXA		TCAJX XXXC		TCAJX XXXD		TCAJX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F_1^{tu} [ksi]	Mean	358.9	370.7	336.8	351.3	364.6	371.1	301.2	309.8	318.9	340.2
	Minimum	321.5	336.2	289.6	308.1	296.3	311.0	278.1	283.8	291.3	311.4
	Maximum	420.4	427.7	378.1	398.5	421.0	418.3	315.9	326.2	347.6	370.0
	C.V.(%)	7.750	6.935	8.842	8.107	8.556	7.307	4.756	5.035	6.960	6.255
	No. Specimens	20		20		20		6		6	
No. Prepreg Lots	3		3		3		1		1		
E_1^t [Msi]	Mean	18.49	19.14	18.10	18.93	17.93	18.36	18.33	18.86	17.27	18.43
	Minimum	17.33	18.61	16.92	18.41	16.70	17.54	17.80	18.38	17.12	17.78
	Maximum	19.56	19.90	19.28	20.02	19.02	19.04	18.82	19.39	17.60	18.77
	C.V.(%)	3.088	2.090	3.427	2.265	3.776	2.445	2.256	2.104	1.188	1.978
	No. Specimens	18		18		18		6		6	
No. Prepreg Lots	3		3		3		1		1		
ν_{12}^t	Mean	0.3331		0.3371		0.3253		0.5033		0.3744	
	Minimum	0.2671		0.2609		0.2629		0.3759		0.3160	
	Maximum	0.3944		0.4045		0.4120		0.5778		0.4230	
	C.V.(%)	10.24		10.20		13.25		18.37		12.04	
	No. Specimens	18		18		18		6		6	
No. Prepreg Lots	3		3		3		1		1		

2.3.2 Transverse Tension Properties (TT)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Tension, 2-axis Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [90]16									
Resin content: 32.82 %wt		Comp. density: 1.573 g/cc									
Fiber volume: 59.03 %vol											
Ply count: 16											
Test method: ASTM D3039-17		Modulus calculation: 1000-3000 microstrain									
Normalized by: NA											
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F,85%	
Source code		TCAUX XXXB		TCAUX XXXA		TCAUX XXXC		TCAUX XXXD		TCAUX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₂^{tu} [ksi]		15.29		13.68		6.750		3.093		5.916	
Minimum		12.01		12.26		6.368		3.013		5.802	
Maximum		16.85		14.59		7.196		3.191		6.030	
C.V.(%)		7.959		3.995		3.037		2.399		1.454	
No. Specimens		19		19		18		7		6	
No. Prepreg Lots		3		3		3		1		1	
E₂^t [Msi]		1.410		1.318		1.010		0.2574		0.7640	
Minimum		1.336		1.269		0.9600		0.2480		0.7353	
Maximum		1.503		1.404		1.068		0.2684		0.7893	
C.V.(%)		3.177		2.928		3.652		3.038		3.144	
No. Specimens		20		19		18		7		6	
No. Prepreg Lots		3		3		3		1		1	

2.3.3 Longitudinal Compression Properties (LC)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Compression, 1-axis									
Resin content: 33.00 %wt		Comp. density: 1.573 g/cc									
Fiber volume: 58.89 %vol											
Ply count: 20											
Test method: ASTM D6641-16e1		Modulus calculation: 1000-3000 microstrain									
Normalized by: 0.0054		in. CPT									
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F,85%	
Source code		TCALX XLXB		TCALX XLXA		TCALX XLXC		TCALX XLXD		TCALX XLXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
E₁^c [Msi]	Mean	16.41	17.30	15.81	16.94	16.06	17.13	15.52	16.43	15.85	16.63
	Minimum	15.60	16.54	15.02	16.33	15.28	16.32	13.45	14.61	14.86	15.83
	Maximum	18.61	18.88	16.48	17.55	16.84	17.89	17.68	18.36	17.10	17.49
	C.V.(%)	4.305	3.269	3.041	2.113	3.220	2.576	9.192	7.868	5.541	3.510
	No. Specimens	18		18		19		6		6	
No. Prepreg Lots	3		3		3		1		1		
v₁₂^c	Mean	0.3647		0.3633		0.3614		0.3795		0.3423	
	Minimum	0.3145		0.3157		0.2783		0.2433		0.2940	
	Maximum	0.5075		0.4149		0.4340		0.6726		0.4626	
	C.V.(%)	12.15		8.210		12.67		41.39		18.55	
	No. Specimens	18		18		19		6		6	
No. Prepreg Lots	3		3		3		1		1		

2.3.4 Transverse Compression Properties (TC)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Compression, 2-axis Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [90]20									
Resin content: 33.00 %wt		Comp. density: 1.573 g/cc									
Fiber volume: 58.89 %vol											
Ply count: 20											
Test method: ASTM D6641-16e1		Modulus calculation: 1000-3000 microstrain									
Normalized by: NA											
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F,85%	
Source code		TCAZX XXXB		TCAZX XXXA		TCAZX XXXC		TCAZX XXXD		TCAZX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
Mean		39.49		30.76		17.20		7.435		15.70	
Minimum		38.16		29.71		16.46		6.957		15.01	
Maximum		40.61		31.89		18.28		8.054		16.67	
F₂^{cu} [ksi]		1.834		2.196		3.256		5.408		3.632	
No. Specimens		18		18		20		8		6	
No. Prepreg Lots		3		3		3		1		1	
Mean		1.413		1.340		1.187		0.3367		1.009	
Minimum		1.368		1.296		1.133		0.3177		0.9342	
Maximum		1.496		1.382		1.237		0.3532		1.055	
E₂^c [Msi]		2.514		1.766		2.545		3.697		4.764	
No. Specimens		18		18		20		8		6	
No. Prepreg Lots		3		3		3		1		1	

2.3.5 “50/0/50” Unnotched Compression 0/90 Properties (UNC0)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Unnotched Compression 0/90 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [90/0]4S									
Resin content: 33.23 %wt		Comp. density: 1.571 g/cc									
Fiber volume: 58.59 %vol											
Ply count: 16											
Test method: ASTM D6641-16e1		Modulus calculation: 1000-3000 microstrain									
		ETA2 Modulus calculation: 500-2000 microstrain, 1000-3000 microstrain									
Normalized by: 0.0054		in. CPT									
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F,85%	
Source code		TCARX XXXB		TCARX XXXA		TCARX XXXC		TCARX XXXD		TCARX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
(0/90) UNC0 Strength [ksi]	Mean	102.2	104.2	96.29	97.68	68.78	68.93	24.99	24.54	64.27	63.30
	Minimum	93.19	95.93	87.94	90.98	61.46	63.82	22.93	22.55	52.74	51.80
	Maximum	111.7	113.5	106.0	105.4	78.73	77.30	26.77	26.49	76.31	75.86
	C.V.(%)	6.259	5.482	4.958	4.287	5.827	4.816	6.144	5.864	12.21	12.70
	No. Specimens	19		18		18		6		6	
No. Prepreg Lots	3		3		3		1		1		
(0/90) UNC0 Modulus [Msi]	Mean	9.307	9.497	9.239	9.364	9.163	9.184	8.839	8.681	9.179	9.037
	Minimum	8.756	8.794	8.723	9.056	8.651	8.835	8.257	7.997	8.942	8.750
	Maximum	9.854	10.09	9.716	9.724	9.620	9.583	9.297	9.258	9.374	9.319
	C.V.(%)	3.426	4.051	2.913	1.842	3.353	2.633	4.518	4.920	1.743	2.212
	No. Specimens	18		18		18		6		6	
No. Prepreg Lots	3		3		3		1		1		

2.3.6 In-Plane Shear Properties (IPS)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		In-Plane Shear									
Resin content: 33.12 %wt		Comp. density: 1.568 g/cc		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/-45]4S							
Fiber volume: 58.57 %vol											
Ply count: 16											
Test method: ASTM D3518-18		Modulus calculation: 1000-3000 microstrain (CTA & RTA), 200-1000 microstrain (ETA1, ETA2 & ETW)									
Normalized by: NA											
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F,85%	
Source code		TCANX XNXB		TCANX XNXA		TCANX XNXC		TCANX XNXD		TCANX XNXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₁₂^{90.2%} [ksi]	Mean		6.834		5.437		1.800		0.5403		1.341
	Minimum		6.650		5.231		1.436		0.5162		1.151
	Maximum		7.044		6.089		1.994		0.5635		1.745
	C.V.(%)		1.609		3.656		8.106		3.160		15.81
	No. Specimens		18		18		18		7		6
	No. Prepreg Lots		3		3		3		1		1
F₁₂^{5%strain} [ksi]	Mean		13.14		9.505		4.565				3.770
	Minimum		12.81		9.353		4.120				3.541
	Maximum		13.53		9.760		4.781				3.921
	C.V.(%)		1.596		1.201		3.849				3.476
	No. Specimens		18		18		18				6
	No. Prepreg Lots		3		3		3				1
G₁₂⁹ [Msj]	Mean		0.7326		0.6739		0.4790		0.09234		0.3746
	Minimum		0.7102		0.6437		0.3794		0.08234		0.3355
	Maximum		0.7641		0.7009		0.5423		0.09817		0.4441
	C.V.(%)		2.267		2.558		8.237		5.540		10.06
	No. Specimens		18		18		18		7		6
	No. Prepreg Lots		3		3		3		1		1

Strength at 5% strain is not available for ETA2 because strain gage failed prior to reaching 5% strain.

2.3.7 0° Flexural Proc. A Properties (0FLEX)

Material:		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC								0FLEX, Proc. A Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0]22	
Resin content:	33.44 %wt	Comp. density: 1.574 g/cc									
Fiber volume:	58.55 %vol										
Ply count:	22										
Test method:	ASTM D790-17, Procedure A										
Normalized by:	0.0054	in. CPT									
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F,85%	
Source code		TCATX XXXB		TCATX XXXA		TCATX XXXC		TCATX XXXD		TCATX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
Mean								39.49	41.17		
Minimum								37.76	39.70		
0FLEX, Proc. A Maximum								41.85	43.41		
0.2% Offset Strength C.V.(%)								3.901	3.567		
[ksi]											
No. Specimens									6		
No. Prepreg Lots									1		
Mean								45.02	46.94		
Minimum								43.48	45.34		
0FLEX, Proc. A Maximum								46.78	49.11		
1% Offset Strength C.V.(%)								3.120	3.170		
[ksi]											
No. Specimens									6		
No. Prepreg Lots									1		
Mean		232.2	242.1	201.1	211.2	138.3	145.4			111.1	114.3
Minimum		224.8	229.8	183.9	190.6	120.1	124.4			107.8	110.5
0FLEX, Proc. A Maximum		245.1	252.1	215.8	224.0	149.0	155.9			113.7	117.8
Strength [ksi]		2.485	3.007	4.607	4.356	5.605	6.262			1.763	2.077
C.V.(%)											
No. Specimens			18		18		18				6
No. Prepreg Lots			3		3		3				1

2.3.8 90° Flexural Proc. A Properties (90FLEX)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		90FLEX, Proc. A Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [90]22	
Resin content: 33.44 %wt	Comp. density: 1.574 g/cc		
Fiber volume: 58.55 %vol			
Ply count: 22			
Test method: ASTM D790-17, Procedure A			
Normalized by: 0.0054 in. CPT			
RTA			
Test Temperature [°F]	70		
Moisture Conditioning Equilibrium at T, RH	Ambient		
Source code	TCAT90X XXXA		
	Normalized	Measured	
90FLEX, Proc. A Strength [ksi]	20.56	21.24	
Mean	18.07	19.06	
Minimum	23.12	23.79	
Maximum	7.201	6.664	
C.V.(%)			
No. Specimens	18		
No. Prepreg Lots	3		

Test specimens machined from 0° FLEX panels.

2.3.9 Lamina Short-Beam Strength Properties (SBS) – Reference only

Informational use only due to invalid failure modes.

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Short-Beam Strength Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0]34									
Resin content:	32.27 %wt	Comp. density: 1.577 g/cc									
Fiber volume:	59.68 %vol										
Ply count:	34										
Test method:	ASTM D2344-16										
Normalized by:	NA										
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F,85%	
Source code		TCAQX XXXB		TCAQX XXXA		TCAQX XXXC		TCAQX XXXD		TCAQX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
SBS 0.2% Offset Strength [ksi]	Mean		14.16		10.37		5.277		1.367		4.394
	Minimum		13.02		9.861		4.512		1.235		4.182
	Maximum		14.91		11.24		5.826		1.480		4.736
	C.V.(%)		4.049		2.773		6.190		7.248		4.640
	No. Specimens		18		19		19		6		6
No. Prepreg Lots		3		3		3		1		1	
SBS 1% Offset Strength [ksi]	Mean		17.48		13.06		6.355		2.078		5.470
	Minimum		16.56		12.51		5.352		1.997		5.277
	Maximum		18.13		13.80		6.938		2.172		5.812
	C.V.(%)		2.959		2.125		5.489		3.276		3.661
	No. Specimens		18		19		19		6		6
No. Prepreg Lots		3		3		3		1		1	
SBS 2% Offset Strength [ksi]	Mean		18.85		14.13		7.065		2.511		6.185
	Minimum		17.93		13.48		6.002		2.455		5.963
	Maximum		19.55		14.98		7.703		2.638		6.561
	C.V.(%)		3.050		2.218		5.282		2.703		3.688
	No. Specimens		18		19		19		6		6
No. Prepreg Lots		3		3		3		1		1	

2.3.10 In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Strength Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0]34									
Resin content:	32.27 %wt	Comp. density: 1.577 g/cc									
Fiber volume:	59.68 %vol										
Ply count:	34										
Test method:	ASTM D3846-08 (2015)										
Normalized by:	NA										
	CTA		RTA		ETA1		ETA2		ETW		
Test Temperature [°F]	-65		70		275		400		275		
Moisture Conditioning	Ambient		Ambient		Ambient		Ambient		Equilibrium 160F, 85%		
Equilibrium at T, RH											
Source code	TCAVX XXXB		TCAVX XXXA		TCAVX XXXC		TCAVX XXXD		TCAVX XXXE		
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
Round Notch DNS	Mean		16.77		14.10		8.161				7.406
In-Plane	Minimum		14.97		13.16		7.597				6.904
(Interlaminar) Shear	Maximum		17.43		14.60		8.541				7.689
Strength	C.V.(%)		3.852		2.561		3.520				3.747
[ksi]	No. Specimens		18		18		18				6
	No. Prepreg Lots		3		3		3				1

ETA2 data not available due to unacceptable failure mode.

2.3.11 "25/50/25" Unnotched Tension 1 Properties (UNT1)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Unnotched Tension 1 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/0/-45/90]2S									
Resin content: 33.16 %wt		Comp. density: 1.566 g/cc									
Fiber volume: 58.49 %vol											
Ply count: 16											
Test method: ASTM D3039-17		Modulus calculation: 1000-3000 microstrain									
Normalized by: 0.0054		in. CPT									
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F,85%	
Source code		TCAAX XXXB		TCAAX XXXA		TCAAX XXXC		TCAAX XXXD		TCAAX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT1 Strength [ksi]		148.9	153.9	141.0	147.5	132.4	137.1	103.4	107.3	124.0	129.7
Minimum		141.0	144.9	121.9	125.8	122.0	123.6	98.48	101.0	121.7	126.3
Maximum		160.4	169.9	154.9	164.5	145.7	154.8	106.0	111.2	127.0	133.7
C.V.(%)		3.527	4.634	5.796	6.943	4.828	6.708	2.907	3.868	1.754	2.313
No. Specimens		19		18		18		6		6	
No. Prepreg Lots		3		3		3		1		1	
UNT1 Modulus [Msi]		7.030	7.270	6.651	6.955	6.447	6.674	6.028	6.255	6.020	6.294
Minimum		6.539	6.727	6.338	6.638	6.142	6.201	5.907	6.125	5.751	5.970
Maximum		7.341	7.741	6.917	7.379	6.595	7.013	6.112	6.399	6.309	6.487
C.V.(%)		2.816	4.211	2.443	3.423	1.676	3.301	1.333	1.743	3.277	2.748
No. Specimens		18		18		18		6		6	
No. Prepreg Lots		3		3		3		1		1	

2.3.12 “10/80/10” Unnotched Tension 2 Properties (UNT2)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Unnotched Tension 2					
Resin content: 32.81 %wt		Comp. density: 1.568 g/cc					
Fiber volume: 58.87 %vol		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC					
Ply count: 20		[45/-45/0/45/-45/90/45/-45/45/-45]S					
Test method: ASTM D3039-17		Modulus calculation: 1000-3000 microstrain					
Normalized by: 0.0054		in. CPT					
		CTA		RTA		ETA1	
Test Temperature [°F]		-65		70		275	
Moisture Conditioning		Ambient		Ambient		Ambient	
Equilibrium at T, RH							
Source code		TCABX XXXB		TCABX XXXA		TCABX XXXC	
		Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT2 Strength [ksi] C.V.(%)		83.72	86.37	74.96	77.82	59.68	61.63
Minimum		75.14	76.55	66.50	68.32	55.08	56.20
Maximum		89.22	93.13	81.32	84.57	67.54	70.33
C.V.(%)		5.058	5.802	5.526	5.923	4.579	4.926
No. Specimens		18		18		18	
No. Prepreg Lots		3		3		3	
UNT2 Modulus [Msi] C.V.(%)		4.565	4.707	4.188	4.346	3.433	3.545
Minimum		4.409	4.555	3.900	4.106	3.219	3.333
Maximum		4.700	4.913	4.432	4.628	3.775	3.931
C.V.(%)		1.699	2.119	3.275	3.006	3.779	3.936
No. Specimens		18		18		18	
No. Prepreg Lots		3		3		3	

2.3.13 “50/40/10” Unnotched Tension 3 Properties (UNT3)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Unnotched Tension 3					
Resin content: 32.64 %wt		Comp. density: 1.570 g/cc					
Fiber volume: 59.09 %vol		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC					
Ply count: 20		[0/45/0/90/0/-45/0/45/0/-45]S					
Test method: ASTM D3039-17		Modulus calculation: 1000-3000 microstrain					
Normalized by: 0.0054 in. CPT							
		CTA		RTA		ETA1	
Test Temperature [°F]		-65		70		275	
Moisture Conditioning		Ambient		Ambient		Ambient	
Equilibrium at T, RH							
Source code		TCACX XXXB		TCACX XXXA		TCACX XXXC	
		Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT3 Strength [ksi]		198.0	206.5	204.6	214.3	188.1	198.0
Minimum		179.5	183.6	191.5	195.8	172.8	178.7
Maximum		218.8	230.7	228.5	245.2	214.6	232.2
C.V.(%)		6.172	7.236	5.154	6.666	6.465	8.037
No. Specimens		18		18		19	
No. Prepreg Lots		3		3		3	
UNT3 Modulus [Msi]		10.46	10.91	10.23	10.71	9.746	10.23
Minimum		9.994	10.25	9.720	9.994	9.348	9.855
Maximum		11.16	11.56	10.92	11.25	10.00	10.89
C.V.(%)		3.258	3.699	3.179	3.550	2.061	2.861
No. Specimens		18		18		18	
No. Prepreg Lots		3		3		3	

2.3.14 “25/50/25” Unnotched Compression 1 Properties (UNC1)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Unnotched Compression 1							
Resin content: 32.74 %wt		Comp. density: 1.570 g/cc							
Fiber volume: 58.99 %vol		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC							
Ply count: 24		[45/0/-45/90]3S							
Test method: ASTM D6641-16e1		Modulus calculation: 1000-3000 microstrain							
Normalized by: 0.0054		in. CPT							
		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH								160F,85%	
Source code		TCAWX XXXA		TCAWX XXXC		TCAWX XXXD		TCAWX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNC1 Strength [ksi]									
Mean		77.07	81.18	59.29	62.31	21.41	22.24	56.06	58.82
Minimum		70.55	75.33	54.73	57.94	18.36	18.66	51.22	53.08
Maximum		82.46	86.15	62.05	64.91	24.41	25.08	58.14	61.83
C.V.(%)		4.126	3.697	3.946	3.528	11.35	10.89	4.484	5.440
No. Specimens		18		18		6		6	
No. Prepreg Lots		3		3		1		1	
UNC1 Modulus [Msi]									
Mean		6.180	6.511	6.183	6.503	4.982	5.176	5.959	6.249
Minimum		5.941	6.288	5.855	6.202	4.781	5.061	5.775	6.118
Maximum		6.434	6.711	6.632	6.929	5.126	5.255	6.079	6.431
C.V.(%)		2.200	1.881	4.079	4.194	3.184	1.665	2.100	1.706
No. Specimens		18		18		6		6	
No. Prepreg Lots		3		3		1		1	

2.3.15 “10/80/10” Unnotched Compression 2 Properties (UNC2)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Unnotched Compression 2			
Resin content: 32.32 %wt	Comp. density: 1.572 g/cc			Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC	
Fiber volume: 59.45 %vol	[45/-45/0/45/-45/90/45/-45/45/-45]S				
Ply count: 20					
Test method: ASTM D6641-16e1	Modulus calculation: 1000-3000 microstrain				
Normalized by: 0.0054	in. CPT				
	RTA		ETA1		
Test Temperature [°F]	70		275		
Moisture Conditioning	Ambient		Ambient		
Equilibrium at T, RH					
Source code	TCAXX XXXA		TCAXX XXXC		
	Normalized	Measured	Normalized	Measured	
UNC2 Strength [ksi] C.V.(%)	58.17	60.77	39.47	40.92	
Minimum	50.46	51.73	34.89	37.04	
Maximum	66.94	67.96	44.84	44.25	
C.V.(%)	6.423	6.678	6.174	4.785	
No. Specimens	18		18		
No. Prepreg Lots	3		3		
UNC2 Modulus [Msi] C.V.(%)	4.193	4.379	3.740	3.879	
Minimum	4.033	4.199	3.485	3.608	
Maximum	4.737	4.809	4.331	4.273	
C.V.(%)	3.931	3.365	5.657	4.436	
No. Specimens	18		18		
No. Prepreg Lots	3		3		

2.3.16 “50/40/10” Unnotched Compression 3 Properties (UNC3)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Unnotched Compression 3 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0/45/0/90/0/-45/0/45/0/-45]S	
Resin content: 32.79 %wt	Comp. density: 1.569 g/cc		
Fiber volume: 58.94 %vol			
Ply count: 20			
Test method: ASTM D6641-16e1		Modulus calculation: 1000-3000 microstrain	
Normalized by: 0.0054 in. CPT			
	RTA	ETA1	
Test Temperature [°F]	70	275	
Moisture Conditioning	Ambient	Ambient	
Equilibrium at T, RH			
Source code	TCAYX XXXA	TCAYX XXXC	
	Normalized	Measured	Normalized
	Measured	Normalized	Measured
UNC3 Strength [ksi] C.V.(%)	98.06	102.8	74.81
	90.95	94.82	68.94
	109.1	110.9	82.81
	5.695	4.291	4.733
	3.829		
No. Specimens	18		18
No. Prepreg Lots	3		3
UNC3 Modulus [Msi] C.V.(%)	9.351	9.818	9.501
	8.776	9.290	8.908
	10.09	10.34	10.40
	3.734	3.727	3.668
	3.350		
No. Specimens	18		18
No. Prepreg Lots	3		3

2.3.17 Laminate Short-Beam Strength Properties (SBS1) – Reference only

Informational use only due to invalid failure modes.

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Laminate Short-Beam Strength									
Resin content: 32.74 %wt		Comp. density: 1.570 g/cc		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/0/-45/90]3S							
Fiber volume: 58.99 %vol											
Ply count: 24											
Test method: ASTM D2344-16											
Normalized by: NA											
		RTA		ETA1		ETA2		ETW			
Test Temperature [°F]		70		275		400		275			
Moisture Conditioning		Ambient		Ambient		Ambient		Equilibrium			
Equilibrium at T, RH								160F,85%			
Source code		TCAPX XXXA		TCAPX XXXC		TCAPX XXXD		TCAPX XXXE			
		Normalized		Measured		Normalized		Measured			
SBS1 0.2% Offset Strength [ksi]		11.11		5.595		1.574		4.492			
Minimum		10.97		4.843		1.428		4.363			
Maximum		11.43		5.967		1.776		4.677			
C.V.(%)		1.021		3.958		8.777		3.045			
No. Specimens		18		18		6		6			
No. Prepreg Lots		3		3		1		1			
SBS1 1% Offset Strength [ksi]		13.25		6.888		2.346		5.938			
Minimum		13.01		6.220		2.131		5.830			
Maximum		13.39		7.185		2.621		6.053			
C.V.(%)		0.9784		2.848		8.363		1.550			
No. Specimens		15		18		6		6			
No. Prepreg Lots		3		3		1		1			

Specimens machined from UNC1 panels.

2.3.18 Laminate In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS1)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Laminate In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Strength Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/0/-45/90]3S									
Resin content:	32.74 %wt									Comp. density: 1.570 g/cc	
Fiber volume:	58.99 %vol										
Ply count:	24										
Test method: ASTM D3846-08 (2015)											
Normalized by: NA											
		RTA		ETA1		ETA2		ETW			
Test Temperature [°F]	70	70		275		400		275			
Moisture Conditioning	Ambient	Ambient		Ambient		Ambient		Equilibrium			
Equilibrium at T, RH								160F, 85%			
Source code	TCAV1X XXXA	TCAV1X XXXC		TCAV1X XXXD		TCAV1X XXXE					
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured		
Round Notch DNS1	Mean		12.09		6.964				6.265		
	Minimum		11.02		6.262				5.911		
In-Plane	Maximum		12.73		7.874				6.525		
(Interlaminar) Shear	C.V.(%)		3.972		5.638				3.739		
Strength [ksi]	No. Specimens		18		19				6		
	No. Prepreg Lots		3		3				1		

ETA2 data not available due to unacceptable failure mode.

2.3.19 "25/50/25" Open-Hole Tension 1 Properties (OHT1)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Open-Hole Tension 1								
Resin content: 33.17 %wt		Comp. density: 1.568 g/cc								
Fiber volume: 58.54 %vol		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/0-45/90]2S								
Ply count: 16										
Test method: ASTM D5766-11(2018)										
Normalized by: 0.0054 in. CPT										
	CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]	-65		70		275		400		275	
Moisture Conditioning	Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH									160F,85%	
Source code	TCADX XXXB		TCADX XXXA		TCADX XXXC		TCADX XXXD		TCADX XXXE	
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
Mean	70.30	71.72	68.52	69.82	66.18	67.24	58.03	60.12	63.11	65.00
Minimum	65.42	66.24	63.82	63.21	61.50	59.29	56.55	57.80	60.97	63.12
Maximum	75.35	78.42	76.45	78.29	75.44	77.38	59.29	62.74	65.01	67.61
OHT1 Strength [ksi]	4.169	5.442	4.710	6.141	5.796	7.623	2.208	2.700	2.547	2.706
C.V.(%)										
No. Specimens	19		18		18		6		6	
No. Prepreg Lots	3		3		3		1		1	

2.3.20 “10/80/10” Open-Hole Tension 2 Properties (OHT2)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Open-Hole Tension 2						
Resin content: 31.64 %wt		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC						
Fiber volume: 60.08 %vol		[45/-45/0/45/-45/90/45/-45/45/-45]S						
Ply count: 20								
Test method: ASTM D5766-11(2018)								
Normalized by: 0.0054 in. CPT								
	CTA	RTA		ETA1				
Test Temperature [°F]	-65	70		275				
Moisture Conditioning	Ambient	Ambient		Ambient				
Equilibrium at T, RH								
Source code	TCAEX XXXB		TCAEX XXXA		TCAEX XXXC			
	Normalized	Measured	Normalized	Measured	Normalized	Measured		
Mean	56.03	57.23	51.03	52.45	42.06	43.20		
Minimum	52.85	53.29	47.88	48.78	39.85	40.55		
Maximum	58.11	60.65	53.96	56.54	43.77	45.77		
OHT2 Strength [ksi] C.V.(%)	2.253	3.447	3.070	4.001	3.099	3.608		
No. Specimens	18		18		18			
No. Prepreg Lots	3		3		3			

2.3.21 “50/40/10” Open-Hole Tension 3 Properties (OHT3)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Open-Hole Tension 3					
Resin content: 32.02 %wt		Comp. density: 1.572 g/cc					
Fiber volume: 59.72 %vol		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC					
Ply count: 20		[0/45/0/90/0/-45/0/45/0/-45]S					
Test method: ASTM D5766-11(2018)							
Normalized by: 0.0054 in. CPT							
	CTA	RTA		ETA1			
Test Temperature [°F]	-65	70		275			
Moisture Conditioning	Ambient	Ambient		Ambient			
Equilibrium at T, RH							
Source code	TCAFX XXXB	TCAFX XXXA		TCAFX XXXC			
	Normalized	Measured	Normalized	Measured	Normalized	Measured	
Mean	97.90	104.5	95.06	102.8	98.05	105.2	
Minimum	92.48	99.05	86.06	94.24	90.90	98.64	
Maximum	107.6	114.9	103.9	112.6	108.0	114.6	
OHT3 Strength [ksi] C.V.(%)	4.195	4.091	4.590	4.279	4.940	4.863	
No. Specimens	18		18		18		
No. Prepreg Lots	3		3		3		

2.3.22 "25/50/25" Filled-Hole Tension 1 Properties (FHT1)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Filled-Hole Tension 1									
Resin content: 33.35 %wt		Comp. density: 1.573 g/cc		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/0/-45/90]2S							
Fiber volume: 58.57 %vol											
Ply count: 16											
Test method: ASTM D6742-17											
Normalized by: 0.0054 in. CPT											
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F, 85%	
Source code		TCA4X X4XB		TCA4X X4XA		TCA4X X4XC		TCA4X X4XD		TCA4X X4XE	
		Normalized		Measured		Normalized		Measured		Normalized	
		Measured		Normalized		Measured		Normalized		Measured	
Mean		77.60 79.60		71.02 73.54		70.14 72.31		60.64 61.96		68.21 70.26	
Minimum		73.58 75.67		66.69 69.43		65.94 68.07		59.33 60.45		63.32 65.80	
Maximum		84.30 87.13		73.89 77.69		74.34 77.19		62.08 63.92		71.46 72.94	
FHT1 Strength [ksi]		3.942 4.736		2.488 3.154		3.343 4.268		1.886 2.036		4.634 4.199	
C.V.(%)											
No. Specimens		18		18		18		6		6	
No. Prepreg Lots		3		3		3		1		1	

2.3.23 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Filled-Hole Tension 2				
Resin content: 32.22 %wt		Comp. density: 1.575 g/cc				
Fiber volume: 59.63 %vol		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC				
Ply count: 20		[45/-45/0/45/-45/90/45/-45/45/-45]S				
Test method: ASTM D6742-17						
Normalized by: 0.0054 in. CPT						
	CTA	RTA	ETA1			
Test Temperature [°F]	-65	70	275			
Moisture Conditioning	Ambient	Ambient	Ambient			
Equilibrium at T, RH						
Source code	TCA5X X5XB	TCA5X X5XA		TCA5X X5XC		
	Normalized	Measured	Normalized	Measured	Normalized	Measured
Mean	61.81	63.41	53.66	55.37	44.55	45.93
Minimum	58.38	60.15	45.26	48.14	41.50	43.25
Maximum	66.69	68.62	57.31	59.26	47.69	48.74
FHT2 Strength [ksi] C.V.(%)	3.193	3.397	5.363	4.793	4.180	4.165
No. Specimens	18		18		18	
No. Prepreg Lots	3		3		3	

2.3.24 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Filled-Hole Tension 3						
Resin content: 32.92 %wt		Comp. density: 1.573 g/cc						
Fiber volume: 58.94 %vol		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC						
Ply count: 20		[0/45/0/90/0/-45/0/45/0/-45]S						
Test method: ASTM D6742-17								
Normalized by: 0.0054 in. CPT								
	CTA	RTA		ETA1				
Test Temperature [°F]	-65	70		275				
Moisture Conditioning	Ambient	Ambient		Ambient				
Equilibrium at T, RH								
Source code	TCA6X X6XB		TCA6X X6XA		TCA6X X6XC			
	Normalized	Measured	Normalized	Measured	Normalized	Measured		
Mean	97.61	103.0	93.20	99.81	95.04	102.1		
Minimum	89.75	93.40	85.87	91.29	90.15	95.09		
Maximum	106.6	114.8	102.3	110.4	103.8	111.2		
FHT3 Strength [ksi] C.V.(%)	5.044	5.912	4.723	5.022	4.684	5.564		
No. Specimens	18		18		18			
No. Prepreg Lots	3		3		3			

2.3.25 “25/50/25” Open-Hole Compression 1 Properties (OHC1)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Open-Hole Compression 1 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/0/-45/90]4S								
Resin content:	33.17 %wt	Comp. density: 1.570 g/cc								
Fiber volume:	58.62 %vol									
Ply count:	32									
Test method:	ASTM D6484-14									
Normalized by:	0.0054	in. CPT								
		RTA		ETA1		ETA2		ETW		
Test Temperature [°F]	70	70		275		400		275		
Moisture Conditioning	Ambient	Ambient		Ambient		Ambient		Equilibrium		
Equilibrium at T, RH								160F,85%		
Source code		TCAGX XXXA		TCAGX XXXC		TCAGX XXXD		TCAGX XXXE		
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	
Mean		45.79	47.33	34.00	34.96	17.38	17.77	29.19	29.93	
Minimum		43.64	44.99	31.95	33.02	16.64	17.28	28.83	28.98	
Maximum		47.95	48.95	35.99	37.47	18.47	19.19	29.72	30.74	
OHC1 Strength [ksi] C.V.(%)		3.014	2.610	3.268	3.607	3.701	4.015	1.163	2.139	
No. Specimens		18		18		6		6		
No. Prepreg Lots		3		3		1		1		

2.3.26 “10/80/10” Open-Hole Compression 2 Properties (OHC2)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Open-Hole Compression 2 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/-45/0/45/-45/90/45/-45/45/-45]2S		
Resin content: 30.98 %wt	Comp. density: 1.578 g/cc			
Fiber volume: 60.83 %vol				
Ply count: 40				
Test method: ASTM D6484-14				
Normalized by: 0.0054 in. CPT				
	RTA		ETA1	
Test Temperature [°F]	70		275	
Moisture Conditioning	Ambient		Ambient	
Equilibrium at T, RH				
Source code	TCAHX XXXA		TCAHX XXXC	
	Normalized	Measured	Normalized	Measured
Mean	43.12	45.10	31.95	33.14
Minimum	41.88	43.46	31.22	31.91
Maximum	44.98	46.62	33.84	34.93
OHC2 Strength [ksi] C.V.(%)	2.065	1.833	1.967	2.568
No. Specimens	18		18	
No. Prepreg Lots	3		3	

2.3.27 “50/40/10” Open-Hole Compression 3 Properties (OHC3)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Open-Hole Compression 3 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0/45/0/90/0/-45/0/45/0/-45]2S	
Resin content: 31.06 %wt	Comp. density: 1.576 g/cc		
Fiber volume: 60.72 %vol			
Ply count: 40			
Test method: ASTM D6484-14			
Normalized by: 0.0054 in. CPT			
	RTA		ETA1
Test Temperature [°F]	70		275
Moisture Conditioning	Ambient		Ambient
Equilibrium at T, RH			
Source code	TCAIX XXXA		TCAIX XXXC
	Normalized	Measured	Normalized
	Measured		Measured
Mean	55.04	57.59	40.82
Minimum	52.64	56.16	39.19
Maximum	56.50	59.23	42.54
OHC3 Strength [ksi] C.V.(%)	1.886	1.496	1.968
			3.409
No. Specimens	18		18
No. Prepreg Lots	3		3

2.3.28 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Filled-Hole Compression 1						
Resin content: 32.09 %wt	Comp. density: 1.571 g/cc			Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/0/-45/90]4S				
Fiber volume: 59.61 %vol								
Ply count: 32								
Test method: ASTM D6742-17								
Normalized by: 0.0054 in. CPT								
	RTA	ETA1		ETA2	ETW			
Test Temperature [°F]	70	275		400	275			
Moisture Conditioning	Ambient	Ambient		Ambient	Equilibrium			
Equilibrium at T, RH					160F, 85%			
Source code	TCA7X XXXA	TCA7X XXXC		TCA7X XXXD	TCA7X XXXE			
	Normalized	Measured	Normalized	Measured	Normalized	Measured		
Mean	73.88	77.79	55.47	57.94	24.01*	24.79*	66.69*	68.44*
Minimum	70.10	73.04	53.51	55.27	23.00	23.57	64.82	66.92
Maximum	79.15	82.36	57.75	60.53	25.63	26.51	67.85	69.86
FHC1 Strength [ksi] C.V.(%)	3.433	3.907	2.379	2.714	4.125	4.263	1.881	1.771
No. Specimens	18		18		6		6	
No. Prepreg Lots	3		3		1		1	

* In some cases of FHC>UNC, FHC data is for informational purposes only and is not appropriate to be used for design.

2.3.29 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Filled-Hole Compression 2 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/-45/0/45/-45/90/45/-45/45/-45]2S	
Resin content: 31.98 %wt	Comp. density: 1.572 g/cc		
Fiber volume: 59.76 %vol			
Ply count: 40			
Test method: ASTM D6742-17			
Normalized by: 0.0054	in. CPT		
	RTA	ETA1	
Test Temperature [°F]	70	275	
Moisture Conditioning	Ambient	Ambient	
Equilibrium at T, RH			
Source code	TCA8X XXXA	TCA8X XXXC	
	Normalized	Measured	Normalized
	Measured	Normalized	Measured
Mean	55.99	58.03	41.88*
Minimum	53.40	56.44	37.32
Maximum	58.65	59.79	44.82
FHC2 Strength [ksi] C.V.(%)	2.677	2.010	5.938
			5.442
No. Specimens	18		18
No. Prepreg Lots	3		3

* In some cases of FHC>UNC, FHC data is for informational purposes only and is not appropriate to be used for design.

2.3.30 "50/40/10" Filled-Hole Compression 3 Properties (FHC3)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Filled-Hole Compression 3 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0/45/0/90/0/-45/0/45/0/-45]2S				
Resin content: 31.79 %wt	Comp. density: 1.580 g/cc					
Fiber volume: 60.22 %vol						
Ply count: 40						
Test method: ASTM D6742-17						
Normalized by: 0.0054	in. CPT					
	RTA	ETA1				
Test Temperature [°F]	70	275				
Moisture Conditioning	Ambient	Ambient				
Equilibrium at T, RH						
Source code	TCA9X XXXA		TCA9X XXXC			
	Normalized	Measured	Normalized	Measured		
Mean	89.48	93.74	69.17	72.23		
Minimum	86.26	88.36	66.26	69.02		
Maximum	92.72	98.82	74.33	78.86		
FHC3 Strength [ksi] C.V.(%)	2.111	3.594	2.889	3.979		
No. Specimens	18		18			
No. Prepreg Lots	3		3			

2.3.31 “25/50/25” Single-Shear Bearing 1, Proc. C Properties (SSB1)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Single-Shear Bearing 1, Proc. C							
Resin content: 32.82 %wt		Comp. density: 1.575 g/cc							
Fiber volume: 59.12 %vol		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC							
Ply count: 16		[45/0/-45/90]2S							
Test method: ASTM D5961-17, Procedure C									
Normalized by: 0.0054 in. CPT									
		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH								160F,85%	
Source code		TCA1X XXXA		TCA1X XXXC		TCA1X XXXD		TCA1X XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
Mean		100.9	107.2	84.98	89.28	50.58	52.32	88.12	91.08
Minimum		87.04	92.64	71.88	75.08	47.01	48.19	79.51	81.38
Maximum		113.8	119.5	94.02	96.56	55.75	56.36	92.57	96.52
2% Offset Strength C.V.(%)		7.900	6.820	5.920	5.759	6.569	5.582	5.166	5.918
[ksi]									
No. Specimens		18		18		6		6	
No. Prepreg Lots		3		3		1		1	
Mean		126.9	134.9	101.8	106.9	69.35	71.80	95.82	99.04
Minimum		118.2	124.4	95.60	101.0	66.66	68.34	91.68	93.83
Maximum		134.5	140.6	109.5	116.2	71.06	75.06	100.9	105.2
Ultimate Strength C.V.(%)		3.410	3.357	3.933	3.600	2.240	3.859	3.918	5.012
[ksi]									
No. Specimens		18		18		6		6	
No. Prepreg Lots		3		3		1		1	

2.3.32 “10/80/10” Single-Shear Bearing 2, Proc. C Properties (SSB2)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Single-Shear Bearing 2, Proc. C Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [45/-45/0/45/-45/90/45/-45/45/-45]S			
Resin content: 32.75 %wt	Comp. density: 1.571 g/cc				
Fiber volume: 59.04 %vol					
Ply count: 20					
Test method: ASTM D5961-17, Procedure C					
Normalized by: 0.0054 in. CPT					
	RTA	ETA1			
Test Temperature [°F]	70	275			
Moisture Conditioning	Ambient	Ambient			
Equilibrium at T, RH					
Source code	TCA2X XXXA	TCA2X XXXC			
	Normalized	Measured	Normalized	Measured	
Mean	106.5	112.7	87.29	89.76	
Minimum	99.57	104.1	77.01	81.74	
Maximum	116.1	124.9	97.13	97.67	
2% Offset Strength C.V.(%)	4.166	5.107	5.375	4.737	
[ksi]					
No. Specimens	18		18		
No. Prepreg Lots	3		3		
Mean	134.3	142.1	105.4	108.4	
Minimum	127.9	134.4	96.63	101.2	
Maximum	141.2	152.6	111.7	115.0	
Ultimate Strength C.V.(%)	2.690	3.438	3.729	3.692	
[ksi]					
No. Specimens	18		18		
No. Prepreg Lots	3		3		

2.3.33 “50/40/10” Single-Shear Bearing 3, Proc. C Properties (SSB3)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		<table border="1"> <tr> <td colspan="2" style="text-align: center;">Single-Shear Bearing 3, Proc. C</td> </tr> <tr> <td colspan="2">Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0/45/0/90/0/-45/0/45/0/-45]S</td> </tr> </table>				Single-Shear Bearing 3, Proc. C		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0/45/0/90/0/-45/0/45/0/-45]S	
Single-Shear Bearing 3, Proc. C									
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0/45/0/90/0/-45/0/45/0/-45]S									
Resin content: 32.79 %wt	Comp. density: 1.571 g/cc								
Fiber volume: 59.00 %vol									
Ply count: 20									
Test method: ASTM D5961-17, Procedure C									
Normalized by: 0.0054 in. CPT									
	RTA	ETA1							
Test Temperature [°F]	70	275							
Moisture Conditioning	Ambient	Ambient							
Equilibrium at T, RH									
Source code	TCA3X XXXA		TCA3X XXXC						
	Normalized	Measured	Normalized	Measured					
SSB3, Proc. C	109.3	117.5	82.90	88.85					
2% Offset Strength	100.7	110.0	75.33	81.71					
C.V.(%)	114.7	123.4	90.79	95.24					
[ksi]	3.414	3.022	5.054	3.715					
No. Specimens	18		18						
No. Prepreg Lots	3		3						
SSB3, Proc. C	132.7	142.8	96.12	103.1					
Ultimate Strength	125.6	132.8	90.16	97.54					
C.V.(%)	140.9	150.0	103.8	114.6					
[ksi]	3.092	3.417	4.031	3.628					
No. Specimens	18		18						
No. Prepreg Lots	3		3						

2.3.34 “25/50/25” Compression After Impact 1 Properties (CAI1)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Compression After Impact 1							
Resin content: 34.54 %wt		Comp. density: 1.562 g/cc							
Fiber volume: 57.13 %vol		Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC							
Ply count: 32		[45/0/-45/90]4S							
Test method: ASTM D7136-15/D7137-17									
Normalized by: 0.0054 in. CPT									
		RTA	ETA1		ETA2		ETW		
Test Temperature [°F]		70	275		400		275		
Moisture Conditioning		Ambient	Ambient		Ambient		Equilibrium		
Equilibrium at T, RH							160F, 85%		
Source code		TCAKX XXXA	TCAKX XXXC		TCAKX XXXD		TCAKX XXXE		
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
CAI1 Strength [ksi]	Mean	45.38	46.10	34.04	34.44	13.77	14.14	31.86	32.56
	Minimum	43.39	43.65	32.94	33.25	13.17	13.37	31.25	32.07
	Maximum	47.10	48.06	36.71	37.13	14.29	14.76	32.60	33.13
	C.V.(%)	3.544	3.730	4.035	4.077	2.777	3.295	1.719	1.495
	No. Specimens	6		6		7		6	
	No. Prepreg Lots	1		1		1		1	

See section 5 for dent depths.

2.3.35 Interlaminar Tension Properties (ILT)

Material: Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC		Interlaminar Tension Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC [0]30									
Resin content: 33.51 %wt		Comp. density: 1.567 g/cc									
Fiber volume: 58.20 %vol											
Ply count: 30											
Test method: ASTM D6415-06a(2013)											
Normalized by: NA											
		CTA		RTA		ETA1		ETA2		ETW	
Test Temperature [°F]		-65		70		275		400		275	
Moisture Conditioning		Ambient		Ambient		Ambient		Ambient		Equilibrium	
Equilibrium at T, RH										160F,85%	
Source code		TCAMX XMxB		TCAMX XMxA		TCAMX XMxC		TCAMX XMxD		TCAMX XMxE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
CBS [lb]	Mean		607.7		537.9		289.1				236.2
	Minimum		557.8		514.4		285.8				227.1
	Maximum		665.2		555.9		295.7				247.1
	C.V.(%)		6.727		3.060		1.588				3.055
	No. Specimens		6		6		6				6
No. Prepreg Lots		1		1		1				1	
ILT [ksi]	Mean		18.61		16.66		8.821				7.036
	Minimum		17.15		15.92		8.719				6.711
	Maximum		20.18		17.12		9.006				7.323
	C.V.(%)		6.228		3.143		1.363				3.299
	No. Specimens		6		6		6				6
No. Prepreg Lots		1		1		1				1	

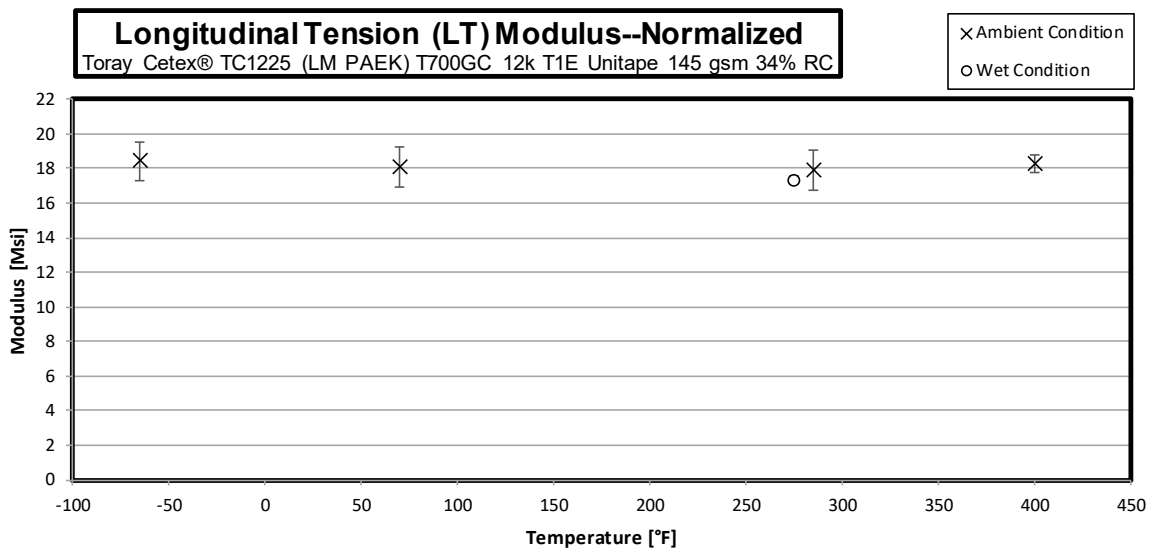
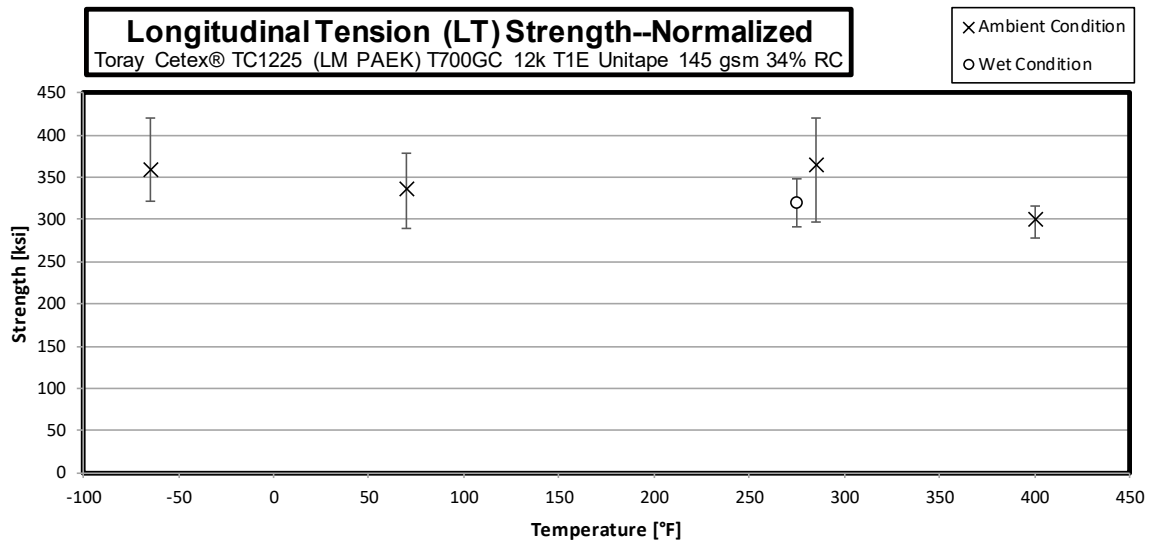
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3 Individual Material Property Test Charts

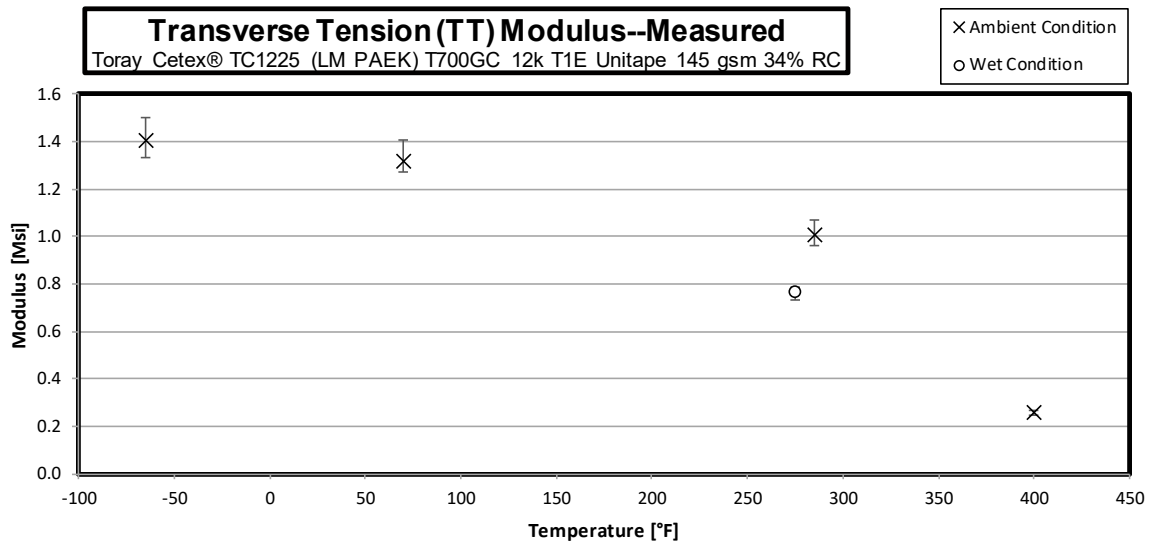
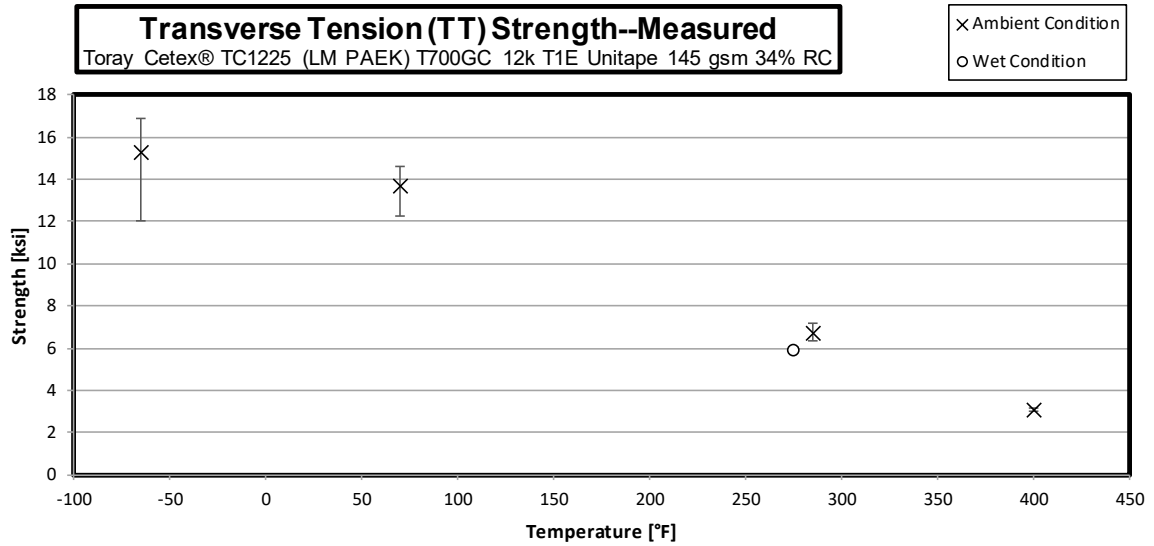
The material property test charts display a combination of all three batches and both consolidate cycles for a particular property as a function of test temperature for ambient and wet test conditions. The average is plotted for each material property and the minimum to maximum range is represented by vertical bars.

Plots for ETA1 have been offset to 285°F (from 275°F) to improve clarity and readability.

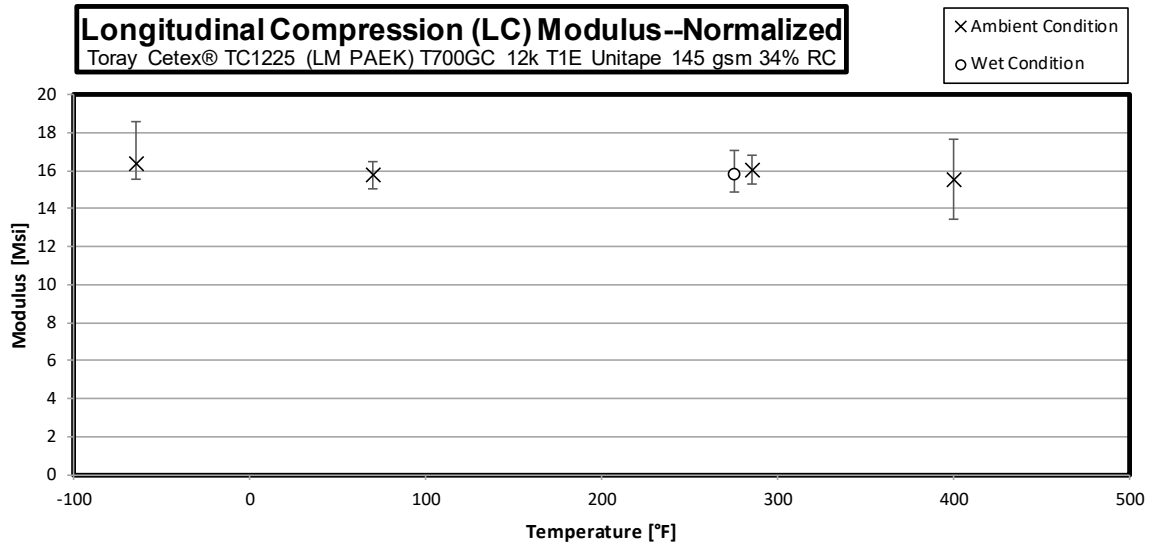
3.1 Longitudinal Tension Properties (LT)



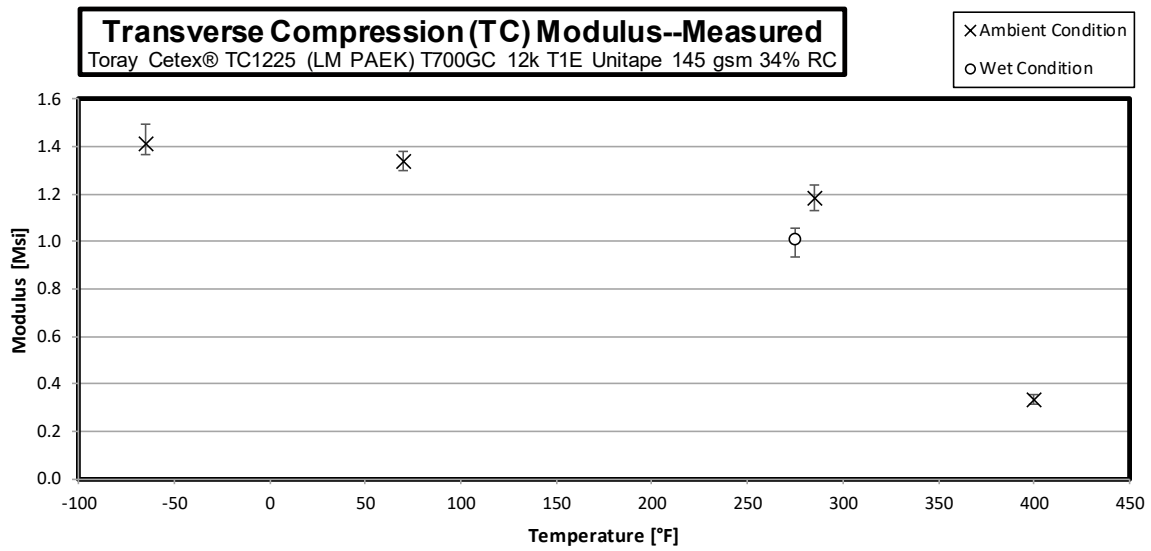
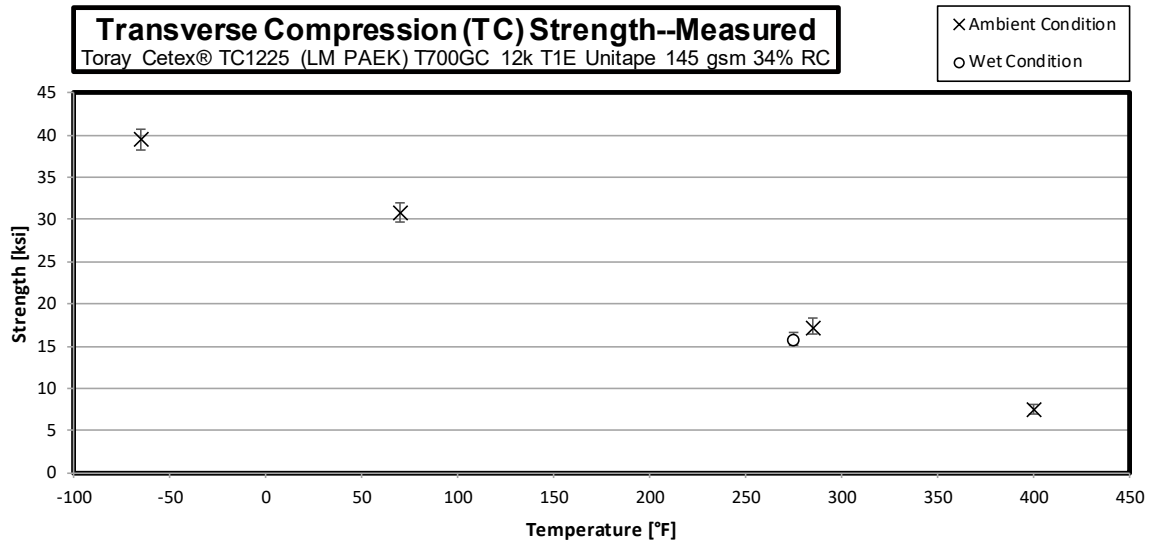
3.2 Transverse Tension Properties (TT)



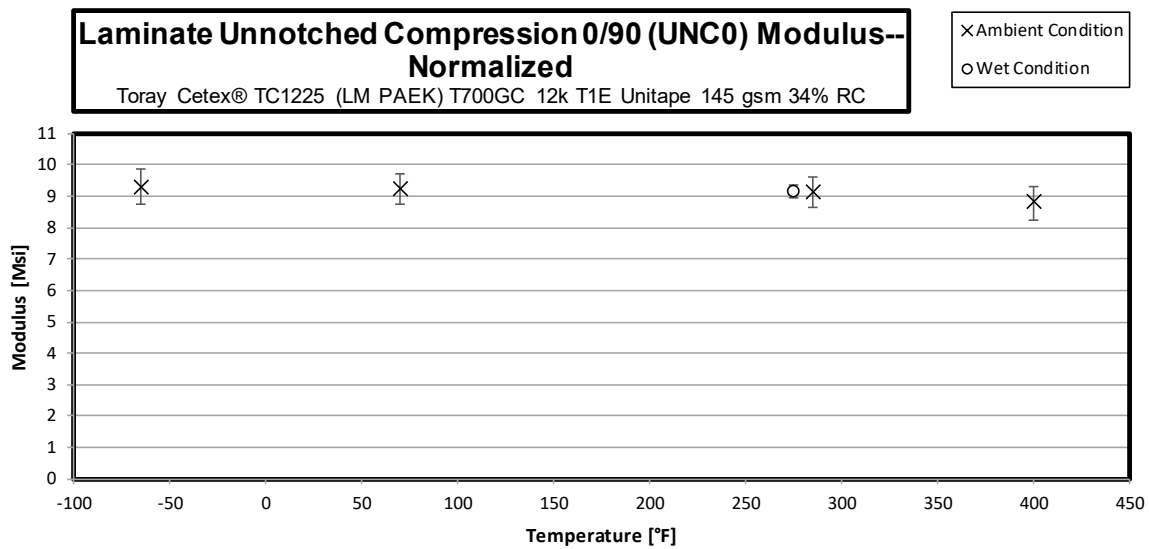
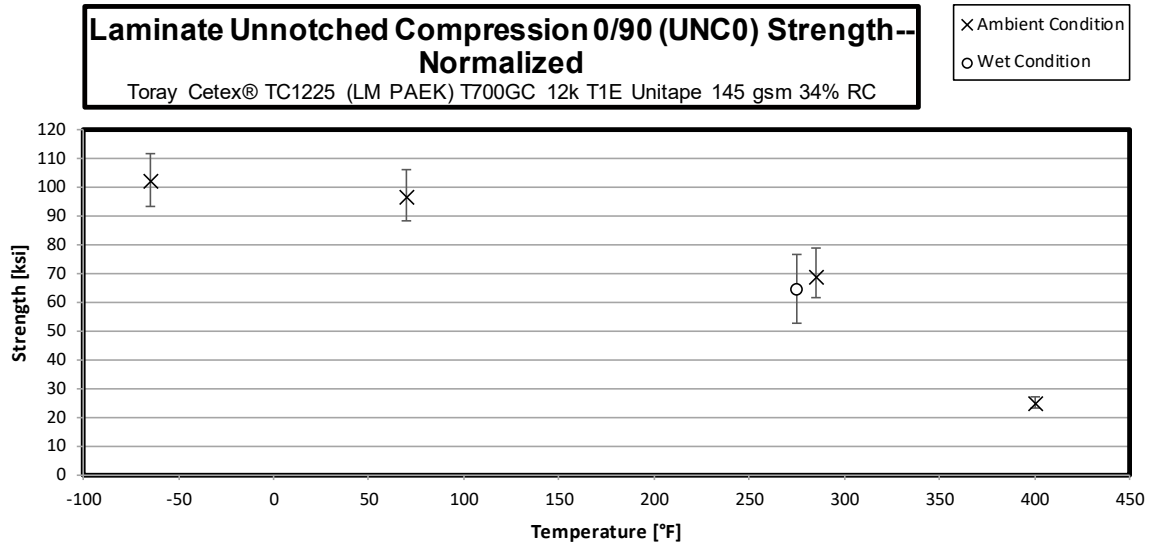
3.3 Longitudinal Compression Properties (LC)



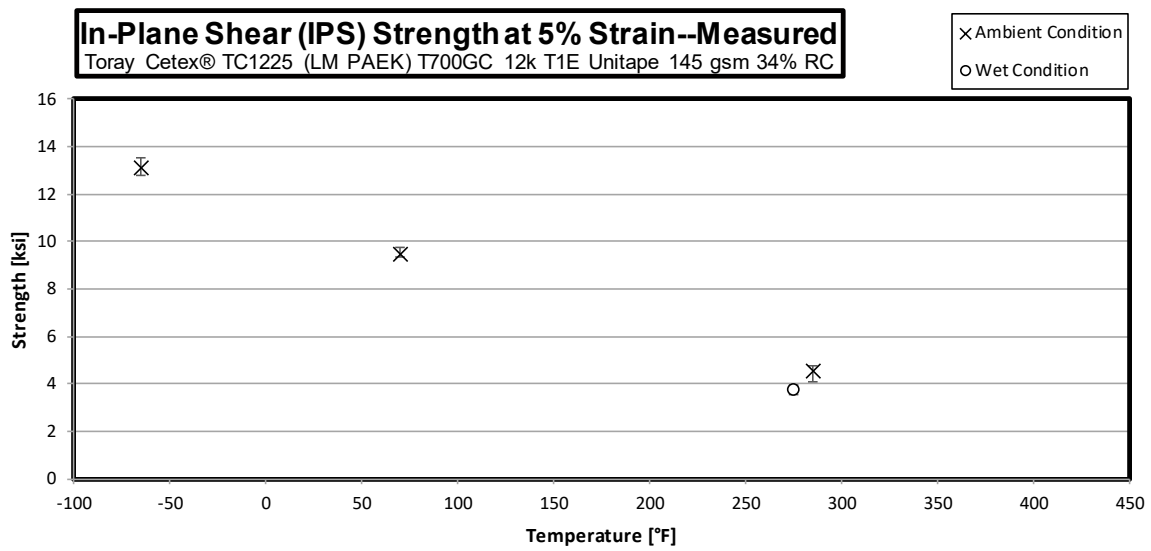
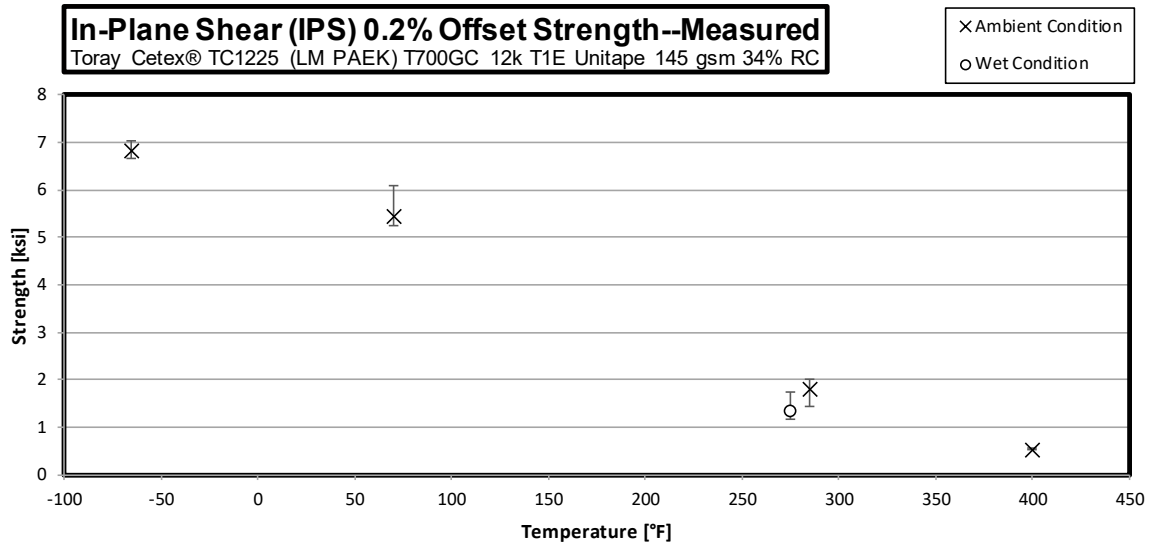
3.4 Transverse Compression Properties (TC)

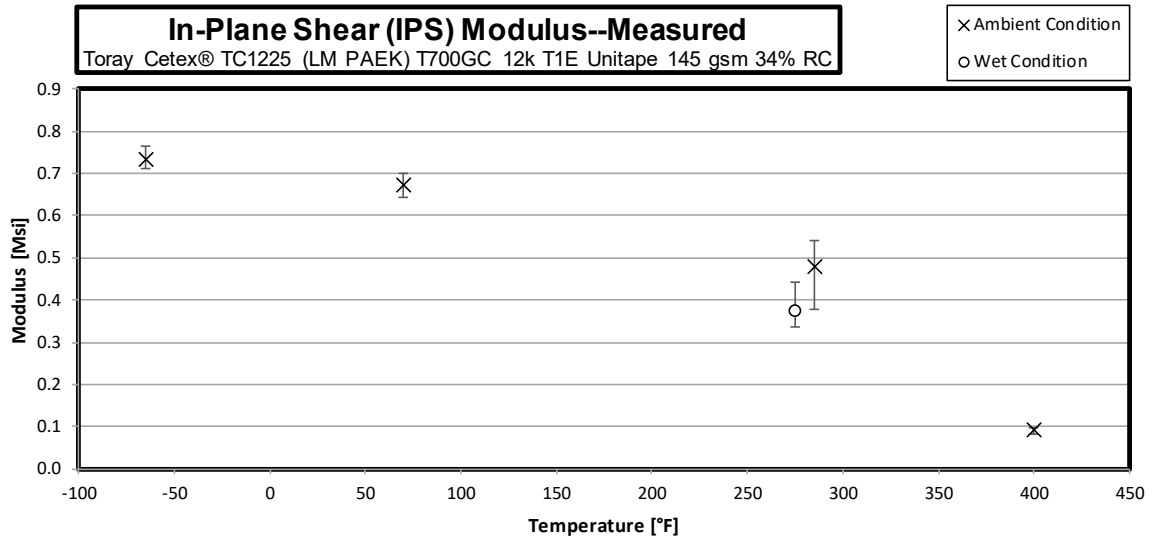


3.5 “50/0/50” Unnotched Compression 0/90 Properties (UNC0)

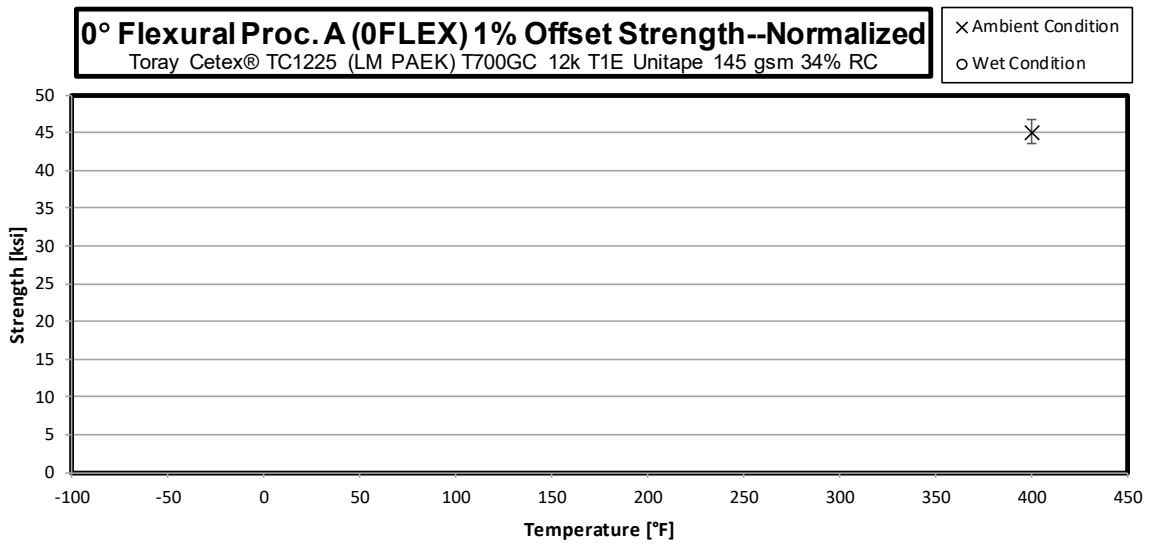
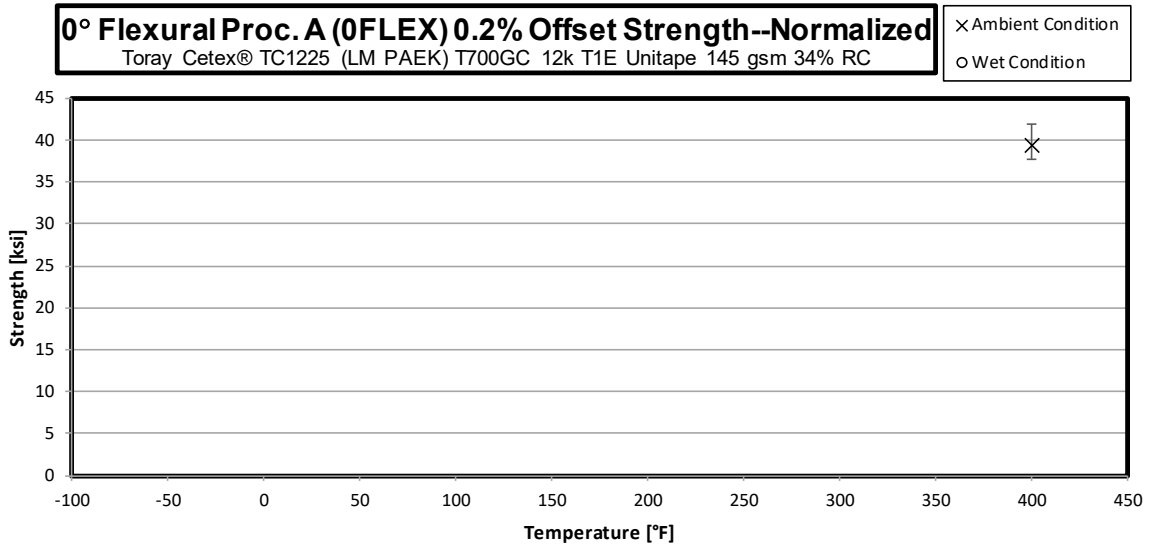


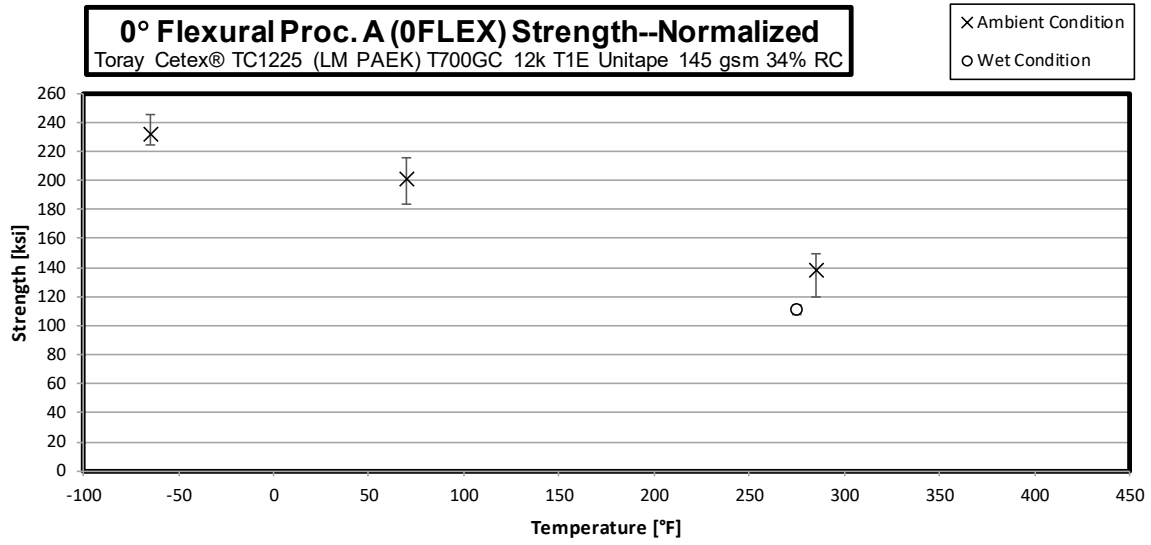
3.6 In-Plane Shear Properties (IPS)



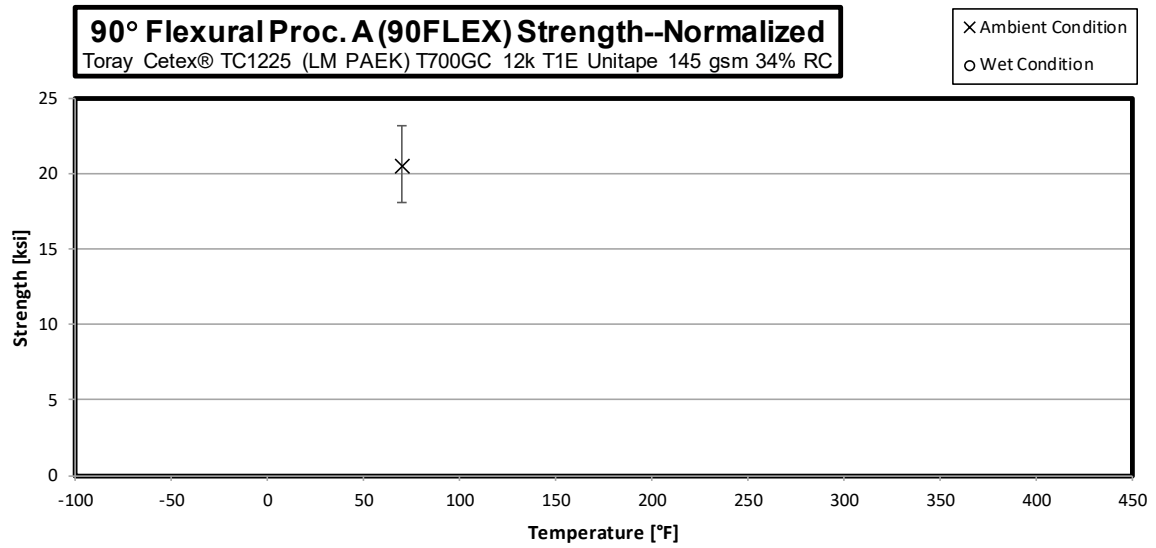


3.7 0° Flexural Proc. A Properties (0FLEX)



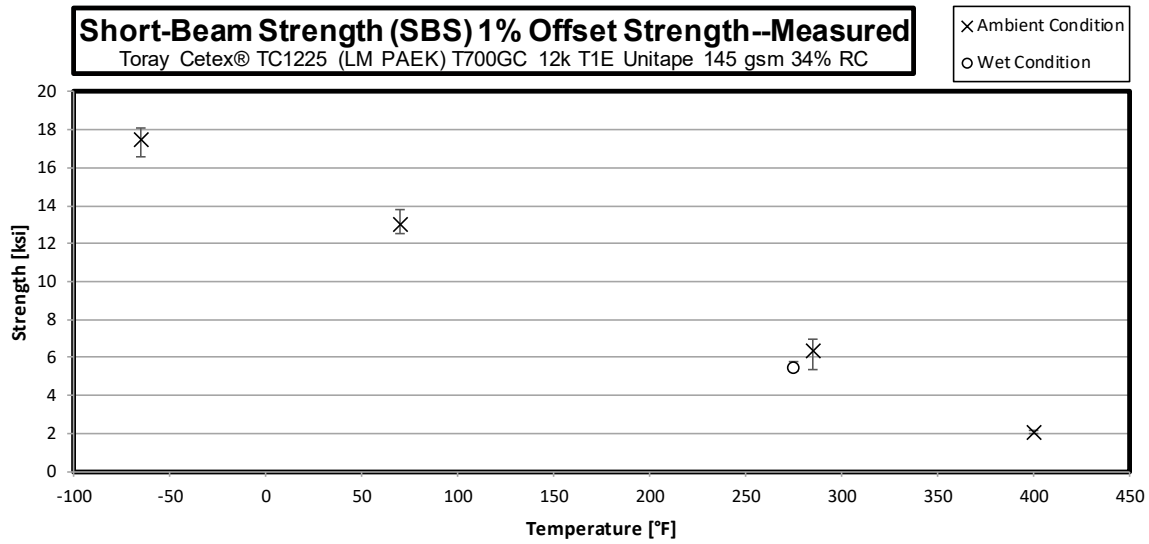
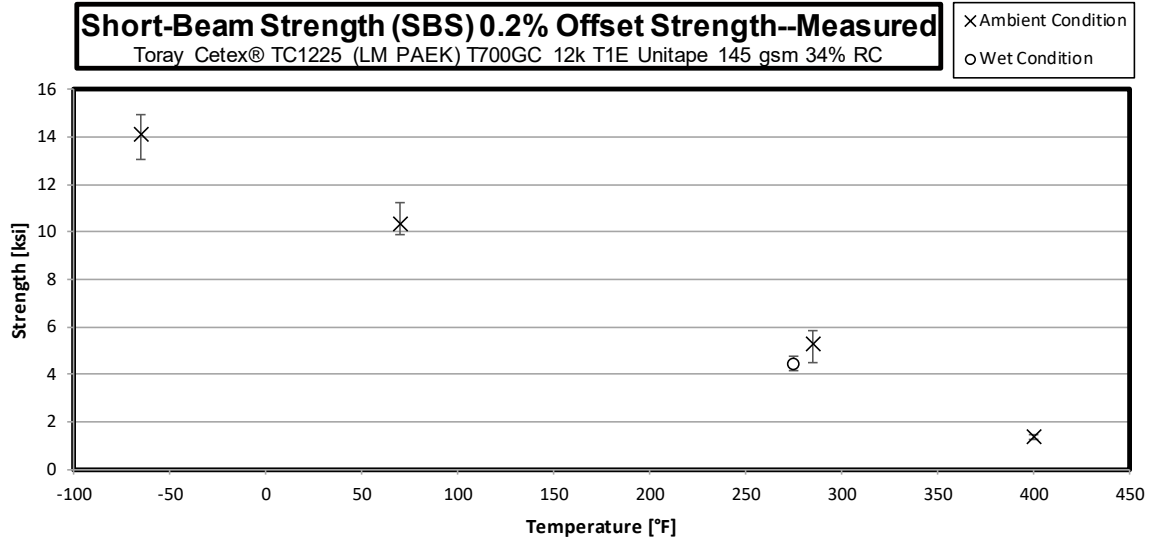


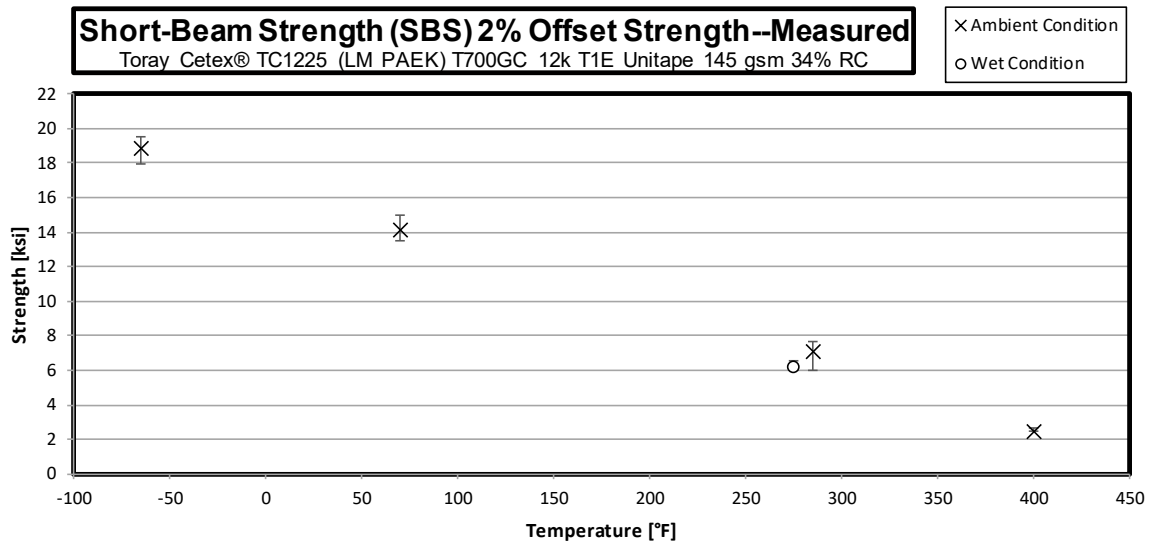
3.8 90° Flexural Proc. A Properties (90FLEX)



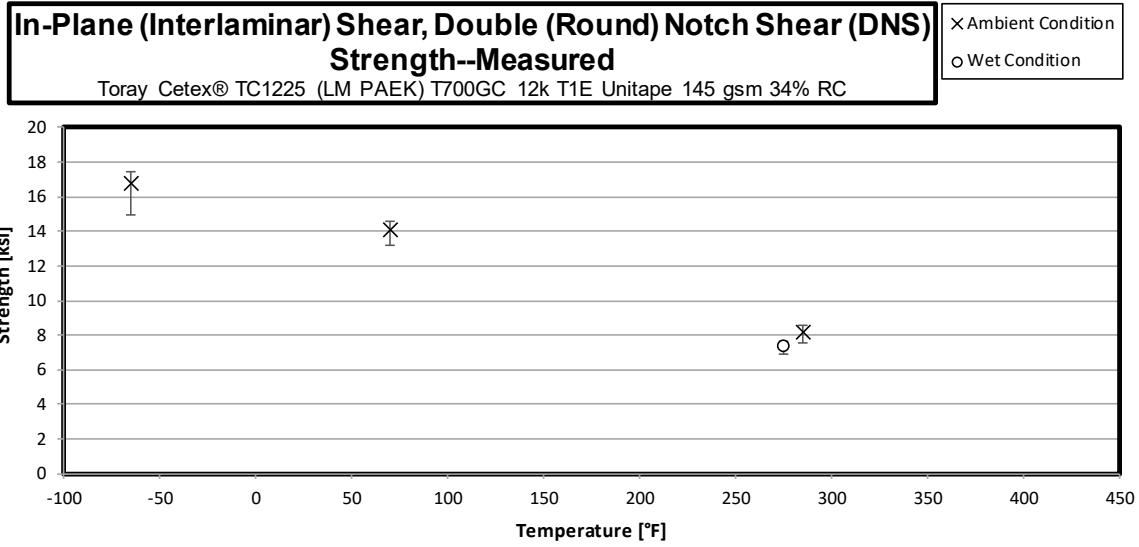
3.9 Lamina Short-Beam Shear Properties (SBS) – Reference only

Informational use only due to invalid failure modes.

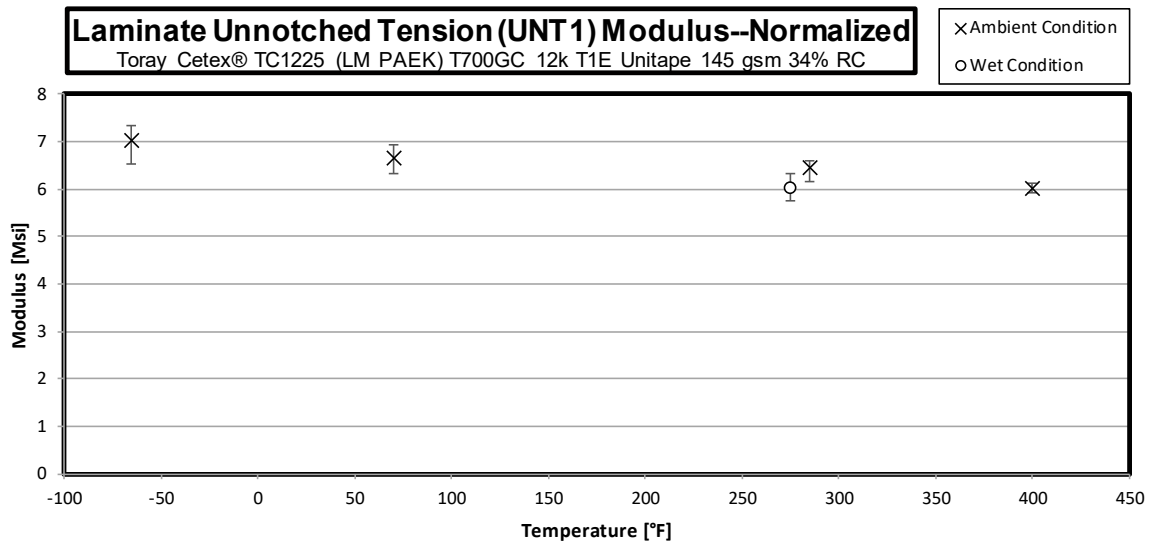
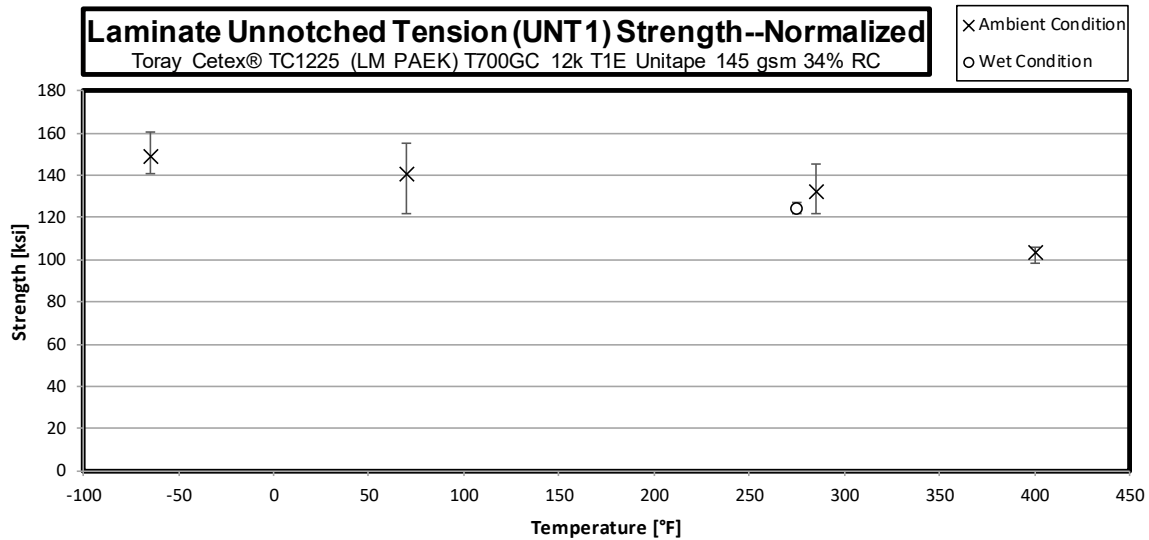




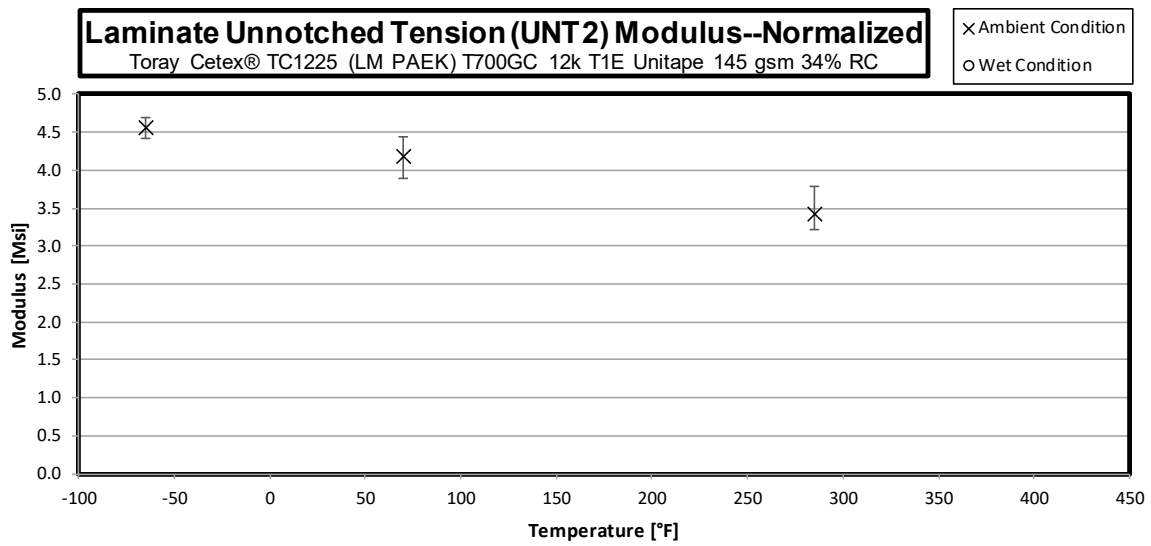
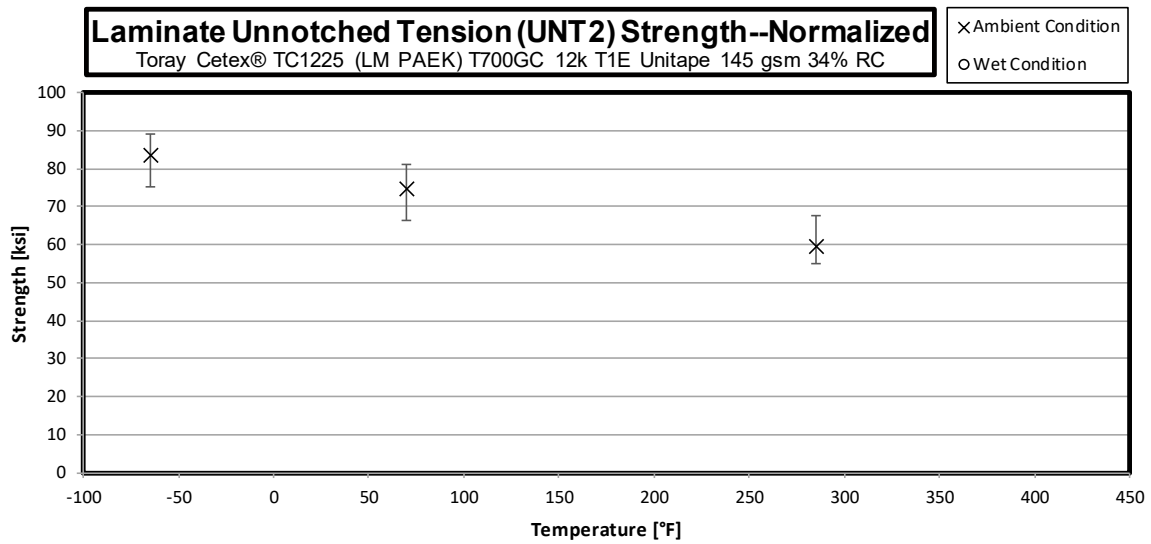
3.10 In-Plane Shear (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS)



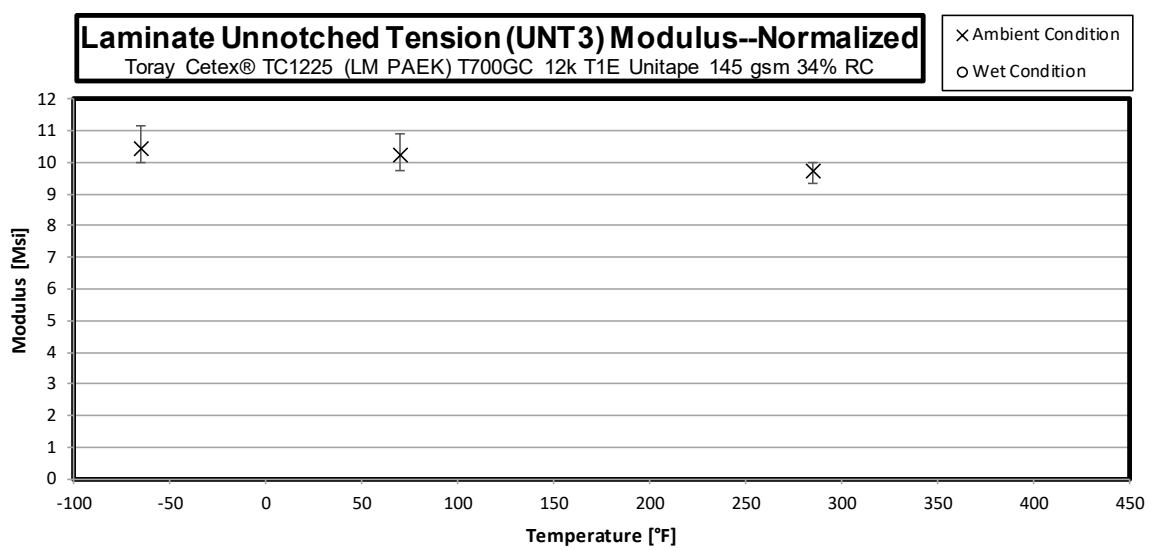
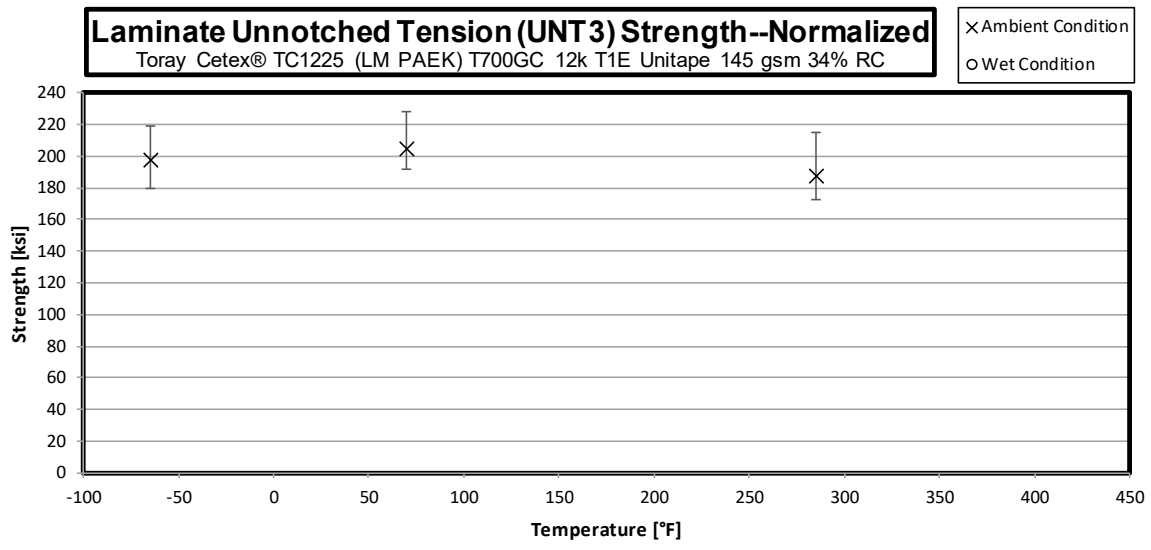
3.11 “25/50/25” Unnotched Tension 1 Properties (UNT1)



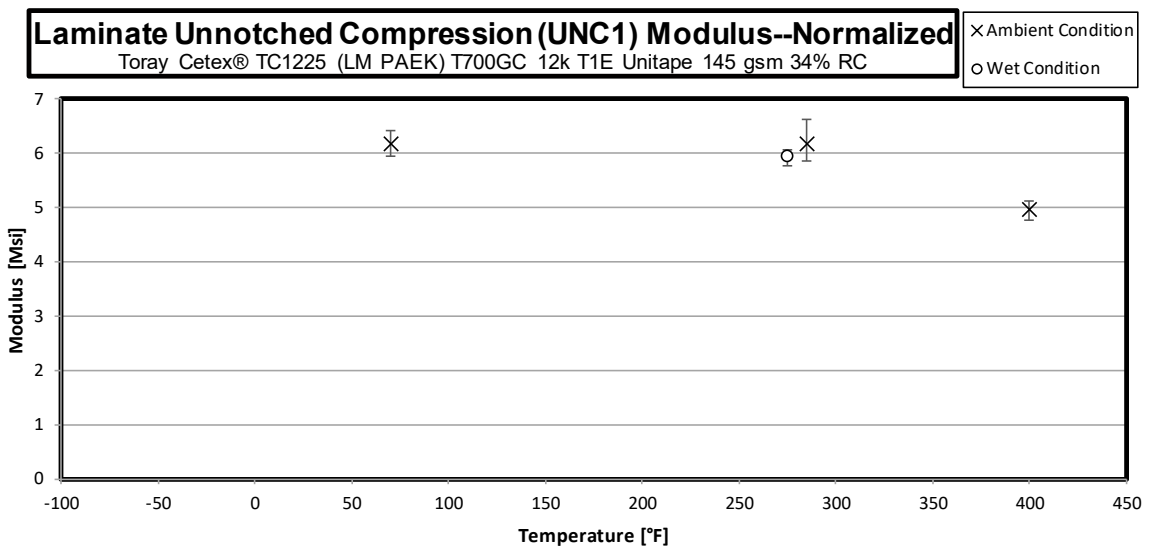
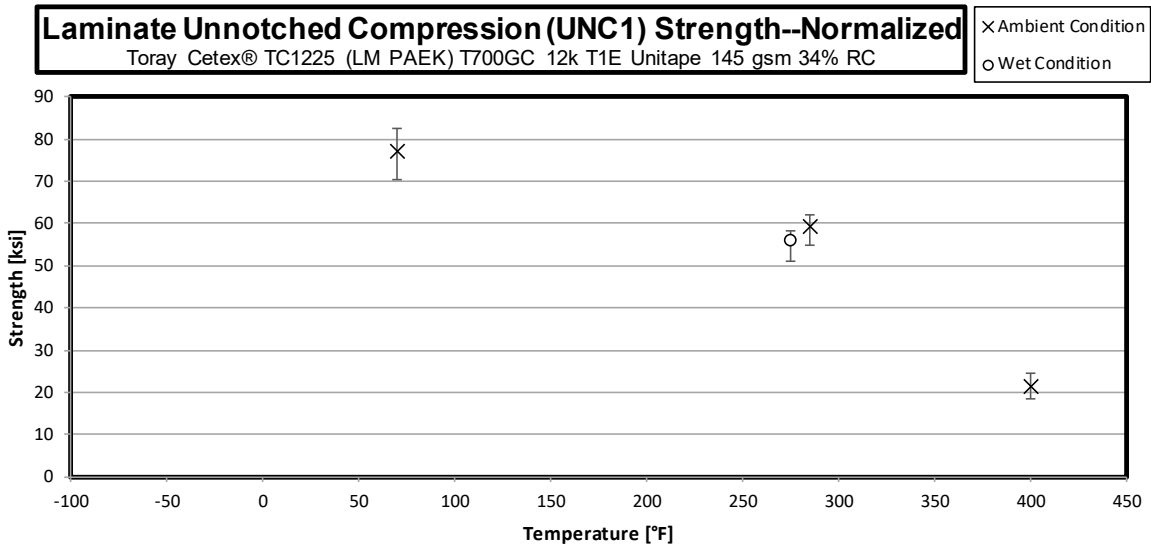
3.12 “10/80/10” Unnotched Tension 2 Properties (UNT2)



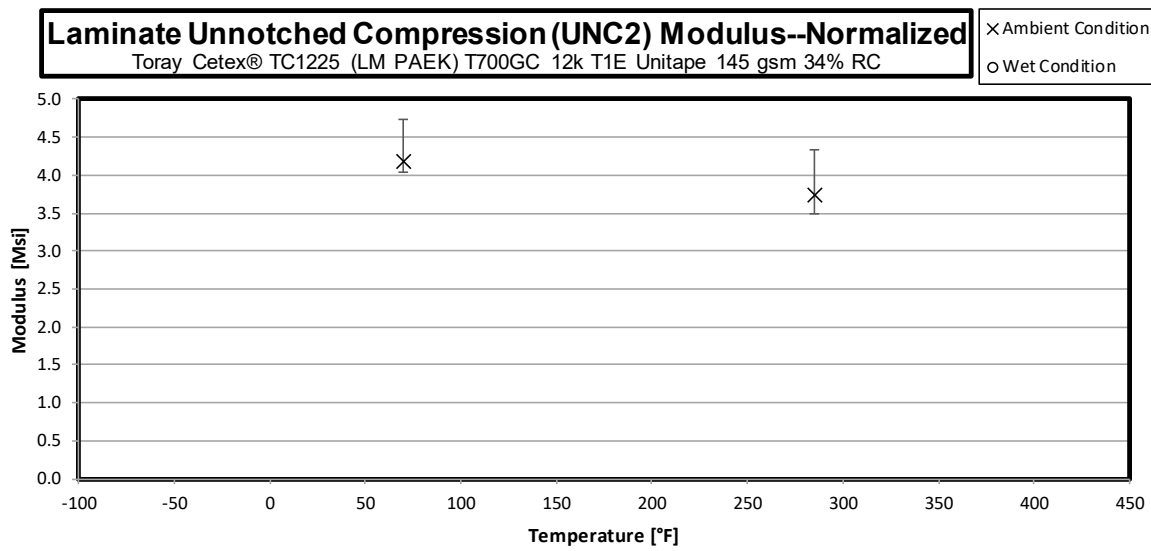
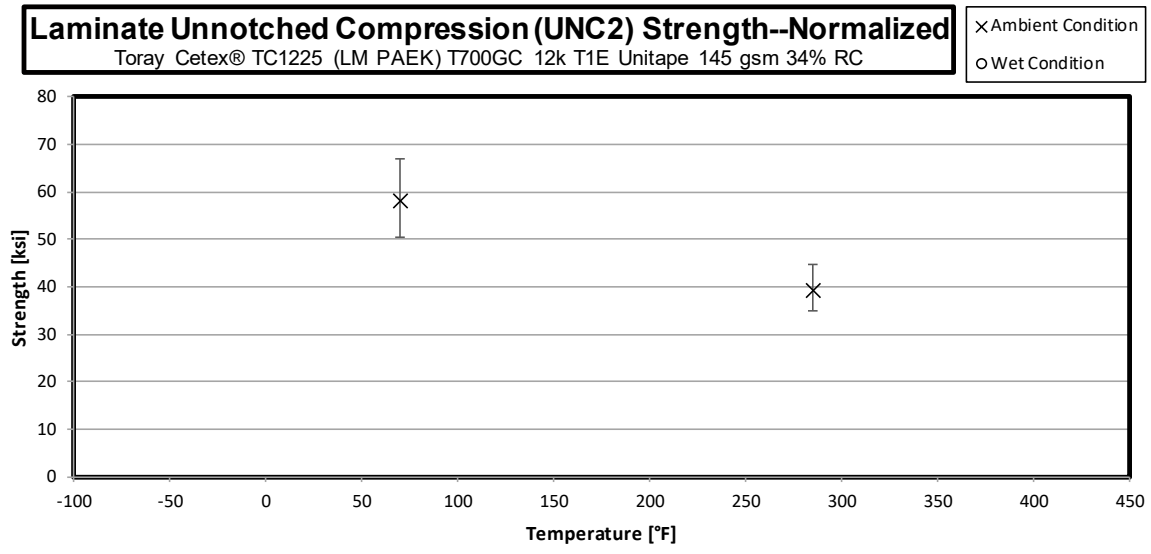
3.13 “50/40/10” Unnotched Tension 3 Properties (UNT3)



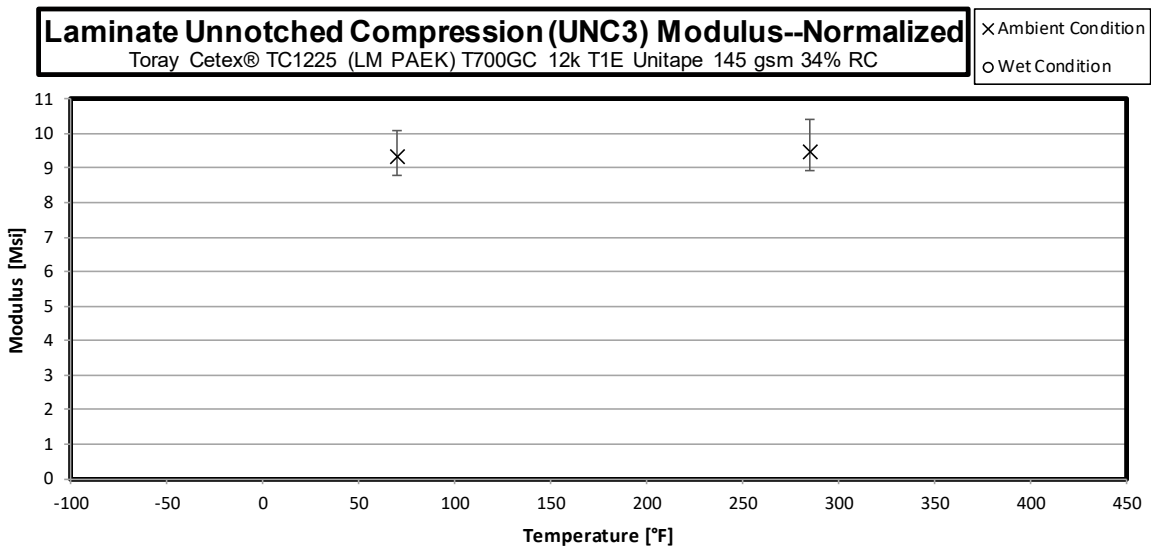
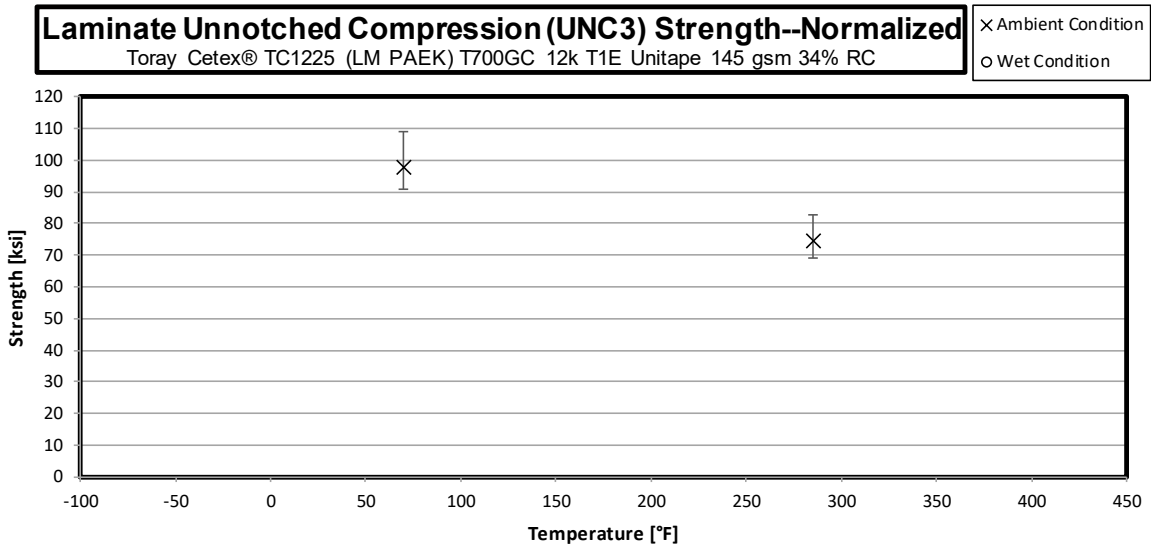
3.14 “25/50/25” Unnotched Compression 1 Properties (UNC1)



3.15 "10/80/10" Unnotched Compression 2 Properties (UNC2)

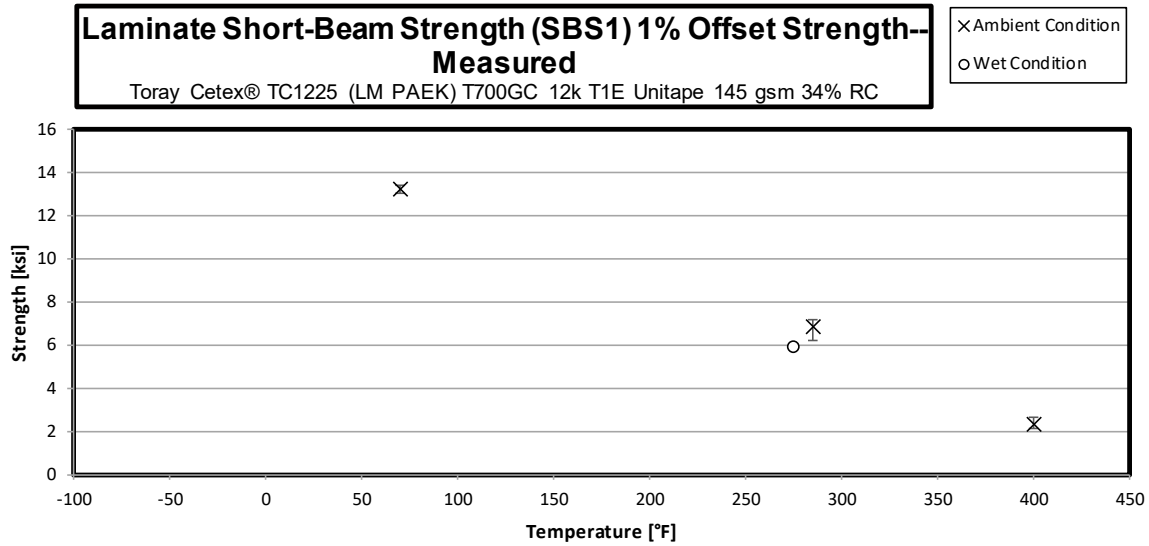
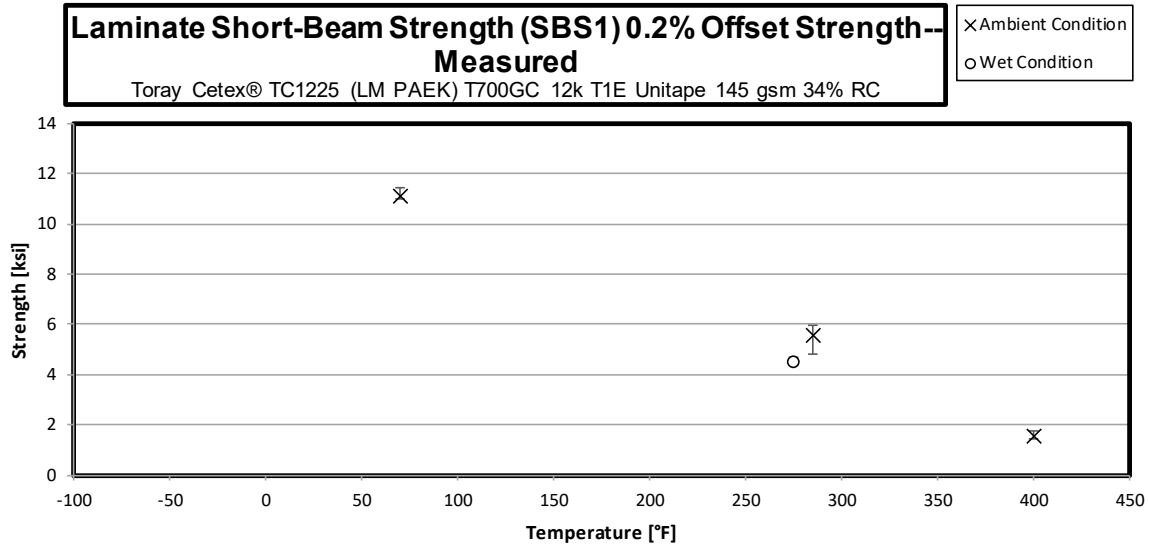


3.16 “50/40/10” Unnotched Compression 3 Properties (UNC3)

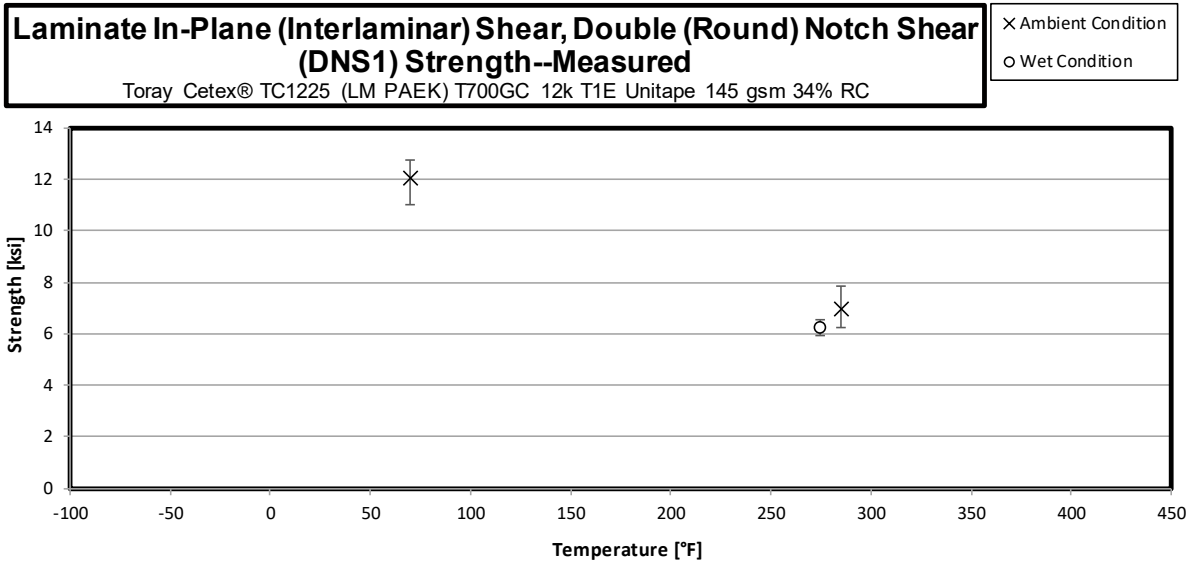


3.17 Laminate Short-Beam Strength Properties (SBS1) – Reference only

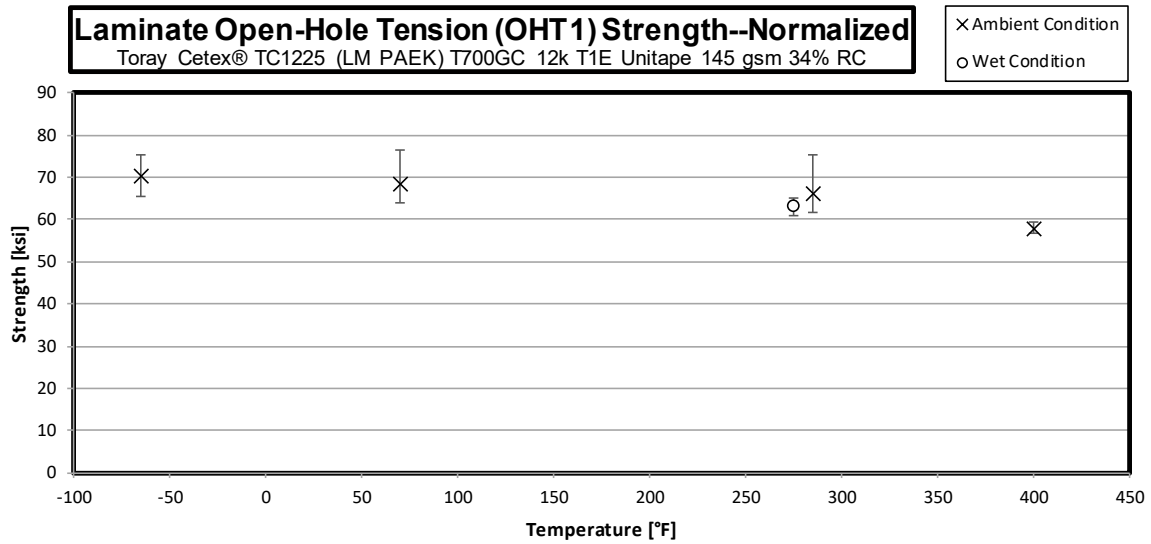
Informational use only due to invalid failure modes.



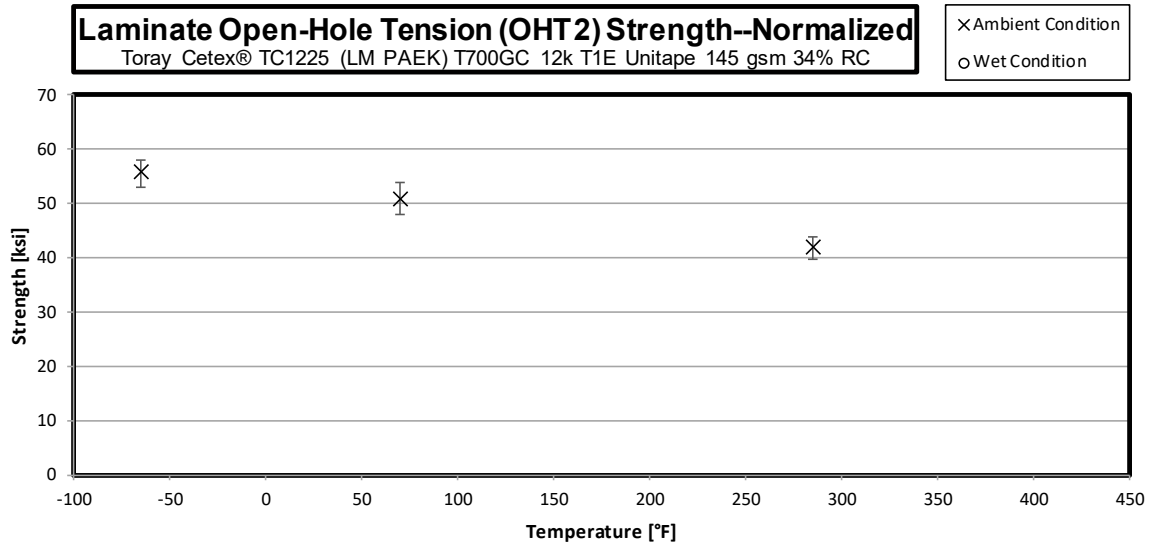
3.18 Laminate In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS1)



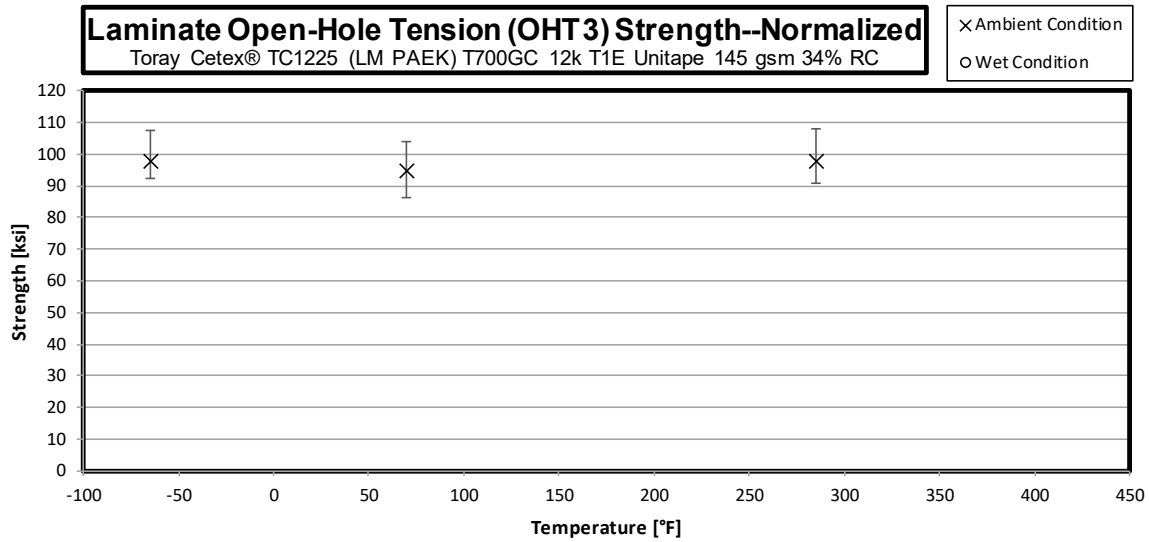
3.19 “25/50/25” Open-Hole Tension 1 Properties (OHT1)



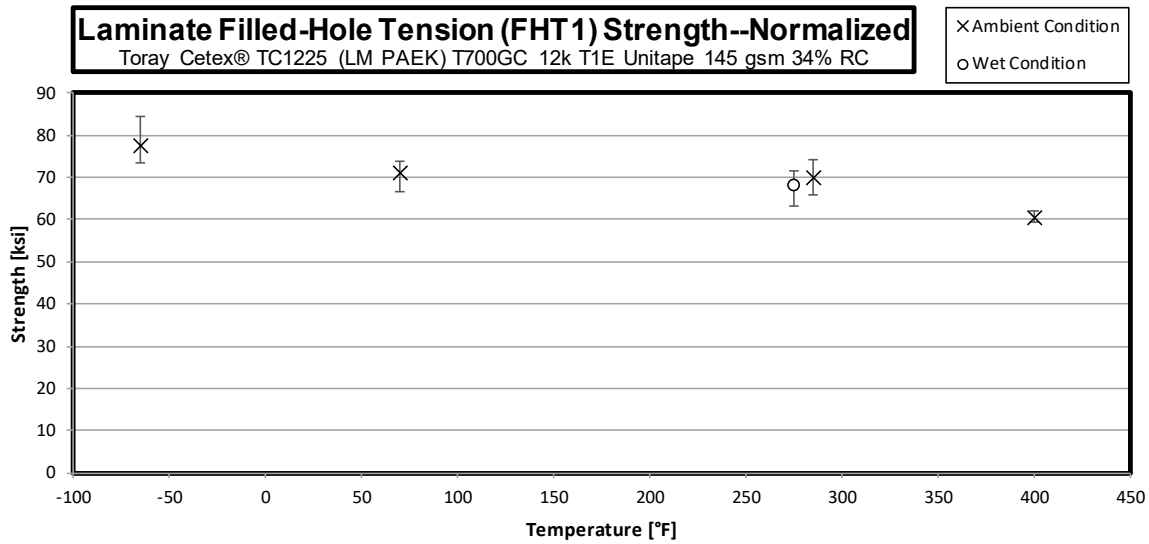
3.20 “10/80/10” Open-Hole Tension 2 Properties (OHT2)



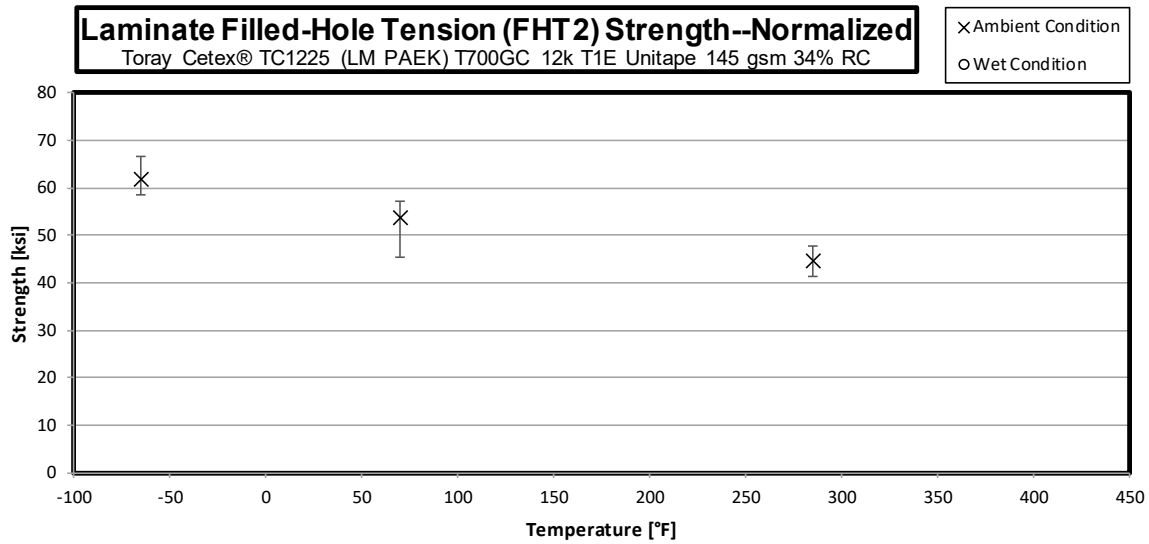
3.21 “50/40/10” Open-Hole Tension 3 Properties (OHT3)



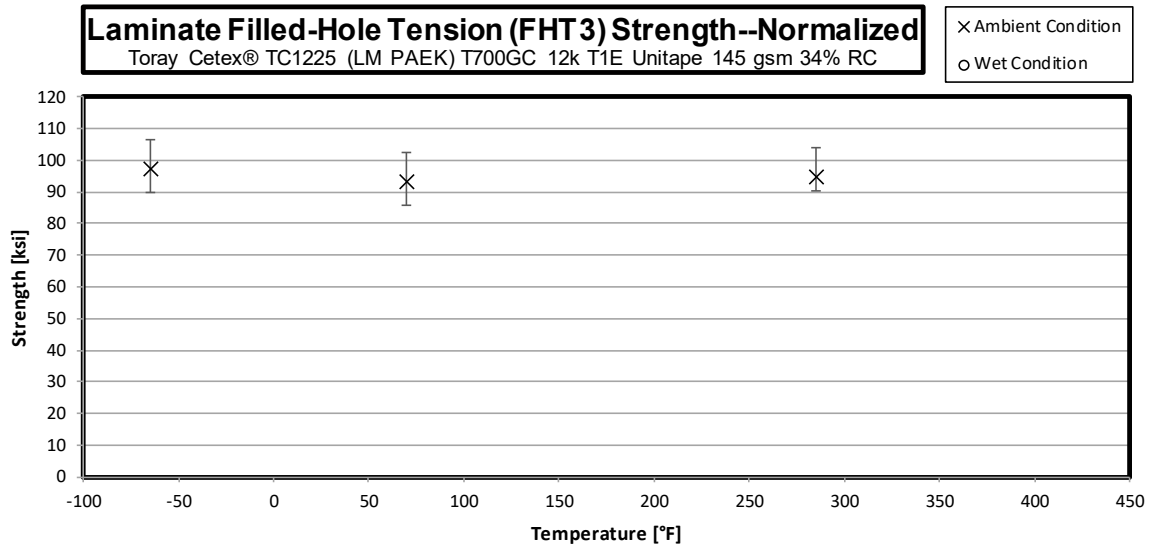
3.22 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)



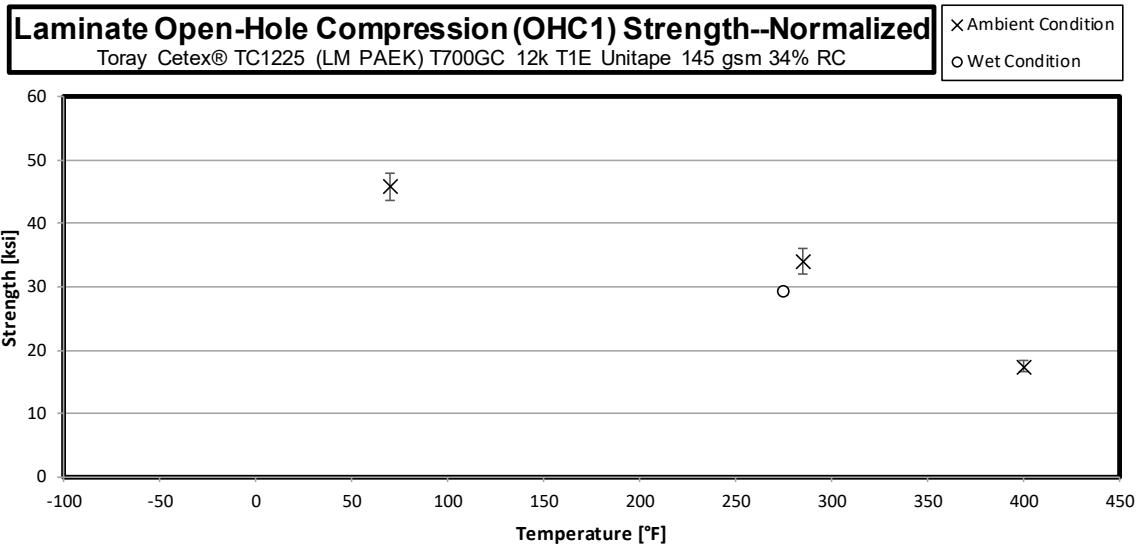
3.23 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)



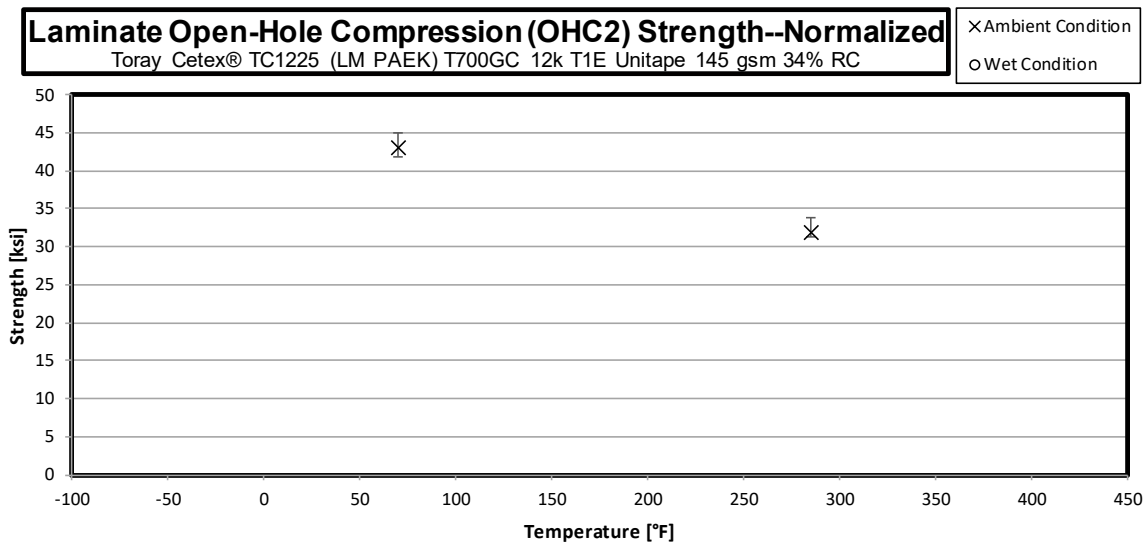
3.24 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)



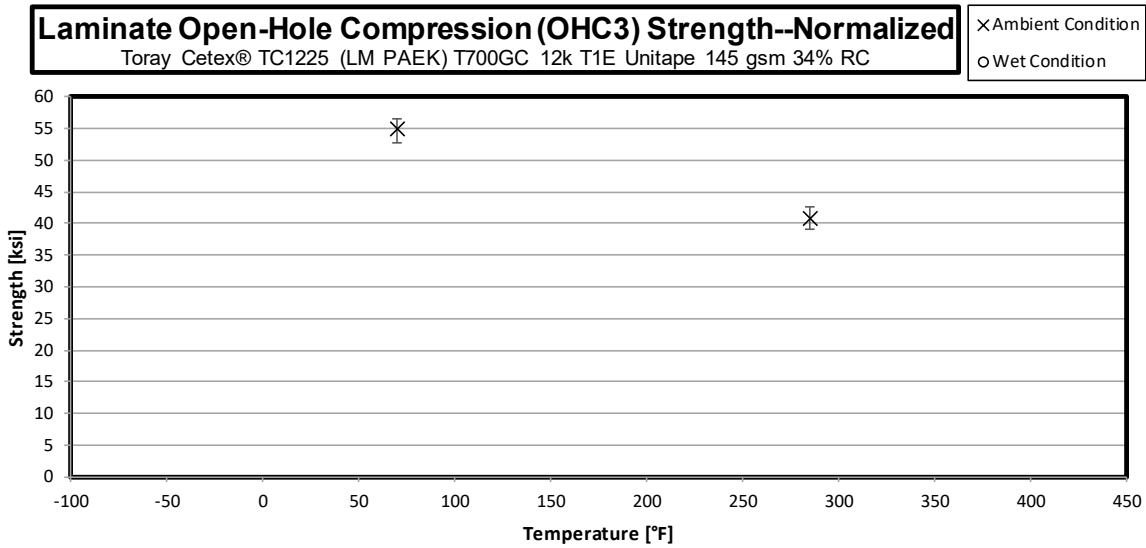
3.25 “25/50/25” Open-Hole Compression 1 Properties (OHC1)



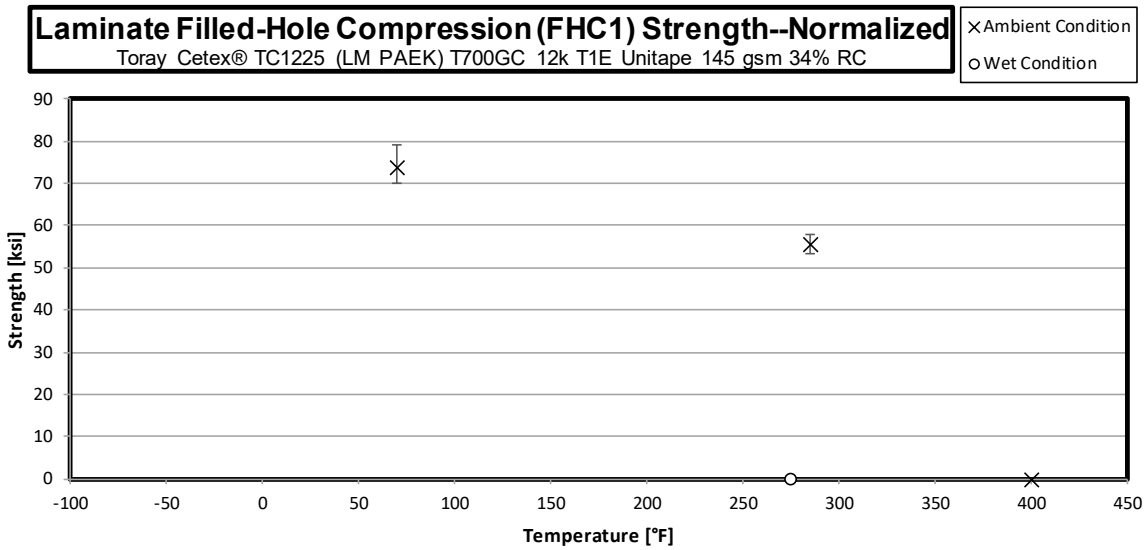
3.26 “10/80/10” Open-Hole Compression 2 Properties (OHC2)



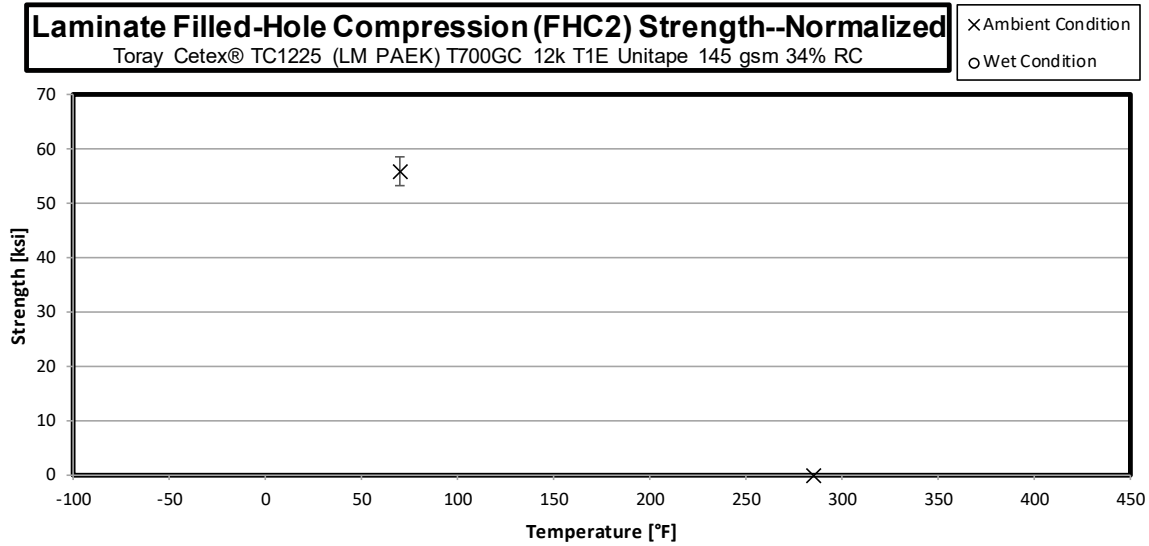
3.27 “50/40/10” Open-Hole Compression 3 Properties (OHC3)



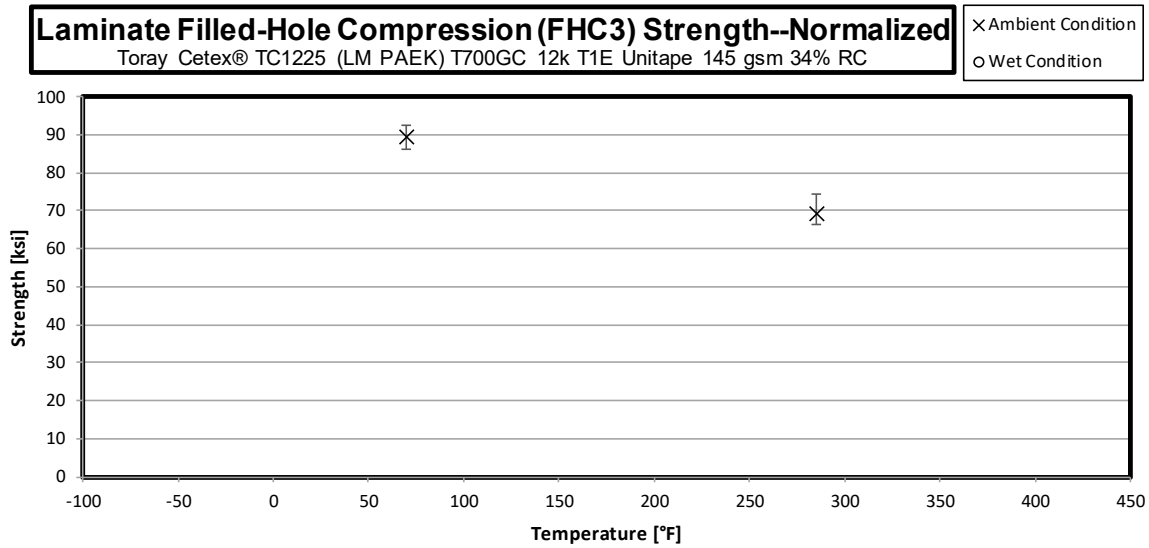
3.28 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)



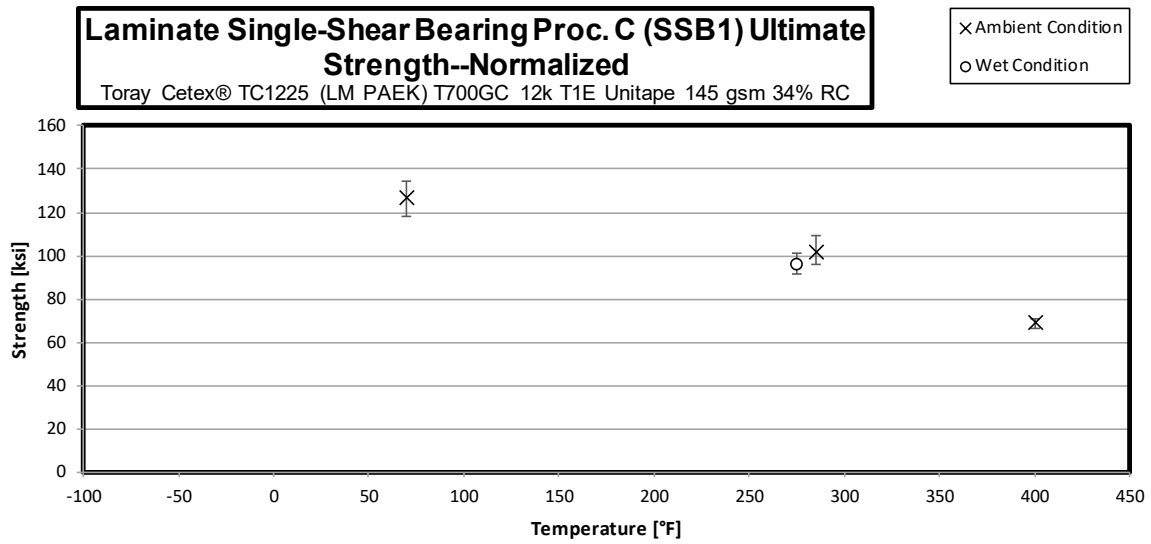
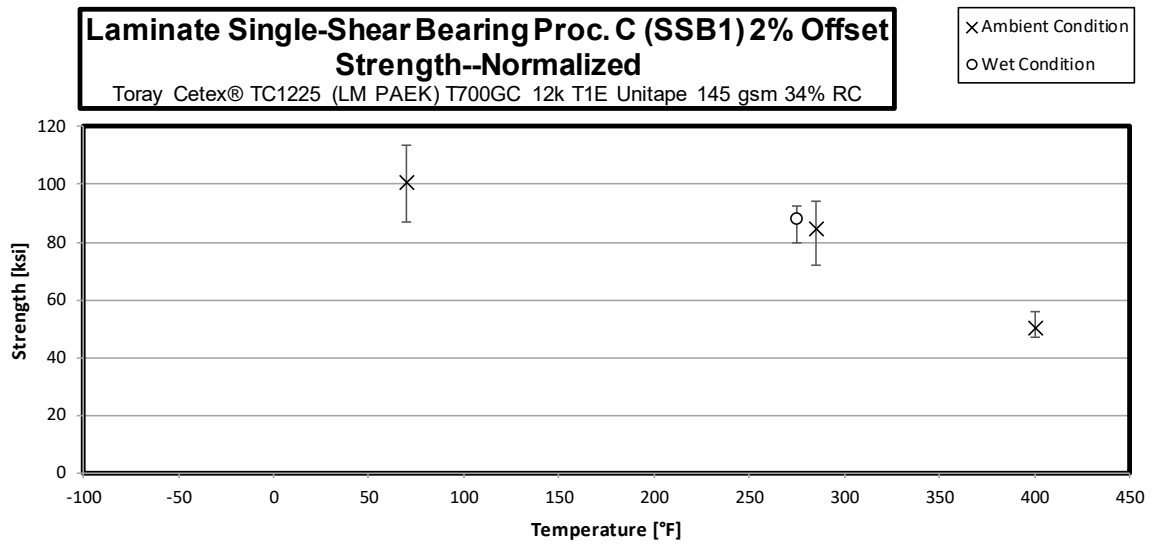
3.29 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)



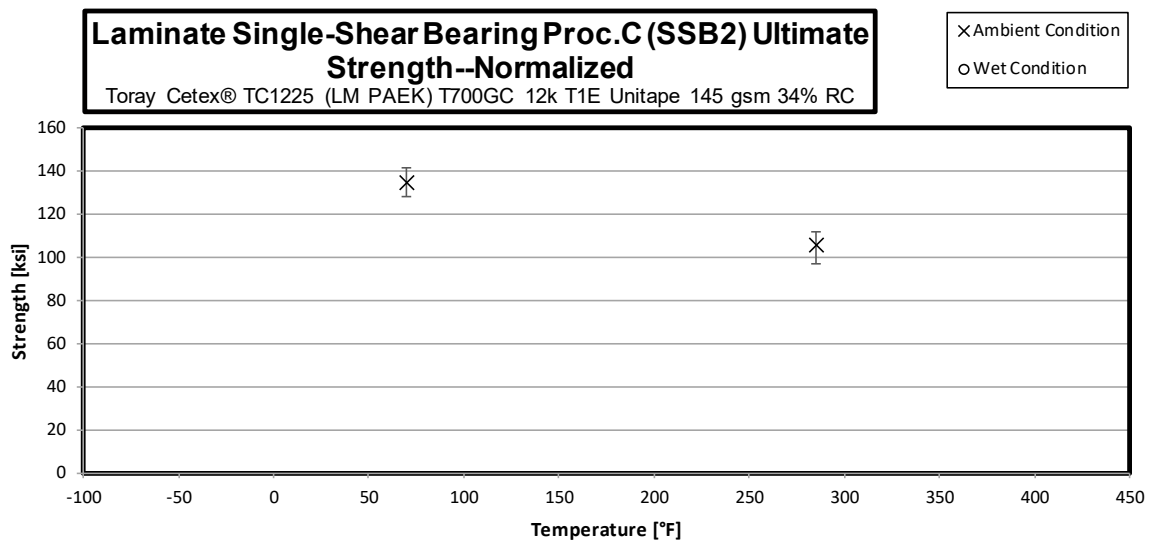
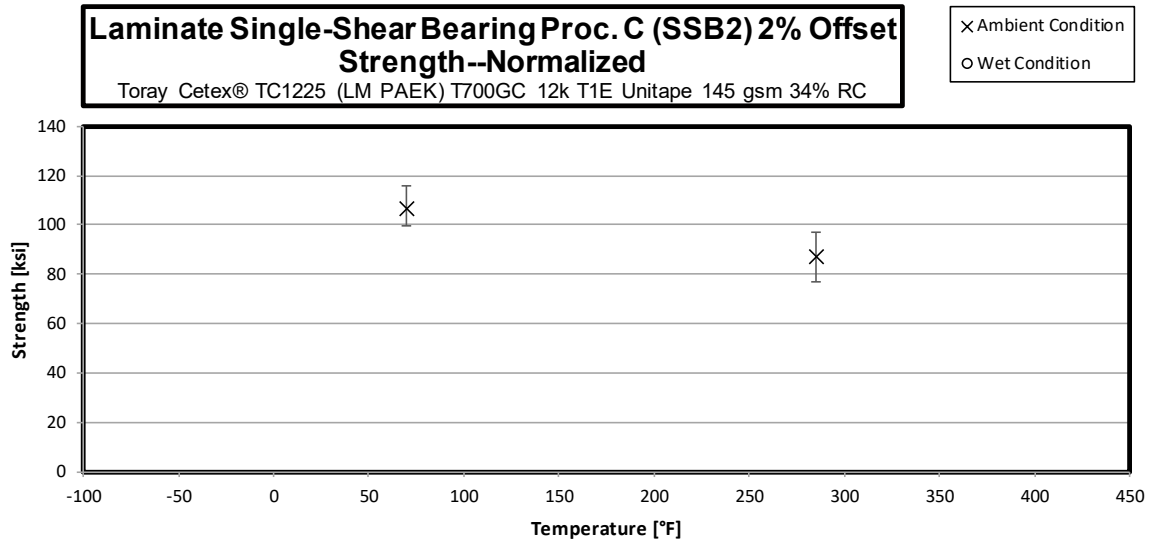
3.30 “50/40/10” Filled-Hole Compression 3 Properties (FHC3)



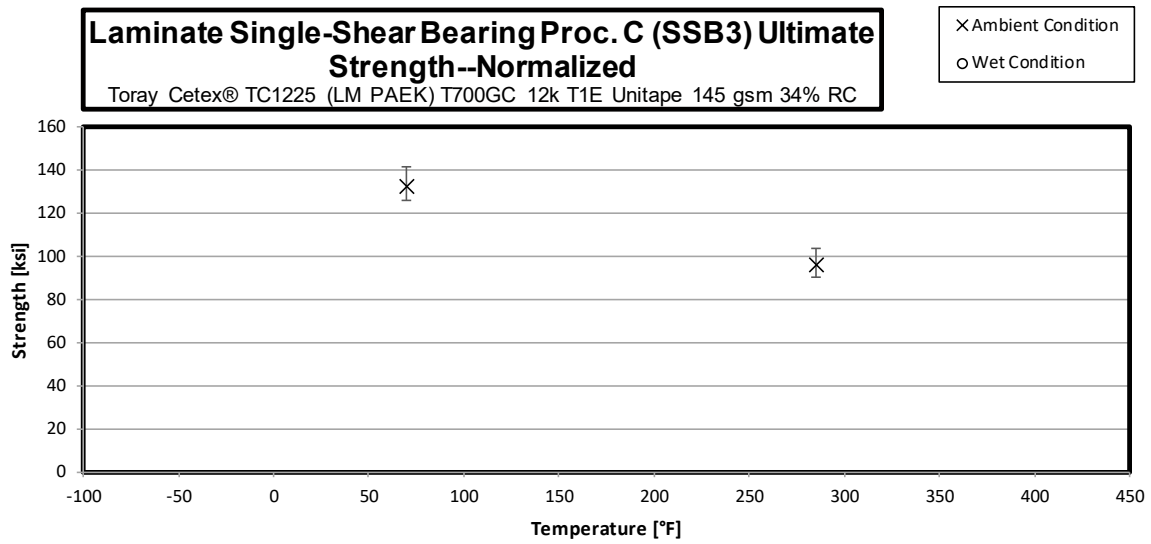
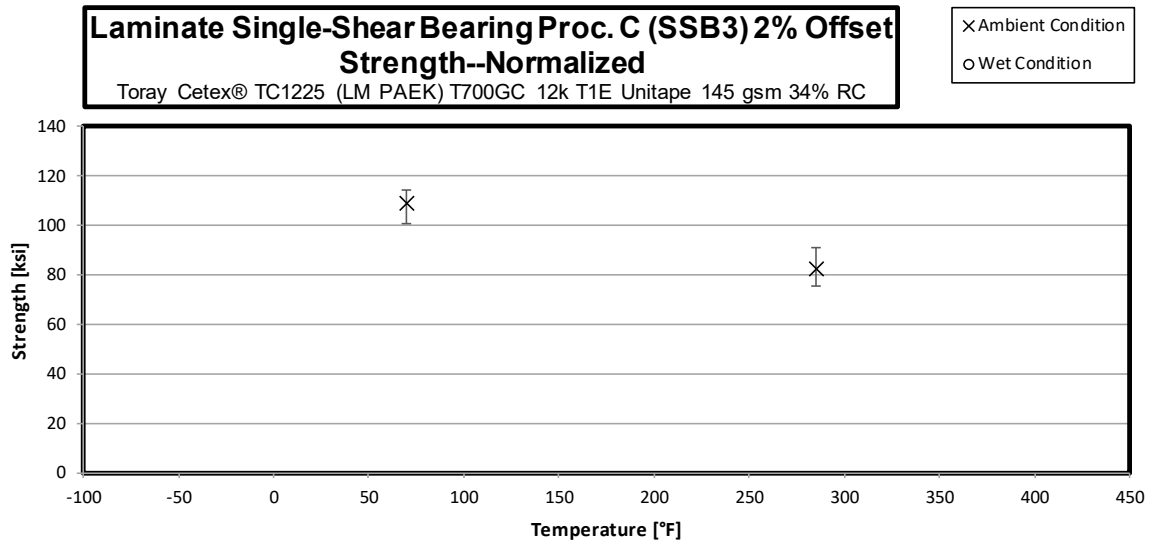
3.31 “25/50/25” Single-Shear Bearing 1, Proc. C Properties (SSB1)



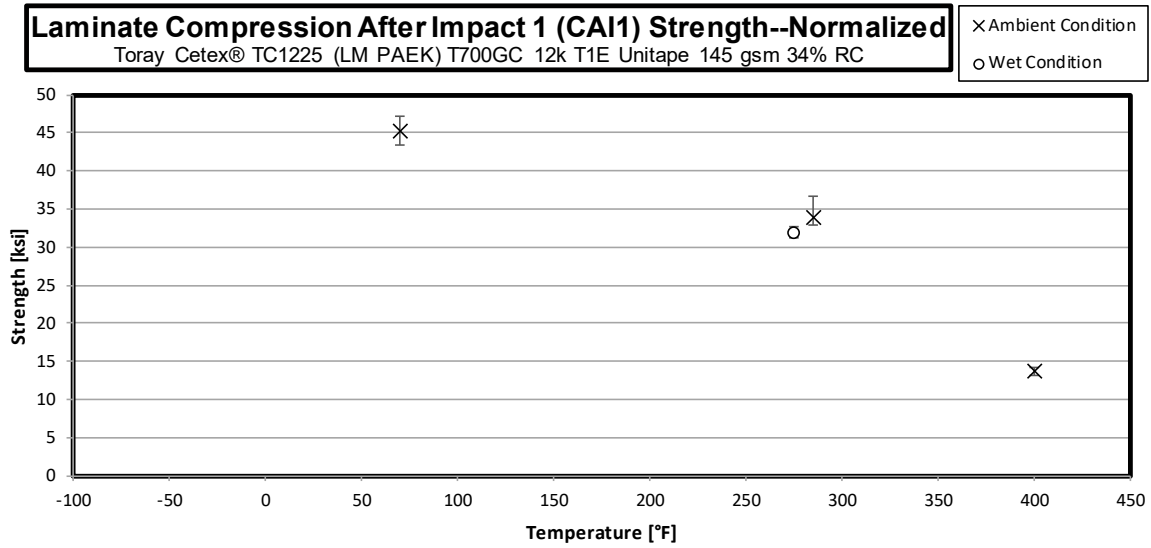
3.32 “10/80/10” Single-Shear Bearing 2, Proc. C Properties (SSB2)



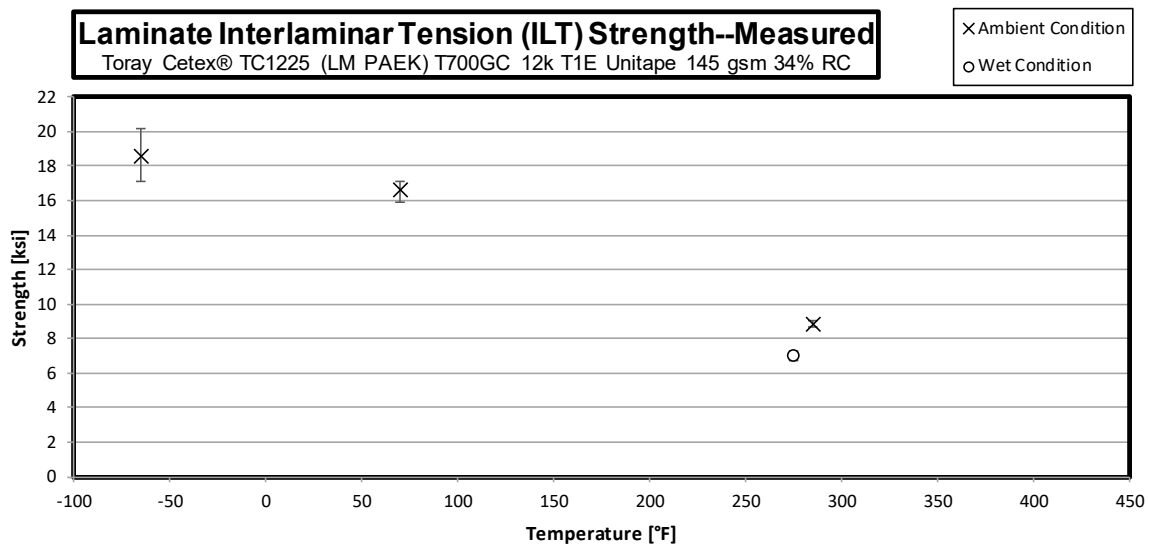
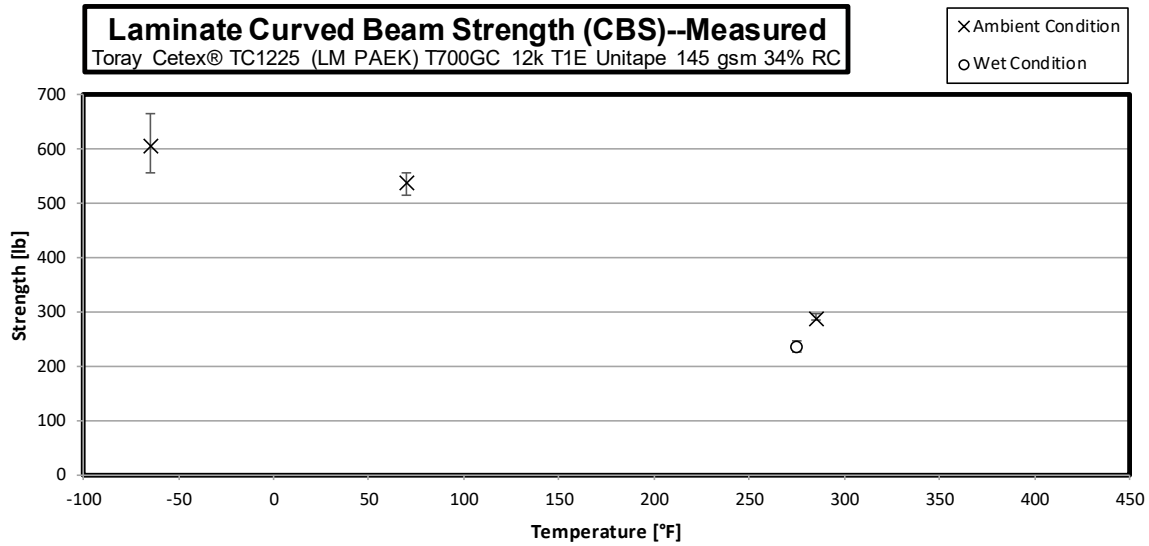
3.33 “50/40/10” Single-Shear Bearing 3, Proc. C Properties (SSB3)



3.34 “25/50/25” Compression After Impact 1 Properties (CAI1)



3.35 Interlaminar Tension Properties (ILT)



4 Raw Data

4.1 Longitudinal Tension Properties (LT)

Longitudinal Tension Properties (LT)--CTA (-65°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAJA111B	A	C1	1	1	340.2	18.66	0.3160	0.04082	8	XGM
TCAJA112B	A	C1	1	1	352.5	18.76	0.3360	0.04155	8	XGM
TCAJA113B	A	C1	1	1	358.6	19.59	0.3913	0.04183	8	XGM
TCAJA114B***	A	C1	1	1	347.3			0.04185	8	XGM
TCAJA115B***	A	C1	1	1	370.1			0.04182	8	XGM
TCAJA211B*	A	C2	1	2		18.73	0.3258	0.03998	8	SGM, LWT, GIB
TCAJA212B	A	C2	1	2	359.2	19.45	0.3260	0.03990	8	AWT
TCAJA213B*	A	C2	1	2		19.47	0.3829	0.04098	8	GIB
TCAJA214B***	A	C2	1	2	399.9			0.04113	8	XGM
TCAJA215B***	A	C2	1	2	347.0			0.04127	8	XGM
TCAJB111B	B	C1	2	1	336.2	18.73	0.3102	0.04338	8	XGM
TCAJB112B	B	C1	2	1	390.2	18.98	0.3444	0.04290	8	XGM
TCAJB113B	B	C1	2	1	394.0	19.17	0.2671	0.04263	8	XGM
TCAJB211B*	B	C2	2	2		19.57	0.3224	0.04215	8	SGM, GIB
TCAJB212B	B	C2	2	2	392.2	19.23	0.3377	0.04187	8	XGM
TCAJB213B	B	C2	2	2	355.4	19.06	0.3201	0.04153	8	XGM
TCAJB215B***	B	C2	2	2	379.0			0.04158	8	XGM
TCAJC111B	C	C1	3	1	337.0	18.66	0.2816	0.04122	8	XGM
TCAJC112B	C	C1	3	1	370.7	19.67	0.3944	0.04140	8	XGM
TCAJC113B	C	C1	3	1	357.9	18.61	0.3047	0.04235	8	XGM
TCAJC211B**	C	C2	3	2		19.15	0.3646	0.04158	8	SGM
TCAJC212B	C	C2	3	2	396.0	19.15	0.3364	0.04243	8	XGM
TCAJC213B	C	C2	3	2	427.7	19.90	0.3347	0.04247	8	XGM
TCAJC214B***	C	C2	3	2	402.2			0.04225	8	XGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0051	321.5	17.63
0.0052	339.0	18.04
0.0052	347.2	18.97
0.0052	336.5	
0.0052	358.2	
0.0050		17.33
0.0050	331.8	17.96
0.0051		18.47
0.0051	380.8	
0.0052	331.4	
0.0054	337.6	18.81
0.0054	387.5	18.84
0.0053	388.8	18.92
0.0053		19.10
0.0052	380.1	18.64
0.0052	341.7	18.33
0.0052	364.8	
0.0052	321.5	17.80
0.0052	355.3	18.85
0.0053	350.9	18.24
0.0052		18.44
0.0053	388.9	18.81
0.0053	420.4	19.56
0.0053	393.4	

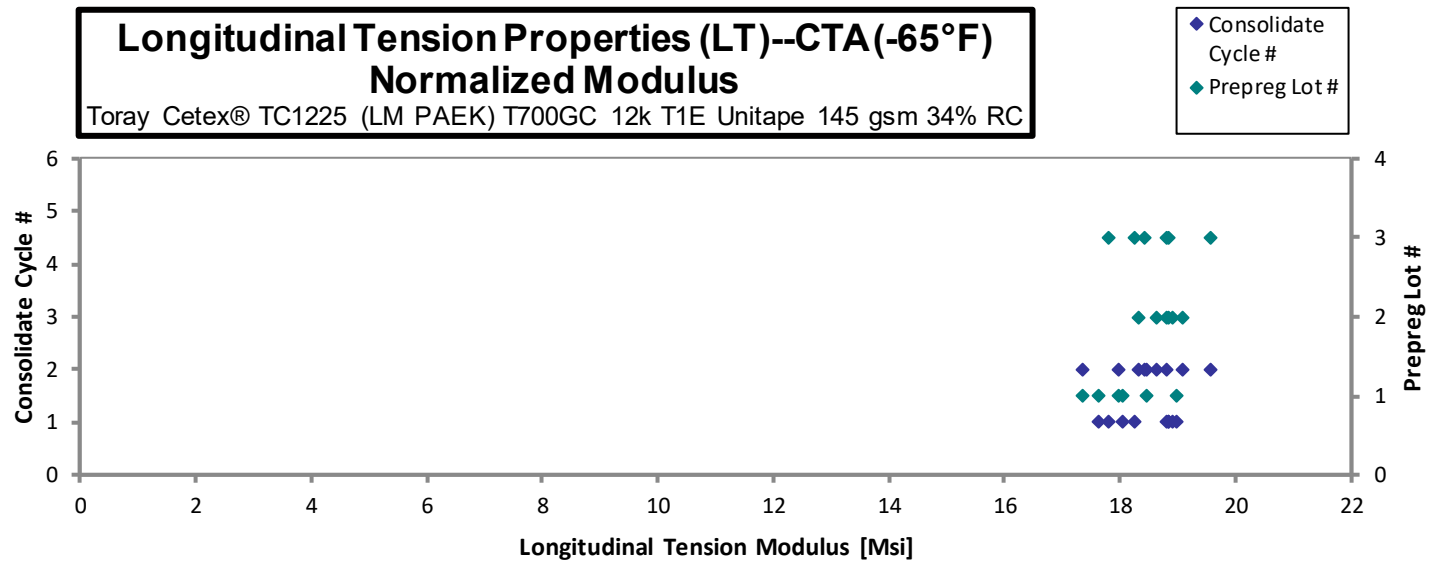
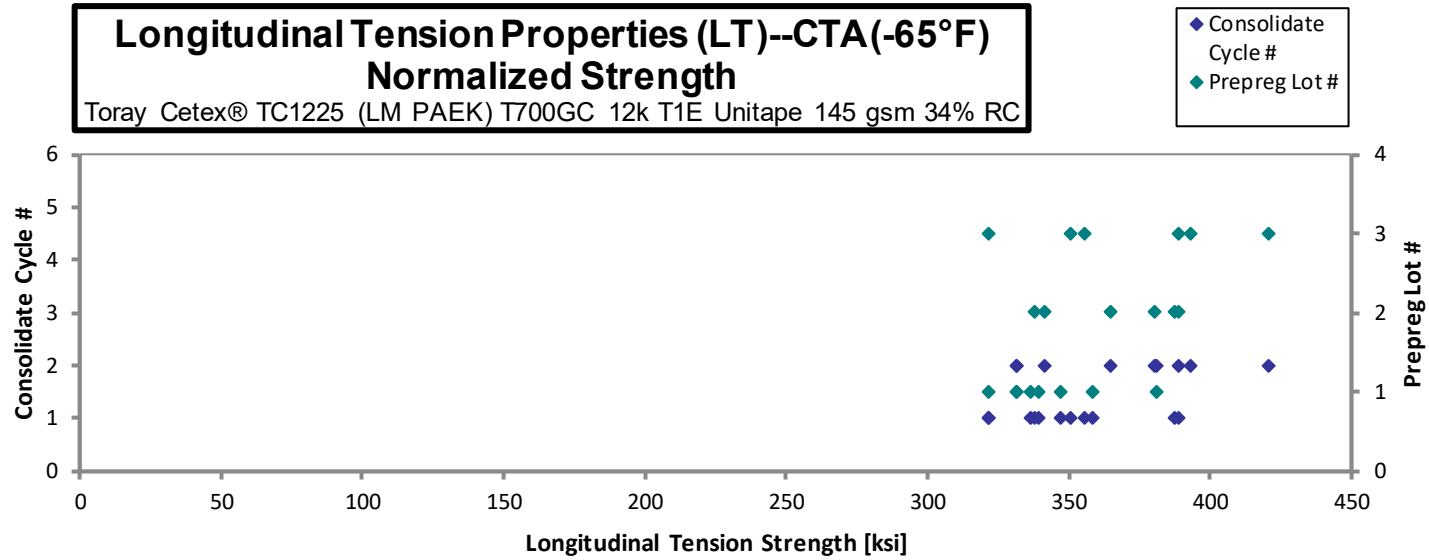
*Strength not reported due to unacceptable failure mode.

**Strength not reported because the specimen's tab disbonded during testing.

***Specimen was not gaged, only strength is tested.

Average	370.7	19.14	0.3331
Standard Dev.	25.71	0.4001	0.03413
Coeff. of Var. [%]	6.935	2.090	10.24
Min.	336.2	18.61	0.2671
Max.	427.7	19.90	0.3944
Number of Spec.	20	18	18

Average_{norm}	0.0052	358.9	18.49
Standard Dev._{norm}		27.81	0.5709
Coeff. of Var. [%]_{norm}		7.750	3.088
Min.	0.0050	321.5	17.33
Max.	0.0054	420.4	19.56
Number of Spec.	24	20	18



**Longitudinal Tension Properties (LT)--RTA (70°F)
Strength & Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAJA111A*	A	C1	1	1		18.50	0.2990	0.03952	8	GIB, SIB
TCAJA112A*	A	C1	1	1		18.74	0.2609	0.04060	8	GIB, SIB
TCAJA113A	A	C1	1	1	310.0	18.56	0.2815	0.04115	8	XGM
TCAJA114A**	A	C1	1	1	308.8			0.04112	8	XGM
TCAJA114D**	A	C1	1	1	389.9			0.04142	8	XGM
TCAJA115D**	A	C1	1	1	398.5			0.04098	8	XGM
TCAJA116D**	A	C1	1	1	378.4			0.04115	8	XGM
TCAJA211A*	A	C2	1	2		18.69	0.3516	0.04095	8	GIT, SGM
TCAJA212A*	A	C2	1	2		18.55	0.3660	0.04097	8	GIT, SGM
TCAJA213A	A	C2	1	2	327.5	18.74	0.3458	0.04075	8	XGM
TCAJA214A**	A	C2	1	2	308.1			0.04060	8	XGM
TCAJB111A	B	C1	2	1	331.1	18.97	0.3471	0.04190	8	XGM
TCAJB112A	B	C1	2	1	364.2	19.12	0.3587	0.04202	8	XGM
TCAJB113A	B	C1	2	1	352.4	18.81	0.3551	0.04247	8	XGM
TCAJB211A	B	C2	2	2	332.1	19.32	0.4045	0.03947	8	XGM
TCAJB212A	B	C2	2	2	345.5	18.97	0.3383	0.04025	8	SGM
TCAJB213A	B	C2	2	2	323.2	18.41	0.3237	0.04113	8	XGM
TCAJC111A	C	C1	3	1	382.9	20.02	0.3766	0.04160	8	XGM
TCAJC112A	C	C1	3	1	356.8	19.02	0.3523	0.04337	8	XGM
TCAJC113A	C	C1	3	1	347.9	18.42	0.3206	0.04290	8	XGM
TCAJC211A	C	C2	3	2	344.2	19.62	0.3153	0.04093	8	SGM
TCAJC212A	C	C2	3	2	357.6	19.27	0.3204	0.04162	8	XGM
TCAJC213A	C	C2	3	2	380.1	18.99	0.3512	0.04182	8	SGM
TCAJC214A**	C	C2	3	2	387.2			0.04133	8	XGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0049		16.92
0.0051		17.61
0.0051	295.3	17.68
0.0051	293.9	
0.0052	373.8	
0.0051	378.1	
0.0051	360.4	
0.0051		17.71
0.0051		17.59
0.0051	308.9	17.68
0.0051	289.6	
0.0052	321.1	18.40
0.0053	354.2	18.59
0.0053	346.4	18.49
0.0049	303.4	17.65
0.0050	321.9	17.67
0.0051	307.7	17.53
0.0052	368.7	19.28
0.0054	358.2	19.10
0.0054	345.5	18.29
0.0051	326.1	18.60
0.0052	344.5	18.56
0.0052	367.9	18.38
0.0052	370.5	

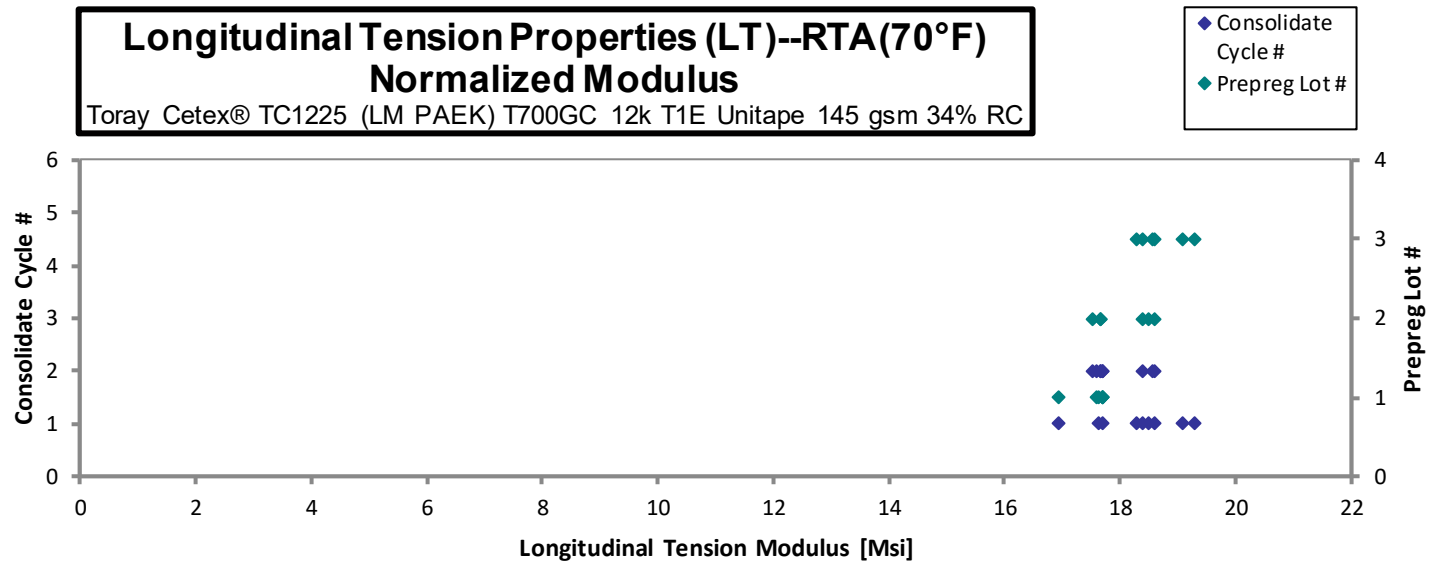
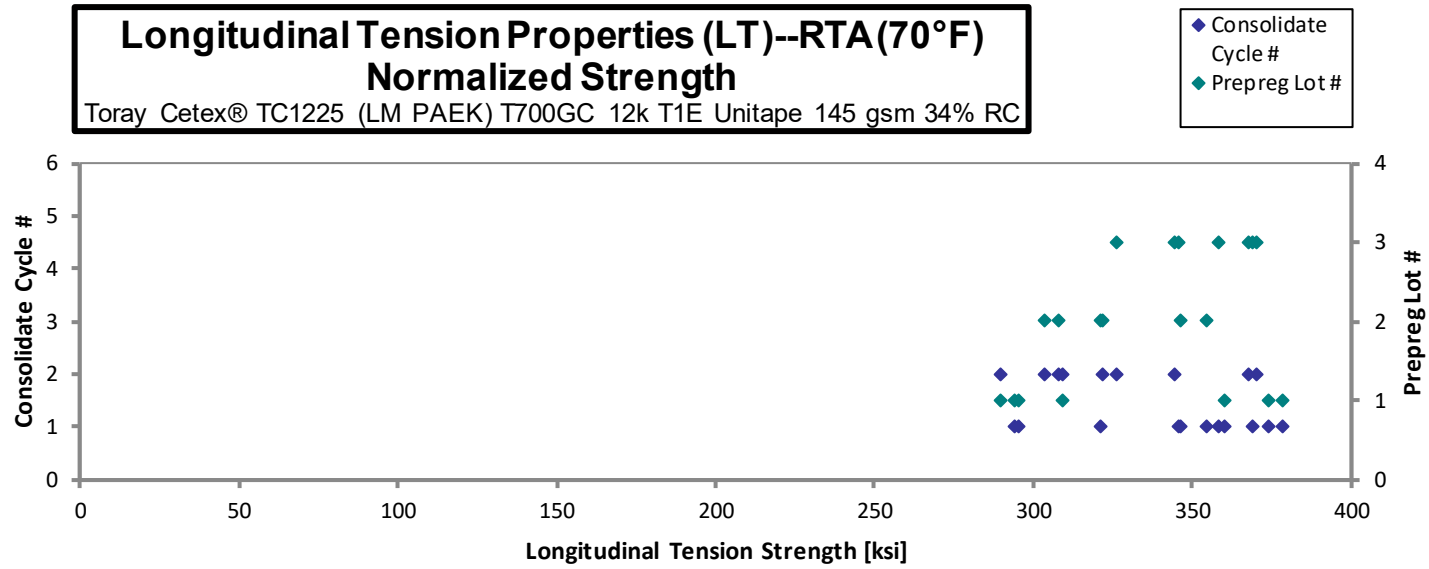
*Strength not reported due to unacceptable failure mode.

**Specimen was not gaged, only strength is tested.

TCAJA114D, TCAJA115D & TCAJA116D: Specimens are taken from ETA2 and tested as RTA.

Average	351.3	18.93	0.3371
Standard Dev.	28.48	0.4288	0.03438
Coeff. of Var. [%]	8.107	2.265	10.20
Min.	308.1	18.41	0.2609
Max.	398.5	20.02	0.4045
Number of Spec.	20	18	18

Average_{norm}	0.0052	336.8	18.10
Standard Dev._{norm}		29.78	0.6202
Coeff. of Var. [%]_{norm}		8.842	3.427
Min.	0.0049	289.6	16.92
Max.	0.0054	378.1	19.28
Number of Spec.	24	20	18



**Longitudinal Tension Properties (LT)--ETA1 (275°F)
Strength & Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing

t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAJA111C*	A	C1	1	1		17.54	0.2629	0.04113	8	SGM, GIB
TCAJA112C	A	C1	1	1	311.0	17.89	0.3118	0.04117	8	XGM
TCAJA113C	A	C1	1	1	347.4	17.70	0.3491	0.04148	8	XGM
TCAJA114C**	A	C1	1	1	349.2			0.04205	8	XGM
TCAJA211C	A	C2	1	2	365.5	18.80	0.2913	0.04112	8	XGM
TCAJA212C	A	C2	1	2	377.4	19.04	0.3492	0.04108	8	XGM
TCAJA213C	A	C2	1	2	390.2	18.78	0.2695	0.04187	8	XGM
TCAJB111C*	B	C1	2	1		18.00	0.2800	0.04168	8	AWT, GIB, SGM
TCAJB112C*	B	C1	2	1		18.00	0.3402	0.04127	8	AWT, GIB, SGM
TCAJB113C	B	C1	2	1	345.3	18.34	0.3562	0.04158	8	XGM
TCAJB115A**	B	C1	2	1	328.6			0.04275	8	XGM
TCAJB114B**	B	C1	2	1	354.5			0.04267	8	XGM
TCAJB115B**	B	C1	2	1	346.0			0.04267	8	XGM
TCAJB211C	B	C2	2	2	388.1	18.35	0.2958	0.04195	8	XGM
TCAJB212C	B	C2	2	2	376.3	18.00	0.3247	0.04253	8	XGM
TCAJB213C	B	C2	2	2	386.7	18.57	0.3088	0.04242	8	XGM
TCAJB214C**	B	C2	2	2	375.1			0.04267	8	XGM
TCAJC111C	C	C1	3	1	408.9	18.86	0.2822	0.04358	8	XGM
TCAJC112C	C	C1	3	1	418.3	18.24	0.3533	0.04348	8	XGM
TCAJC113C	C	C1	3	1	385.1	19.04	0.4120	0.04282	8	XGM
TCAJC211C	C	C2	3	2	382.8	18.18	0.3497	0.04357	8	XGM
TCAJC212C	C	C2	3	2	391.1	18.57	0.3105	0.04370	8	XGM
TCAJC213C	C	C2	3	2	394.5	18.53	0.4076	0.04303	8	XGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0051		16.70
0.0051	296.3	17.04
0.0052	333.6	17.00
0.0053	339.9	
0.0051	347.9	17.89
0.0051	359.0	18.11
0.0052	378.1	18.20
0.0052		17.37
0.0052		17.19
0.0052	332.4	17.65
0.0053	325.2	
0.0053	350.1	
0.0053	341.7	
0.0052	376.9	17.82
0.0053	370.5	17.72
0.0053	379.7	18.23
0.0053	370.4	
0.0054	412.5	19.02
0.0054	421.0	18.36
0.0054	381.7	18.88
0.0054	386.1	18.34
0.0055	395.6	18.78
0.0054	393.0	18.46

*Strength not reported due to unacceptable failure mode.

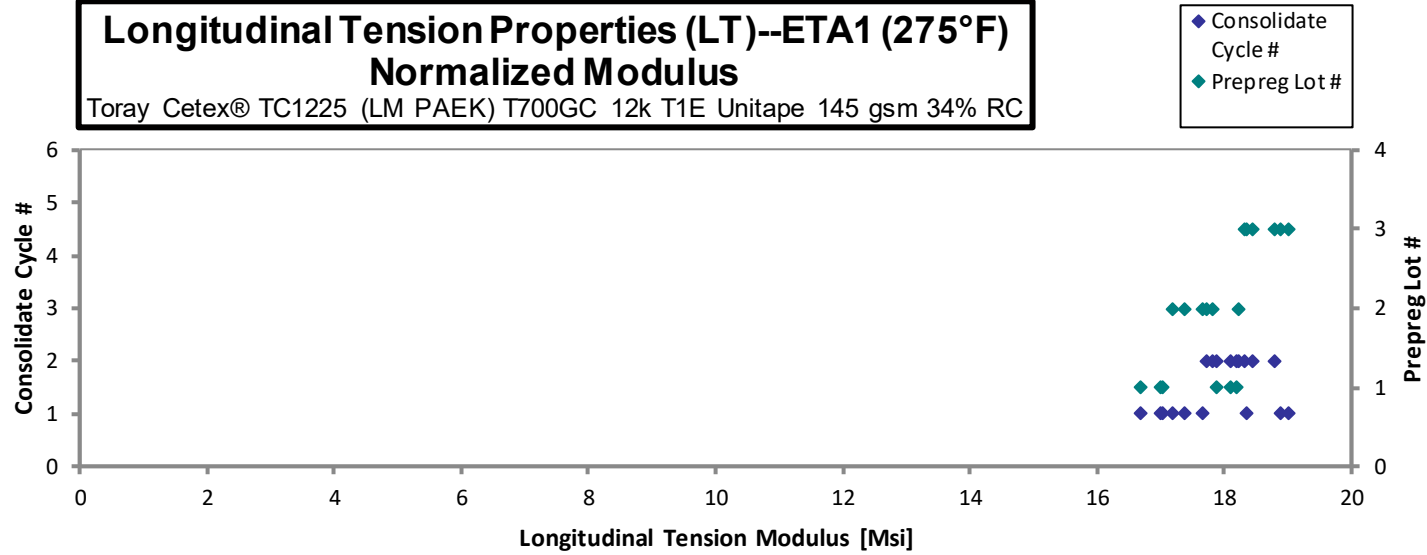
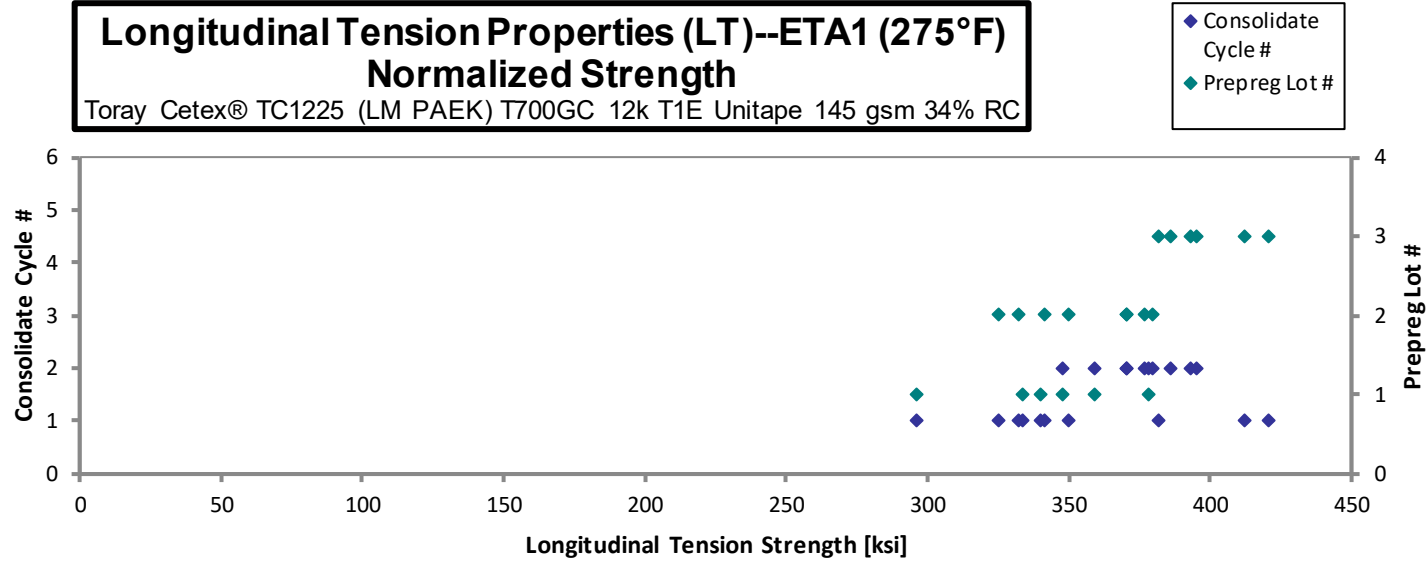
**Specimen was not gaged, only strength is tested.

TCAJB115A: Specimen is taken from RTA and tested as ETA1.

TCAJB114B & TCAJB115B: Specimens are taken from CTA and tested as ETA1.

Average	371.1	18.36	0.3253
Standard Dev.	27.12	0.4488	0.04311
Coeff. of Var. [%]	7.307	2.445	13.25
Min.	311.0	17.54	0.2629
Max.	418.3	19.04	0.4120
Number of Spec.	20	18	18

Average _{norm}	0.0053	364.6	17.93
Standard Dev. _{norm}		31.19	0.6770
Coeff. of Var. [%] _{norm}		8.556	3.776
Min.	0.0051	296.3	16.70
Max.	0.0055	421.0	19.02
Number of Spec.	23	20	18



Longitudinal Tension Properties (LT)--ETA2 (400°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

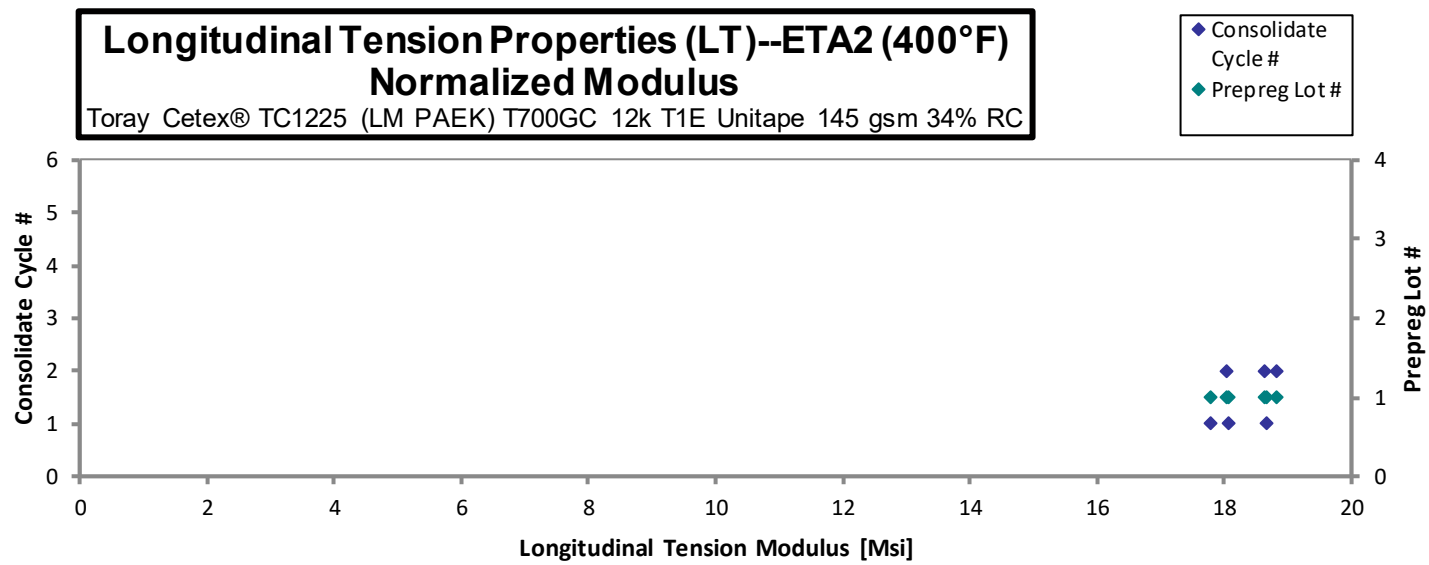
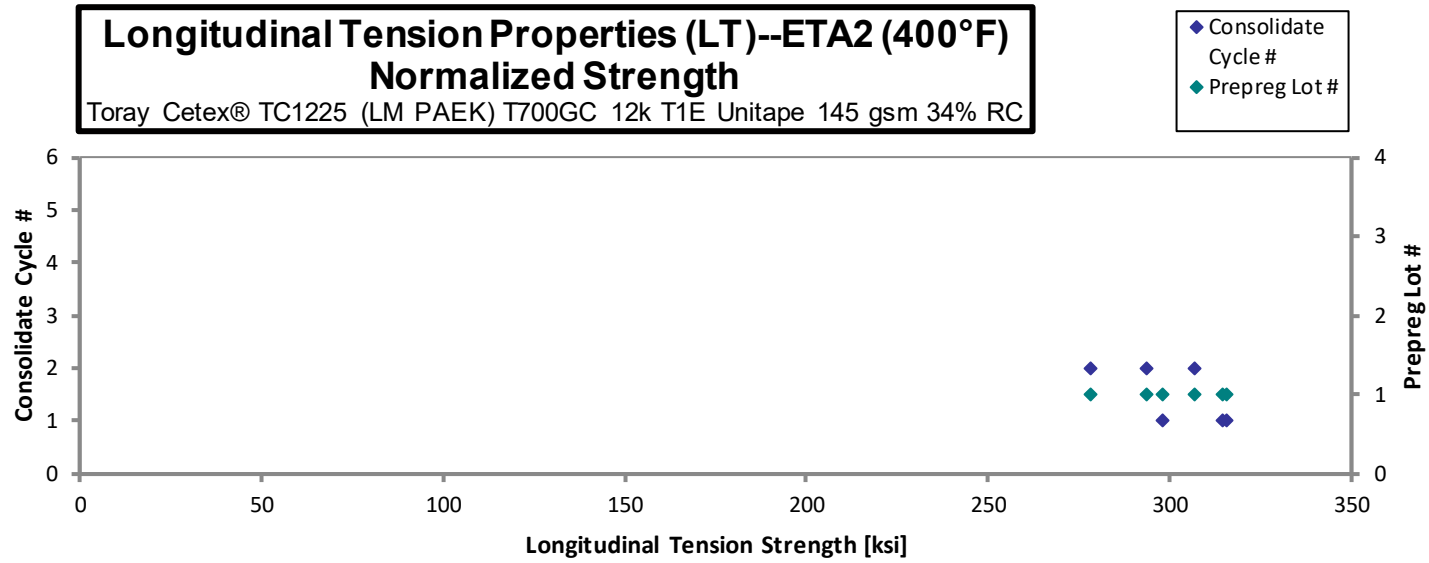
normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAJA111D	A	C1	1	1	307.3	18.64	0.5778	0.04188	8	XGM
TCAJA112D	A	C1	1	1	326.2	18.38	0.3959	0.04183	8	XGM
TCAJA113D	A	C1	1	1	323.4	19.18	0.5746	0.04202	8	XGM
TCAJA211D	A	C2	1	2	302.8	19.39	0.5339	0.04192	8	XGM
TCAJA212D	A	C2	1	2	315.4	18.54	0.5615	0.04205	8	XGM
TCAJA213D	A	C2	1	2	283.8	19.00	0.3759	0.04233	8	XGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0052	297.9	18.07
0.0052	315.9	17.80
0.0053	314.5	18.65
0.0052	293.8	18.82
0.0053	307.0	18.05
0.0053	278.1	18.62

Average	309.8	18.86	0.5033
Standard Dev.	15.60	0.3967	0.09244
Coeff. of Var. [%]	5.035	2.104	18.37
Min.	283.8	18.38	0.3759
Max.	326.2	19.39	0.5778
Number of Spec.	6	6	6

Average _{norm}	0.0053	301.2	18.33
Standard Dev. _{norm}		14.33	0.4136
Coeff. of Var. [%] _{norm}		4.756	2.256
Min.	0.0052	278.1	17.80
Max.	0.0053	315.9	18.82
Number of Spec.	6	6	6



Longitudinal Tension Properties (LT)--ETW (275°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

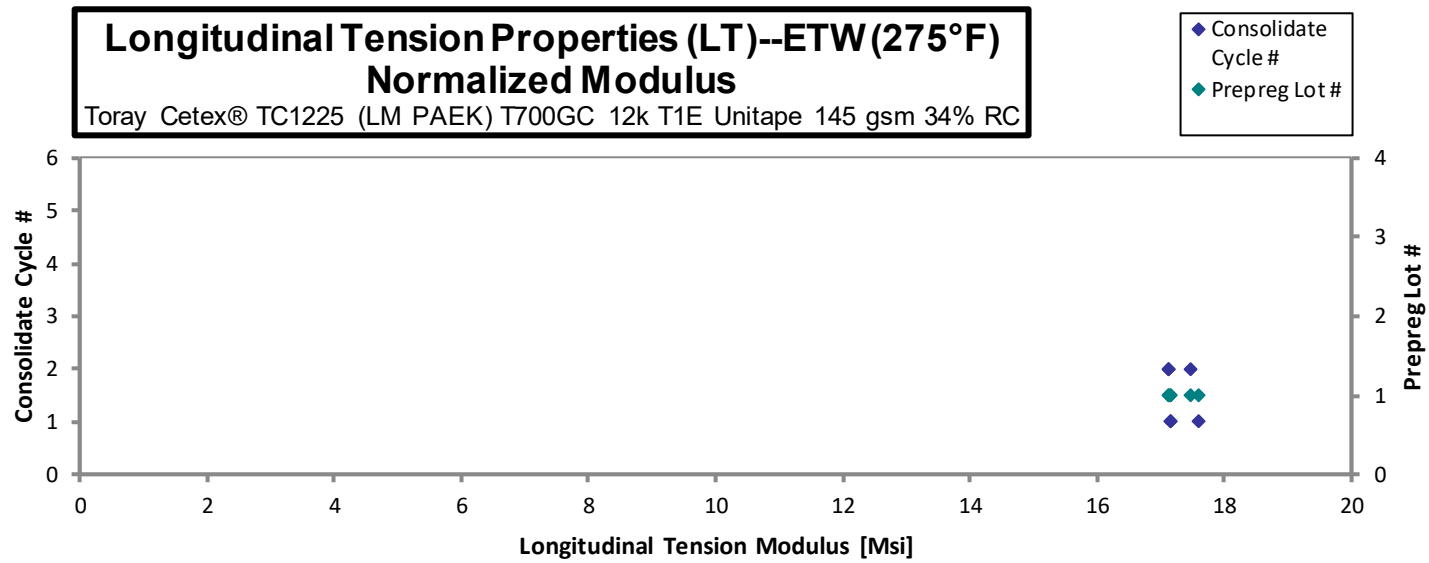
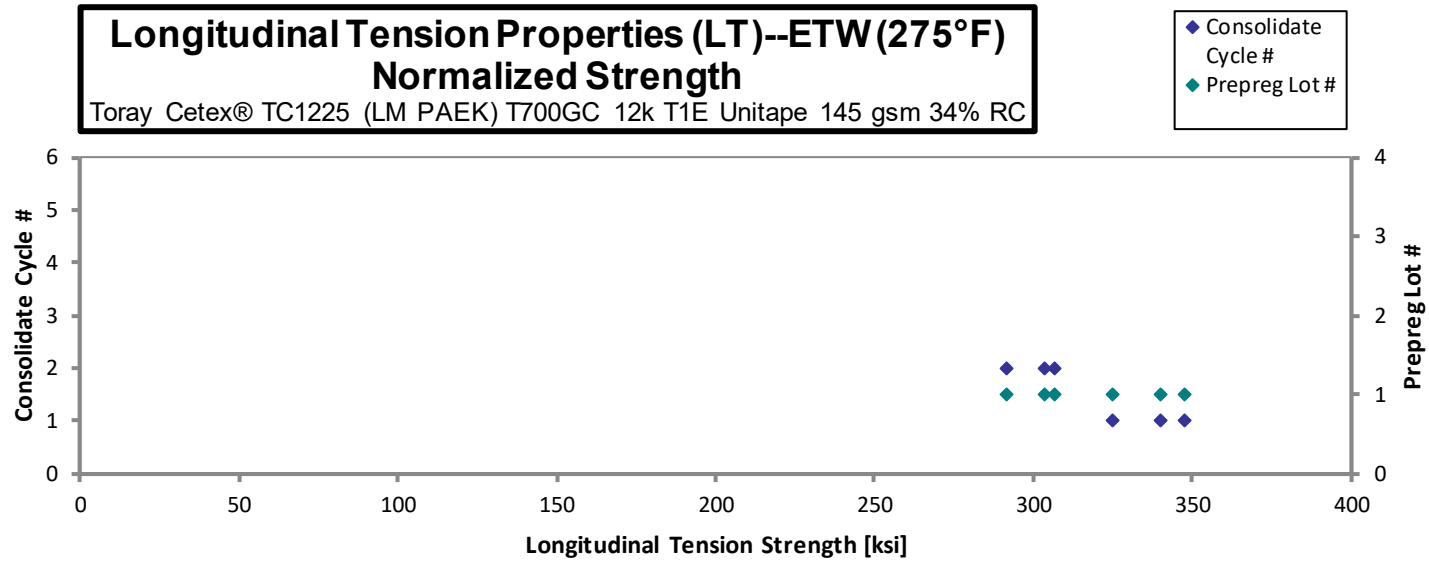
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 t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAJA111E	A	C1	1	1	336.1	17.78	0.4230	0.04173	8	XGM
TCAJA112E	A	C1	1	1	359.9	18.62	0.3625	0.04083	8	LGB, SGM
TCAJA113E	A	C1	1	1	370.0	18.26	0.3160	0.04058	8	XGM
TCAJA211E	A	C2	1	2	331.0	18.50	0.3301	0.04000	8	XGM
TCAJA212E	A	C2	1	2	332.7	18.77	0.4004	0.03940	8	XGM
TCAJA213E	A	C2	1	2	311.4	18.67	0.4144	0.04042	8	XGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0052	324.7	17.17
0.0051	340.1	17.60
0.0051	347.6	17.16
0.0050	306.5	17.13
0.0049	303.4	17.12
0.0051	291.3	17.46

Average	340.2	18.43	0.3744
Standard Dev.	21.28	0.3645	0.04506
Coeff. of Var. [%]	6.255	1.978	12.04
Min.	311.4	17.78	0.3160
Max.	370.0	18.77	0.4230
Number of Spec.	6	6	6

Average _{norm}	0.0051	318.9	17.27
Standard Dev. _{norm}		22.20	0.2053
Coeff. of Var. [%] _{norm}		6.960	1.188
Min.	0.0049	291.3	17.12
Max.	0.0052	347.6	17.60
Number of Spec.	6	6	6



4.2 Transverse Tension Properties (TT)

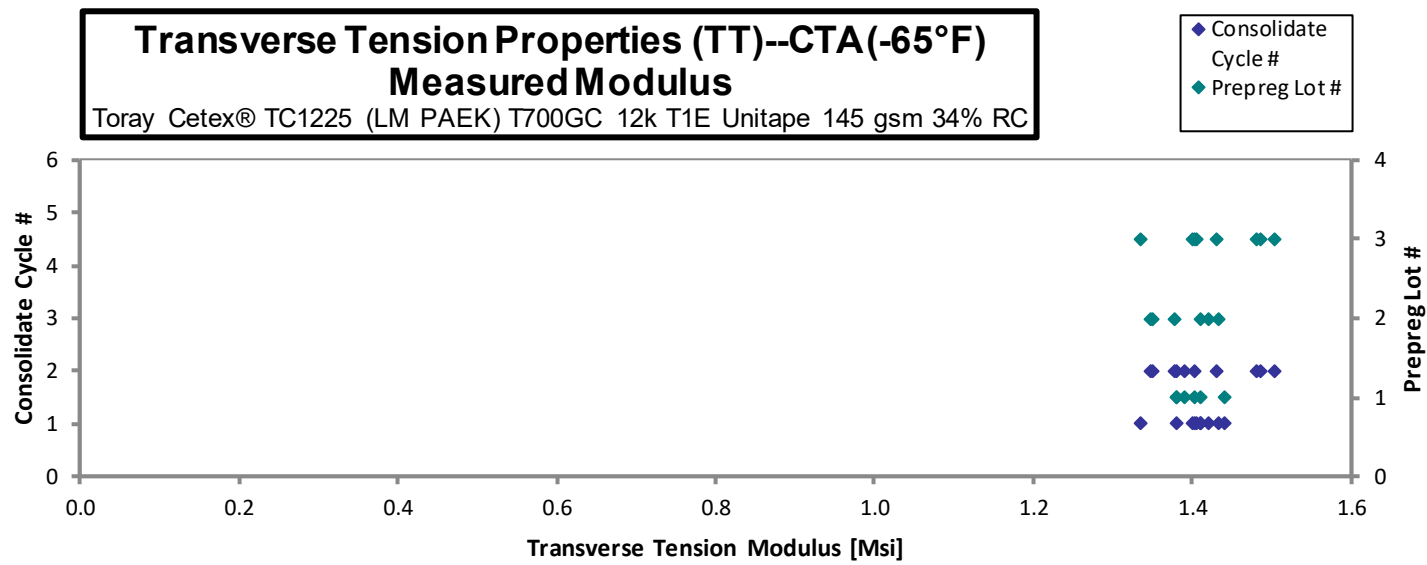
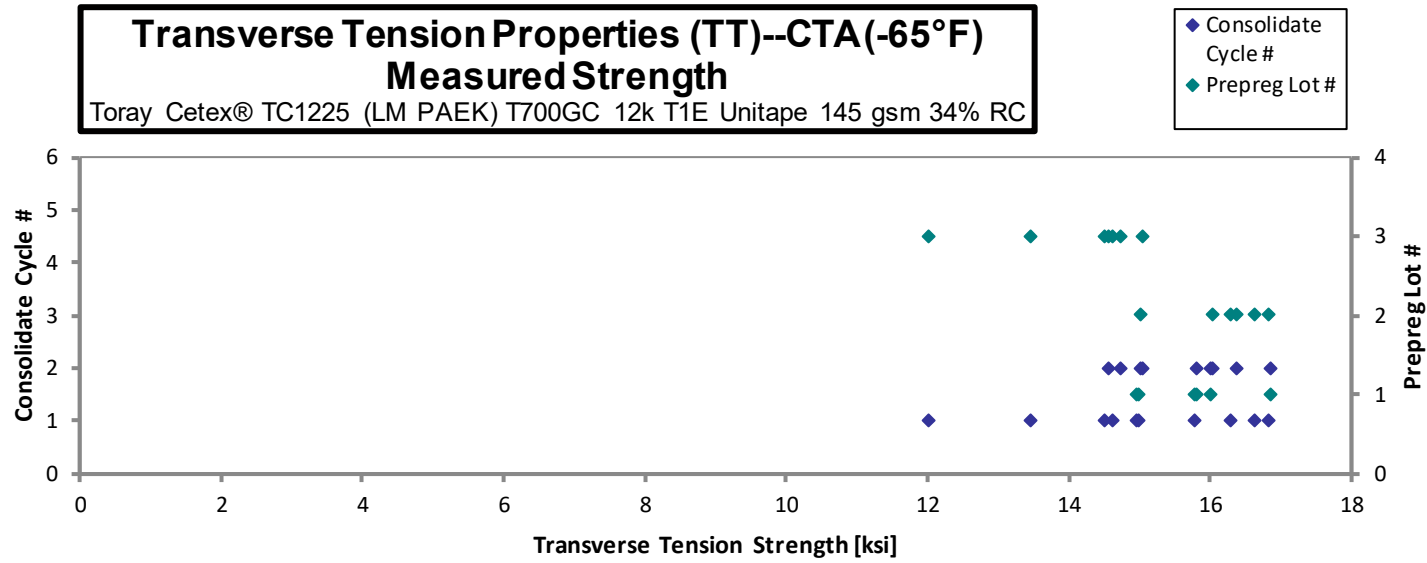
Transverse Tension Properties (TT)--CTA (-65°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAUA111B	A	C1	1	1	15.77	1.440	0.08470	16	0.0053	LGT
TCAUA112B	A	C1	1	1	14.95	1.381	0.08425	16	0.0053	LWT
TCAUA113B	A	C1	1	1	14.98	1.411	0.08367	16	0.0052	LWT
TCAUA211B	A	C2	1	2	16.02	1.380	0.08480	16	0.0053	LWB
TCAUA212B	A	C2	1	2	16.85	1.402	0.08492	16	0.0053	LGM, LAB
TCAUA213B	A	C2	1	2	15.81	1.391	0.08443	16	0.0053	LGM
TCAUB111B	B	C1	2	1	16.82	1.432	0.08142	16	0.0051	LGM
TCAUB112B	B	C1	2	1	16.28	1.421	0.08175	16	0.0051	LGM
TCAUB113B	B	C1	2	1	16.64	1.411	0.08143	16	0.0051	LWT
TCAUB211B	B	C2	2	2	15.02	1.379	0.08557	16	0.0053	LGB
TCAUB212B	B	C2	2	2	16.38	1.349	0.08592	16	0.0054	LGB
TCAUB213B	B	C2	2	2	16.04	1.347	0.08518	16	0.0053	LGB
TCAUC111B	C	C1	3	1	14.63	1.406	0.08183	16	0.0051	LGM
TCAUC112B	C	C1	3	1	12.01	1.401	0.08102	16	0.0051	LGM
TCAUC113B	C	C1	3	1	14.50	1.403	0.08137	16	0.0051	LGM
TCAUC114B*	C	C1	3	1	13.47	1.336	0.08172	16	0.0051	LGM
TCAUC211B	C	C2	3	2	14.57	1.487	0.08170	16	0.0051	LGM, LAB
TCAUC212B	C	C2	3	2	15.06	1.503	0.08083	16	0.0051	LGB, LWB
TCAUC213B**	C	C2	3	2		1.481	0.08118	16	0.0051	LAB, LIB
TCAUC214B*	C	C2	3	2	14.73	1.430	0.08162	16	0.0051	LWT

*Strain measurement was measured with extensometer. Strain gauge used on other coupons.

**Strength not reported due to unacceptable failure mode.

Average	15.29	1.410	0.0052
Standard Dev.	1.217	0.04479	
Coeff. of Var. [%]	7.959	3.177	
Min.	12.01	1.336	0.0051
Max.	16.85	1.503	0.0054
Number of Spec.	19	20	20

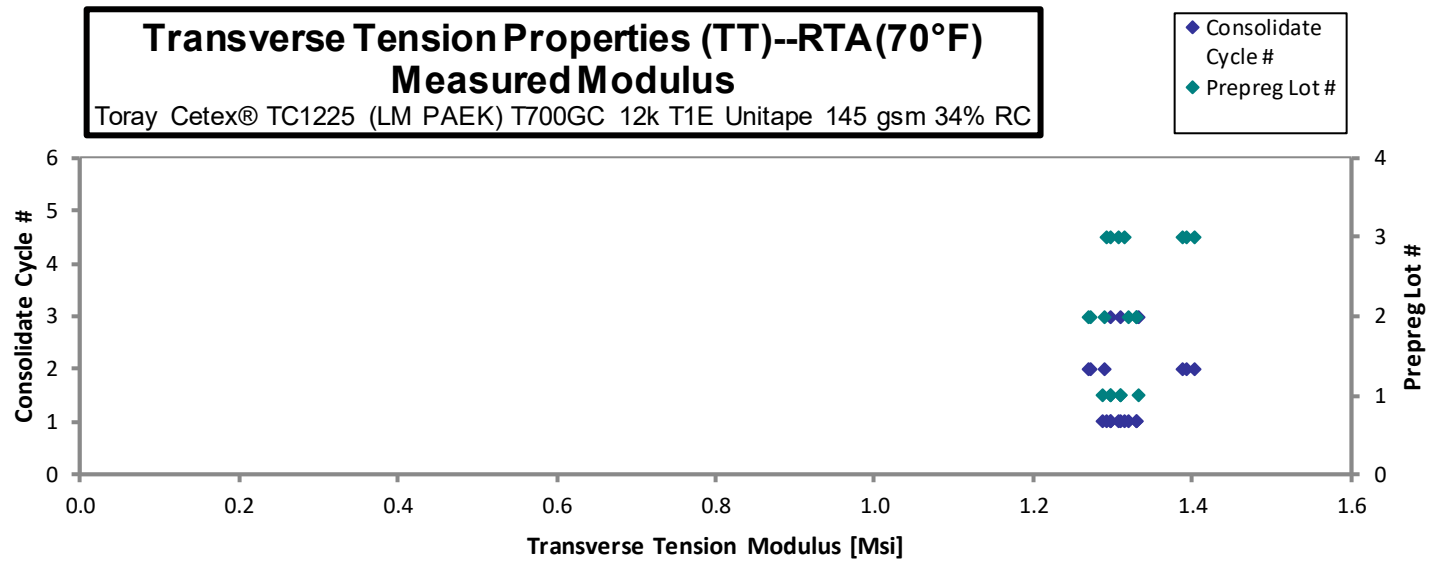
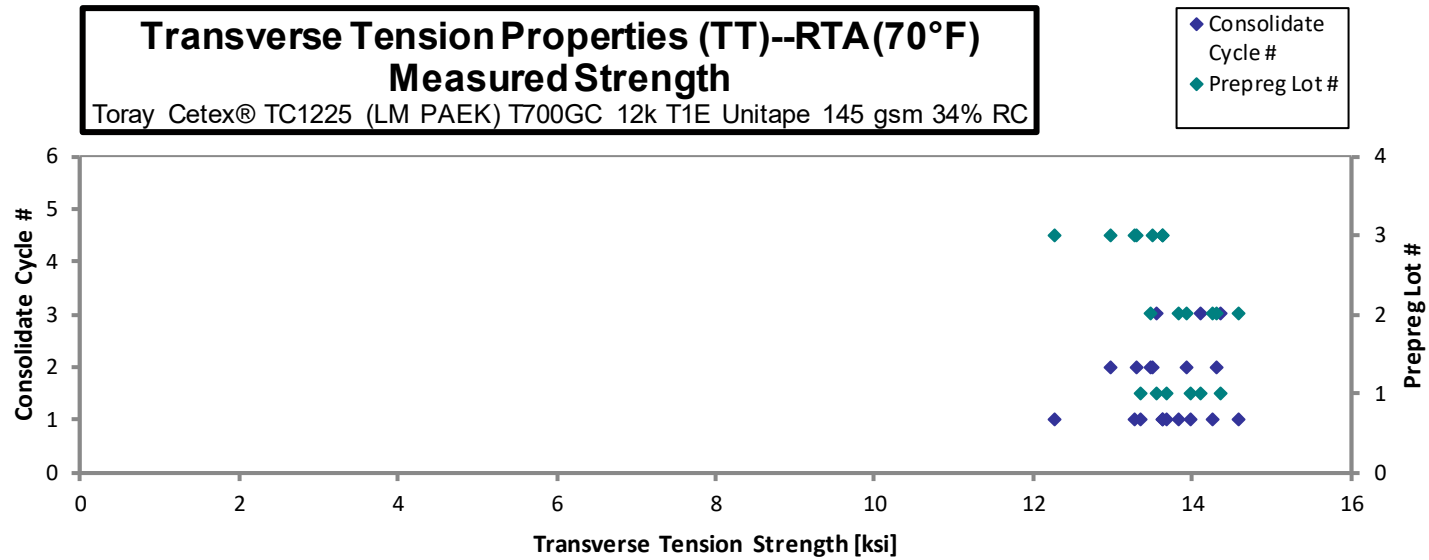


Transverse Tension Properties (TT)--RTA (70°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAUA111A	A	C1	1	1	13.35	1.309	0.08430	16	0.0053	LGT
TCAUA112A	A	C1	1	1	13.69	1.297	0.08420	16	0.0053	LGT
TCAUA113A	A	C1	1	1	13.98	1.287	0.08410	16	0.0053	LGM
TCAUA311A	A	C3	1	3	14.35	1.332	0.08208	16	0.0051	LGB
TCAUA312A	A	C3	1	3	13.55	1.311	0.08190	16	0.0051	LGB
TCAUA313A	A	C3	1	3	14.11	1.296	0.08172	16	0.0051	LGM
TCAUB111A	B	C1	2	1	14.24	1.320	0.08157	16	0.0051	LGT
TCAUB112A	B	C1	2	1	14.59	1.329	0.08168	16	0.0051	LGM
TCAUB113A	B	C1	2	1	13.83	1.330	0.08113	16	0.0051	LGB
TCAUB211A	B	C2	2	2	13.47	1.289	0.08550	16	0.0053	LGM
TCAUB212A	B	C2	2	2	14.30	1.271	0.08555	16	0.0053	LGM
TCAUB213A	B	C2	2	2	13.93	1.269	0.08558	16	0.0053	LGT
TCAUC111A	C	C1	3	1	12.26	1.292	0.08285	16	0.0052	LAB
TCAUC112A	C	C1	3	1	13.26	1.315	0.08125	16	0.0051	LGM, LWT
TCAUC113A	C	C1	3	1	13.63	1.306	0.08062	16	0.0050	LGM
TCAUC114A*	C	C1	3	1	13.62	1.297	0.08077	16	0.0050	LGM, LAB
TCAUC211A	C	C2	3	2	13.29	1.392	0.08160	16	0.0051	LGB
TCAUC212A	C	C2	3	2	12.97	1.404	0.08080	16	0.0051	LGB
TCAUC213A	C	C2	3	2	13.50	1.388	0.08073	16	0.0050	LGM

*Strain measurement was measured with extensometer. Strain gauge used on other coupons.

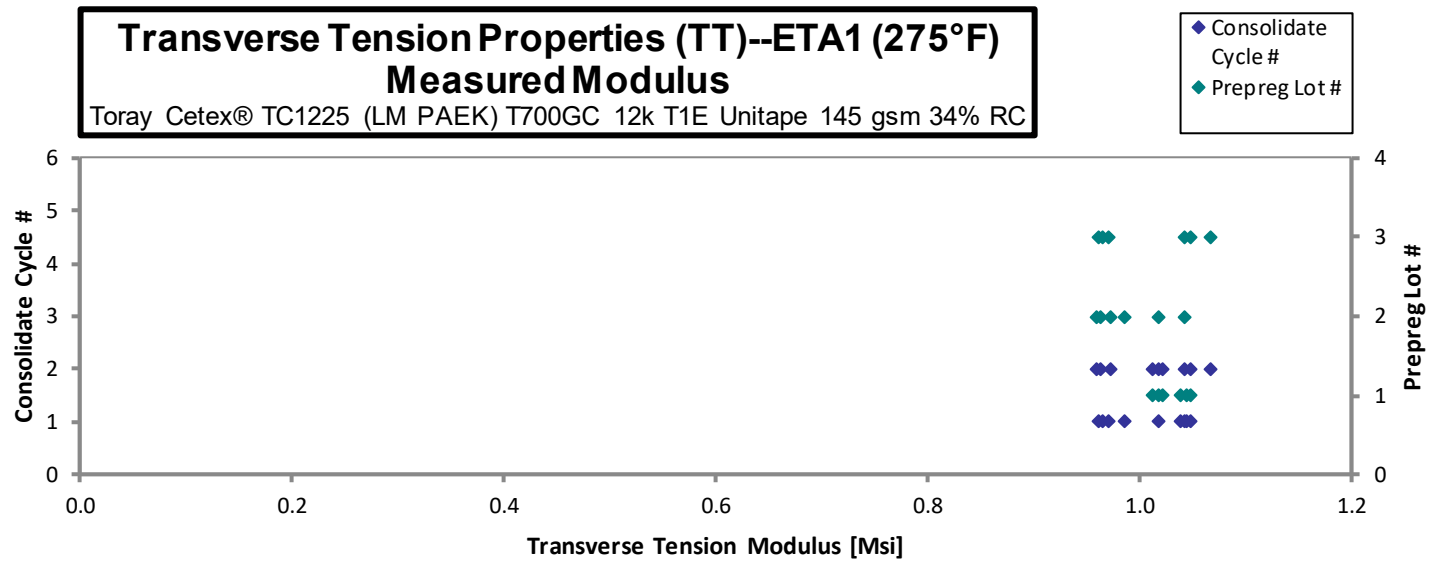
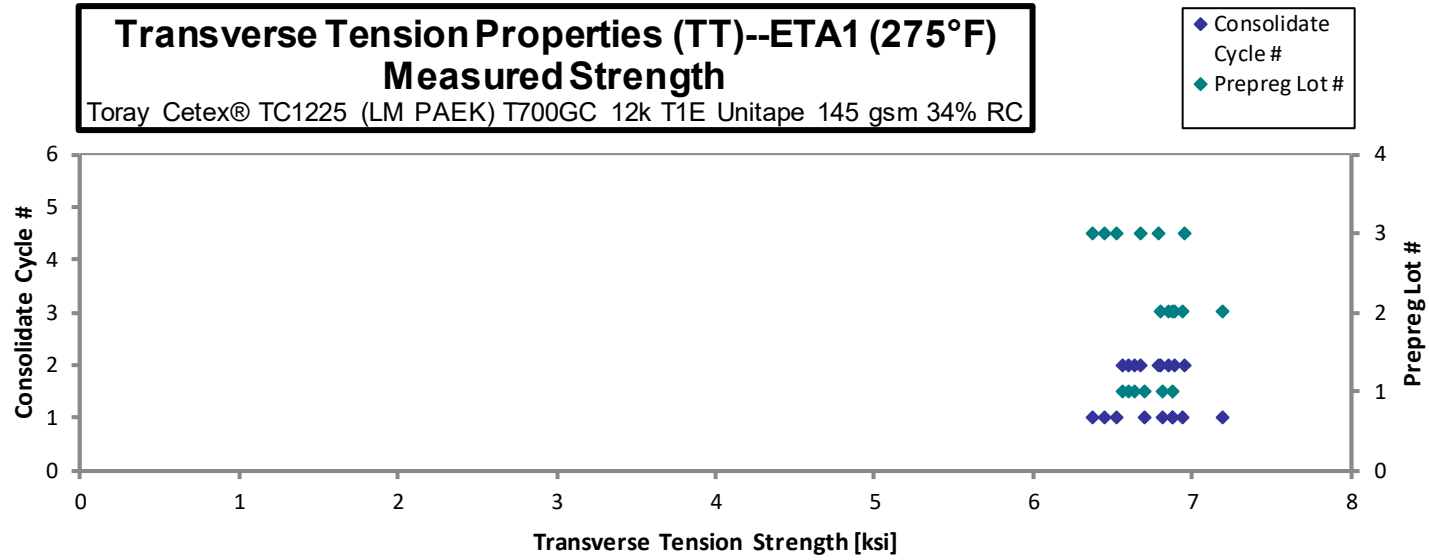
Average	13.68	1.318	0.0052
Standard Dev.	0.5464	0.03858	
Coeff. of Var. [%]	3.995	2.928	
Min.	12.26	1.269	0.0050
Max.	14.59	1.404	0.0053
Number of Spec.	19	19	19



Transverse Tension Properties (TT)--ETA1 (275°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCAUA111C	A	C1	1	1	6.704	1.039	0.08387	16	0.0052	LGT
TCAUA112C	A	C1	1	1	6.818	1.044	0.08382	16	0.0052	LGT
TCAUA113C	A	C1	1	1	6.878	1.048	0.08293	16	0.0052	LGT
TCAUA211C	A	C2	1	2	6.634	1.022	0.08503	16	0.0053	LGT
TCAUA212C	A	C2	1	2	6.564	1.019	0.08507	16	0.0053	LGT
TCAUA213C	A	C2	1	2	6.601	1.012	0.08495	16	0.0053	LGT
TCAUB111C	B	C1	2	1	7.196	1.042	0.08167	16	0.0051	LGT
TCAUB112C	B	C1	2	1	6.942	1.019	0.08157	16	0.0051	LGB
TCAUB113C	B	C1	2	1	6.878	0.9864	0.08227	16	0.0051	LGB
TCAUB211C	B	C2	2	2	6.852	0.9600	0.08602	16	0.0054	LGB
TCAUB212C	B	C2	2	2	6.795	0.9629	0.08610	16	0.0054	LGM
TCAUB213C	B	C2	2	2	6.885	0.9729	0.08523	16	0.0053	LGM
TCAUC111C	C	C1	3	1	6.522	0.9711	0.08113	16	0.0051	LGM
TCAUC112C	C	C1	3	1	6.448	0.9613	0.08122	16	0.0051	LGB
TCAUC113C	C	C1	3	1	6.368	0.9650	0.08167	16	0.0051	LGM
TCAUC211C	C	C2	3	2	6.954	1.068	0.08118	16	0.0051	LGM
TCAUC212C	C	C2	3	2	6.677	1.048	0.08118	16	0.0051	LGM
TCAUC213C	C	C2	3	2	6.788	1.042	0.08142	16	0.0051	LGM

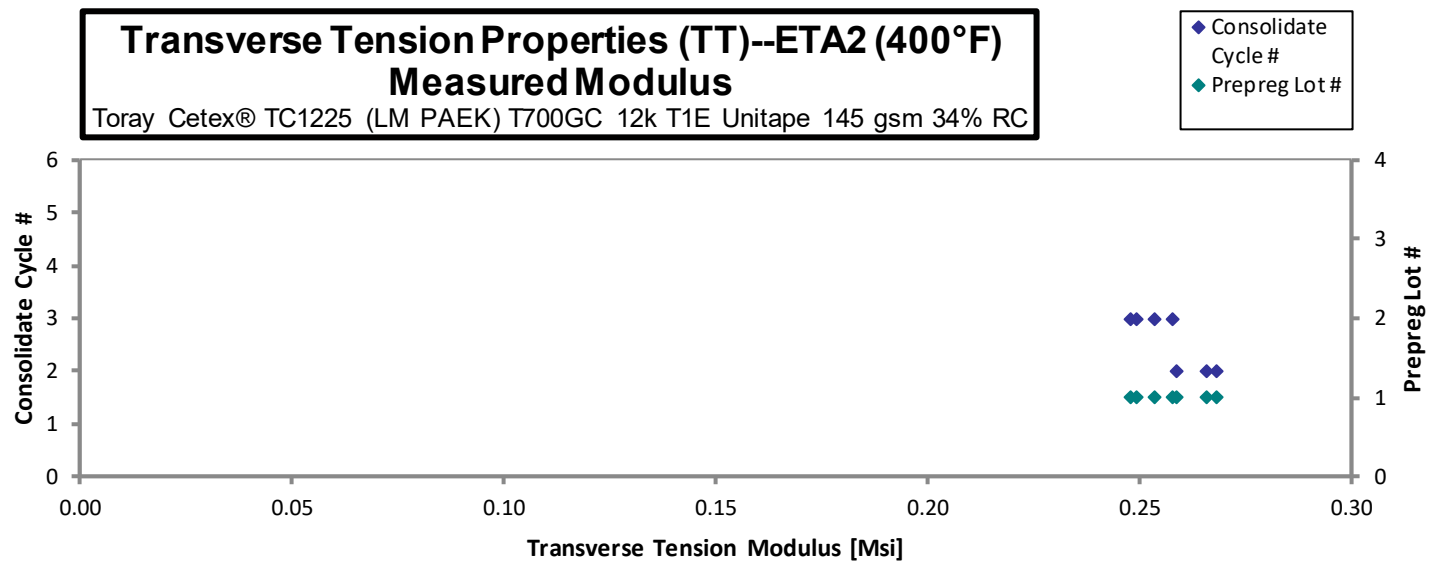
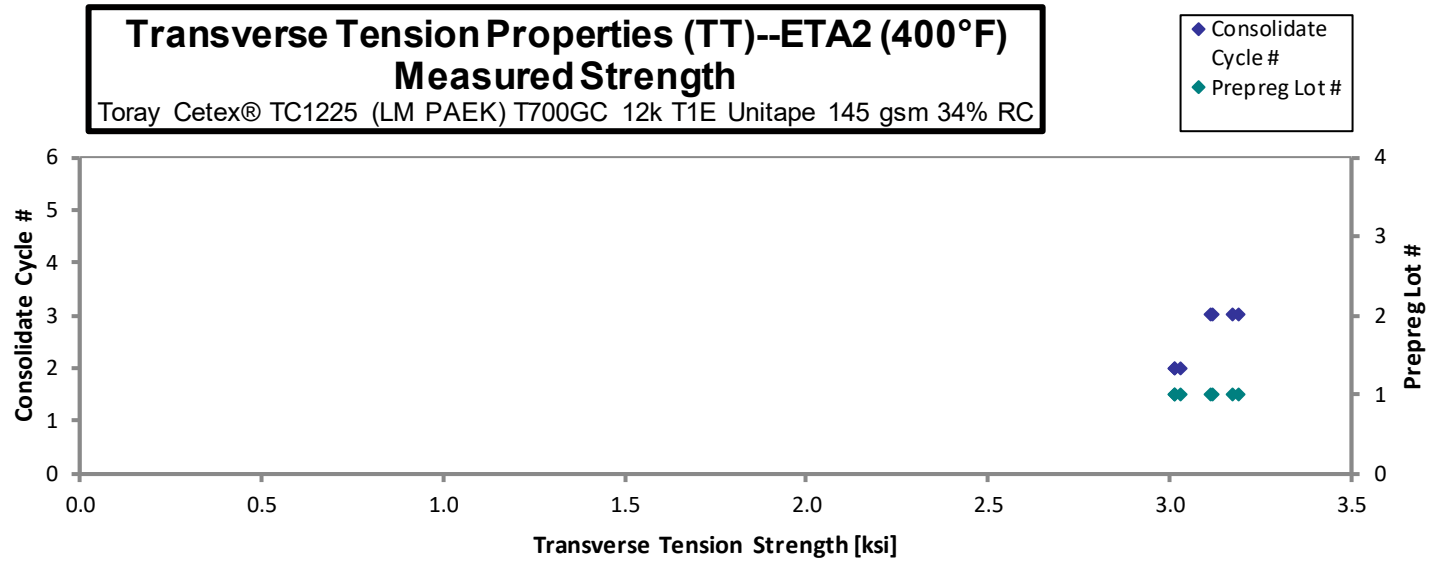
Average	6.750	1.010	0.0052
Standard Dev.	0.2050	0.03689	
Coeff. of Var. [%]	3.037	3.652	
Min.	6.368	0.9600	0.0051
Max.	7.196	1.068	0.0054
Number of Spec.	18	18	18



Transverse Tension Properties (TT)--ETA2 (400°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAUA211D	A	C2	1	2	3.015	0.2660	0.08507	16	0.0053	LGM
TCAUA212D	A	C2	1	2	3.013	0.2684	0.08475	16	0.0053	LGM
TCAUA213D	A	C2	1	2	3.030	0.2588	0.08522	16	0.0053	LGM
TCAUA311D	A	C3	1	3	3.191	0.2480	0.08152	16	0.0051	LGM
TCAUA312D	A	C3	1	3	3.110	0.2581	0.08118	16	0.0051	LGB
TCAUA313D	A	C3	1	3	3.171	0.2535	0.08163	16	0.0051	LGB
TCAUA314D	A	C3	1	3	3.118	0.2493	0.08230	16	0.0051	LGB

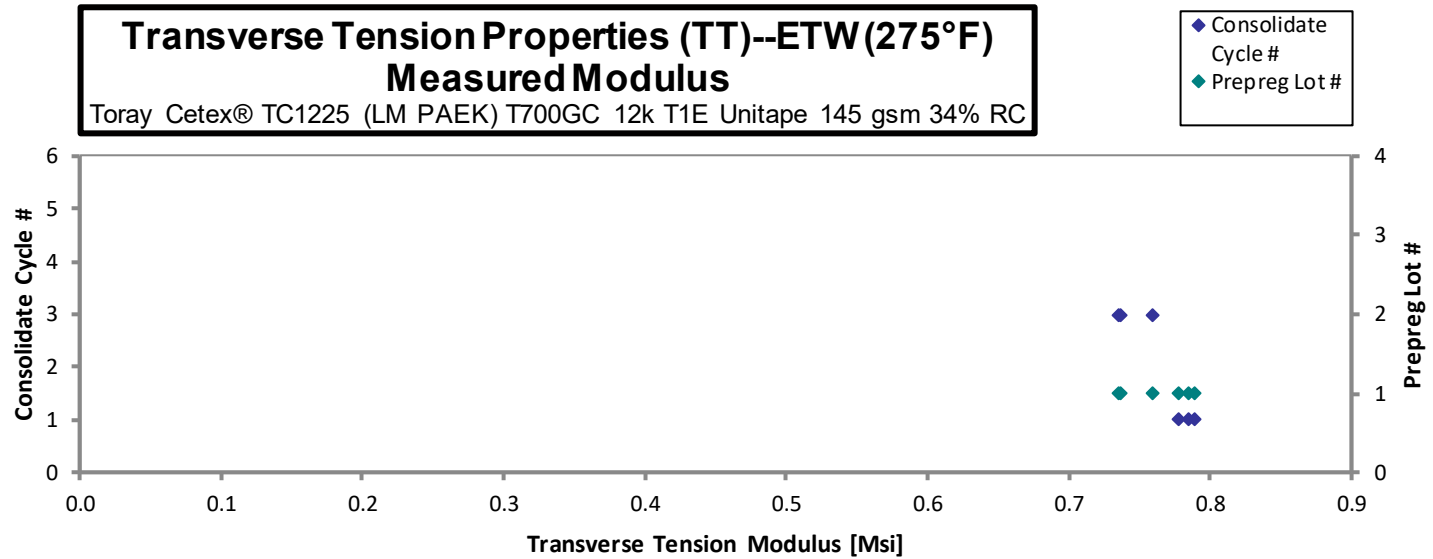
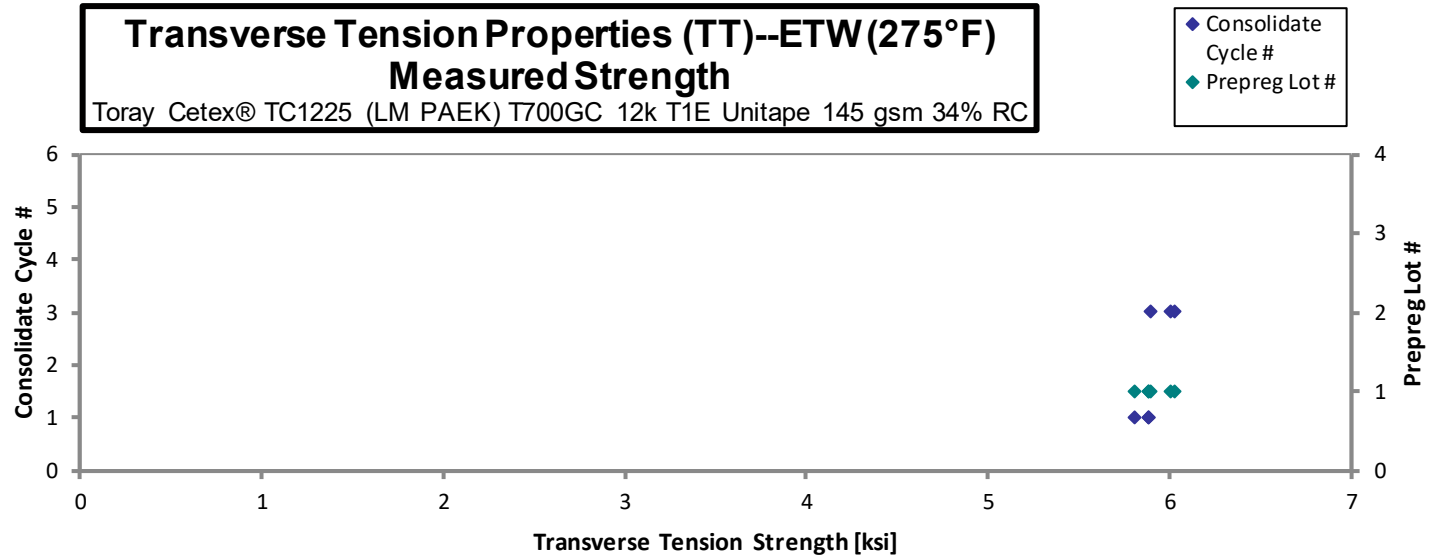
Average	3.093	0.2574	0.0052
Standard Dev.	0.07420	0.007822	
Coeff. of Var. [%]	2.399	3.038	
Min.	3.013	0.2480	0.0051
Max.	3.191	0.2684	0.0053
Number of Spec.	7	7	7



Transverse Tension Properties (TT)--ETW (275°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAUA111E	A	C1	1	1	5.802	0.7781	0.08372	16	0.0052	LGT
TCAUA112E	A	C1	1	1	5.881	0.7850	0.08448	16	0.0053	LGT
TCAUA113E	A	C1	1	1	5.885	0.7893	0.08432	16	0.0053	LGT
TCAUA311E	A	C3	1	3	6.006	0.7600	0.08120	16	0.0051	LGT
TCAUA312E	A	C3	1	3	6.030	0.7353	0.08230	16	0.0051	LGM
TCAUA313E	A	C3	1	3	5.890	0.7364	0.08315	16	0.0052	LGT

Average	5.916	0.7640	0.0052
Standard Dev.	0.08599	0.02402	
Coeff. of Var. [%]	1.454	3.144	
Min.	5.802	0.7353	0.0051
Max.	6.030	0.7893	0.0053
Number of Spec.	6	6	6



4.3 Longitudinal Compression Properties (LC)

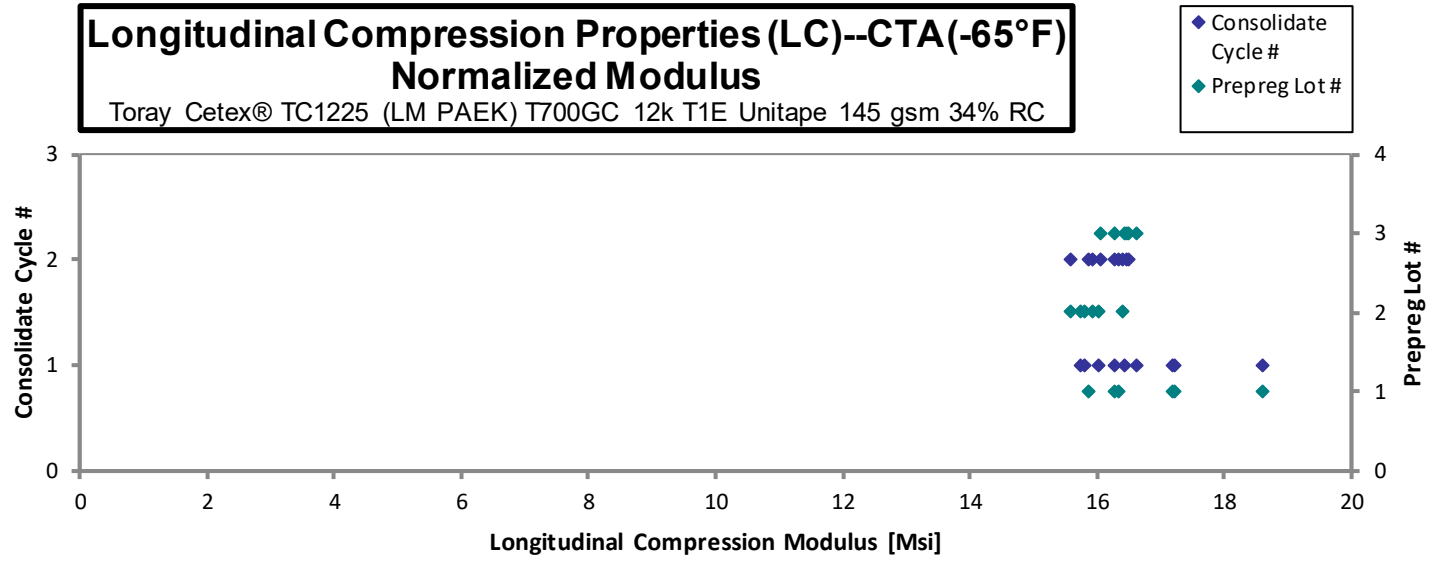
Longitudinal Compression Properties (LC)--CTA (-65°F)
Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate
TCALA111B	A	C1	1	1	17.64	0.3322	0.1053	20
TCALA112B	A	C1	1	1	18.88	0.3963	0.1065	20
TCALA113B	A	C1	1	1	17.33	0.3853	0.1072	20
TCALA211B	A	C2	1	2	17.17	0.3479	0.1023	20
TCALA212B	A	C2	1	2	16.59	0.3716	0.1032	20
TCALA213B	A	C2	1	2	17.10	0.3613	0.1031	20
TCALB111B	B	C1	2	1	16.77	0.4017	0.1015	20
TCALB112B	B	C1	2	1	16.84	0.3505	0.1027	20
TCALB113B	B	C1	2	1	16.54	0.3382	0.1032	20
TCALB211B	B	C2	2	2	17.58	0.5075	0.1007	20
TCALB212B	B	C2	2	2	16.65	0.3145	0.1012	20
TCALB213B	B	C2	2	2	17.02	0.3262	0.1011	20
TCALC111B	C	C1	3	1	17.53	0.3447	0.1003	20
TCALC112B	C	C1	3	1	17.59	0.3618	0.1009	20
TCALC113B	C	C1	3	1	17.79	0.3511	0.1010	20
TCALC211B	C	C2	3	2	17.10	0.3265	0.1015	20
TCALC212B	C	C2	3	2	17.64	0.3446	0.1010	20
TCALC213B	C	C2	3	2	17.57	0.4023	0.1012	20

Avg. t_{ply} [in]	Modulus _{norm} [Msi]
0.0053	17.21
0.0053	18.61
0.0054	17.20
0.0051	16.26
0.0052	15.86
0.0052	16.32
0.0051	15.76
0.0051	16.01
0.0052	15.81
0.0050	16.39
0.0051	15.60
0.0051	15.93
0.0050	16.27
0.0050	16.43
0.0051	16.64
0.0051	16.07
0.0050	16.49
0.0051	16.46

Average	17.30	0.3647	Average _{norm}	0.0051	16.41
Standard Dev.	0.5653	0.04430	Standard Dev. _{norm}		0.7062
Coeff. of Var. [%]	3.269	12.15	Coeff. of Var. [%] _{norm}		4.305
Min.	16.54	0.3145	Min.	0.0050	15.60
Max.	18.88	0.5075	Max.	0.0054	18.61
Number of Spec.	18	18	Number of Spec.	18	18



**Longitudinal Compression Properties (LC)--RTA (70°F)
Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate
TCALA111A*	A	C1	1	1	16.63	0.3474	0.1020	20
TCALA113A*	A	C1	1	1	16.80	0.3950	0.1049	20
TCALA114A	A	C1	1	1	17.00	0.3321	0.1047	20
TCALA211A	A	C2	1	2	16.98	0.3664	0.09707	20
TCALA212A	A	C2	1	2	16.53	0.3547	0.09813	20
TCALA213A	A	C2	1	2	16.82	0.3779	0.09953	20
TCALB111A	B	C1	2	1	16.59	0.4149	0.09887	20
TCALB112A	B	C1	2	1	16.33	0.3418	0.1005	20
TCALB113A	B	C1	2	1	16.40	0.4135	0.1014	20
TCALB211A	B	C2	2	2	16.99	0.4145	0.1006	20
TCALB212A	B	C2	2	2	17.11	0.3557	0.1004	20
TCALB213A	B	C2	2	2	16.87	0.3550	0.09987	20
TCALC111A	C	C1	3	1	17.51	0.3378	0.1007	20
TCALC112A	C	C1	3	1	17.37	0.3491	0.1014	20
TCALC113A	C	C1	3	1	17.25	0.3740	0.1017	20
TCALC212A	C	C2	3	2	17.15	0.3320	0.09963	20
TCALC213A	C	C2	3	2	17.11	0.3625	0.1016	20
TCALC214A	C	C2	3	2	17.55	0.3157	0.1014	20

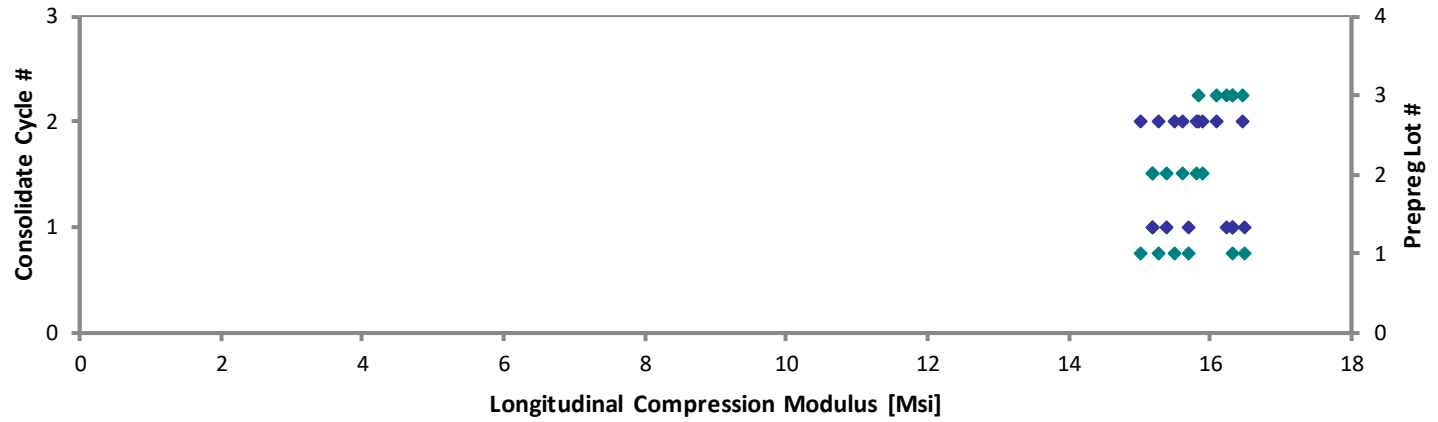
Avg. t _{ply} [in]	Modulus _{norm} [Msi]
0.0051	15.70
0.0052	16.31
0.0052	16.48
0.0049	15.27
0.0049	15.02
0.0050	15.50
0.0049	15.19
0.0050	15.20
0.0051	15.40
0.0050	15.82
0.0050	15.90
0.0050	15.60
0.0050	16.33
0.0051	16.31
0.0051	16.24
0.0050	15.83
0.0051	16.09
0.0051	16.47

*Modulus and Poisson's Ratio are averaged values of 2 strain gages.

Average	16.94	0.3633	Average_{norm}	0.0050	15.81
Standard Dev.	0.3580	0.02983	Standard Dev._{norm}		0.4809
Coeff. of Var. [%]	2.113	8.210	Coeff. of Var. [%]_{norm}		3.041
Min.	16.33	0.3157	Min.	0.0049	15.02
Max.	17.55	0.4149	Max.	0.0052	16.48
Number of Spec.	18	18	Number of Spec.	18	18

**Longitudinal Compression Properties (LC)--RTA(70°F)
Normalized Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate
Cycle #
◆ Prepreg Lot #



**Longitudinal Compression Properties (LC)--ETA1 (275°F)
Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

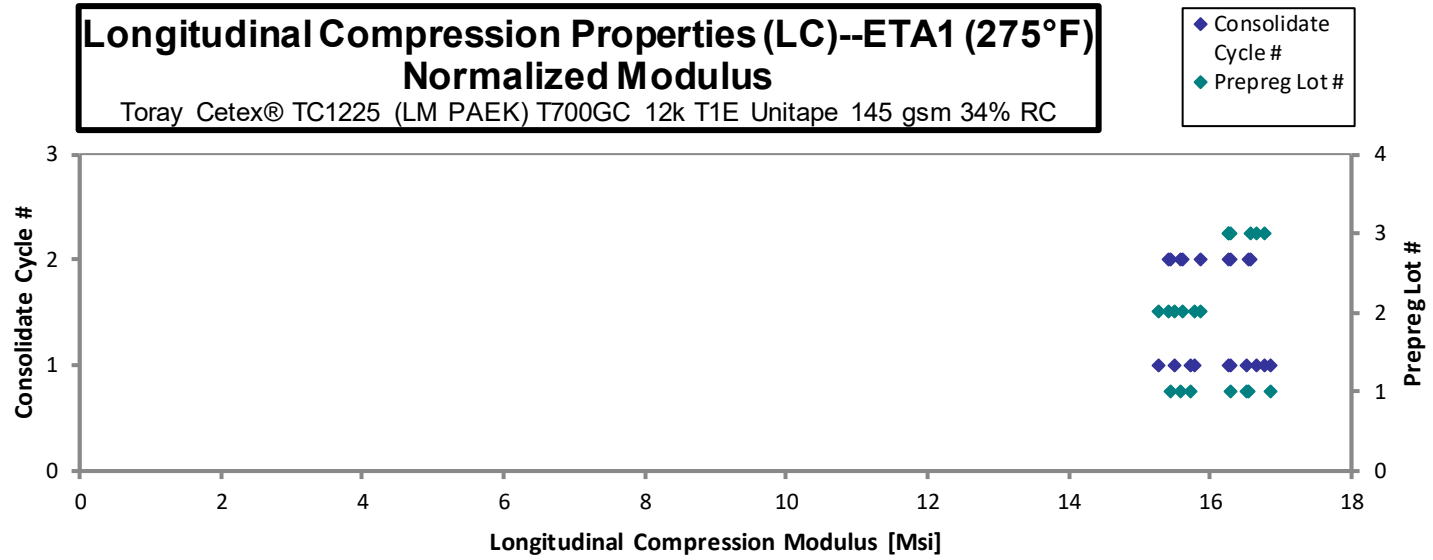
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate
TCALA111C*	A	C1	1	1	16.91	0.3652	0.1055	20
TCALA112C*	A	C1	1	1	17.22	0.3613	0.1057	20
TCALA113C	A	C1	1	1	16.79	0.3028	0.1011	20
TCALA114C	A	C1	1	1	17.24	0.3477	0.1022	20
TCALA211C	A	C2	1	2	16.46	0.3652	0.1022	20
TCALA212C	A	C2	1	2	17.28	0.3613	0.1035	20
TCALA213C	A	C2	1	2	16.98	0.3028	0.09823	20
TCALB111C	B	C1	2	1	16.32	0.4340	0.1011	20
TCALB112C	B	C1	2	1	16.62	0.3446	0.1006	20
TCALB113C	B	C1	2	1	16.88	0.3388	0.1010	20
TCALB211C	B	C2	2	2	16.98	0.2783	0.09933	20
TCALB212C	B	C2	2	2	17.29	0.3327	0.09907	20
TCALB213C	B	C2	2	2	16.82	0.4214	0.09893	20
TCALC111C	C	C1	3	1	17.86	0.3190	0.1014	20
TCALC112C	C	C1	3	1	17.36	0.4326	0.1012	20
TCALC113C	C	C1	3	1	17.89	0.4297	0.1007	20
TCALC211C	C	C2	3	2	17.38	0.3504	0.1010	20
TCALC212C	C	C2	3	2	17.71	0.3965	0.1011	20
TCALC213C	C	C2	3	2	17.54	0.3817	0.1004	20

Avg. t _{ply} [in]	Modulus _{norm} [Msi]
0.0053	16.52
0.0053	16.84
0.0051	15.71
0.0051	16.31
0.0051	15.57
0.0052	16.55
0.0049	15.45
0.0051	15.28
0.0050	15.49
0.0051	15.79
0.0050	15.62
0.0050	15.86
0.0049	15.41
0.0051	16.77
0.0051	16.26
0.0050	16.67
0.0051	16.25
0.0051	16.58
0.0050	16.30

*Modulus and Poisson's Ratio are averaged values of 2 strain gages.

Average	17.13	0.3614	Average_{norm}	0.0051	16.06
Standard Dev.	0.4413	0.04580	Standard Dev._{norm}		0.5173
Coeff. of Var. [%]	2.576	12.67	Coeff. of Var. [%]_{norm}		3.220
Min.	16.32	0.2783	Min.	0.0049	15.28
Max.	17.89	0.4340	Max.	0.0053	16.84
Number of Spec.	19	19	Number of Spec.	19	19



**Longitudinal Compression Properties (LC)--ETA2 (400°F)
Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate
TCALA111D*	A	C1	1	1	17.04	0.2820	0.1028	20
TCALA112D*	A	C1	1	1	16.13	0.4084	0.1032	20
TCALA113D	A	C1	1	1	18.36	0.6726	0.1040	20
TCALA211D	A	C2	1	2	14.61	0.2874	0.09945	20
TCALA212D	A	C2	1	2	16.84	0.2433	0.1006	20
TCALA213D	A	C2	1	2	15.62	0.3830	0.1016	20

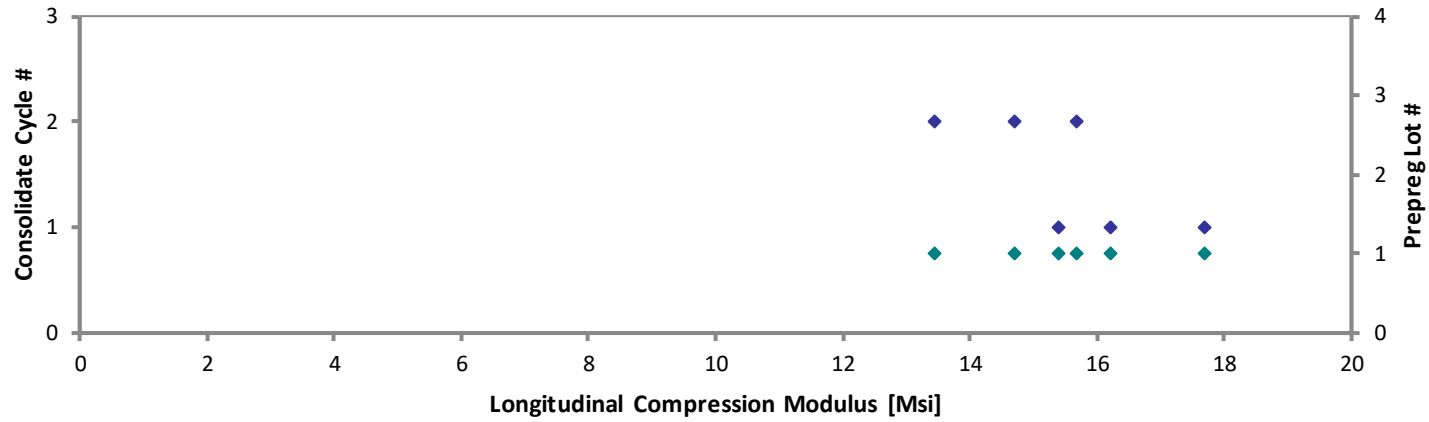
Avg. t _{ply} [in]	Modulus _{norm} [Msi]
0.0051	16.23
0.0052	15.40
0.0052	17.68
0.0050	13.45
0.0050	15.68
0.0051	14.70

*Modulus and Poisson's Ratio are averaged values of 2 strain gages.

Average	16.43	0.3795	Average_{norm}	0.0051	15.52
Standard Dev.	1.293	0.1570	Standard Dev._{norm}		1.427
Coeff. of Var. [%]	7.868	41.39	Coeff. of Var. [%]_{norm}		9.192
Min.	14.61	0.2433	Min.	0.0050	13.45
Max.	18.36	0.6726	Max.	0.0052	17.68
Number of Spec.	6	6	Number of Spec.	6	6

**Longitudinal Compression Properties (LC)--ETA2 (400°F)
Normalized Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate
Cycle #
◆ Prepreg Lot #



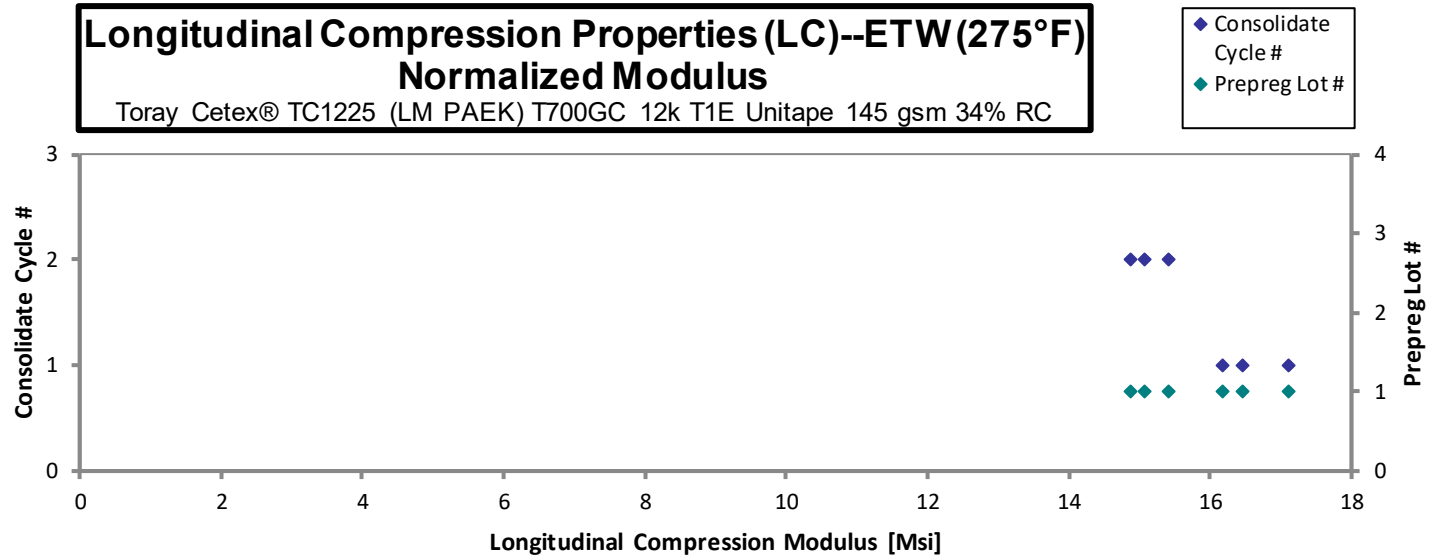
**Longitudinal Compression Properties (LC)--ETW (275°F)
Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate
TCALA111E	A	C1	1	1	17.49	0.4626	0.1056	20
TCALA112E	A	C1	1	1	16.96	0.3158	0.1049	20
TCALA113E	A	C1	1	1	16.75	0.2940	0.1043	20
TCALA211E	A	C2	1	2	15.83	0.2979	0.1014	20
TCALA212E	A	C2	1	2	16.20	0.3234	0.1004	20
TCALA213E	A	C2	1	2	16.53	0.3600	0.1006	20

Avg. t _{ply} [in]	Modulus _{norm} [Msi]
0.0053	17.10
0.0052	16.47
0.0052	16.17
0.0051	14.86
0.0050	15.06
0.0050	15.40

Average	16.63	0.3423	Average _{norm}	0.0051	15.85
Standard Dev.	0.5836	0.06348	Standard Dev. _{norm}		0.8780
Coeff. of Var. [%]	3.510	18.55	Coeff. of Var. [%] _{norm}		5.541
Min.	15.83	0.2940	Min.	0.0050	14.86
Max.	17.49	0.4626	Max.	0.0053	17.10
Number of Spec.	6	6	Number of Spec.	6	6

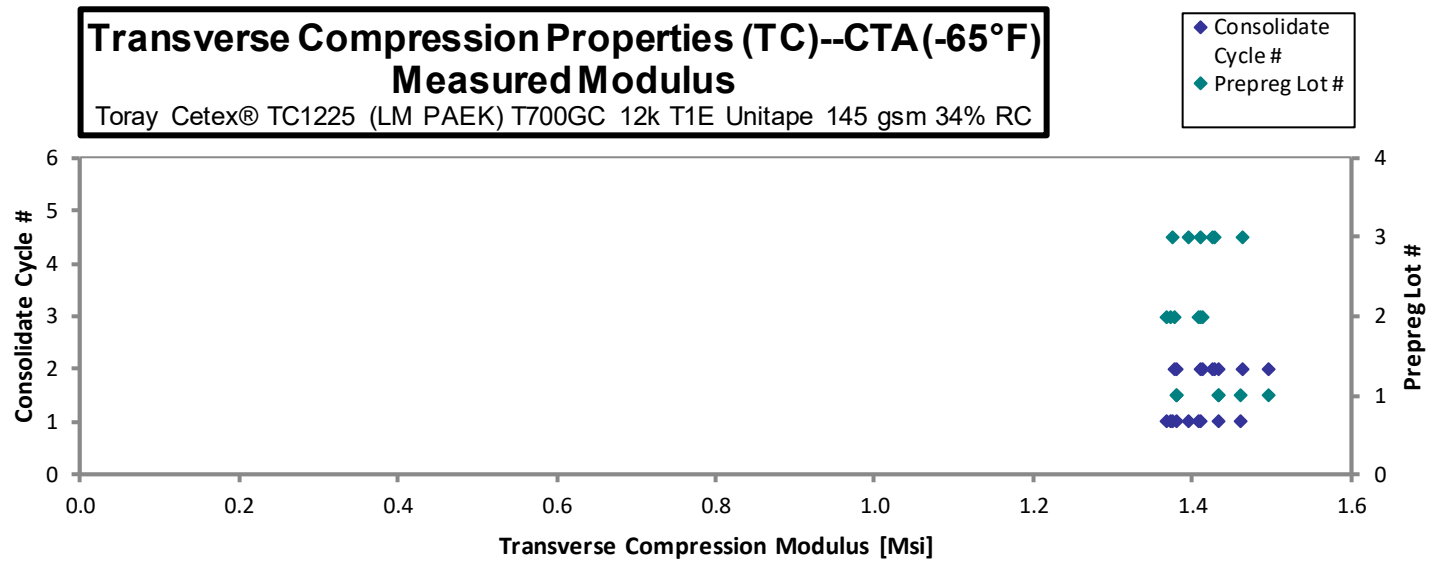
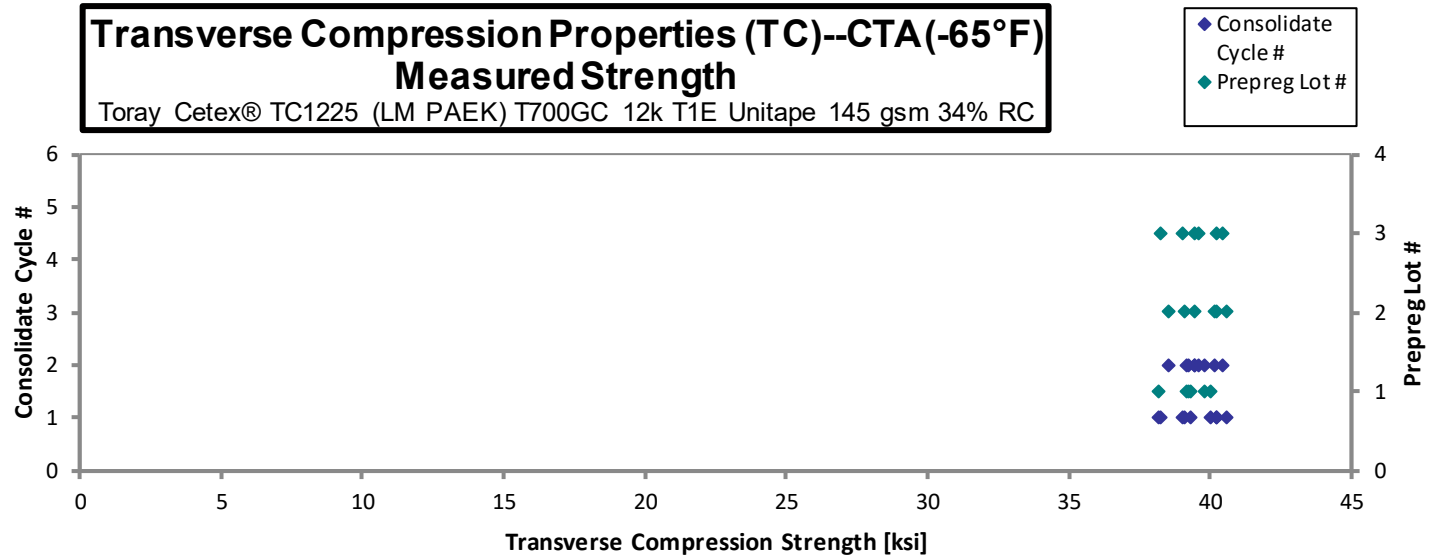


4.4 Transverse Compression Properties (TC)

**Transverse Compression Properties (TC)--CTA (-65°F)
Strength & Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAZA111B	A	C1	1	1	39.32	1.380	0.1046	20	0.0052	HGM, TAT
TCAZA112B	A	C1	1	1	38.16	1.434	0.1048	20	0.0052	HGM, TAT
TCAZA113B	A	C1	1	1	40.05	1.460	0.1050	20	0.0053	HGM, TAT
TCAZA211B	A	C2	1	2	39.83	1.496	0.1063	20	0.0053	BGM, TAT
TCAZA212B	A	C2	1	2	39.26	1.381	0.1062	20	0.0053	BGM, HAB
TCAZA213B	A	C2	1	2	39.18	1.432	0.1059	20	0.0053	BGM
TCAZB111B	B	C1	2	1	40.26	1.368	0.1044	20	0.0052	HGM, TAB
TCAZB112B	B	C1	2	1	40.61	1.374	0.1040	20	0.0052	HGM, TAT
TCAZB113B	B	C1	2	1	39.07	1.409	0.1039	20	0.0052	HGM, TAB
TCAZB211B	B	C2	2	2	38.55	1.379	0.1011	20	0.0051	HGM, TAB
TCAZB212B	B	C2	2	2	40.14	1.414	0.1009	20	0.0050	HGM, TAT
TCAZB213B	B	C2	2	2	39.47	1.411	0.1009	20	0.0050	HGM, TAB
TCAZC111B	C	C1	3	1	39.04	1.395	0.1018	20	0.0051	HGM, TAB
TCAZC112B	C	C1	3	1	40.23	1.410	0.1016	20	0.0051	HGM, TAB
TCAZC113B	C	C1	3	1	38.24	1.374	0.1019	20	0.0051	HGM, TAB
TCAZC211B	C	C2	3	2	39.58	1.424	0.1021	20	0.0051	HGM, TAB
TCAZC212B	C	C2	3	2	40.43	1.462	0.1020	20	0.0051	HGM, TAB
TCAZC213B	C	C2	3	2	39.45	1.428	0.1019	20	0.0051	BGM, TAB

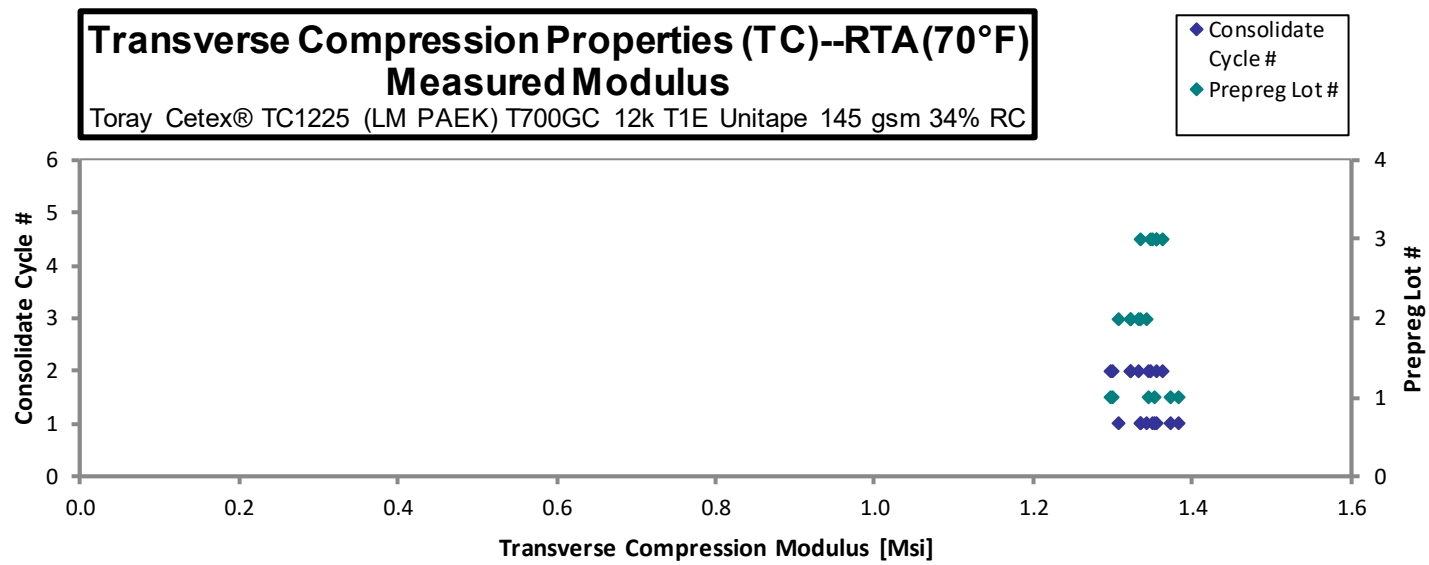
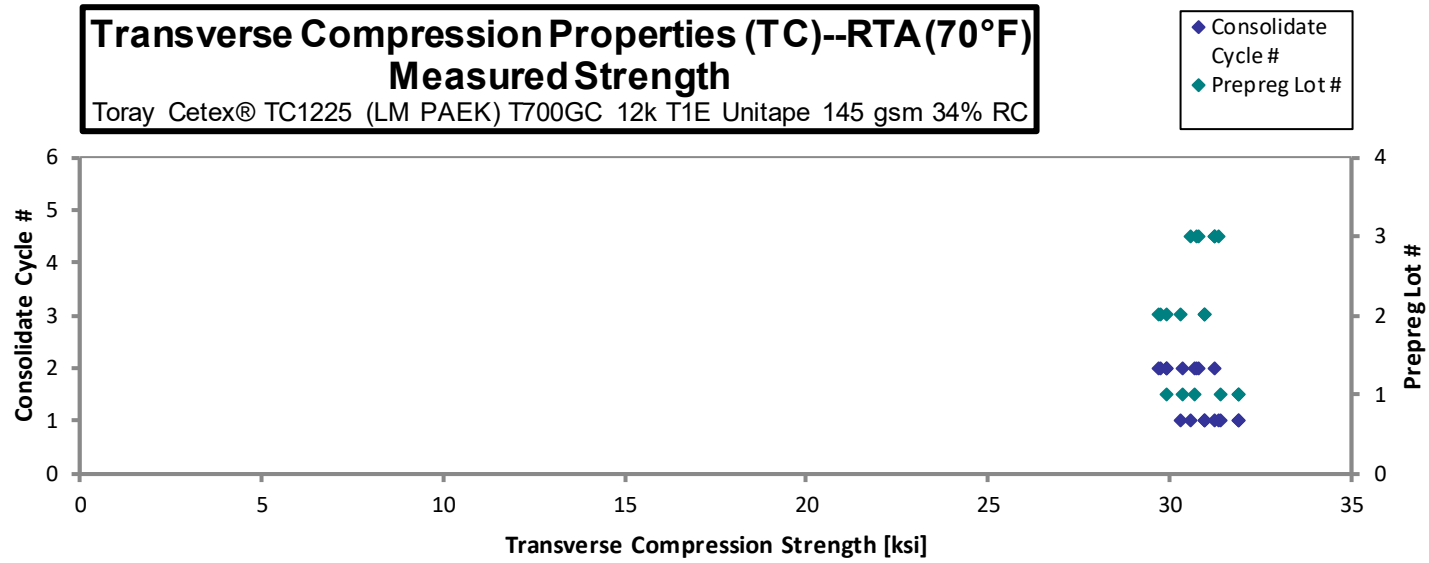
Average	39.49	1.413	0.0052
Standard Dev.	0.7244	0.03552	
Coeff. of Var. [%]	1.834	2.514	
Min.	38.16	1.368	0.0050
Max.	40.61	1.496	0.0053
Number of Spec.	18	18	18



**Transverse Compression Properties (TC)--RTA (70°F)
Strength & Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msij]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCAZA111A	A	C1	1	1	31.88	1.352	0.1057	20	0.0053	HGM, TAT
TCAZA112A	A	C1	1	1	31.41	1.373	0.1056	20	0.0053	HGM, TAT
TCAZA113A	A	C1	1	1	31.89	1.382	0.1054	20	0.0053	HGM, TAT
TCAZA211A	A	C2	1	2	30.34	1.299	0.1071	20	0.0054	HGM, TAT
TCAZA212A	A	C2	1	2	30.71	1.345	0.1068	20	0.0053	HGM, TAT
TCAZA213A	A	C2	1	2	29.94	1.296	0.1071	20	0.0054	HGM, TAT
TCAZB111A	B	C1	2	1	30.94	1.336	0.1046	20	0.0052	HGM, TAT
TCAZB112A	B	C1	2	1	30.30	1.342	0.1048	20	0.0052	HGM, TAB
TCAZB113A	B	C1	2	1	30.94	1.308	0.1048	20	0.0052	HGM, TAT
TCAZB211A	B	C2	2	2	29.71	1.323	0.1026	20	0.0051	HGM, TAB
TCAZB212A	B	C2	2	2	29.75	1.321	0.1019	20	0.0051	HGM, TAB
TCAZB213A	B	C2	2	2	29.90	1.332	0.1020	20	0.0051	HGM, TAB
TCAZC111A	C	C1	3	1	31.26	1.349	0.1036	20	0.0052	HGM
TCAZC112A	C	C1	3	1	31.33	1.354	0.1027	20	0.0051	HGM, TAT
TCAZC113A	C	C1	3	1	30.60	1.334	0.1031	20	0.0052	HGM, TAT
TCAZC211A	C	C2	3	2	31.23	1.348	0.1042	20	0.0052	HGM, TAT
TCAZC212A	C	C2	3	2	30.72	1.356	0.1032	20	0.0052	HGM, TAT
TCAZC213A	C	C2	3	2	30.80	1.363	0.1035	20	0.0052	HGM, TAT

Average	30.76	1.340	0.0052
Standard Dev.	0.6753	0.02366	
Coeff. of Var. [%]	2.196	1.766	
Min.	29.71	1.296	0.0051
Max.	31.89	1.382	0.0054
Number of Spec.	18	18	18

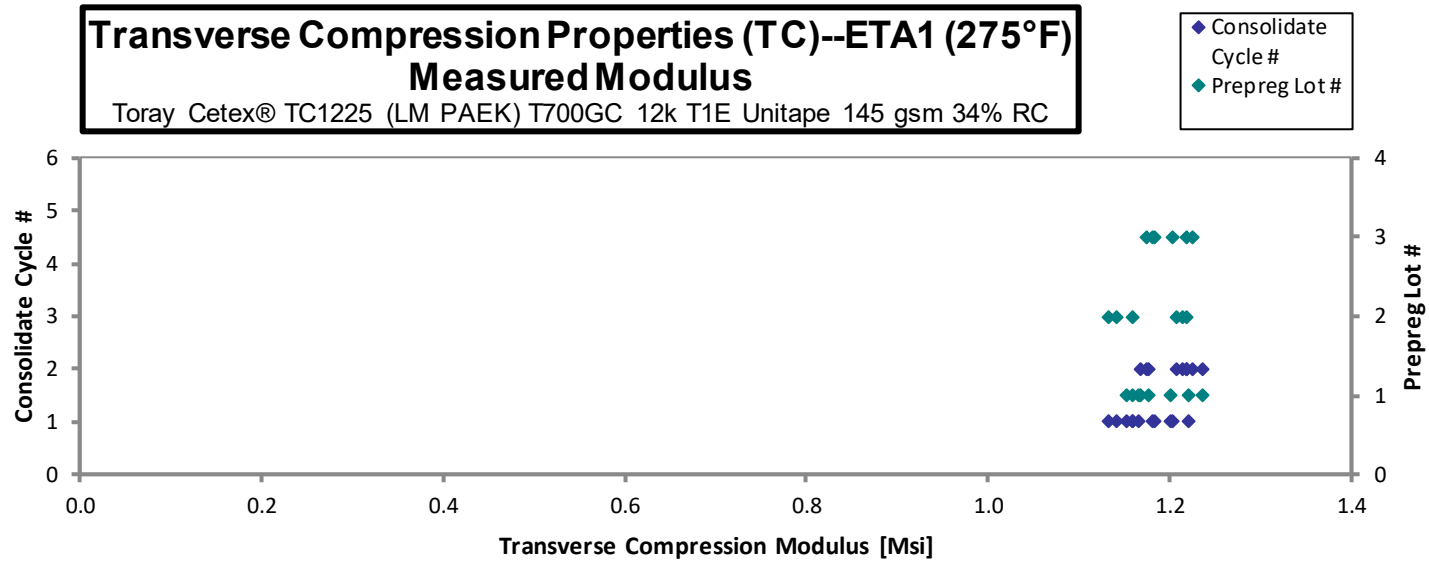
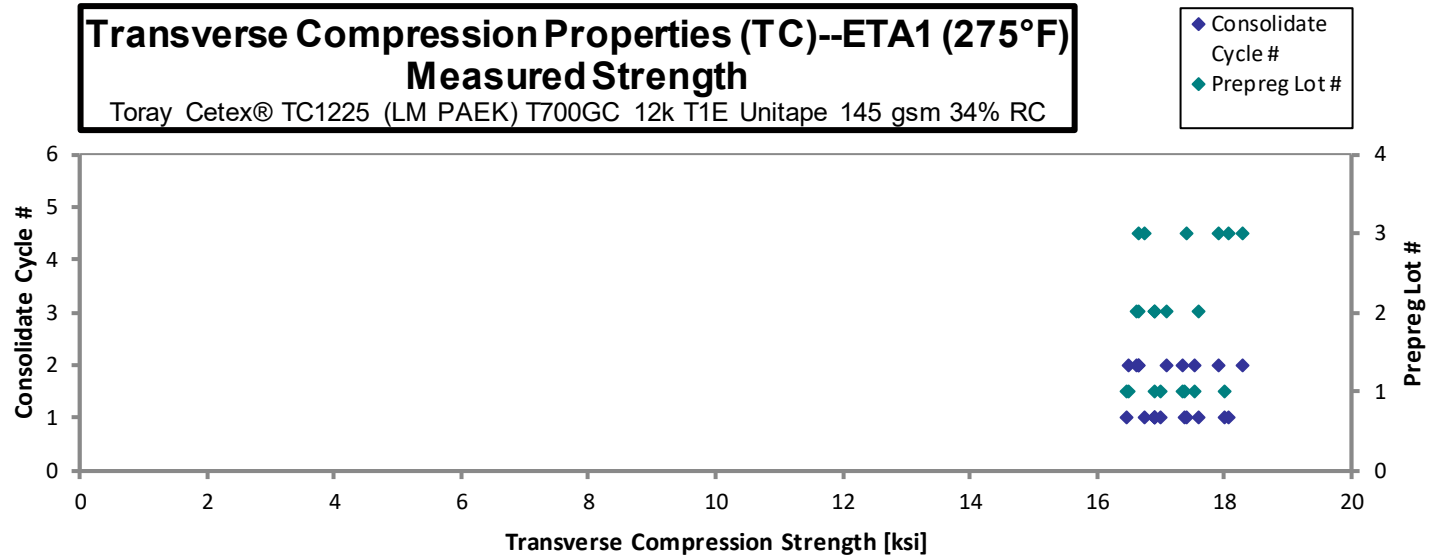


Transverse Compression Properties (TC)--ETA1 (275°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCAZA111C	A	C1	1	1	16.46	1.160	0.1048	20	0.0052	HAB
TCAZA112C	A	C1	1	1	16.89	1.202	0.1047	20	0.0052	HAB
TCAZA113C	A	C1	1	1	17.00	1.220	0.1050	20	0.0053	HAB
TCAZA114C*	A	C1	1	1	18.02	1.153	0.1050	20	0.0053	HAB
TCAZA115C	A	C1	1	1	17.36	1.165	0.1050	20	0.0053	HAB
TCAZA211C	A	C2	1	2	17.35	1.168	0.1053	20	0.0053	EGM, HAT
TCAZA212C	A	C2	1	2	17.55	1.237	0.1054	20	0.0053	HAB
TCAZA213C	A	C2	1	2	16.49	1.176	0.1056	20	0.0053	EGM, HAB
TCAZB111C	B	C1	2	1	16.90	1.160	0.1045	20	0.0052	HAT
TCAZB112C	B	C1	2	1	17.59	1.142	0.1042	20	0.0052	HAT
TCAZB113C	B	C1	2	1	16.92	1.133	0.1043	20	0.0052	HAT
TCAZB211C	B	C2	2	2	16.66	1.214	0.1002	20	0.0050	HGM
TCAZB212C	B	C2	2	2	17.08	1.207	0.1001	20	0.0050	HAB
TCAZB213C	B	C2	2	2	16.63	1.218	0.1001	20	0.0050	HGM
TCAZC111C	C	C1	3	1	16.74	1.181	0.1017	20	0.0051	HAB
TCAZC112C	C	C1	3	1	17.42	1.184	0.1018	20	0.0051	HAB
TCAZC113C	C	C1	3	1	18.07	1.204	0.1021	20	0.0051	HAB
TCAZC211C	C	C2	3	2	18.28	1.225	0.1017	20	0.0051	HGM
TCAZC212C	C	C2	3	2	16.65	1.175	0.1019	20	0.0051	HAB
TCAZC213C	C	C2	3	2	17.90	1.219	0.1019	20	0.0051	HAT

*Modulus are averaged values of 2 strain gages.

Average	17.20	1.187	0.0052
Standard Dev.	0.5599	0.03021	
Coeff. of Var. [%]	3.256	2.545	
Min.	16.46	1.133	0.0050
Max.	18.28	1.237	0.0053
Number of Spec.	20	20	20

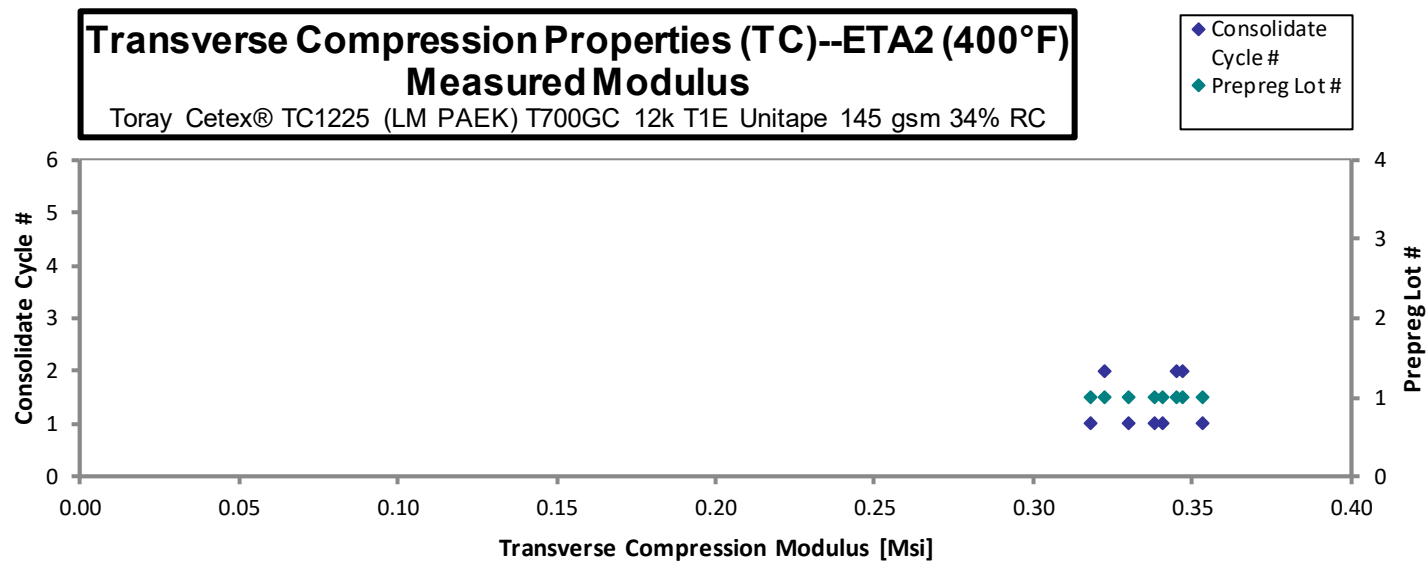
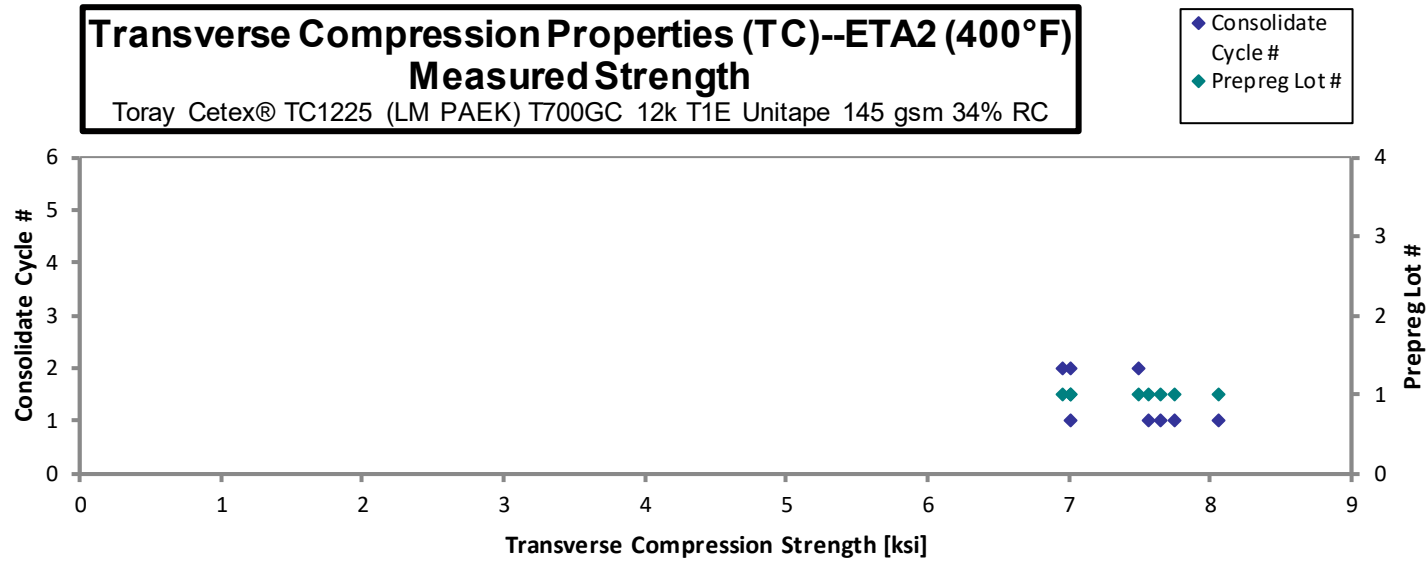


**Transverse Compression Properties (TC)--ETA2 (400°F)
Strength & Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCAZA111D	A	C1	1	1	7.010	0.3177	0.1052	20	0.0053	M(E,H)GM
TCAZA112D	A	C1	1	1	7.562	0.3298	0.1051	20	0.0053	M(E,H)GM
TCAZA113D	A	C1	1	1	8.054	0.3409	0.1049	20	0.0052	EGM, HAT
TCAZA114D*	A	C1	1	1	7.746	0.3532	0.1050	20	0.0052	EGM, HAB, HAT
TCAZA115D*	A	C1	1	1	7.646	0.3379	0.1052	20	0.0053	EGM, HAB
TCAZA211D	A	C2	1	2	6.957	0.3469	0.1055	20	0.0053	EGM, HAT
TCAZA212D	A	C2	1	2	7.492	0.3451	0.1058	20	0.0053	EGM, HAT
TCAZA213D	A	C2	1	2	7.013	0.3222	0.1059	20	0.0053	EGM, HAT

*Modulus are averaged values of 2 strain gages.

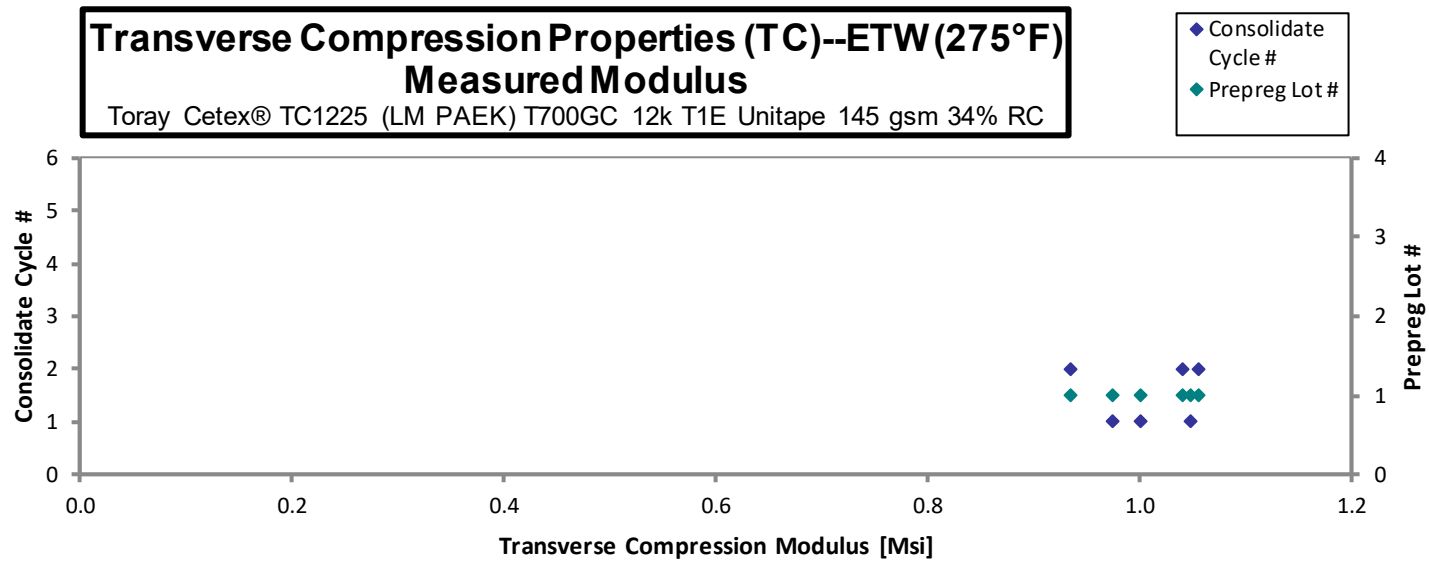
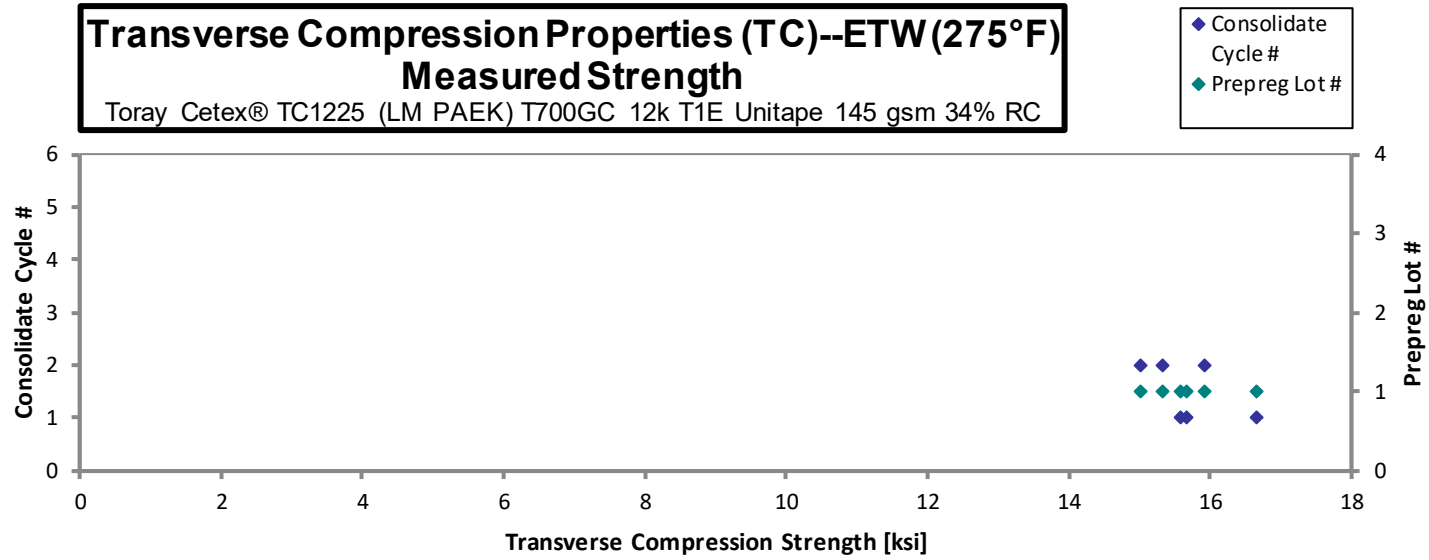
Average	7.435	0.3367	0.0053
Standard Dev.	0.4021	0.01245	
Coeff. of Var. [%]	5.408	3.697	
Min.	6.957	0.3177	0.0052
Max.	8.054	0.3532	0.0053
Number of Spec.	8	8	8



**Transverse Compression Properties (TC)--ETW (275°F)
Strength & Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCAZA111E	A	C1	1	1	16.67	1.048	0.1053	20	0.0053	M(E,H)GM
TCAZA112E	A	C1	1	1	15.68	0.9738	0.1055	20	0.0053	M(E,H)GM
TCAZA113E	A	C1	1	1	15.57	1.001	0.1057	20	0.0053	M(E,H)GM
TCAZA211E	A	C2	1	2	15.01	1.040	0.1062	20	0.0053	M(E,H)GM
TCAZA212E	A	C2	1	2	15.93	1.055	0.1067	20	0.0053	M(E,H)GM
TCAZA213E	A	C2	1	2	15.34	0.9342	0.1072	20	0.0054	M(E,H)GM

Average	15.70	1.009	0.0053
Standard Dev.	0.5702	0.04806	
Coeff. of Var. [%]	3.632	4.764	
Min.	15.01	0.9342	0.0053
Max.	16.67	1.055	0.0054
Number of Spec.	6	6	6



4.5 “50/0/50” Unnotched Compression 0/90 Properties (UNC0)

Laminate Unnotched Compression 0/90 Properties (UNC0)--CTA (-65°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCARA111B	A	C1	1	1	98.53	9.450	0.08550	16	BAT
TCARA112B	A	C1	1	1	102.3	8.998	0.08538	16	BAT
TCARA113B	A	C1	1	1	107.1	8.990	0.08538	16	BAT
TCARA211B	A	C2	1	2	110.9	9.520	0.08628	16	M(B,H)AT
TCARA212B	A	C2	1	2	112.2	9.487	0.08600	16	BAB
TCARA213B	A	C2	1	2	110.8	9.457	0.08492	16	BGM
TCARB111B*	B	C1	2	1	109.2	9.457	0.08548	16	BAT
TCARB112B	B	C1	2	1	105.1	9.333	0.08445	16	BAT
TCARB113B	B	C1	2	1	97.59	9.044	0.08365	16	BAT
TCARB114B	B	C1	2	1	109.4	8.794	0.08737	16	BAB, HIB
TCARB211B	B	C2	2	2	95.93	9.356	0.08470	16	BAT
TCARB212B	B	C2	2	2	102.2	9.426	0.08412	16	HAT
TCARB213B	B	C2	2	2	102.2	9.954	0.08413	16	HGM
TCARC111B	C	C1	3	1	99.11	9.855	0.08297	16	DGM
TCARC112B	C	C1	3	1	96.77	10.01	0.08320	16	DGM
TCARC113B	C	C1	3	1	97.28	10.09	0.08438	16	BAT
TCARC211B	C	C2	3	2	105.6	9.657	0.08433	16	BAT
TCARC212B	C	C2	3	2	103.6	9.511	0.08393	16	BGM
TCARC213B	C	C2	3	2	113.5	10.02	0.08378	16	BAT

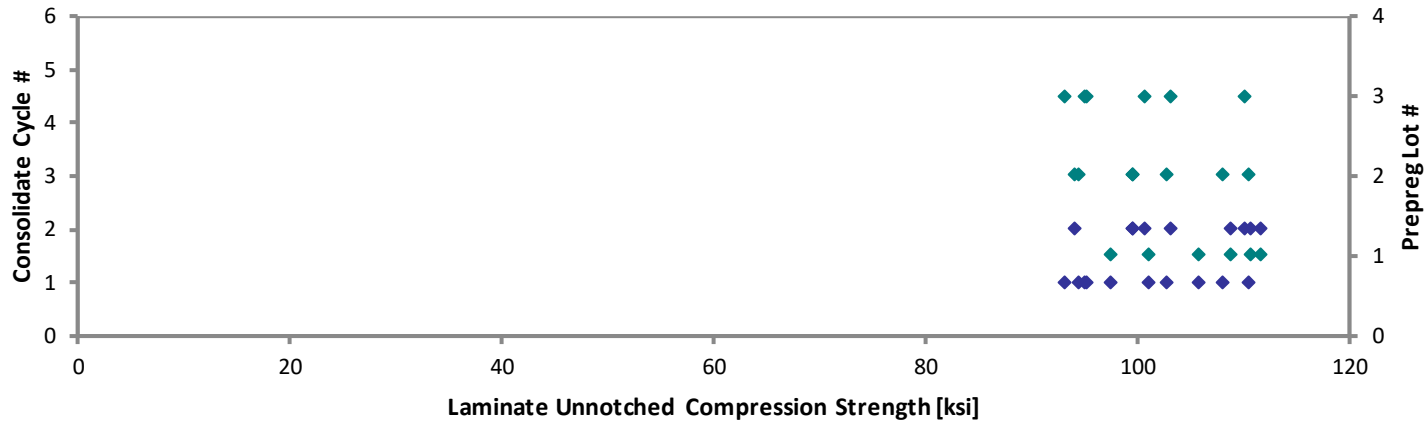
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0053	97.50	9.352
0.0053	101.1	8.892
0.0053	105.8	8.884
0.0054	110.7	9.507
0.0054	111.7	9.443
0.0053	108.9	9.295
0.0053	108.1	
0.0053	102.8	9.122
0.0052	94.48	8.756
0.0055	110.6	8.892
0.0053	94.04	9.171
0.0053	99.54	9.177
0.0053	99.55	9.693
0.0052	95.17	9.463
0.0052	93.19	9.643
0.0053	95.01	9.854
0.0053	103.1	9.426
0.0052	100.6	9.239
0.0052	110.1	9.716

*Specimen was not gaged, only strength is tested.

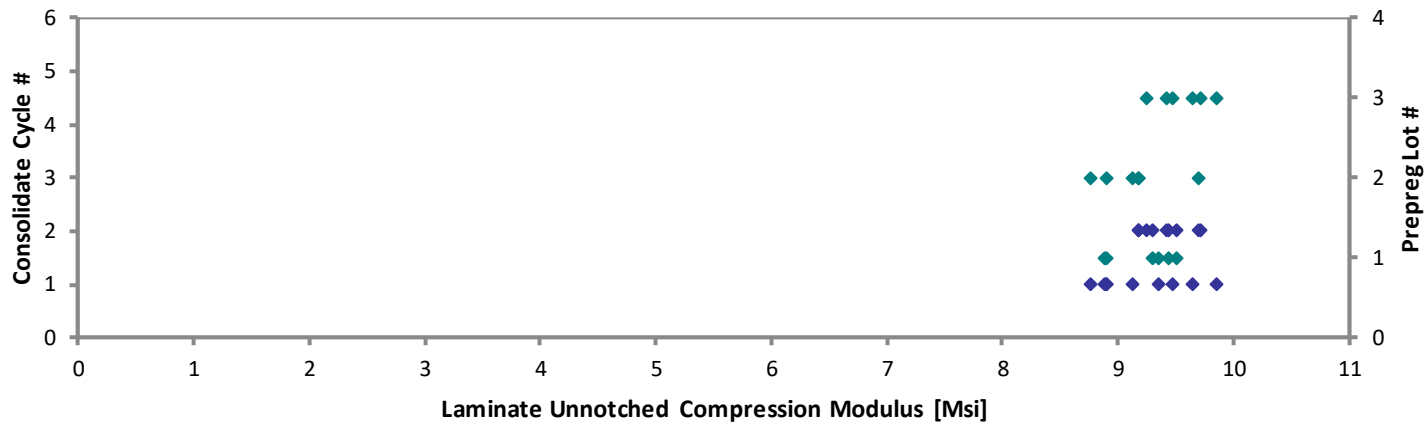
Average 104.2 9.497
 Standard Dev. 5.710 0.3847
 Coeff. of Var. [%] 5.482 4.051
 Min. 95.93 8.794
 Max. 113.5 10.09
 Number of Spec. 19 18

Average_{norm} 0.0053 102.2 9.307
 Standard Dev._{norm} 6.397 0.3188
 Coeff. of Var. [%]_{norm} 6.259 3.426
 Min. 0.0052 93.19 8.756
 Max. 0.0055 111.7 9.854
 Number of Spec. 19 18

Laminate Unnotched Compression 0/90 Properties (UNC0)--CTA (-65°F)
Normalized Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



Laminate Unnotched Compression 0/90 Properties (UNC0)--CTA (-65°F)
Normalized Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



Laminate Unnotched Compression 0/90 Properties (UNC0)--RTA (70°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCARA111A*	A	C1	1	1	95.96	9.447	0.08717	16	BGM
TCARA112A*	A	C1	1	1	97.13	9.381	0.08712	16	BAB
TCARA113A**	A	C1	1	1		9.284	0.08623	16	HIT
TCARA114A***	A	C1	1	1	91.19		0.08612	16	HGM
TCARA211A*	A	C2	1	2	103.1	9.329	0.08887	16	BAB, HIB
TCARA212A***	A	C2	1	2		9.333	0.08632	16	HIB
TCARA213A	A	C2	1	2	94.07	9.381	0.08453	16	BAT
TCARA214A***	A	C2	1	2	94.59		0.08500	16	M(B,H)AT
TCARB111A*	B	C1	2	1	96.90	9.281	0.08467	16	BAT
TCARB112A*	B	C1	2	1	97.41	9.207	0.08508	16	M(B,H)AT
TCARB113A	B	C1	2	1	99.00	9.056	0.08552	16	BGM, HAT
TCARB211A*	B	C2	2	2	103.1	9.324	0.08515	16	BAT, HIT
TCARB212A*	B	C2	2	2	99.64	9.275	0.08425	16	BAB, HIB
TCARB213A	B	C2	2	2	90.98	9.309	0.08475	16	M(B,H)AT
TCARC111A*	C	C1	3	1	99.50	9.724	0.08633	16	M(B,H)AT
TCARC112A*	C	C1	3	1	97.78	9.643	0.08485	16	M(B,H)AT
TCARC113A	C	C1	3	1	91.32	9.216	0.08320	16	BAT
TCARC211A*	C	C2	3	2	105.4	9.620	0.08567	16	M(B,H)AT
TCARC212A*	C	C2	3	2	100.9	9.538	0.08273	16	BAT
TCARC213A	C	C2	3	2	100.3	9.202	0.08190	16	BAT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0054	96.82	9.530
0.0054	97.94	9.459
0.0054		9.266
0.0054	90.89	
0.0056	106.0	9.596
0.0054		9.324
0.0053	92.04	9.178
0.0053	93.06	
0.0053	94.95	9.095
0.0053	95.93	9.067
0.0053	97.99	8.963
0.0053	101.6	9.189
0.0053	97.16	9.045
0.0053	89.24	9.131
0.0054	99.42	9.716
0.0053	96.02	9.470
0.0052	87.94	8.875
0.0054	104.5	9.538
0.0052	96.63	9.133
0.0051	95.05	8.723

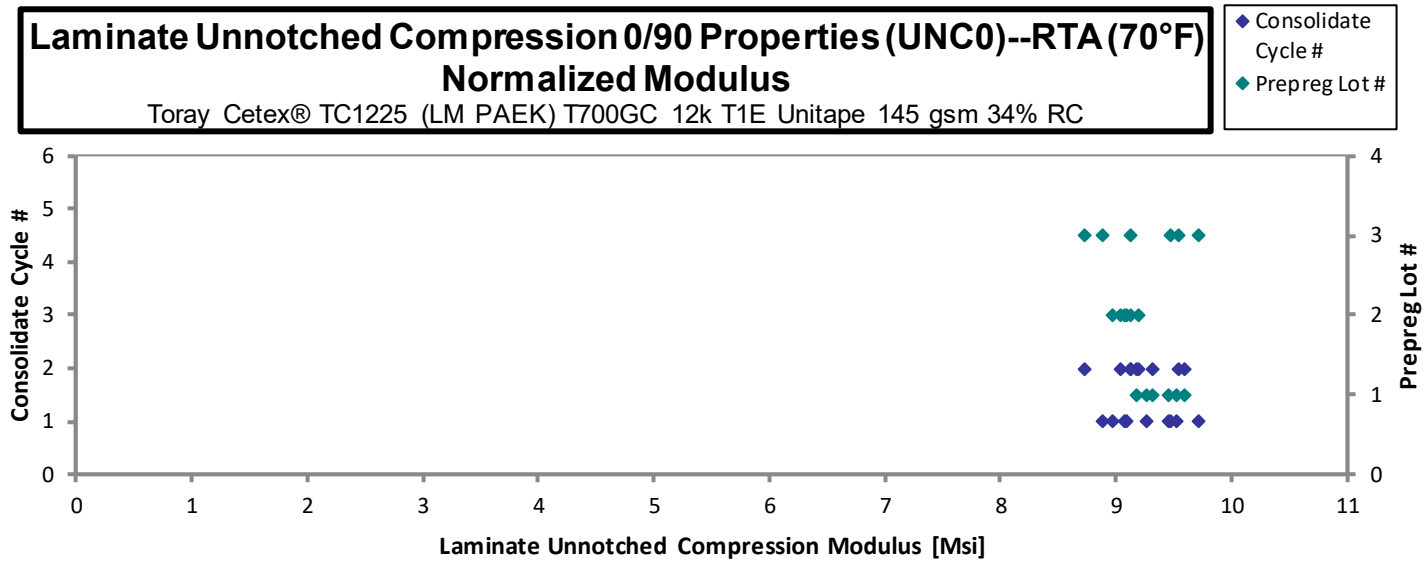
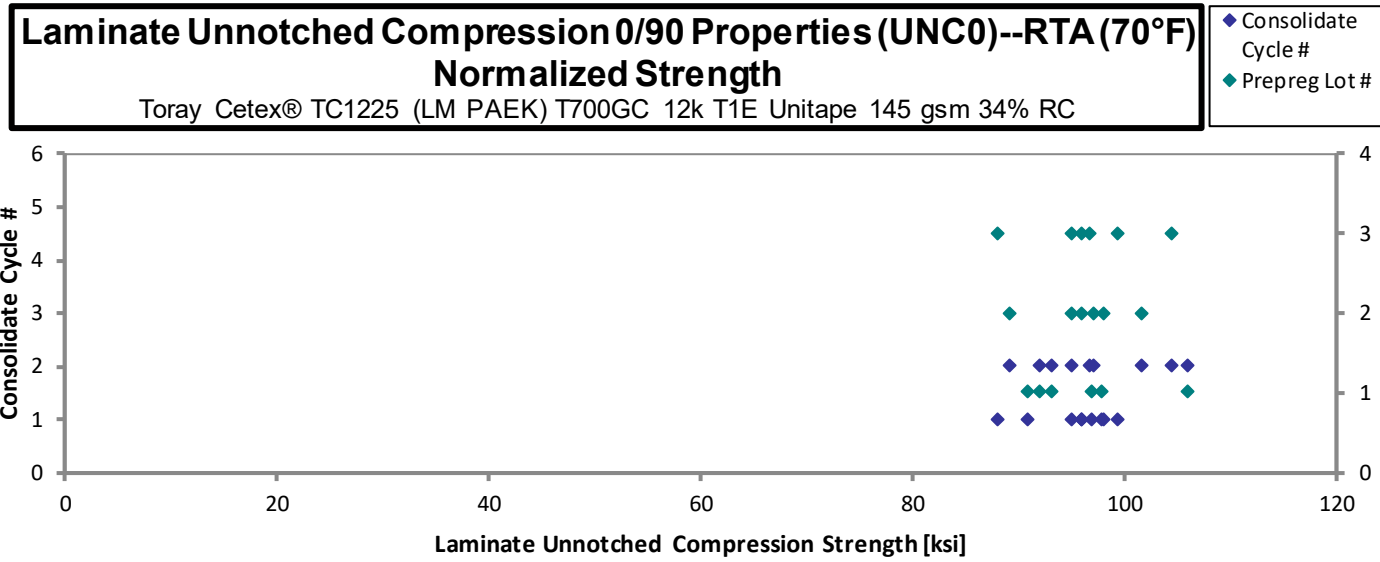
*Modulus are averaged values of 2 strain gages.

**Strength not reported due to unacceptable failure mode.

***Specimen was not gaged, only strength is tested.

Average	97.68	9.364
Standard Dev.	4.187	0.1725
Coeff. of Var. [%]	4.287	1.842
Min.	90.98	9.056
Max.	105.4	9.724
Number of Spec.	18	18

Average _{norm}	0.0053	96.29	9.239
Standard Dev. _{norm}		4.774	0.2691
Coeff. of Var. [%] _{norm}		4.958	2.913
Min.	0.0051	87.94	8.723
Max.	0.0056	106.0	9.716
Number of Spec.	20	18	18



**Laminate Unnotched Compression 0/90 Properties (UNC0)--ETA1 (275°F)
Strength & Modulus**

Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

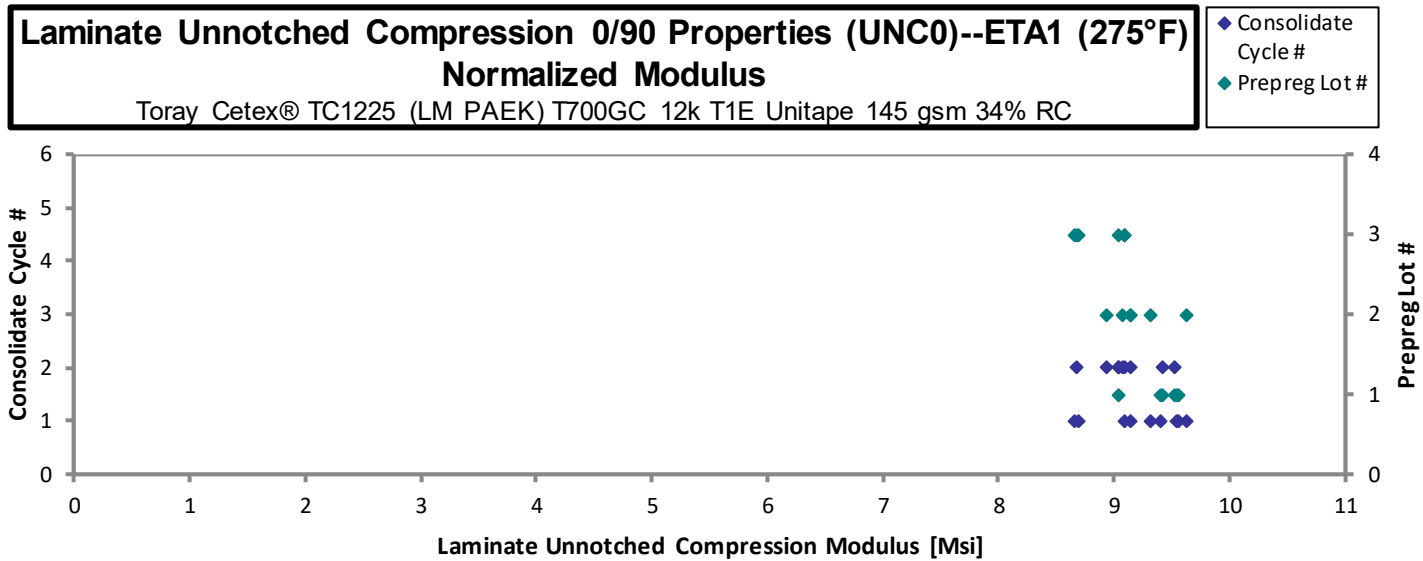
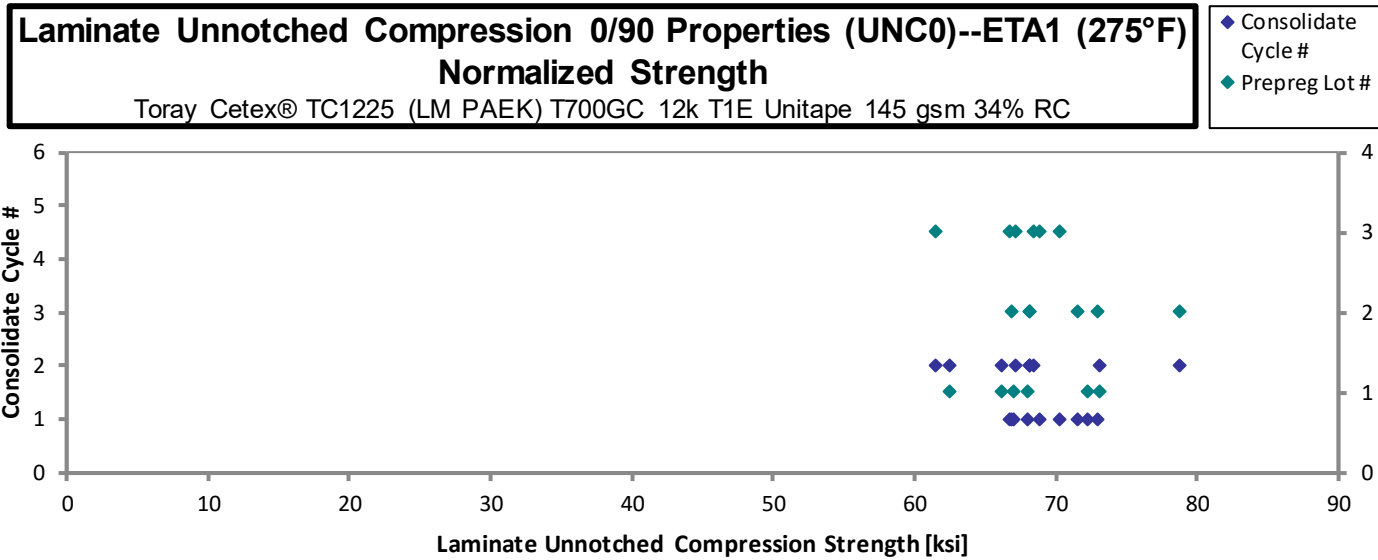
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCARA111C	A	C1	1	1	68.06	9.418	0.08627	16	HAT, HIT
TCARA112C	A	C1	1	1	72.46	9.565	0.08615	16	HAT, HIT
TCARA113C	A	C1	1	1	66.09	9.425	0.08755	16	HAT, HIT
TCARA211C	A	C2	1	2	63.84	9.239	0.08453	16	HAB, HIB
TCARA212C	A	C2	1	2	67.30	9.583	0.08493	16	HAT, HIT
TCARA213C	A	C2	1	2	70.03	9.124	0.09020	16	HAT, HIT
TCARB111C	B	C1	2	1	72.05	9.031	0.08750	16	BAT, HAT, HIT
TCARB112C	B	C1	2	1	65.78	9.463	0.08783	16	M(B,H)GM
TCARB113C	B	C1	2	1	70.35	9.162	0.08785	16	BAT, HIT
TCARB211C	B	C2	2	2	67.51	8.835	0.08730	16	BAT, HIT
TCARB212C	B	C2	2	2	67.27	8.956	0.08758	16	HAT, HIT
TCARB213C	B	C2	2	2	77.30	8.968	0.08800	16	M(B,H)AB, HIB
TCARC111C	C	C1	3	1	71.77	8.891	0.08455	16	BAB
TCARC112C	C	C1	3	1	70.47	8.856	0.08440	16	BAB
TCARC113C	C	C1	3	1	67.82	9.242	0.08493	16	BAB, HAT
TCARC211C	C	C2	3	2	63.82	9.003	0.08320	16	BAT
TCARC212C	C	C2	3	2	70.28	9.290	0.08405	16	HAB, HIB
TCARC213C	C	C2	3	2	68.48	9.268	0.08472	16	HAT, HIT

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0054	67.96	9.403
0.0054	72.25	9.538
0.0055	66.97	9.551
0.0053	62.46	9.039
0.0053	66.16	9.421
0.0056	73.11	9.525
0.0055	72.97	9.146
0.0055	66.87	9.620
0.0055	71.54	9.316
0.0055	68.21	8.927
0.0055	68.19	9.079
0.0055	78.73	9.134
0.0053	70.23	8.700
0.0053	68.84	8.651
0.0053	66.67	9.085
0.0052	61.46	8.670
0.0053	68.37	9.037
0.0053	67.14	9.087

Average 68.93 9.184
Standard Dev. 3.320 0.2418
Coeff. of Var. [%] 4.816 2.633
Min. 63.82 8.835
Max. 77.30 9.583
Number of Spec. 18 18

Average_{norm} 0.0054 68.78 9.163
Standard Dev_{norm} 4.008 0.3072
Coeff. of Var. [%]_{norm} 5.827 3.353
Min. 0.0052 61.46 8.651
Max. 0.0056 78.73 9.620
Number of Spec. 18 18 18



Laminate Unnotched Compression 0/90 Properties (UNC0)--ETA2 (400°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12K T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCARA111D*	A	C1	1	1	25.00	8.561	0.08752	16	HAT
TCARA112D*	A	C1	1	1	26.49	8.616	0.08732	16	HAT
TCARA113D	A	C1	1	1	23.35	9.258	0.08668	16	HAT
TCARA211D ^{*/**}	A	C2	1	2	22.55	8.666	0.08787	16	HAB
TCARA212D ^{*/**}	A	C2	1	2	25.50	7.997	0.08920	16	HAB
TCARA213D	A	C2	1	2	24.34	8.985	0.08940	16	HAB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0055	25.32	8.672
0.0055	26.77	8.708
0.0054	23.43	9.289
0.0055	22.93	8.813
0.0056	26.33	8.257
0.0056	25.19	9.297

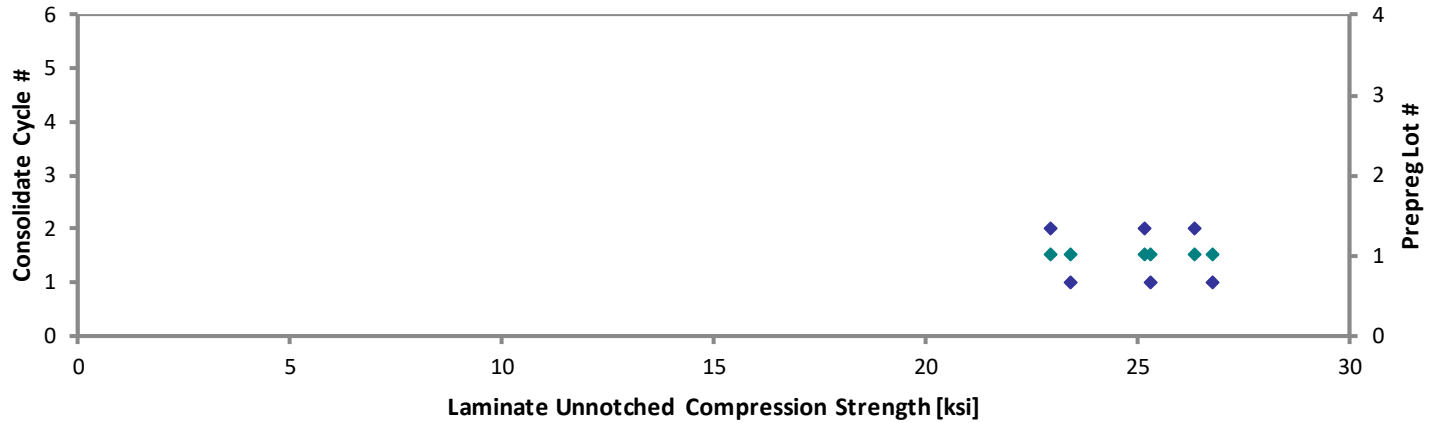
*Modulus are averaged values of 2 strain gages.

**Modulus calculation is obtained from 500 to 2000 microstrain.

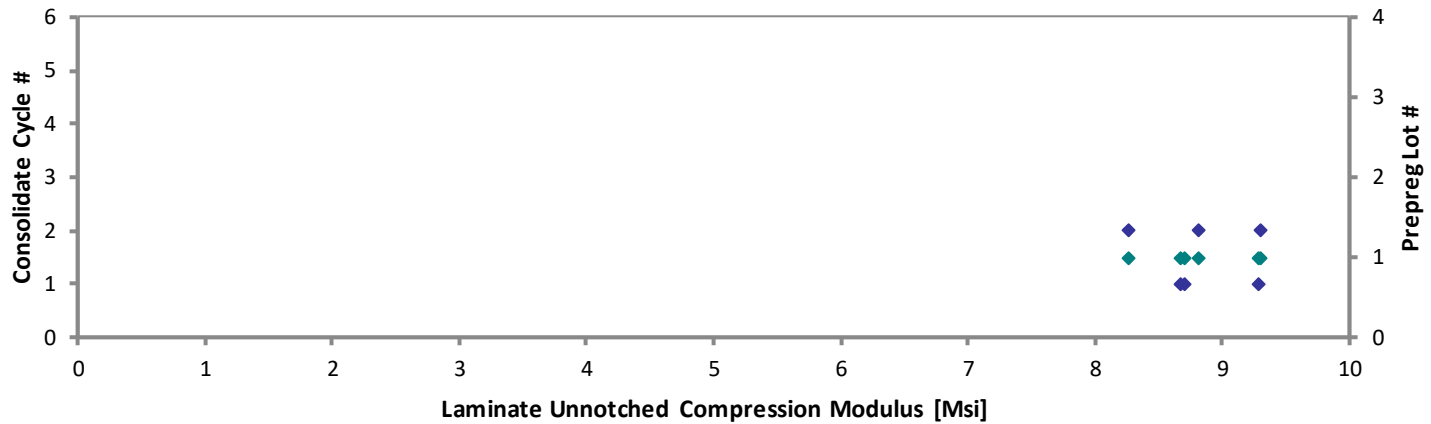
Average	24.54	8.681
Standard Dev.	1.439	0.4271
Coeff. of Var. [%]	5.864	4.920
Min.	22.55	7.997
Max.	26.49	9.258
Number of Spec.	6	6

Average _{norm}	0.0055	24.99	8.839
Standard Dev. _{norm}		1.536	0.3994
Coeff. of Var. [%] _{norm}		6.144	4.518
Min.	0.0054	22.93	8.257
Max.	0.0056	26.77	9.297
Number of Spec.	6	6	6

Laminate Unnotched Compression 0/90 Properties (UNC0)--ETA2 (400°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



Laminate Unnotched Compression 0/90 Properties (UNC0)--ETA2 (400°F)
Normalized Modulus
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



Laminate Unnotched Compression 0/90 Properties (UNC0)--ETW (275°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

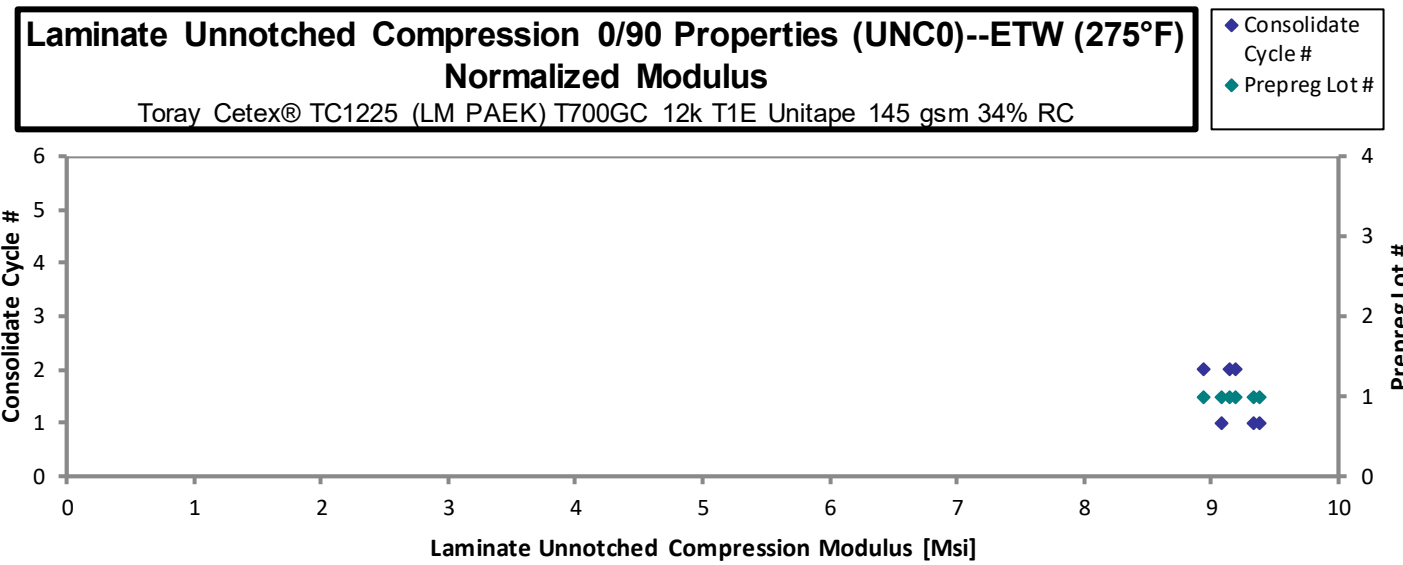
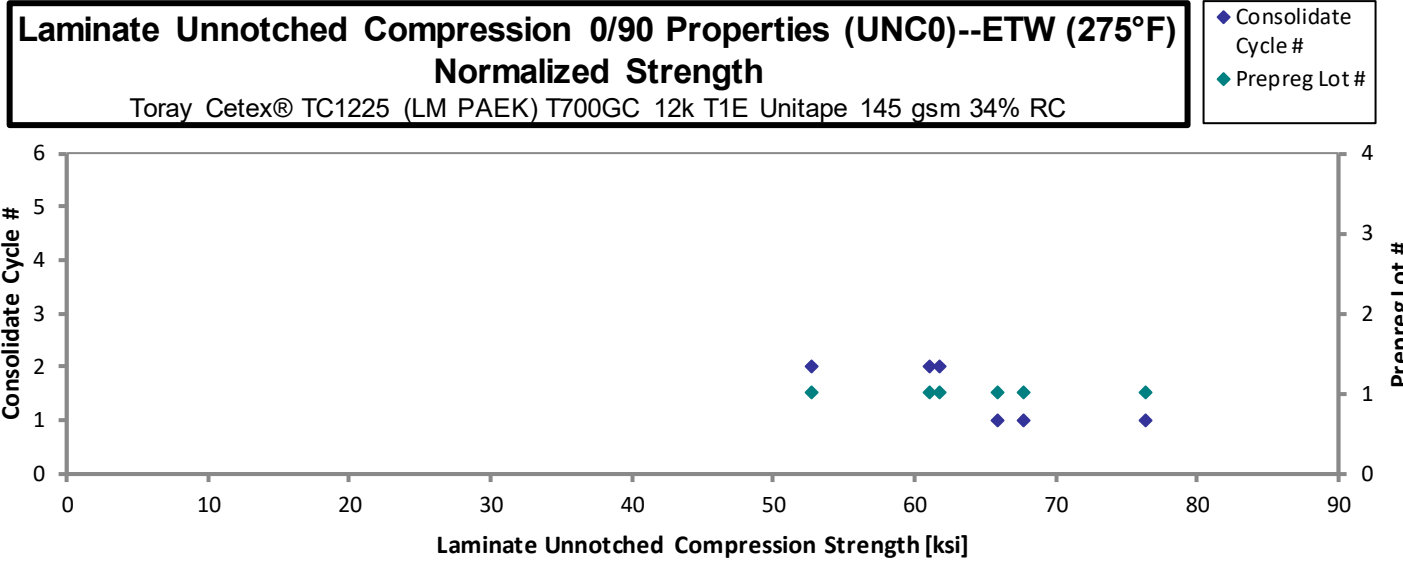
normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCARA111E	A	C1	1	1	75.86	9.319	0.08692	16	HAT, HIT
TCARA112E	A	C1	1	1	66.71	9.200	0.08763	16	HAT, HIT
TCARA113E	A	C1	1	1	64.93	8.944	0.08773	16	HAT, HIT
TCARA211E	A	C2	1	2	60.70	9.023	0.08803	16	HAT, HIT
TCARA212E	A	C2	1	2	59.81	8.750	0.08830	16	HAT
TCARA213E	A	C2	1	2	51.80	8.986	0.08797	16	HAT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0054	76.31	9.374
0.0055	67.67	9.331
0.0055	65.93	9.082
0.0055	61.85	9.193
0.0055	61.12	8.942
0.0055	52.74	9.149

Average 63.30 9.037
 Standard Dev. 8.038 0.1999
 Coeff. of Var. [%] 12.70 2.212
 Min. 51.80 8.750
 Max. 75.86 9.319
 Number of Spec. 6 6

Average_{norm} 0.0055 64.27 9.179
 Standard Dev_{norm} 7.847 0.1600
 Coeff. of Var. [%]_{norm} 12.21 1.743
 Min. 0.0054 52.74 8.942
 Max. 0.0055 76.31 9.374
 Number of Spec. 6 6 6



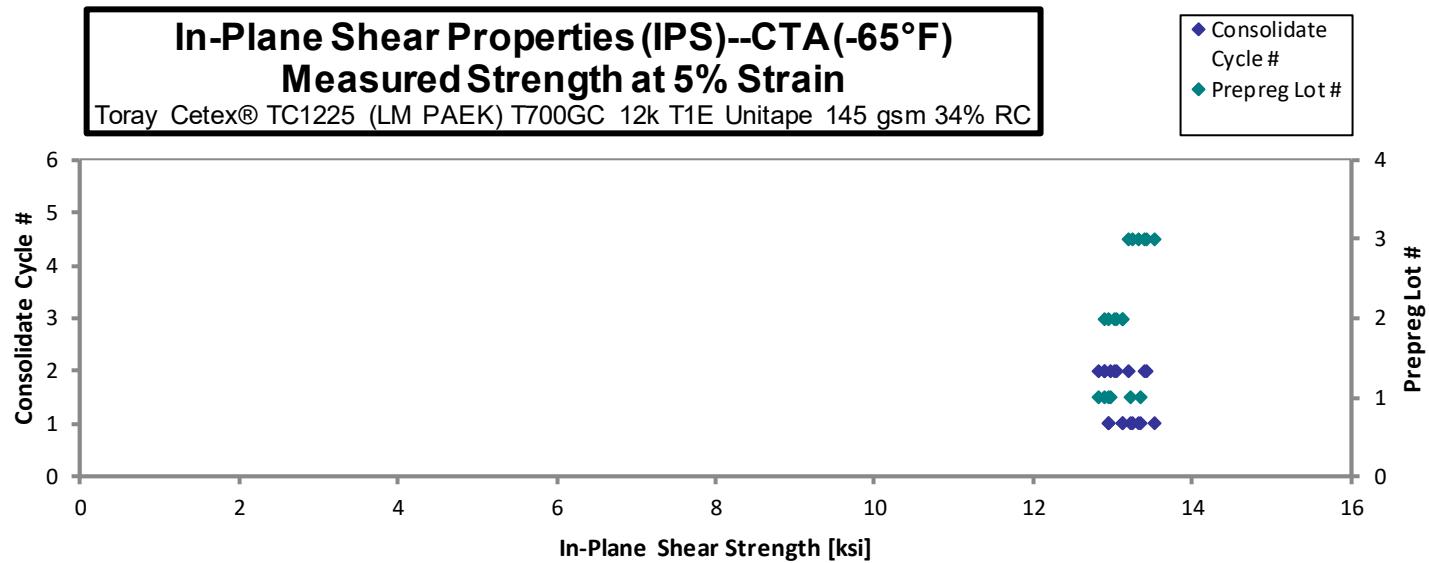
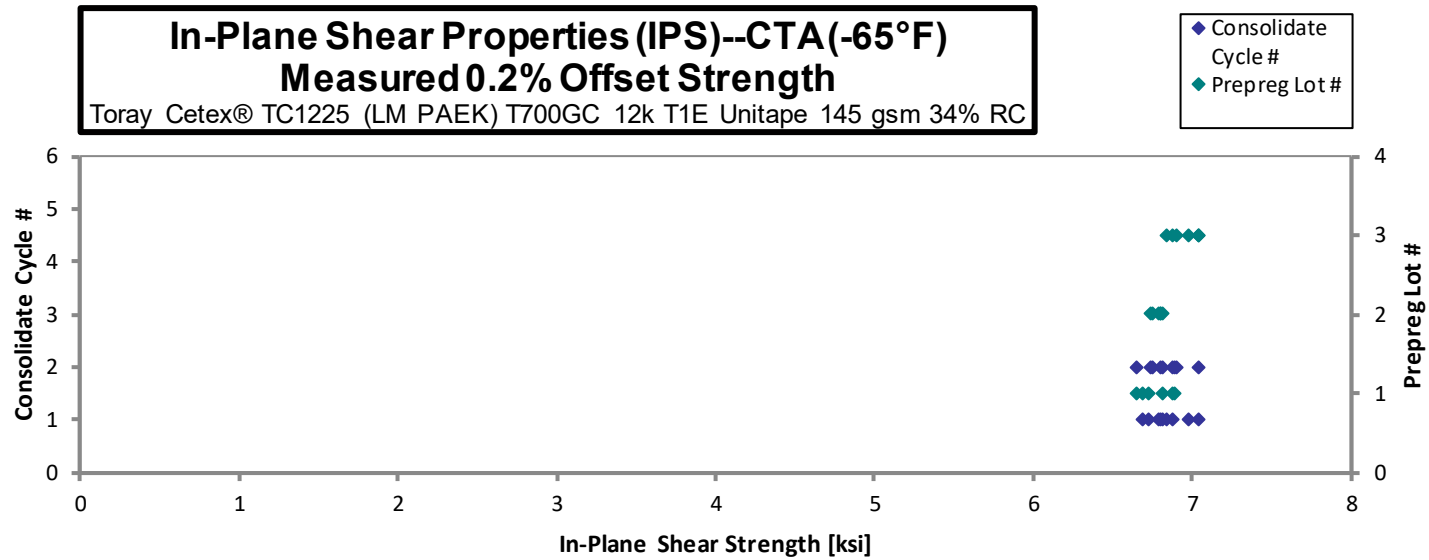
4.6 In-Plane Shear Properties (IPS)

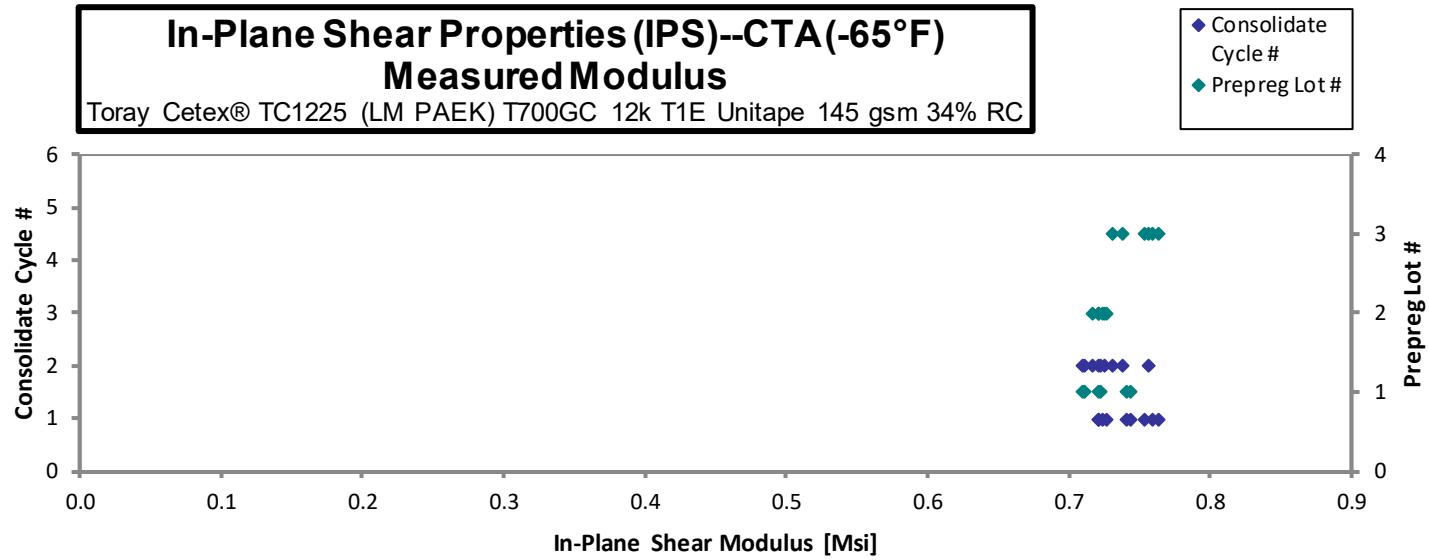
In-Plane Shear Properties (IPS)--CTA (-65°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCANA111B	A	C1	1	1	6.881	13.35	0.7405	0.08442	16	0.0053
TCANA112B	A	C1	1	1	6.687	13.23	0.7432	0.08408	16	0.0053
TCANA113B	A	C1	1	1	6.728	12.96	0.7212	0.08410	16	0.0053
TCANA211B	A	C2	1	2	6.894	12.89	0.7102	0.08453	16	0.0053
TCANA212B	A	C2	1	2	6.809	12.98	0.7112	0.08483	16	0.0053
TCANA213B	A	C2	1	2	6.650	12.81	0.7232	0.08480	16	0.0053
TCANB111B	B	C1	2	1	6.792	12.94	0.7214	0.08518	16	0.0053
TCANB112B	B	C1	2	1	6.797	13.13	0.7243	0.08495	16	0.0053
TCANB113B	B	C1	2	1	6.817	13.13	0.7264	0.08480	16	0.0053
TCANB211B	B	C2	2	2	6.800	13.06	0.7211	0.08475	16	0.0053
TCANB212B	B	C2	2	2	6.739	12.90	0.7173	0.08478	16	0.0053
TCANB213B	B	C2	2	2	6.752	13.02	0.7250	0.08497	16	0.0053
TCANC111B	C	C1	3	1	7.044	13.32	0.7641	0.08432	16	0.0053
TCANC112B	C	C1	3	1	6.978	13.53	0.7531	0.08442	16	0.0053
TCANC113B	C	C1	3	1	6.834	13.25	0.7586	0.08452	16	0.0053
TCANC211B	C	C2	3	2	6.899	13.41	0.7560	0.08525	16	0.0053
TCANC212B	C	C2	3	2	7.038	13.41	0.7387	0.08448	16	0.0053
TCANC213B	C	C2	3	2	6.869	13.20	0.7312	0.08480	16	0.0053

Modulus calculation is obtained from 1000 to 3000 microstrain.

Average	6.834	13.14	0.7326	0.0053
Standard Dev.	0.1099	0.2097	0.01661	
Coeff. of Var. [%]	1.609	1.596	2.267	
Min.	6.650	12.81	0.7102	0.0053
Max.	7.044	13.53	0.7641	0.0053
Number of Spec.	18	18	18	18



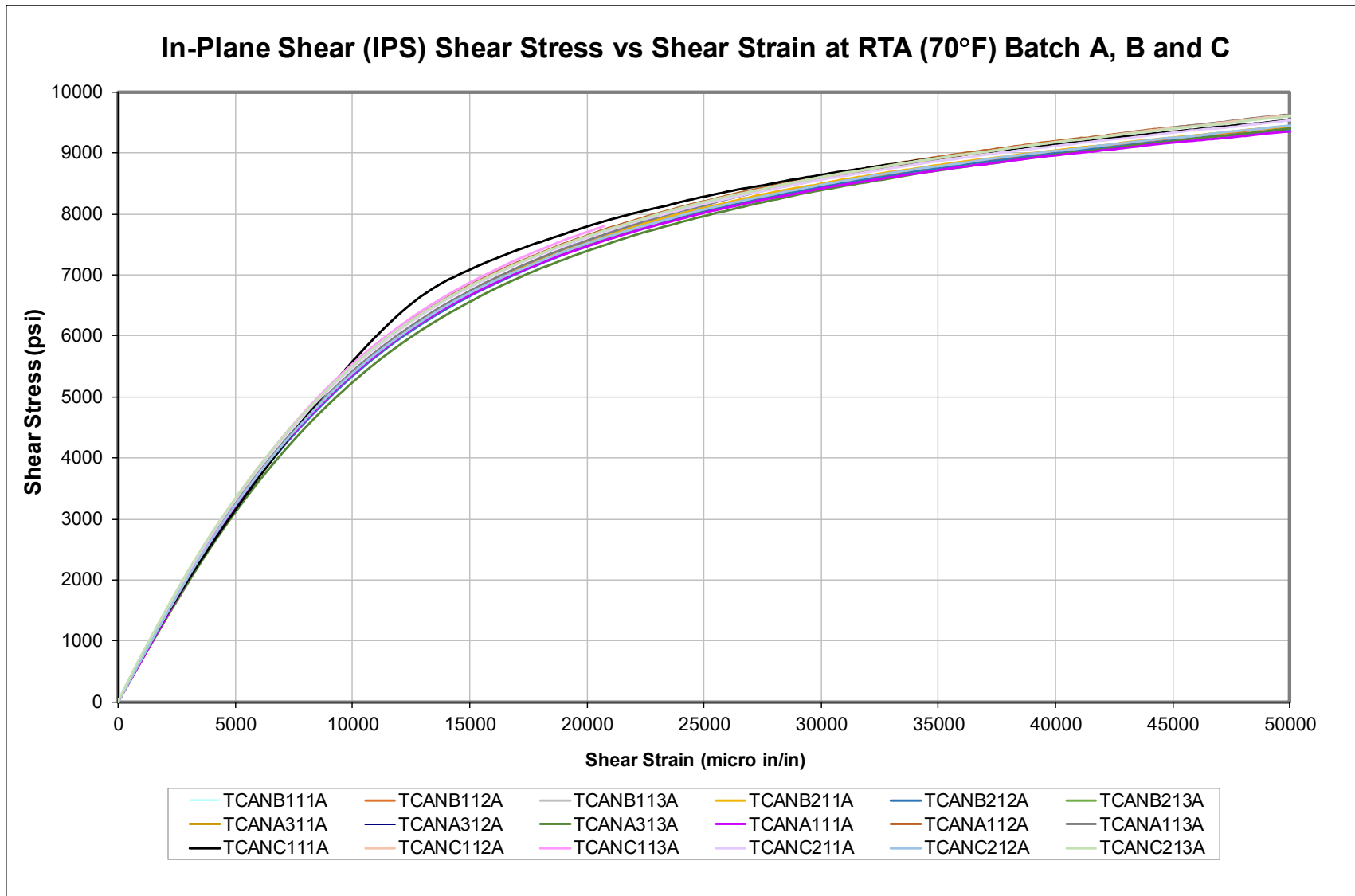


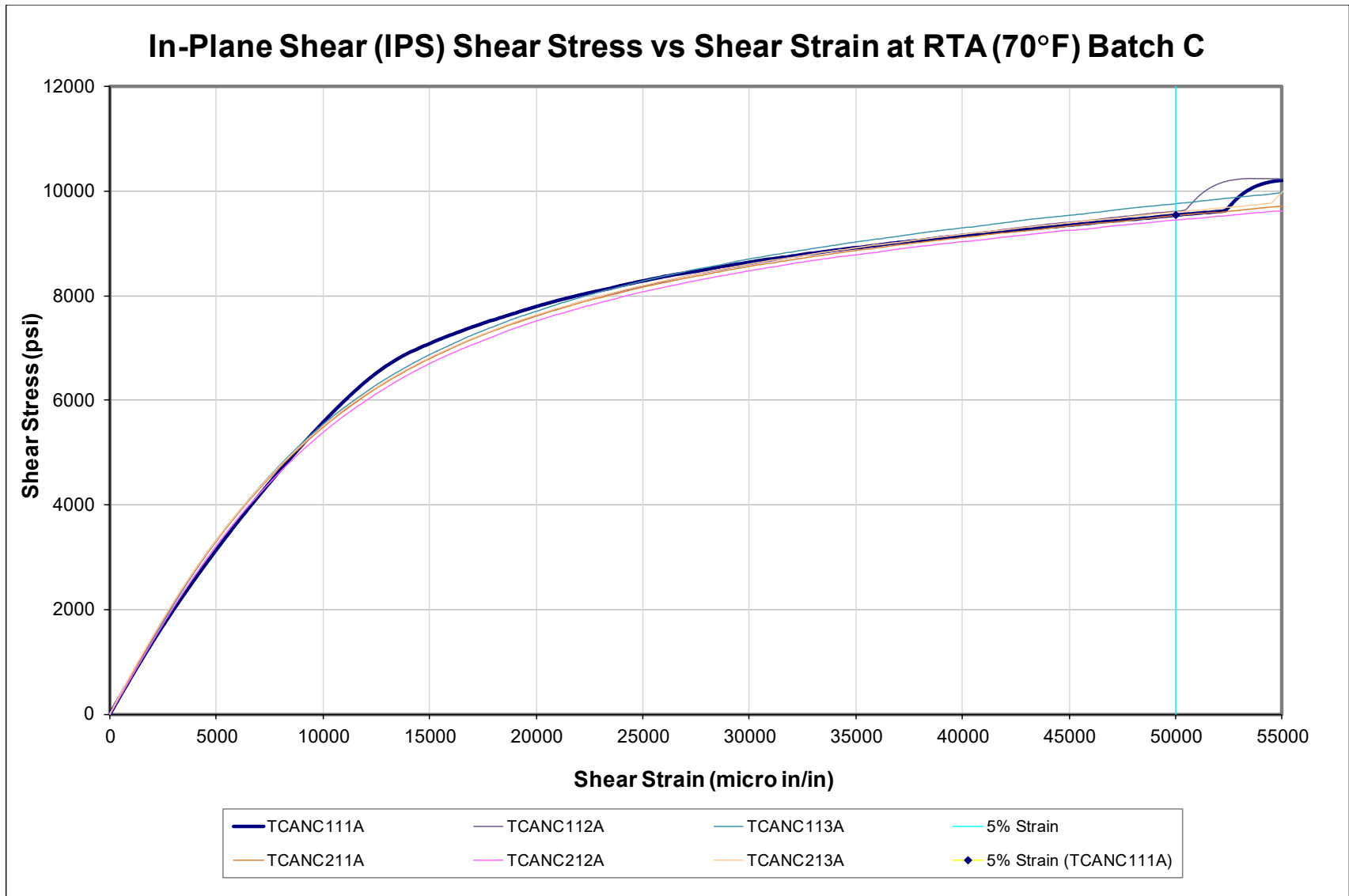
In-Plane Shear Properties (IPS)--RTA (70°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC
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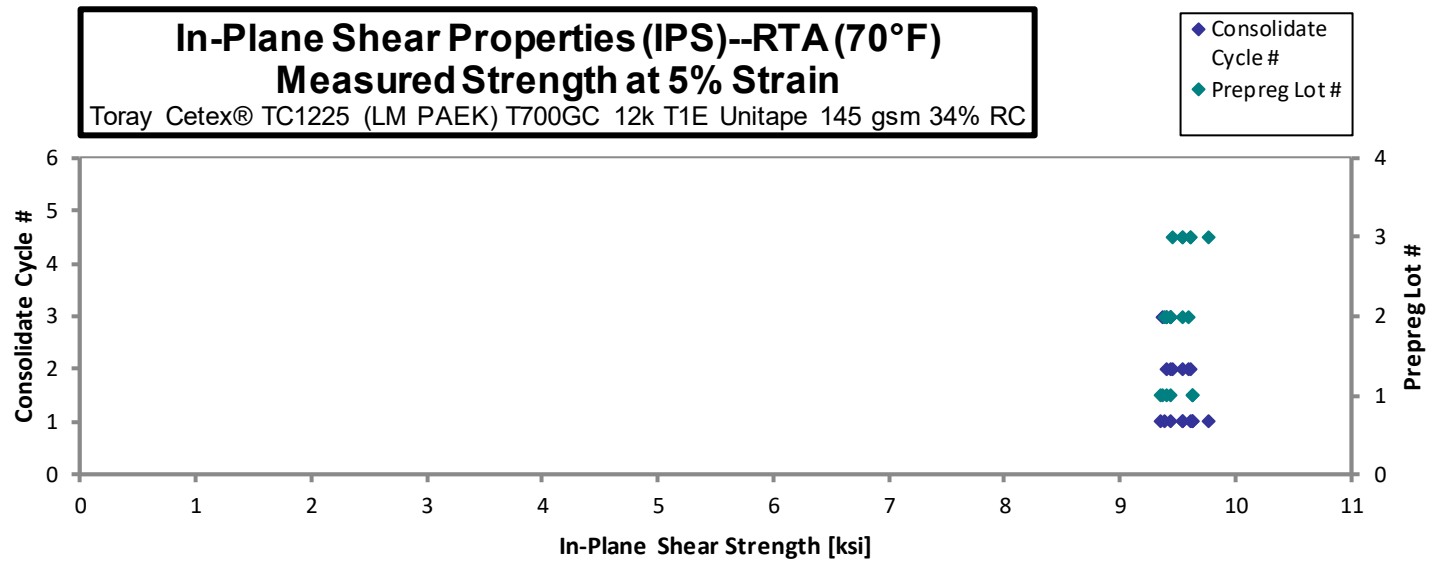
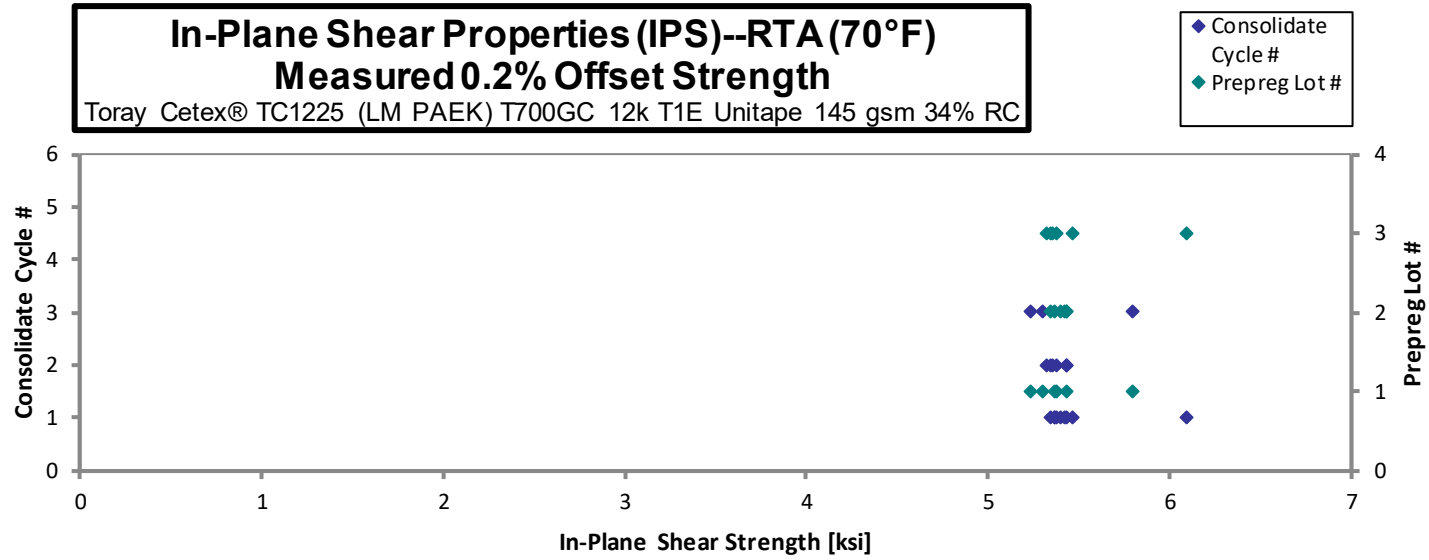
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCANA111A	A	C1	1	1	5.380	9.353	0.6676	0.08283	16	0.0052
TCANA112A	A	C1	1	1	5.438	9.621	0.6943	0.08335	16	0.0052
TCANA113A	A	C1	1	1	5.370	9.625	0.6800	0.08407	16	0.0053
TCANA311A	A	C3	1	3	5.798	9.441	0.6536	0.08718	16	0.0054
TCANA312A	A	C3	1	3	5.231	9.376	0.6566	0.08712	16	0.0054
TCANA313A	A	C3	1	3	5.295	9.400	0.6437	0.08668	16	0.0054
TCANB111A	B	C1	2	1	5.404	9.383	0.6736	0.08492	16	0.0053
TCANB112A	B	C1	2	1	5.365	9.431	0.6698	0.08490	16	0.0053
TCANB113A	B	C1	2	1	5.419	9.543	0.6735	0.08462	16	0.0053
TCANB211A	B	C2	2	2	5.436	9.436	0.6632	0.08342	16	0.0052
TCANB212A	B	C2	2	2	5.347	9.393	0.6620	0.08367	16	0.0052
TCANB213A	B	C2	2	2	5.429	9.595	0.6782	0.08393	16	0.0052
TCANC111A	C	C1	3	1	6.089	9.543	0.6505	0.08333	16	0.0052
TCANC112A	C	C1	3	1	5.349	9.614	0.6989	0.08413	16	0.0053
TCANC113A	C	C1	3	1	5.464	9.760	0.7009	0.08417	16	0.0053
TCANC211A	C	C2	3	2	5.358	9.533	0.6928	0.08448	16	0.0053
TCANC212A	C	C2	3	2	5.323	9.447	0.6771	0.08475	16	0.0053
TCANC213A	C	C2	3	2	5.380	9.602	0.6933	0.08398	16	0.0052

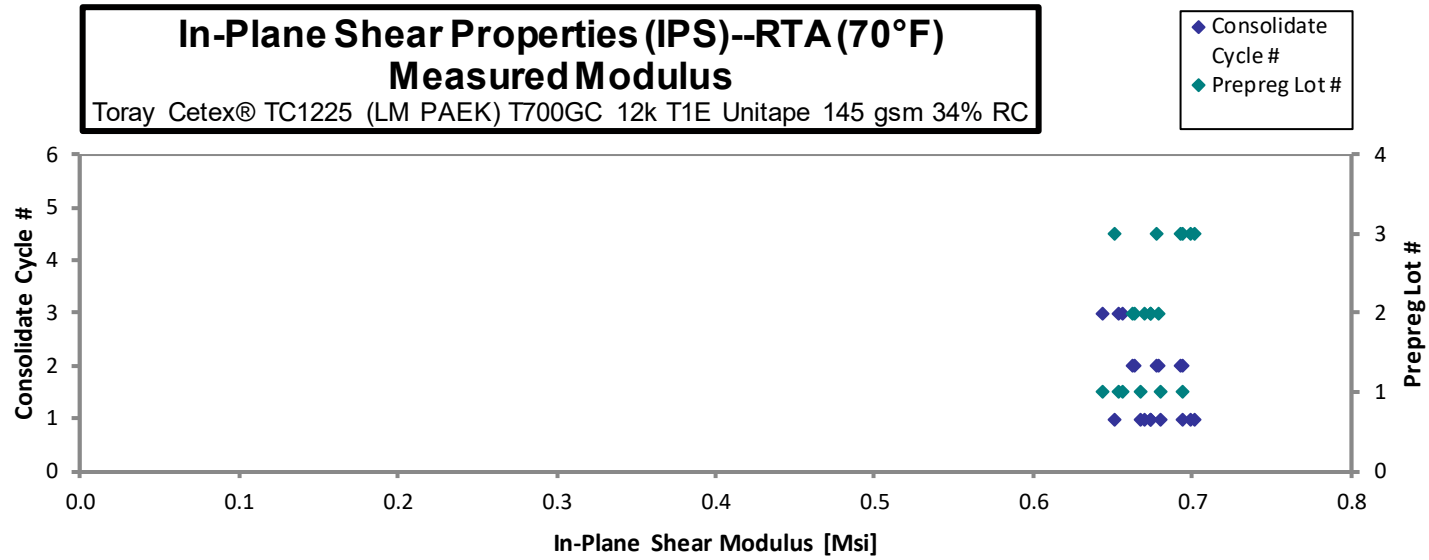
Modulus calculation is obtained from 1000 to 3000 microstrain.
 TCANC111A: 0.2% Offset Strength is higher compared to other specimens. Investigated and no probable cause to omit data.

Average	5.437	9.505	0.6739	0.0053
Standard Dev.	0.1988	0.1142	0.01724	
Coeff. of Var. [%]	3.656	1.201	2.558	
Min.	5.231	9.353	0.6437	0.0052
Max.	6.089	9.760	0.7009	0.0054
Number of Spec.	18	18	18	18







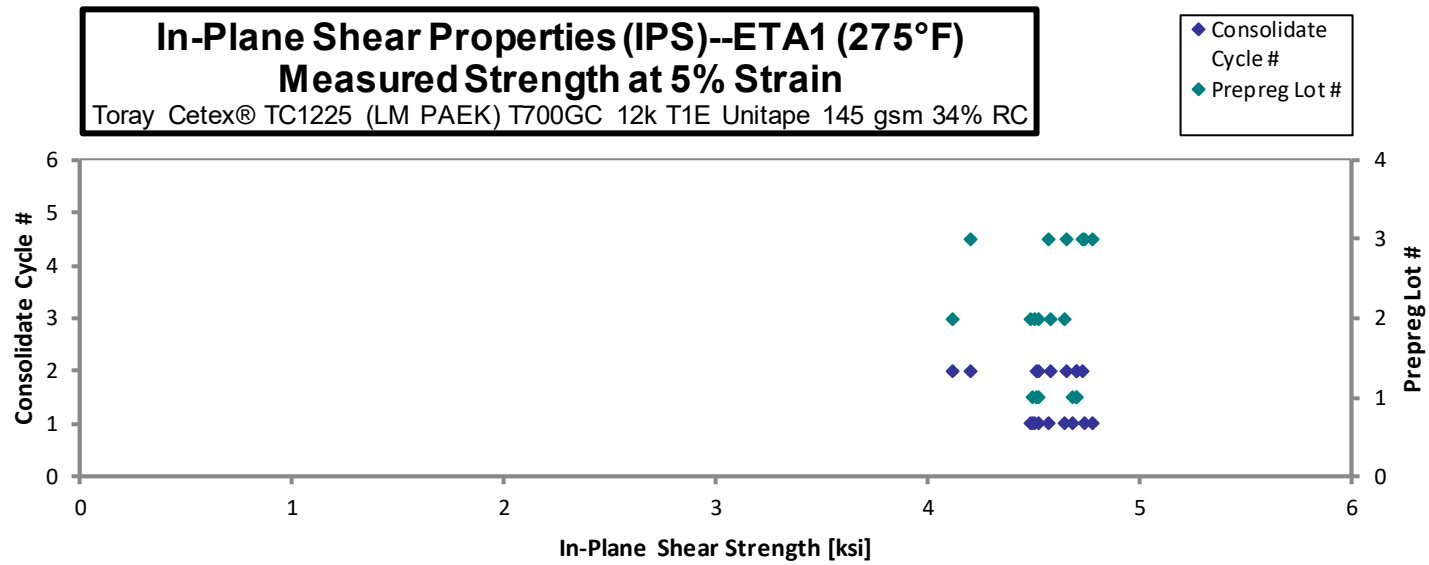
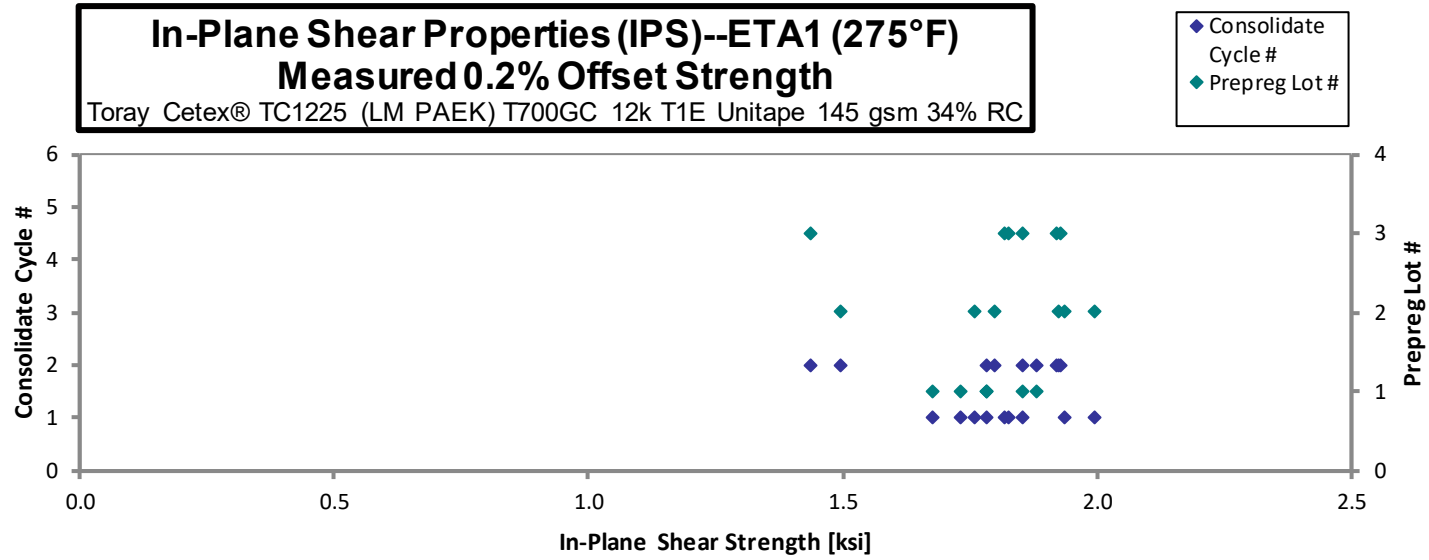


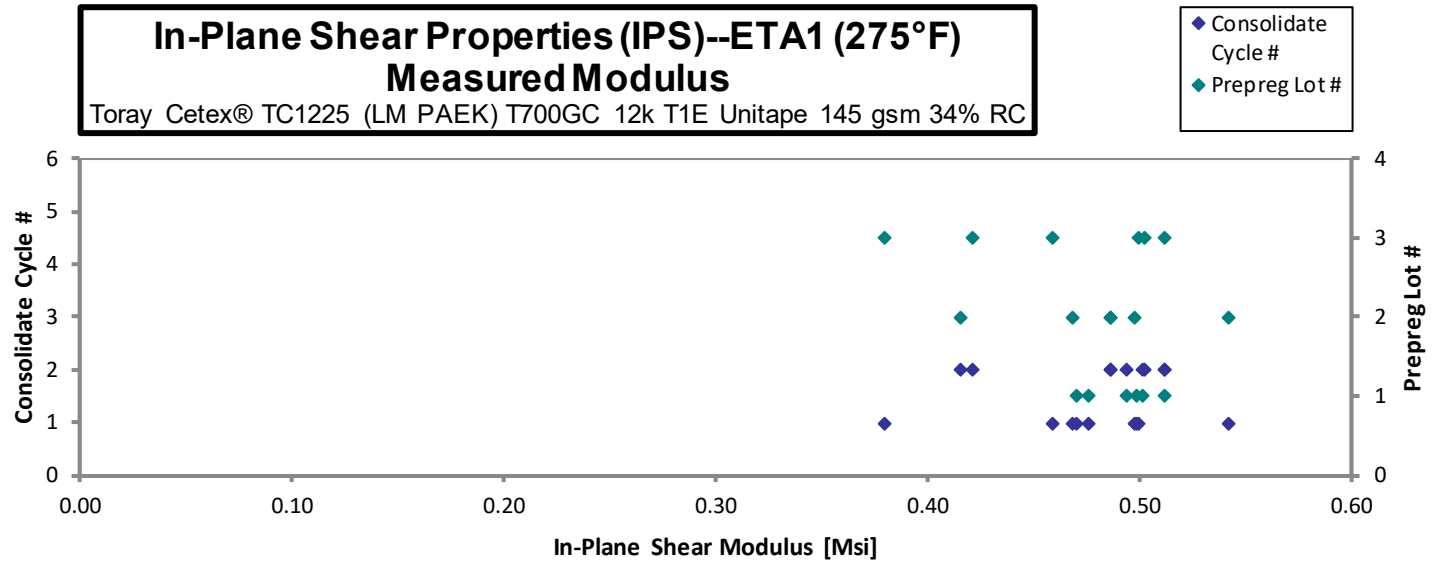
In-Plane Shear Properties (IPS)--ETA1 (275°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCANA111C	A	C1	1	1	1.734	4.521	0.4704	0.08403	16	0.0053
TCANA112C	A	C1	1	1	1.678	4.681	0.4762	0.08427	16	0.0053
TCANA113C	A	C1	1	1	1.784	4.495	0.4983	0.08417	16	0.0053
TCANA211C	A	C2	1	2	1.881	4.708	0.5115	0.08482	16	0.0053
TCANA212C	A	C2	1	2	1.781	4.514	0.5020	0.08425	16	0.0053
TCANA213C	A	C2	1	2	1.853	4.701	0.4940	0.08442	16	0.0053
TCANB111C	B	C1	2	1	1.760	4.487	0.4683	0.08430	16	0.0053
TCANB112C	B	C1	2	1	1.936	4.507	0.4975	0.08432	16	0.0053
TCANB113C	B	C1	2	1	1.994	4.647	0.5423	0.08467	16	0.0053
TCANB211C	B	C2	2	2	1.497	4.120	0.4159	0.08483	16	0.0053
TCANB212C	B	C2	2	2	1.800	4.585	0.4863	0.08455	16	0.0053
TCANB213C	B	C2	2	2	1.924	4.526	0.4869	0.08438	16	0.0053
TCANC111C	C	C1	3	1	1.854	4.781	0.4992	0.08428	16	0.0053
TCANC112C	C	C1	3	1	1.818	4.741	0.3794	0.08432	16	0.0053
TCANC113C	C	C1	3	1	1.825	4.571	0.4591	0.08392	16	0.0052
TCANC211C	C	C2	3	2	1.436	4.201	0.4213	0.08405	16	0.0053
TCANC212C	C	C2	3	2	1.929	4.733	0.5021	0.08410	16	0.0053
TCANC213C	C	C2	3	2	1.920	4.658	0.5115	0.08422	16	0.0053

Modulus calculation is obtained from 200 to 1000 microstrain.

Average	1.800	4.565	0.4790	0.0053
Standard Dev.	0.1459	0.1757	0.03946	
Coeff. of Var. [%]	8.106	3.849	8.237	
Min.	1.436	4.120	0.3794	0.0052
Max.	1.994	4.781	0.5423	0.0053
Number of Spec.	18	18	18	18





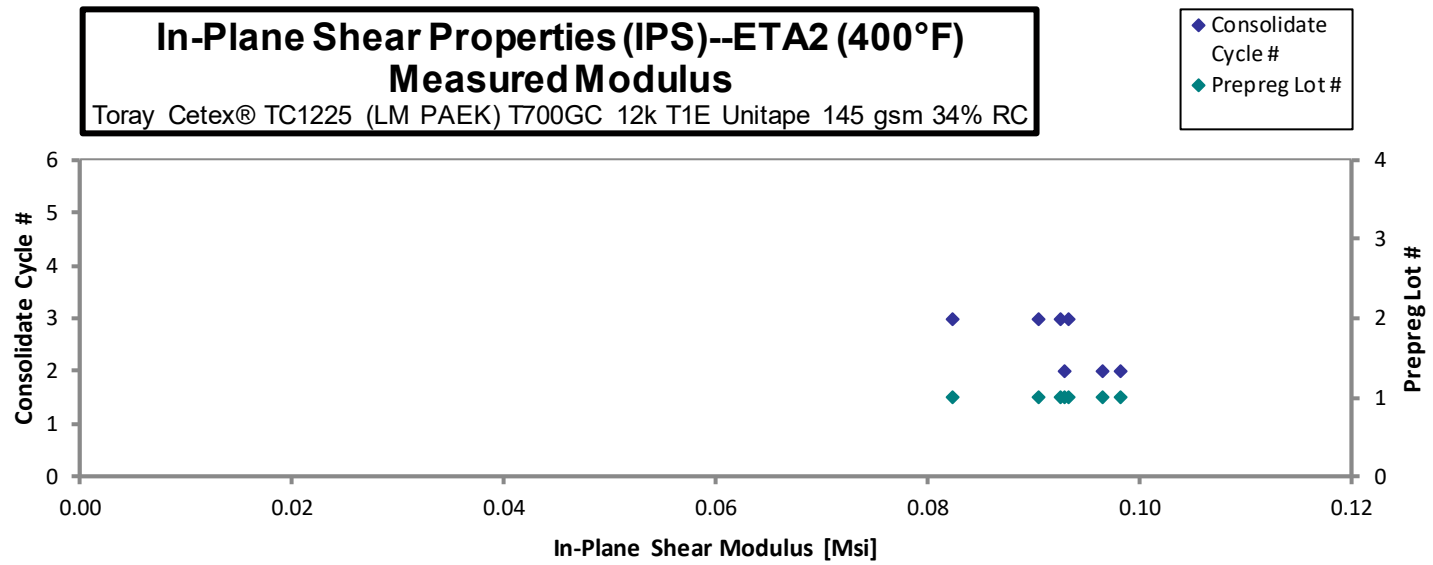
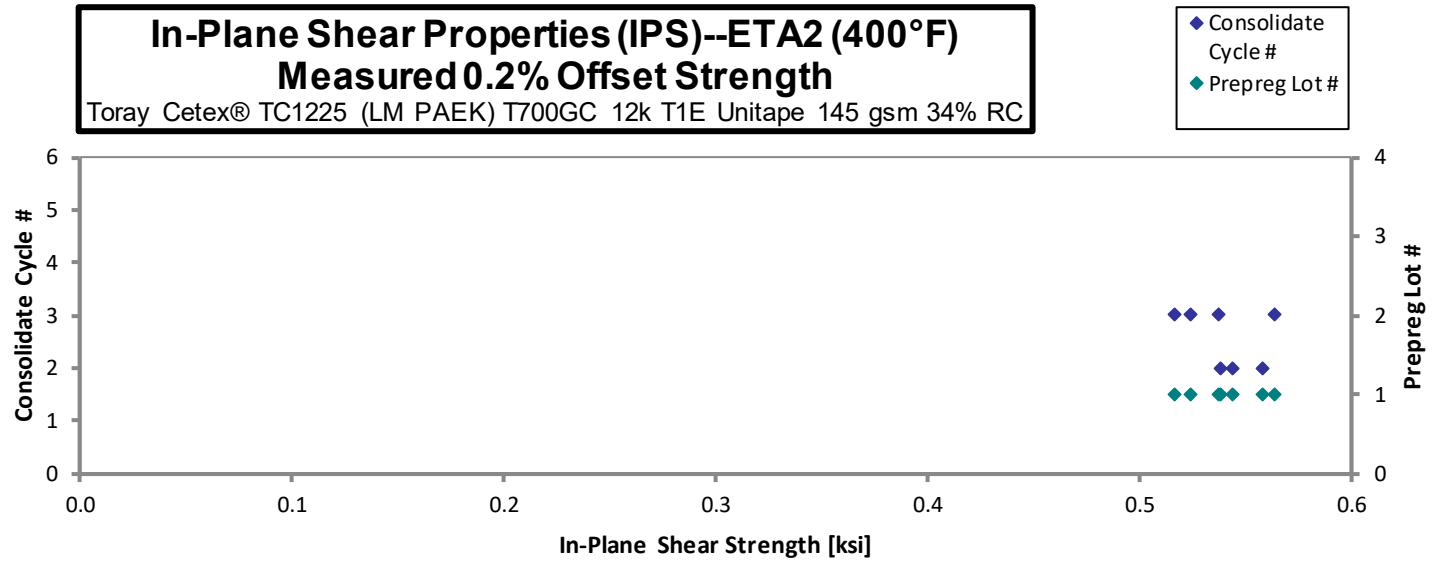
In-Plane Shear Properties (IPS)--ETA2 (400°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCANA211D	A	C2	1	2	0.5441	0.09659	0.08455	16	0.0053
TCANA212D	A	C2	1	2	0.5383	0.09299	0.08363	16	0.0052
TCANA213D	A	C2	1	2	0.5585	0.09817	0.08357	16	0.0052
TCANA311D	A	C3	1	3	0.5162	0.08234	0.08683	16	0.0054
TCANA312D	A	C3	1	3	0.5238	0.09325	0.08735	16	0.0055
TCANA313D	A	C3	1	3	0.5635	0.09044	0.08782	16	0.0055
TCANA314D	A	C3	1	3	0.5377	0.09261	0.08660	16	0.0054

Strength at 5% strain is not available for all specimens because strain gage failed prior to reaching 5% strain.

Modulus calculation is obtained from 200 to 1000 microstrain.

Average	0.5403	0.09234	0.0054
Standard Dev.	0.01707	0.005116	
Coeff. of Var. [%]	3.160	5.540	
Min.	0.5162	0.08234	0.0052
Max.	0.5635	0.09817	0.0055
Number of Spec.	7	7	7

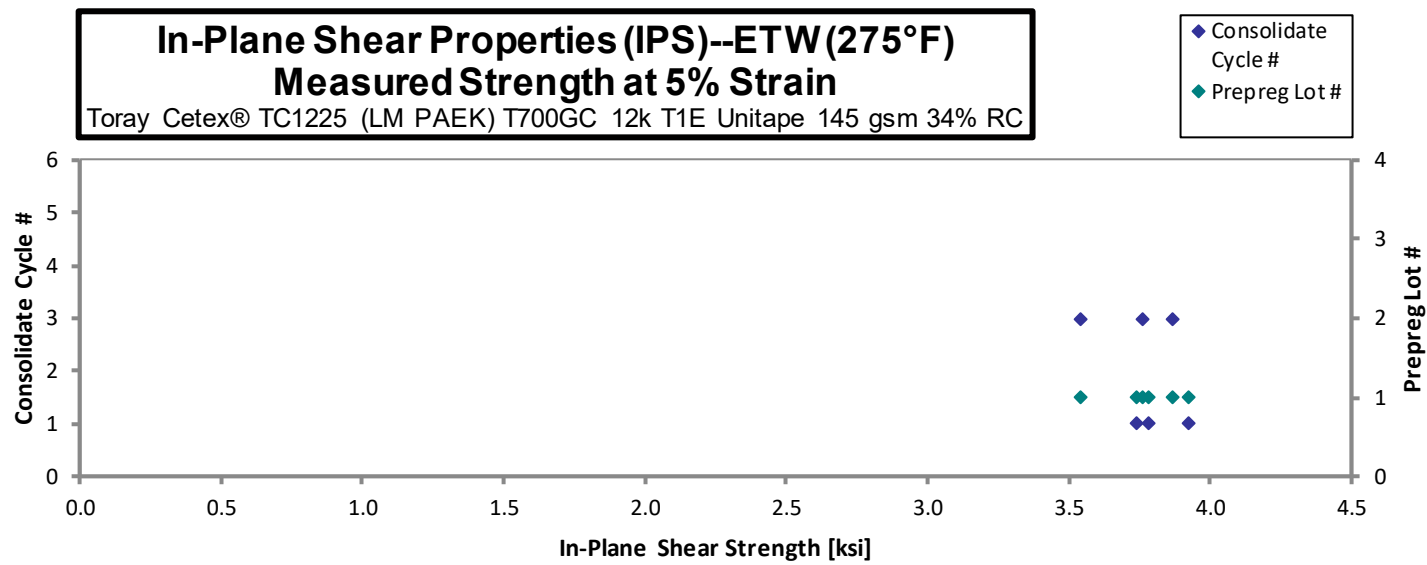
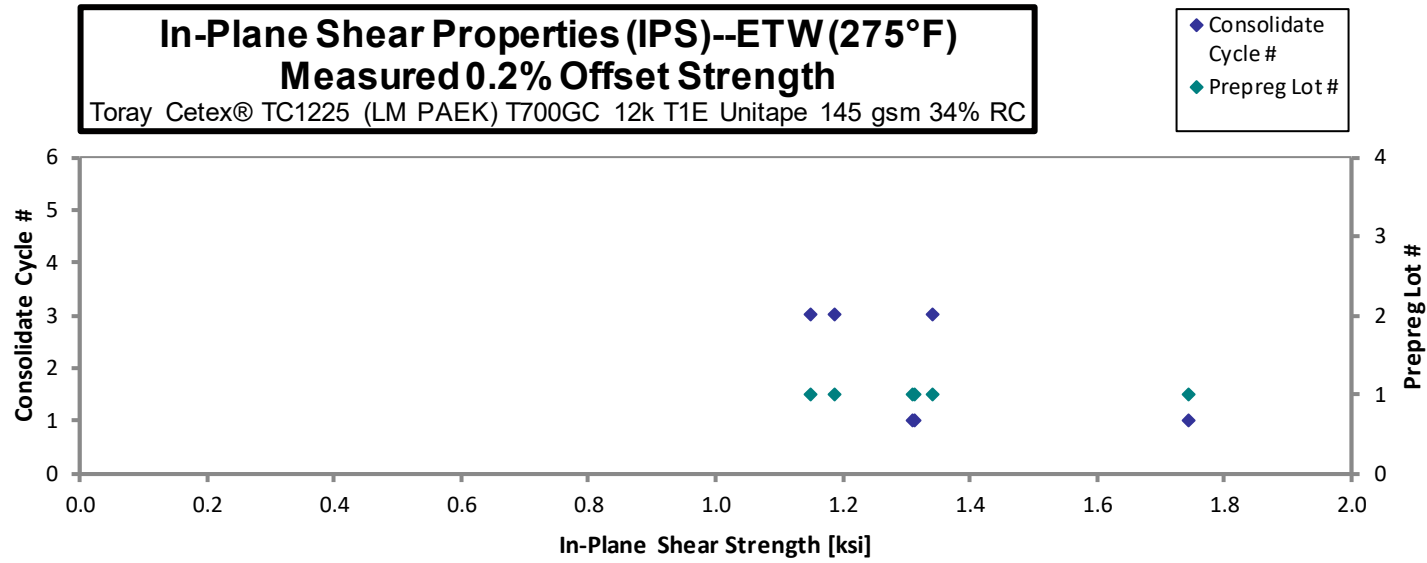


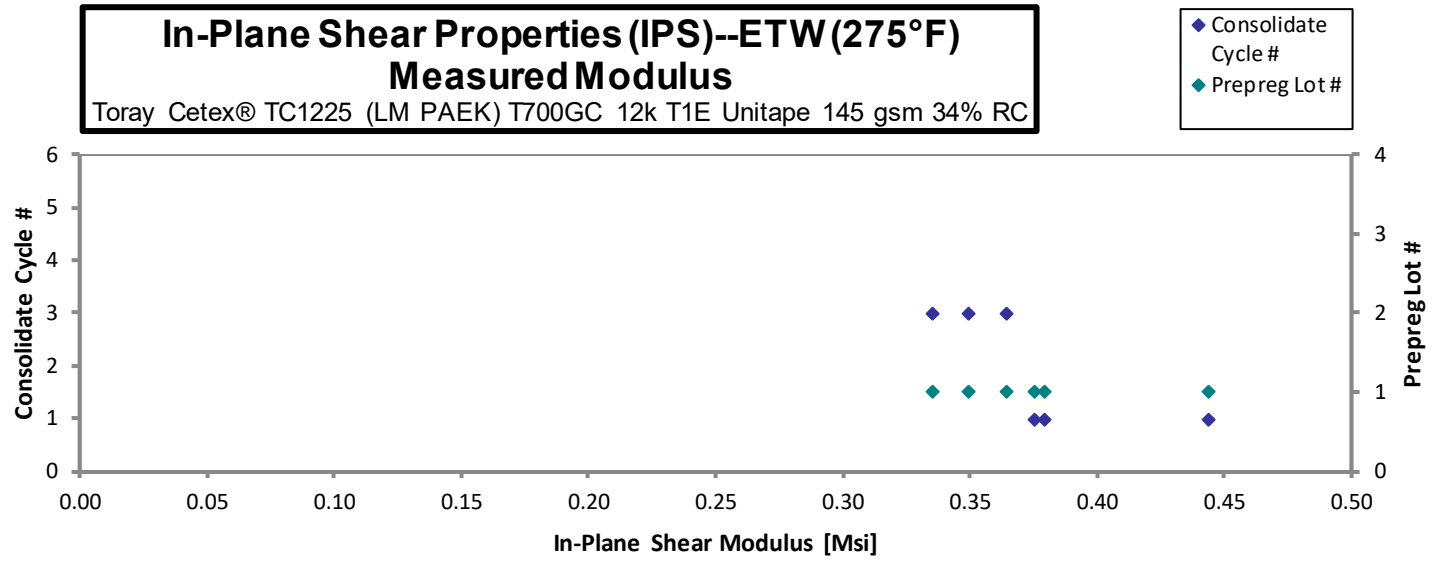
In-Plane Shear Properties (IPS)--ETW (275°F) Strength & Modulus Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCANA111E	A	C1	1	1	1.311	3.781	0.3790	0.08427	16	0.0053
TCANA112E	A	C1	1	1	1.745	3.921	0.4441	0.08370	16	0.0052
TCANA113E	A	C1	1	1	1.314	3.743	0.3751	0.08392	16	0.0052
TCANA311E	A	C3	1	3	1.340	3.868	0.3641	0.08628	16	0.0054
TCANA312E	A	C3	1	3	1.151	3.541	0.3355	0.08617	16	0.0054
TCANA313E	A	C3	1	3	1.187	3.763	0.3498	0.08653	16	0.0054

Modulus calculation is obtained from 200 to 1000 microstrain.

Average	1.341	3.770	0.3746	0.0053
Standard Dev.	0.2120	0.1310	0.03770	
Coeff. of Var. [%]	15.81	3.476	10.06	
Min.	1.151	3.541	0.3355	0.0052
Max.	1.745	3.921	0.4441	0.0054
Number of Spec.	6	6	6	6





4.7 0° Flexural Proc. A Properties (0FLEX)

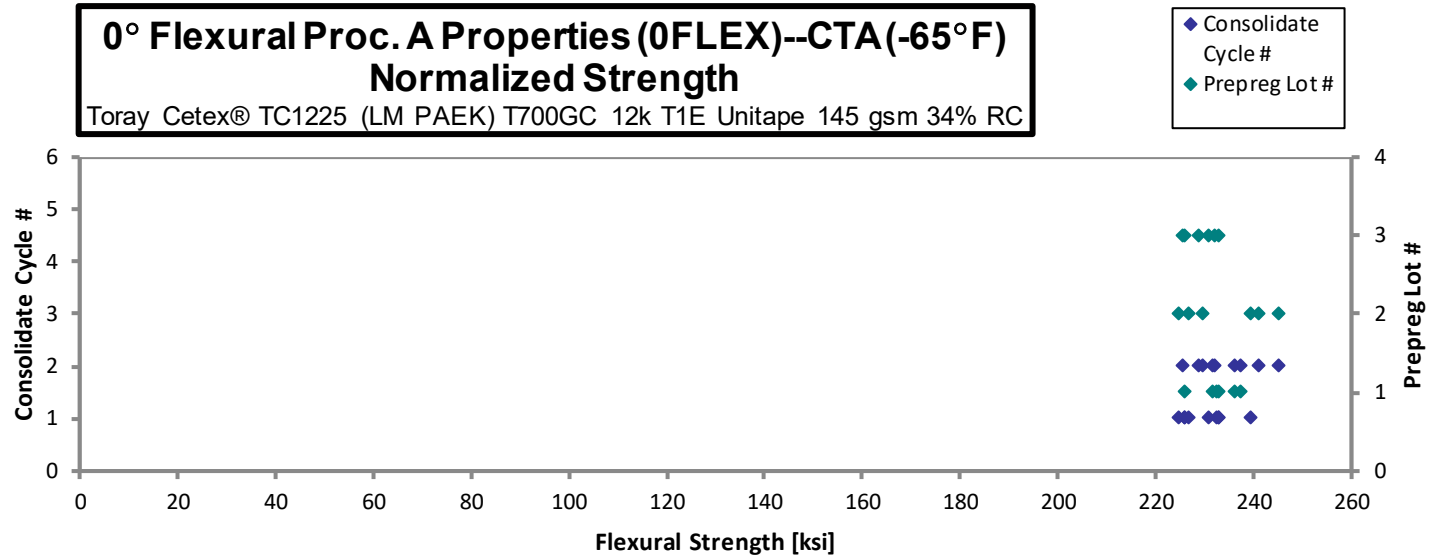
**0° Flexural Proc. A Properties (0FLEX)--CTA (-65°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t _{ply} [in]	Strength _{norm} [ksi]
TCATA111B	A	C1	1	1	239.3	0.1155	22	CAT, TAB	0.0052	232.6
TCATA112B	A	C1	1	1	239.0	0.1158	22	CAT, TAB	0.0053	232.9
TCATA113B	A	C1	1	1	231.0	0.1162	22	CAT, TAB	0.0053	225.9
TCATA211B	A	C2	1	2	238.8	0.1152	22	CAT, TAB	0.0052	231.6
TCATA212B	A	C2	1	2	242.7	0.1156	22	CAT, TAB	0.0053	236.1
TCATA213B	A	C2	1	2	243.4	0.1158	22	CAT, TAB	0.0053	237.2
TCATB111B	B	C1	2	1	232.1	0.1160	22	CAT, TAB	0.0053	226.6
TCATB112B	B	C1	2	1	229.8	0.1162	22	CAT, TAB	0.0053	224.8
TCATB113B	B	C1	2	1	244.5	0.1164	22	CAT, TAB	0.0053	239.5
TCATB211B	B	C2	2	2	247.3	0.1177	22	CAT, TAB	0.0054	245.1
TCATB212B	B	C2	2	2	243.0	0.1178	22	CAT, TAB	0.0054	241.0
TCATB213B	B	C2	2	2	231.3	0.1180	22	CAT, TAB	0.0054	229.6
TCATC111B	C	C1	3	1	245.6	0.1093	22	CAT, TAB	0.0050	226.0
TCATC112B	C	C1	3	1	252.1	0.1098	22	CAT, TAB	0.0050	233.0
TCATC113B	C	C1	3	1	248.0	0.1106	22	CAT, TAB	0.0050	230.8
TCATC211B	C	C2	3	2	247.7	0.1082	22	CAT, TAB	0.0049	225.5
TCATC212B	C	C2	3	2	250.3	0.1086	22	CAT, TAB	0.0049	228.9
TCATC213B	C	C2	3	2	252.1	0.1094	22	CAT, TAB	0.0050	232.2

Average 242.1
Standard Dev. 7.279
Coeff. of Var. [%] 3.007
Min. 229.8
Max. 252.1
Number of Spec. 18

Average_{norm} 0.0052 232.2
Standard Dev._{norm} 5.770
Coeff. of Var. [%]_{norm} 2.485
Min. 0.0049 224.8
Max. 0.0054 245.1
Number of Spec. 18 18



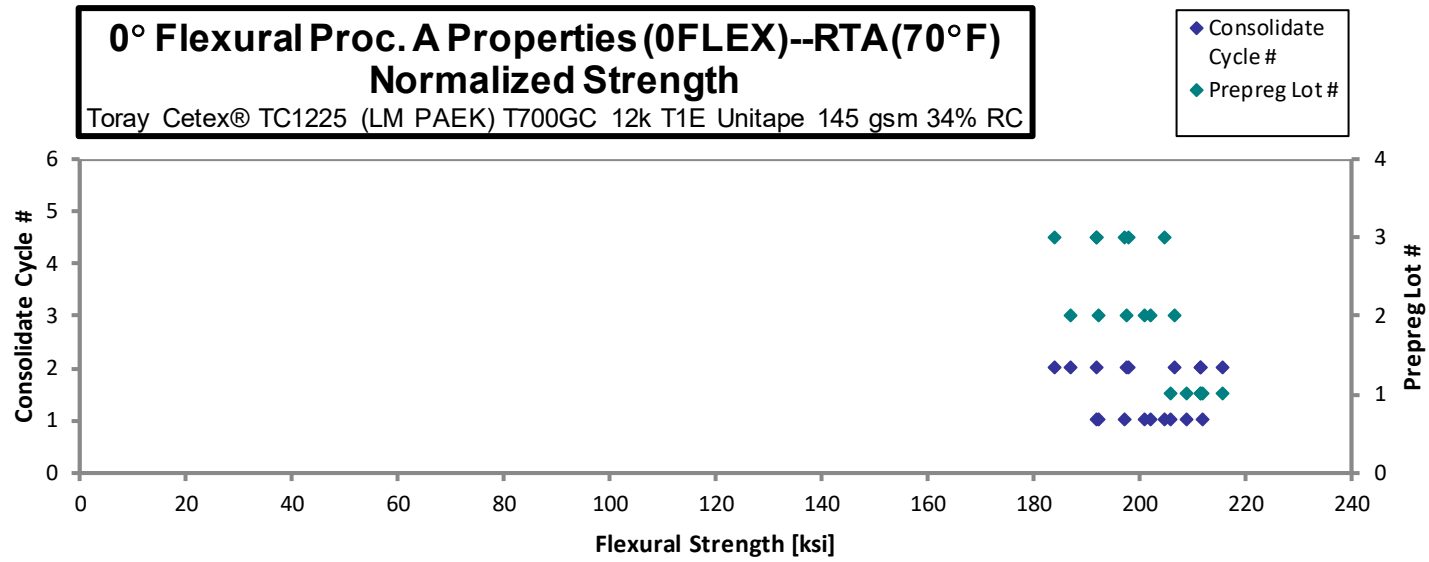
**0° Flexural Proc. A Properties (0FLEX)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksj]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t _{ply} [in]	Strength _{norm} [ksj]
TCATA111A	A	C1	1	1	212.7	0.1150	22	CAT	0.0052	205.9
TCATA112A	A	C1	1	1	216.3	0.1148	22	CAT	0.0052	209.0
TCATA113A	A	C1	1	1	218.3	0.1153	22	CAT, TAB	0.0052	211.9
TCATA211A	A	C2	1	2	223.9	0.1145	22	CAT, TAB	0.0052	215.8
TCATA212A	A	C2	1	2	219.3	0.1146	22	CAT, TAB	0.0052	211.5
TCATA213A	A	C2	1	2	218.1	0.1152	22	CAT, TAB	0.0052	211.5
TCATB111A	B	C1	2	1	206.2	0.1164	22	CAT, TAB	0.0053	202.1
TCATB112A	B	C1	2	1	205.5	0.1163	22	CAT, TAB	0.0053	201.1
TCATB113A	B	C1	2	1	196.0	0.1166	22	CAT, TAB	0.0053	192.3
TCATB211A	B	C2	2	2	203.8	0.1151	22	CAT, TAB	0.0052	197.5
TCATB212A	B	C2	2	2	190.6	0.1165	22	CAT, TAB	0.0053	187.0
TCATB213A	B	C2	2	2	207.7	0.1183	22	CAT, TAB	0.0054	206.8
TCATC111A	C	C1	3	1	216.1	0.1083	22	CAT, TAB	0.0049	197.0
TCATC112A	C	C1	3	1	210.5	0.1084	22	CAT, TAB	0.0049	192.1
TCATC113A	C	C1	3	1	224.0	0.1086	22	CAT, TAB	0.0049	204.8
TCATC211A	C	C2	3	2	218.4	0.1077	22	CAT, TAB	0.0049	197.9
TCATC212A	C	C2	3	2	211.5	0.1078	22	CAT, TAB	0.0049	191.9
TCATC213A	C	C2	3	2	203.1	0.1076	22	CAT, TAB	0.0049	183.9

Average 211.2
Standard Dev. 9.202
Coeff. of Var. [%] 4.356
Min. 190.6
Max. 224.0
Number of Spec. 18

Average_{norm} 0.0051
Standard Dev._{norm} 9.265
Coeff. of Var. [%]_{norm} 4.607
Min. 0.0049
Max. 0.0054
Number of Spec. 18



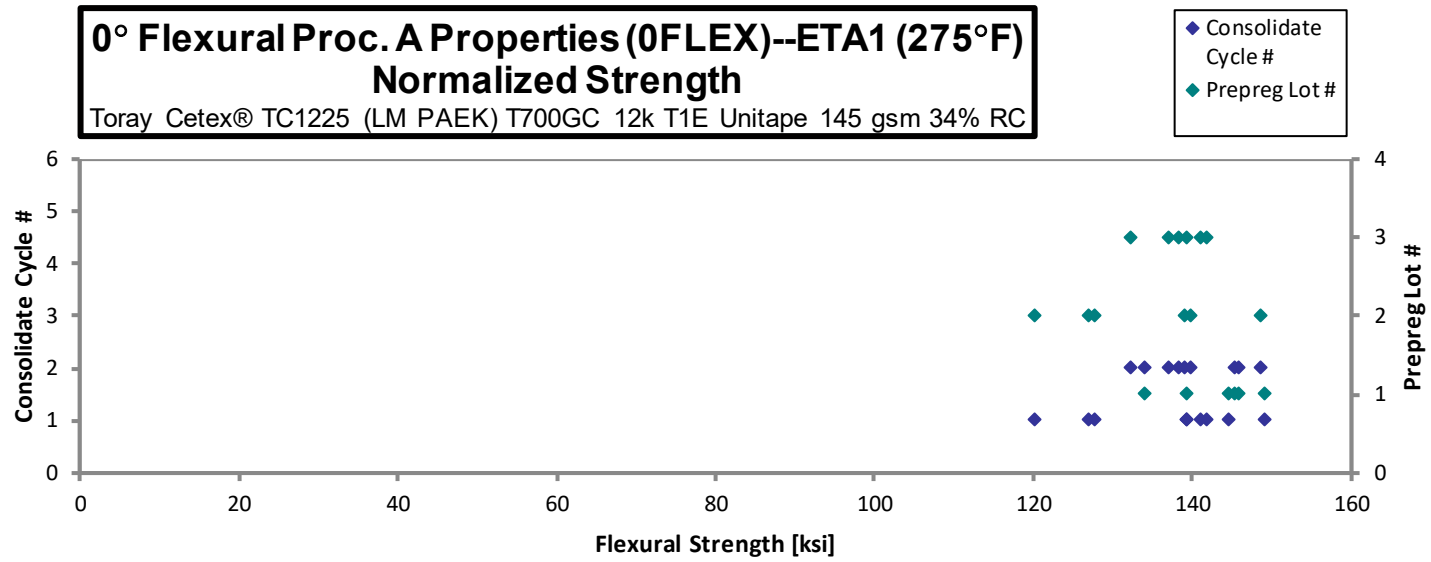
**0° Flexural Proc. A Properties (0FLEX)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t _{ply} [in]	Strength _{norm} [ksi]
TCATA111C	A	C1	1	1	152.6	0.1160	22	CAT	0.0053	149.0
TCATA112C	A	C1	1	1	148.5	0.1156	22	CAT	0.0053	144.6
TCATA113C	A	C1	1	1	143.6	0.1153	22	CAT	0.0052	139.4
TCATA211C	A	C2	1	2	150.6	0.1150	22	CAT	0.0052	145.8
TCATA212C	A	C2	1	2	150.3	0.1149	22	CAT	0.0052	145.4
TCATA213C	A	C2	1	2	139.2	0.1145	22	CAT	0.0052	134.1
TCATB111C	B	C1	2	1	124.4	0.1147	22	CAT	0.0052	120.1
TCATB112C	B	C1	2	1	132.3	0.1147	22	CAT	0.0052	127.7
TCATB113C	B	C1	2	1	131.7	0.1145	22	CAT	0.0052	126.9
TCATB211C	B	C2	2	2	140.1	0.1186	22	CAT	0.0054	139.9
TCATB212C	B	C2	2	2	139.1	0.1187	22	CAT	0.0054	139.0
TCATB213C	B	C2	2	2	149.3	0.1182	22	CAT	0.0054	148.6
TCATC111C	C	C1	3	1	153.2	0.1080	22	CAT	0.0049	139.2
TCATC112C	C	C1	3	1	155.4	0.1078	22	CAT	0.0049	141.0
TCATC113C	C	C1	3	1	155.9	0.1080	22	CAT	0.0049	141.8
TCATC211C	C	C2	3	2	146.6	0.1071	22	CAT	0.0049	132.2
TCATC212C	C	C2	3	2	151.6	0.1073	22	CAT	0.0049	136.9
TCATC213C	C	C2	3	2	153.2	0.1073	22	CAT	0.0049	138.3

Average **145.4**
Standard Dev. **9.107**
Coeff. of Var. [%] **6.262**
Min. **124.4**
Max. **155.9**
Number of Spec. **18**

Average_{norm} **0.0051**
Standard Dev._{norm} **7.752**
Coeff. of Var. [%]_{norm} **5.605**
Min. **0.0049**
Max. **0.0054**
Number of Spec. **18**



**0° Flexural Proc. A Properties (0FLEX)--ETA2 (400°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

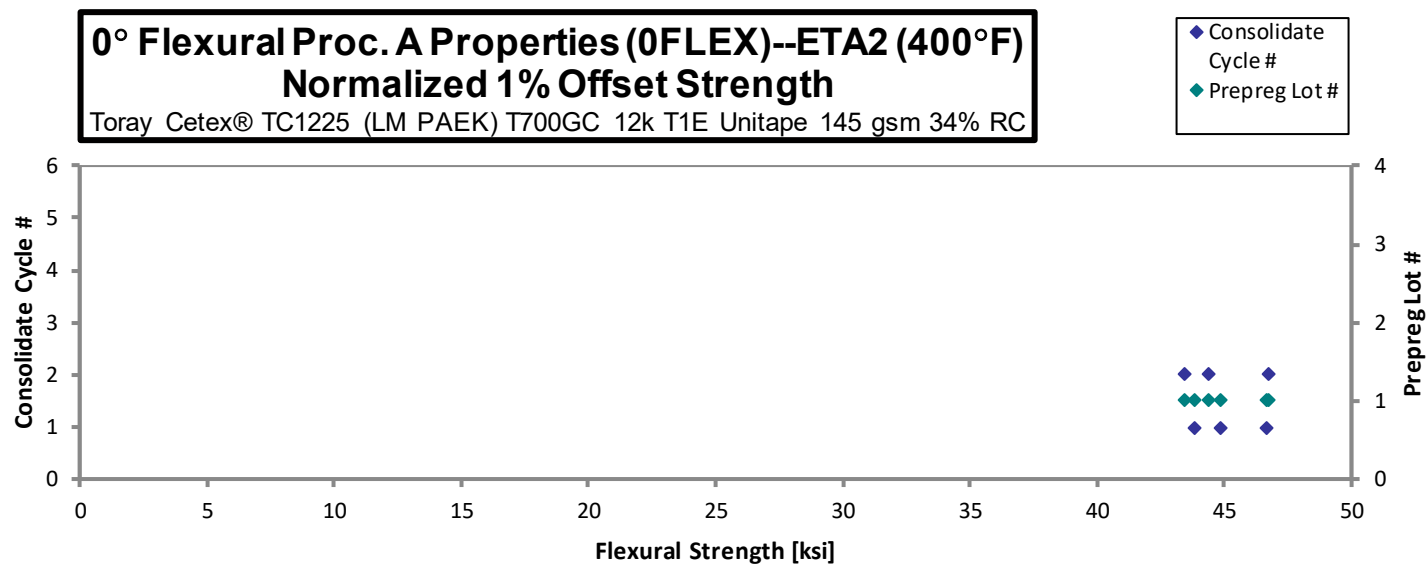
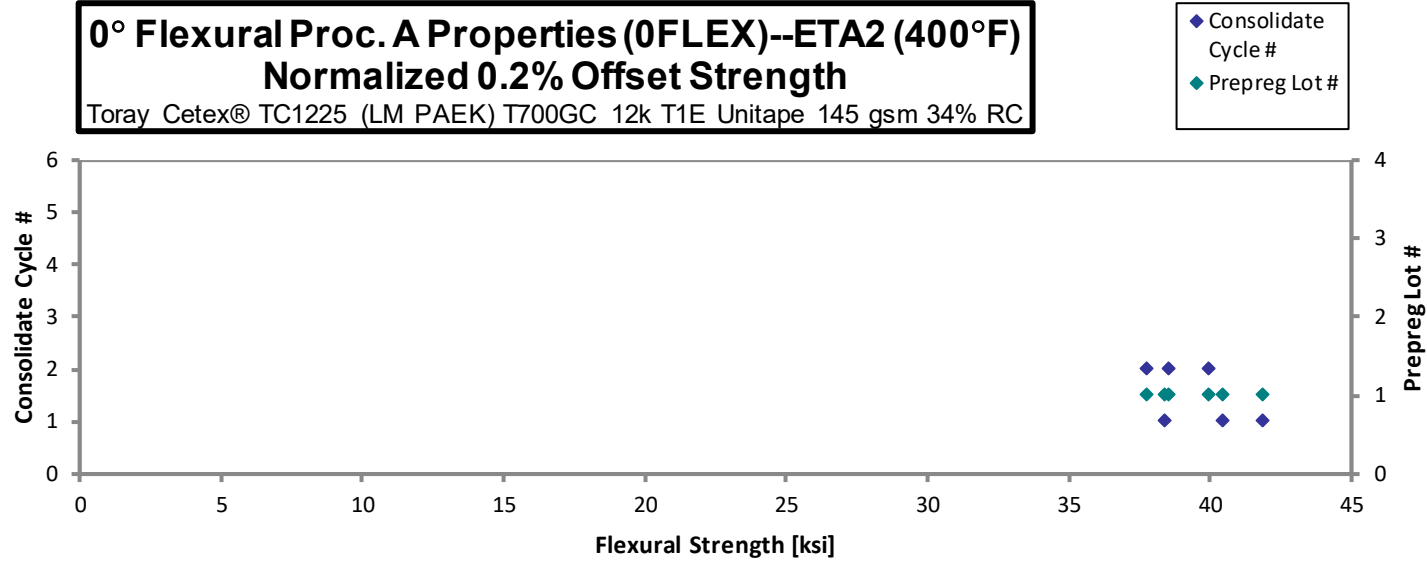
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode at 1% Offset Strength
TCATA111D	A	C1	1	1	43.41	48.41	0.1145	22	CAT
TCATA112D	A	C1	1	1	39.70	45.34	0.1150	22	CAT
TCATA113D	A	C1	1	1	41.84	46.42	0.1149	22	CAT
TCATA211D	A	C2	1	2	39.82	45.85	0.1127	22	CAT
TCATA212D	A	C2	1	2	41.94	49.11	0.1132	22	CAT
TCATA213D	A	C2	1	2	40.31	46.51	0.1135	22	CAT

Avg. t _{ply} [in]	0.2% Offset Strength _{norm} [ksi]	1% Offset Strength _{norm} [ksi]
0.0052	41.85	46.67
0.0052	38.41	43.87
0.0052	40.47	44.90
0.0051	37.76	43.48
0.0051	39.95	46.78
0.0052	38.51	44.42

Average 41.17 46.94
Standard Dev. 1.469 1.488
Coeff. of Var. [%] 3.567 3.170
Min. 39.70 45.34
Max. 43.41 49.11
Number of Spec. 6 6

Average_{norm} 0.0052 39.49 45.02
Standard Dev_{norm} 1.541 1.404
Coeff. of Var. [%]_{norm} 3.901 3.120
Min. 0.0051 37.76 43.48
Max. 0.0052 41.85 46.78
Number of Spec. 6 6 6



**0° Flexural Proc. A Properties (0FLEX)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

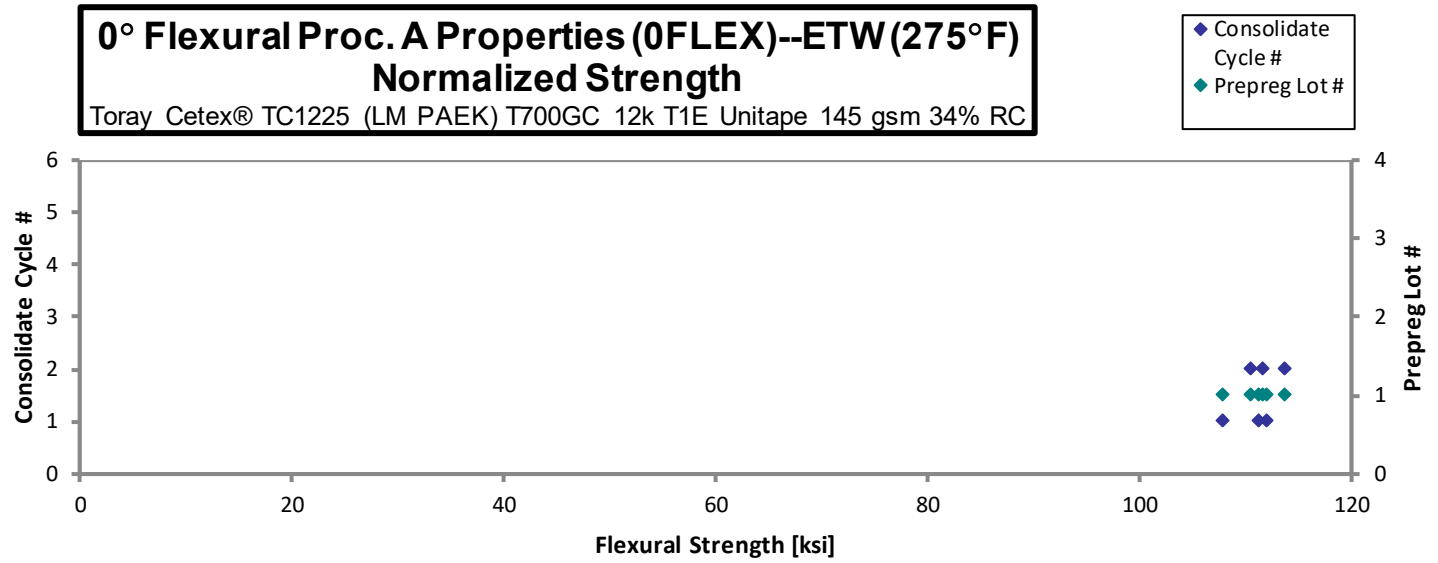
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCATA111E	A	C1	1	1	110.5	0.1160	22	CAT
TCATA112E	A	C1	1	1	114.7	0.1161	22	CAT
TCATA113E	A	C1	1	1	113.8	0.1162	22	CAT
TCATA212E	A	C2	1	2	117.8	0.1147	22	CAT
TCATA213E	A	C2	1	2	115.3	0.1149	22	CAT
TCATA214E	A	C2	1	2	114.0	0.1151	22	CAT

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	107.8
0.0053	112.1
0.0053	111.3
0.0052	113.7
0.0052	111.6
0.0052	110.4

Average 114.3
Standard Dev. 2.375
Coeff. of Var. [%] 2.077
Min. 110.5
Max. 117.8
Number of Spec. 6

Average_{norm} 0.0052 111.1
Standard Dev._{norm} 1.959
Coeff. of Var. [%]_{norm} 1.763
Min. 0.0052 107.8
Max. 0.0053 113.7
Number of Spec. 6 6



4.8 90° Flexural Proc. A Properties (90FLEX)

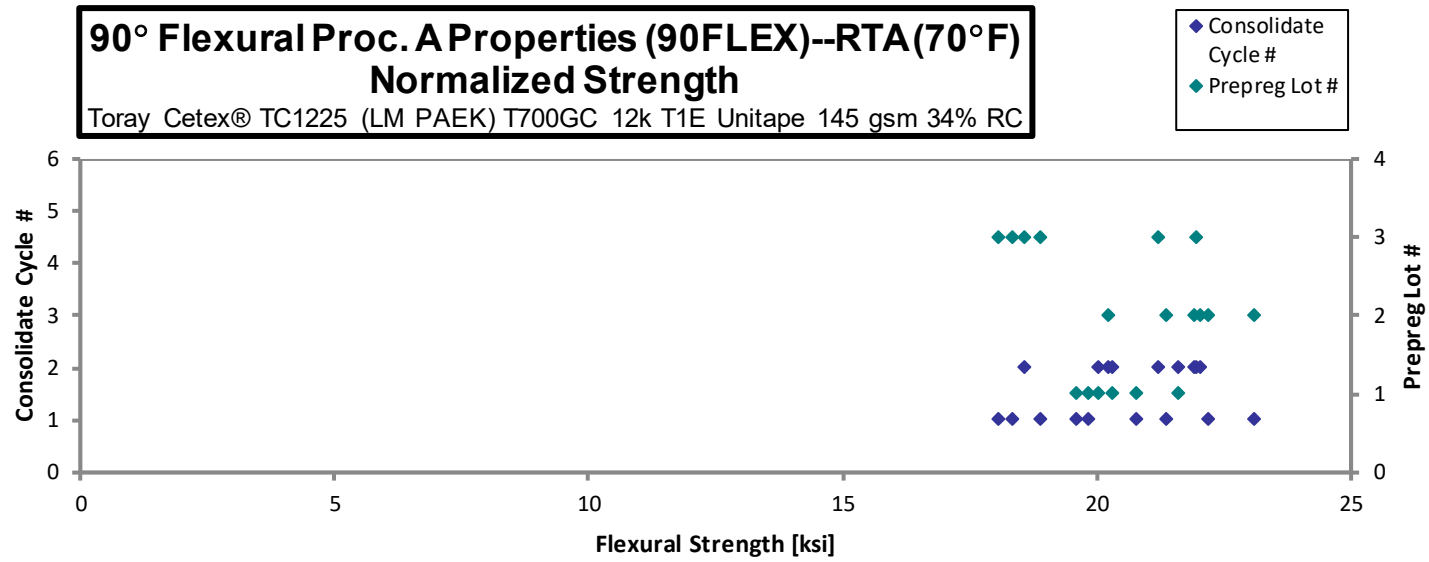
**90° Flexural Proc. A Properties (90FLEX)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t _{ply} [in]	Strength _{norm} [ksi]
TCAT90A111A	A	C1	1	1	21.22	0.1164	22	CAT, TAB	0.0053	20.79
TCAT90A112A	A	C1	1	1	20.30	0.1160	22	TAB	0.0053	19.82
TCAT90A113A	A	C1	1	1	20.04	0.1163	22	TAB	0.0053	19.61
TCAT90A211A	A	C2	1	2	20.55	0.1157	22	CAT, TAB	0.0053	20.01
TCAT90A212A	A	C2	1	2	20.88	0.1156	22	CAT, TAB	0.0053	20.32
TCAT90A213A	A	C2	1	2	22.24	0.1154	22	CAT, TAB	0.0052	21.61
TCAT90B111A	B	C1	2	1	22.95	0.1148	22	CAT, TAB	0.0052	22.18
TCAT90B112A	B	C1	2	1	22.00	0.1154	22	CAT, TAB	0.0052	21.37
TCAT90B113A	B	C1	2	1	23.79	0.1154	22	CAT, TAB	0.0052	23.12
TCAT90B211A	B	C2	2	2	20.25	0.1186	22	CAT, TAB	0.0054	20.22
TCAT90B212A	B	C2	2	2	22.19	0.1180	22	CAT, TAB	0.0054	22.04
TCAT90B213A	B	C2	2	2	22.03	0.1182	22	CAT, TAB	0.0054	21.92
TCAT90C111A	C	C1	3	1	19.38	0.1123	22	CAT, TAB	0.0051	18.33
TCAT90C112A	C	C1	3	1	19.06	0.1126	22	CAT, TAB	0.0051	18.07
TCAT90C113A	C	C1	3	1	19.99	0.1123	22	CAT, TAB	0.0051	18.90
TCAT90C211A	C	C2	3	2	23.23	0.1123	22	CAT, TAB	0.0051	21.97
TCAT90C212A	C	C2	3	2	22.54	0.1119	22	CAT, TAB	0.0051	21.23
TCAT90C213A	C	C2	3	2	19.77	0.1116	22	CAT, TAB	0.0051	18.57

Average 21.24
Standard Dev. 1.416
Coeff. of Var. [%] 6.664
Min. 19.06
Max. 23.79
Number of Spec. 18

Average_{norm} 0.0052 20.56
Standard Dev._{norm} 1.480
Coeff. of Var. [%]_{norm} 7.201
Min. 0.0051 18.07
Max. 0.0054 23.12
Number of Spec. 18 18



4.9 Lamina Short-Beam Strength Properties (SBS) – Reference only

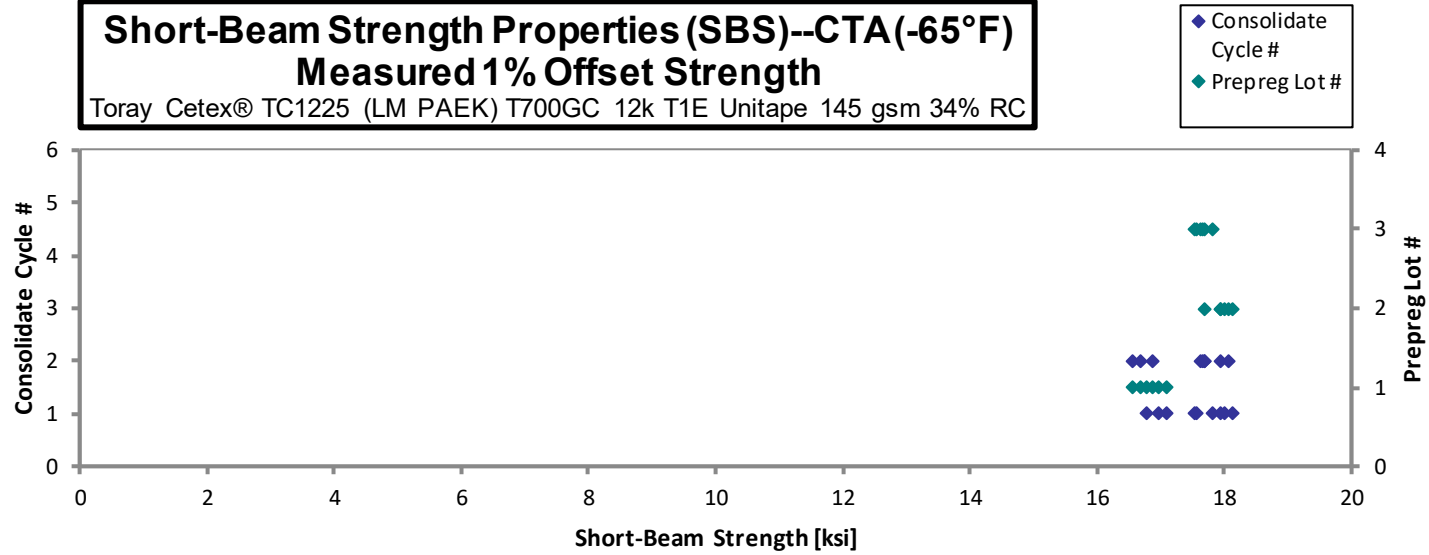
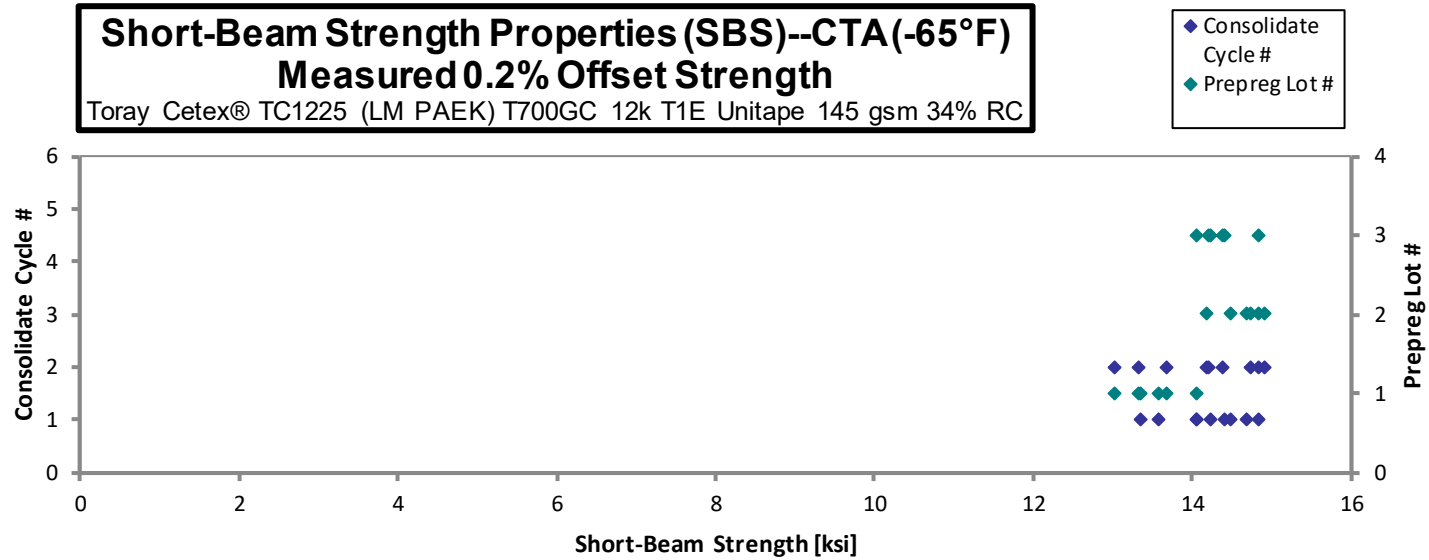
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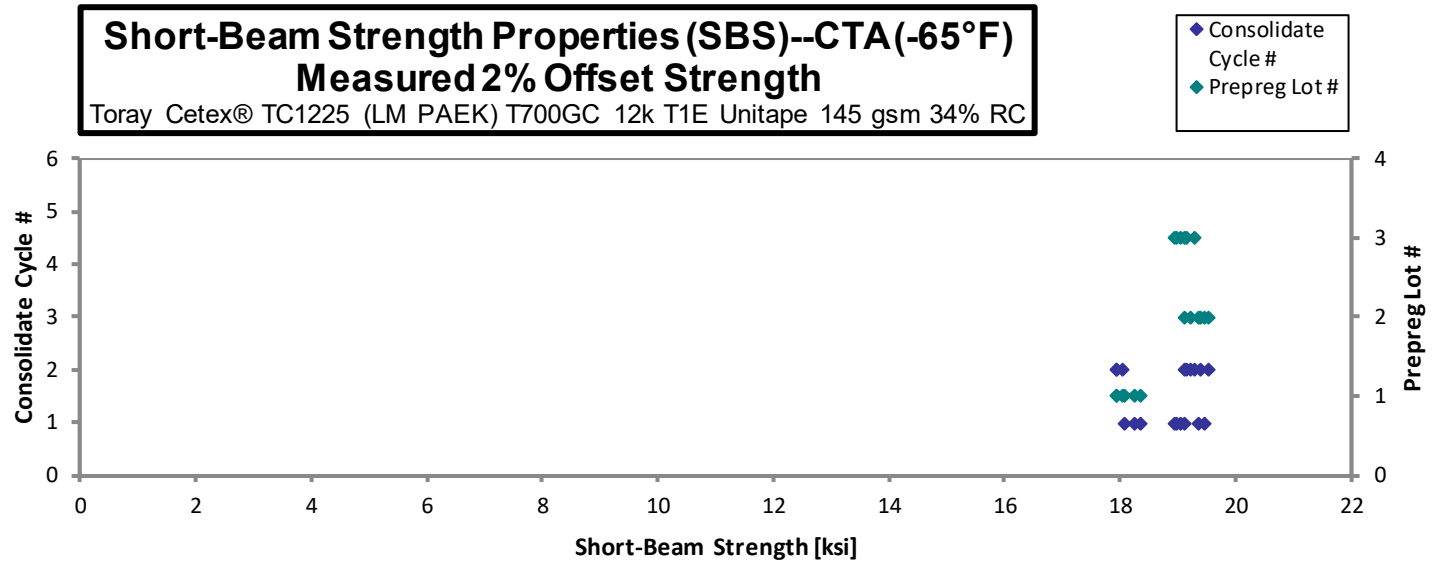
Short-Beam Strength Properties (SBS)--CTA (-65°F) Strength Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	2% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCAQA111B	A	C1	1	1	14.06	17.10	18.36	0.1787	34	0.0053
TCAQA112B	A	C1	1	1	13.56	16.78	18.07	0.1785	34	0.0052
TCAQA114B	A	C1	1	1	13.35	16.96	18.26	0.1794	34	0.0053
TCAQA211B	A	C2	1	2	13.66	16.88	18.03	0.1836	34	0.0054
TCAQA212B	A	C2	1	2	13.02	16.56	17.93	0.1835	34	0.0054
TCAQA213B	A	C2	1	2	13.31	16.67	17.94	0.1836	34	0.0054
TCAQB111B	B	C1	2	1	14.47	18.01	19.46	0.1728	34	0.0051
TCAQB112B	B	C1	2	1	14.83	18.13	19.35	0.1727	34	0.0051
TCAQB113B	B	C1	2	1	14.69	17.96	19.12	0.1726	34	0.0051
TCAQB211B	B	C2	2	2	14.91	17.95	19.41	0.1706	34	0.0050
TCAQB213B	B	C2	2	2	14.72	18.07	19.55	0.1709	34	0.0050
TCAQB215B	B	C2	2	2	14.18	17.69	19.24	0.1711	34	0.0050
TCAQC111B	C	C1	3	1	14.05	17.54	18.93	0.1742	34	0.0051
TCAQC112B	C	C1	3	1	14.40	17.81	19.04	0.1740	34	0.0051
TCAQC113B	C	C1	3	1	14.24	17.56	18.96	0.1743	34	0.0051
TCAQC211B	C	C2	3	2	14.37	17.68	19.30	0.1741	34	0.0051
TCAQC212B	C	C2	3	2	14.21	17.69	19.12	0.1740	34	0.0051
TCAQC213B	C	C2	3	2	14.84	17.63	19.15	0.1739	34	0.0051

Note: Failure mode at failure is not reported because it is not applicable for offset strength.

Average	14.16	17.48	18.85	0.0052
Standard Dev.	0.5734	0.5173	0.5749	
Coeff. of Var. [%]	4.049	2.959	3.050	
Min.	13.02	16.56	17.93	0.0050
Max.	14.91	18.13	19.55	0.0054
Number of Spec.	18	18	18	18



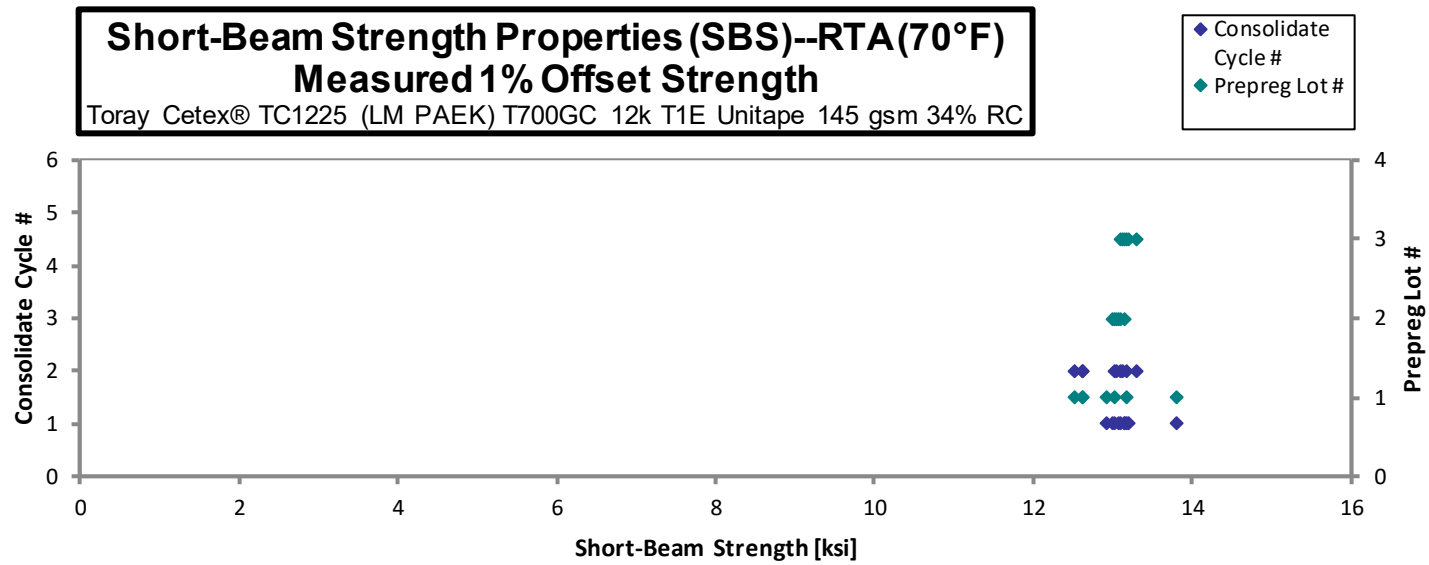
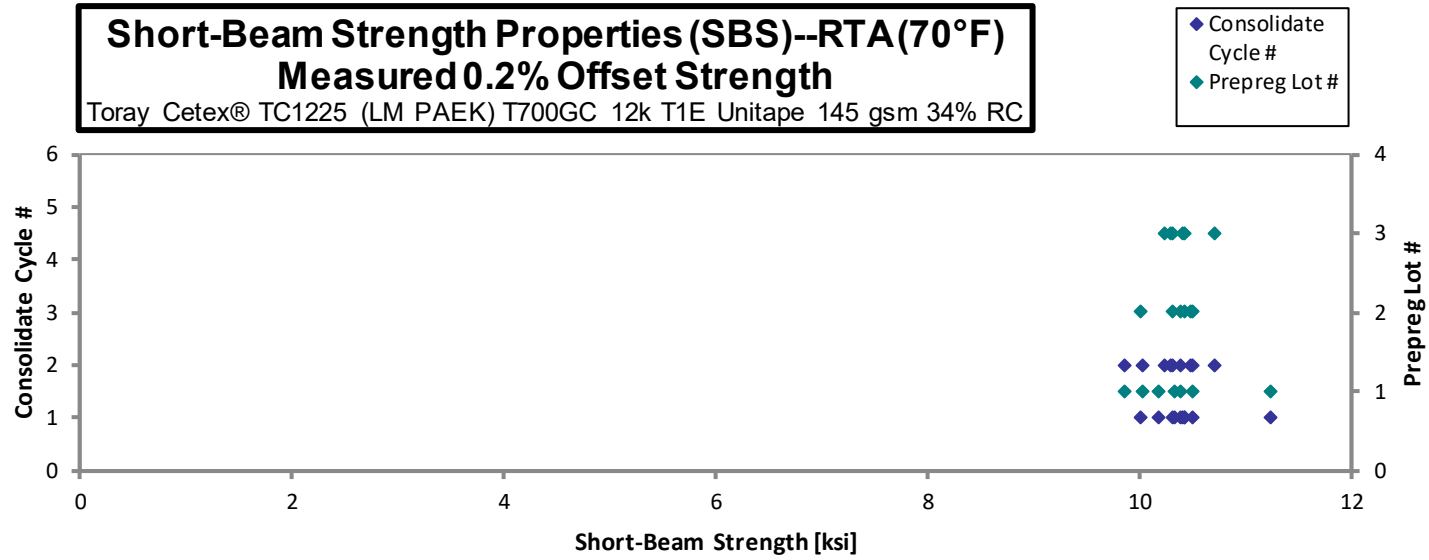


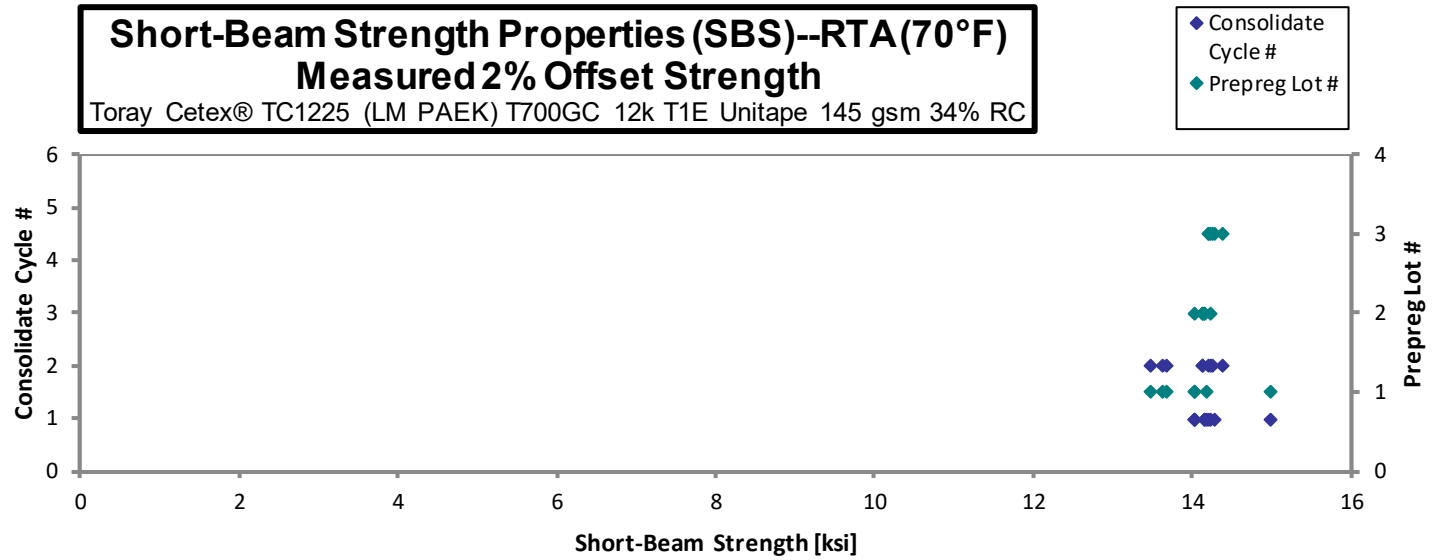
**Short-Beam Strength Properties (SBS)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	2% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCAQA111A	A	C1	1	1	10.19	12.93	14.04	0.1783	34	0.0052
TCAQA112A	A	C1	1	1	11.24	13.80	14.98	0.1780	34	0.0052
TCAQA113A	A	C1	1	1	10.33	13.02	14.03	0.1773	34	0.0052
TCAQA114A	A	C1	1	1	10.39	13.16	14.18	0.1777	34	0.0052
TCAQA211A	A	C2	1	2	10.03	12.62	13.68	0.1859	34	0.0055
TCAQA212A	A	C2	1	2	10.50	12.62	13.63	0.1855	34	0.0055
TCAQA213A	A	C2	1	2	9.861	12.51	13.48	0.1847	34	0.0054
TCAQB111A	B	C1	2	1	10.42	13.14	14.16	0.1723	34	0.0051
TCAQB112A	B	C1	2	1	10.00	13.00	14.03	0.1724	34	0.0051
TCAQB113A	B	C1	2	1	10.50	13.07	14.14	0.1724	34	0.0051
TCAQB211A	B	C2	2	2	10.40	13.05	14.14	0.1708	34	0.0050
TCAQB212A	B	C2	2	2	10.30	13.03	14.13	0.1708	34	0.0050
TCAQB213A	B	C2	2	2	10.48	13.10	14.22	0.1708	34	0.0050
TCAQC111A	C	C1	3	1	10.42	13.14	14.21	0.1749	34	0.0051
TCAQC112A	C	C1	3	1	10.32	13.10	14.23	0.1747	34	0.0051
TCAQC113A	C	C1	3	1	10.42	13.19	14.27	0.1752	34	0.0052
TCAQC211A	C	C2	3	2	10.70	13.31	14.39	0.1746	34	0.0051
TCAQC212A	C	C2	3	2	10.30	13.16	14.25	0.1745	34	0.0051
TCAQC213A	C	C2	3	2	10.24	13.12	14.21	0.1744	34	0.0051

Note: Failure mode at failure is not reported because it is not applicable for offset strength.

Average	10.37	13.06	14.13	0.0052
Standard Dev.	0.2876	0.2774	0.3134	
Coeff. of Var. [%]	2.773	2.125	2.218	
Min.	9.861	12.51	13.48	0.0050
Max.	11.24	13.80	14.98	0.0055
Number of Spec.	19	19	19	19



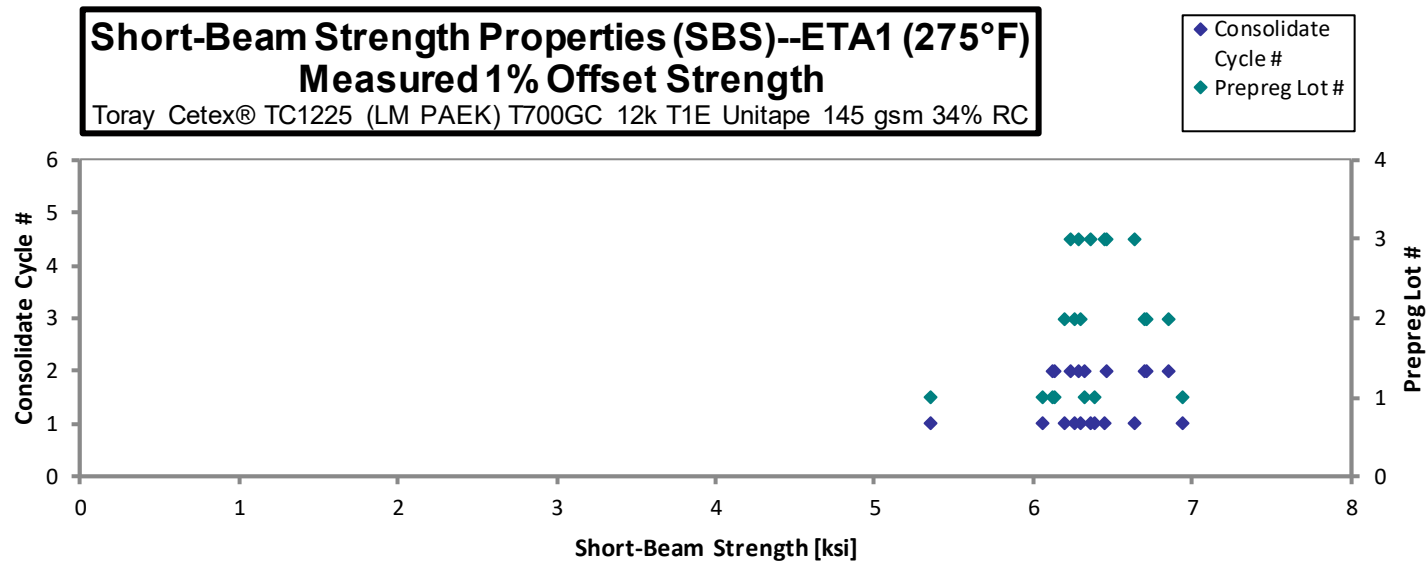
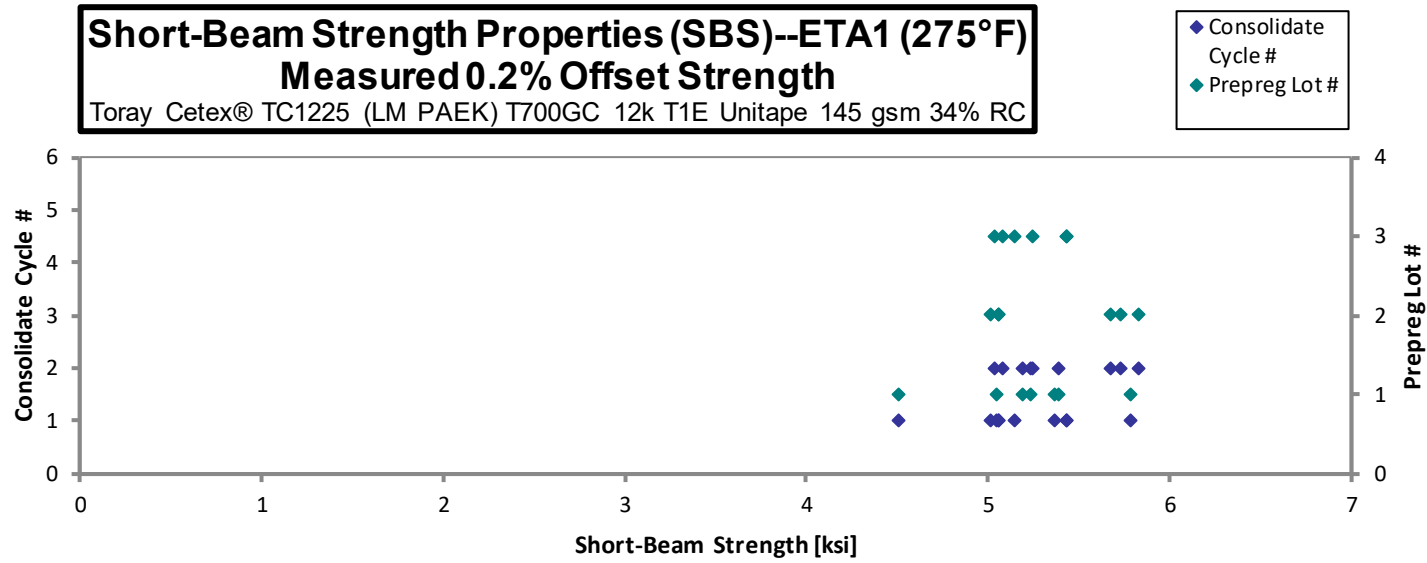


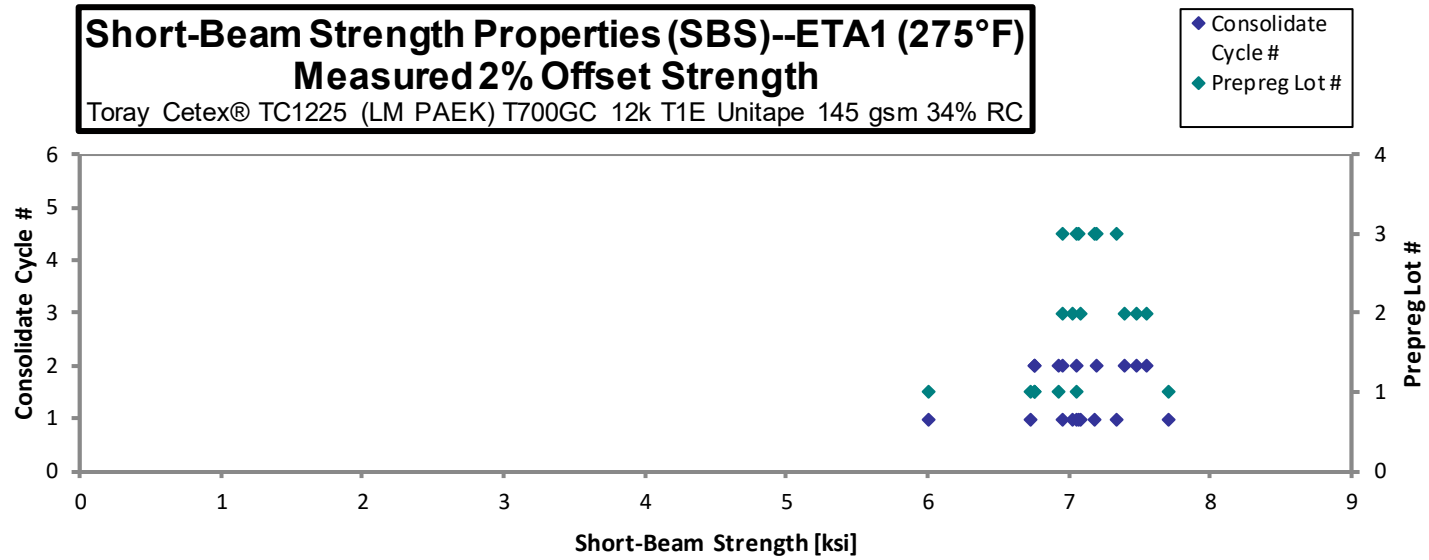
**Short-Beam Strength Properties (SBS)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	2% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCAQA111C	A	C1	1	1	5.789	6.938	7.703	0.1785	34	0.0053
TCAQA112C	A	C1	1	1	5.367	6.391	7.049	0.1778	34	0.0052
TCAQA113C	A	C1	1	1	4.512	5.352	6.002	0.1782	34	0.0052
TCAQA114C	A	C1	1	1	5.046	6.053	6.730	0.1783	34	0.0052
TCAQA211C	A	C2	1	2	5.387	6.319	6.928	0.1854	34	0.0055
TCAQA212C	A	C2	1	2	5.229	6.129	6.761	0.1850	34	0.0054
TCAQA213C	A	C2	1	2	5.195	6.118	6.754	0.1845	34	0.0054
TCAQB111C	B	C1	2	1	5.009	6.199	6.959	0.1727	34	0.0051
TCAQB112C	B	C1	2	1	5.060	6.257	7.079	0.1727	34	0.0051
TCAQB113C	B	C1	2	1	5.055	6.295	7.034	0.1729	34	0.0051
TCAQB211C	B	C2	2	2	5.826	6.847	7.548	0.1713	34	0.0050
TCAQB212C	B	C2	2	2	5.731	6.708	7.483	0.1711	34	0.0050
TCAQB213C	B	C2	2	2	5.671	6.702	7.400	0.1711	34	0.0050
TCAQC111C	C	C1	3	1	5.430	6.636	7.338	0.1750	34	0.0051
TCAQC112C	C	C1	3	1	5.438	6.450	7.183	0.1748	34	0.0051
TCAQC113C	C	C1	3	1	5.149	6.365	7.076	0.1747	34	0.0051
TCAQC211C	C	C2	3	2	5.040	6.237	6.958	0.1752	34	0.0052
TCAQC212C	C	C2	3	2	5.247	6.457	7.191	0.1751	34	0.0052
TCAQC213C	C	C2	3	2	5.083	6.290	7.055	0.1753	34	0.0052

Note: Failure mode at failure is not reported because it is not applicable for offset strength.

Average	5.277	6.355	7.065	0.0052
Standard Dev.	0.3266	0.3488	0.3731	
Coeff. of Var. [%]	6.190	5.489	5.282	
Min.	4.512	5.352	6.002	0.0050
Max.	5.826	6.938	7.703	0.0055
Number of Spec.	19	19	19	19



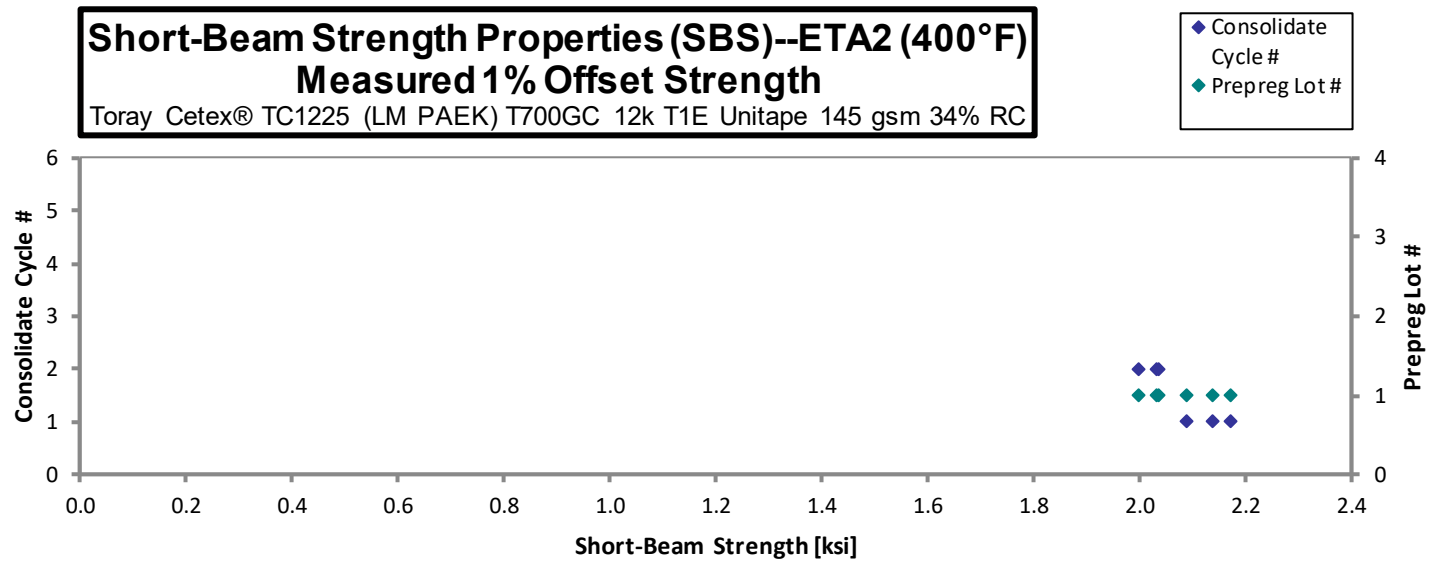
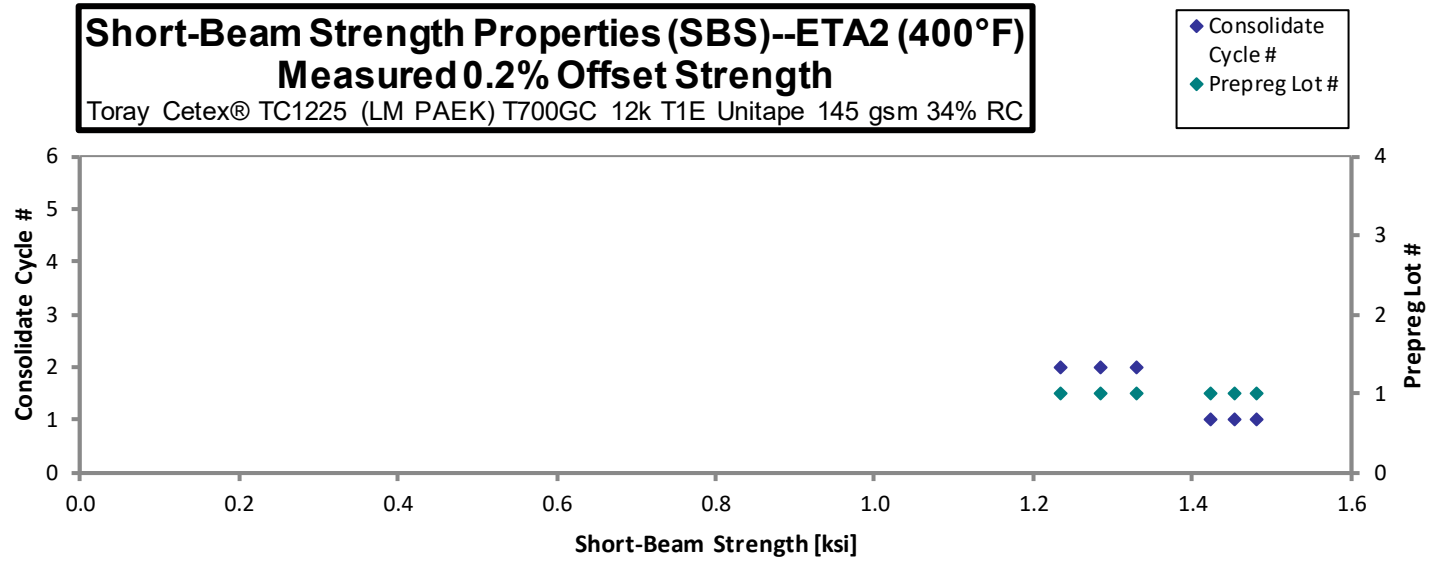


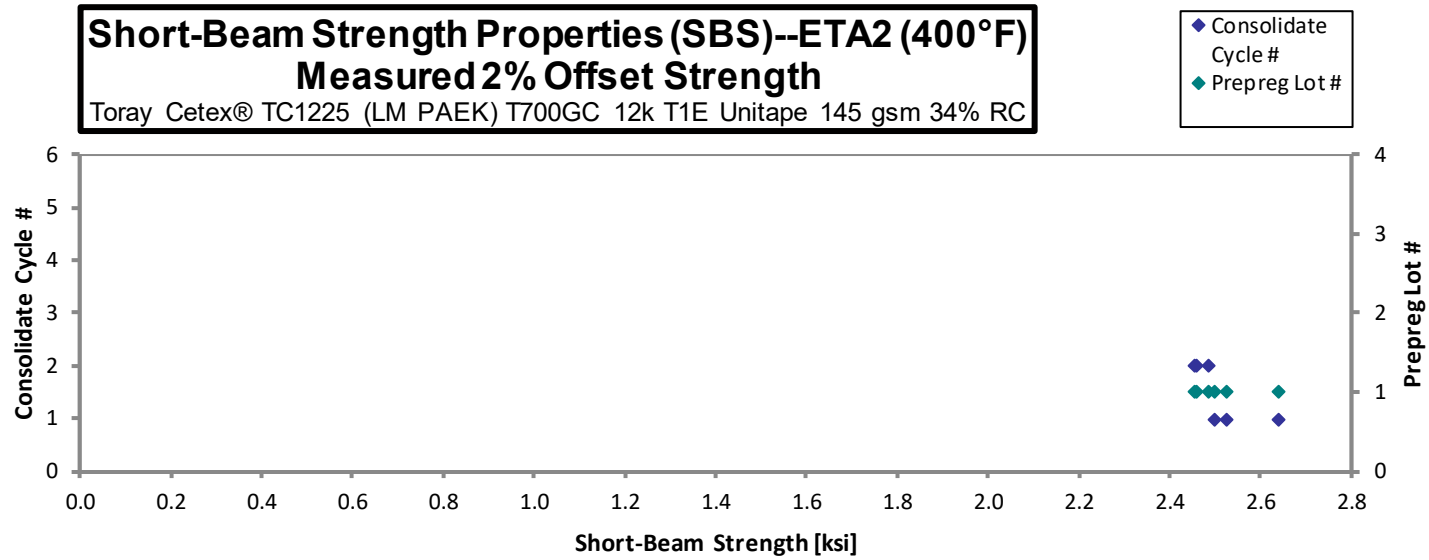
**Short-Beam Strength Properties (SBS)--ETA2 (400°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	2% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCAQA111D	A	C1	1	1	1.452	2.172	2.638	0.1794	34	0.0053
TCAQA112D	A	C1	1	1	1.424	2.087	2.500	0.1797	34	0.0053
TCAQA113D	A	C1	1	1	1.480	2.140	2.527	0.1800	34	0.0053
TCAQA211D	A	C2	1	2	1.330	2.031	2.458	0.1842	34	0.0054
TCAQA212D	A	C2	1	2	1.284	2.038	2.486	0.1844	34	0.0054
TCAQA213D	A	C2	1	2	1.235	1.997	2.455	0.1844	34	0.0054

Note: Failure mode at failure is not reported because it is not applicable for offset strength.

Average	1.367	2.078	2.511	0.0054
Standard Dev.	0.09911	0.06806	0.06788	
Coeff. of Var. [%]	7.248	3.276	2.703	
Min.	1.235	1.997	2.455	0.0053
Max.	1.480	2.172	2.638	0.0054
Number of Spec.	6	6	6	6



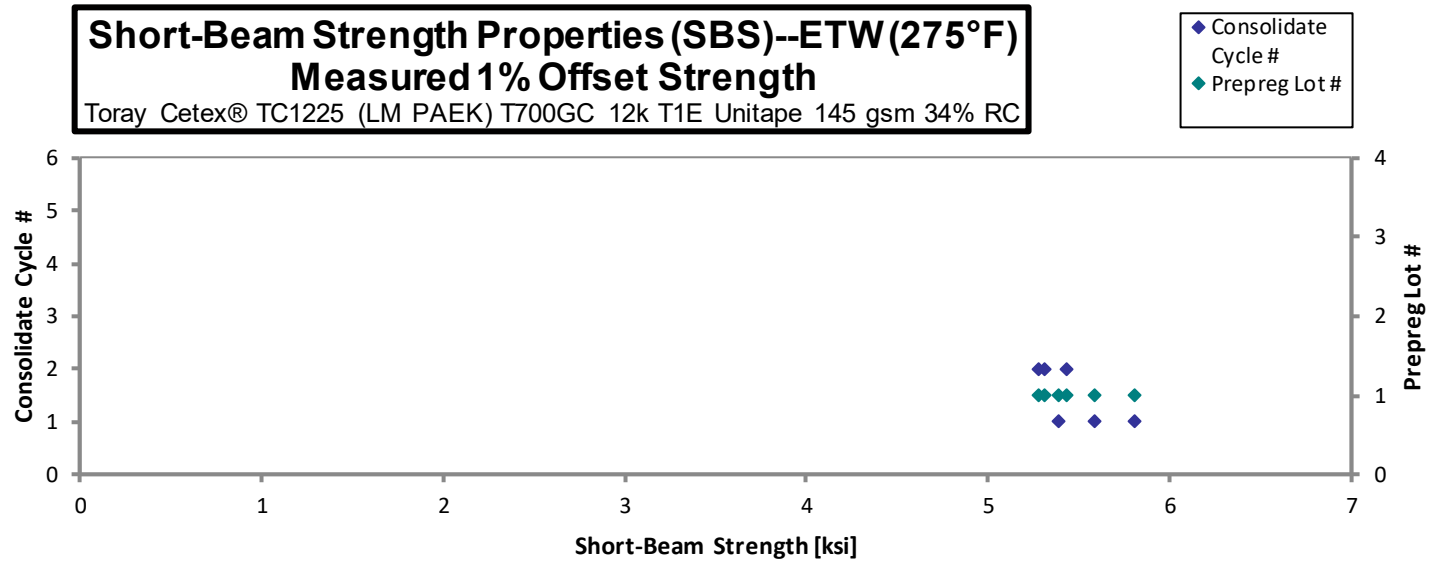
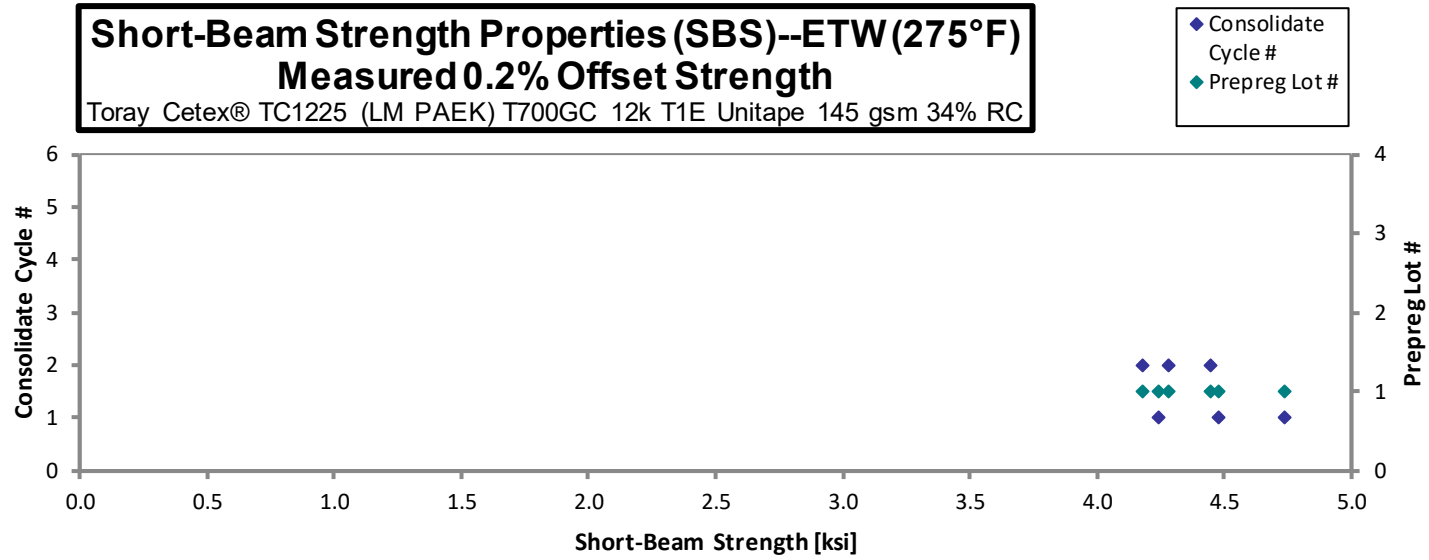


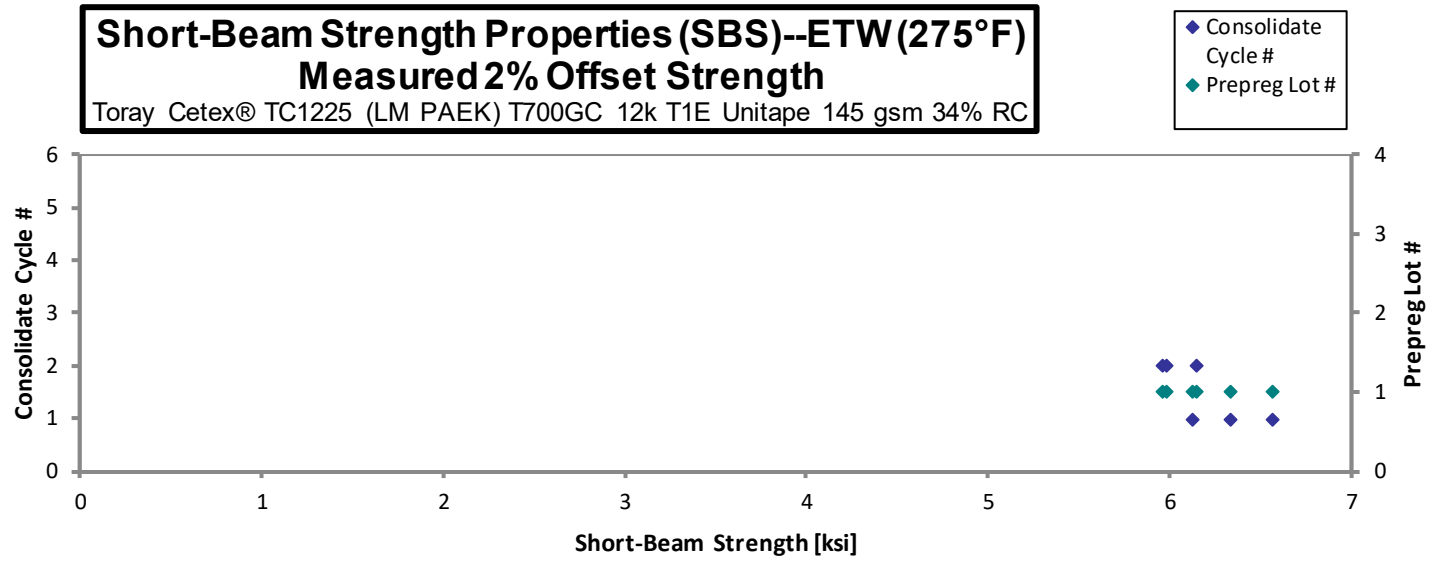
Short-Beam Strength Properties (SBS)--ETW (275°F) Strength Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	2% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCAQA111E	A	C1	1	1	4.736	5.812	6.561	0.1777	34	0.0052
TCAQA112E	A	C1	1	1	4.480	5.592	6.333	0.1780	34	0.0052
TCAQA113E	A	C1	1	1	4.242	5.393	6.130	0.1793	34	0.0053
TCAQA211E	A	C2	1	2	4.445	5.431	6.144	0.1850	34	0.0054
TCAQA212E	A	C2	1	2	4.281	5.316	5.979	0.1847	34	0.0054
TCAQA213E	A	C2	1	2	4.182	5.277	5.963	0.1848	34	0.0054

Note: Failure mode at failure is not reported because it is not applicable for offset strength.

Average	4.394	5.470	6.185	0.0053
Standard Dev.	0.2039	0.2002	0.2281	
Coeff. of Var. [%]	4.640	3.661	3.688	
Min.	4.182	5.277	5.963	0.0052
Max.	4.736	5.812	6.561	0.0054
Number of Spec.	6	6	6	6





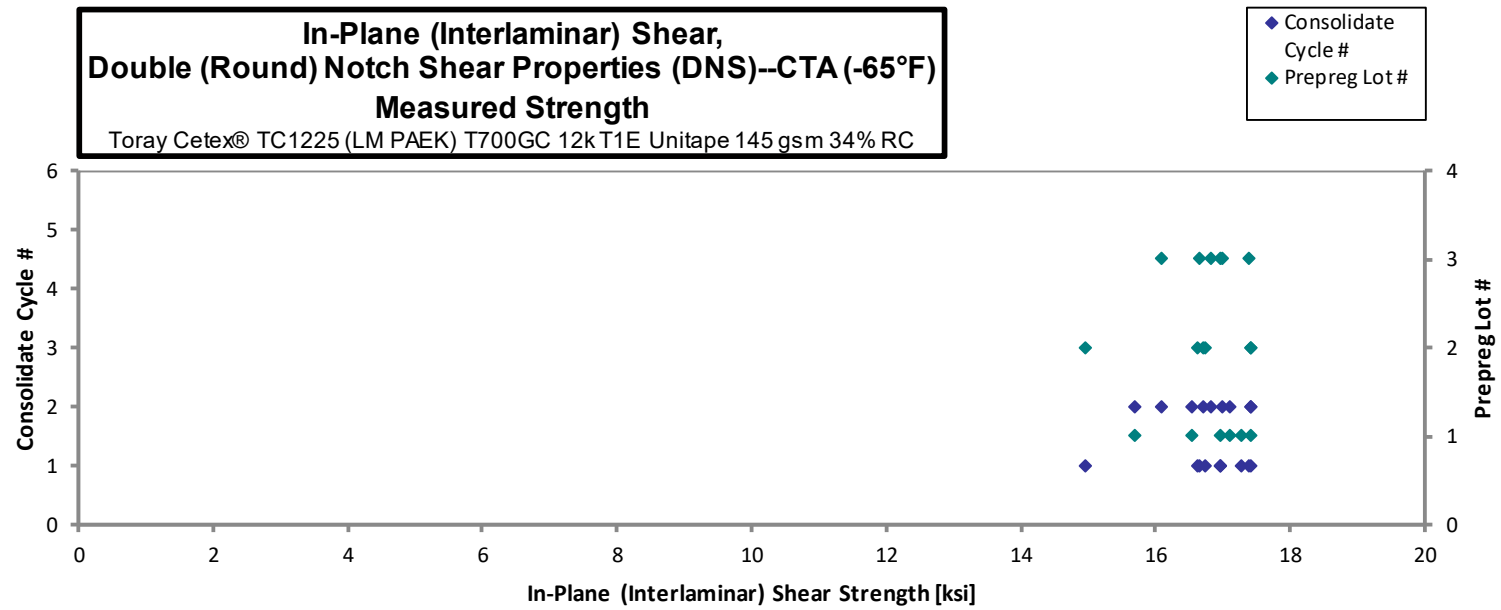
4.10 In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS)

**In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS)--CTA (-65°F)
Strength**

Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAVA111B	A	C1	1	1	17.43	0.1818	34	0.0053	GAGE SECTION SHEAR
TCAVA112B	A	C1	1	1	16.97	0.1817	34	0.0053	GAGE SECTION SHEAR
TCAVA113B	A	C1	1	1	17.28	0.1820	34	0.0054	GAGE SECTION SHEAR
TCAVA211B	A	C2	1	2	17.12	0.1828	34	0.0054	GAGE SECTION SHEAR
TCAVA212B	A	C2	1	2	16.56	0.1824	34	0.0054	GAGE SECTION SHEAR
TCAVA213B	A	C2	1	2	15.70	0.1819	34	0.0053	GAGE SECTION SHEAR
TCAVB111B	B	C1	2	1	16.62	0.1719	34	0.0051	GAGE SECTION SHEAR
TCAVB112B	B	C1	2	1	16.74	0.1720	34	0.0051	GAGE SECTION SHEAR
TCAVB113B	B	C1	2	1	14.97	0.1720	34	0.0051	GAGE SECTION SHEAR
TCAVB211B	B	C2	2	2	16.72	0.1724	34	0.0051	GAGE SECTION SHEAR
TCAVB212B	B	C2	2	2	17.42	0.1729	34	0.0051	GAGE SECTION SHEAR
TCAVB213B	B	C2	2	2	17.41	0.1727	34	0.0051	GAGE SECTION SHEAR
TCAVC111B	C	C1	3	1	16.96	0.1728	34	0.0051	GAGE SECTION SHEAR
TCAVC112B	C	C1	3	1	16.66	0.1726	34	0.0051	GAGE SECTION SHEAR
TCAVC113B	C	C1	3	1	17.40	0.1724	34	0.0051	GAGE SECTION SHEAR
TCAVC211B	C	C2	3	2	16.83	0.1727	34	0.0051	GAGE SECTION SHEAR
TCAVC212B	C	C2	3	2	16.09	0.1723	34	0.0051	GAGE SECTION SHEAR
TCAVC213B	C	C2	3	2	16.98	0.1719	34	0.0051	GAGE SECTION SHEAR

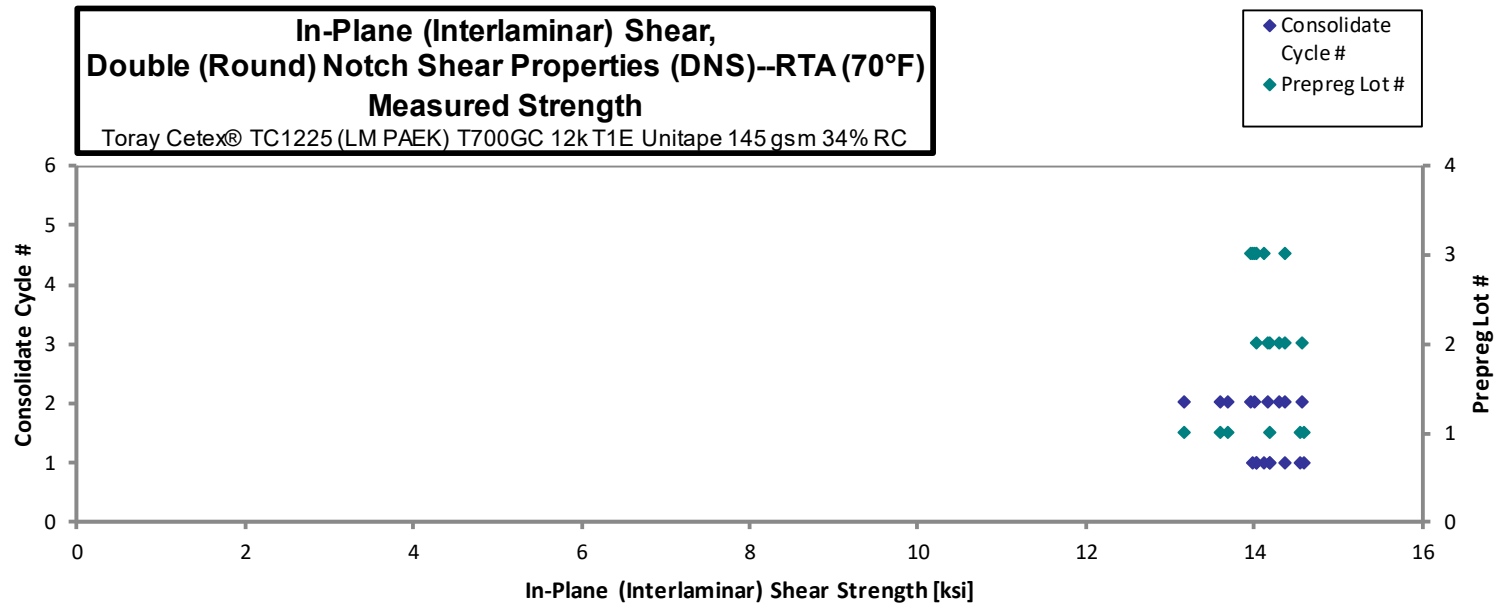
Average	16.77	0.0052
Standard Dev.	0.6460	
Coeff. of Var. [%]	3.852	
Min.	14.97	0.0051
Max.	17.43	0.0054
Number of Spec.	18	18



**In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAVA111A	A	C1	1	1	14.54	0.1802	34	0.0053	GAGE SECTION SHEAR
TCAVA112A	A	C1	1	1	14.60	0.1801	34	0.0053	GAGE SECTION SHEAR
TCAVA113A	A	C1	1	1	14.18	0.1804	34	0.0053	GAGE SECTION SHEAR
TCAVA211A	A	C2	1	2	13.16	0.1839	34	0.0054	GAGE SECTION SHEAR
TCAVA212A	A	C2	1	2	13.60	0.1837	34	0.0054	GAGE SECTION SHEAR
TCAVA213A	A	C2	1	2	13.68	0.1830	34	0.0054	GAGE SECTION SHEAR
TCAVB111A	B	C1	2	1	14.37	0.1724	34	0.0051	GAGE SECTION SHEAR
TCAVB112A	B	C1	2	1	14.03	0.1722	34	0.0051	GAGE SECTION SHEAR
TCAVB113A	B	C1	2	1	14.19	0.1723	34	0.0051	GAGE SECTION SHEAR
TCAVB211A	B	C2	2	2	14.30	0.1721	34	0.0051	GAGE SECTION SHEAR
TCAVB212A	B	C2	2	2	14.56	0.1724	34	0.0051	GAGE SECTION SHEAR
TCAVB213A	B	C2	2	2	14.16	0.1719	34	0.0051	GAGE SECTION SHEAR
TCAVC111A	C	C1	3	1	14.12	0.1750	34	0.0051	GAGE SECTION SHEAR
TCAVC112A	C	C1	3	1	13.98	0.1744	34	0.0051	GAGE SECTION SHEAR
TCAVC113A	C	C1	3	1	14.03	0.1742	34	0.0051	GAGE SECTION SHEAR
TCAVC211A	C	C2	3	2	14.37	0.1730	34	0.0051	GAGE SECTION SHEAR
TCAVC212A	C	C2	3	2	13.96	0.1729	34	0.0051	GAGE SECTION SHEAR
TCAVC213A	C	C2	3	2	14.01	0.1722	34	0.0051	GAGE SECTION SHEAR

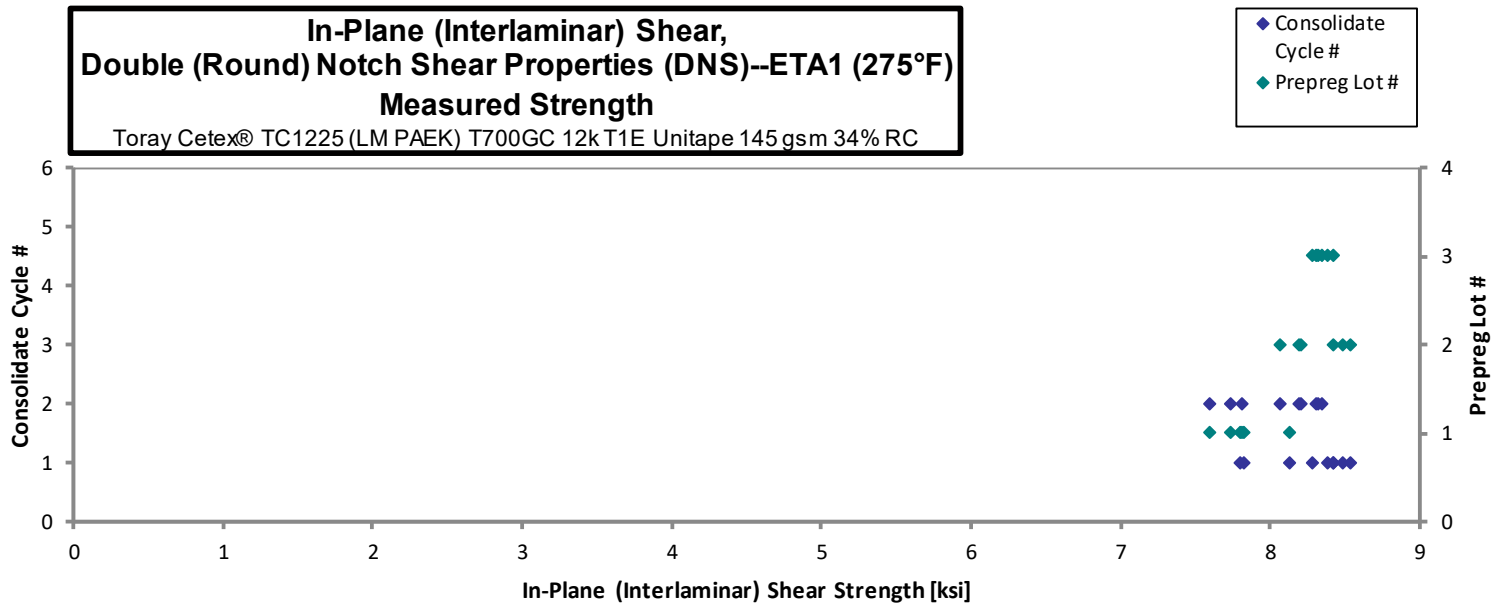
Average	14.10	0.0052
Standard Dev.	0.3611	
Coeff. of Var. [%]	2.561	
Min.	13.16	0.0051
Max.	14.60	0.0054
Number of Spec.	18	18



**In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAVA111C	A	C1	1	1	7.801	0.1812	34	0.0053	GAGE SECTION SHEAR
TCAVA112C	A	C1	1	1	7.821	0.1817	34	0.0053	GAGE SECTION SHEAR
TCAVA113C	A	C1	1	1	8.137	0.1817	34	0.0053	GAGE SECTION SHEAR
TCAVA211C	A	C2	1	2	7.739	0.1846	34	0.0054	GAGE SECTION SHEAR
TCAVA212C	A	C2	1	2	7.819	0.1842	34	0.0054	GAGE SECTION SHEAR
TCAVA213C	A	C2	1	2	7.597	0.1839	34	0.0054	GAGE SECTION SHEAR
TCAVB111C	B	C1	2	1	8.485	0.1707	34	0.0050	GAGE SECTION SHEAR
TCAVB112C	B	C1	2	1	8.424	0.1705	34	0.0050	GAGE SECTION SHEAR
TCAVB113C	B	C1	2	1	8.541	0.1699	34	0.0050	GAGE SECTION SHEAR
TCAVB211C	B	C2	2	2	8.073	0.1722	34	0.0051	GAGE SECTION SHEAR
TCAVB212C	B	C2	2	2	8.205	0.1721	34	0.0051	GAGE SECTION SHEAR
TCAVB213C	B	C2	2	2	8.189	0.1722	34	0.0051	GAGE SECTION SHEAR
TCAVC111C	C	C1	3	1	8.417	0.1717	34	0.0051	GAGE SECTION SHEAR
TCAVC112C	C	C1	3	1	8.382	0.1716	34	0.0050	GAGE SECTION SHEAR
TCAVC113C	C	C1	3	1	8.288	0.1717	34	0.0051	GAGE SECTION SHEAR
TCAVC211C	C	C2	3	2	8.304	0.1708	34	0.0050	GAGE SECTION SHEAR
TCAVC212C	C	C2	3	2	8.352	0.1702	34	0.0050	GAGE SECTION SHEAR
TCAVC213C	C	C2	3	2	8.325	0.1703	34	0.0050	GAGE SECTION SHEAR

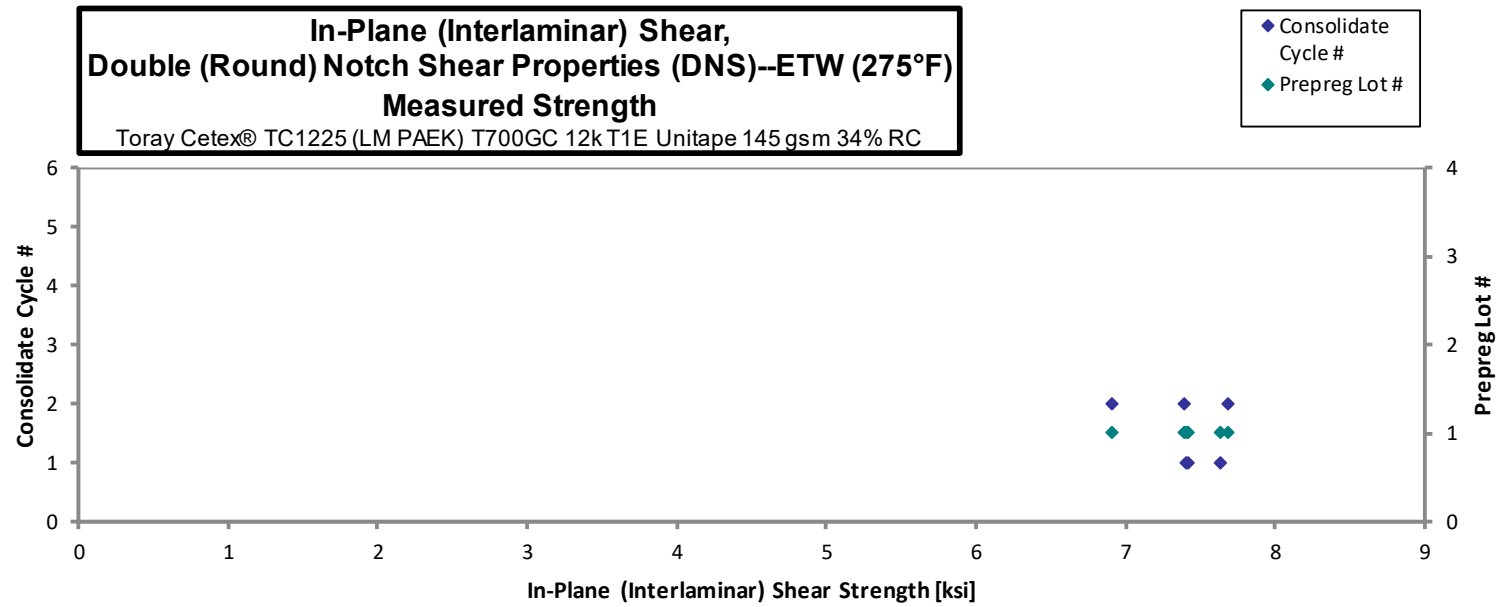
Average	8.161	0.0051
Standard Dev.	0.2873	
Coeff. of Var. [%]	3.520	
Min.	7.597	0.0050
Max.	8.541	0.0054
Number of Spec.	18	18



**In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCAVA111E	A	C1	1	1	7.416	0.1810	34	0.0053	GAGE SECTION SHEAR
TCAVA112E	A	C1	1	1	7.402	0.1810	34	0.0053	GAGE SECTION SHEAR
TCAVA113E	A	C1	1	1	7.635	0.1820	34	0.0054	GAGE SECTION SHEAR
TCAVA211E	A	C2	1	2	6.904	0.1840	34	0.0054	GAGE SECTION SHEAR
TCAVA212E	A	C2	1	2	7.389	0.1830	34	0.0054	GAGE SECTION SHEAR
TCAVA213E	A	C2	1	2	7.689	0.1830	34	0.0054	GAGE SECTION SHEAR

Average	7.406	0.0054
Standard Dev.	0.2775	
Coeff. of Var. [%]	3.747	
Min.	6.904	0.0053
Max.	7.689	0.0054
Number of Spec.	6	6



4.11 “25/50/25” Unnotched Tension 1 Properties (UNT1)

Laminate Unnotched Tension Properties (UNT1)--CTA (-65°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

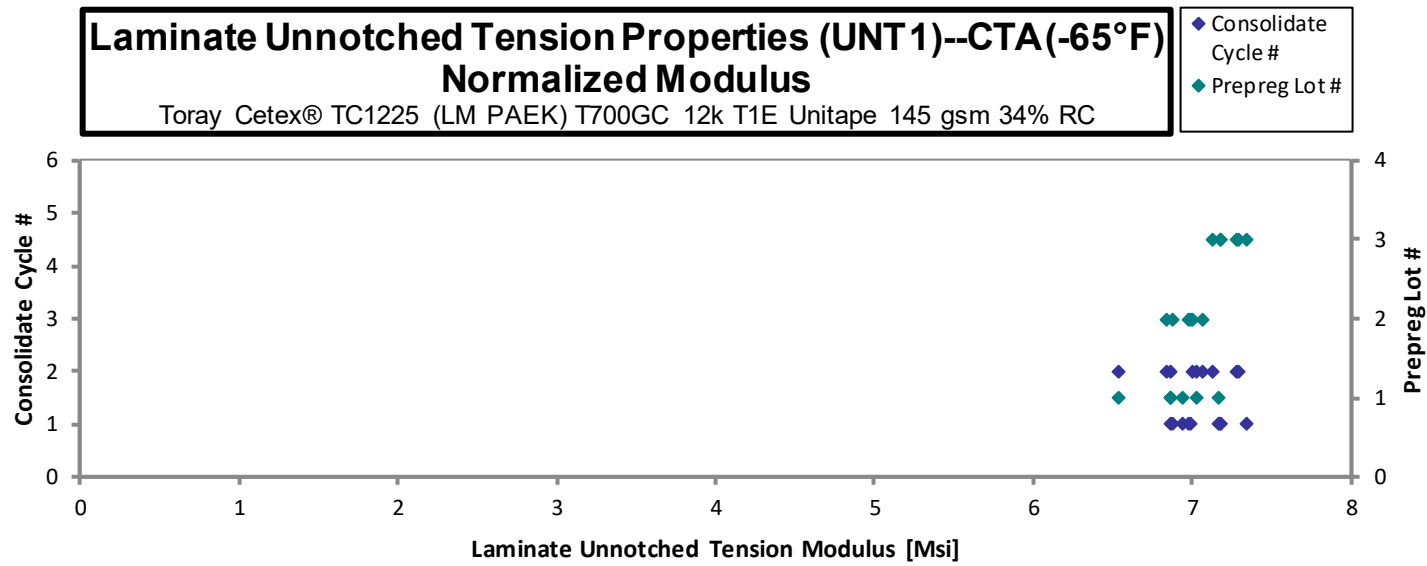
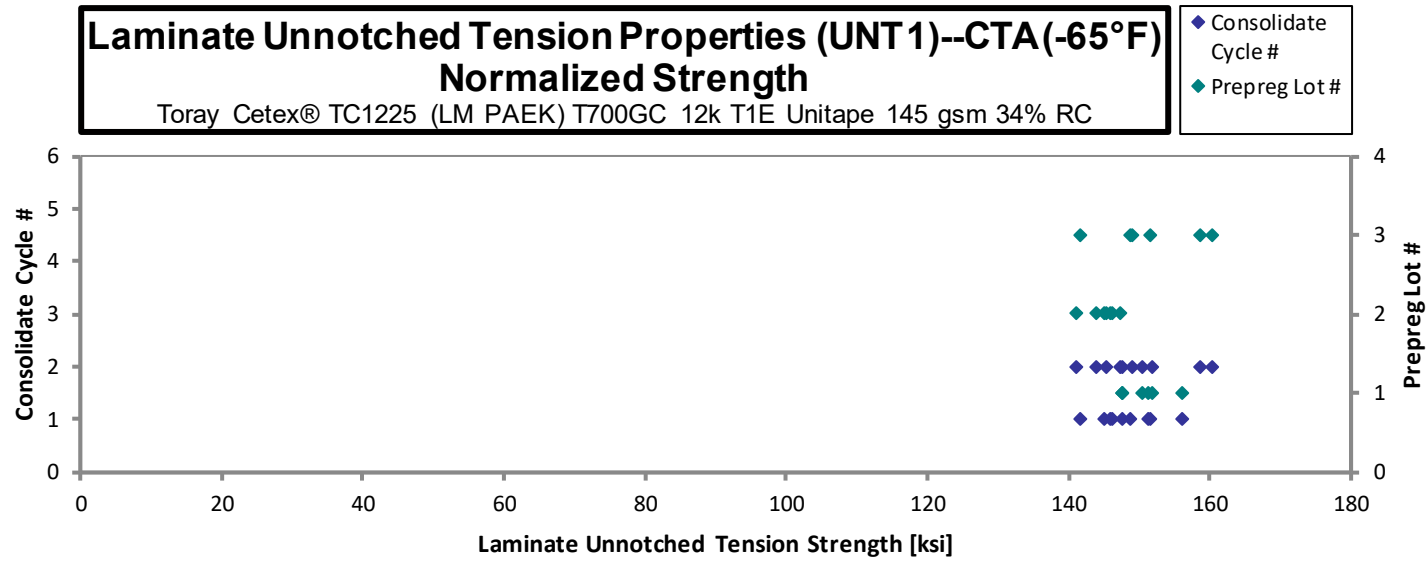
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAA111B	A	C1	1	1	155.8	7.065	0.08390	16	AWB, LWT
TCAA112B	A	C1	1	1	153.0	7.192	0.08332	16	DGM, AGB
TCAA113B	A	C1	1	1	160.7	7.372	0.08398	16	AGT, LWB
TCAA211B	A	C2	1	2	156.2	6.727	0.08398	16	AGB, LWT
TCAA212B	A	C2	1	2	150.9	7.028	0.08445	16	AGB
TCAA213B	A	C2	1	2	153.8	7.190	0.08447	16	M(A,D)WT, LWB
TCAAB111B	B	C1	2	1	147.1	6.919	0.08583	16	LWT, LWB
TCAAB112B	B	C1	2	1	147.6	7.098	0.08493	16	M(A,L)GT
TCAAB113B	B	C1	2	1	147.9	7.078	0.08530	16	AGT
TCAAB211B*	B	C2	2	2	144.9	6.840	0.08408	16	AWB, LWT
TCAAB212B	B	C2	2	2	147.5	7.237	0.08435	16	AGT
TCAAB213B	B	C2	2	2	148.0	6.969	0.08480	16	LWT, AWB
TCAAB214B	B	C2	2	2	149.7	7.126	0.08495	16	AGM
TCAAC111B	C	C1	3	1	148.8	7.539	0.08227	16	M(A,D,L)GM
TCAAC112B	C	C1	3	1	159.8	7.568	0.08198	16	M(A,D,L)GM
TCAAC113B	C	C1	3	1	156.7	7.741	0.08193	16	M(A,D)GB, LWT
TCAAC211B	C	C2	3	2	168.4	7.718	0.08147	16	M(A,D)GT, LWB
TCAAC212B	C	C2	3	2	169.9	7.717	0.08157	16	M(A,D)GT, LWB
TCAAC213B	C	C2	3	2	158.3	7.568	0.08132	16	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0052	151.3	6.861
0.0052	147.5	6.936
0.0052	156.2	7.166
0.0052	151.9	6.539
0.0053	147.5	6.869
0.0053	150.4	7.029
0.0054	146.1	6.874
0.0053	145.1	6.977
0.0053	146.0	6.987
0.0053	141.0	6.840
0.0053	144.0	7.066
0.0053	145.2	6.840
0.0053	147.2	7.007
0.0051	141.6	7.179
0.0051	151.6	7.181
0.0051	148.6	7.341
0.0051	158.8	7.278
0.0051	160.4	7.285
0.0051	149.0	7.123

*Specimen was not gaged, only strength is tested.

Average	153.9	7.270
Standard Dev.	7.133	0.3061
Coeff. of Var. [%]	4.634	4.211
Min.	144.9	6.727
Max.	169.9	7.741
Number of Spec.	19	18

Average _{norm}	0.0052	148.9	7.030
Standard Dev. _{norm}		5.252	0.1980
Coeff. of Var. [%] _{norm}		3.527	2.816
Min.	0.0051	141.0	6.539
Max.	0.0054	160.4	7.341
Number of Spec.	19	19	18



Laminate Unnotched Tension Properties (UNT1)--RTA (70°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

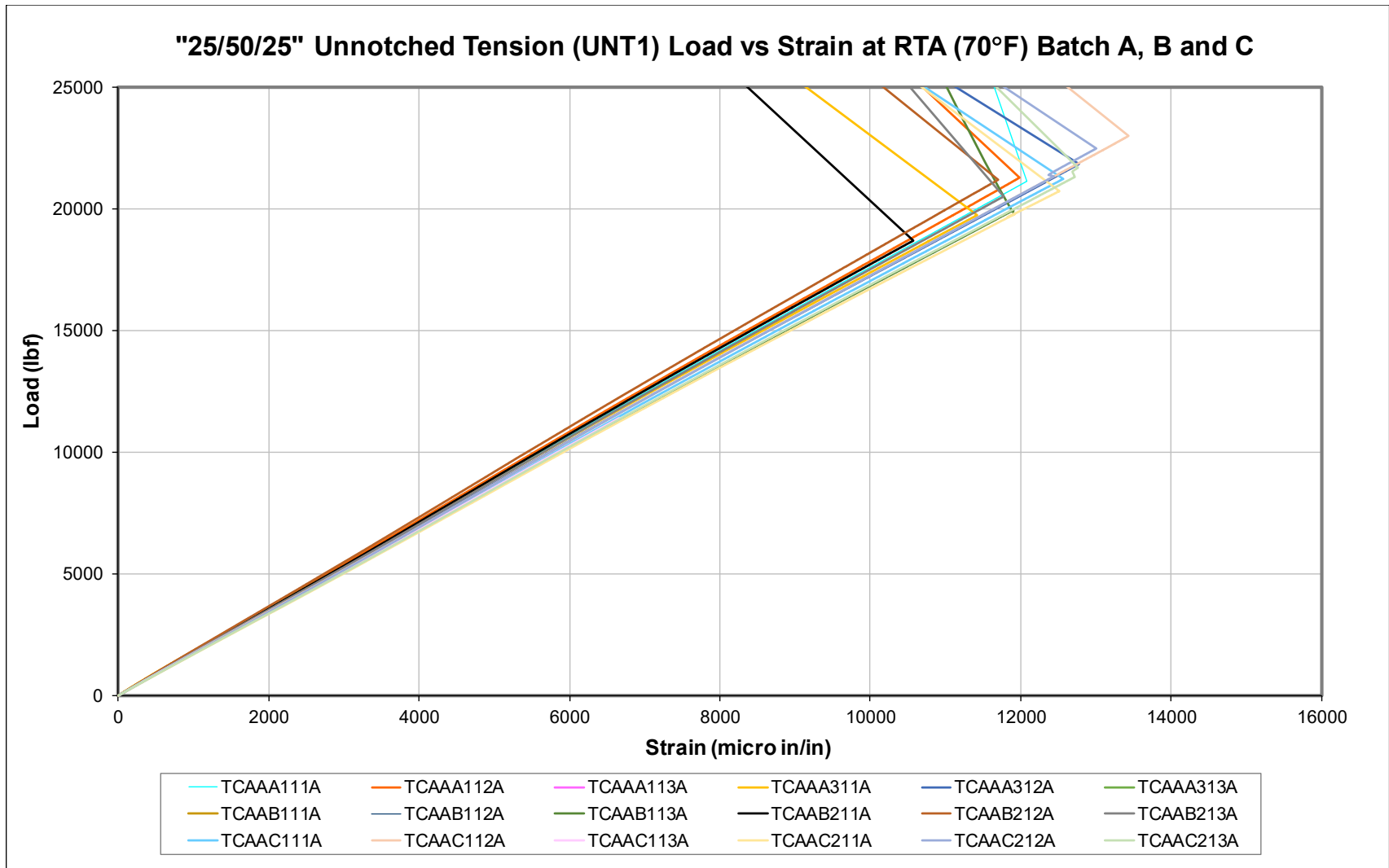
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAAA111A	A	C1	1	1	145.0	6.820	0.08297	16	M(A,D,L)GB, LWT
TCAAA112A	A	C1	1	1	143.7	6.683	0.08312	16	M(A,D,L)GB, LWT
TCAAA113A	A	C1	1	1	145.3	6.849	0.08332	16	M(A,D)GB, LWT
TCAA311A	A	C3	1	3	138.2	6.864	0.08240	16	LWT, LWB
TCAA312A	A	C3	1	3	153.7	6.957	0.08278	16	AGB
TCAA313A	A	C3	1	3	143.5	6.890	0.08243	16	AGM
TCAAB111A	B	C1	2	1	142.6	6.721	0.08412	16	AGM
TCAAB112A	B	C1	2	1	141.8	6.790	0.08502	16	AGM
TCAAB113A	B	C1	2	1	139.6	6.988	0.08497	16	AGT, LWB
TCAAB211A	B	C2	2	2	125.8	6.697	0.08372	16	M(A,D)GM
TCAAB212A	B	C2	2	2	141.2	6.638	0.08250	16	LWB, AWT
TCAAB213A	B	C2	2	2	139.9	6.797	0.08382	16	LWB, AWT
TCAAC111A	C	C1	3	1	152.8	7.167	0.08193	16	M(A,D,L)GM
TCAAC112A	C	C1	3	1	164.5	7.110	0.08135	16	AWT, M(A,L)WB
TCAAC113A	C	C1	3	1	164.3	7.237	0.08143	16	LWB, M(A,L)WT
TCAAC211A	C	C2	3	2	153.8	7.372	0.08107	16	LWT, M(A,L)WB
TCAAC212A	C	C2	3	2	160.9	7.220	0.08052	16	LWT, AGB
TCAAC213A	C	C2	3	2	157.9	7.379	0.08057	16	M(A,D)GM

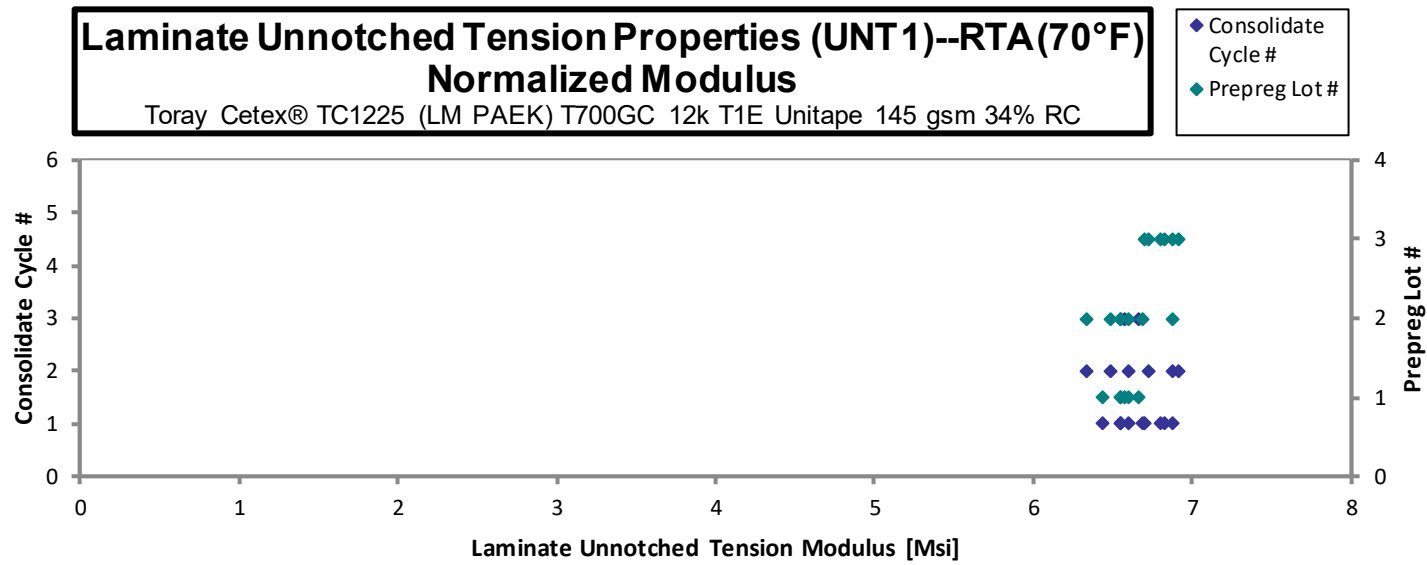
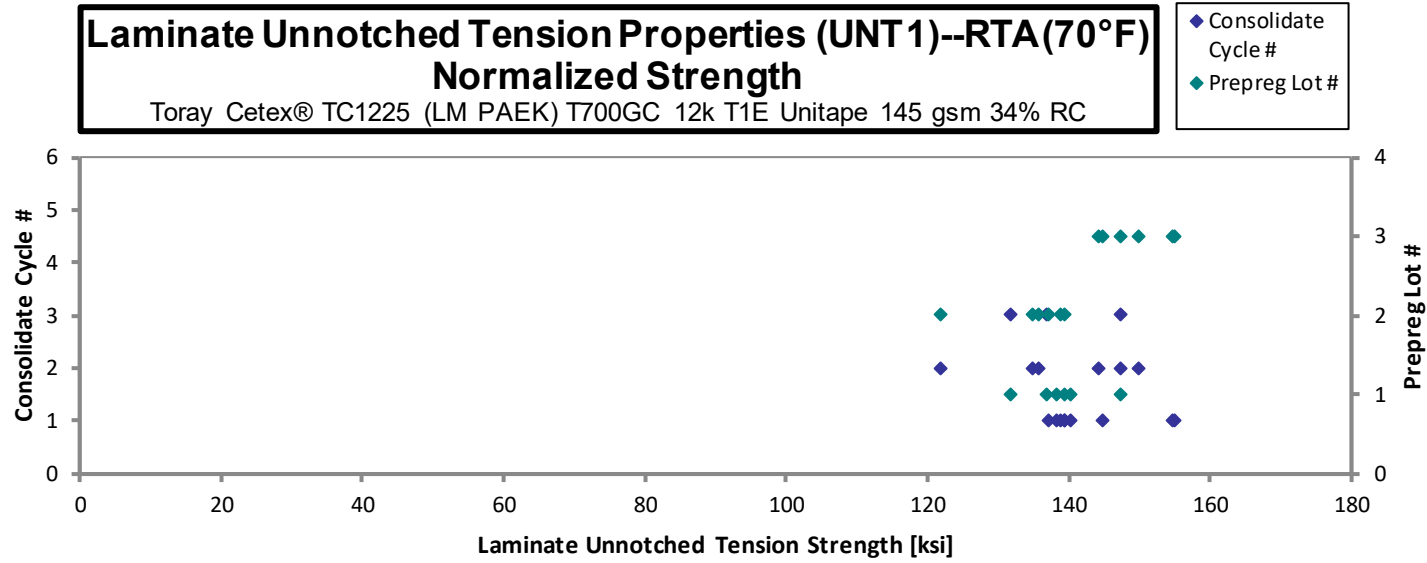
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0052	139.3	6.549
0.0052	138.2	6.429
0.0052	140.2	6.605
0.0052	131.8	6.547
0.0052	147.3	6.666
0.0052	136.9	6.574
0.0053	138.8	6.543
0.0053	139.5	6.681
0.0053	137.3	6.872
0.0052	121.9	6.489
0.0052	134.9	6.338
0.0052	135.7	6.594
0.0051	144.9	6.797
0.0051	154.9	6.695
0.0051	154.8	6.821
0.0051	144.3	6.917
0.0050	149.9	6.729
0.0050	147.2	6.881

TCAAB211A: Strength is lower compared to other specimens. Investigated and no probable cause to omit data.

Average 147.5 6.955
 Standard Dev. 10.24 0.2381
 Coeff. of Var. [%] 6.943 3.423
 Min. 125.8 6.638
 Max. 164.5 7.379
 Number of Spec. 18 18

Average_{norm} 0.0052 141.0 6.651
 Standard Dev._{norm} 8.172 0.1625
 Coeff. of Var. [%]_{norm} 5.796 2.443
 Min. 0.0050 121.9 6.338
 Max. 0.0053 154.9 6.917
 Number of Spec. 18 18 18





Laminate Unnotched Tension Properties (UNT1)--ETA1 (275°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12K T1E Unitape 145 gsm 34% RC

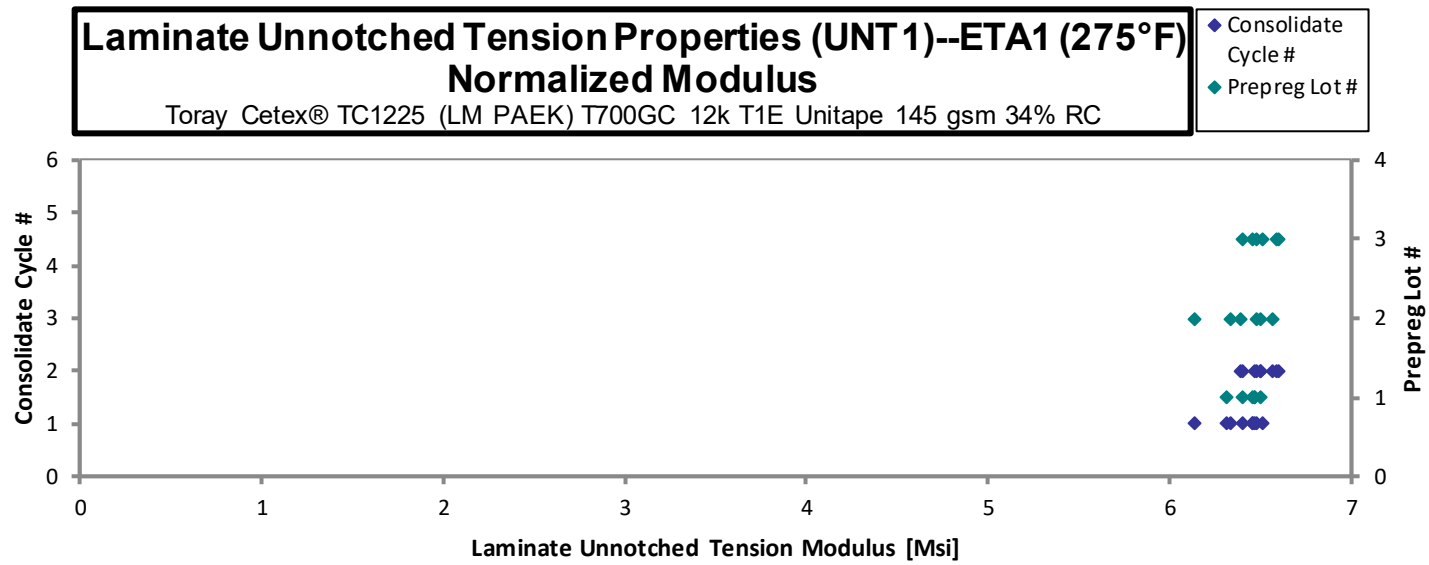
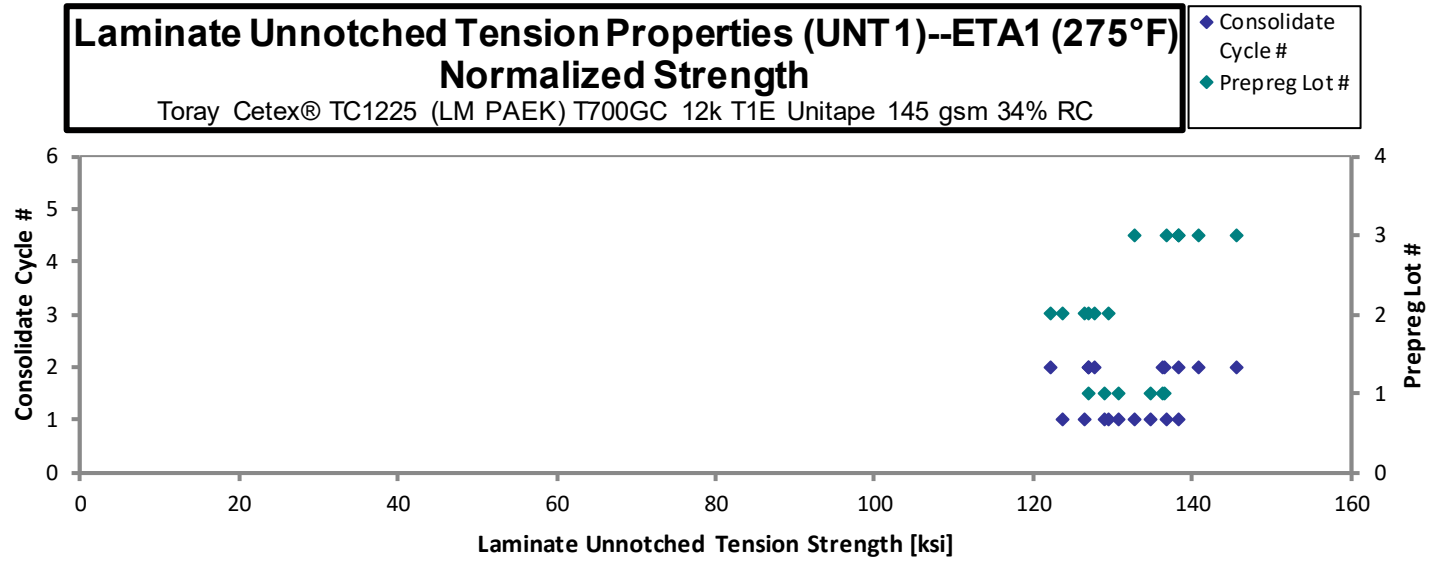
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 t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAAA111C	A	C1	1	1	134.4	6.642	0.08408	16	M(A,L)GT, LWB
TCAAA112C	A	C1	1	1	137.8	6.600	0.08450	16	M(A,L)WB, LWT
TCAAA113C	A	C1	1	1	132.5	6.490	0.08408	16	M(A,L)WB, LWT
TCAA211C	A	C2	1	2	139.5	6.554	0.08440	16	M(A,L)GM, LWB, LWT
TCAA212C	A	C2	1	2	140.3	6.648	0.08410	16	M(A,L)GM
TCAA213C	A	C2	1	2	130.5	6.674	0.08413	16	M(A,L)GM
TCAAB111C	B	C1	2	1	128.4	6.576	0.08510	16	M(A,L)GB, LWT
TCAAB112C	B	C1	2	1	130.9	6.411	0.08537	16	M(A,L)GM, LWT
TCAAB113C	B	C1	2	1	124.9	6.201	0.08558	16	M(A,L)GT, LWB
TCAAB211C	B	C2	2	2	129.6	6.660	0.08512	16	M(A,L)GB, LWT
TCAAB212C	B	C2	2	2	128.9	6.611	0.08502	16	M(A,L)GB, LWT
TCAAB213C	B	C2	2	2	123.6	6.478	0.08528	16	M(A,L)GB, LWT
TCAAC111C	C	C1	3	1	147.5	6.947	0.08095	16	M(A,D,L)GM, LWT
TCAAC112C	C	C1	3	1	145.9	6.830	0.08098	16	LWT, M(A,L)WB
TCAAC113C	C	C1	3	1	141.7	6.893	0.08088	16	M(A,L)WB, LWT
TCAAC211C	C	C2	3	2	149.7	7.013	0.08120	16	M(A,L)GB, LWT
TCAAC212C	C	C2	3	2	147.1	6.896	0.08123	16	M(A,L)GM
TCAAC213C	C	C2	3	2	154.8	7.010	0.08128	16	LWT, M(A,L)GB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0053	130.8	6.464
0.0053	134.8	6.455
0.0053	129.0	6.316
0.0053	136.2	6.402
0.0053	136.5	6.471
0.0053	127.1	6.498
0.0053	126.4	6.477
0.0053	129.3	6.334
0.0053	123.7	6.142
0.0053	127.7	6.561
0.0053	126.8	6.505
0.0053	122.0	6.394
0.0051	138.2	6.509
0.0051	136.8	6.402
0.0051	132.7	6.453
0.0051	140.7	6.591
0.0051	138.3	6.483
0.0051	145.7	6.595

Average 137.1 6.674
 Standard Dev. 9.198 0.2203
 Coeff. of Var. [%] 6.708 3.301
 Min. 123.6 6.201
 Max. 154.8 7.013
 Number of Spec. 18 18

Average_{norm} 0.0052 132.4 6.447
 Standard Dev_{norm} 6.392 0.1081
 Coeff. of Var. [%]_{norm} 4.828 1.676
 Min. 0.0051 122.0 6.142
 Max. 0.0053 145.7 6.595
 Number of Spec. 18 18 18



Laminate Unnotched Tension Properties (UNT1)--ETA2 (400°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

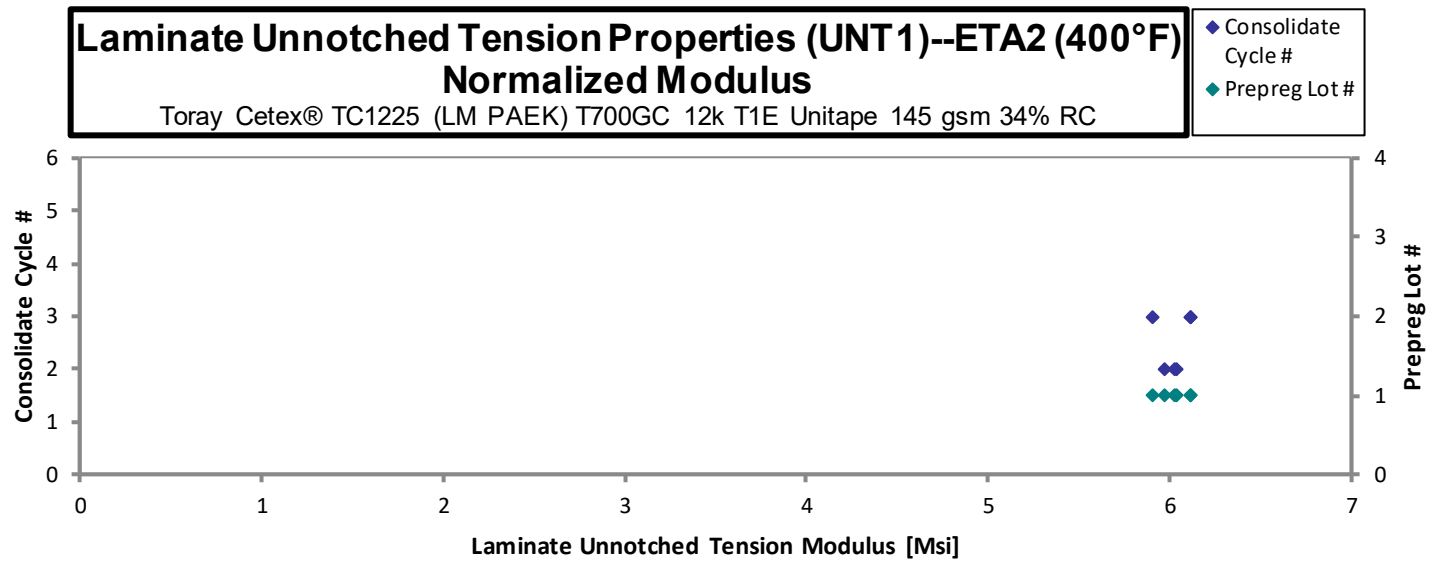
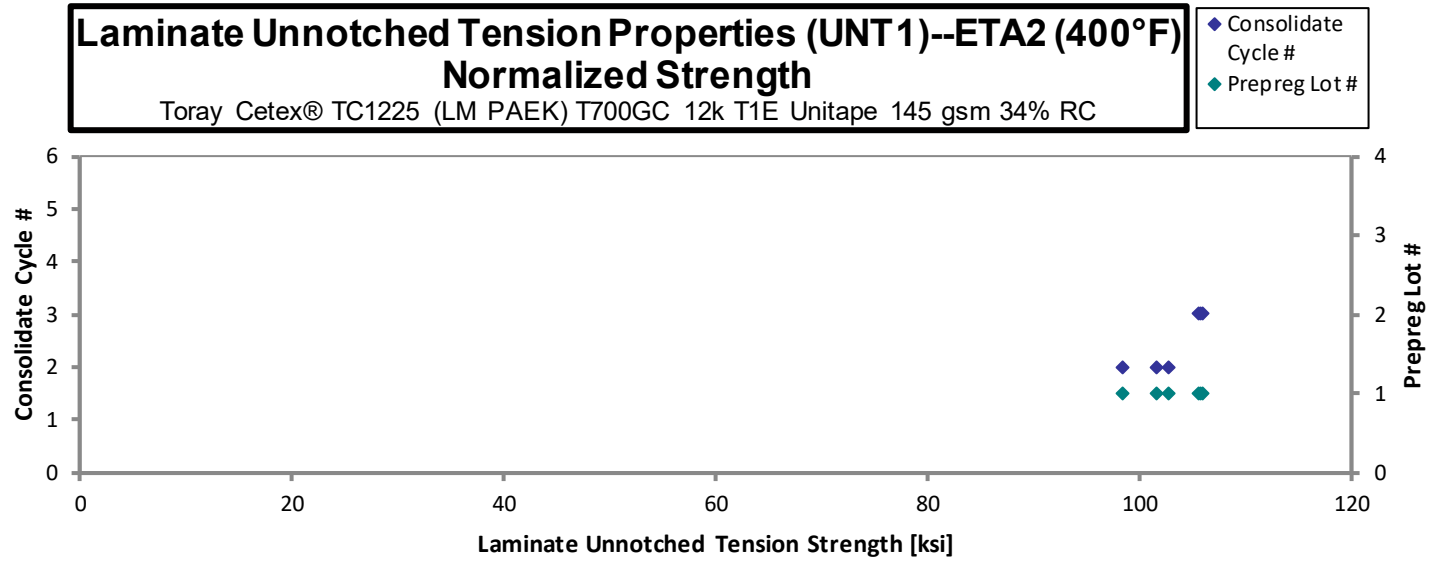
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAA212D	A	C2	1	2	101.0	6.185	0.08427	16	M(A,D)GM
TCAA213D	A	C2	1	2	105.5	6.125	0.08420	16	M(A,D)GM
TCAA214D	A	C2	1	2	104.9	6.231	0.08368	16	M(A,D)GM
TCAA311D	A	C3	1	3	110.6	6.375	0.08283	16	M(A,D)GM
TCAA312D	A	C3	1	3	110.6	6.399	0.08252	16	M(A,D)GM
TCAA313D	A	C3	1	3	111.2	6.212	0.08215	16	M(A,D)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0053	98.48	6.033
0.0053	102.8	5.969
0.0052	101.6	6.035
0.0052	106.0	6.112
0.0052	105.7	6.112
0.0051	105.7	5.907

Average 107.3 6.255
Standard Dev. 4.151 0.1090
Coeff. of Var. [%] 3.868 1.743
Min. 101.0 6.125
Max. 111.2 6.399
Number of Spec. 6 6

Average_{norm} 0.0052 103.4 6.028
Standard Dev._{norm} 3.005 0.08035
Coeff. of Var. [%]_{norm} 2.907 1.333
Min. 0.0051 98.48 5.907
Max. 0.0053 106.0 6.112
Number of Spec. 6 6 6



Laminate Unnotched Tension Properties (UNT1)--ETW (275°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

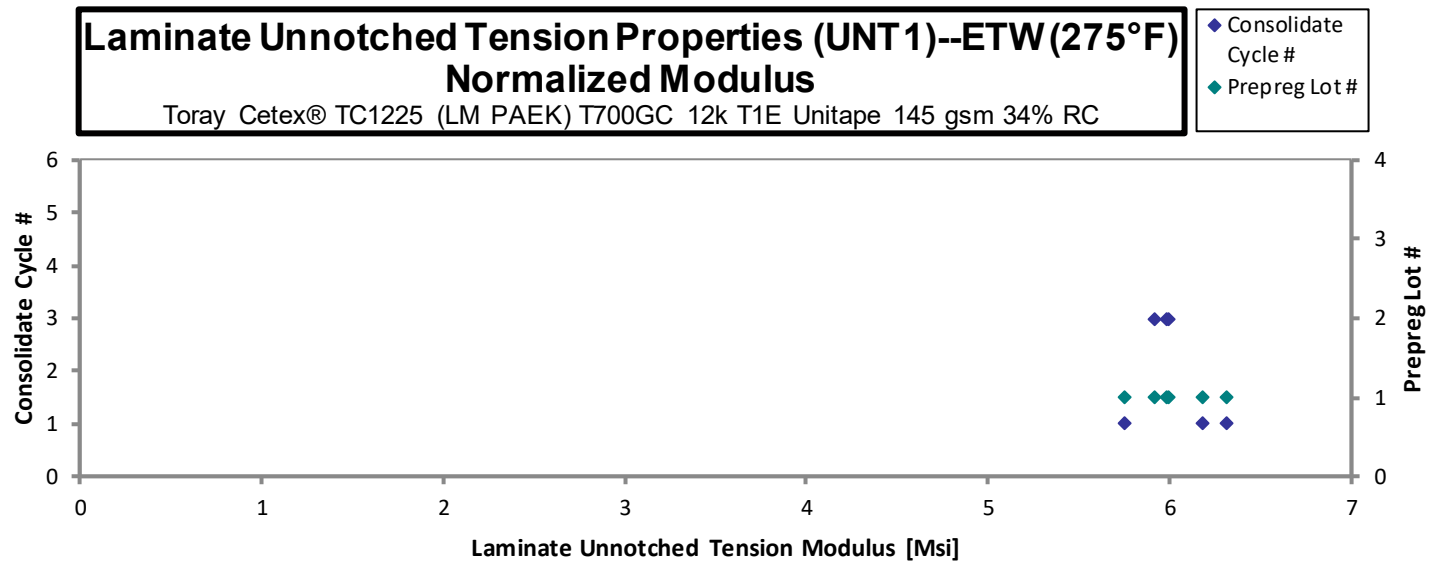
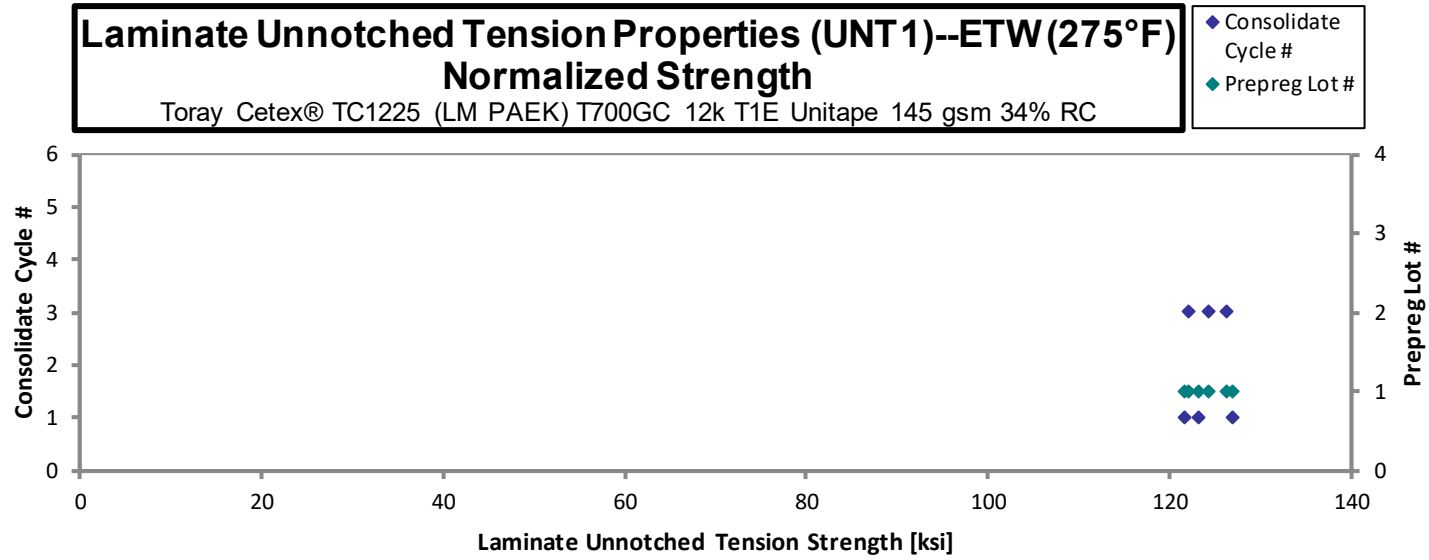
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAA111E	A	C1	1	1	126.3	6.341	0.08420	16	M(A,L)WB, LWT
TCAA112E	A	C1	1	1	126.3	5.970	0.08323	16	M(A,L)GT, LWB
TCAA113E	A	C1	1	1	130.5	6.487	0.08403	16	M(A,L)GB
TCAA311E	A	C3	1	3	129.4	6.353	0.08145	16	LWT, M(A,L)WB
TCAA312E	A	C3	1	3	133.7	6.336	0.08153	16	LWB, M(A,L)GT
TCAA313E	A	C3	1	3	132.0	6.279	0.08138	16	M(A,L)GB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0053	123.1	6.179
0.0052	121.7	5.751
0.0053	127.0	6.309
0.0051	122.0	5.989
0.0051	126.2	5.979
0.0051	124.3	5.915

Average 129.7 6.294
Standard Dev. 3.000 0.1730
Coeff. of Var. [%] 2.313 2.748
Min. 126.3 5.970
Max. 133.7 6.487
Number of Spec. 6 6

Average_{norm} 0.0052 124.0 6.020
Standard Dev._{norm} 2.175 0.1973
Coeff. of Var. [%]_{norm} 1.754 3.277
Min. 0.0051 121.7 5.751
Max. 0.0053 127.0 6.309
Number of Spec. 6 6 6



4.12 “10/80/10” Unnotched Tension 2 Properties (UNT2)

Laminate Unnotched Tension Properties (UNT2)--CTA (-65°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

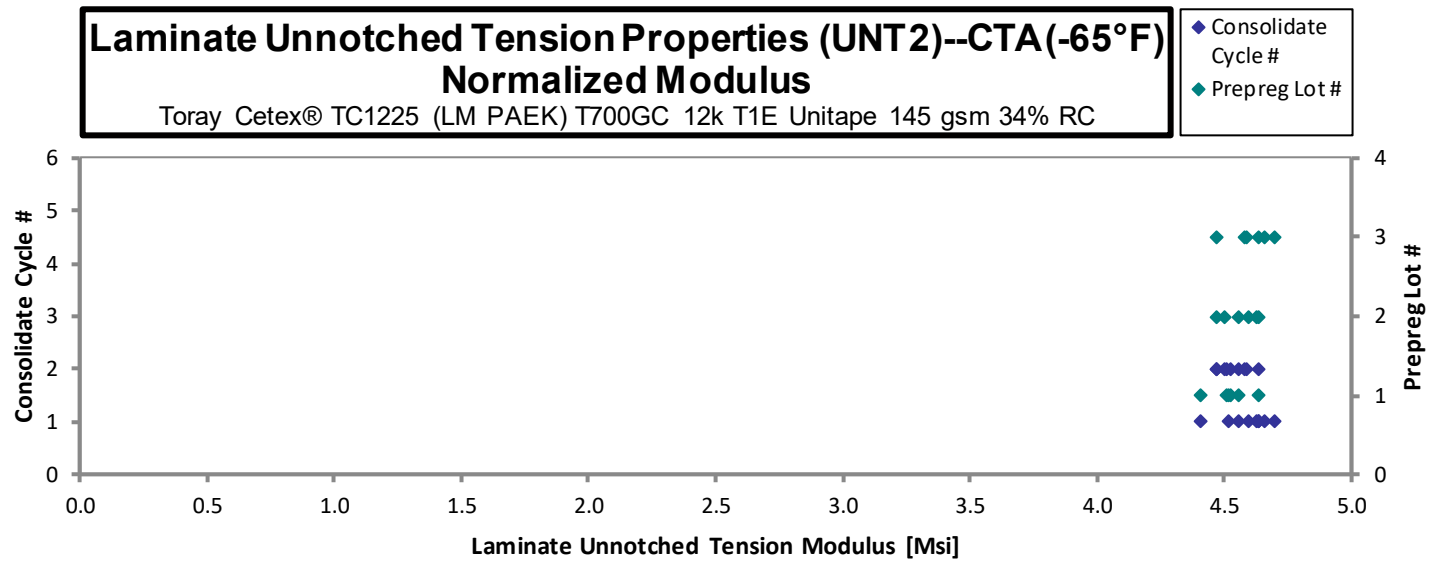
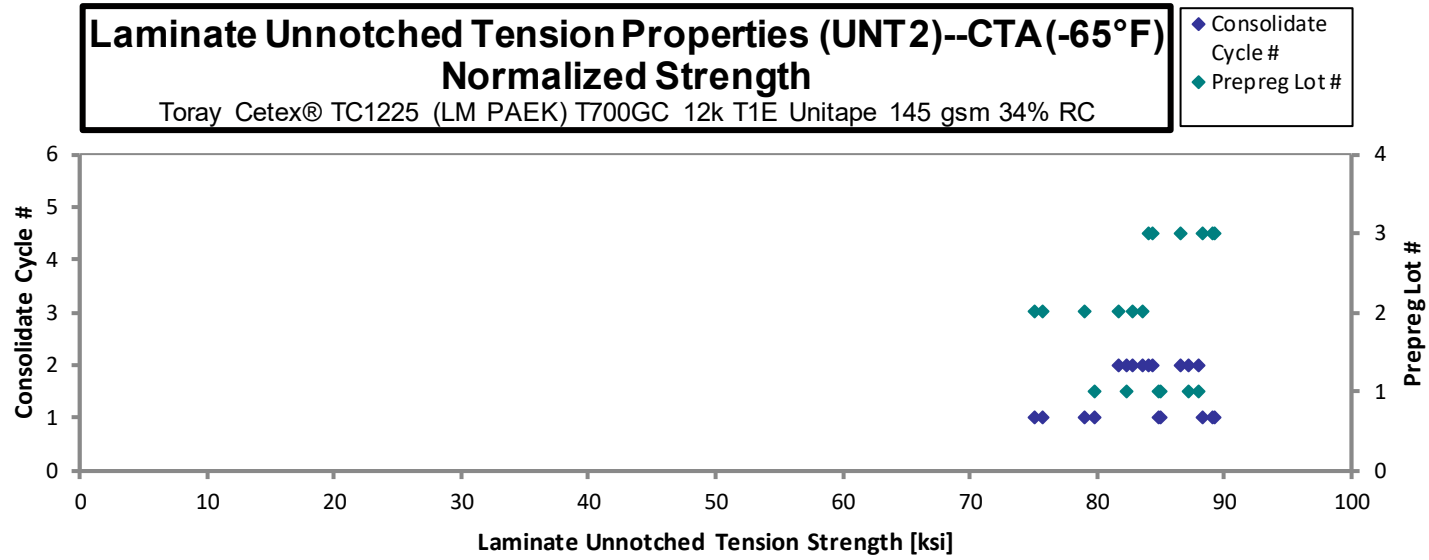
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 t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCABA111B	A	C1	1	1	83.22	4.593	0.1037	20	M(A,D)WB
TCABA112B	A	C1	1	1	87.87	4.678	0.1043	20	M(A,D)GB
TCABA113B	A	C1	1	1	88.05	4.718	0.1044	20	M(A,D)GT
TCABA211B	A	C2	1	2	85.38	4.689	0.1042	20	M(A,D)WB
TCABA212B	A	C2	1	2	90.52	4.806	0.1041	20	M(A,D)GM
TCABA213B	A	C2	1	2	91.52	4.691	0.1038	20	M(A,D)WB
TCABB111B	B	C1	2	1	77.16	4.717	0.1059	20	M(A,D)WT
TCABB112B	B	C1	2	1	80.67	4.687	0.1059	20	M(A,D)WT
TCABB113B	B	C1	2	1	76.55	4.722	0.1060	20	M(A,D)WT
TCABB211B	B	C2	2	2	84.24	4.634	0.1062	20	M(A,D)WB
TCABB212B	B	C2	2	2	82.82	4.563	0.1065	20	M(A,D)GB
TCABB213B	B	C2	2	2	85.10	4.555	0.1060	20	M(A,D)WB
TCABC111B	C	C1	3	1	93.06	4.839	0.1036	20	M(A,D)WB
TCABC112B	C	C1	3	1	93.13	4.871	0.1033	20	M(A,D)WT
TCABC113B	C	C1	3	1	92.36	4.913	0.1033	20	M(A,D)WB
TCABC211B	C	C2	3	2	86.63	4.726	0.1048	20	M(A,D)WT
TCABC212B	C	C2	3	2	87.25	4.618	0.1045	20	M(A,D)GM
TCABC213B	C	C2	3	2	89.10	4.711	0.1050	20	M(A,D)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0052	79.88	4.409
0.0052	84.85	4.517
0.0052	85.08	4.559
0.0052	82.40	4.526
0.0052	87.25	4.633
0.0052	87.93	4.507
0.0053	75.67	4.626
0.0053	79.09	4.596
0.0053	75.14	4.634
0.0053	82.79	4.554
0.0053	81.65	4.499
0.0053	83.52	4.471
0.0052	89.22	4.639
0.0052	89.11	4.661
0.0052	88.37	4.700
0.0052	84.05	4.585
0.0052	84.39	4.467
0.0053	86.63	4.580

Average 86.37 4.707
Standard Dev. 5.011 0.09973
Coeff. of Var. [%] 5.802 2.119
Min. 76.55 4.555
Max. 93.13 4.913
Number of Spec. 18 18

Average_{norm} 0.0052 83.72 4.565
Standard Dev._{norm} 4.235 0.07756
Coeff. of Var. [%]_{norm} 5.058 1.699
Min. 0.0052 75.14 4.409
Max. 0.0053 89.22 4.700
Number of Spec. 18 18 18



**Laminate Unnotched Tension Properties (UNT2)--RTA (70°F)
Strength & Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

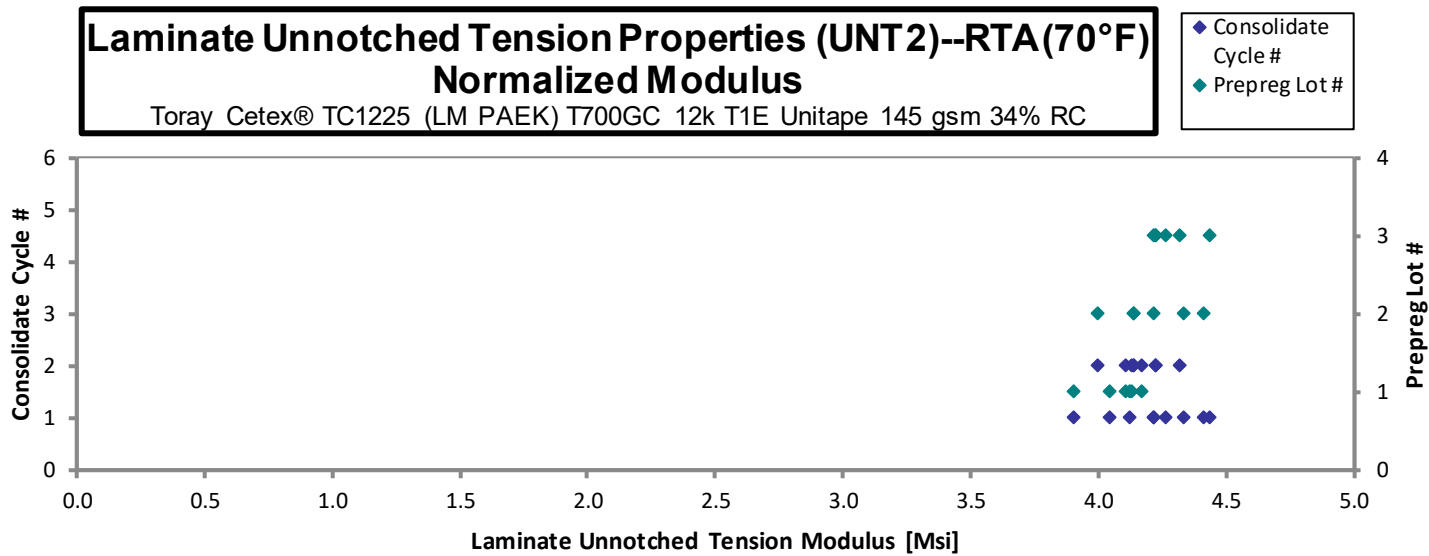
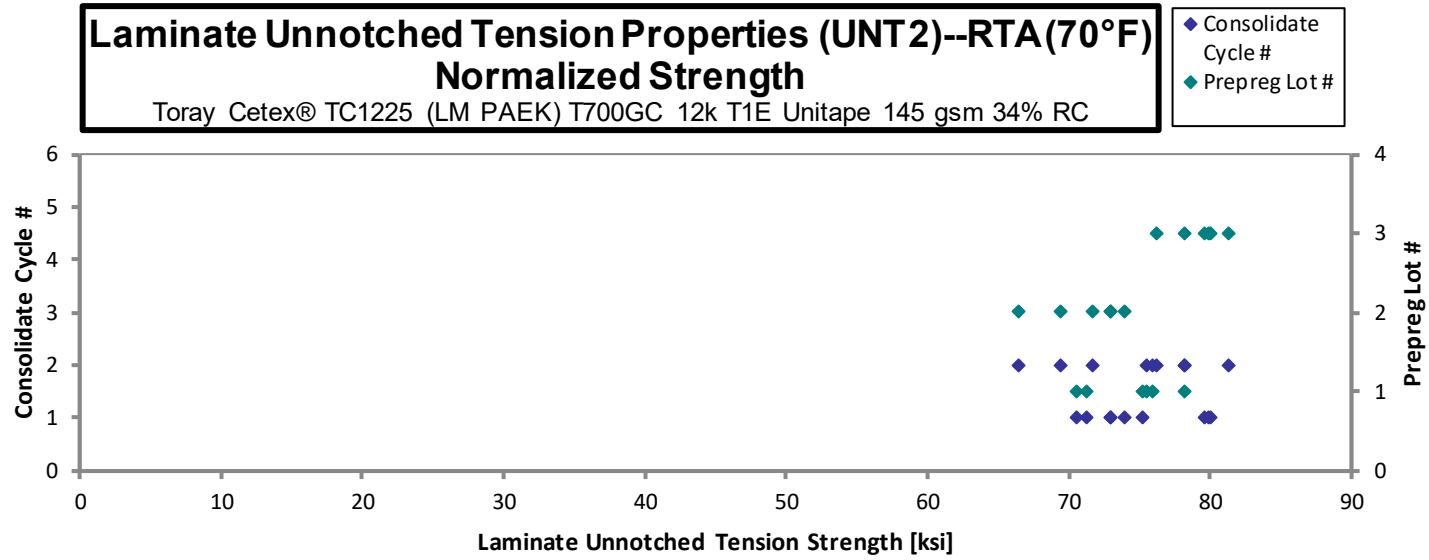
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCABA111A	A	C1	1	1	74.23	4.106	0.1026	20	M(A,D)GM
TCABA112A	A	C1	1	1	74.69	4.233	0.1031	20	M(A,D)GM
TCABA113A	A	C1	1	1	78.73	4.312	0.1032	20	M(A,D)WB
TCABA211A	A	C2	1	2	79.21	4.284	0.1035	20	M(A,D)GB
TCABA212A	A	C2	1	2	79.10	4.324	0.1031	20	M(A,D)GT
TCABA213A	A	C2	1	2	81.39	4.340	0.1038	20	M(A,D)GB
TCABB111A	B	C1	2	1	74.50	4.423	0.1059	20	M(A,D)WT
TCABB112A	B	C1	2	1	75.61	4.312	0.1056	20	M(A,D)GB
TCABB113A	B	C1	2	1	74.62	4.514	0.1055	20	M(A,D)GM
TCABB211A	B	C2	2	2	68.32	4.253	0.1051	20	M(A,D)WB
TCABB212A	B	C2	2	2	71.68	4.128	0.1046	20	M(A,D)GM
TCABB213A	B	C2	2	2	73.69	4.258	0.1050	20	M(A,D)GM
TCABC111A	C	C1	3	1	83.02	4.434	0.1039	20	M(A,D)GB
TCABC112A	C	C1	3	1	83.50	4.422	0.1030	20	M(A,D)GM
TCABC113A	C	C1	3	1	83.55	4.628	0.1034	20	M(A,D)WB
TCABC211A	C	C2	3	2	81.06	4.479	0.1042	20	M(A,D)GM
TCABC212A	C	C2	3	2	79.30	4.389	0.1039	20	DGM, AGT
TCABC213A	C	C2	3	2	84.57	4.392	0.1039	20	M(A,D)GT

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0051	70.51	3.900
0.0052	71.30	4.041
0.0052	75.24	4.121
0.0052	75.88	4.104
0.0052	75.53	4.129
0.0052	78.25	4.172
0.0053	73.02	4.335
0.0053	73.89	4.214
0.0053	72.90	4.410
0.0053	66.50	4.140
0.0052	69.39	3.996
0.0052	71.62	4.138
0.0052	79.85	4.265
0.0051	79.62	4.216
0.0052	80.02	4.432
0.0052	78.19	4.321
0.0052	76.26	4.221
0.0052	81.32	4.224

Average 77.82 4.346
Standard Dev. 4.609 0.1306
Coeff. of Var. [%] 5.923 3.006
Min. 68.32 4.106
Max. 84.57 4.628
Number of Spec. 18 18

Average_{norm} 0.0052 74.96 4.188
Standard Dev_{norm} 4.143 0.1372
Coeff. of Var. [%]_{norm} 5.526 3.275
Min. 0.0051 66.50 3.900
Max. 0.0053 81.32 4.432
Number of Spec. 18 18 18



**Laminate Unnotched Tension Properties (UNT2)--ETA1 (275°F)
Strength & Modulus**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

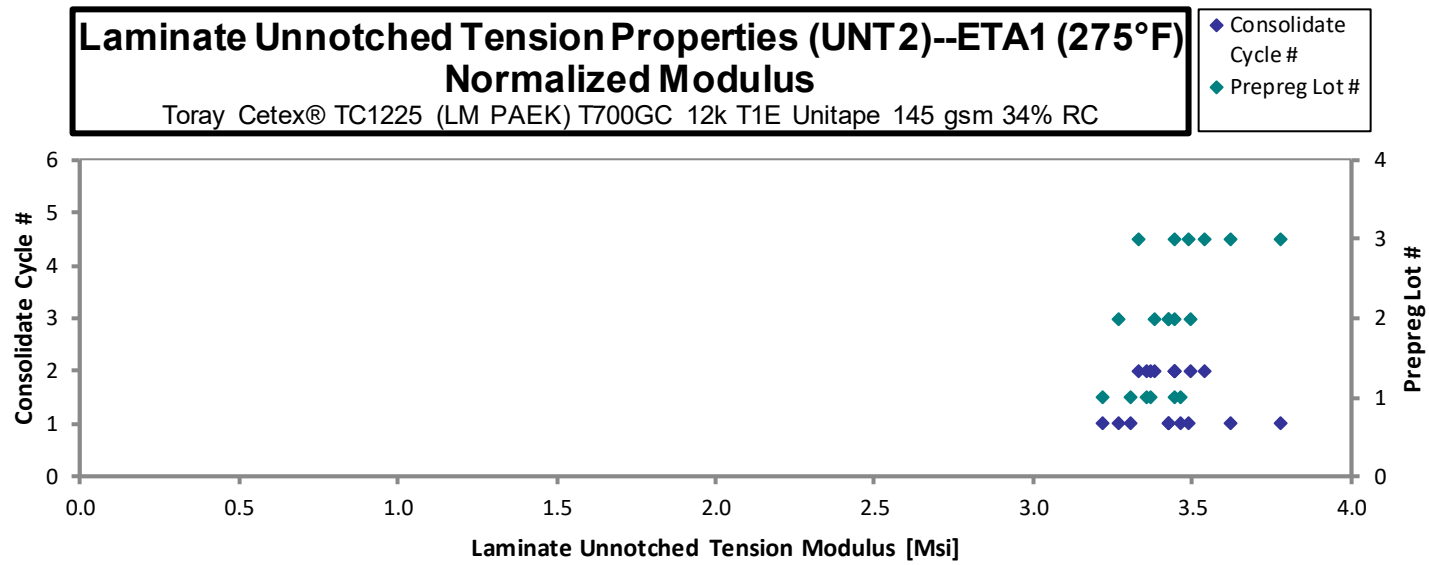
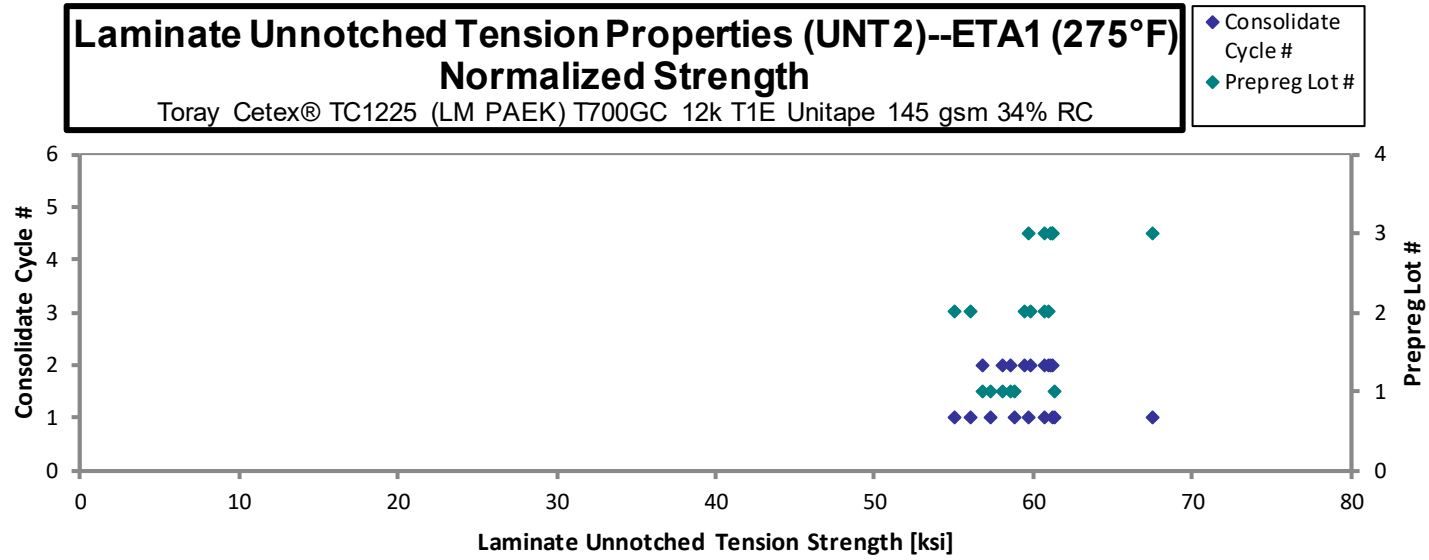
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCABA111C	A	C1	1	1	63.73	3.600	0.1039	20	DGM
TCABA112C	A	C1	1	1	61.43	3.450	0.1034	20	DGM
TCABA113C	A	C1	1	1	59.96	3.367	0.1033	20	DGM
TCABA211C	A	C2	1	2	60.29	3.576	0.1040	20	DGM
TCABA212C	A	C2	1	2	59.11	3.492	0.1039	20	DGM
TCABA213C	A	C2	1	2	60.94	3.506	0.1038	20	DGM
TCABB111C	B	C1	2	1	56.20	3.497	0.1059	20	DGM
TCABB112C	B	C1	2	1	61.82	3.491	0.1060	20	DGM
TCABB113C	B	C1	2	1	57.20	3.333	0.1059	20	DGM
TCABB211C	B	C2	2	2	60.47	3.534	0.1068	20	DGM
TCABB212C	B	C2	2	2	60.40	3.498	0.1063	20	DGM
TCABB213C	B	C2	2	2	62.07	3.441	0.1061	20	DGM
TCABC111C	C	C1	3	1	70.33	3.931	0.1037	20	DGM
TCABC112C	C	C1	3	1	62.01	3.625	0.1039	20	DGM
TCABC113C	C	C1	3	1	63.49	3.760	0.1040	20	DGM
TCABC211C	C	C2	3	2	62.62	3.652	0.1047	20	DGM
TCABC212C	C	C2	3	2	63.57	3.575	0.1040	20	DGM
TCABC213C	C	C2	3	2	63.79	3.482	0.1034	20	DGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0052	61.28	3.462
0.0052	58.81	3.303
0.0052	57.32	3.219
0.0052	58.07	3.444
0.0052	56.84	3.358
0.0052	58.55	3.368
0.0053	55.08	3.427
0.0053	60.68	3.427
0.0053	56.06	3.266
0.0053	59.82	3.496
0.0053	59.46	3.443
0.0053	60.96	3.380
0.0052	67.54	3.775
0.0052	59.67	3.488
0.0052	61.15	3.622
0.0052	60.72	3.541
0.0052	61.22	3.443
0.0052	61.05	3.332

Average 61.63 3.545
Standard Dev. 3.036 0.1395
Coeff. of Var. [%] 4.926 3.936
Min. 56.20 3.333
Max. 70.33 3.931
Number of Spec. 18 18

Average_{norm} 0.0052 59.68 3.433
Standard Dev_{norm} 2.733 0.1297
Coeff. of Var. [%]_{norm} 4.579 3.779
Min. 0.0052 55.08 3.219
Max. 0.0053 67.54 3.775
Number of Spec. 18 18 18



4.13 “50/40/10” Unnotched Tension 3 Properties (UNT3)

Laminate Unnotched Tension Properties (UNT3)--CTA (-65°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

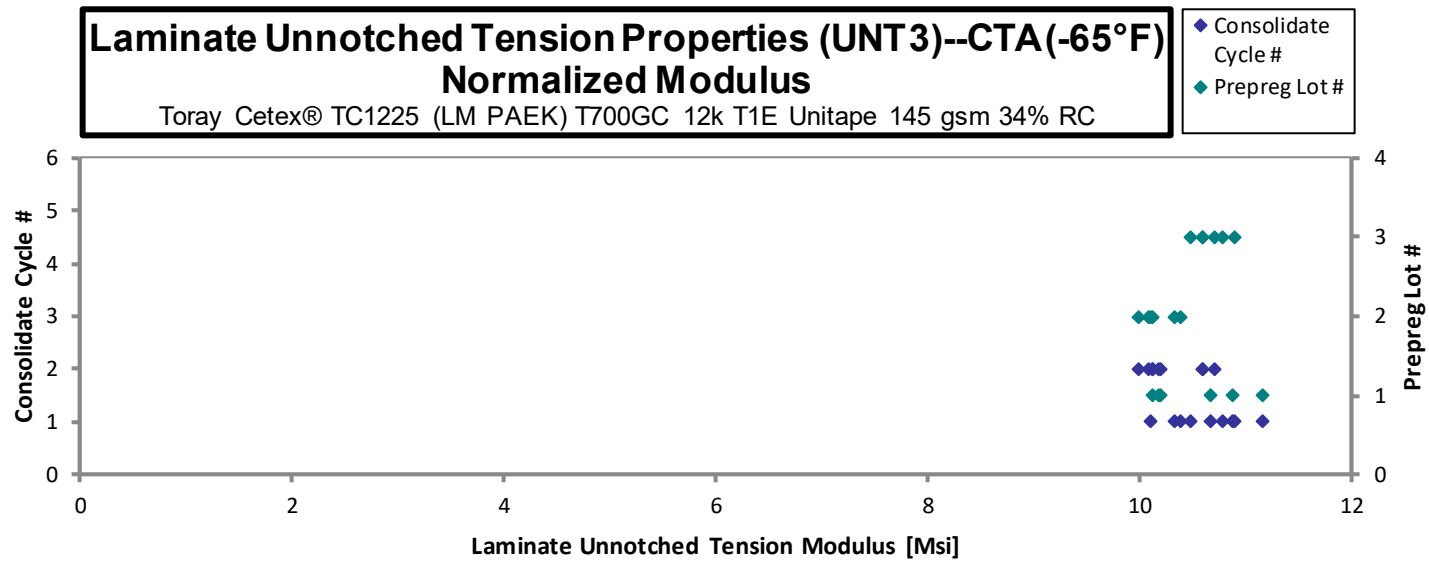
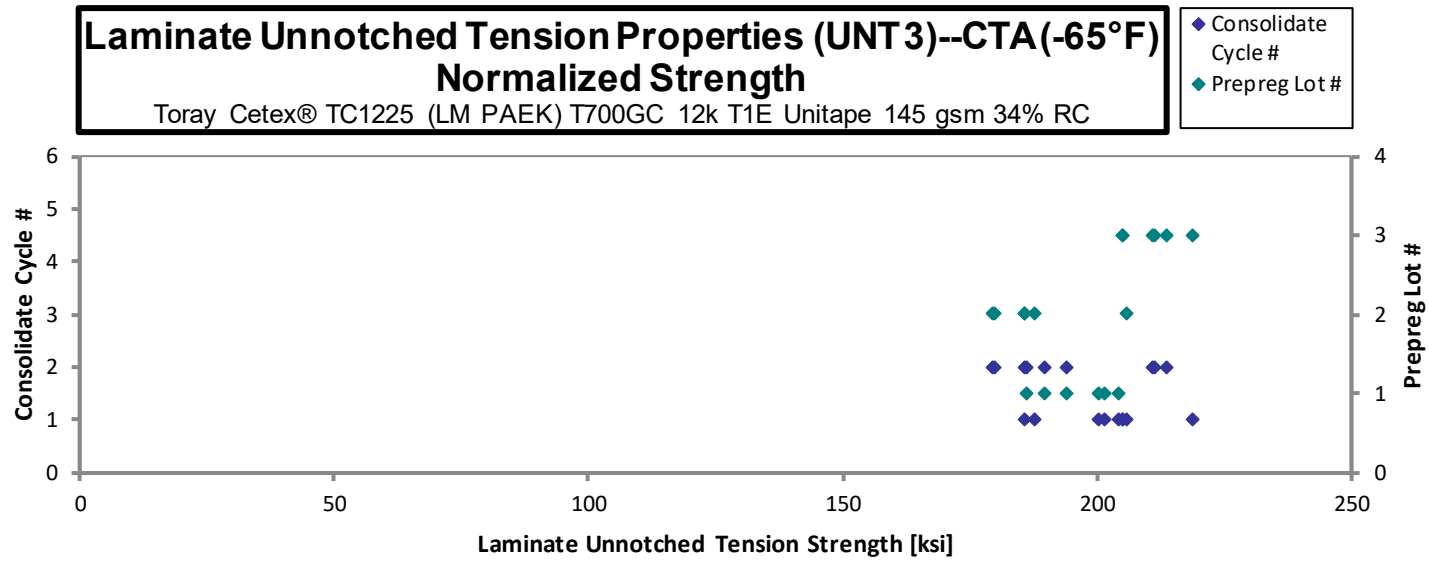
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCACA111B	A	C1	1	1	204.5	11.12	0.1057	20	M(A,L)GT, DGM
TCACA112B	A	C1	1	1	207.5	10.84	0.1063	20	DGM, LWT, AAB
TCACA113B	A	C1	1	1	203.7	11.27	0.1069	20	DGM, AWT, AWB
TCACA211B	A	C2	1	2	198.1	10.66	0.1034	20	DGM, LWB, M(A,L)AT
TCACA212B	A	C2	1	2	203.7	10.63	0.1029	20	DGM, LWT, AAB
TCACA213B	A	C2	1	2	195.2	10.69	0.1029	20	DGM, AAB, M(A,L)WT
TCACB111B	B	C1	2	1	195.4	10.64	0.1027	20	M(A,D,L)GDM
TCACB112B	B	C1	2	1	214.3	10.83	0.1036	20	DGM, AWB, LWT
TCACB113B	B	C1	2	1	195.3	10.73	0.1039	20	DGM, M(A,L)WB
TCACB211B	B	C2	2	2	184.2	10.36	0.1052	20	DGM, M(A,L)WB
TCACB212B	B	C2	2	2	183.6	10.33	0.1058	20	DGM, M(A,L)AB, LWT
TCACB213B	B	C2	2	2	190.3	10.25	0.1054	20	DGM, LAT, AAB
TCACC111B	C	C1	3	1	227.5	11.33	0.1038	20	DGM, M(A,L)AT, LWB
TCACC112B	C	C1	3	1	214.7	11.29	0.1033	20	DGM, AWB
TCACC113B	C	C1	3	1	215.5	11.03	0.1027	20	DGM,, M(A,L)WB
TCACC211B	C	C2	3	2	226.3	11.36	0.1008	20	DGM, M(A,L)GT
TCACC212B	C	C2	3	2	226.9	11.41	0.1003	20	DGM, M(A,L)WT, AAB
TCACC213B	C	C2	3	2	230.7	11.56	0.1001	20	DGM, LAT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0053	200.2	10.89
0.0053	204.3	10.67
0.0053	201.6	11.16
0.0052	189.6	10.21
0.0051	194.0	10.12
0.0051	186.0	10.19
0.0051	185.8	10.11
0.0052	205.7	10.40
0.0052	187.9	10.32
0.0053	179.5	10.09
0.0053	179.8	10.12
0.0053	185.7	9.994
0.0052	218.8	10.89
0.0052	205.2	10.79
0.0051	204.9	10.49
0.0050	211.2	10.60
0.0050	210.7	10.60
0.0050	213.7	10.71

Average 206.5 10.91
Standard Dev. 14.94 0.4034
Coeff. of Var. [%] 7.236 3.699
Min. 183.6 10.25
Max. 230.7 11.56
Number of Spec. 18 18

Average_{norm} 0.0052 198.0 10.46
Standard Dev._{norm} 12.22 0.3409
Coeff. of Var. [%]_{norm} 6.172 3.258
Min. 0.0050 179.5 9.994
Max. 0.0053 218.8 11.16
Number of Spec. 18 18 18



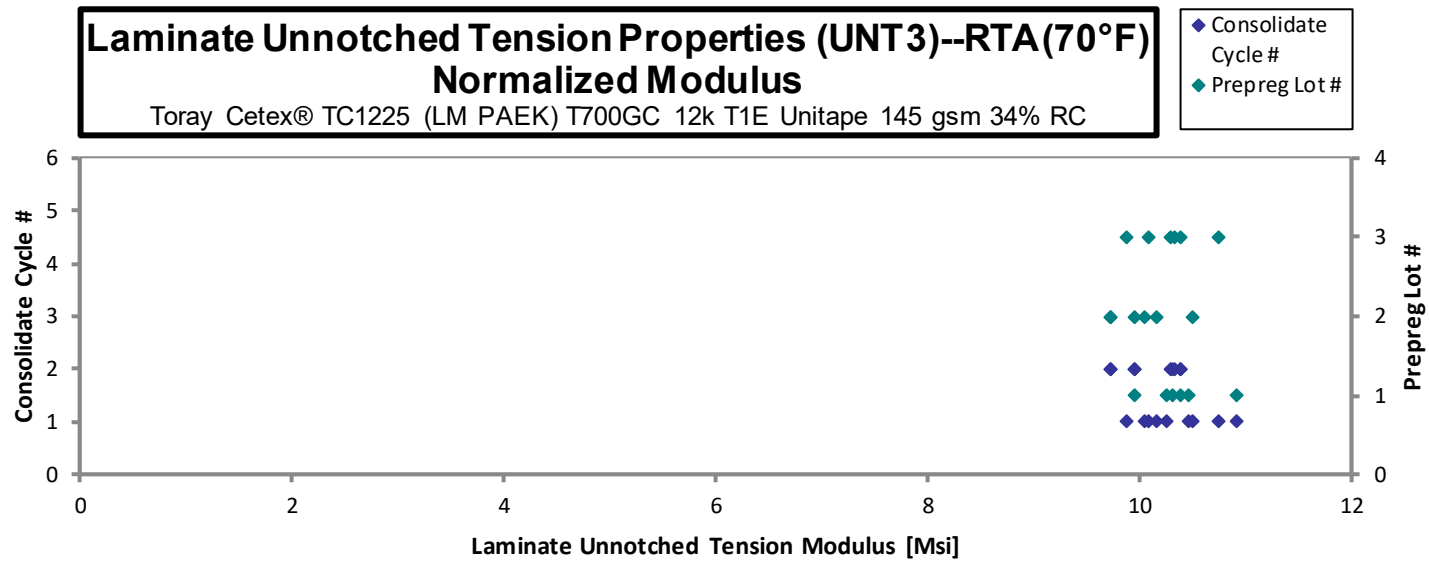
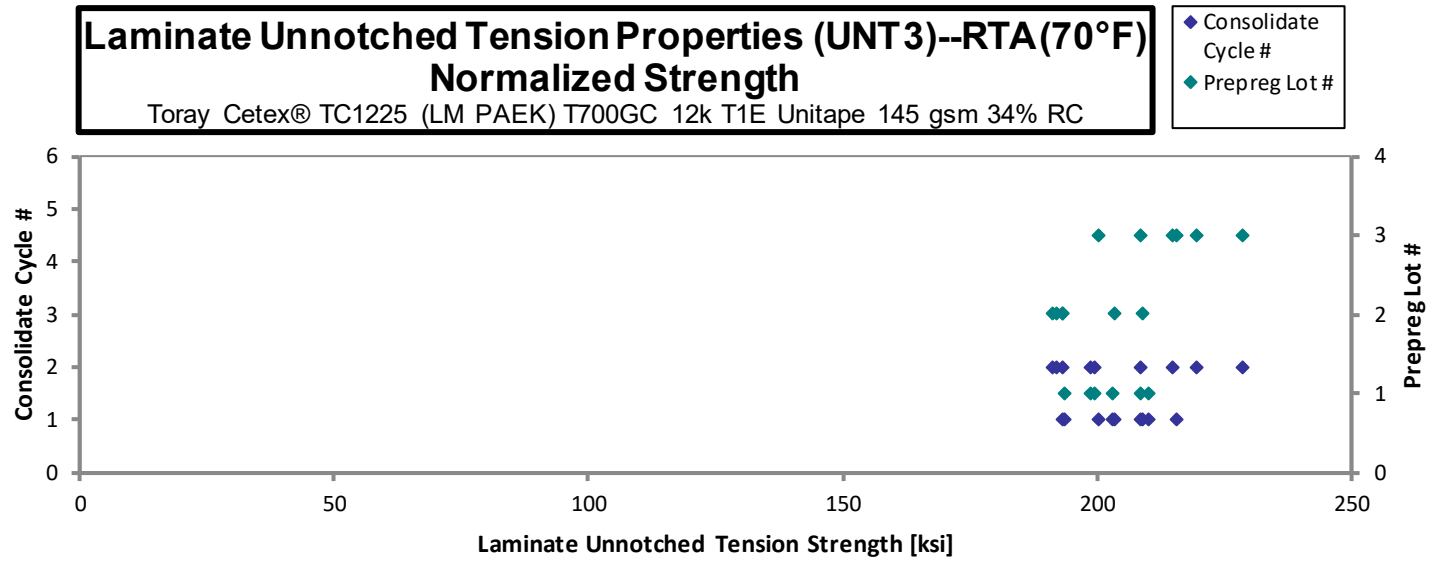
Laminate Unnotched Tension Properties (UNT3)--RTA (70°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCACA111A	A	C1	1	1	208.5	10.54	0.1052	20	DGM, M(A,L)GB	0.0053	203.0	10.26
TCACA112A	A	C1	1	1	214.4	10.69	0.1058	20	DGM, LWB, AWT	0.0053	210.0	10.47
TCACA113A	A	C1	1	1	195.8	11.04	0.1069	20	DGM	0.0053	193.8	10.92
TCACA211A	A	C2	1	2	218.2	10.79	0.1033	20	LGT, DGM, AWB	0.0052	208.7	10.32
TCACA212A	A	C2	1	2	209.2	10.88	0.1031	20	DGM, AGT	0.0052	199.7	10.39
TCACA213A	A	C2	1	2	209.1	10.48	0.1026	20	DGM, AWT	0.0051	198.7	9.957
TCACB111A	B	C1	2	1	216.1	10.53	0.1043	20	M(A,D)GM, LAB	0.0052	208.8	10.17
TCACB112A	B	C1	2	1	201.8	10.97	0.1035	20	M(D,L)GM, AGB	0.0052	193.3	10.51
TCACB113A	B	C1	2	1	213.4	10.55	0.1030	20	DGT, LAB	0.0051	203.5	10.05
TCACB211A	B	C2	2	2	197.6	9.994	0.1050	20	DGM, M(A,L)WB, LWT	0.0053	192.1	9.720
TCACB212A	B	C2	2	2	197.8	10.05	0.1045	20	M(A,L)WB, M(A,D,L)GM	0.0052	191.5	9.723
TCACB213A	B	C2	2	2	199.4	10.28	0.1046	20	DGM, M(A,L)GB	0.0052	193.0	9.952
TCACC111A	C	C1	3	1	224.0	10.82	0.1007	20	LGM, LWB, AWT	0.0050	208.7	10.09
TCACC112A	C	C1	3	1	211.7	10.45	0.1021	20	DGB	0.0051	200.2	9.882
TCACC113A	C	C1	3	1	225.2	11.21	0.1035	20	DGB, M(A,L)WB, M(A,L)WT	0.0052	215.8	10.75
TCACC211A	C	C2	3	2	239.9	11.25	0.09885	20	DGM, M(A,L)GB, LWT	0.0049	219.6	10.29
TCACC212A	C	C2	3	2	230.4	11.10	0.1006	20	M(A,D,L)GM	0.0050	214.7	10.34
TCACC213A	C	C2	3	2	245.2	11.15	0.1006	20	M(A,D,L)GT	0.0050	228.5	10.39

Average 214.3 10.71
 Standard Dev. 14.29 0.3802
 Coeff. of Var. [%] 6.666 3.550
 Min. 195.8 9.994
 Max. 245.2 11.25
 Number of Spec. 18 18

Average_{norm} 0.0052 204.6 10.23
 Standard Dev._{norm} 10.55 0.3253
 Coeff. of Var. [%]_{norm} 5.154 3.179
 Min. 0.0049 191.5 9.720
 Max. 0.0053 228.5 10.92
 Number of Spec. 18 18 18



Laminate Unnotched Tension Properties (UNT3)--ETA1 (275°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCACA111C	A	C1	1	1	195.0	10.23	0.1052	20	DGM, LWT
TCACA112C	A	C1	1	1	194.6	10.31	0.1048	20	LGB, M(A,L)IT
TCACA113C	A	C1	1	1	194.2	10.16	0.1054	20	DGM, LAT
TCACA211C	A	C2	1	2	192.0	10.01	0.1032	20	DGM, AGM
TCACA212C	A	C2	1	2	184.9	9.935	0.1025	20	DGM, AWT
TCACA213C	A	C2	1	2	187.9	9.883	0.1022	20	LWB, AIT
TCACB111C	B	C1	2	1	188.6	10.28	0.1024	20	DGM
TCACB112C	B	C1	2	1	182.7	10.19	0.1021	20	DGM
TCACB113C	B	C1	2	1	189.8	10.30	0.1028	20	DGM
TCACB211C	B	C2	2	2	188.2	10.07	0.1055	20	LGT, LWT, AIB
TCACB212C	B	C2	2	2	178.7	9.855	0.1052	20	DGM
TCACB213C	B	C2	2	2	179.8	9.973	0.1051	20	DGM
TCACC111C	C	C1	3	1	198.8	10.46	0.1026	20	DGM, AWT
TCACC112C	C	C1	3	1	203.2	10.10	0.1028	20	DGM, AWT
TCACC113C	C	C1	3	1	210.3	10.09	0.1029	20	DGM, LWT, AIB
TCACC211C*	C	C2	3	2		10.81	0.09990	20	
TCACC212C	C	C2	3	2	216.5	10.89	0.09915	20	M(D,L)GM
TCACC213C	C	C2	3	2	215.1	10.52	0.09987	20	DGM
TCACC214C**	C	C2	3	2	232.2		0.09980	20	DGM
TCACC215C**	C	C2	3	2	230.3		0.09862	20	DGM, AWB

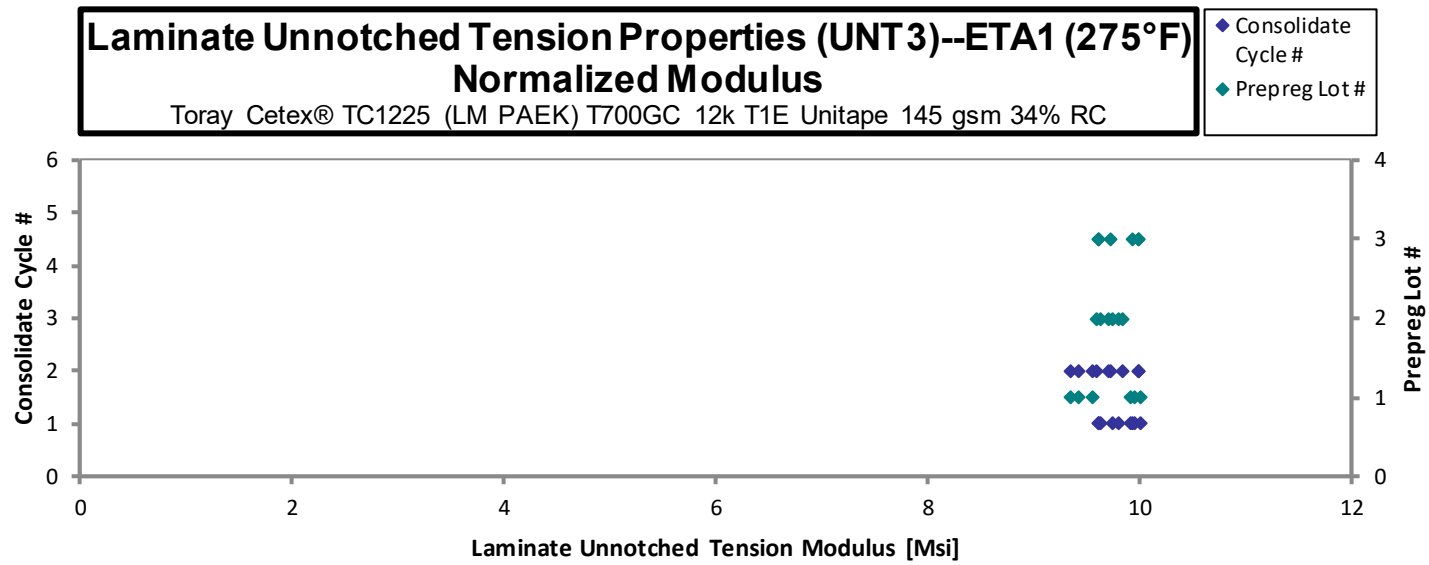
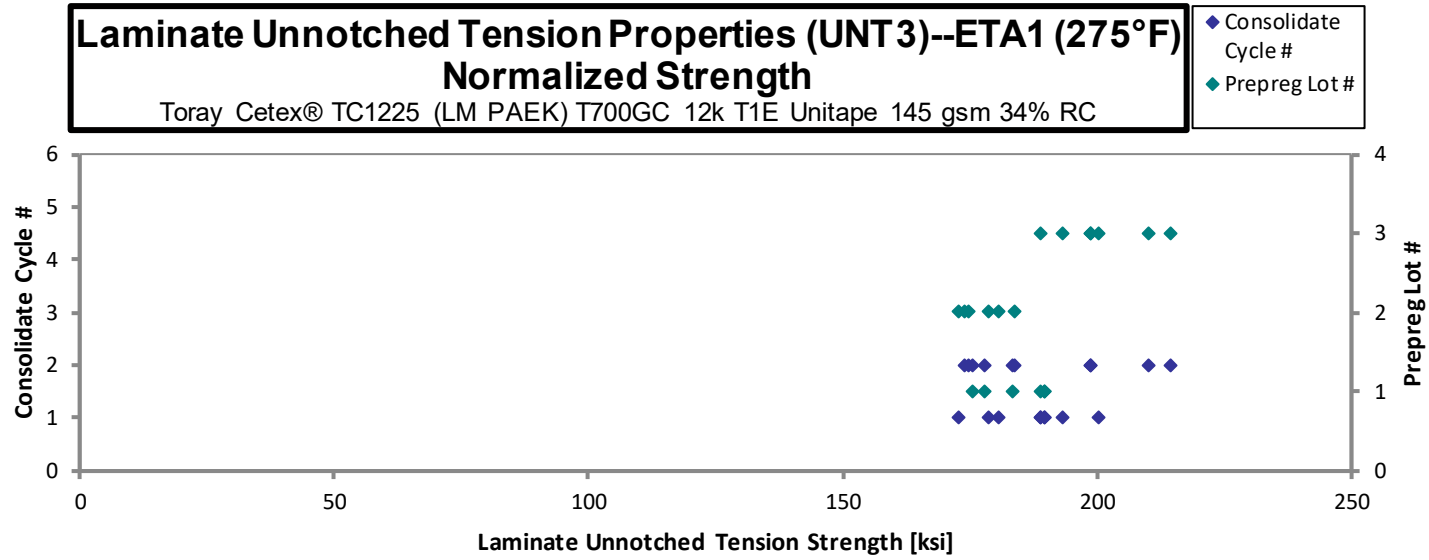
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0053	189.9	9.961
0.0052	188.8	10.00
0.0053	189.6	9.920
0.0052	183.4	9.564
0.0051	175.4	9.426
0.0051	177.8	9.348
0.0051	178.7	9.743
0.0051	172.8	9.637
0.0051	180.6	9.803
0.0053	183.8	9.832
0.0053	174.1	9.603
0.0053	174.9	9.702
0.0051	188.9	9.942
0.0051	193.4	9.611
0.0051	200.3	9.607
0.0050		9.998
0.0050	198.7	9.998
0.0050	198.9	9.726
0.0050	214.6	
0.0049	210.3	

*Strength not reported due to slippage during testing.

**Specimen was not gaged, only strength is tested.

Average	198.0	10.23
Standard Dev.	15.92	0.2926
Coeff. of Var. [%]	8.037	2.861
Min.	178.7	9.855
Max.	232.2	10.89
Number of Spec.	19	18

Average _{norm}	0.0051	188.1	9.746
Standard Dev. _{norm}		12.16	0.2008
Coeff. of Var. [%] _{norm}		6.465	2.061
Min.	0.0049	172.8	9.348
Max.	0.0053	214.6	10.00
Number of Spec.	20	19	18



4.14 “25/50/25” Unnotched Compression 1 Properties (UNC1)

Laminate Unnotched Compression Properties (UNC1)--RTA (70°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

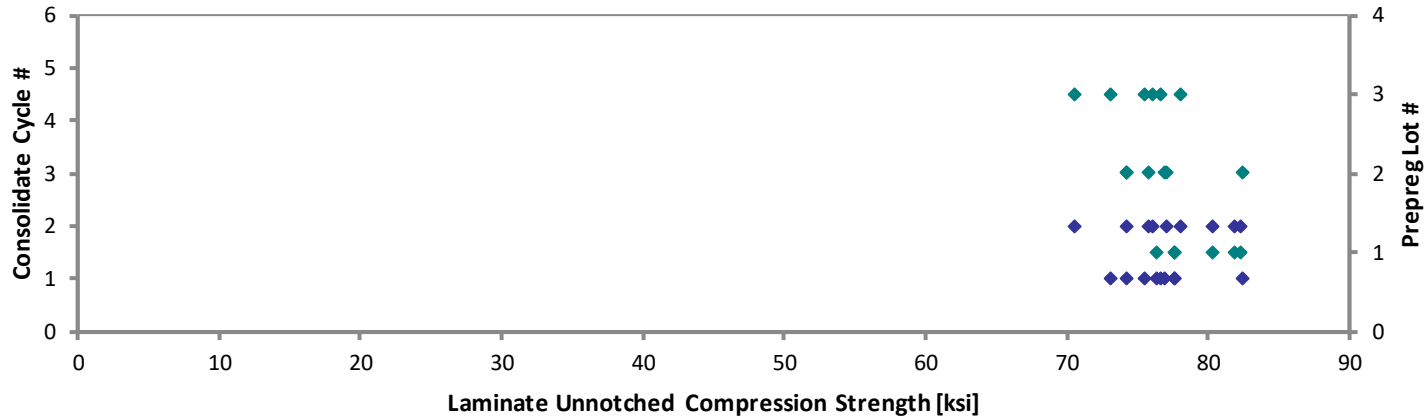
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAWA111A*	A	C1	1	1	80.86	6.288	0.1225	24	BGM
TCAWA112A*	A	C1	1	1	82.16	6.558	0.1226	24	BGM, HIB
TCAWA113A	A	C1	1	1	82.68	6.677	0.1218	24	BGM
TCAWA211A*	A	C2	1	2	85.54	6.640	0.1247	24	BGM, CIT
TCAWA212A*	A	C2	1	2	85.46	6.711	0.1243	24	BGM
TCAWA213A	A	C2	1	2	83.68	6.645	0.1245	24	BGM
TCAWB111A*	B	C1	2	1	86.15	6.549	0.1241	24	BGM
TCAWB112A*	B	C1	2	1	77.50	6.582	0.1242	24	BGM
TCAWB113A	B	C1	2	1	80.33	6.391	0.1240	24	BGM
TCAWB211A*	B	C2	2	2	80.89	6.320	0.1236	24	BGM
TCAWB212A*	B	C2	2	2	79.43	6.428	0.1238	24	BGM
TCAWB213A	B	C2	2	2	78.00	6.369	0.1233	24	BAT
TCAWC111A*	C	C1	3	1	81.05	6.391	0.1227	24	BGM
TCAWC112A*	C	C1	3	1	80.01	6.505	0.1223	24	BGM
TCAWC113A	C	C1	3	1	77.49	6.535	0.1223	24	BGM
TCAWC211A*	C	C2	3	2	83.31	6.531	0.1213	24	BGM
TCAWC212A*	C	C2	3	2	75.33	6.535	0.1214	24	BGM
TCAWC213A	C	C2	3	2	81.45	6.537	0.1211	24	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0051	76.40	5.941
0.0051	77.69	6.201
0.0051	77.70	6.276
0.0052	82.29	6.387
0.0052	81.94	6.434
0.0052	80.37	6.382
0.0052	82.46	6.268
0.0052	74.26	6.307
0.0052	76.87	6.116
0.0051	77.12	6.025
0.0052	75.84	6.138
0.0051	74.23	6.061
0.0051	76.70	6.048
0.0051	75.52	6.140
0.0051	73.13	6.168
0.0051	78.00	6.114
0.0051	70.55	6.121
0.0050	76.12	6.109

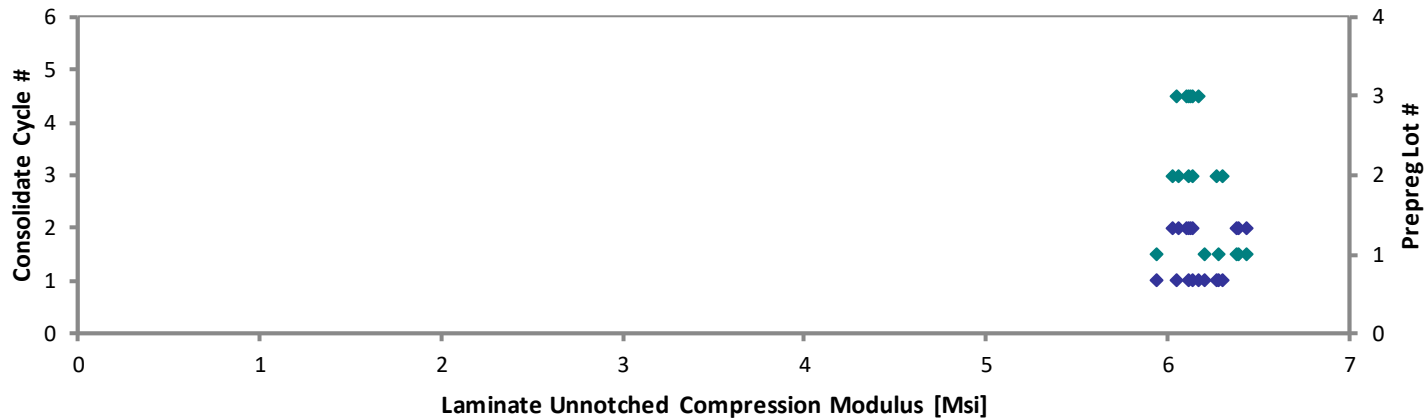
*Modulus are averaged values of 2 strain gages.

Average	81.18	6.511	Average_{norm}	0.0051	77.07	6.180
Standard Dev.	3.001	0.1224	Standard Dev_{norm}		3.180	0.1359
Coeff. of Var. [%]	3.697	1.881	Coeff. of Var. [%]_{norm}		4.126	2.200
Min.	75.33	6.288	Min.	0.0050	70.55	5.941
Max.	86.15	6.711	Max.	0.0052	82.46	6.434
Number of Spec.	18	18	Number of Spec.	18	18	18

Laminate Unnotched Compression Properties (UNC1)--RTA (70°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



Laminate Unnotched Compression Properties (UNC1)--RTA (70°F)
Normalized Modulus
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



Laminate Unnotched Compression Properties (UNC1)--ETA1 (275°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAWA111C	A	C1	1	1	60.73	6.780	0.1218	24	DGM
TCAWA112C	A	C1	1	1	64.90	6.844	0.1215	24	BAT
TCAWA113C	A	C1	1	1	63.65	6.824	0.1217	24	BAT, HIT
TCAWA211C	A	C2	1	2	64.91	6.885	0.1239	24	BAB
TCAWA212C	A	C2	1	2	64.20	6.891	0.1237	24	BGM
TCAWA213C	A	C2	1	2	64.61	6.929	0.1241	24	BAB, HIB
TCAWB111C	B	C1	2	1	63.65	6.387	0.1253	24	BAT
TCAWB112C	B	C1	2	1	63.13	6.233	0.1254	24	BGM, HIB
TCAWB113C	B	C1	2	1	63.76	6.221	0.1255	24	BAT, HAT
TCAWB211C	B	C2	2	2	61.92	6.446	0.1240	24	BAT
TCAWB212C	B	C2	2	2	58.30	6.357	0.1232	24	BGM
TCAWB213C	B	C2	2	2	60.38	6.259	0.1233	24	BAT
TCAWC111C*	C	C1	3	1		6.387	0.1223	24	HIB
TCAWC112C	C	C1	3	1	63.01	6.473	0.1225	24	BGM
TCAWC113C	C	C1	3	1	62.95	6.421	0.1231	24	BAT
TCAWC114C**	C	C1	3	1	62.47		0.1237	24	BAT
TCAWC211C	C	C2	3	2	57.94	6.203	0.1224	24	BGM
TCAWC212C	C	C2	3	2	59.01	6.202	0.1224	24	BAT
TCAWC213C*	C	C2	3	2		6.304	0.1223	24	HIT
TCAWC214C**	C	C2	3	2	62.13		0.1221	24	BAB, HIB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0051	57.08	6.373
0.0051	60.83	6.415
0.0051	59.77	6.409
0.0052	62.05	6.581
0.0052	61.29	6.579
0.0052	61.85	6.632
0.0052	61.55	6.177
0.0052	61.07	6.030
0.0052	61.76	6.026
0.0052	59.25	6.168
0.0051	55.43	6.045
0.0051	57.42	5.952
0.0051		6.027
0.0051	59.57	6.119
0.0051	59.77	6.097
0.0052	59.60	
0.0051	54.73	5.859
0.0051	55.71	5.855
0.0051		5.949
0.0051	58.52	

*Strength not reported due to unacceptable failure mode.

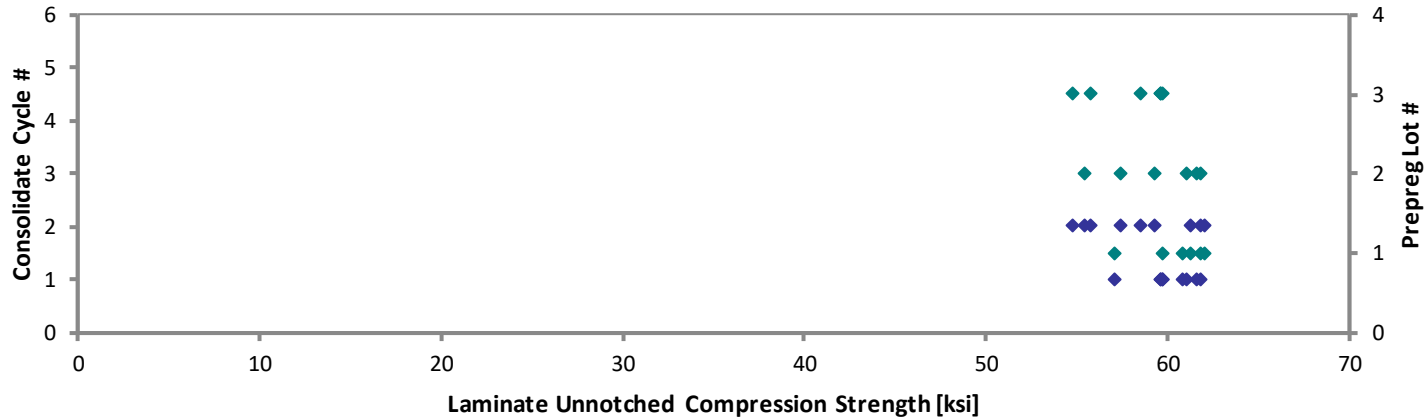
**Specimen was not gaged, only strength is tested.

Average	62.31	6.503
Standard Dev.	2.199	0.2727
Coeff. of Var. [%]	3.528	4.194
Min.	57.94	6.202
Max.	64.91	6.929
Number of Spec.	18	18

Average _{norm}	0.0051	59.29	6.183
Standard Dev. _{norm}		2.340	0.2522
Coeff. of Var. [%] _{norm}		3.946	4.079
Min.	0.0051	54.73	5.855
Max.	0.0052	62.05	6.632
Number of Spec.	20	18	18

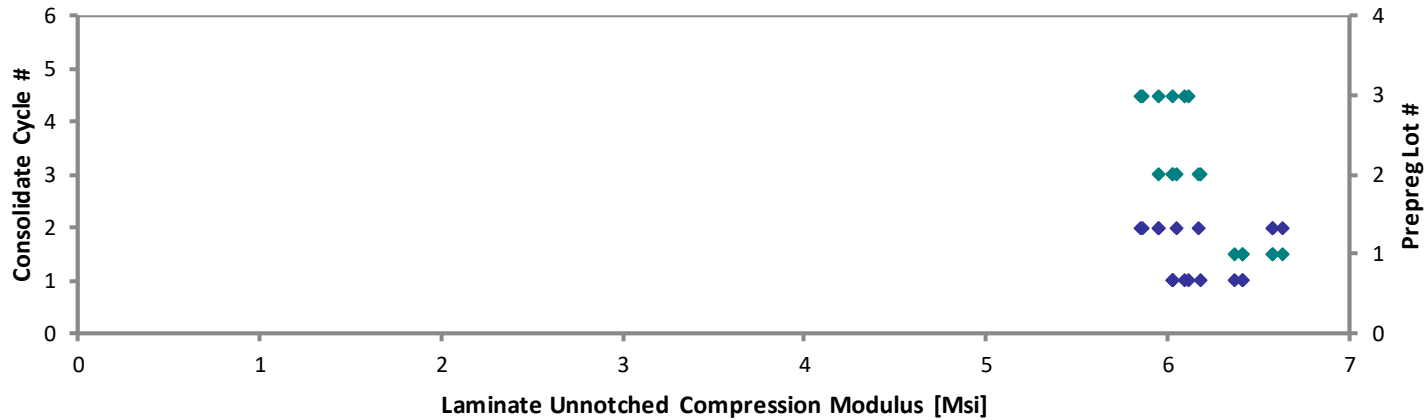
Laminate Unnotched Compression Properties (UNC1)--ETA1 (275°F)
Normalized Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
 ◆ Prepreg Lot #



Laminate Unnotched Compression Properties (UNC1)--ETA1 (275°F)
Normalized Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
 ◆ Prepreg Lot #



Laminate Unnotched Compression Properties (UNC1)--ETA2 (400°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAWA111D*	A	C1	1	1	20.85	5.061	0.1224	24	HAT
TCAWA112D*	A	C1	1	1	23.00	5.237	0.1229	24	HAT
TCAWA113D	A	C1	1	1	21.35	5.076	0.1226	24	HAT
TCAWA211D*	A	C2	1	2	18.66	5.188	0.1275	24	HAT
TCAWA212D*	A	C2	1	2	24.52	5.238	0.1268	24	HAT
TCAWA213D	A	C2	1	2	25.08	5.255	0.1261	24	HGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0051	19.69	4.781
0.0051	21.81	4.964
0.0051	20.20	4.803
0.0053	18.36	5.104
0.0053	24.00	5.126
0.0053	24.41	5.115

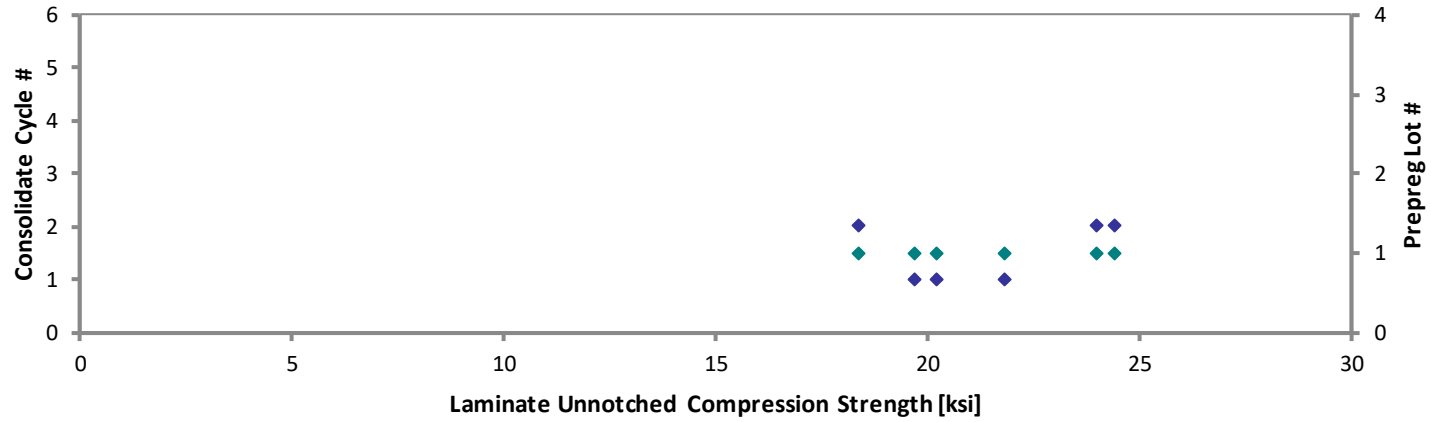
*Modulus are averaged values of 2 strain gages.

Average	22.24	5.176
Standard Dev.	2.423	0.08618
Coeff. of Var. [%]	10.89	1.665
Min.	18.66	5.061
Max.	25.08	5.255
Number of Spec.	6	6

Average_{norm}	0.0052	21.41	4.982
Standard Dev_{norm}		2.430	0.1586
Coeff. of Var. [%]_{norm}		11.35	3.184
Min.	0.0051	18.36	4.781
Max.	0.0053	24.41	5.126
Number of Spec.	6	6	6

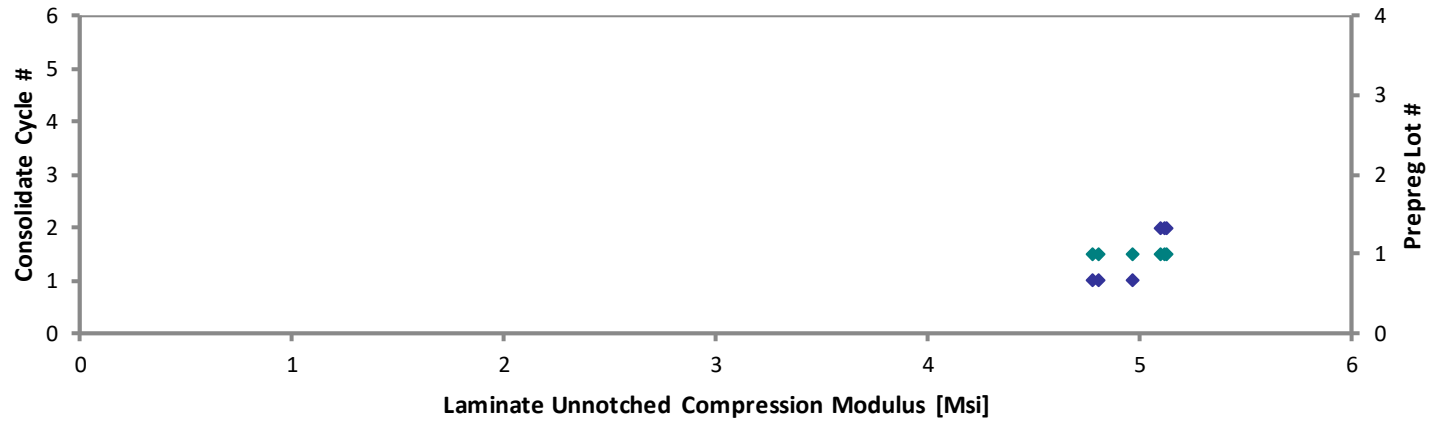
Laminate Unnotched Compression Properties (UNC1)--ETA2 (400°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
◆ Prepreg Lot #



Laminate Unnotched Compression Properties (UNC1)--ETA2 (400°F)
Normalized Modulus
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
◆ Prepreg Lot #



Laminate Unnotched Compression Properties (UNC1)--ETW (275°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

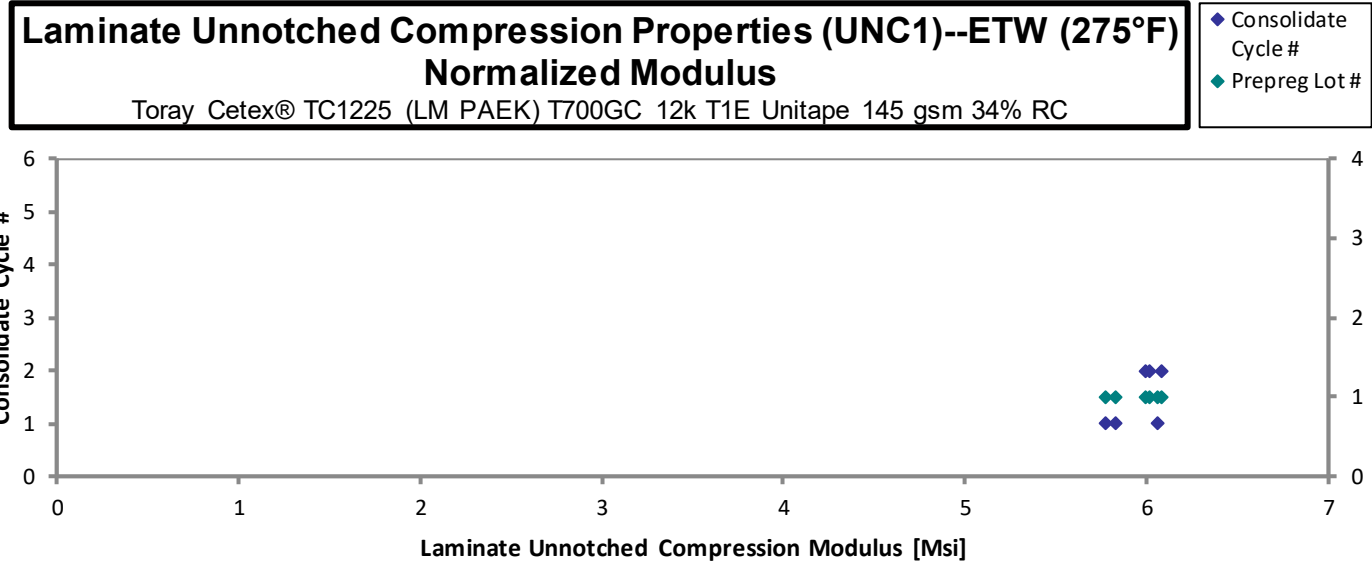
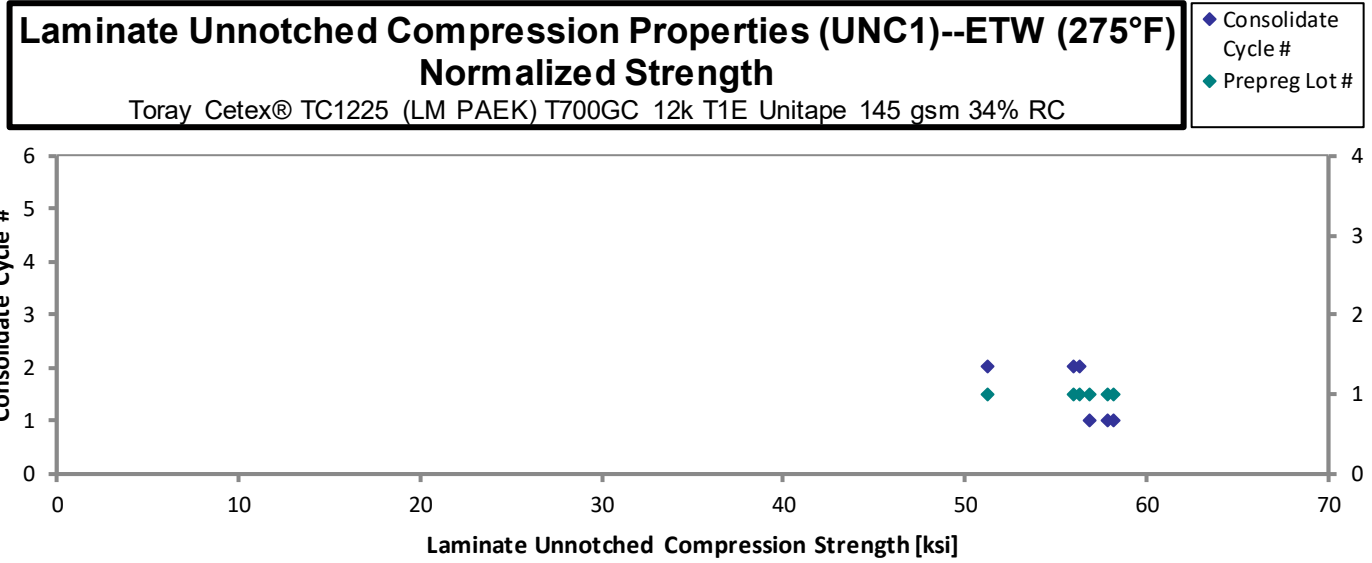
normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAWA111E	A	C1	1	1	61.83	6.204	0.1219	24	BAB
TCAWA112E	A	C1	1	1	60.40	6.431	0.1221	24	BAT
TCAWA113E	A	C1	1	1	61.23	6.118	0.1223	24	BGM
TCAWA211E	A	C2	1	2	58.38	6.300	0.1251	24	BGM
TCAWA212E	A	C2	1	2	53.08	6.213	0.1251	24	BGM
TCAWA213E	A	C2	1	2	58.00	6.228	0.1252	24	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0051	58.14	5.834
0.0051	56.89	6.058
0.0051	57.80	5.775
0.0052	56.33	6.079
0.0052	51.22	5.995
0.0052	56.01	6.014

Average **58.82** **6.249**
Standard Dev. **3.200** **0.1066**
Coeff. of Var. [%] **5.440** **1.706**
Min. **53.08** **6.118**
Max. **61.83** **6.431**
Number of Spec. **6** **6**

Average_{norm} **0.0051** **56.06** **5.959**
Standard Dev._{norm} **2.514** **0.1251**
Coeff. of Var. [%]_{norm} **4.484** **2.100**
Min. **0.0051** **51.22** **5.775**
Max. **0.0052** **58.14** **6.079**
Number of Spec. **6** **6** **6**



4.15 “10/80/10” Unnotched Compression 2 Properties (UNC2)

Laminate Unnotched Compression Properties (UNC2)--RTA (70°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

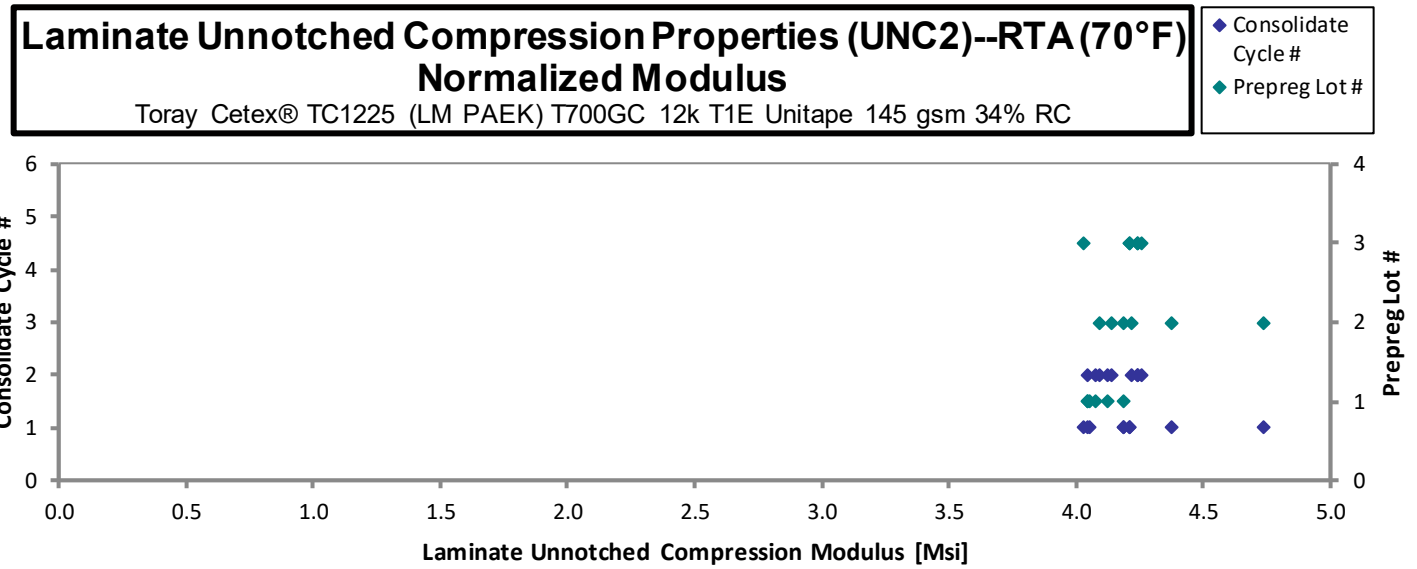
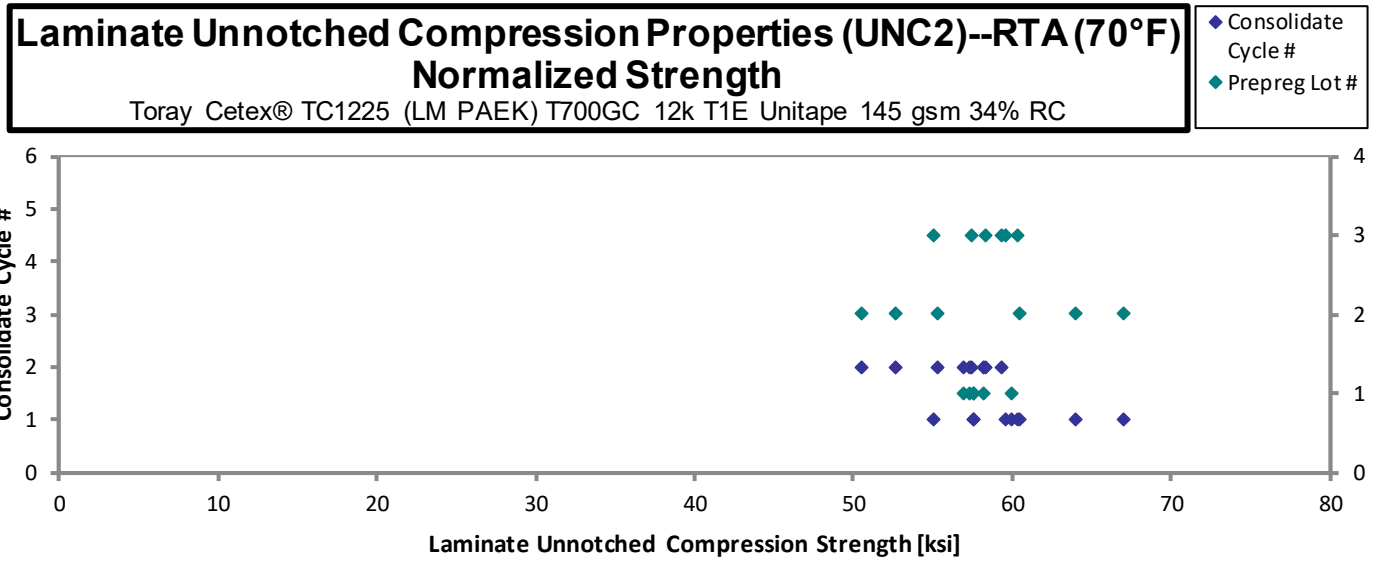
normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAXA111A*	A	C1	1	1	61.60	4.327	0.1009	20	BGM
TCAXA112A*	A	C1	1	1	64.17	4.335	0.1009	20	BGM
TCAXA113A	A	C1	1	1	61.45	4.470	0.1012	20	BGM
TCAXA211A*	A	C2	1	2	59.20	4.238	0.1039	20	BGM
TCAXA212A*	A	C2	1	2	60.74	4.218	0.1035	20	BGM
TCAXA213A	A	C2	1	2	59.97	4.318	0.1032	20	BGM
TCAXB111A*	B	C1	2	1	67.96	4.809	0.1064	20	BGM
TCAXB112A*	B	C1	2	1	66.40	4.547	0.1040	20	BGM
TCAXB113A	B	C1	2	1	63.28	4.383	0.1031	20	BGM
TCAXB211A*	B	C2	2	2	53.57	4.290	0.1062	20	BGM
TCAXB212A*	B	C2	2	2	56.60	4.236	0.1055	20	BGM
TCAXB213A	B	C2	2	2	51.73	4.199	0.1054	20	BGM
TCAXC111A*	C	C1	3	1	58.17	4.263	0.1022	20	BGM
TCAXC112A*	C	C1	3	1	63.72	4.452	0.1022	20	BGM
TCAXC113A	C	C1	3	1	63.03	4.457	0.1020	20	BGM
TCAXC211A*	C	C2	3	2	62.11	4.447	0.1031	20	BGM
TCAXC212A*	C	C2	3	2	59.80	4.433	0.1037	20	M(B,D)GM
TCAXC213A	C	C2	3	2	60.43	4.394	0.1042	20	M(B,D)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0050	57.56	4.043
0.0050	59.97	4.051
0.0051	57.58	4.188
0.0052	56.97	4.079
0.0052	58.20	4.042
0.0052	57.31	4.126
0.0053	66.94	4.737
0.0052	63.96	4.379
0.0052	60.42	4.185
0.0053	52.68	4.219
0.0053	55.28	4.138
0.0053	50.46	4.096
0.0051	55.02	4.033
0.0051	60.27	4.211
0.0051	59.51	4.208
0.0052	59.26	4.244
0.0052	57.42	4.257
0.0052	58.30	4.239

*Modulus are averaged values of 2 strain gages.

Average	60.77	4.379	Average_{norm}	0.0052	58.17	4.193
Standard Dev.	4.058	0.1473	Standard Dev_{norm}		3.737	0.1648
Coeff. of Var. [%]	6.678	3.365	Coeff. of Var. [%]_{norm}		6.423	3.931
Min.	51.73	4.199	Min.	0.0050	50.46	4.033
Max.	67.96	4.809	Max.	0.0053	66.94	4.737
Number of Spec.	18	18	Number of Spec.	18	18	18



Laminate Unnotched Compression Properties (UNC2)--ETA1 (275°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAXA111C	A	C1	1	1	38.32	3.806	0.1012	20	HAT
TCAXA112C	A	C1	1	1	37.04	3.787	0.1017	20	HAT
TCAXA113C	A	C1	1	1	41.33	3.789	0.1017	20	DGM
TCAXA211C	A	C2	1	2	43.68	3.921	0.1047	20	DGM
TCAXA212C	A	C2	1	2	41.20	3.823	0.1039	20	BGM
TCAXA213C	A	C2	1	2	38.72	3.707	0.1039	20	HAB
TCAXB111C	B	C1	2	1	44.25	4.273	0.1095	20	M(B,D)GM
TCAXB112C	B	C1	2	1	41.45	3.996	0.1068	20	M(B,D)GM
TCAXB113C	B	C1	2	1	41.38	3.822	0.1056	20	BGM
TCAXB211C	B	C2	2	2	39.86	3.608	0.1043	20	M(B,D)GM
TCAXB212C	B	C2	2	2	41.72	3.717	0.1039	20	M(B,D)GM
TCAXB213C	B	C2	2	2	40.23	3.940	0.1042	20	BGM
TCAXC111C	C	C1	3	1	42.56	3.679	0.1024	20	DGM
TCAXC112C	C	C1	3	1	38.84	4.133	0.1028	20	M(B,D)GM
TCAXC113C	C	C1	3	1	39.28	4.120	0.1028	20	DAT
TCAXC211C	C	C2	3	2	42.54	3.899	0.1044	20	DGM, KAB
TCAXC212C	C	C2	3	2	43.02	3.958	0.1047	20	M(B,D)GM
TCAXC213C	C	C2	3	2	41.22	3.838	0.1056	20	DGM, KAT

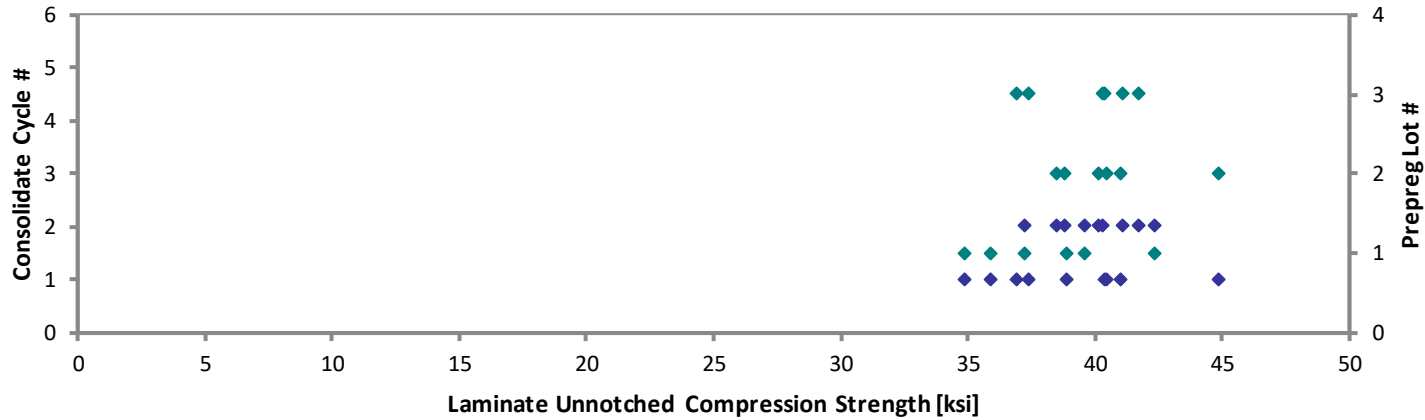
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0051	35.90	3.567
0.0051	34.89	3.567
0.0051	38.92	3.568
0.0052	42.35	3.801
0.0052	39.62	3.676
0.0052	37.23	3.565
0.0055	44.84	4.331
0.0053	40.98	3.950
0.0053	40.47	3.737
0.0052	38.50	3.485
0.0052	40.14	3.576
0.0052	38.83	3.802
0.0051	40.36	3.488
0.0051	36.95	3.932
0.0051	37.40	3.923
0.0052	41.10	3.767
0.0052	41.71	3.837
0.0053	40.29	3.752

Average 40.92 3.879
 Standard Dev. 1.958 0.1721
 Coeff. of Var. [%] 4.785 4.436
 Min. 37.04 3.608
 Max. 44.25 4.273
 Number of Spec. 18 18

Average_{norm} 0.0052 39.47 3.740
 Standard Dev._{norm} 2.437 0.2116
 Coeff. of Var. [%]_{norm} 6.174 5.657
 Min. 0.0051 34.89 3.485
 Max. 0.0055 44.84 4.331
 Number of Spec. 18 18 18

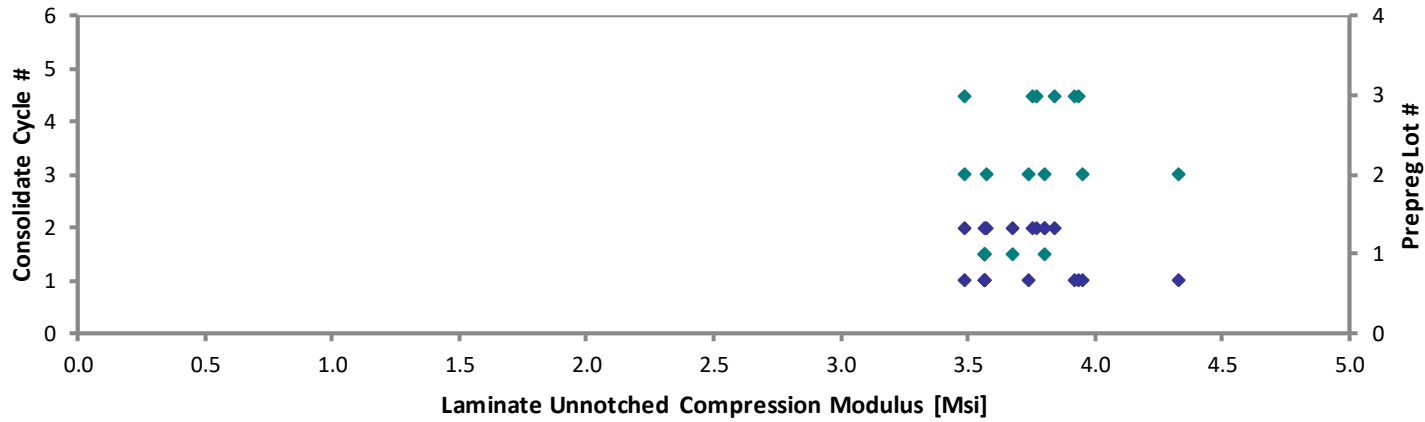
Laminate Unnotched Compression Properties (UNC2)--ETA1 (275°F)
Normalized Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
 ◆ Prepreg Lot #



Laminate Unnotched Compression Properties (UNC2)--ETA1 (275°F)
Normalized Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
 ◆ Prepreg Lot #



4.16 “50/40/10” Unnotched Compression 3 Properties (UNC3)

Laminate Unnotched Compression Properties (UNC3)--RTA (70°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAYA111A*	A	C1	1	1	110.9	9.909	0.1044	20	BAB
TCAYA112A ^{*/**}	A	C1	1	1		10.07	0.1036	20	CIT
TCAYA113A	A	C1	1	1	107.8	10.09	0.1051	20	BAT
TCAYA114A ^{***}	A	C1	1	1	103.2		0.1054	20	BAT
TCAYA211A ^{*/**}	A	C2	1	2		9.889	0.1039	20	HIB, CIB
TCAYA212A*	A	C2	1	2	107.9	9.513	0.1036	20	BGM, CIT
TCAYA213A	A	C2	1	2	94.82	9.327	0.1036	20	BAT
TCAYA214A ^{***}	A	C2	1	2	108.1		0.1033	20	BGM
TCAYB111A*	B	C1	2	1	107.0	9.894	0.1101	20	BAT
TCAYB112A*	B	C1	2	1	97.92	9.441	0.1091	20	BGM
TCAYB113A	B	C1	2	1	96.57	9.290	0.1080	20	BAB
TCAYB211A*	B	C2	2	2	101.2	9.520	0.1006	20	BAT
TCAYB212A*	B	C2	2	2	106.1	9.345	0.1014	20	BAB
TCAYB213A	B	C2	2	2	100.7	9.391	0.1015	20	BAT
TCAYC111A ^{*/**}	C	C1	3	1		10.22	0.09973	20	HIT
TCAYC112A*	C	C1	3	1	101.2	10.06	0.1002	20	BAT
TCAYC113A	C	C1	3	1	100.1	9.957	0.1006	20	BAT
TCAYC114A ^{***}	C	C1	3	1	102.4		0.1001	20	BAT
TCAYC211A*	C	C2	3	2	101.1	10.34	0.09918	20	BAT
TCAYC212A*	C	C2	3	2	103.8	10.30	0.09900	20	BAT
TCAYC213A	C	C2	3	2	99.65	10.17	0.09903	20	BAT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0052	107.2	9.577
0.0052		9.656
0.0053	104.8	9.821
0.0053	100.8	
0.0052		9.513
0.0052	103.5	9.125
0.0052	90.95	8.945
0.0052	103.3	
0.0055	109.1	10.09
0.0055	98.91	9.537
0.0054	96.57	9.290
0.0050	94.30	8.867
0.0051	99.61	8.776
0.0051	94.58	8.824
0.0050		9.433
0.0050	93.89	9.328
0.0050	93.23	9.274
0.0050	94.94	
0.0050	92.84	9.493
0.0050	95.14	9.445
0.0050	91.38	9.327

*Modulus are averaged values of 2 strain gages.

**Strength not reported due to unacceptable failure mode.

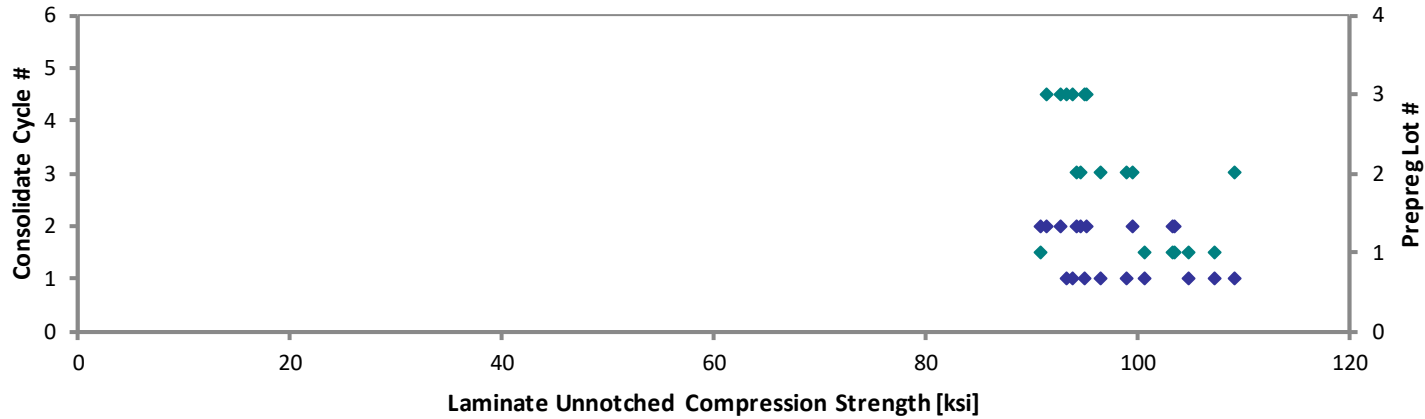
***Specimen was not gaged, only strength is tested.

Average	102.8	9.818
Standard Dev.	4.412	0.3659
Coeff. of Var. [%]	4.291	3.727
Min.	94.82	9.290
Max.	110.9	10.34
Number of Spec.	18	18

Average _{norm}	0.0051	98.06	9.351
Standard Dev. _{norm}		5.584	0.3492
Coeff. of Var. [%] _{norm}		5.695	3.734
Min.	0.0050	90.95	8.776
Max.	0.0055	109.1	10.09
Number of Spec.	21	18	18

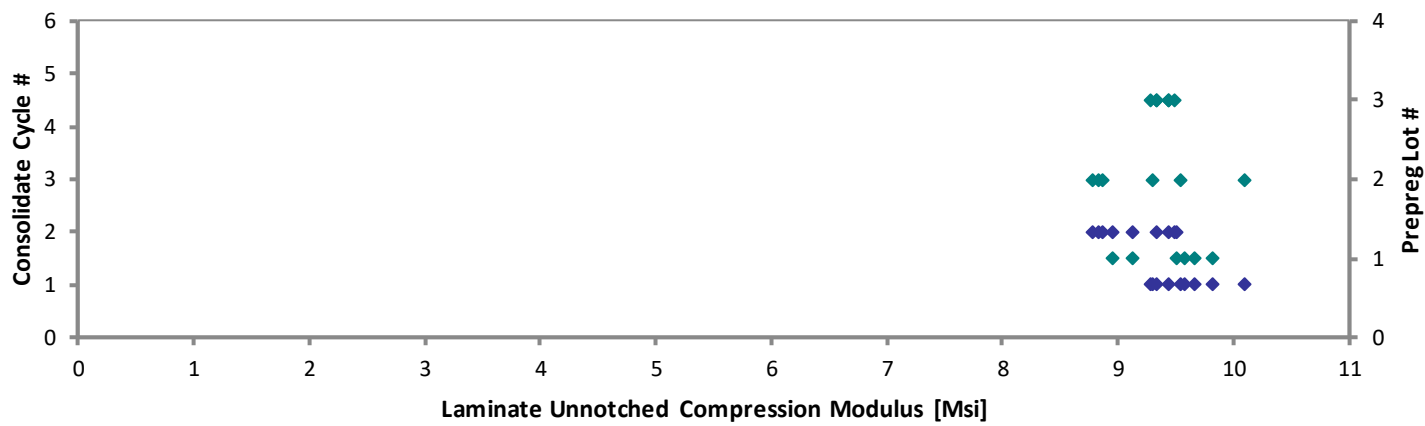
Laminate Unnotched Compression Properties (UNC3)--RTA (70°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

- ◆ Consolidate Cycle #
- ◆ Prepreg Lot #



Laminate Unnotched Compression Properties (UNC3)--RTA (70°F)
Normalized Modulus
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

- ◆ Consolidate Cycle #
- ◆ Prepreg Lot #



Laminate Unnotched Compression Properties (UNC3)--ETA1 (275°F)
Strength & Modulus
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

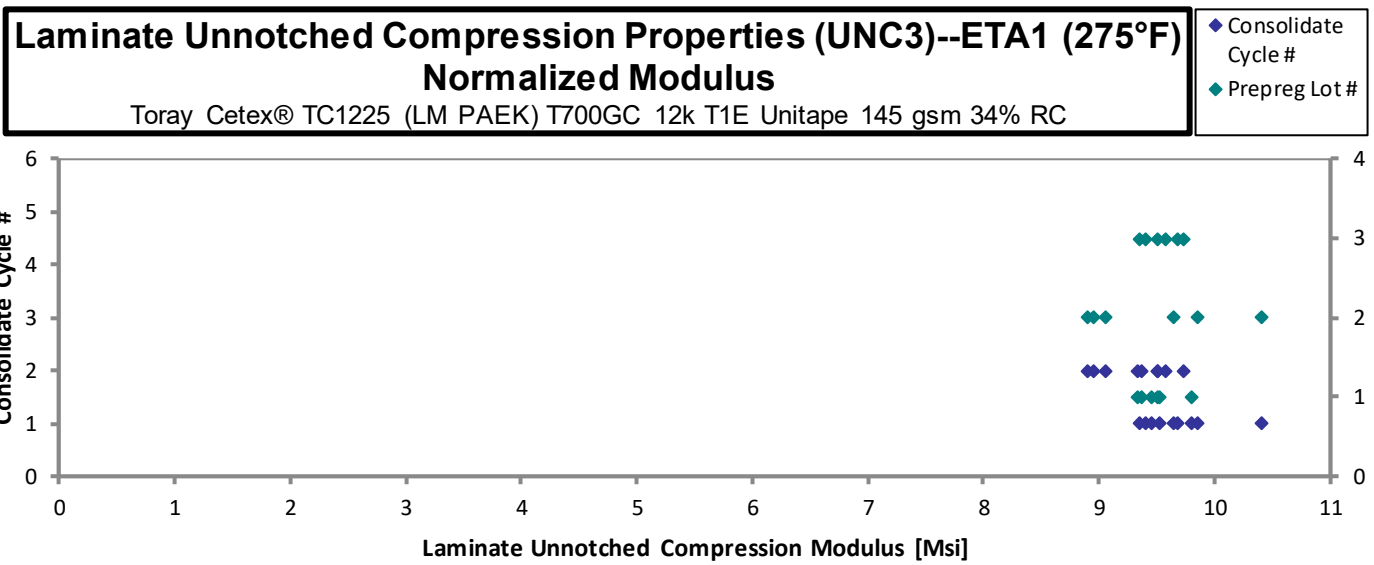
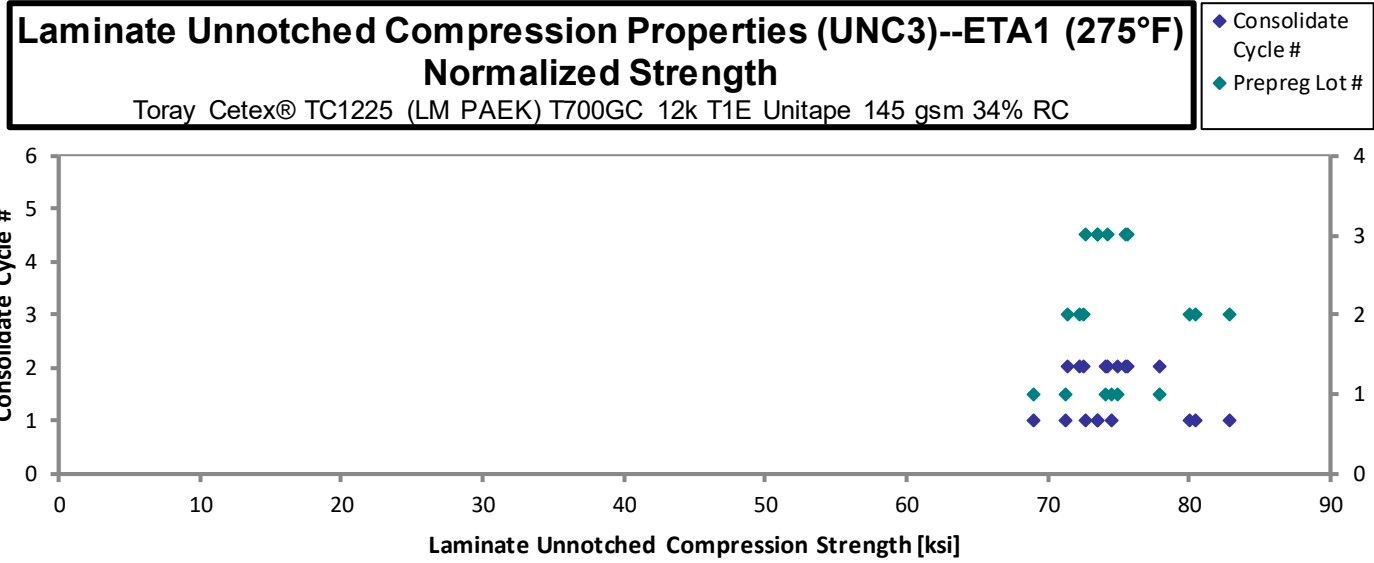
normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAYA111C	A	C1	1	1	71.87	9.922	0.1036	20	HAT, HIT
TCAYA112C	A	C1	1	1	74.18	9.829	0.1038	20	HAB, HIB
TCAYA113C	A	C1	1	1	75.56	9.936	0.1065	20	BAB
TCAYA211C	A	C2	1	2	76.71	9.708	0.1043	20	BAB
TCAYA212C	A	C2	1	2	77.41	9.641	0.1045	20	BAT
TCAYA213C	A	C2	1	2	80.31	9.792	0.1048	20	BAB, HIB
TCAYB111C	B	C1	2	1	78.39	10.13	0.1109	20	HAT, HIT
TCAYB112C	B	C1	2	1	82.81	9.851	0.1080	20	BAT
TCAYB113C	B	C1	2	1	80.99	9.760	0.1067	20	BAB, HIB
TCAYB211C	B	C2	2	2	77.70	9.628	0.1005	20	BAB
TCAYB213C	B	C2	2	2	76.80	9.581	0.1020	20	HAT, HIT
TCAYB214C	B	C2	2	2	75.76	9.449	0.1018	20	BAB
TCAYC111C	C	C1	3	1	79.64	10.13	0.09972	20	HAT, HIT
TCAYC112C	C	C1	3	1	79.40	10.45	0.1001	20	BAT
TCAYC113C	C	C1	3	1	78.11	10.10	0.1006	20	BAT
TCAYC211C	C	C2	3	2	82.81	10.46	0.09875	20	BAT
TCAYC212C	C	C2	3	2	80.81	10.60	0.09913	20	BAT
TCAYC213C	C	C2	3	2	82.02	10.33	0.09950	20	BAT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0052	68.94	9.518
0.0052	71.30	9.448
0.0053	74.54	9.801
0.0052	74.08	9.375
0.0052	74.92	9.330
0.0052	77.93	9.502
0.0055	80.51	10.40
0.0054	82.81	9.851
0.0053	80.00	9.641
0.0050	72.27	8.955
0.0051	72.52	9.048
0.0051	71.42	8.908
0.0050	73.53	9.354
0.0050	73.55	9.678
0.0050	72.72	9.407
0.0049	75.72	9.568
0.0050	74.18	9.730
0.0050	75.57	9.513

Average 78.41 9.961
 Standard Dev. 3.002 0.3337
 Coeff. of Var. [%] 3.829 3.350
 Min. 71.87 9.449
 Max. 82.81 10.60
 Number of Spec. 18 18

Average_{norm} 0.0052 74.81 9.501
 Standard Dev._{norm} 3.541 0.3485
 Coeff. of Var. [%]_{norm} 4.733 3.668
 Min. 0.0049 68.94 8.908
 Max. 0.0055 82.81 10.40
 Number of Spec. 18 18 18



4.17 Laminate Short-Beam Strength Properties (SBS1) – Reference only

Informational use only due to invalid failure modes.

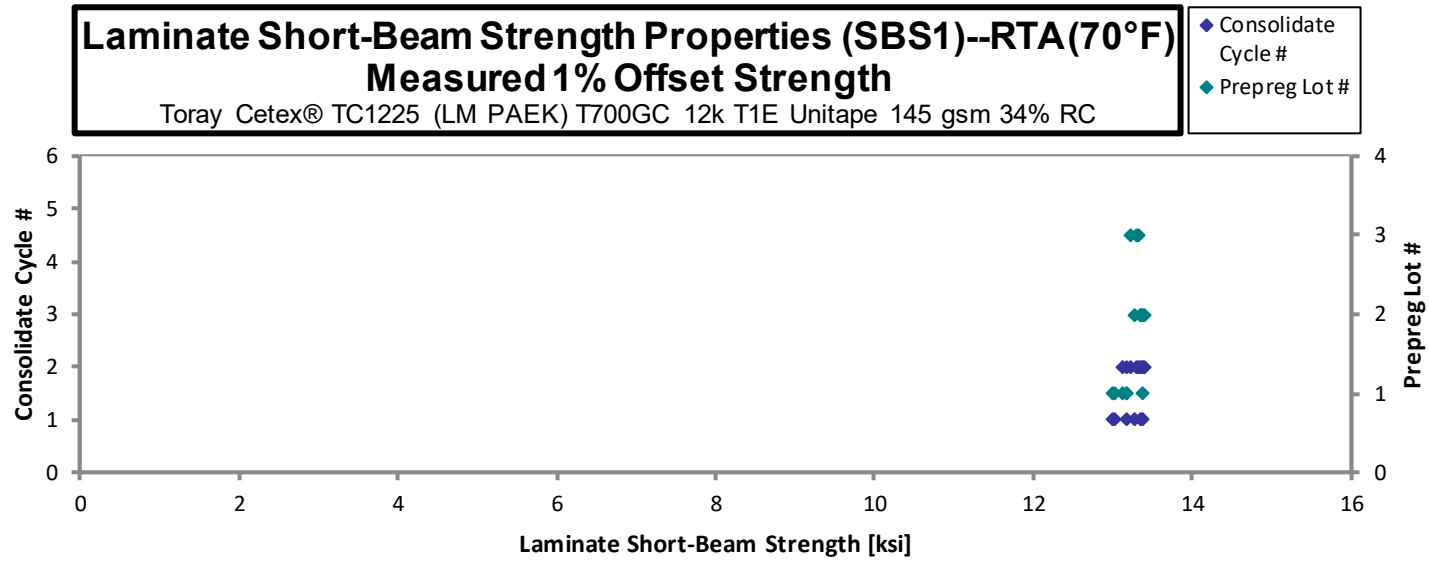
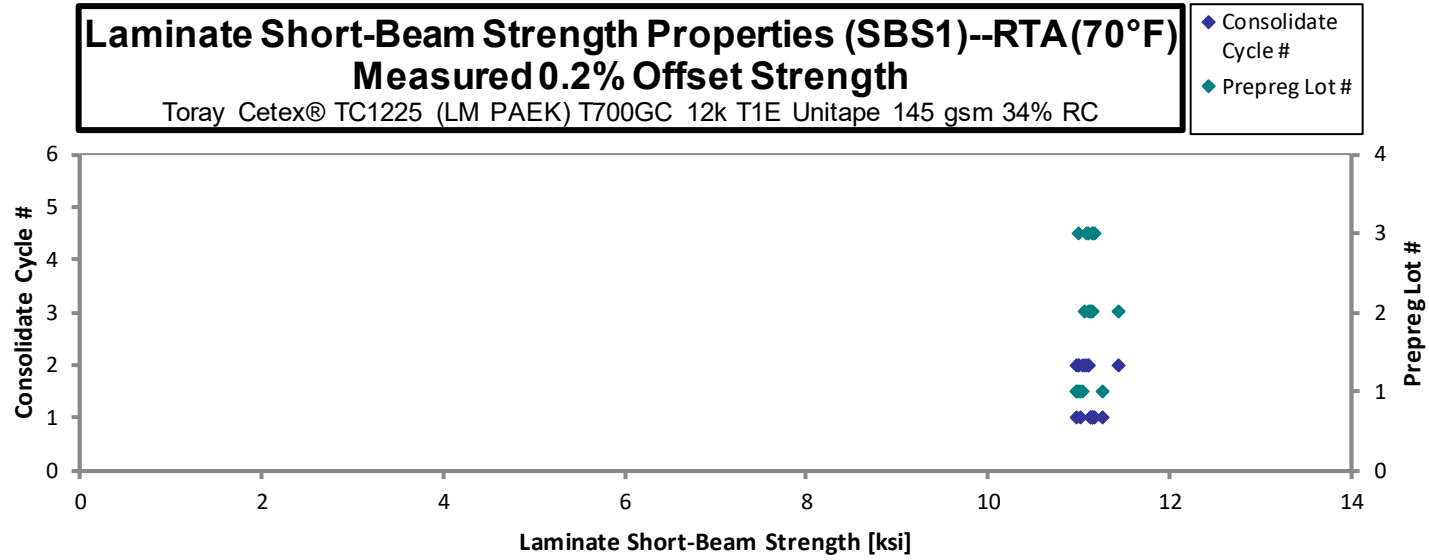
Laminate Short-Beam Strength Properties (SBS1)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCAPA111A	A	C1	1	1	11.27	13.01	0.1226	24	0.0051
TCAPA112A	A	C1	1	1	11.02	13.17	0.1225	24	0.0051
TCAPA113A	A	C1	1	1	10.97	13.03	0.1224	24	0.0051
TCAPA211A	A	C2	1	2	10.97	13.16	0.1231	24	0.0051
TCAPA212A	A	C2	1	2	11.03	13.37	0.1246	24	0.0052
TCAPA213A	A	C2	1	2	10.99	13.12	0.1232	24	0.0051
TCAPB111A	B	C1	2	1	11.12	13.26	0.1225	24	0.0051
TCAPB112A	B	C1	2	1	11.14	13.38	0.1224	24	0.0051
TCAPB113A	B	C1	2	1	11.14	13.35	0.1223	24	0.0051
TCAPB211A	B	C2	2	2	11.43	13.35	0.1244	24	0.0052
TCAPB212A	B	C2	2	2	11.11	13.38	0.1244	24	0.0052
TCAPB213A	B	C2	2	2	11.07	13.39	0.1246	24	0.0052
TCAPC111A*	C	C1	3	1	11.15		0.1237	24	0.0052
TCAPC112A*	C	C1	3	1	11.18		0.1240	24	0.0052
TCAPC113A*	C	C1	3	1	11.15		0.1242	24	0.0052
TCAPC211A	C	C2	3	2	11.08	13.32	0.1222	24	0.0051
TCAPC212A	C	C2	3	2	11.01	13.22	0.1220	24	0.0051
TCAPC213A	C	C2	3	2	11.10	13.30	0.1220	24	0.0051

*1% offset strength not reported as it occurs after max load.

Note: Failure mode at failure is not reported because it is not applicable for offset strength.

Average	11.11	13.25	0.0051
Standard Dev.	0.1134	0.1297	
Coeff. of Var. [%]	1.021	0.9784	
Min.	10.97	13.01	0.0051
Max.	11.43	13.39	0.0052
Number of Spec.	18	15	18



**Laminate Short-Beam Strength Properties (SBS1)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

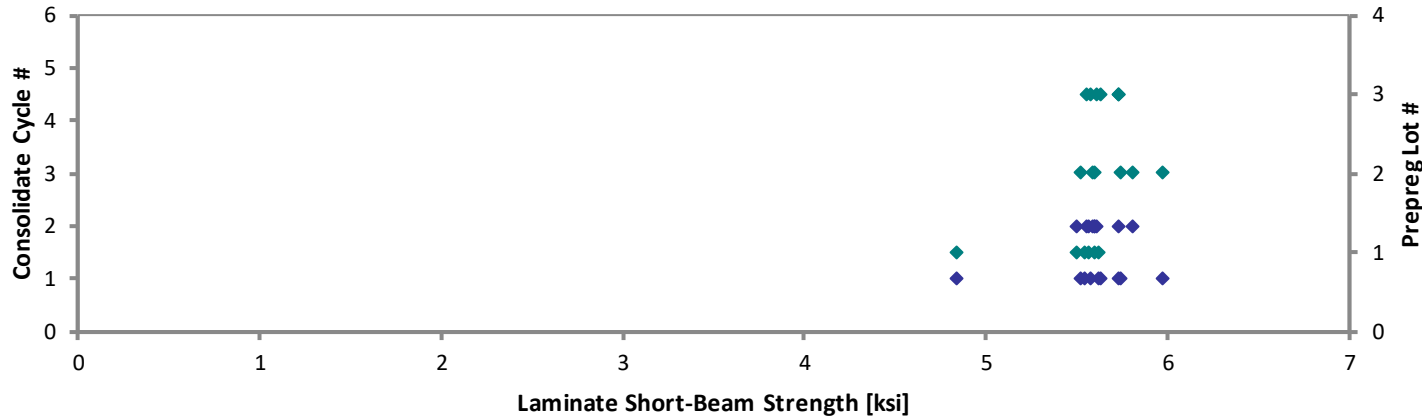
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCAPA111C	A	C1	1	1	5.623	6.915	0.1229	24	0.0051
TCAPA112C	A	C1	1	1	4.843	6.220	0.1232	24	0.0051
TCAPA113C	A	C1	1	1	5.543	6.802	0.1230	24	0.0051
TCAPA211C	A	C2	1	2	5.493	6.765	0.1231	24	0.0051
TCAPA212C	A	C2	1	2	5.566	6.797	0.1247	24	0.0052
TCAPA213C	A	C2	1	2	5.593	6.906	0.1248	24	0.0052
TCAPB111C	B	C1	2	1	5.967	7.185	0.1239	24	0.0052
TCAPB112C	B	C1	2	1	5.516	6.860	0.1238	24	0.0052
TCAPB113C	B	C1	2	1	5.746	6.934	0.1236	24	0.0052
TCAPB211C	B	C2	2	2	5.603	6.928	0.1236	24	0.0052
TCAPB212C	B	C2	2	2	5.582	6.858	0.1236	24	0.0051
TCAPB213C	B	C2	2	2	5.812	7.027	0.1238	24	0.0052
TCAPC111C	C	C1	3	1	5.626	6.994	0.1239	24	0.0052
TCAPC112C	C	C1	3	1	5.732	7.032	0.1244	24	0.0052
TCAPC113C	C	C1	3	1	5.581	6.920	0.1248	24	0.0052
TCAPC211C	C	C2	3	2	5.551	6.840	0.1217	24	0.0051
TCAPC212C	C	C2	3	2	5.614	6.973	0.1214	24	0.0051
TCAPC213C	C	C2	3	2	5.725	7.034	0.1216	24	0.0051

Note: Failure mode at failure is not reported because it is not applicable for offset strength.

Average	5.595	6.888	0.0051
Standard Dev.	0.2215	0.1962	
Coeff. of Var. [%]	3.958	2.848	
Min.	4.843	6.220	0.0051
Max.	5.967	7.185	0.0052
Number of Spec.	18	18	18

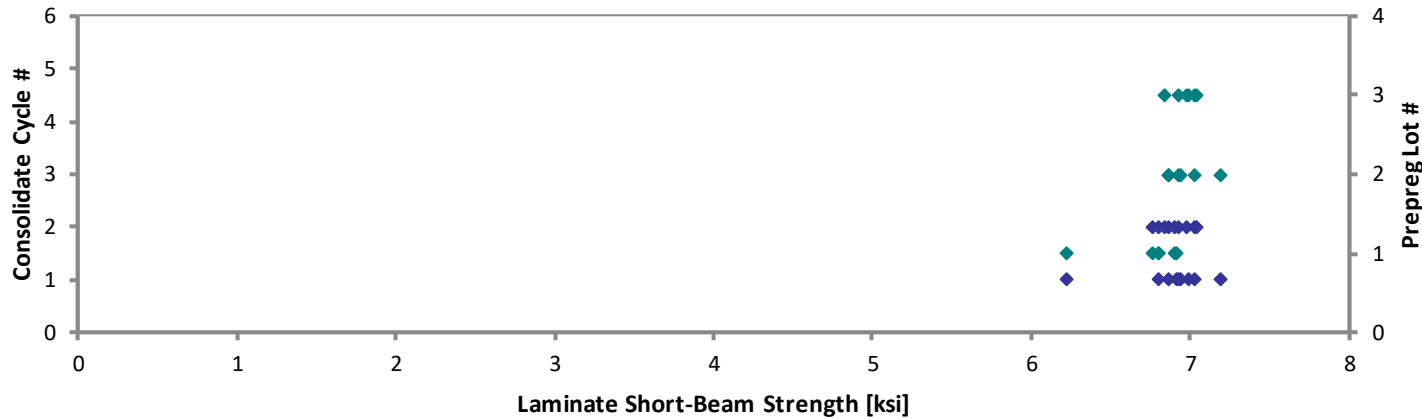
Laminate Short-Beam Strength Properties (SBS1)--ETA1 (275°F)
Measured 0.2% Offset Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
◆ Prepreg Lot #



Laminate Short-Beam Strength Properties (SBS1)--ETA1 (275°F)
Measured 1% Offset Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
◆ Prepreg Lot #

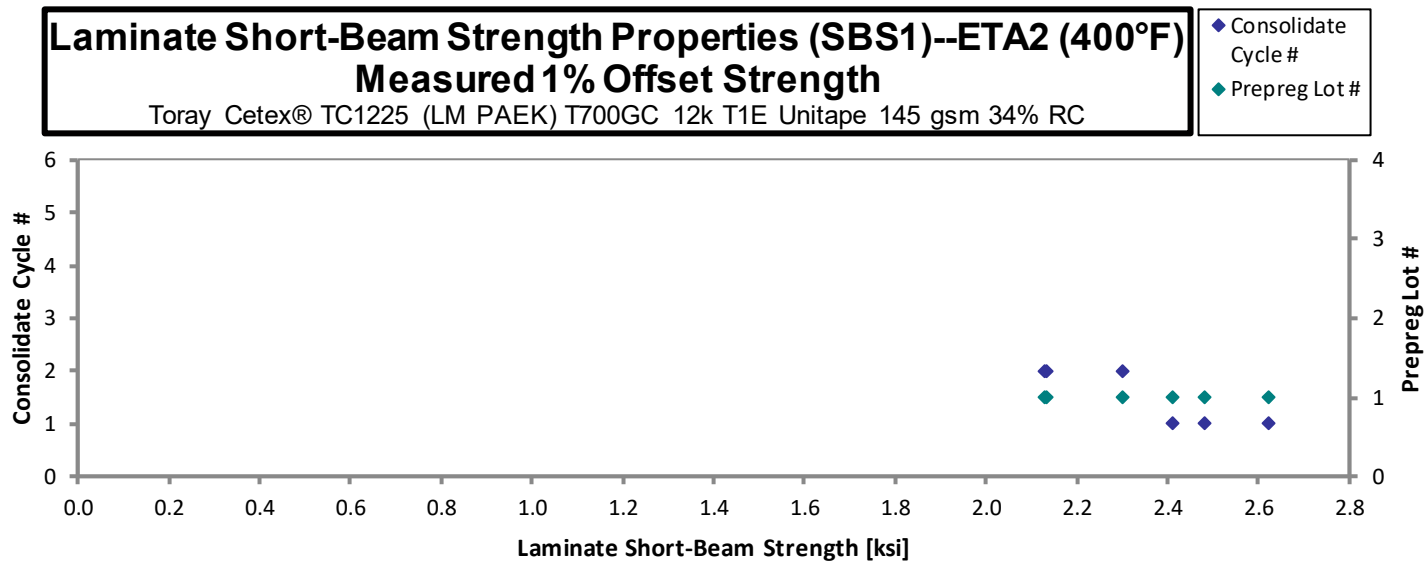
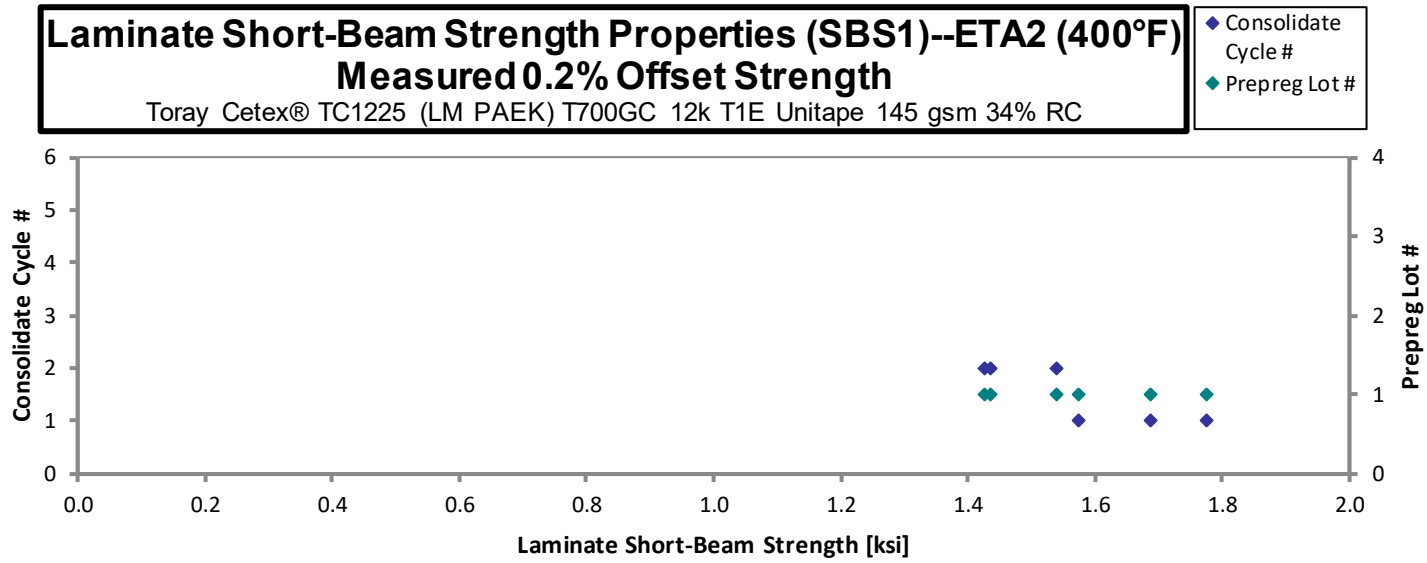


Laminate Short-Beam Strength Properties (SBS1)--ETA2 (400°F) Strength Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCAPA111D	A	C1	1	1	1.776	2.621	0.1235	24	0.0051
TCAPA112D	A	C1	1	1	1.688	2.482	0.1238	24	0.0052
TCAPA113D	A	C1	1	1	1.574	2.411	0.1237	24	0.0052
TCAPA211D	A	C2	1	2	1.540	2.299	0.1254	24	0.0052
TCAPA212D	A	C2	1	2	1.436	2.132	0.1253	24	0.0052
TCAPA213D	A	C2	1	2	1.428	2.131	0.1252	24	0.0052

Note: Failure mode at failure is not reported because it is not applicable for offset strength.

Average	1.574	2.346	0.0052
Standard Dev.	0.1381	0.1962	
Coeff. of Var. [%]	8.777	8.363	
Min.	1.428	2.131	0.0051
Max.	1.776	2.621	0.0052
Number of Spec.	6	6	6



**Laminate Short-Beam Strength Properties (SBS1)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

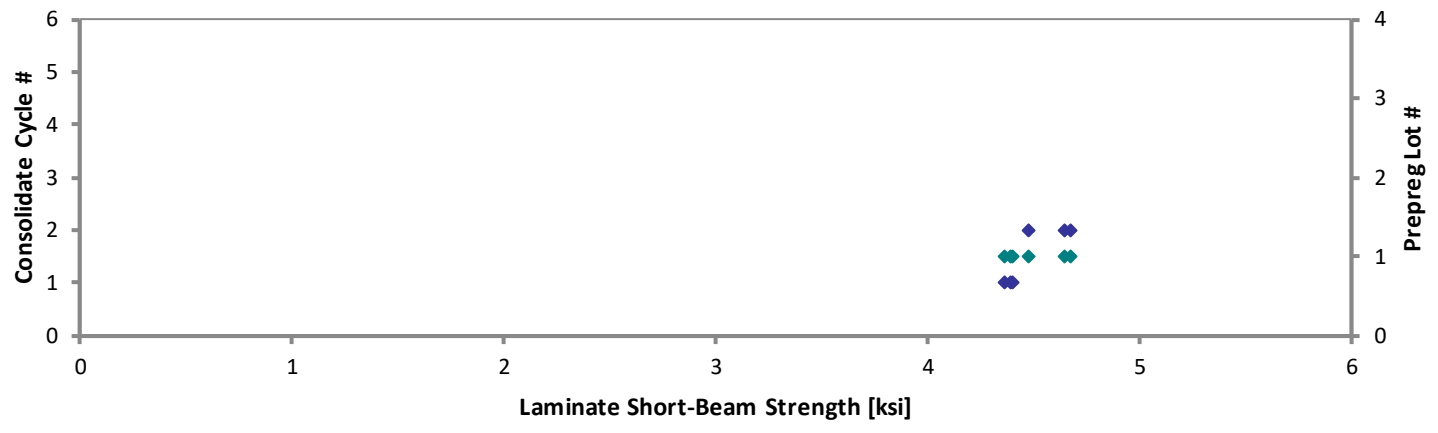
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	0.2% Offset Strength [ksi]	1% Offset Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCAPA111E	A	C1	1	1	4.363	5.830	0.1239	24	0.0052
TCAPA112E	A	C1	1	1	4.402	5.894	0.1238	24	0.0052
TCAPA113E	A	C1	1	1	4.389	5.864	0.1235	24	0.0051
TCAPA211E	A	C2	1	2	4.677	6.037	0.1260	24	0.0053
TCAPA212E	A	C2	1	2	4.647	6.053	0.1257	24	0.0052
TCAPA213E	A	C2	1	2	4.475	5.947	0.1254	24	0.0052

Note: Failure mode at failure is not reported because it is not applicable for offset strength.

Average	4.492	5.938	0.0052
Standard Dev.	0.1368	0.09205	
Coeff. of Var. [%]	3.045	1.550	
Min.	4.363	5.830	0.0051
Max.	4.677	6.053	0.0053
Number of Spec.	6	6	6

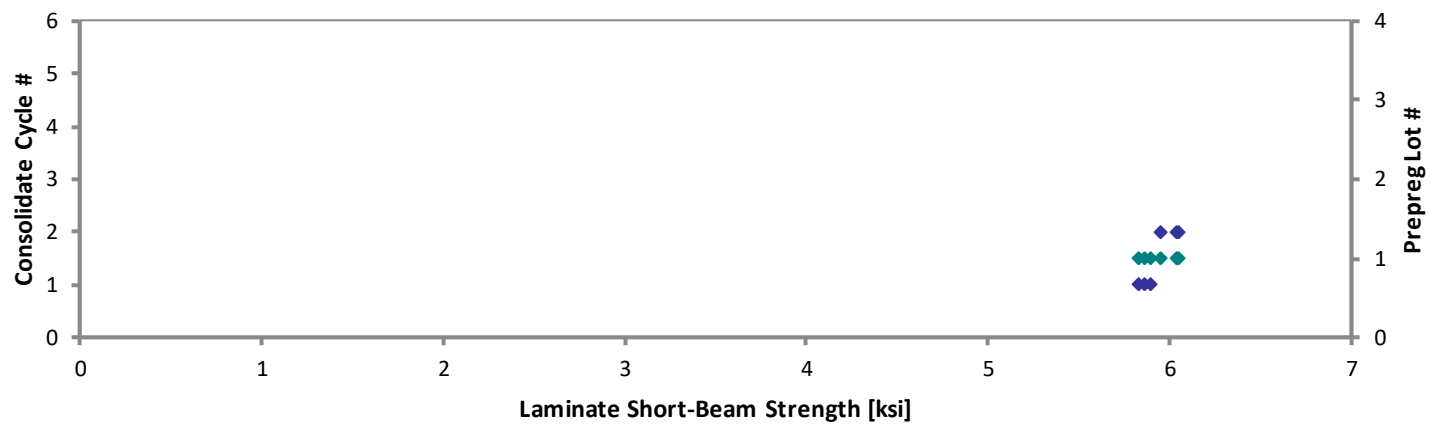
Laminate Short-Beam Strength Properties (SBS1)--ETW(275°F)
Measured 0.2% Offset Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
◆ Prepreg Lot #



Laminate Short-Beam Strength Properties (SBS1)--ETW(275°F)
Measured 1% Offset Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
◆ Prepreg Lot #

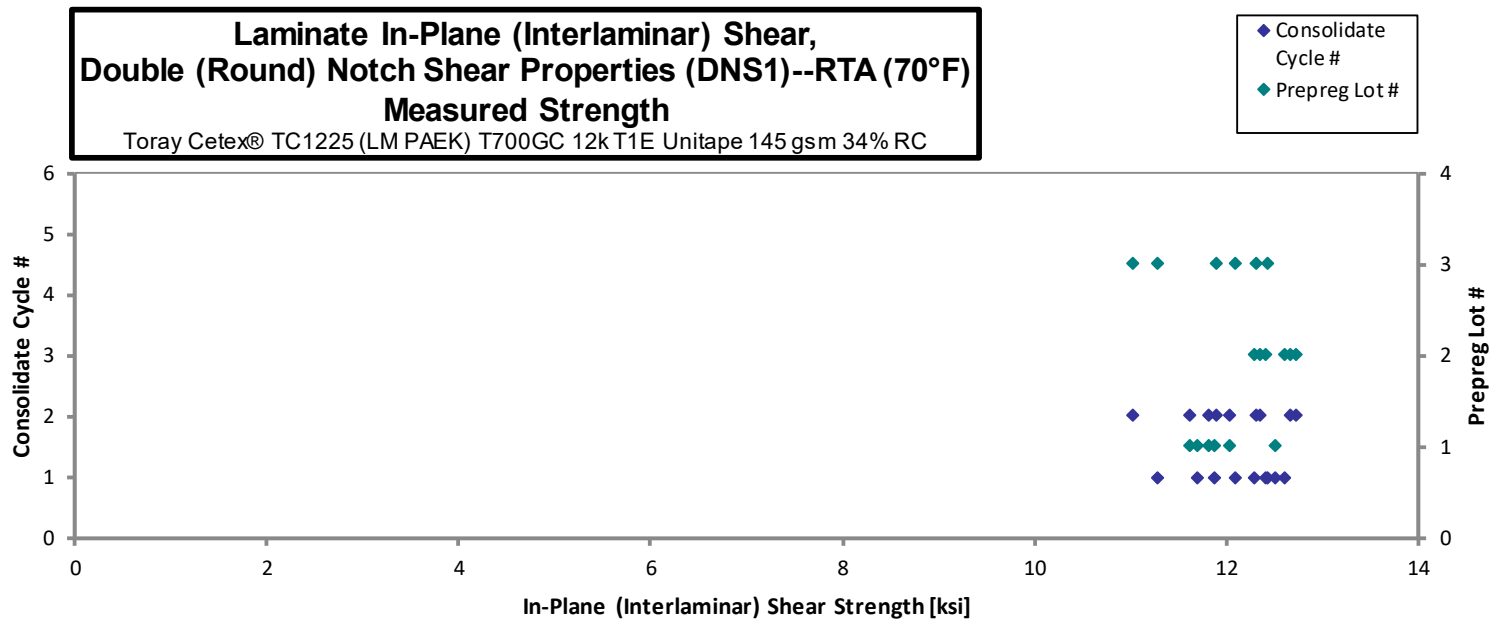


4.18 Laminate In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS1)

Laminate In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS1)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCAV1A111A	A	C1	1	1	11.88	0.1249	24	0.0052	GAGE SECTION SHEAR
TCAV1A112A	A	C1	1	1	12.51	0.1245	24	0.0052	GAGE SECTION SHEAR
TCAV1A113A	A	C1	1	1	11.70	0.1241	24	0.0052	GAGE SECTION SHEAR
TCAV1A211A	A	C2	1	2	11.81	0.1229	24	0.0051	GAGE SECTION SHEAR
TCAV1A212A	A	C2	1	2	11.62	0.1227	24	0.0051	GAGE SECTION SHEAR
TCAV1A213A	A	C2	1	2	12.03	0.1224	24	0.0051	GAGE SECTION SHEAR
TCAV1B111A	B	C1	2	1	12.61	0.1223	24	0.0051	GAGE SECTION SHEAR
TCAV1B112A	B	C1	2	1	12.30	0.1220	24	0.0051	GAGE SECTION SHEAR
TCAV1B113A	B	C1	2	1	12.42	0.1222	24	0.0051	GAGE SECTION SHEAR
TCAV1B211A	B	C2	2	2	12.68	0.1240	24	0.0052	GAGE SECTION SHEAR
TCAV1B212A	B	C2	2	2	12.73	0.1242	24	0.0052	GAGE SECTION SHEAR
TCAV1B213A	B	C2	2	2	12.35	0.1240	24	0.0052	GAGE SECTION SHEAR
TCAV1C111A	C	C1	3	1	11.28	0.1243	24	0.0052	GAGE SECTION SHEAR
TCAV1C112A	C	C1	3	1	12.43	0.1238	24	0.0052	GAGE SECTION SHEAR
TCAV1C113A	C	C1	3	1	12.09	0.1235	24	0.0051	GAGE SECTION SHEAR
TCAV1C211A	C	C2	3	2	12.32	0.1226	24	0.0051	GAGE SECTION SHEAR
TCAV1C212A	C	C2	3	2	11.02	0.1226	24	0.0051	GAGE SECTION SHEAR
TCAV1C213A	C	C2	3	2	11.89	0.1221	24	0.0051	GAGE SECTION SHEAR

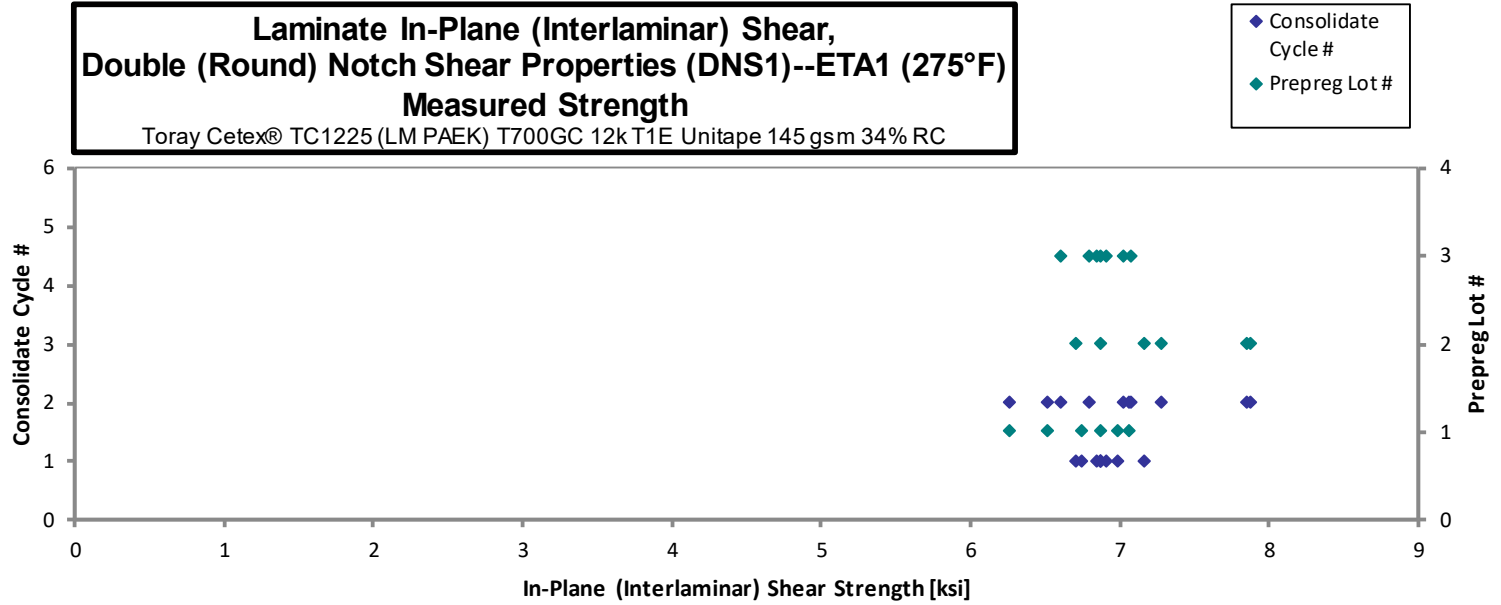
Average	12.09	0.0051
Standard Dev.	0.4804	
Coeff. of Var. [%]	3.972	
Min.	11.02	0.0051
Max.	12.73	0.0052
Number of Spec.	18	18



**Laminate In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS1)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAV1A111C	A	C1	1	1	6.987	0.1250	24	0.0052	GAGE SECTION SHEAR
TCAV1A112C	A	C1	1	1	6.868	0.1246	24	0.0052	GAGE SECTION SHEAR
TCAV1A113C	A	C1	1	1	6.743	0.1248	24	0.0052	GAGE SECTION SHEAR
TCAV1A211C	A	C2	1	2	6.515	0.1225	24	0.0051	GAGE SECTION SHEAR
TCAV1A212C	A	C2	1	2	7.059	0.1221	24	0.0051	GAGE SECTION SHEAR
TCAV1A213C	A	C2	1	2	6.262	0.1221	24	0.0051	GAGE SECTION SHEAR
TCAV1B111C	B	C1	2	1	7.163	0.1222	24	0.0051	GAGE SECTION SHEAR
TCAV1B112C	B	C1	2	1	6.711	0.1221	24	0.0051	GAGE SECTION SHEAR
TCAV1B113C	B	C1	2	1	6.877	0.1216	24	0.0051	GAGE SECTION SHEAR
TCAV1B211C	B	C2	2	2	7.847	0.1241	24	0.0052	GAGE SECTION SHEAR
TCAV1B212C	B	C2	2	2	7.874	0.1235	24	0.0051	GAGE SECTION SHEAR
TCAV1B213C	B	C2	2	2	7.277	0.1231	24	0.0051	GAGE SECTION SHEAR
TCAV1C111C	C	C1	3	1	6.876	0.1241	24	0.0052	GAGE SECTION SHEAR
TCAV1C112C	C	C1	3	1	6.843	0.1246	24	0.0052	GAGE SECTION SHEAR
TCAV1C113C	C	C1	3	1	6.911	0.1239	24	0.0052	GAGE SECTION SHEAR
TCAV1C211C	C	C2	3	2	6.795	0.1218	24	0.0051	GAGE SECTION SHEAR
TCAV1C212C	C	C2	3	2	7.026	0.1220	24	0.0051	GAGE SECTION SHEAR
TCAV1C213C	C	C2	3	2	7.078	0.1218	24	0.0051	GAGE SECTION SHEAR
TCAV1C214C	C	C2	3	2	6.608	0.1221	24	0.0051	GAGE SECTION SHEAR

Average	6.964	0.0051
Standard Dev.	0.3927	
Coeff. of Var. [%]	5.638	
Min.	6.262	0.0051
Max.	7.874	0.0052
Number of Spec.	19	19



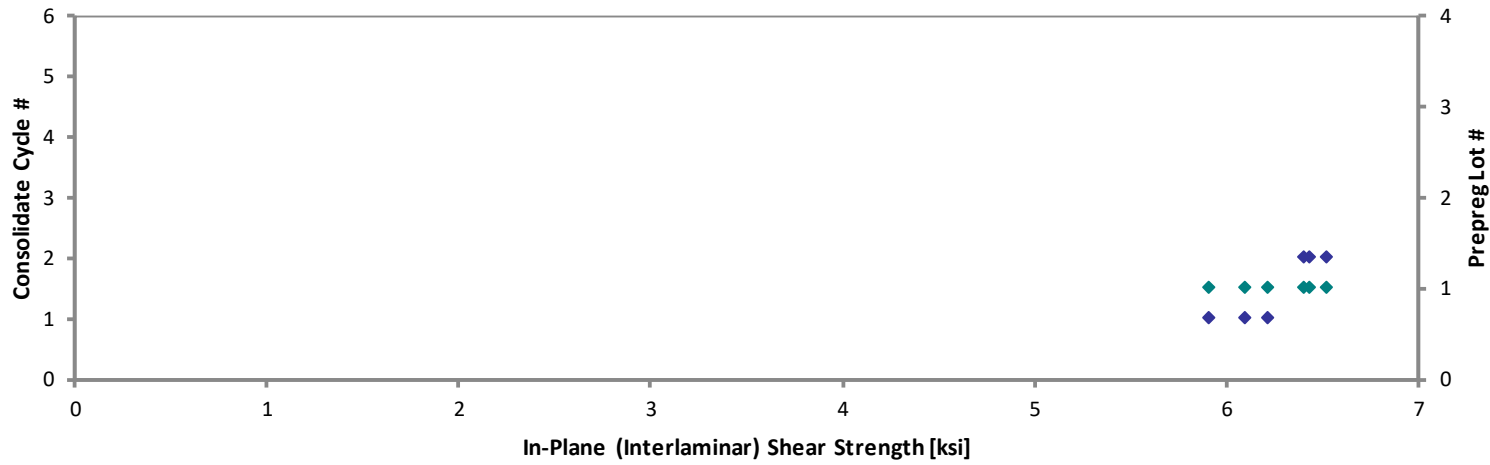
**Laminate In-Plane (Interlaminar) Shear, Double (Round) Notch Shear Properties (DNS1)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCAV1A111E	A	C1	1	1	5.911	0.1245	24	0.0052	GAGE SECTION SHEAR
TCAV1A112E	A	C1	1	1	6.093	0.1242	24	0.0052	GAGE SECTION SHEAR
TCAV1A113E	A	C1	1	1	6.215	0.1242	24	0.0052	GAGE SECTION SHEAR
TCAV1A211E	A	C2	1	2	6.525	0.1230	24	0.0051	GAGE SECTION SHEAR
TCAV1A212E	A	C2	1	2	6.437	0.1230	24	0.0051	GAGE SECTION SHEAR
TCAV1A213E	A	C2	1	2	6.407	0.1230	24	0.0051	GAGE SECTION SHEAR

Average	6.265	0.0052
Standard Dev.	0.2343	
Coeff. of Var. [%]	3.739	
Min.	5.911	0.0051
Max.	6.525	0.0052
Number of Spec.	6	6

**Laminate In-Plane (Interlaminar) Shear,
Double (Round) Notch Shear Properties (DNS1)--ETW (275°F)
Measured Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate
Cycle #
◆ Prepreg Lot #



4.19 “25/50/25” Open-Hole Tension 1 Properties (OHT1)

Laminate Open-Hole Tension Properties (OHT1)--CTA (-65°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

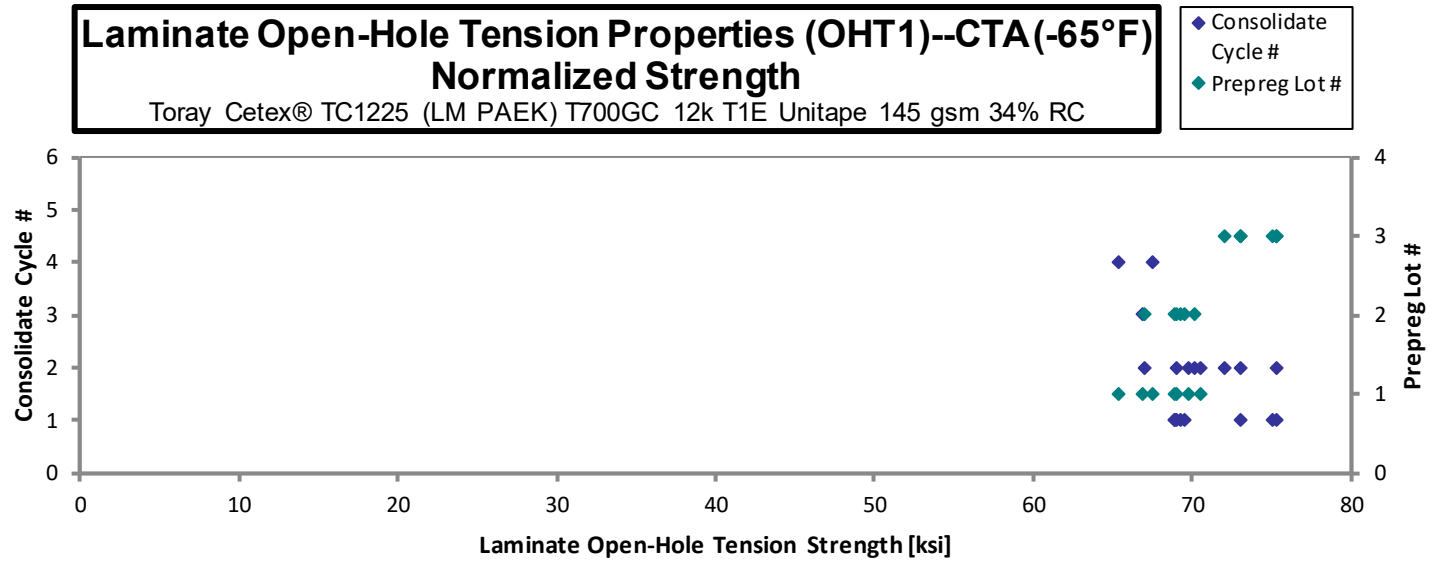
normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCADA111B	A	C1	1	1	70.91	0.08410	16	AGM
TCADA112B	A	C1	1	1	70.84	0.08403	16	AGM
TCADA211B	A	C2	1	2	69.75	0.08643	16	AGM
TCADA212B	A	C2	1	2	70.54	0.08643	16	AGM
TCADA311B	A	C3	1	3	70.60	0.08183	16	AGM
TCADA411B	A	C4	1	4	68.86	0.08473	16	AGM
TCADA412B	A	C4	1	4	66.89	0.08450	16	AGM
TCADB111B	B	C1	2	1	66.24	0.08985	16	AGM
TCADB112B	B	C1	2	1	68.21	0.08805	16	AGM
TCADB113B	B	C1	2	1	66.76	0.08962	16	AGM
TCADB211B	B	C2	2	2	72.10	0.08403	16	AGM
TCADB212B	B	C2	2	2	70.97	0.08395	16	AGM
TCADB213B	B	C2	2	2	69.42	0.08345	16	AGM
TCADC111B	C	C1	3	1	77.01	0.08423	16	AGM
TCADC112B	C	C1	3	1	77.82	0.08365	16	AGM
TCADC113B	C	C1	3	1	75.44	0.08358	16	AGM
TCADC211B	C	C2	3	2	77.04	0.08193	16	AGM
TCADC212B	C	C2	3	2	74.79	0.08315	16	AGM
TCADC213B	C	C2	3	2	78.42	0.08298	16	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0053	69.02
0.0053	68.90
0.0054	69.78
0.0054	70.57
0.0051	66.86
0.0053	67.53
0.0053	65.42
0.0056	68.89
0.0055	69.52
0.0056	69.25
0.0053	70.13
0.0052	68.95
0.0052	67.05
0.0053	75.08
0.0052	75.35
0.0052	72.98
0.0051	73.06
0.0052	71.98
0.0052	75.32

Average 71.72
 Standard Dev. 3.903
 Coeff. of Var. [%] 5.442
 Min. 66.24
 Max. 78.42
 Number of Spec. 19

Average_{norm} 0.0053 70.30
 Standard Dev._{norm} 2.931
 Coeff. of Var. [%]_{norm} 4.169
 Min. 0.0051 65.42
 Max. 0.0056 75.35
 Number of Spec. 19 19



**Laminate Open-Hole Tension Properties (OHT1)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

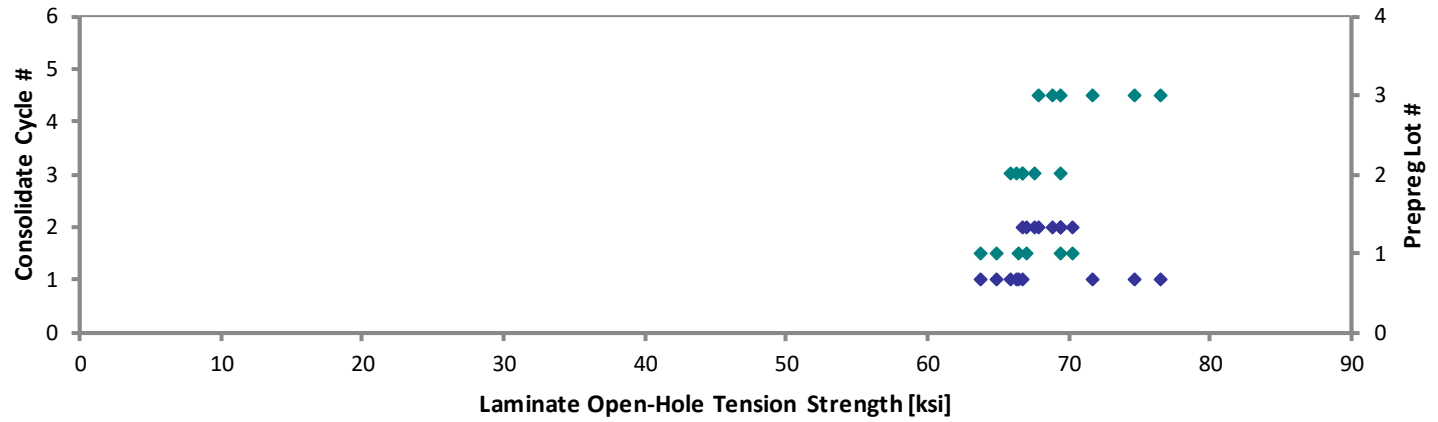
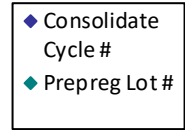
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCADA111A	A	C1	1	1	66.80	0.08255	16	AGM
TCADA112A	A	C1	1	1	66.76	0.08395	16	AGM
TCADA113A	A	C1	1	1	68.05	0.08438	16	AGM
TCADA211A	A	C2	1	2	67.71	0.08548	16	AGM
TCADA212A	A	C2	1	2	69.61	0.08615	16	AGM
TCADA213A	A	C2	1	2	70.11	0.08657	16	AGM
TCADB111A	B	C1	2	1	64.50	0.08888	16	AGM
TCADB112A	B	C1	2	1	63.21	0.09003	16	AGM
TCADB113A	B	C1	2	1	64.35	0.08962	16	AGM
TCADB211A	B	C2	2	2	68.25	0.08455	16	AGM
TCADB212A	B	C2	2	2	68.90	0.08468	16	AGM
TCADB213A	B	C2	2	2	71.19	0.08422	16	AGM
TCADC111A	C	C1	3	1	78.11	0.08257	16	AGM
TCADC112A	C	C1	3	1	78.29	0.08437	16	AGM
TCADC113A	C	C1	3	1	74.25	0.08342	16	AGM
TCADC211A	C	C2	3	2	71.29	0.08222	16	AGM
TCADC212A	C	C2	3	2	71.94	0.08267	16	AGM
TCADC213A	C	C2	3	2	73.35	0.08177	16	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	63.82
0.0052	64.87
0.0053	66.46
0.0053	66.99
0.0054	69.41
0.0054	70.25
0.0056	66.36
0.0056	65.87
0.0056	66.75
0.0053	66.79
0.0053	67.53
0.0053	69.39
0.0052	74.65
0.0053	76.45
0.0052	71.68
0.0051	67.84
0.0052	68.83
0.0051	69.42

Average 69.82
Standard Dev. 4.287
Coeff. of Var. [%] 6.141
Min. 63.21
Max. 78.29
Number of Spec. 18

Average_{norm} 0.0053 68.52
Standard Dev._{norm} 3.227
Coeff. of Var. [%]_{norm} 4.710
Min. 0.0051 63.82
Max. 0.0056 76.45
Number of Spec. 18 18

**Laminate Open-Hole Tension Properties (OHT1)--RTA(70°F)
Normalized Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



**Laminate Open-Hole Tension Properties (OHT1)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

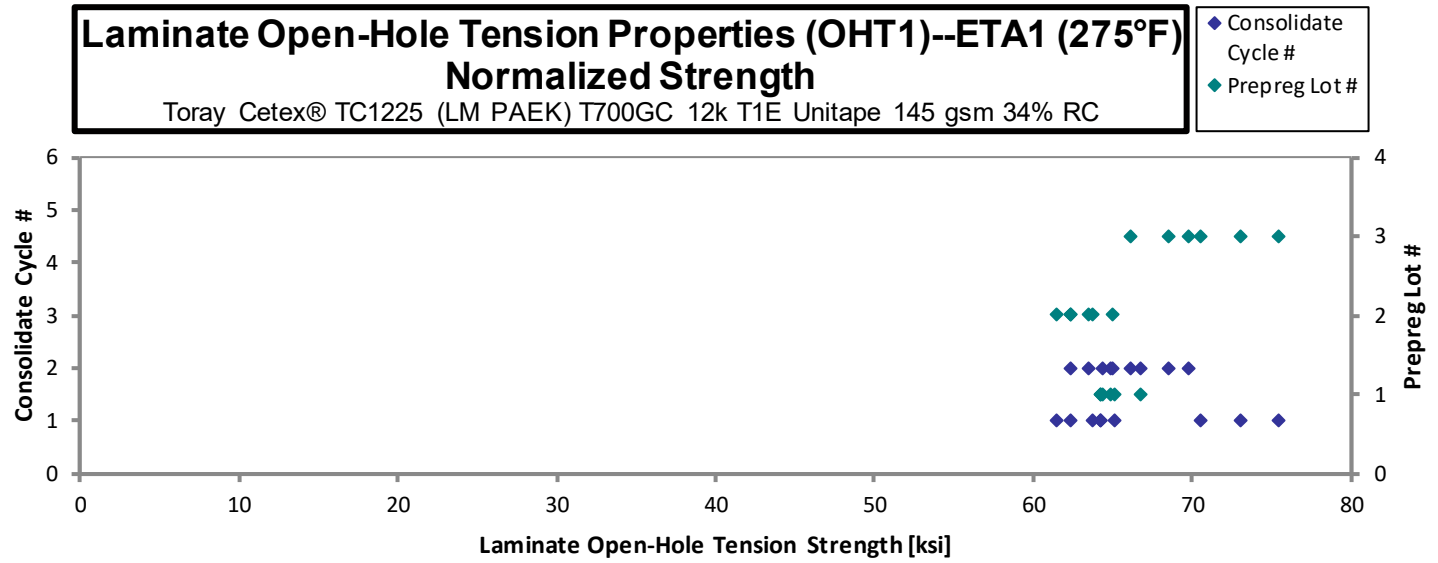
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCADA111C	A	C1	1	1	66.54	0.08447	16	AGM
TCADA112C	A	C1	1	1	65.25	0.08505	16	AGM
TCADA113C	A	C1	1	1	65.43	0.08478	16	AGM
TCADA211C	A	C2	1	2	66.42	0.08687	16	AGM
TCADA212C	A	C2	1	2	64.19	0.08670	16	AGM
TCADA213C	A	C2	1	2	63.87	0.08772	16	AGM
TCADB111C	B	C1	2	1	59.29	0.08962	16	AGM
TCADB112C	B	C1	2	1	61.50	0.08958	16	AGM
TCADB113C	B	C1	2	1	60.46	0.08908	16	AGM
TCADB211C	B	C2	2	2	67.43	0.08323	16	AGM
TCADB212C	B	C2	2	2	65.29	0.08397	16	AGM
TCADB213C	B	C2	2	2	64.66	0.08328	16	AGM
TCADC111C	C	C1	3	1	75.71	0.08330	16	AGM
TCADC112C	C	C1	3	1	77.38	0.08423	16	AGM
TCADC113C	C	C1	3	1	73.08	0.08340	16	AGM
TCADC211C	C	C2	3	2	71.93	0.08233	16	AGM
TCADC212C	C	C2	3	2	69.00	0.08273	16	AGM
TCADC213C	C	C2	3	2	72.81	0.08277	16	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	65.05
0.0053	64.23
0.0053	64.20
0.0054	66.78
0.0054	64.41
0.0055	64.84
0.0056	61.50
0.0056	63.77
0.0056	62.34
0.0052	64.96
0.0052	63.45
0.0052	62.33
0.0052	72.99
0.0053	75.44
0.0052	70.55
0.0051	68.55
0.0052	66.07
0.0052	69.75

Average 67.24
Standard Dev. 5.125
Coeff. of Var. [%] 7.623
Min. 59.29
Max. 77.38
Number of Spec. 18

Average_{norm} 0.0053 66.18
Standard Dev._{norm} 3.836
Coeff. of Var. [%]_{norm} 5.796
Min. 0.0051 61.50
Max. 0.0056 75.44
Number of Spec. 18 18



**Laminate Open-Hole Tension Properties (OHT1)--ETA2 (400°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

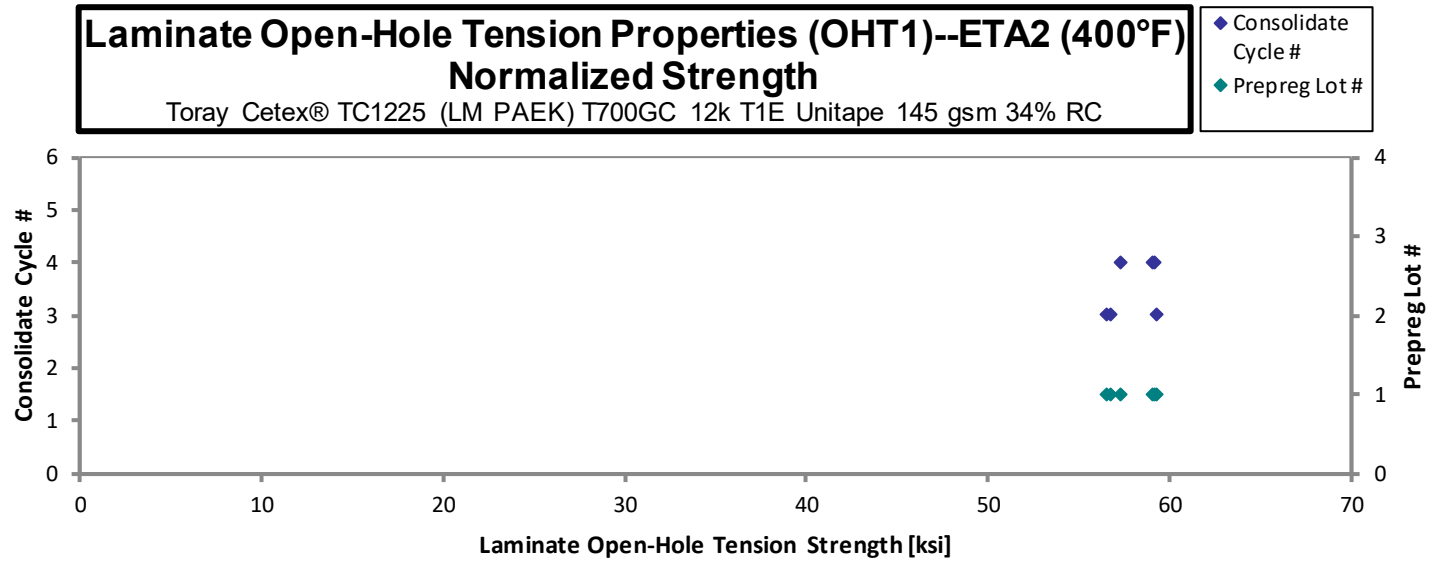
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCADA311D	A	C3	1	3	60.16	0.08122	16	AGM
TCADA312D	A	C3	1	3	60.32	0.08132	16	AGM
TCADA313D	A	C3	1	3	62.74	0.08165	16	AGM
TCADA411D	A	C4	1	4	60.46	0.08460	16	AGM
TCADA412D	A	C4	1	4	57.80	0.08570	16	AGM
TCADA413D	A	C4	1	4	59.23	0.08610	16	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0051	56.55
0.0051	56.77
0.0051	59.29
0.0053	59.20
0.0054	57.33
0.0054	59.03

Average 60.12
Standard Dev. 1.623
Coeff. of Var. [%] 2.700
Min. 57.80
Max. 62.74
Number of Spec. 6

Average_{norm} 0.0052 58.03
Standard Dev_{norm} 1.281
Coeff. of Var. [%]_{norm} 2.208
Min. 0.0051 56.55
Max. 0.0054 59.29
Number of Spec. 6 6



**Laminate Open-Hole Tension Properties (OHT1)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

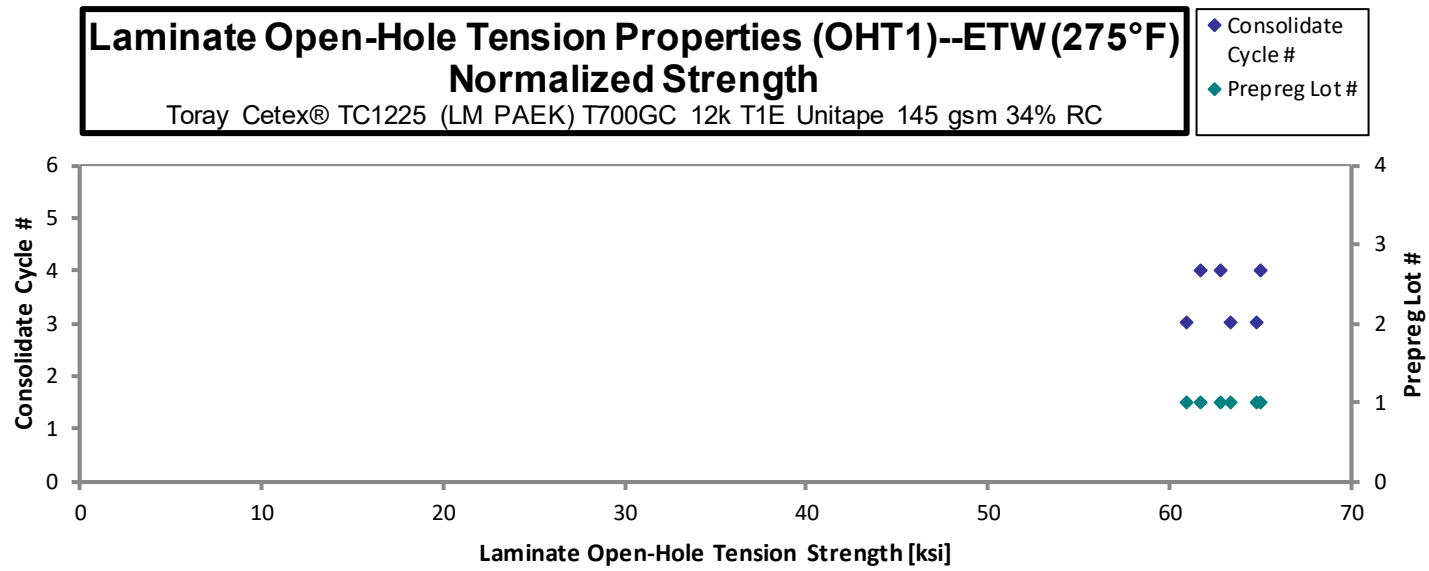
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCADA311E	A	C3	1	3	67.61	0.08275	16	AGM
TCADA312E	A	C3	1	3	63.59	0.08285	16	AGM
TCADA313E	A	C3	1	3	66.00	0.08290	16	AGM
TCADA411E	A	C4	1	4	63.83	0.08507	16	AGM
TCADA412E	A	C4	1	4	65.87	0.08527	16	AGM
TCADA413E	A	C4	1	4	63.12	0.08448	16	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	64.76
0.0052	60.97
0.0052	63.32
0.0053	62.85
0.0053	65.01
0.0053	61.72

Average **65.00**
Standard Dev. **1.759**
Coeff. of Var. [%] **2.706**
Min. **63.12**
Max. **67.61**
Number of Spec. **6**

Average_{norm} **0.0052** **63.11**
Standard Dev_{norm} **1.608**
Coeff. of Var. [%]_{norm} **2.547**
Min. **0.0052** **60.97**
Max. **0.0053** **65.01**
Number of Spec. **6** **6**



4.20 “10/80/10” Open-Hole Tension 2 Properties (OHT2)

Laminate Open-Hole Tension Properties (OHT2)--CTA (-65°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

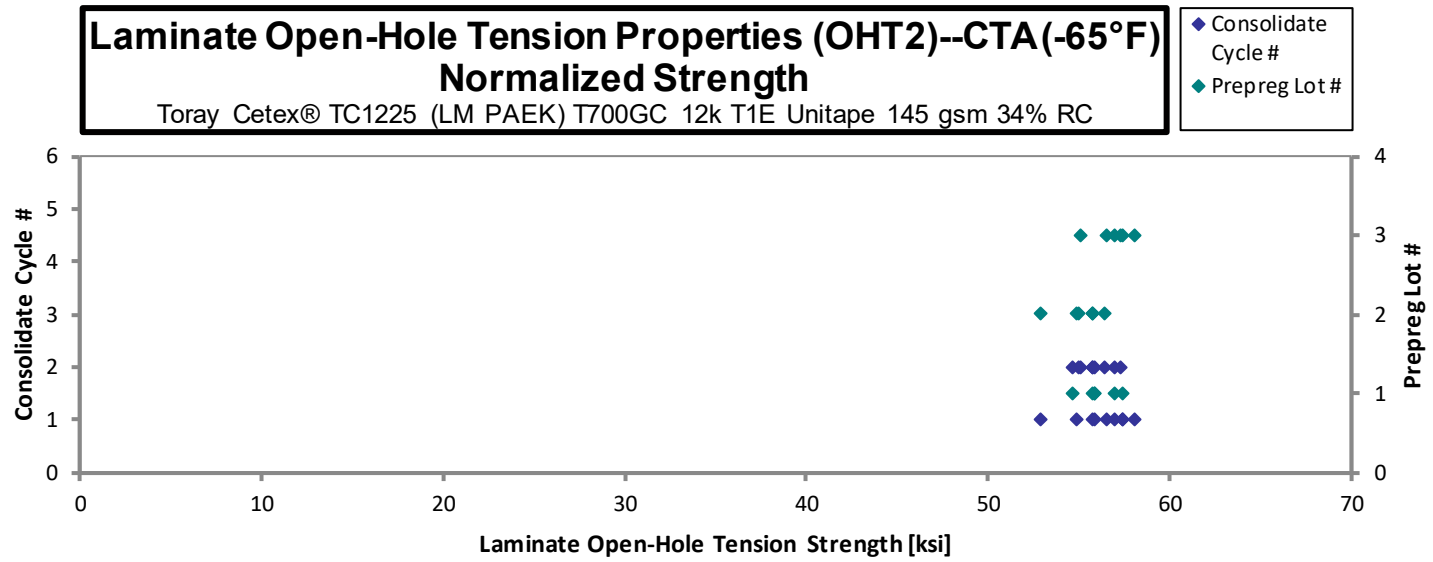
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 t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAEA111B	A	C1	1	1	59.31	0.1045	20	AGM
TCAEA112B	A	C1	1	1	58.59	0.1049	20	AGM
TCAEA113B	A	C1	1	1	57.59	0.1047	20	AGM
TCAEA211B	A	C2	1	2	54.79	0.1078	20	AGM
TCAEA212B	A	C2	1	2	56.97	0.1059	20	AGM
TCAEA213B	A	C2	1	2	56.62	0.1065	20	AGM
TCAEB111B	B	C1	2	1	56.30	0.1069	20	AGM
TCAEB112B	B	C1	2	1	55.31	0.1072	20	AGM
TCAEB113B	B	C1	2	1	53.29	0.1071	20	AGM
TCAEB211B	B	C2	2	2	55.53	0.1070	20	AGM
TCAEB212B	B	C2	2	2	55.89	0.1091	20	AGM
TCAEB213B	B	C2	2	2	55.93	0.1077	20	AGM
TCAEC111B	C	C1	3	1	59.83	0.1036	20	AGM
TCAEC112B	C	C1	3	1	58.84	0.1038	20	AGM
TCAEC113B	C	C1	3	1	60.65	0.1035	20	AGM
TCAEC211B	C	C2	3	2	59.10	0.1047	20	AGM
TCAEC212B	C	C2	3	2	56.79	0.1047	20	AGM
TCAEC213B	C	C2	3	2	58.75	0.1046	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0052	57.37
0.0052	56.93
0.0052	55.82
0.0054	54.70
0.0053	55.87
0.0053	55.81
0.0053	55.75
0.0054	54.89
0.0054	52.85
0.0053	54.99
0.0055	56.46
0.0054	55.79
0.0052	57.39
0.0052	56.54
0.0052	58.11
0.0052	57.28
0.0052	55.04
0.0052	56.92

Average **57.23**
 Standard Dev. **1.972**
 Coeff. of Var. [%] **3.447**
 Min. **53.29**
 Max. **60.65**
 Number of Spec. **18**

Average_{norm} **0.0053** **56.03**
 Standard Dev._{norm} **1.262**
 Coeff. of Var. [%]_{norm} **2.253**
 Min. **0.0052** **52.85**
 Max. **0.0055** **58.11**
 Number of Spec. **18** **18**



**Laminate Open-Hole Tension Properties (OHT2)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

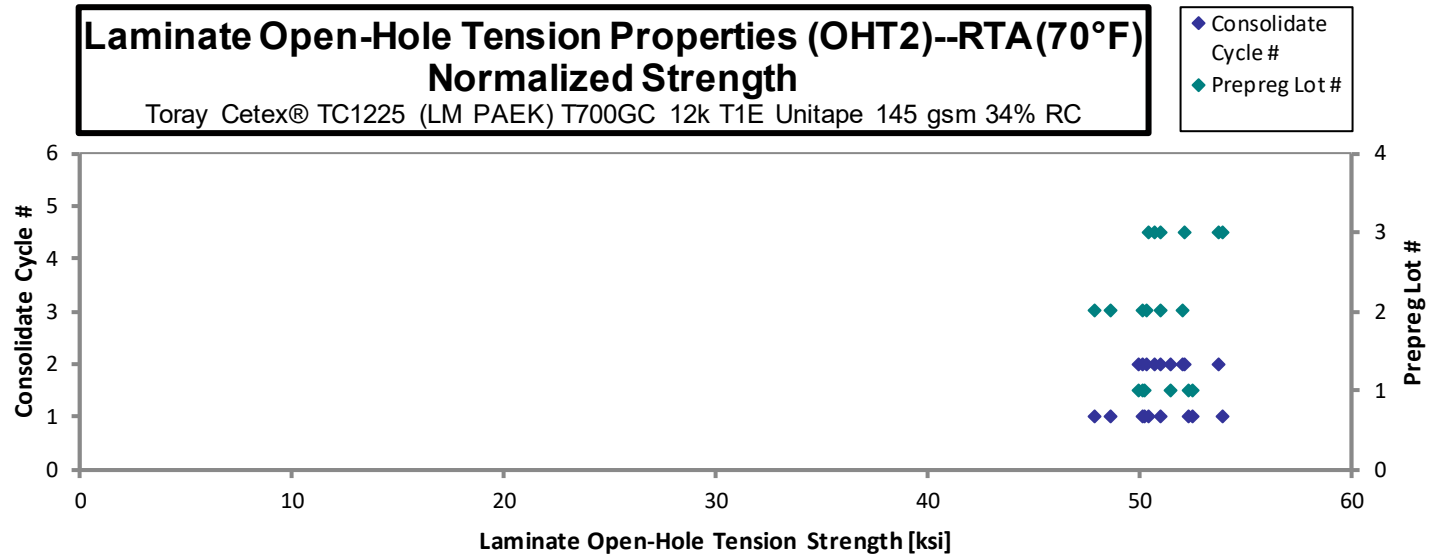
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAEA111A	A	C1	1	1	53.09	0.1022	20	AGM
TCAEA112A	A	C1	1	1	54.96	0.1031	20	AGM
TCAEA113A	A	C1	1	1	54.26	0.1042	20	AGM
TCAEA211A	A	C2	1	2	51.41	0.1053	20	AGM
TCAEA212A	A	C2	1	2	52.59	0.1058	20	AGM
TCAEA213A	A	C2	1	2	49.93	0.1081	20	AGM
TCAEB111A	B	C1	2	1	49.03	0.1072	20	AGM
TCAEB112A	B	C1	2	1	48.78	0.1060	20	AGM
TCAEB113A	B	C1	2	1	51.15	0.1059	20	AGM
TCAEB211A	B	C2	2	2	51.45	0.1070	20	AGM
TCAEB212A	B	C2	2	2	50.77	0.1071	20	AGM
TCAEB213A	B	C2	2	2	52.63	0.1067	20	AGM
TCAEC111A	C	C1	3	1	53.07	0.1026	20	AGM
TCAEC112A	C	C1	3	1	53.32	0.1033	20	AGM
TCAEC113A	C	C1	3	1	56.54	0.1031	20	AGM
TCAEC211A	C	C2	3	2	52.44	0.1044	20	AGM
TCAEC212A	C	C2	3	2	53.50	0.1052	20	AGM
TCAEC213A	C	C2	3	2	55.24	0.1050	20	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0051	50.24
0.0052	52.48
0.0052	52.34
0.0053	50.11
0.0053	51.51
0.0054	49.97
0.0054	48.67
0.0053	47.88
0.0053	50.16
0.0053	50.96
0.0054	50.36
0.0053	52.01
0.0051	50.39
0.0052	50.99
0.0052	53.96
0.0052	50.67
0.0053	52.10
0.0052	53.69

Average 52.45
Standard Dev. 2.099
Coeff. of Var. [%] 4.001
Min. 48.78
Max. 56.54
Number of Spec. 18

Average_{norm} 0.0053 51.03
Standard Dev._{norm} 1.567
Coeff. of Var. [%]_{norm} 3.070
Min. 0.0051 47.88
Max. 0.0054 53.96
Number of Spec. 18 18



**Laminate Open-Hole Tension Properties (OHT2)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

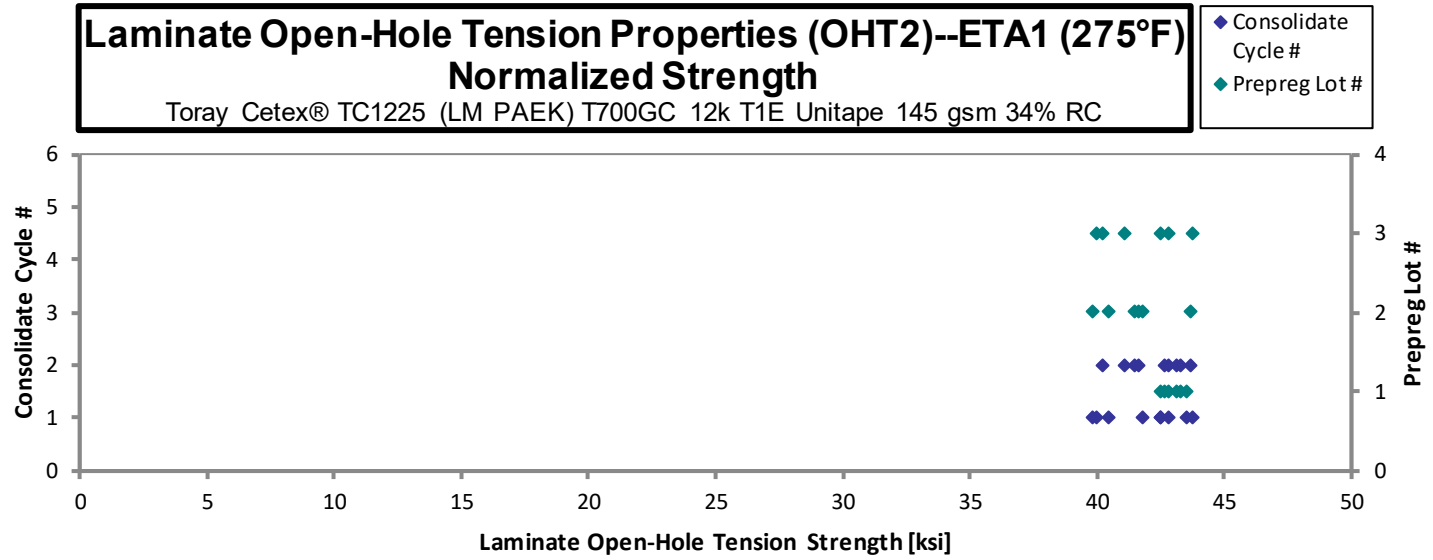
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAEA111C	A	C1	1	1	44.32	0.1044	20	AGM
TCAEA112C	A	C1	1	1	45.32	0.1037	20	AGM
TCAEA113C	A	C1	1	1	44.43	0.1033	20	AGM
TCAEA211C	A	C2	1	2	43.66	0.1054	20	AGM
TCAEA212C	A	C2	1	2	44.22	0.1057	20	AGM
TCAEA213C	A	C2	1	2	43.23	0.1078	20	AGM
TCAEB111C	B	C1	2	1	42.04	0.1074	20	AGM
TCAEB112C	B	C1	2	1	40.91	0.1069	20	AGM
TCAEB113C	B	C1	2	1	40.55	0.1061	20	AGM
TCAEB211C	B	C2	2	2	43.59	0.1082	20	AGM
TCAEB212C	B	C2	2	2	41.42	0.1085	20	AGM
TCAEB213C	B	C2	2	2	41.48	0.1081	20	AGM
TCAEC111C	C	C1	3	1	45.77	0.1033	20	AGM
TCAEC112C	C	C1	3	1	44.80	0.1025	20	AGM
TCAEC113C	C	C1	3	1	42.23	0.1022	20	AGM
TCAEC211C	C	C2	3	2	44.39	0.1041	20	AGM
TCAEC212C	C	C2	3	2	43.13	0.1029	20	AGM
TCAEC213C	C	C2	3	2	42.04	0.1033	20	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	42.82
0.0052	43.50
0.0052	42.48
0.0053	42.63
0.0053	43.29
0.0054	43.13
0.0054	41.82
0.0053	40.47
0.0053	39.85
0.0054	43.68
0.0054	41.63
0.0054	41.51
0.0052	43.77
0.0051	42.54
0.0051	39.94
0.0052	42.79
0.0051	41.09
0.0052	40.21

Average 43.20
Standard Dev. 1.559
Coeff. of Var. [%] 3.608
Min. 40.55
Max. 45.77
Number of Spec. 18

Average_{norm} 0.0053 42.06
Standard Dev._{norm} 1.303
Coeff. of Var. [%]_{norm} 3.099
Min. 0.0051 39.85
Max. 0.0054 43.77
Number of Spec. 18 18



4.21 “50/40/10” Open-Hole Tension 3 Properties (OHT3)

Laminate Open-Hole Tension Properties (OHT3)--CTA (-65°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

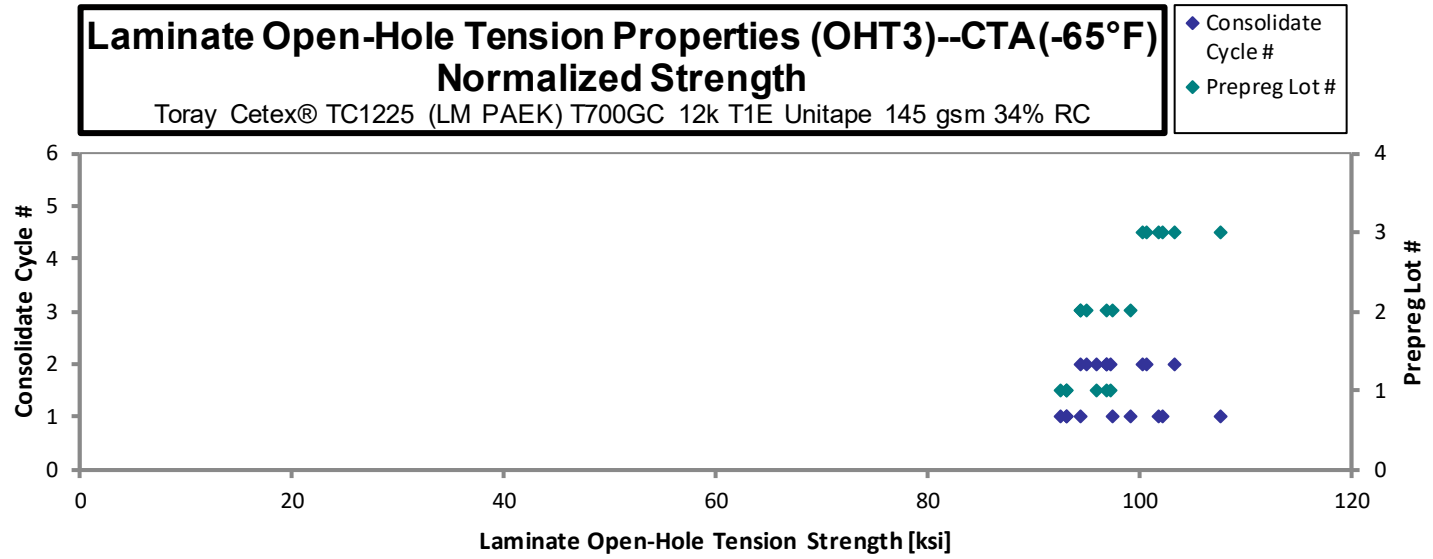
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 t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAFA111B	A	C1	1	1	101.9	0.09875	20	AGM
TCAFA112B	A	C1	1	1	101.0	0.09953	20	AGM
TCAFA113B	A	C1	1	1	100.1	0.09980	20	AGM
TCAFA211B	A	C2	1	2	104.4	0.1007	20	AGM
TCAFA212B	A	C2	1	2	102.7	0.1010	20	AGM
TCAFA213B	A	C2	1	2	103.2	0.1014	20	AGM
TCAFB111B	B	C1	2	1	104.1	0.1011	20	AGM
TCAFB112B	B	C1	2	1	100.3	0.1016	20	AGM
TCAFB113B	B	C1	2	1	104.5	0.1026	20	AGM
TCAFB211B	B	C2	2	2	99.05	0.1030	20	AGM
TCAFB212B	B	C2	2	2	103.0	0.1016	20	AGM
TCAFB213B	B	C2	2	2	99.91	0.1027	20	AGM
TCAFC111B	C	C1	3	1	114.9	0.1011	20	AGM
TCAFC112B	C	C1	3	1	109.2	0.1011	20	AGM
TCAFC113B	C	C1	3	1	108.4	0.1015	20	AGM
TCAFC211B	C	C2	3	2	107.5	0.1007	20	AGM
TCAFC212B	C	C2	3	2	110.2	0.1013	20	AGM
TCAFC213B	C	C2	3	2	107.6	0.1010	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0049	93.13
0.0050	93.04
0.0050	92.48
0.0050	97.36
0.0050	95.95
0.0051	96.85
0.0051	97.51
0.0051	94.37
0.0051	99.22
0.0052	94.49
0.0051	96.91
0.0051	94.99
0.0051	107.6
0.0051	102.2
0.0051	101.9
0.0050	100.2
0.0051	103.3
0.0050	100.6

Average 104.5
 Standard Dev. 4.276
 Coeff. of Var. [%] 4.091
 Min. 99.05
 Max. 114.9
 Number of Spec. 18

Average_{norm} 0.0051 97.90
 Standard Dev._{norm} 4.107
 Coeff. of Var. [%]_{norm} 4.195
 Min. 0.0049 92.48
 Max. 0.0052 107.6
 Number of Spec. 18 18



**Laminate Open-Hole Tension Properties (OHT3)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

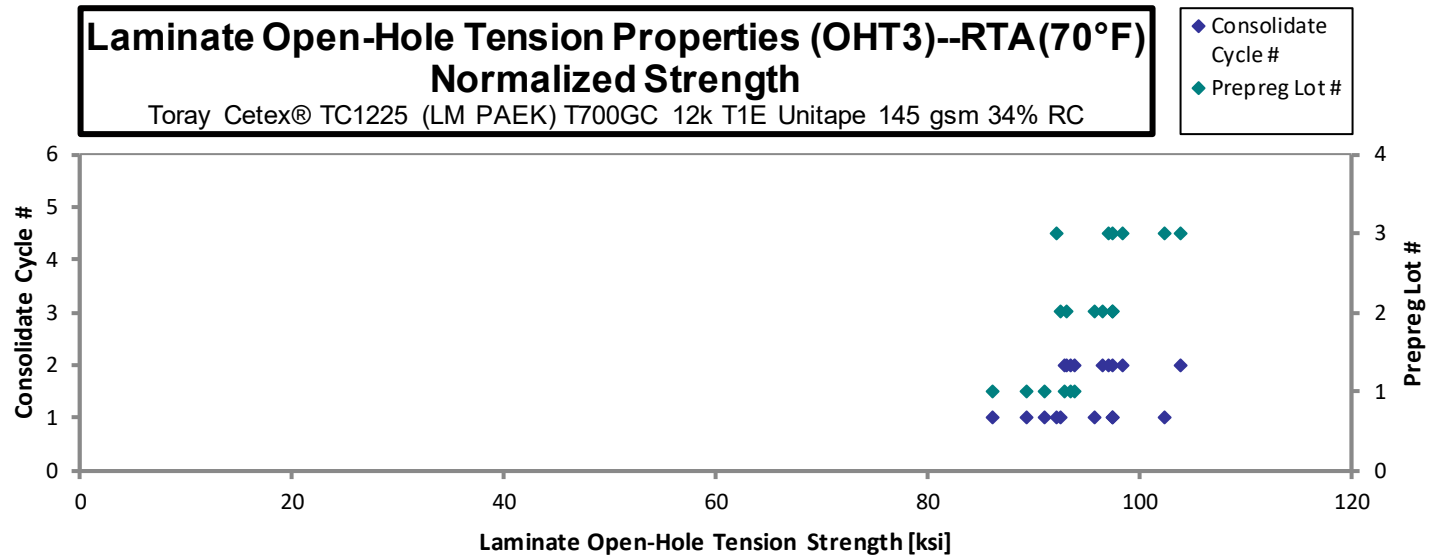
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAFA111A	A	C1	1	1	98.01	0.09847	20	AGM
TCAFA112A	A	C1	1	1	94.24	0.09863	20	AGM
TCAFA113A	A	C1	1	1	98.86	0.09948	20	AGM
TCAFA211A	A	C2	1	2	102.2	0.09882	20	AGM
TCAFA212A	A	C2	1	2	99.94	0.1005	20	AGM
TCAFA213A	A	C2	1	2	100.8	0.1005	20	AGM
TCAFB111A	B	C1	2	1	100.6	0.09943	20	AGM
TCAFB112A	B	C1	2	1	102.4	0.1009	20	AGM
TCAFB113A	B	C1	2	1	104.1	0.1011	20	AGM
TCAFB211A	B	C2	2	2	104.7	0.09957	20	AGM
TCAFB212A	B	C2	2	2	99.71	0.1009	20	AGM
TCAFB213A	B	C2	2	2	103.5	0.1017	20	AGM
TCAFC111A	C	C1	3	1	100.7	0.09877	20	AGM
TCAFC112A	C	C1	3	1	105.6	0.09968	20	AGM
TCAFC113A	C	C1	3	1	110.0	0.1005	20	AGM
TCAFC211A	C	C2	3	2	107.4	0.09895	20	AGM
TCAFC212A	C	C2	3	2	112.6	0.09970	20	AGM
TCAFC213A	C	C2	3	2	104.7	0.1002	20	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0049	89.36
0.0049	86.06
0.0050	91.07
0.0049	93.51
0.0050	92.96
0.0050	93.80
0.0050	92.63
0.0050	95.69
0.0051	97.47
0.0050	96.54
0.0050	93.15
0.0051	97.47
0.0049	92.13
0.0050	97.43
0.0050	102.4
0.0049	98.40
0.0050	103.9
0.0050	97.11

Average 102.8
Standard Dev. 4.398
Coeff. of Var. [%] 4.279
Min. 94.24
Max. 112.6
Number of Spec. 18

Average_{norm} 0.0050 95.06
Standard Dev._{norm} 4.363
Coeff. of Var. [%]_{norm} 4.590
Min. 0.0049 86.06
Max. 0.0051 103.9
Number of Spec. 18 18



**Laminate Open-Hole Tension Properties (OHT3)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

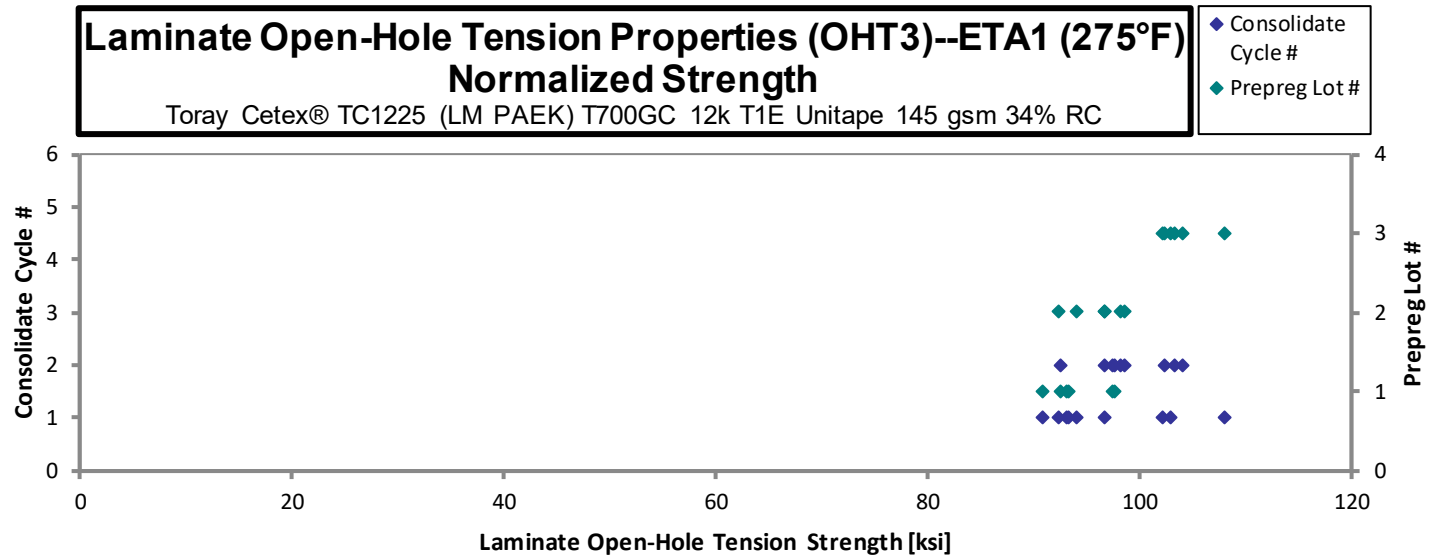
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAFA111C	A	C1	1	1	100.6	0.1001	20	AGM
TCAFA112C	A	C1	1	1	98.95	0.09922	20	AGM
TCAFA113C	A	C1	1	1	100.7	0.1002	20	AGM
TCAFA211C	A	C2	1	2	104.4	0.1008	20	AGM
TCAFA212C	A	C2	1	2	105.7	0.09972	20	AGM
TCAFA213C	A	C2	1	2	100.4	0.09952	20	AGM
TCAFB111C	B	C1	2	1	99.40	0.1023	20	AGM
TCAFB112C	B	C1	2	1	103.1	0.1014	20	AGM
TCAFB113C	B	C1	2	1	98.64	0.1012	20	AGM
TCAFB211C	B	C2	2	2	104.4	0.1016	20	AGM
TCAFB212C	B	C2	2	2	102.9	0.1016	20	AGM
TCAFB213C	B	C2	2	2	105.7	0.1009	20	AGM
TCAFC111C	C	C1	3	1	114.6	0.1018	20	AGM
TCAFC112C	C	C1	3	1	110.0	0.1004	20	AGM
TCAFC113C	C	C1	3	1	111.2	0.09990	20	AGM
TCAFC211C	C	C2	3	2	111.8	0.09982	20	AGM
TCAFC212C	C	C2	3	2	111.4	0.1008	20	AGM
TCAFC213C	C	C2	3	2	110.0	0.1005	20	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0050	93.17
0.0050	90.90
0.0050	93.40
0.0050	97.48
0.0050	97.63
0.0050	92.54
0.0051	94.14
0.0051	96.80
0.0051	92.46
0.0051	98.19
0.0051	96.74
0.0050	98.69
0.0051	108.0
0.0050	102.2
0.0050	102.9
0.0050	103.3
0.0050	104.0
0.0050	102.3

Average 105.2
Standard Dev. 5.117
Coeff. of Var. [%] 4.863
Min. 98.64
Max. 114.6
Number of Spec. 18

Average_{norm} 0.0050 98.05
Standard Dev._{norm} 4.844
Coeff. of Var. [%]_{norm} 4.940
Min. 0.0050 90.90
Max. 0.0051 108.0
Number of Spec. 18 18



4.22 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)

**Laminate Filled-Hole Tension Properties (FHT1)--CTA (-65°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

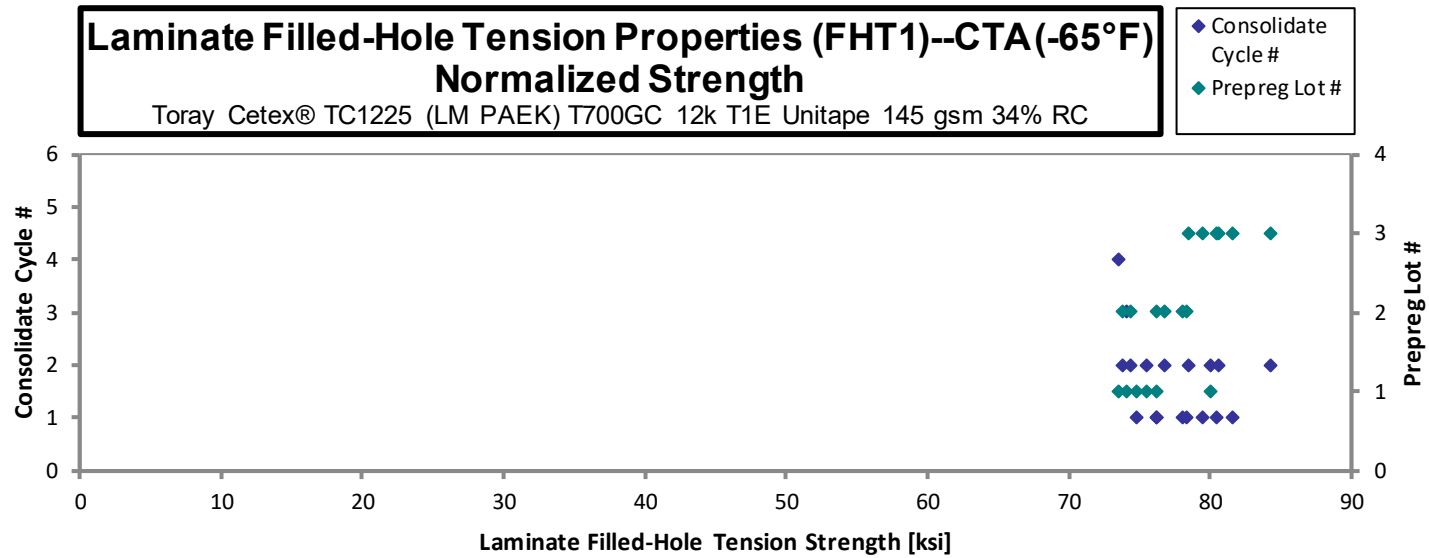
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA4A111B	A	C1	1	1	77.50	0.08493	16	AGM
TCA4A112B	A	C1	1	1	75.88	0.08510	16	AGM
TCA4A211B	A	C2	1	2	76.39	0.08545	16	AGM
TCA4A212B	A	C2	1	2	81.07	0.08532	16	AGM
TCA4A311B	A	C3	1	3	76.57	0.08362	16	AGM
TCA4A411B	A	C4	1	4	75.67	0.08402	16	AGM
TCA4B111B	B	C1	2	1	77.95	0.08680	16	AGM
TCA4B112B	B	C1	2	1	76.26	0.08637	16	AGM
TCA4B113B	B	C1	2	1	78.03	0.08648	16	AGM
TCA4B211B	B	C2	2	2	76.58	0.08393	16	AGM
TCA4B212B	B	C2	2	2	79.10	0.08380	16	AGM
TCA4B213B	B	C2	2	2	76.19	0.08377	16	AGM
TCA4C111B	C	C1	3	1	84.49	0.08235	16	AGM
TCA4C112B	C	C1	3	1	85.60	0.08233	16	AGM
TCA4C113B	C	C1	3	1	83.15	0.08258	16	AGM
TCA4C211B	C	C2	3	2	83.55	0.08337	16	AGM
TCA4C212B	C	C2	3	2	87.13	0.08360	16	AGM
TCA4C213B	C	C2	3	2	81.66	0.08303	16	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	76.19
0.0053	74.74
0.0053	75.55
0.0053	80.06
0.0052	74.11
0.0053	73.58
0.0054	78.31
0.0054	76.23
0.0054	78.10
0.0052	74.39
0.0052	76.72
0.0052	73.87
0.0051	80.53
0.0051	81.57
0.0052	79.47
0.0052	80.61
0.0052	84.30
0.0052	78.48

Average 79.60
Standard Dev. 3.770
Coeff. of Var. [%] 4.736
Min. 75.67
Max. 87.13
Number of Spec. 18

Average_{norm} 0.0053 77.60
Standard Dev._{norm} 3.059
Coeff. of Var. [%]_{norm} 3.942
Min. 0.0051 73.58
Max. 0.0054 84.30
Number of Spec. 18 18



**Laminate Filled-Hole Tension Properties (FHT1)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

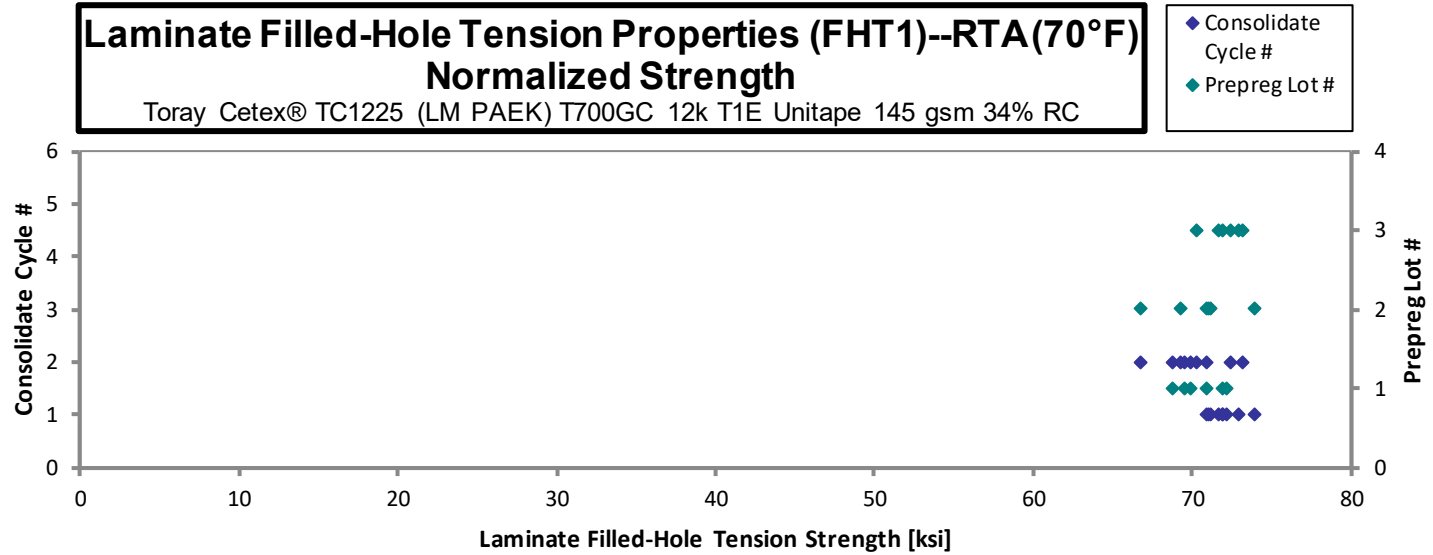
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA4A111A	A	C1	1	1	73.18	0.08370	16	AGM
TCA4A112A	A	C1	1	1	73.34	0.08500	16	AGM
TCA4A113A	A	C1	1	1	72.87	0.08520	16	AGM
TCA4A211A	A	C2	1	2	73.20	0.08250	16	AGM
TCA4A212A	A	C2	1	2	71.78	0.08367	16	AGM
TCA4A213A	A	C2	1	2	70.22	0.08458	16	AGM
TCA4B111A	B	C1	2	1	72.26	0.08490	16	AGM
TCA4B112A	B	C1	2	1	71.97	0.08545	16	AGM
TCA4B113A	B	C1	2	1	74.55	0.08563	16	AGM
TCA4B211A	B	C2	2	2	69.43	0.08300	16	AGM
TCA4B212A	B	C2	2	2	72.90	0.08400	16	AGM
TCA4B213A	B	C2	2	2	70.91	0.08433	16	AGM
TCA4C111A	C	C1	3	1	75.92	0.08157	16	AGM
TCA4C112A	C	C1	3	1	76.33	0.08140	16	AGM
TCA4C113A	C	C1	3	1	76.49	0.08242	16	AGM
TCA4C211A	C	C2	3	2	74.61	0.08137	16	AGM
TCA4C212A	C	C2	3	2	77.69	0.08133	16	AGM
TCA4C213A	C	C2	3	2	76.14	0.08222	16	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	70.89
0.0053	72.15
0.0053	71.86
0.0052	69.90
0.0052	69.51
0.0053	68.74
0.0053	71.01
0.0053	71.18
0.0054	73.89
0.0052	66.69
0.0053	70.87
0.0053	69.21
0.0051	71.67
0.0051	71.91
0.0052	72.96
0.0051	70.27
0.0051	73.13
0.0051	72.45

Average 73.54
Standard Dev. 2.319
Coeff. of Var. [%] 3.154
Min. 69.43
Max. 77.69
Number of Spec. 18

Average_{norm} 0.0052 71.02
Standard Dev_{norm} 1.767
Coeff. of Var. [%]_{norm} 2.488
Min. 0.0051 66.69
Max. 0.0054 73.89
Number of Spec. 18 18



**Laminate Filled-Hole Tension Properties (FHT1)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

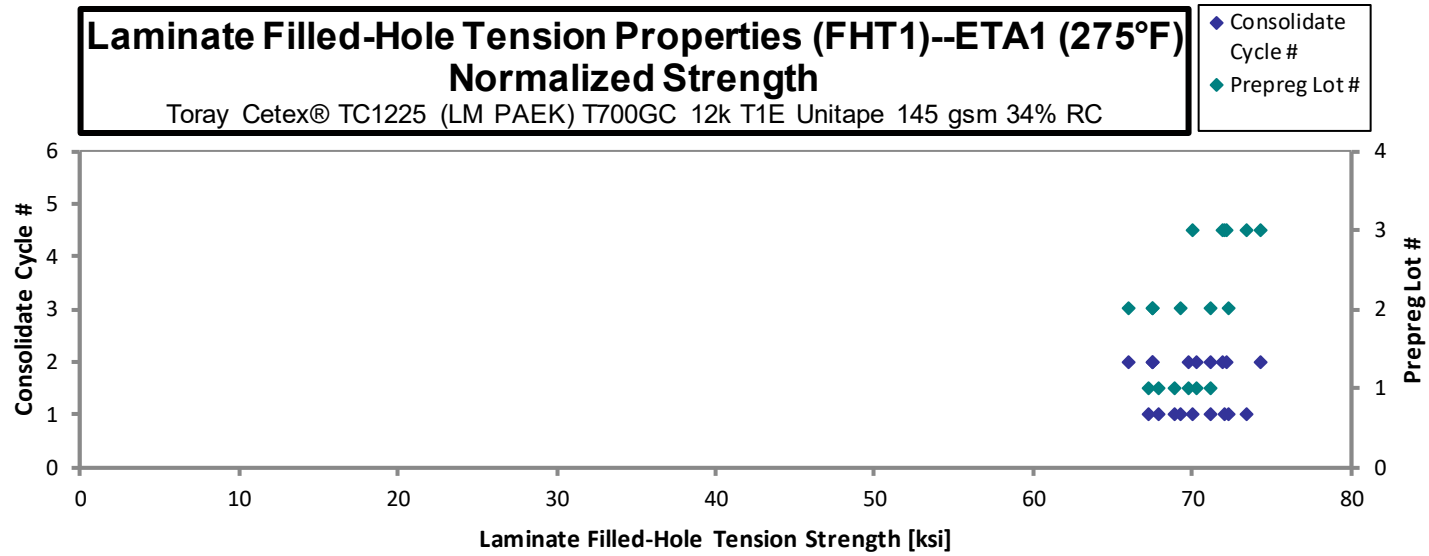
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA4A111C	A	C1	1	1	68.07	0.08533	16	AGM
TCA4A112C	A	C1	1	1	68.78	0.08528	16	AGM
TCA4A113C	A	C1	1	1	69.38	0.08572	16	AGM
TCA4A211C	A	C2	1	2	70.61	0.08542	16	AGM
TCA4A212C	A	C2	1	2	72.53	0.08475	16	AGM
TCA4A213C	A	C2	1	2	71.98	0.08432	16	AGM
TCA4B111C	B	C1	2	1	71.82	0.08698	16	AGM
TCA4B112C	B	C1	2	1	70.09	0.08532	16	AGM
TCA4B113C	B	C1	2	1	72.28	0.08505	16	AGM
TCA4B211C	B	C2	2	2	70.26	0.08305	16	AGM
TCA4B212C	B	C2	2	2	70.20	0.08303	16	AGM
TCA4B213C	B	C2	2	2	68.68	0.08295	16	AGM
TCA4C111C	C	C1	3	1	77.19	0.08217	16	AGM
TCA4C112C	C	C1	3	1	76.32	0.08153	16	AGM
TCA4C113C	C	C1	3	1	75.01	0.08067	16	AGM
TCA4C211C	C	C2	3	2	77.13	0.08327	16	AGM
TCA4C212C	C	C2	3	2	75.45	0.08227	16	AGM
TCA4C213C	C	C2	3	2	75.85	0.08223	16	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	67.22
0.0053	67.89
0.0054	68.83
0.0053	69.81
0.0053	71.14
0.0053	70.24
0.0054	72.31
0.0053	69.21
0.0053	71.15
0.0052	67.53
0.0052	67.47
0.0052	65.94
0.0051	73.41
0.0051	72.02
0.0050	70.03
0.0052	74.34
0.0051	71.84
0.0051	72.19

Average 72.31
Standard Dev. 3.086
Coeff. of Var. [%] 4.268
Min. 68.07
Max. 77.19
Number of Spec. 18

Average_{norm} 0.0052 70.14
Standard Dev._{norm} 2.345
Coeff. of Var. [%]_{norm} 3.343
Min. 0.0050 65.94
Max. 0.0054 74.34
Number of Spec. 18 18



**Laminate Filled-Hole Tension Properties (FHT1)--ETA2 (400°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

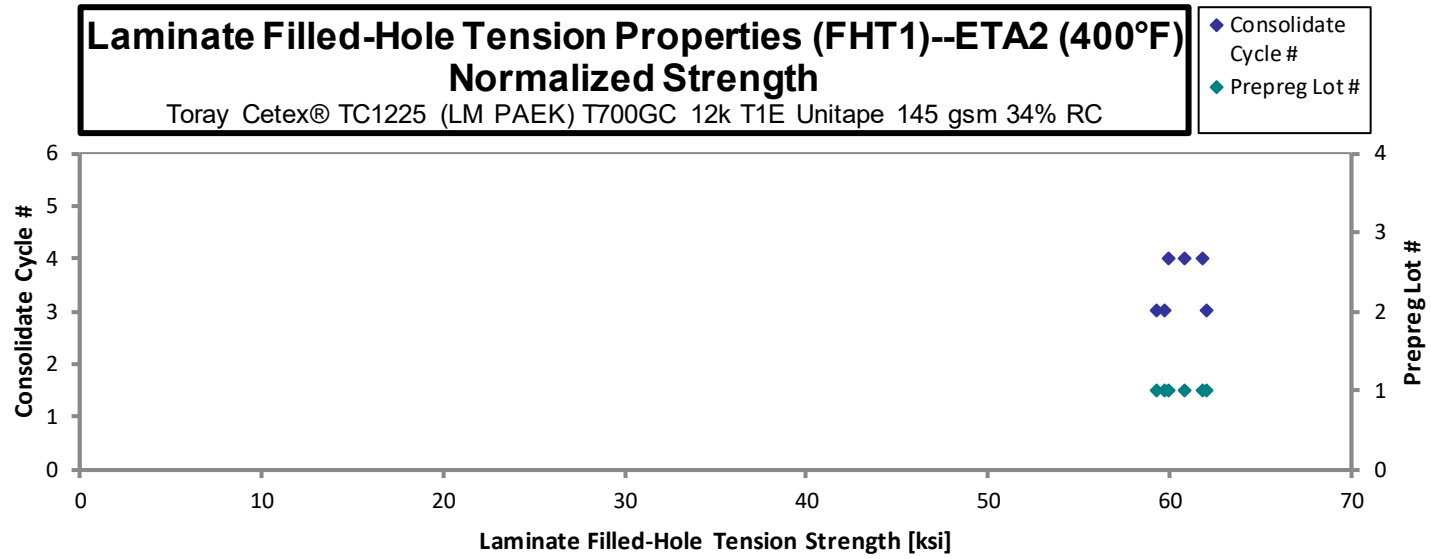
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA4A311D	A	C3	1	3	63.92	0.08392	16	AGM
TCA4A312D	A	C3	1	3	60.45	0.08480	16	AGM
TCA4A313D	A	C3	1	3	60.95	0.08463	16	AGM
TCA4A411D	A	C4	1	4	62.67	0.08523	16	AGM
TCA4A412D	A	C4	1	4	61.48	0.08432	16	AGM
TCA4A413D	A	C4	1	4	62.27	0.08447	16	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	62.08
0.0053	59.33
0.0053	59.71
0.0053	61.83
0.0053	60.00
0.0053	60.87

Average 61.96
Standard Dev. 1.262
Coeff. of Var. [%] 2.036
Min. 60.45
Max. 63.92
Number of Spec. 6

Average_{norm} 0.0053 60.64
Standard Dev_{norm} 1.143
Coeff. of Var. [%]_{norm} 1.886
Min. 0.0052 59.33
Max. 0.0053 62.08
Number of Spec. 6 6



**Laminate Filled-Hole Tension Properties (FHT1)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

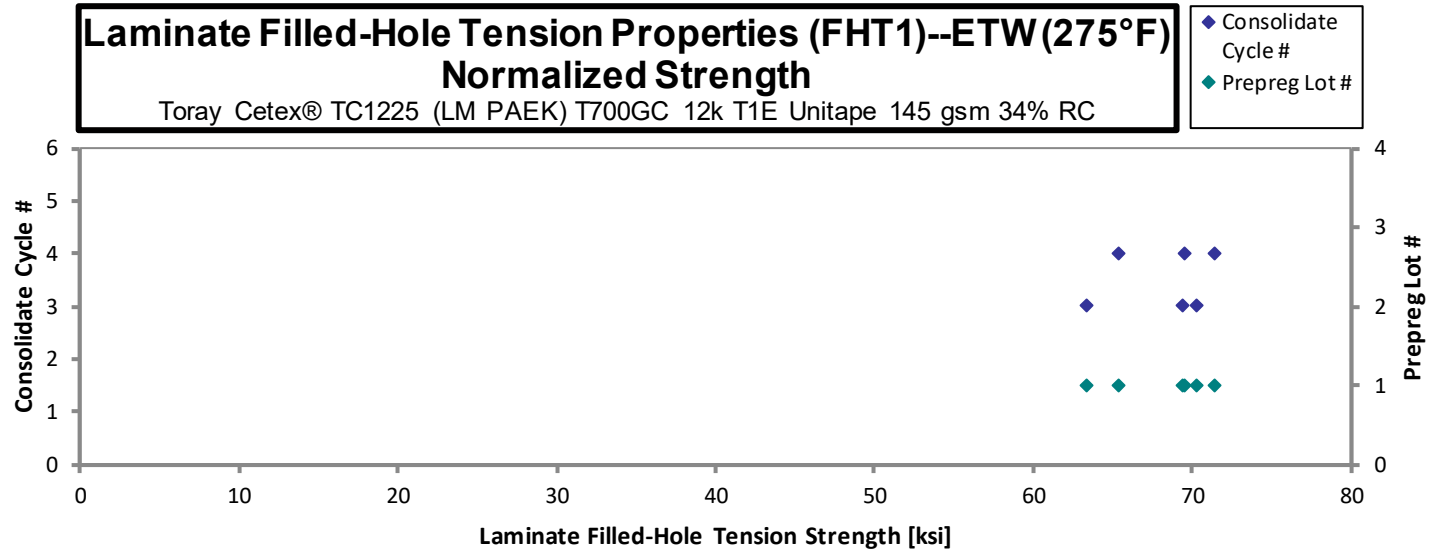
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA4A311E	A	C3	1	3	71.40	0.08390	16	AGM
TCA4A312E	A	C3	1	3	72.94	0.08323	16	AGM
TCA4A313E	A	C3	1	3	65.80	0.08313	16	AGM
TCA4A411E	A	C4	1	4	71.01	0.08462	16	AGM
TCA4A412E	A	C4	1	4	72.91	0.08468	16	AGM
TCA4A413E	A	C4	1	4	67.50	0.08365	16	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	69.33
0.0052	70.27
0.0052	63.32
0.0053	69.54
0.0053	71.46
0.0052	65.35

Average 70.26
Standard Dev. 2.951
Coeff. of Var. [%] 4.199
Min. 65.80
Max. 72.94
Number of Spec. 6

Average_{norm} 0.0052 68.21
Standard Dev_{norm} 3.161
Coeff. of Var. [%]_{norm} 4.634
Min. 0.0052 63.32
Max. 0.0053 71.46
Number of Spec. 6 6



4.23 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)

Laminate Filled-Hole Tension Properties (FHT2)--CTA (-65°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

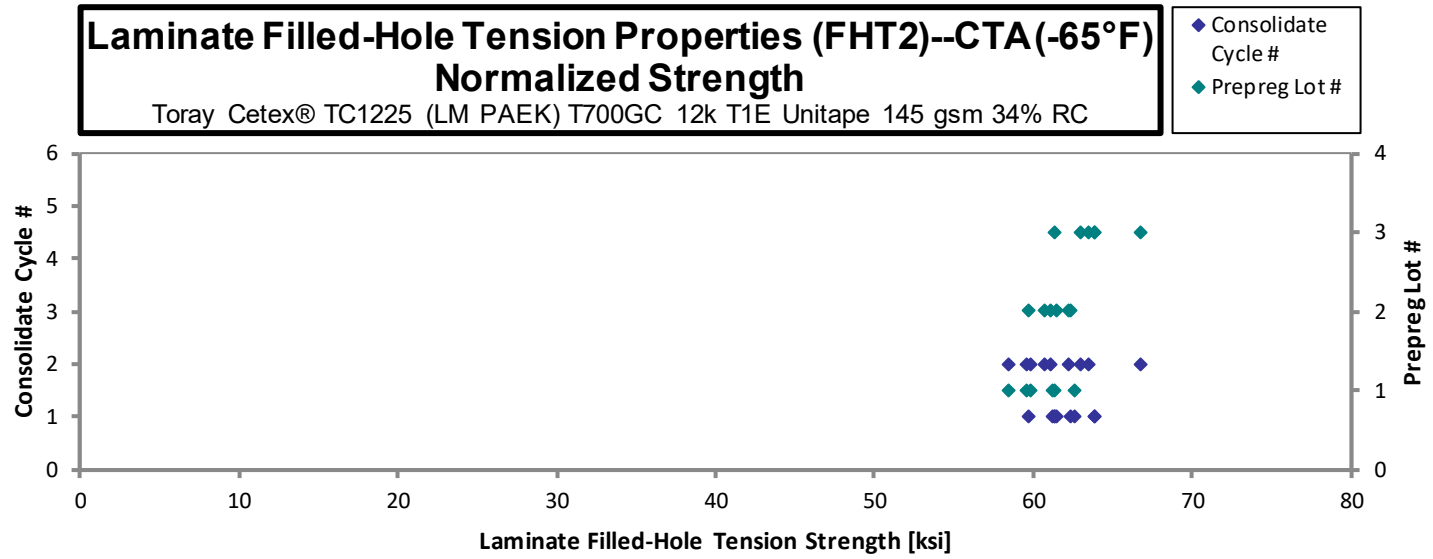
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 t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA5A111B	A	C1	1	1	63.27	0.1046	20	AGM
TCA5A112B	A	C1	1	1	64.69	0.1045	20	AGM
TCA5A113B	A	C1	1	1	63.27	0.1047	20	AGM
TCA5A211B	A	C2	1	2	61.61	0.1043	20	AGM
TCA5A212B	A	C2	1	2	60.15	0.1048	20	AGM
TCA5A213B	A	C2	1	2	61.76	0.1045	20	AGM
TCA5B111B	B	C1	2	1	60.84	0.1059	20	AGM
TCA5B112B	B	C1	2	1	62.32	0.1065	20	AGM
TCA5B113B	B	C1	2	1	63.60	0.1058	20	AGM
TCA5B211B	B	C2	2	2	61.13	0.1073	20	AGM
TCA5B212B	B	C2	2	2	62.95	0.1067	20	AGM
TCA5B213B	B	C2	2	2	62.01	0.1064	20	AGM
TCA5C111B	C	C1	3	1	65.56	0.1052	20	AGM
TCA5C112B	C	C1	3	1	65.66	0.1051	20	AGM
TCA5C113B	C	C1	3	1	63.10	0.1050	20	AGM
TCA5C211B	C	C2	3	2	65.17	0.1045	20	AGM
TCA5C212B	C	C2	3	2	65.74	0.1043	20	AGM
TCA5C213B	C	C2	3	2	68.62	0.1050	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0052	61.26
0.0052	62.60
0.0052	61.34
0.0052	59.51
0.0052	58.38
0.0052	59.77
0.0053	59.64
0.0053	61.47
0.0053	62.32
0.0054	60.74
0.0053	62.19
0.0053	61.06
0.0053	63.86
0.0053	63.91
0.0053	61.37
0.0052	63.03
0.0052	63.49
0.0052	66.69

Average **63.41**
 Standard Dev. **2.154**
 Coeff. of Var. [%] **3.397**
 Min. **60.15**
 Max. **68.62**
 Number of Spec. **18**

Average_{norm} **0.0053** **61.81**
 Standard Dev._{norm} **1.974**
 Coeff. of Var. [%]_{norm} **3.193**
 Min. **0.0052** **58.38**
 Max. **0.0054** **66.69**
 Number of Spec. **18** **18**



**Laminate Filled-Hole Tension Properties (FHT2)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

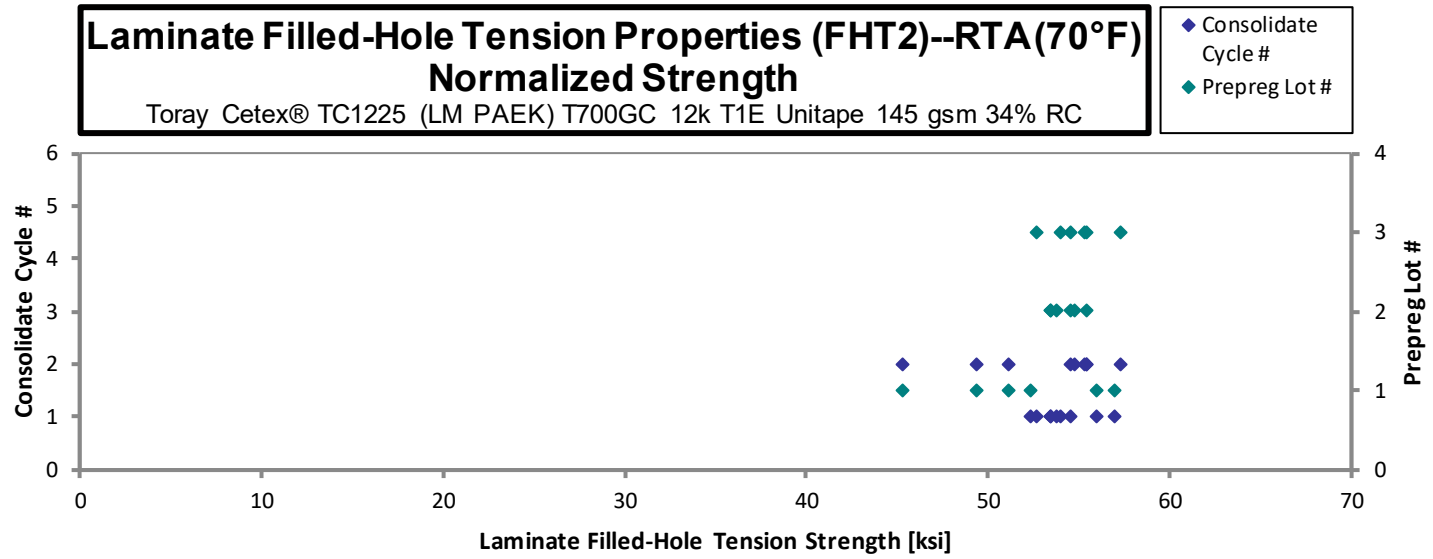
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA5A111A	A	C1	1	1	58.30	0.1056	20	AGM
TCA5A112A	A	C1	1	1	54.60	0.1036	20	AGM
TCA5A113A	A	C1	1	1	57.81	0.1046	20	AGM
TCA5A211A	A	C2	1	2	48.14	0.1015	20	AGM
TCA5A212A	A	C2	1	2	51.83	0.1029	20	AGM
TCA5A213A	A	C2	1	2	53.26	0.1036	20	AGM
TCA5B111A	B	C1	2	1	54.89	0.1057	20	AGM
TCA5B112A	B	C1	2	1	54.18	0.1065	20	AGM
TCA5B113A	B	C1	2	1	53.84	0.1073	20	AGM
TCA5B211A	B	C2	2	2	56.47	0.1061	20	AGM
TCA5B212A	B	C2	2	2	54.99	0.1072	20	AGM
TCA5B213A	B	C2	2	2	55.49	0.1067	20	AGM
TCA5C111A	C	C1	3	1	54.71	0.1039	20	AGM
TCA5C112A	C	C1	3	1	56.86	0.1026	20	AGM
TCA5C113A	C	C1	3	1	56.74	0.1038	20	AGM
TCA5C211A	C	C2	3	2	57.83	0.1034	20	AGM
TCA5C212A	C	C2	3	2	57.43	0.1043	20	AGM
TCA5C213A	C	C2	3	2	59.26	0.1045	20	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	57.02
0.0052	52.39
0.0052	56.01
0.0051	45.26
0.0051	49.37
0.0052	51.09
0.0053	53.72
0.0053	53.42
0.0054	53.47
0.0053	55.48
0.0054	54.55
0.0053	54.80
0.0052	52.63
0.0051	54.01
0.0052	54.52
0.0052	55.35
0.0052	55.44
0.0052	57.31

Average 55.37
Standard Dev. 2.654
Coeff. of Var. [%] 4.793
Min. 48.14
Max. 59.26
Number of Spec. 18

Average_{norm} 0.0052 53.66
Standard Dev._{norm} 2.878
Coeff. of Var. [%]_{norm} 5.363
Min. 0.0051 45.26
Max. 0.0054 57.31
Number of Spec. 18 18



**Laminate Filled-Hole Tension Properties (FHT2)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

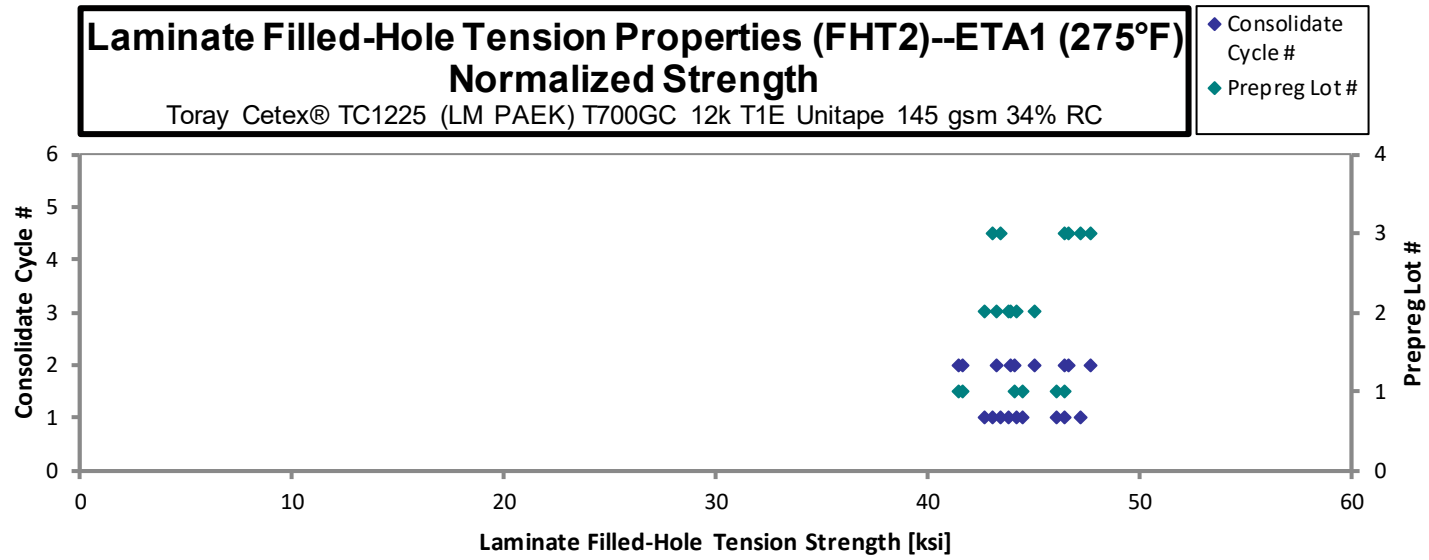
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA5A111C	A	C1	1	1	48.21	0.1042	20	AGM
TCA5A112C	A	C1	1	1	47.46	0.1049	20	AGM
TCA5A113C	A	C1	1	1	45.95	0.1045	20	AGM
TCA5A211C	A	C2	1	2	45.60	0.1044	20	AGM
TCA5A212C	A	C2	1	2	43.30	0.1035	20	AGM
TCA5A213C	A	C2	1	2	43.25	0.1041	20	AGM
TCA5B111C	B	C1	2	1	44.53	0.1062	20	AGM
TCA5B112C	B	C1	2	1	43.78	0.1053	20	AGM
TCA5B113C	B	C1	2	1	45.01	0.1060	20	AGM
TCA5B211C	B	C2	2	2	45.86	0.1062	20	AGM
TCA5B212C	B	C2	2	2	44.34	0.1055	20	AGM
TCA5B213C	B	C2	2	2	44.77	0.1060	20	AGM
TCA5C111C	C	C1	3	1	48.68	0.1047	20	AGM
TCA5C112C	C	C1	3	1	45.71	0.1026	20	AGM
TCA5C113C	C	C1	3	1	44.76	0.1039	20	AGM
TCA5C211C	C	C2	3	2	48.74	0.1035	20	AGM
TCA5C212C	C	C2	3	2	48.19	0.1042	20	AGM
TCA5C213C	C	C2	3	2	48.60	0.1060	20	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	46.51
0.0052	46.09
0.0052	44.47
0.0052	44.08
0.0052	41.50
0.0052	41.70
0.0053	43.79
0.0053	42.70
0.0053	44.17
0.0053	45.09
0.0053	43.29
0.0053	43.94
0.0052	47.20
0.0051	43.42
0.0052	43.07
0.0052	46.68
0.0052	46.48
0.0053	47.69

Average 45.93
Standard Dev. 1.913
Coeff. of Var. [%] 4.165
Min. 43.25
Max. 48.74
Number of Spec. 18

Average_{norm} 0.0052 44.55
Standard Dev._{norm} 1.862
Coeff. of Var. [%]_{norm} 4.180
Min. 0.0051 41.50
Max. 0.0053 47.69
Number of Spec. 18 18



4.24 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)

Laminate Filled-Hole Tension Properties (FHT3)--CTA (-65°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

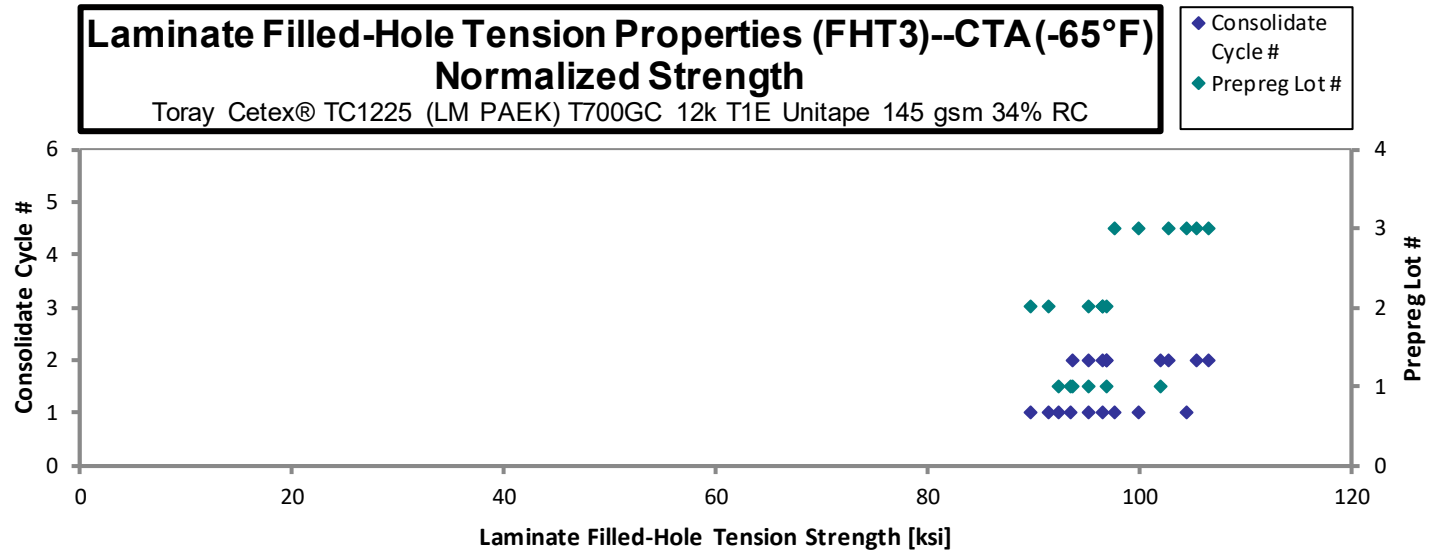
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 t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA6A111B	A	C1	1	1	101.5	0.1014	20	AGM
TCA6A112B	A	C1	1	1	98.33	0.1028	20	AGM
TCA6A113B	A	C1	1	1	96.72	0.1031	20	AGM
TCA6A211B	A	C2	1	2	102.3	0.1023	20	AGM
TCA6A212B	A	C2	1	2	105.7	0.1042	20	AGM
TCA6A213B	A	C2	1	2	98.12	0.1032	20	AGM
TCA6B111B	B	C1	2	1	93.40	0.1038	20	AGM
TCA6B112B	B	C1	2	1	95.16	0.1038	20	AGM
TCA6B113B	B	C1	2	1	100.8	0.1034	20	AGM
TCA6B211B	B	C2	2	2	101.4	0.1033	20	AGM
TCA6B212B	B	C2	2	2	101.2	0.1030	20	AGM
TCA6B213B	B	C2	2	2	99.53	0.1034	20	AGM
TCA6C111B	C	C1	3	1	111.7	0.1009	20	AGM
TCA6C112B	C	C1	3	1	104.2	0.1013	20	AGM
TCA6C113B	C	C1	3	1	107.3	0.1006	20	AGM
TCA6C211B	C	C2	3	2	112.0	0.1016	20	AGM
TCA6C212B	C	C2	3	2	109.5	0.1014	20	AGM
TCA6C213B	C	C2	3	2	114.8	0.1003	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0051	95.28
0.0051	93.55
0.0052	92.31
0.0051	96.84
0.0052	102.0
0.0052	93.73
0.0052	89.75
0.0052	91.42
0.0052	96.58
0.0052	96.99
0.0052	96.51
0.0052	95.26
0.0050	104.4
0.0051	97.72
0.0050	99.94
0.0051	105.3
0.0051	102.8
0.0050	106.6

Average 103.0
 Standard Dev. 6.088
 Coeff. of Var. [%] 5.912
 Min. 93.40
 Max. 114.8
 Number of Spec. 18

Average_{norm} 0.0051 97.61
 Standard Dev._{norm} 4.924
 Coeff. of Var. [%]_{norm} 5.044
 Min. 0.0050 89.75
 Max. 0.0052 106.6
 Number of Spec. 18 18



**Laminate Filled-Hole Tension Properties (FHT3)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

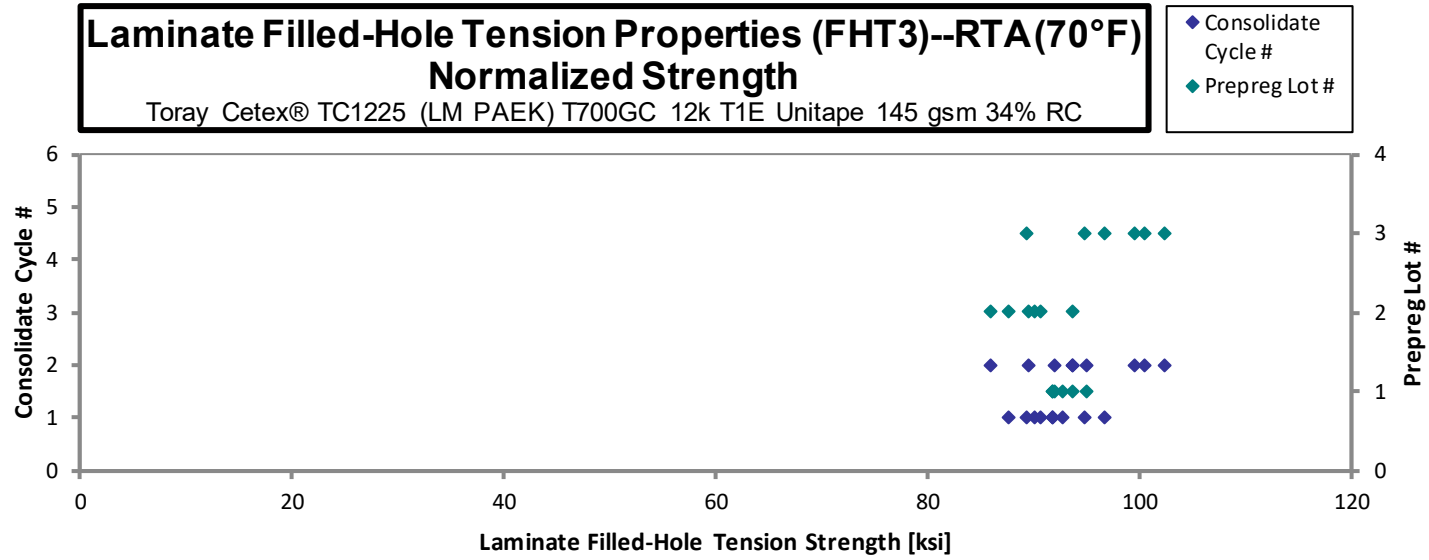
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA6A111A	A	C1	1	1	99.95	0.1002	20	AGM
TCA6A112A	A	C1	1	1	97.95	0.1011	20	AGM
TCA6A113A	A	C1	1	1	98.79	0.1003	20	AGM
TCA6A211A	A	C2	1	2	97.72	0.1017	20	AGM
TCA6A212A	A	C2	1	2	99.79	0.1014	20	AGM
TCA6A213A	A	C2	1	2	101.3	0.1013	20	AGM
TCA6B111A	B	C1	2	1	93.82	0.1008	20	AGM
TCA6B112A	B	C1	2	1	96.16	0.1012	20	AGM
TCA6B113A	B	C1	2	1	96.21	0.1018	20	AGM
TCA6B211A	B	C2	2	2	91.29	0.1016	20	AGM
TCA6B212A	B	C2	2	2	100.3	0.1009	20	AGM
TCA6B213A	B	C2	2	2	94.47	0.1024	20	AGM
TCA6C111A	C	C1	3	1	103.6	0.09883	20	AGM
TCA6C112A	C	C1	3	1	96.97	0.09958	20	AGM
TCA6C113A	C	C1	3	1	104.1	0.1004	20	AGM
TCA6C211A	C	C2	3	2	106.4	0.1010	20	AGM
TCA6C212A	C	C2	3	2	107.3	0.1011	20	AGM
TCA6C213A	C	C2	3	2	110.4	0.1001	20	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0050	92.70
0.0051	91.72
0.0050	91.71
0.0051	92.01
0.0051	93.68
0.0051	95.06
0.0050	87.56
0.0051	90.12
0.0051	90.64
0.0051	85.87
0.0050	93.65
0.0051	89.56
0.0049	94.81
0.0050	89.41
0.0050	96.81
0.0051	99.49
0.0051	100.4
0.0050	102.3

Average **99.81**
Standard Dev. **5.012**
Coeff. of Var. [%] **5.022**
Min. **91.29**
Max. **110.4**
Number of Spec. **18**

Average_{norm} **0.0050** **93.20**
Standard Dev._{norm} **4.402**
Coeff. of Var. [%]_{norm} **4.723**
Min. **0.0049** **85.87**
Max. **0.0051** **102.3**
Number of Spec. **18** **18**



**Laminate Filled-Hole Tension Properties (FHT3)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

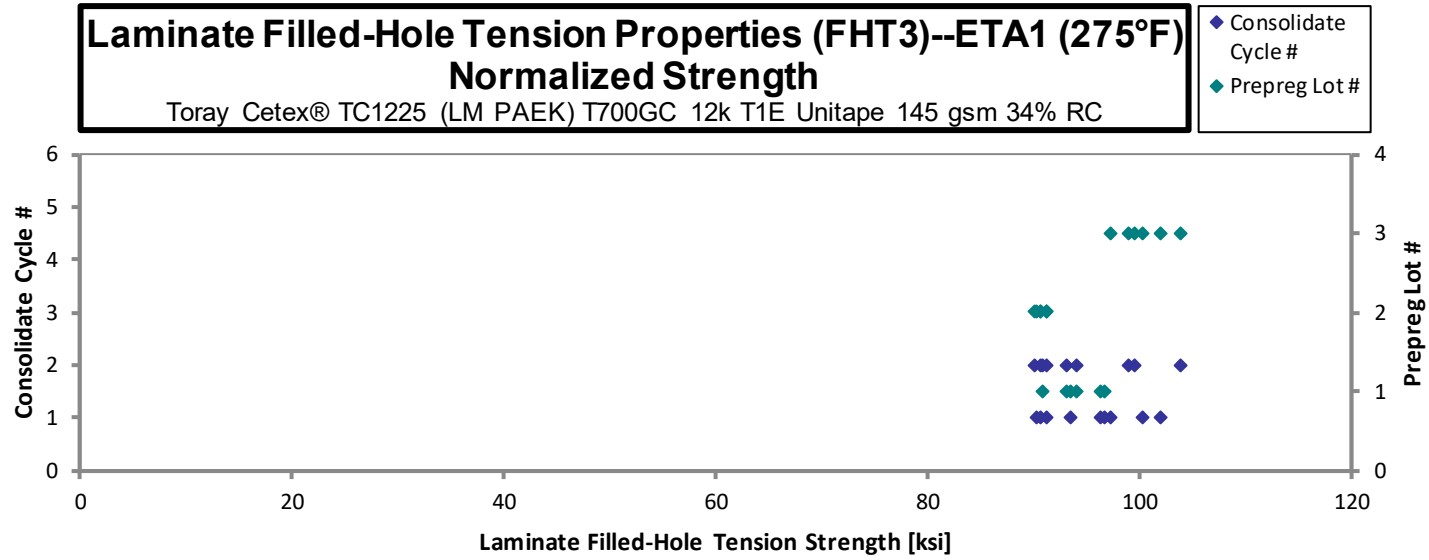
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t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA6A111C	A	C1	1	1	99.64	0.1013	20	AGM
TCA6A112C	A	C1	1	1	103.7	0.1003	20	AGM
TCA6A113C	A	C1	1	1	104.1	0.1004	20	AGM
TCA6A211C	A	C2	1	2	99.80	0.1017	20	AGM
TCA6A212C	A	C2	1	2	99.86	0.1008	20	AGM
TCA6A213C	A	C2	1	2	97.37	0.1007	20	AGM
TCA6B111C	B	C1	2	1	95.09	0.1025	20	AGM
TCA6B112C	B	C1	2	1	96.52	0.1015	20	AGM
TCA6B113C	B	C1	2	1	96.90	0.1017	20	AGM
TCA6B211C	B	C2	2	2	96.43	0.1023	20	AGM
TCA6B212C	B	C2	2	2	96.67	0.1007	20	AGM
TCA6B213C	B	C2	2	2	96.88	0.1011	20	AGM
TCA6C111C	C	C1	3	1	109.5	0.1006	20	AGM
TCA6C112C	C	C1	3	1	108.4	0.09987	20	AGM
TCA6C113C	C	C1	3	1	107.0	0.09822	20	AGM
TCA6C211C	C	C2	3	2	111.2	0.1008	20	AGM
TCA6C212C	C	C2	3	2	108.0	0.09907	20	AGM
TCA6C213C	C	C2	3	2	110.5	0.09723	20	AGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0051	93.46
0.0050	96.32
0.0050	96.80
0.0051	93.98
0.0050	93.16
0.0050	90.79
0.0051	90.26
0.0051	90.67
0.0051	91.22
0.0051	91.30
0.0050	90.15
0.0051	90.71
0.0050	102.0
0.0050	100.3
0.0049	97.30
0.0050	103.8
0.0050	99.07
0.0049	99.52

Average 102.1
Standard Dev. 5.680
Coeff. of Var. [%] 5.564
Min. 95.09
Max. 111.2
Number of Spec. 18

Average_{norm} 0.0050 95.04
Standard Dev._{norm} 4.452
Coeff. of Var. [%]_{norm} 4.684
Min. 0.0049 90.15
Max. 0.0051 103.8
Number of Spec. 18 18



4.25 “25/50/25” Open-Hole Compression 1 Properties (OHC1)

Laminate Open-Hole Compression Properties (OHC1)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

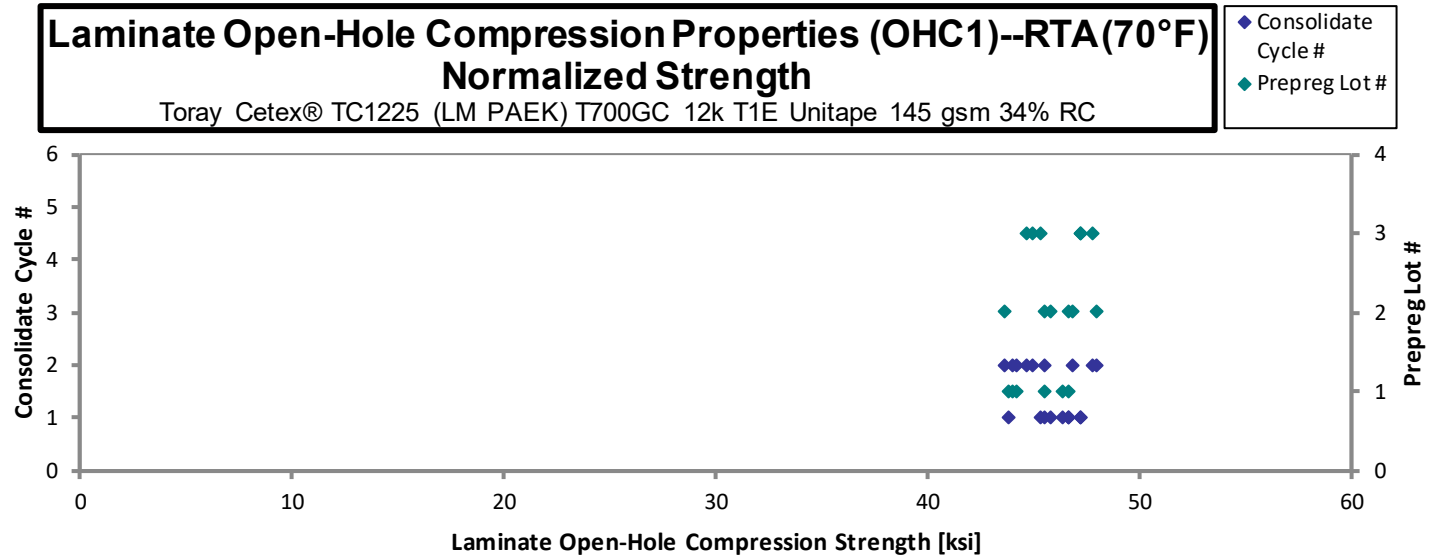
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 t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAGA111A	A	C1	1	1	45.97	0.1649	32	LGM
TCAGA112A	A	C1	1	1	48.87	0.1651	32	LGM
TCAGA113A	A	C1	1	1	48.51	0.1653	32	LGM
TCAGA211A	A	C2	1	2	46.54	0.1633	32	M(A,L)GM
TCAGA212A	A	C2	1	2	45.31	0.1684	32	M(A,L)GM
TCAGA213A	A	C2	1	2	47.48	0.1657	32	M(A,L)GM
TCAGB111A	B	C1	2	1	46.98	0.1685	32	M(A,L)GM
TCAGB112A	B	C1	2	1	46.77	0.1680	32	M(A,L)GM
TCAGB113A	B	C1	2	1	47.59	0.1695	32	LGM
TCAGB211A	B	C2	2	2	44.99	0.1676	32	M(A,L)GM
TCAGB212A	B	C2	2	2	48.95	0.1693	32	M(A,L)GM
TCAGB213A	B	C2	2	2	47.54	0.1703	32	M(A,L)GM
TCAGC111A	C	C1	3	1	47.50	0.1649	32	M(A,L)GM
TCAGC112A	C	C1	3	1	48.50	0.1682	32	M(A,L)GM
TCAGC113A	C	C1	3	1	48.60	0.1679	32	M(A,L)GM
TCAGC211A	C	C2	3	2	46.74	0.1653	32	M(A,L)GM
TCAGC212A	C	C2	3	2	46.21	0.1683	32	LGM
TCAGC213A	C	C2	3	2	48.84	0.1691	32	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0052	43.85
0.0052	46.70
0.0052	46.41
0.0051	43.98
0.0053	44.16
0.0052	45.54
0.0053	45.80
0.0053	45.48
0.0053	46.67
0.0052	43.64
0.0053	47.95
0.0053	46.84
0.0052	45.33
0.0053	47.20
0.0052	47.22
0.0052	44.70
0.0053	44.99
0.0053	47.80

Average 47.33
 Standard Dev. 1.235
 Coeff. of Var. [%] 2.610
 Min. 44.99
 Max. 48.95
 Number of Spec. 18

Average_{norm} 0.0052 45.79
 Standard Dev._{norm} 1.380
 Coeff. of Var. [%]_{norm} 3.014
 Min. 0.0051 43.64
 Max. 0.0053 47.95
 Number of Spec. 18 18



Laminate Open-Hole Compression Properties (OHC1)--ETA1 (275°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

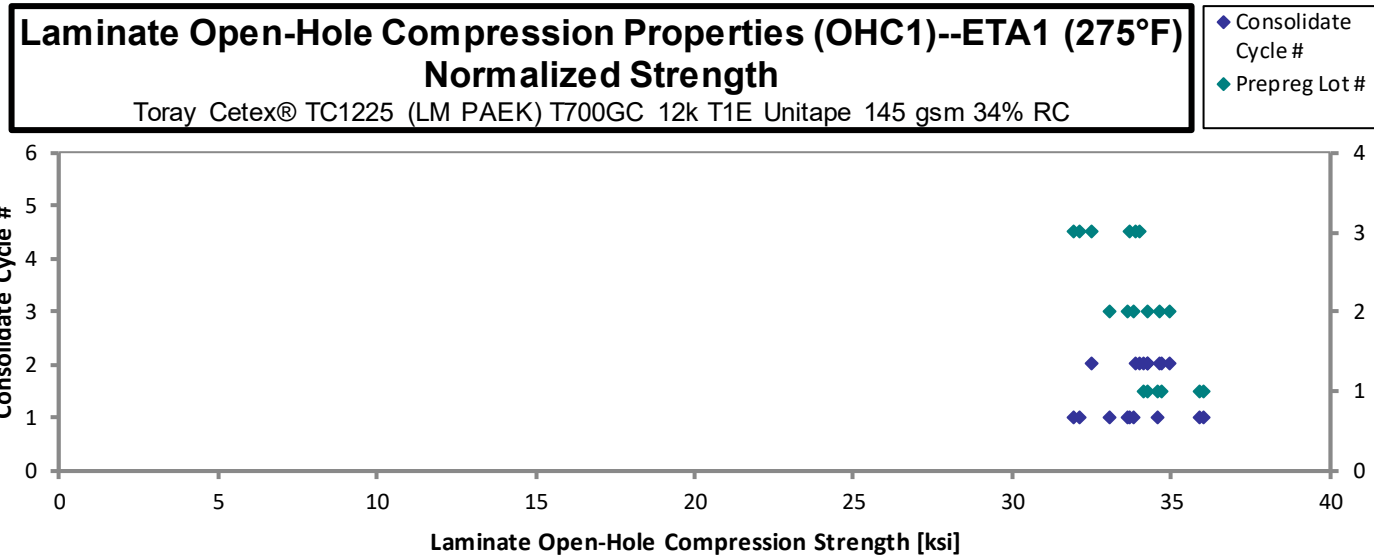
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 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAGA111C	A	C1	1	1	37.10	0.1672	32	LGM
TCAGA112C	A	C1	1	1	37.47	0.1660	32	LGM
TCAGA113C	A	C1	1	1	35.89	0.1665	32	LGM
TCAGA211C	A	C2	1	2	35.37	0.1673	32	LGM
TCAGA212C	A	C2	1	2	36.12	0.1661	32	LGM
TCAGA213C	A	C2	1	2	35.54	0.1660	32	LGM
TCAGB111C	B	C1	2	1	33.73	0.1695	32	LGM
TCAGB112C	B	C1	2	1	34.32	0.1704	32	LGM
TCAGB113C	B	C1	2	1	34.21	0.1698	32	LGM
TCAGB211C	B	C2	2	2	35.58	0.1697	32	LGM
TCAGB212C	B	C2	2	2	35.57	0.1683	32	LGM
TCAGB213C	B	C2	2	2	35.26	0.1677	32	LGM
TCAGC111C	C	C1	3	1	34.64	0.1681	32	LGM
TCAGC112C	C	C1	3	1	33.02	0.1680	32	LGM
TCAGC113C	C	C1	3	1	33.24	0.1661	32	LGM
TCAGC211C	C	C2	3	2	34.38	0.1708	32	LGM
TCAGC212C	C	C2	3	2	34.61	0.1691	32	LGM
TCAGC213C	C	C2	3	2	33.28	0.1688	32	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0052	35.90
0.0052	35.99
0.0052	34.58
0.0052	34.24
0.0052	34.71
0.0052	34.14
0.0053	33.07
0.0053	33.83
0.0053	33.62
0.0053	34.95
0.0053	34.64
0.0052	34.23
0.0053	33.70
0.0052	32.09
0.0052	31.95
0.0053	33.98
0.0053	33.86
0.0053	32.52

Average **34.96**
 Standard Dev. **1.261**
 Coeff. of Var. [%] **3.607**
 Min. **33.02**
 Max. **37.47**
 Number of Spec. **18**

Average_{norm} **0.0053** **34.00**
 Standard Dev._{norm} **1.111**
 Coeff. of Var. [%]_{norm} **3.268**
 Min. **0.0052** **31.95**
 Max. **0.0053** **35.99**
 Number of Spec. **18** **18**



**Laminate Open-Hole Compression Properties (OHC1)--ETA2 (400°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

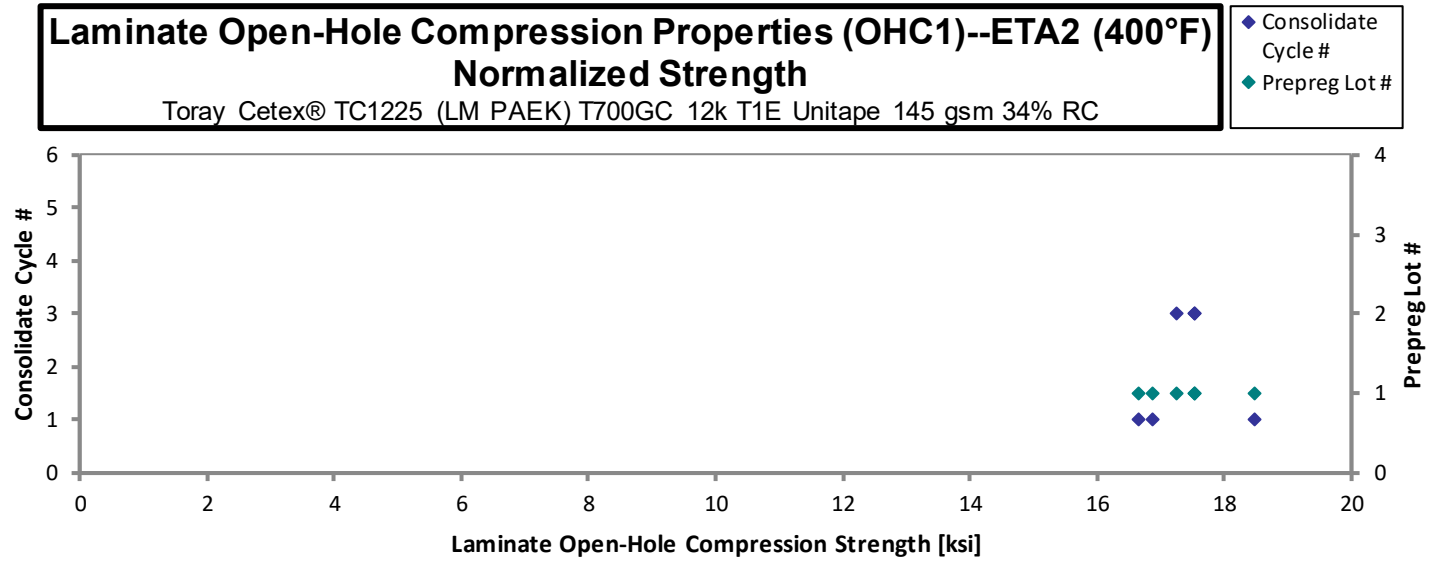
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAGA111D	A	C1	1	1	19.19	0.1664	32	LGM
TCAGA112D	A	C1	1	1	17.56	0.1659	32	LGM
TCAGA113D	A	C1	1	1	17.28	0.1664	32	LGM
TCAGA311D	A	C3	1	3	17.30	0.1723	32	LGM
TCAGA312D	A	C3	1	3	17.73	0.1709	32	LGM
TCAGA313D	A	C3	1	3	17.57	0.1724	32	LGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	18.47
0.0052	16.86
0.0052	16.64
0.0054	17.25
0.0053	17.54
0.0054	17.52

Average 17.77
Standard Dev. 0.7136
Coeff. of Var. [%] 4.015
Min. 17.28
Max. 19.19
Number of Spec. 6

Average_{norm} 0.0053 17.38
Standard Dev_{norm} 0.6432
Coeff. of Var. [%]_{norm} 3.701
Min. 0.0052 16.64
Max. 0.0054 18.47
Number of Spec. 6 6



**Laminate Open-Hole Compression Properties (OHC1)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

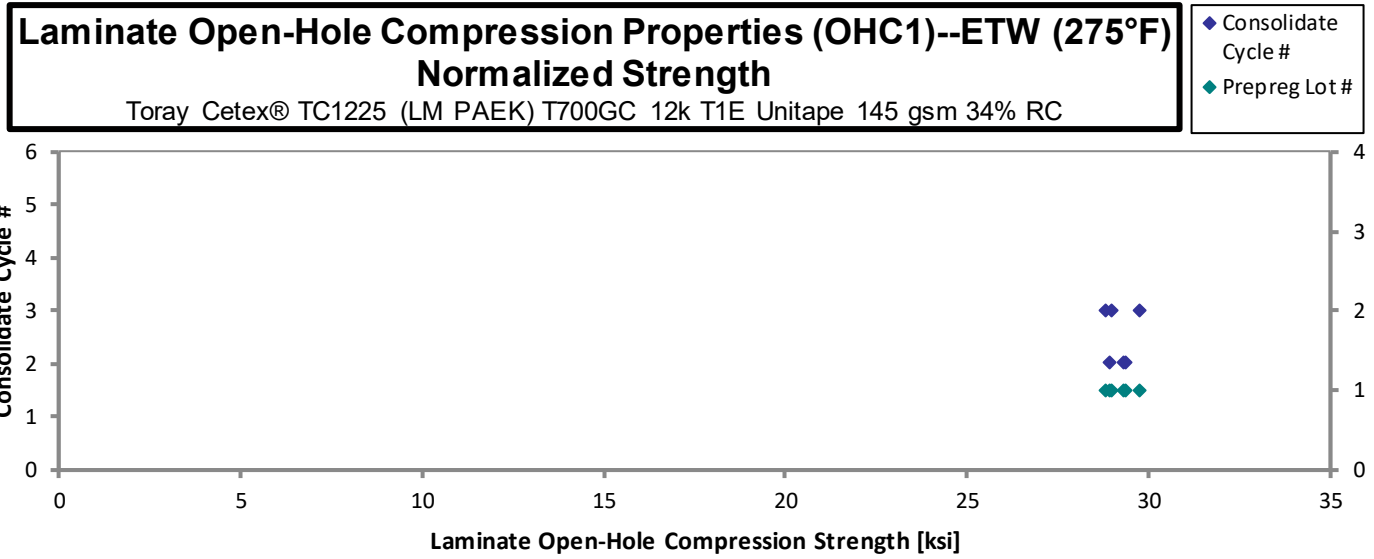
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t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAGA211E	A	C2	1	2	30.13	0.1660	32	M(A,L)GM
TCAGA212E	A	C2	1	2	30.38	0.1667	32	M(A,L)GM
TCAGA213E	A	C2	1	2	30.74	0.1652	32	M(A,L)GM
TCAGA311E	A	C3	1	3	29.93	0.1716	32	LGM
TCAGA312E	A	C3	1	3	28.98	0.1719	32	LGM
TCAGA313E	A	C3	1	3	29.44	0.1702	32	M(A,L)GM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	28.93
0.0052	29.31
0.0052	29.38
0.0054	29.72
0.0054	28.83
0.0053	28.99

Average 29.93
Standard Dev. 0.6402
Coeff. of Var. [%] 2.139
Min. 28.98
Max. 30.74
Number of Spec. 6

Average_{norm} 0.0053 29.19
Standard Dev_{norm} 0.3394
Coeff. of Var. [%]_{norm} 1.163
Min. 0.0052 28.83
Max. 0.0054 29.72
Number of Spec. 6 6



4.26 “10/80/10” Open-Hole Compression 2 Properties (OHC2)

Laminate Open-Hole Compression Properties (OHC2)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

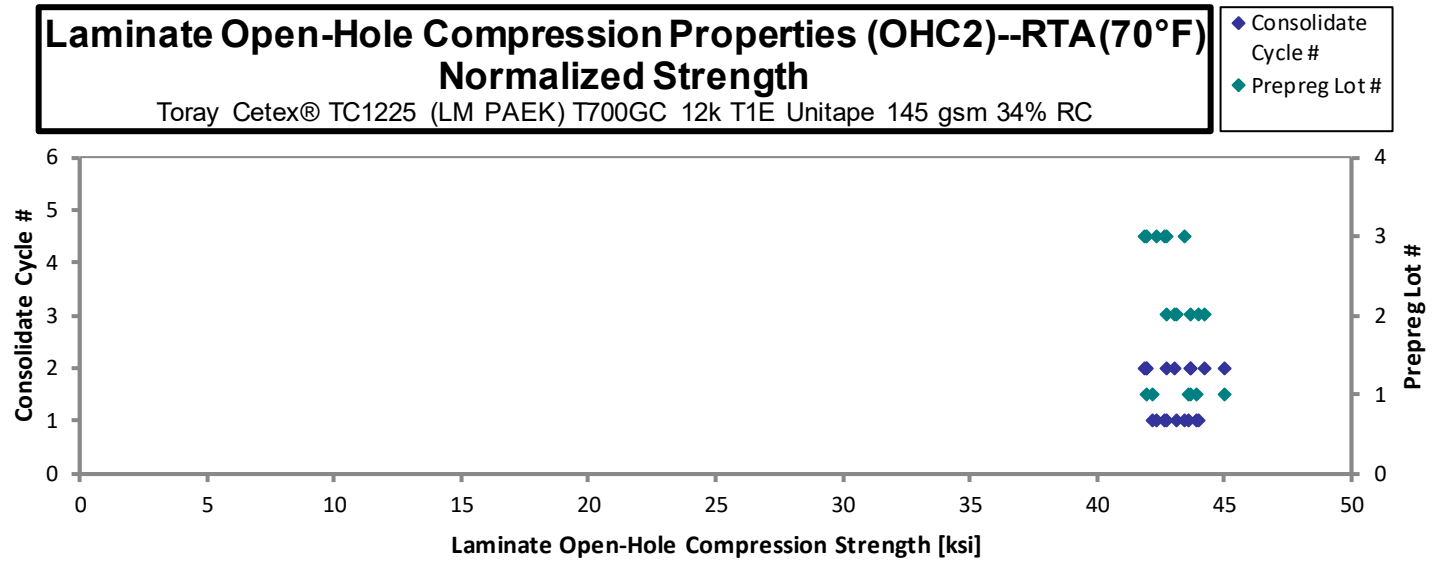
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAHA111A	A	C1	1	1	43.67	0.2086	40	AGM
TCAHA112A	A	C1	1	1	44.81	0.2103	40	AGM
TCAHA113A	A	C1	1	1	45.05	0.2107	40	AGM
TCAHA211A	A	C2	1	2	43.46	0.2084	40	AGM
TCAHA212A	A	C2	1	2	45.00	0.2098	40	AGM
TCAHA213A	A	C2	1	2	46.13	0.2106	40	AGM
TCAHB111A	B	C1	2	1	44.39	0.2081	40	AGM
TCAHB112A	B	C1	2	1	44.76	0.2081	40	AGM
TCAHB113A	B	C1	2	1	45.74	0.2076	40	AGM
TCAHB211A	B	C2	2	2	45.11	0.2091	40	AGM
TCAHB212A	B	C2	2	2	44.19	0.2104	40	AGM
TCAHB213A	B	C2	2	2	45.39	0.2105	40	AGM
TCAHC111A	C	C1	3	1	45.83	0.1997	40	AGM
TCAHC112A	C	C1	3	1	46.05	0.2001	40	M(A,L)GM
TCAHC113A	C	C1	3	1	46.62	0.2015	40	M(A,L)GM
TCAHC211A	C	C2	3	2	45.16	0.2006	40	AGM
TCAHC212A	C	C2	3	2	45.09	0.2006	40	AGM
TCAHC213A	C	C2	3	2	45.31	0.2036	40	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0052	42.17
0.0053	43.63
0.0053	43.94
0.0052	41.93
0.0052	43.72
0.0053	44.98
0.0052	42.77
0.0052	43.12
0.0052	43.97
0.0052	43.67
0.0053	43.04
0.0053	44.24
0.0050	42.36
0.0050	42.66
0.0050	43.48
0.0050	41.95
0.0050	41.88
0.0051	42.71

Average 45.10
 Standard Dev. 0.8266
 Coeff. of Var. [%] 1.833
 Min. 43.46
 Max. 46.62
 Number of Spec. 18

Average_{norm} 0.0052 43.12
 Standard Dev._{norm} 0.8906
 Coeff. of Var. [%]_{norm} 2.065
 Min. 0.0050 41.88
 Max. 0.0053 44.98
 Number of Spec. 18 18



**Laminate Open-Hole Compression Properties (OHC2)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

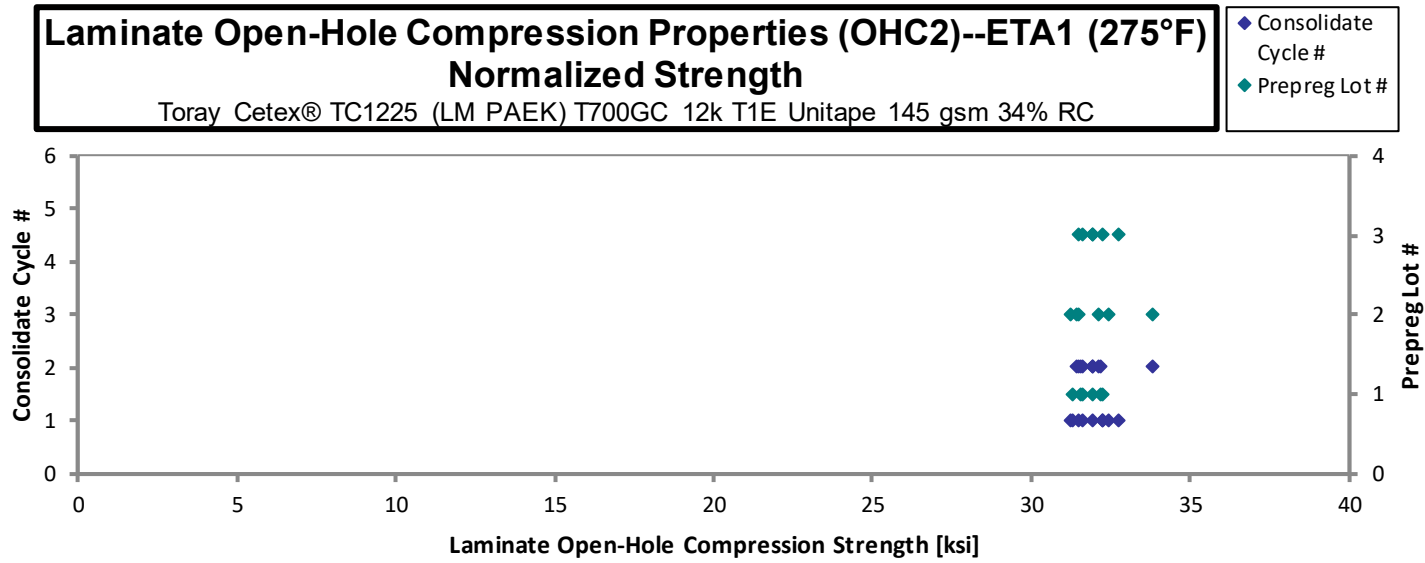
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAHA111C	A	C1	1	1	32.85	0.2119	40	AGM
TCAHA112C	A	C1	1	1	31.91	0.2120	40	AGM
TCAHA113C	A	C1	1	1	32.24	0.2118	40	AGM
TCAHA211C	A	C2	1	2	32.22	0.2114	40	M(A,L)GM
TCAHA212C	A	C2	1	2	32.90	0.2111	40	M(A,L)GM
TCAHA213C	A	C2	1	2	32.71	0.2107	40	M(A,L)GM
TCAHB111C	B	C1	2	1	33.45	0.2095	40	AGM
TCAHB112C	B	C1	2	1	32.79	0.2075	40	M(A,L)GM
TCAHB113C	B	C1	2	1	32.55	0.2072	40	AGM
TCAHB211C	B	C2	2	2	34.31	0.2130	40	AGM
TCAHB212C	B	C2	2	2	32.73	0.2121	40	M(A,L)GM
TCAHB213C	B	C2	2	2	32.27	0.2102	40	AGM
TCAHC111C	C	C1	3	1	34.33	0.2027	40	AGM
TCAHC112C	C	C1	3	1	34.93	0.2025	40	AGM
TCAHC113C	C	C1	3	1	34.21	0.2016	40	AGM
TCAHC211C	C	C2	3	2	33.26	0.2073	40	M(A,L)GM
TCAHC212C	C	C2	3	2	33.33	0.2042	40	M(A,L)GM
TCAHC213C	C	C2	3	2	33.52	0.2035	40	M(A,L)GM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	32.22
0.0053	31.32
0.0053	31.61
0.0053	31.53
0.0053	32.15
0.0053	31.91
0.0052	32.45
0.0052	31.49
0.0052	31.22
0.0053	33.84
0.0053	32.14
0.0053	31.40
0.0051	32.22
0.0051	32.74
0.0050	31.93
0.0052	31.91
0.0051	31.50
0.0051	31.58

Average 33.14
Standard Dev. 0.8509
Coeff. of Var. [%] 2.568
Min. 31.91
Max. 34.93
Number of Spec. 18

Average_{norm} 0.0052 31.95
Standard Dev._{norm} 0.6286
Coeff. of Var. [%]_{norm} 1.967
Min. 0.0050 31.22
Max. 0.0053 33.84
Number of Spec. 18 18



4.27 “50/40/10” Open-Hole Compression 3 Properties (OHC3)

Laminate Open-Hole Compression Properties (OHC3)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAIA111A	A	C1	1	1	58.29	0.2085	40	LGM
TCAIA112A	A	C1	1	1	57.45	0.2103	40	LGM
TCAIA113A	A	C1	1	1	57.77	0.2113	40	LGM
TCAIA211A	A	C2	1	2	57.73	0.2104	40	LGM
TCAIA212A	A	C2	1	2	56.27	0.2117	40	LGM
TCAIA213A	A	C2	1	2	56.35	0.2114	40	LGM
TCAIB111A	B	C1	2	1	58.39	0.2026	40	LGM
TCAIB112A	B	C1	2	1	57.35	0.2042	40	LGM
TCAIB113A	B	C1	2	1	57.61	0.2044	40	LGM
TCAIB211A	B	C2	2	2	57.32	0.2013	40	LGM
TCAIB212A	B	C2	2	2	56.16	0.2025	40	LGM
TCAIB213A	B	C2	2	2	59.23	0.2032	40	LGM
TCAIC111A	C	C1	3	1	57.69	0.2040	40	LGM
TCAIC112A	C	C1	3	1	58.59	0.2045	40	LGM
TCAIC113A	C	C1	3	1	56.46	0.2065	40	LGM
TCAIC211A	C	C2	3	2	58.26	0.2061	40	LGM
TCAIC212A	C	C2	3	2	58.27	0.2069	40	LGM
TCAIC213A	C	C2	3	2	57.36	0.2067	40	LGM

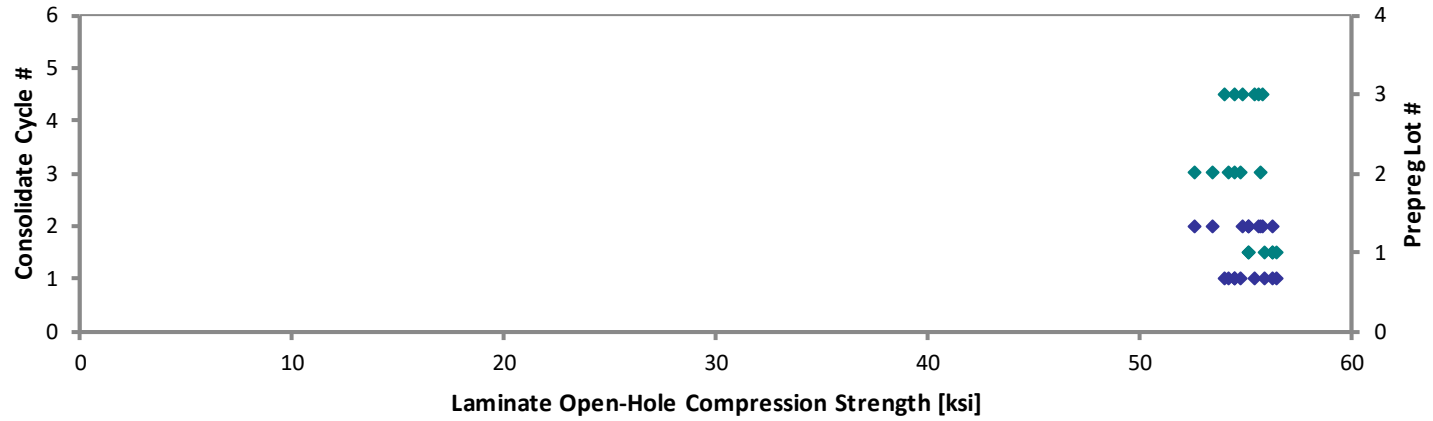
Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0052	56.26
0.0053	55.95
0.0053	56.50
0.0053	56.25
0.0053	55.16
0.0053	55.15
0.0051	54.77
0.0051	54.22
0.0051	54.52
0.0050	53.42
0.0051	52.64
0.0051	55.71
0.0051	54.47
0.0051	55.47
0.0052	53.98
0.0052	55.59
0.0052	55.81
0.0052	54.89

Average **57.59**
 Standard Dev. **0.8612**
 Coeff. of Var. [%] **1.496**
 Min. **56.16**
 Max. **59.23**
 Number of Spec. **18**

Average_{norm} **0.0052** **55.04**
 Standard Dev._{norm} **1.038**
 Coeff. of Var. [%]_{norm} **1.886**
 Min. **0.0050** **52.64**
 Max. **0.0053** **56.50**
 Number of Spec. **18** **18**

Laminate Open-Hole Compression Properties (OHC3)--RTA(70°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

- ◆ Consolidate Cycle #
- ◆ Prepreg Lot #



**Laminate Open-Hole Compression Properties (OHC3)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAIA111C	A	C1	1	1	40.35	0.2098	40	LGM
TCAIA112C	A	C1	1	1	41.18	0.2106	40	LGM
TCAIA113C	A	C1	1	1	40.97	0.2105	40	LGM
TCAIA211C	A	C2	1	2	40.75	0.2140	40	LGM
TCAIA212C	A	C2	1	2	40.68	0.2139	40	LGM
TCAIA213C	A	C2	1	2	40.50	0.2151	40	LGM
TCAIB111C	B	C1	2	1	44.26	0.2037	40	LGM
TCAIB112C	B	C1	2	1	43.94	0.2047	40	LGM
TCAIB113C	B	C1	2	1	45.09	0.2038	40	LGM
TCAIB211C	B	C2	2	2	42.92	0.2045	40	LGM
TCAIB212C	B	C2	2	2	43.19	0.2053	40	LGM
TCAIB213C	B	C2	2	2	44.28	0.2047	40	LGM
TCAIC111C	C	C1	3	1	42.84	0.2068	40	LGM
TCAIC112C	C	C1	3	1	42.68	0.2079	40	LGM
TCAIC113C	C	C1	3	1	42.68	0.2066	40	LGM
TCAIC211C	C	C2	3	2	42.09	0.2064	40	LGM
TCAIC212C	C	C2	3	2	42.91	0.2057	40	LGM
TCAIC213C	C	C2	3	2	43.09	0.2052	40	LGM

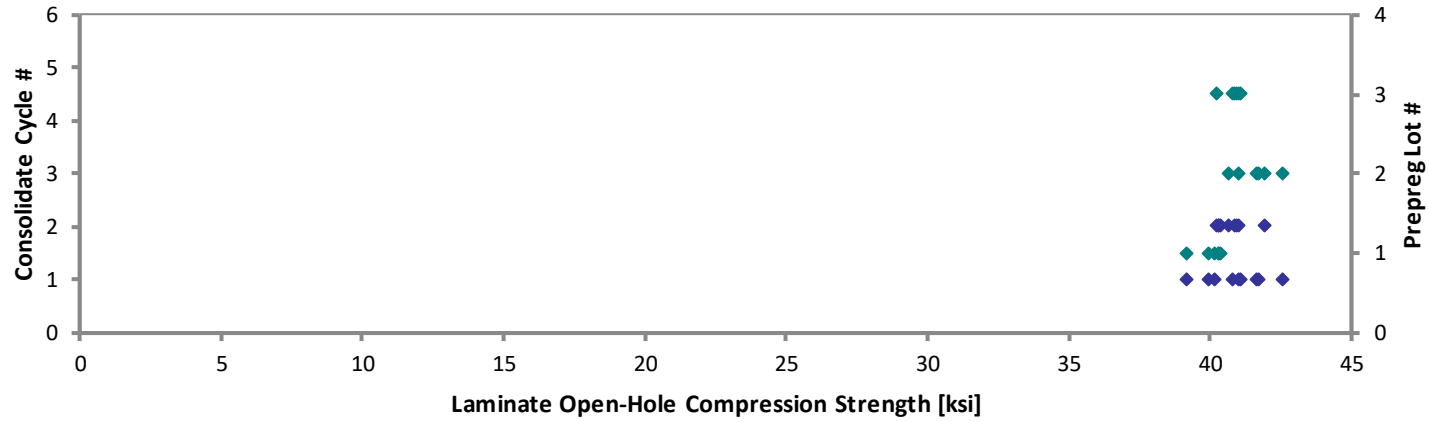
Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	39.19
0.0053	40.15
0.0053	39.92
0.0053	40.37
0.0053	40.30
0.0054	40.33
0.0051	41.74
0.0051	41.63
0.0051	42.54
0.0051	40.63
0.0051	41.04
0.0051	41.96
0.0052	41.01
0.0052	41.08
0.0052	40.82
0.0052	40.22
0.0051	40.87
0.0051	40.94

Average 42.47
Standard Dev. 1.448
Coeff. of Var. [%] 3.409
Min. 40.35
Max. 45.09
Number of Spec. 18

Average_{norm} 0.0052 40.82
Standard Dev._{norm} 0.8034
Coeff. of Var. [%]_{norm} 1.968
Min. 0.0051 39.19
Max. 0.0054 42.54
Number of Spec. 18 18

Laminate Open-Hole Compression Properties (OHC3)--ETA1 (275°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

- ◆ Consolidate Cycle #
- ◆ Prepreg Lot #



4.28 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)

Laminate Filled-Hole Compression Properties (FHC1)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

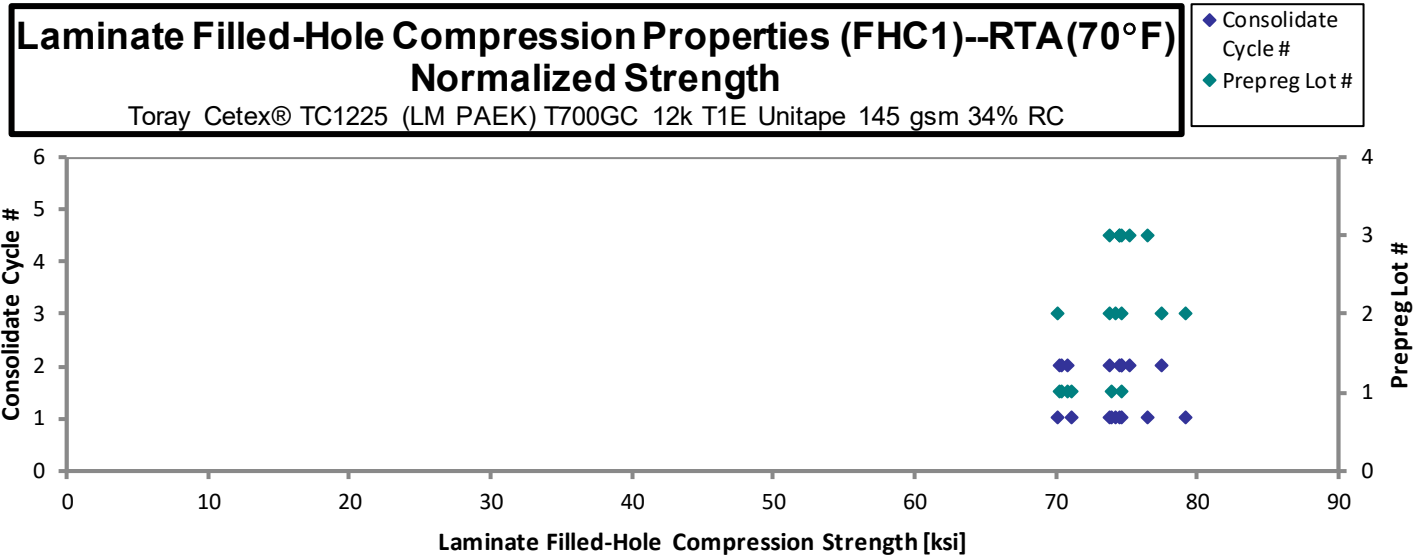
normalizing
 t_{ply} [in]
 0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA7A111A	A	C1	1	1	77.93	0.1655	32	LGF
TCA7A112A	A	C1	1	1	73.98	0.1660	32	M(A,L)GF
TCA7A113A	A	C1	1	1	76.64	0.1668	32	AGO, M(A,L)GF
TCA7A211A	A	C2	1	2	74.06	0.1640	32	M(A,L)GF
TCA7A212A	A	C2	1	2	74.08	0.1652	32	M(A,L)GO, M(A,L)GF
TCA7A213A	A	C2	1	2	73.35	0.1658	32	M(A,L)GO, M(A,L)GF
TCA7B111A	B	C1	2	1	77.40	0.1657	32	M(A,L)GM, M(A,L)GF
TCA7B112A	B	C1	2	1	73.04	0.1659	32	M(A,L)GM, M(A,L)GF
TCA7B113A	B	C1	2	1	82.36	0.1661	32	LGF
TCA7B211A	B	C2	2	2	82.08	0.1632	32	M(A,L)GF
TCA7B212A	B	C2	2	2	77.66	0.1641	32	M(A,L)GF
TCA7B213A	B	C2	2	2	78.27	0.1647	32	LGF, LGT
TCA7C111A	C	C1	3	1	80.50	0.1601	32	M(A,L)GF
TCA7C112A	C	C1	3	1	78.93	0.1615	32	M(A,L)GF
TCA7C113A	C	C1	3	1	81.44	0.1625	32	M(A,L)GF
TCA7C211A	C	C2	3	2	80.18	0.1620	32	M(A,L)GF
TCA7C212A	C	C2	3	2	79.41	0.1625	32	LGF
TCA7C213A	C	C2	3	2	78.91	0.1633	32	LGF

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0052	74.63
0.0052	71.07
0.0052	73.97
0.0051	70.30
0.0052	70.81
0.0052	70.36
0.0052	74.20
0.0052	70.10
0.0052	79.15
0.0051	77.50
0.0051	73.75
0.0051	74.60
0.0050	74.58
0.0050	73.76
0.0051	76.57
0.0051	75.18
0.0051	74.67
0.0051	74.57

Average 77.79
 Standard Dev. 3.040
 Coeff. of Var. [%] 3.907
 Min. 73.04
 Max. 82.36
 Number of Spec. 18

Average_{norm} 0.0051 73.88
 Standard Dev_{norm} 2.536
 Coeff. of Var. [%]_{norm} 3.433
 Min. 0.0050 70.10
 Max. 0.0052 79.15
 Number of Spec. 18 18



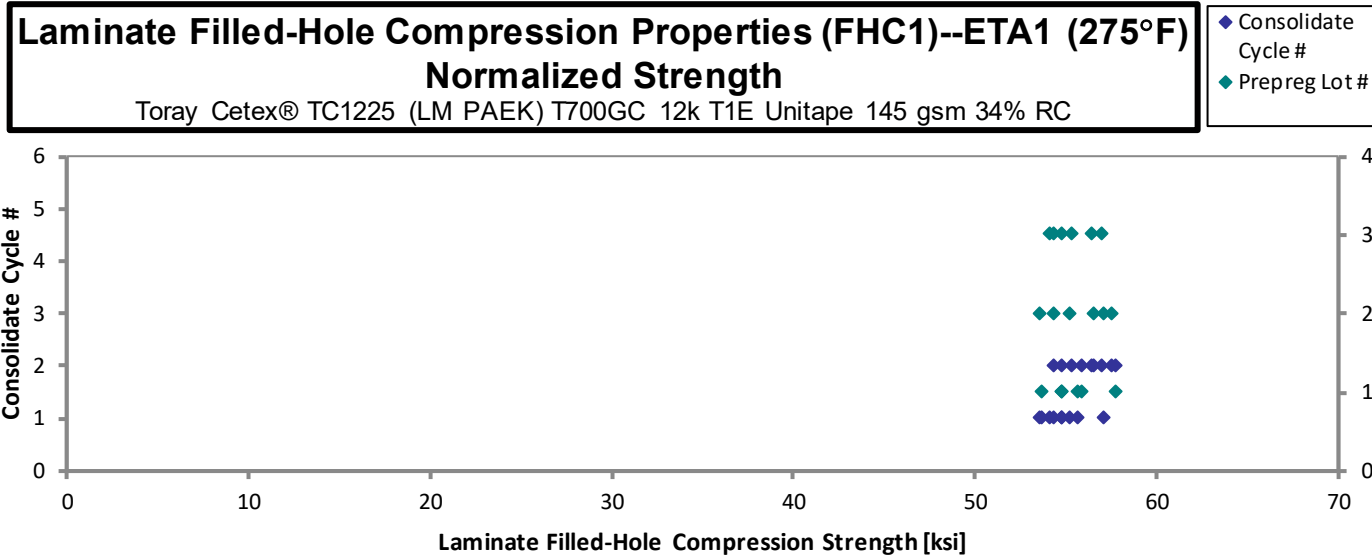
**Laminate Filled-Hole Compression Properties (FHC1)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t _{ply} [in]	Strength _{norm} [ksi]
TCA7A111C	A	C1	1	1	55.27	0.1679	32	LGF	0.0052	53.70
TCA7A112C	A	C1	1	1	57.04	0.1686	32	LGF	0.0053	55.65
TCA7A113C	A	C1	1	1	55.99	0.1690	32	LGF	0.0053	54.76
TCA7A211C	A	C2	1	2	56.71	0.1667	32	M(A,L)GF	0.0052	54.72
TCA7A212C	A	C2	1	2	59.80	0.1669	32	M(A,L)GF	0.0052	57.75
TCA7A213C	A	C2	1	2	57.56	0.1677	32	M(A,L)GF	0.0052	55.87
TCA7B111C	B	C1	2	1	58.99	0.1671	32	LGF, LGT	0.0052	57.04
TCA7B112C	B	C1	2	1	57.28	0.1665	32	LGF	0.0052	55.19
TCA7B113C	B	C1	2	1	55.64	0.1662	32	LGT	0.0052	53.51
TCA7B211C	B	C2	2	2	59.06	0.1654	32	LGM, M(A,L)GF	0.0052	56.53
TCA7B212C	B	C2	2	2	60.53	0.1643	32	LGF	0.0051	57.54
TCA7B213C	B	C2	2	2	57.45	0.1636	32	M(A,L)GF	0.0051	54.38
TCA7C111C	C	C1	3	1	57.33	0.1636	32	LGF, LGT	0.0051	54.28
TCA7C112C	C	C1	3	1	57.20	0.1634	32	LGF	0.0051	54.08
TCA7C113C	C	C1	3	1	58.30	0.1624	32	LGF	0.0051	54.78
TCA7C211C	C	C2	3	2	60.15	0.1637	32	M(A,L)GF	0.0051	56.97
TCA7C212C	C	C2	3	2	59.72	0.1633	32	M(A,L)GF	0.0051	56.44
TCA7C213C	C	C2	3	2	58.97	0.1621	32	M(A,L)GF	0.0051	55.31

Average 57.94
Standard Dev. 1.572
Coeff. of Var. [%] 2.714
Min. 55.27
Max. 60.53
Number of Spec. 18

Average_{norm} 0.0052
Standard Dev._{norm} 1.320
Coeff. of Var. [%]_{norm} 2.379
Min. 0.0051
Max. 0.0053
Number of Spec. 18



**Laminate Filled-Hole Compression Properties (FHC1)--ETA2 (400°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

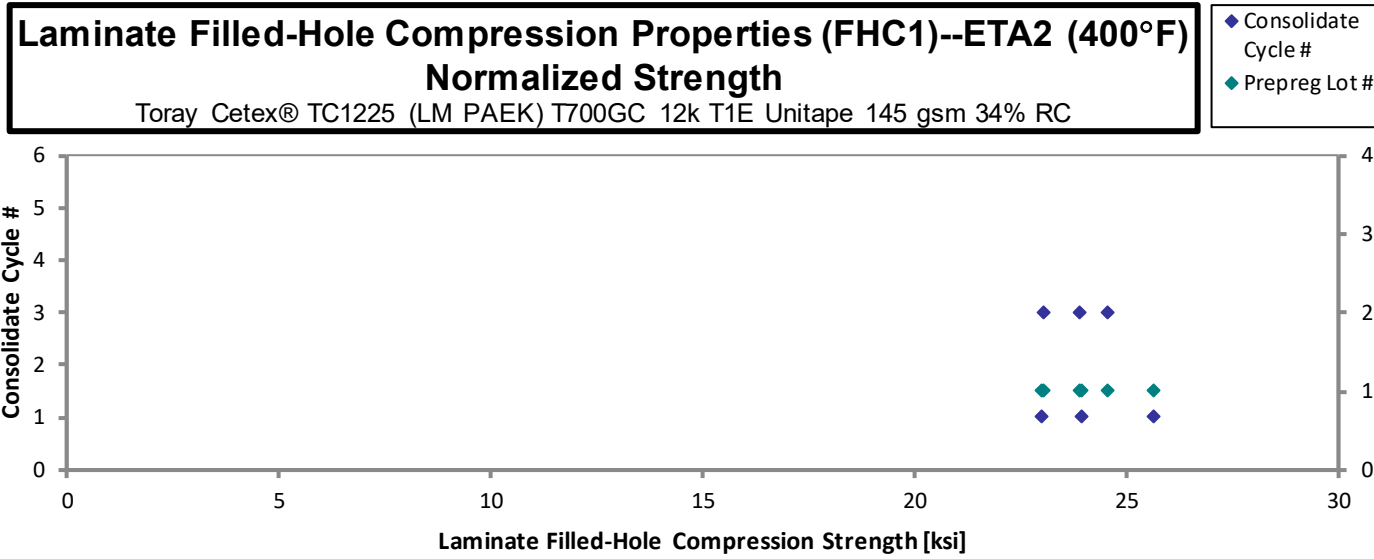
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA7A111D	A	C1	1	1	23.57	0.1686	32	LGF
TCA7A112D	A	C1	1	1	26.51	0.1671	32	LGB
TCA7A113D	A	C1	1	1	24.87	0.1663	32	LGF
TCA7A311D	A	C3	1	3	23.91	0.1665	32	LGF
TCA7A312D	A	C3	1	3	25.35	0.1674	32	LGT
TCA7A313D	A	C3	1	3	24.55	0.1683	32	LGF

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	23.00
0.0052	25.63
0.0052	23.94
0.0052	23.04
0.0052	24.56
0.0053	23.91

* In some cases of FHC>UNC, FHC data is for informational purposes only and is not appropriate to be used for design.

Average **24.79***
Standard Dev. **1.057**
Coeff. of Var. [%] **4.263**
Min. **23.57**
Max. **26.51**
Number of Spec. **6**

Average_{norm} **0.0052** **24.01***
Standard Dev_{norm} **0.9906**
Coeff. of Var. [%]_{norm} **4.125**
Min. **0.0052** **23.00**
Max. **0.0053** **25.63**
Number of Spec. **6** **6**



Laminate Filled-Hole Compression Properties (FHC1)--ETW (275°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

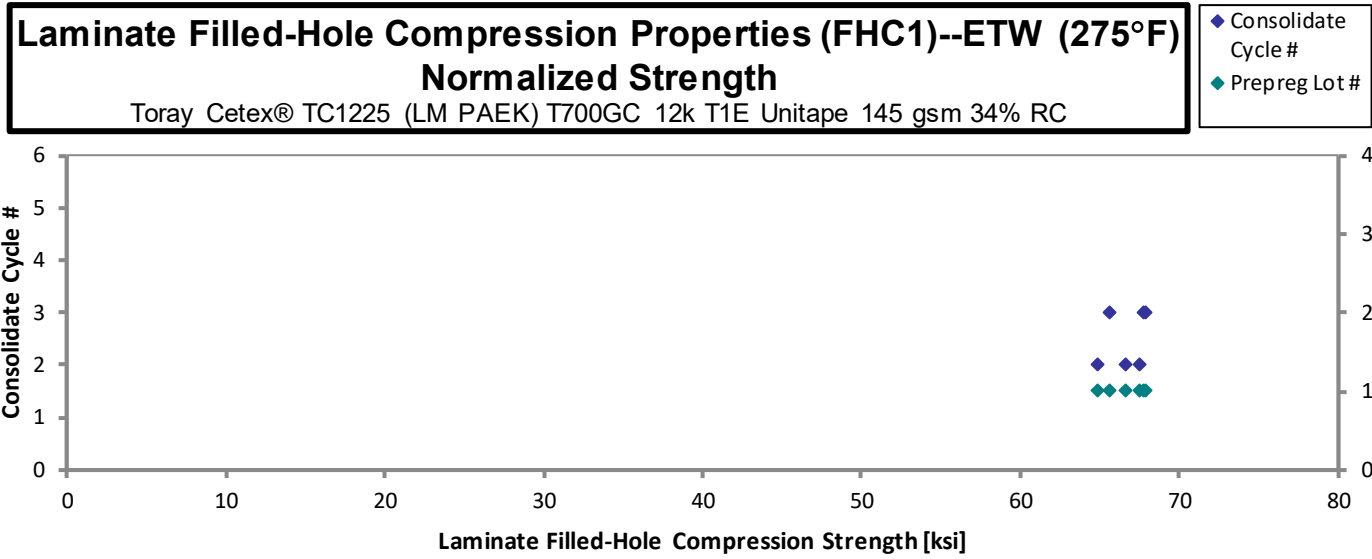
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA7A211E	A	C2	1	2	68.69	0.1676	32	AGM
TCA7A212E	A	C2	1	2	69.86	0.1670	32	AGM
TCA7A213E	A	C2	1	2	66.99	0.1672	32	AGM
TCA7A311E	A	C3	1	3	69.12	0.1696	32	AGM
TCA7A312E	A	C3	1	3	69.07	0.1695	32	AGM
TCA7A313E	A	C3	1	3	66.92	0.1694	32	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0052	66.62
0.0052	67.52
0.0052	64.82
0.0053	67.85
0.0053	67.75
0.0053	65.60

* In some cases of FHC>UNC, FHC data is for informational purposes only and is not appropriate to be used for design.

Average 68.44*
 Standard Dev. 1.212
 Coeff. of Var. [%] 1.771
 Min. 66.92
 Max. 69.86
 Number of Spec. 6

Average_{norm} 0.0053 66.69*
 Standard Dev_{norm} 1.254
 Coeff. of Var. [%]_{norm} 1.881
 Min. 0.0052 64.82
 Max. 0.0053 67.85
 Number of Spec. 6 6



4.29 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

**Laminate Filled-Hole Compression Properties (FHC2)--RTA
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

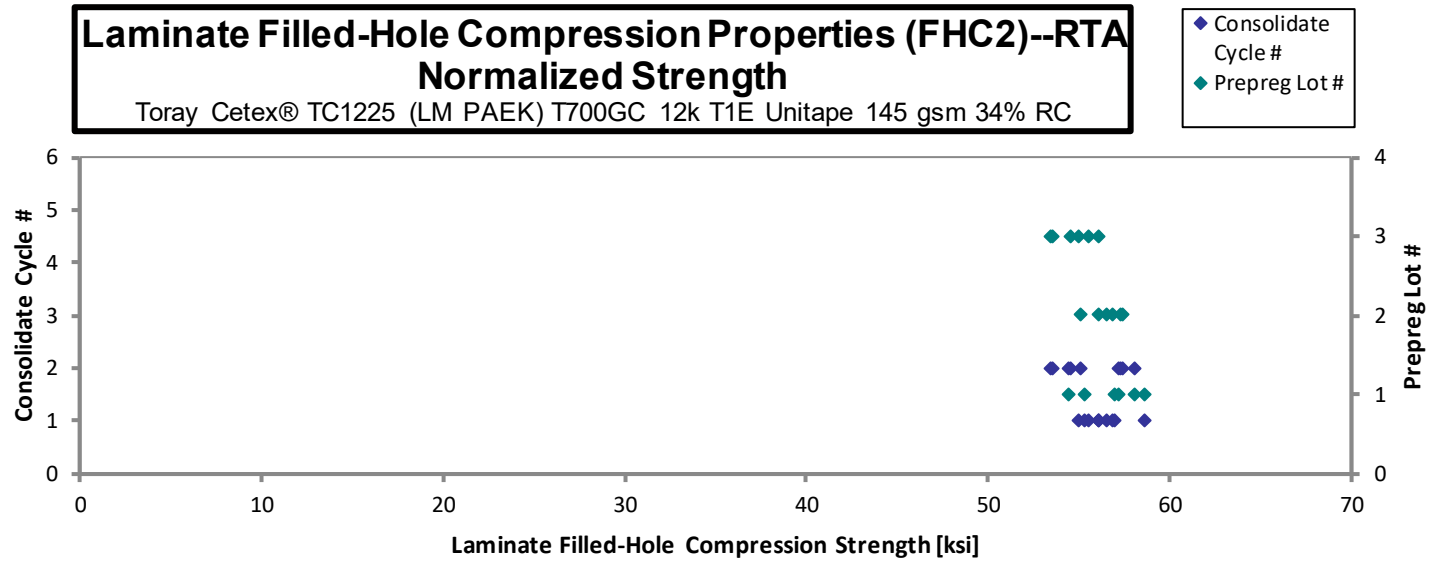
normalizing
 t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA8A111A	A	C1	1	1	56.84	0.2102	40	LGF, AWT
TCA8A112A	A	C1	1	1	58.20	0.2113	40	AGO, AGF
TCA8A113A	A	C1	1	1	59.72	0.2121	40	AGF
TCA8A211A	A	C2	1	2	56.44	0.2081	40	M(A,L)GF, M(A,L)GT
TCA8A212A	A	C2	1	2	59.00	0.2094	40	M(A,L)GF, AGT
TCA8A213A	A	C2	1	2	59.65	0.2101	40	AGT, AWT
TCA8B111A	B	C1	2	1	57.63	0.2120	40	LGF, AWT
TCA8B112A	B	C1	2	1	56.99	0.2126	40	AGT, AWT
TCA8B113A	B	C1	2	1	57.60	0.2133	40	AGF, AWT
TCA8B211A	B	C2	2	2	56.59	0.2104	40	AWT
TCA8B212A	B	C2	2	2	58.57	0.2115	40	AGT, AWT
TCA8B213A	B	C2	2	2	58.17	0.2126	40	AGB
TCA8C111A	C	C1	3	1	59.46	0.2017	40	M(A,L)GF, AWT
TCA8C112A	C	C1	3	1	58.70	0.2022	40	AGF, AWB
TCA8C113A	C	C1	3	1	59.79	0.2025	40	AGF, AGB, AWT
TCA8C211A	C	C2	3	2	56.79	0.2031	40	AGT, AWT
TCA8C212A	C	C2	3	2	56.76	0.2036	40	LGF, M(A,L)GT, M(A,L)GB
TCA8C213A	C	C2	3	2	57.60	0.2046	40	AGF, AGT, AGB

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0053	55.31
0.0053	56.93
0.0053	58.65
0.0052	54.38
0.0052	57.21
0.0053	58.03
0.0053	56.56
0.0053	56.09
0.0053	56.88
0.0053	55.13
0.0053	57.35
0.0053	57.26
0.0050	55.53
0.0051	54.94
0.0051	56.05
0.0051	53.40
0.0051	53.51
0.0051	54.56

Average 58.03
Standard Dev. 1.166
Coeff. of Var. [%] 2.010
Min. 56.44
Max. 59.79
Number of Spec. 18

Average_{norm} 0.0052 55.99
Standard Dev._{norm} 1.499
Coeff. of Var. [%]_{norm} 2.677
Min. 0.0050 53.40
Max. 0.0053 58.65
Number of Spec. 18 18



Laminate Filled-Hole Compression Properties (FHC2)--ETA1 Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

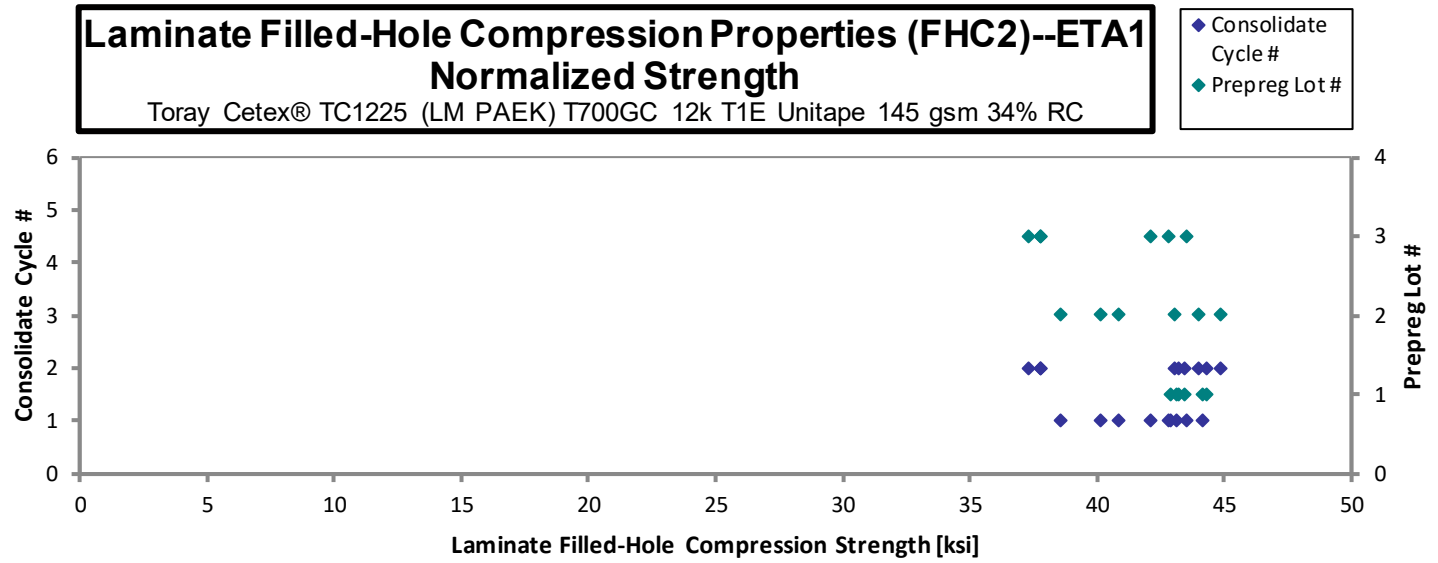
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA8A111C	A	C1	1	1	44.75	0.2132	40	AGF
TCA8A112C	A	C1	1	1	44.03	0.2118	40	AGB
TCA8A113C	A	C1	1	1	43.80	0.2116	40	AGF, AGB
TCA8A211C	A	C2	1	2	44.12	0.2115	40	AGF
TCA8A212C	A	C2	1	2	45.36	0.2108	40	AGF
TCA8A213C	A	C2	1	2	44.44	0.2111	40	AGF
TCA8B111C	B	C1	2	1	41.34	0.2133	40	AGB
TCA8B112C	B	C1	2	1	40.72	0.2131	40	AGF
TCA8B113C	B	C1	2	1	39.19	0.2127	40	AGB, AWB
TCA8B211C	B	C2	2	2	44.30	0.2145	40	AGB, AWB
TCA8B212C	B	C2	2	2	45.30	0.2138	40	AGB, AWB
TCA8B213C	B	C2	2	2	43.77	0.2125	40	AGB, AWB
TCA8C111C	C	C1	3	1	46.18	0.2035	40	M(A,L)GF
TCA8C112C	C	C1	3	1	45.44	0.2033	40	AGB
TCA8C113C	C	C1	3	1	44.88	0.2025	40	AGF, LGB
TCA8C211C	C	C2	3	2	39.28	0.2053	40	M(A,L)GB
TCA8C212C	C	C2	3	2	40.01	0.2040	40	M(A,L)WB
TCA8C213C	C	C2	3	2	40.14	0.2032	40	M(A,L)GB, M(A,L)WB

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	44.16
0.0053	43.17
0.0053	42.92
0.0053	43.21
0.0053	44.27
0.0053	43.43
0.0053	40.83
0.0053	40.18
0.0053	38.59
0.0054	43.99
0.0053	44.82
0.0053	43.05
0.0051	43.51
0.0051	42.78
0.0051	42.07
0.0051	37.32
0.0051	37.78
0.0051	37.76

* In some cases of FHC>UNC, FHC data is for informational purposes only and is not appropriate to be used for design.

Average 43.17*
Standard Dev. 2.349
Coeff. of Var. [%] 5.442
Min. 39.19
Max. 46.18
Number of Spec. 18

Average_{norm} 0.0052
Standard Dev._{norm} 2.487
Coeff. of Var. [%]_{norm} 5.938
Min. 0.0051
Max. 0.0054
Number of Spec. 18



4.30 “50/40/10” Filled-Hole Compression 3 Properties (FHC3)

Laminate Filled-Hole Compression Properties (FHC3)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

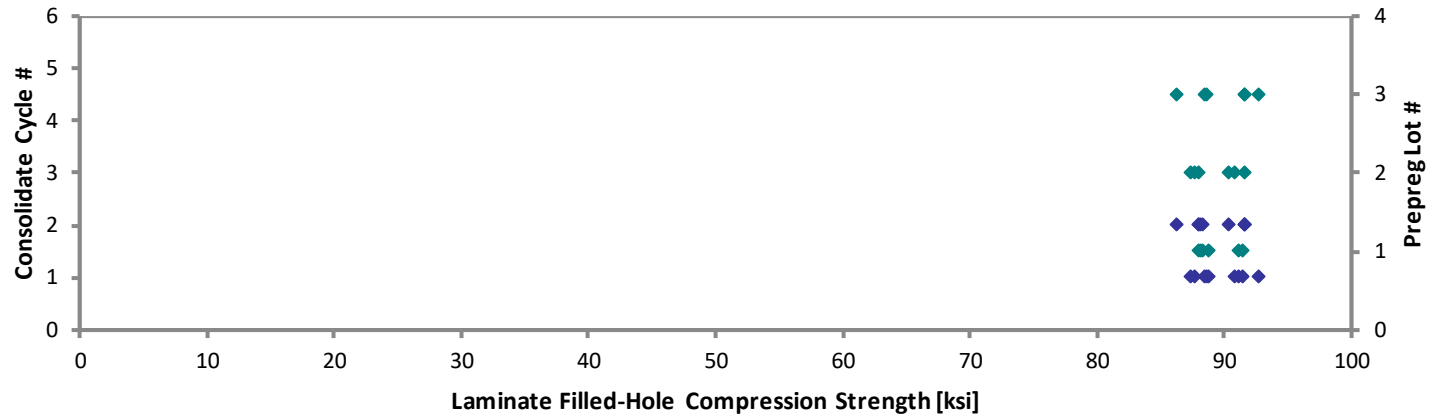
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCA9A111A	A	C1	1	1	94.14	0.2097	40	LGO, LGF	0.0052	91.40
TCA9A112A	A	C1	1	1	93.38	0.2107	40	M(A,L)GO, LGF	0.0053	91.10
TCA9A113A	A	C1	1	1	90.78	0.2111	40	AGO, LGF	0.0053	88.71
TCA9A211A	A	C2	1	2	88.79	0.2144	40	LGO, LGF	0.0054	88.13
TCA9A212A	A	C2	1	2	88.36	0.2153	40	AGO, LGF	0.0054	88.06
TCA9A213A	A	C2	1	2	88.41	0.2157	40	LGO, LGB, LGF	0.0054	88.28
TCA9B111A	B	C1	2	1	93.95	0.2008	40	AGO	0.0050	87.33
TCA9B112A	B	C1	2	1	94.00	0.2015	40	LGF	0.0050	87.69
TCA9B113A	B	C1	2	1	96.98	0.2024	40	AGO	0.0051	90.88
TCA9B211A	B	C2	2	2	98.35	0.1983	40	M(A,L)GO	0.0050	90.28
TCA9B212A	B	C2	2	2	95.26	0.1994	40	AGO, AGF	0.0050	87.93
TCA9B213A	B	C2	2	2	98.82	0.2001	40	LGO	0.0050	91.57
TCA9C111A	C	C1	3	1	92.91	0.2062	40	LGM, LGO, LGF	0.0052	88.68
TCA9C112A	C	C1	3	1	97.18	0.2061	40	LGO, LGF	0.0052	92.72
TCA9C113A	C	C1	3	1	92.52	0.2065	40	LGO, LGF	0.0052	88.45
TCA9C211A	C	C2	3	2	96.79	0.2044	40	M(A,L)GO	0.0051	91.57
TCA9C212A	C	C2	3	2	96.38	0.2052	40	M(A,L)GO	0.0051	91.56
TCA9C213A	C	C2	3	2	90.32	0.2063	40	M(A,L)GO	0.0052	86.26

Average 93.74
Standard Dev. 3.369
Coeff. of Var. [%] 3.594
Min. 88.36
Max. 98.82
Number of Spec. 18

Average_{norm} 0.0052 **89.48**
Standard Dev._{norm} 1.889
Coeff. of Var. [%]_{norm} 2.111
Min. 0.0050 **86.26**
Max. 0.0054 **92.72**
Number of Spec. 18 **18**

Laminate Filled-Hole Compression Properties (FHC3)--RTA(70°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

- ◆ Consolidate Cycle #
- ◆ Prepreg Lot #



**Laminate Filled-Hole Compression Properties (FHC3)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

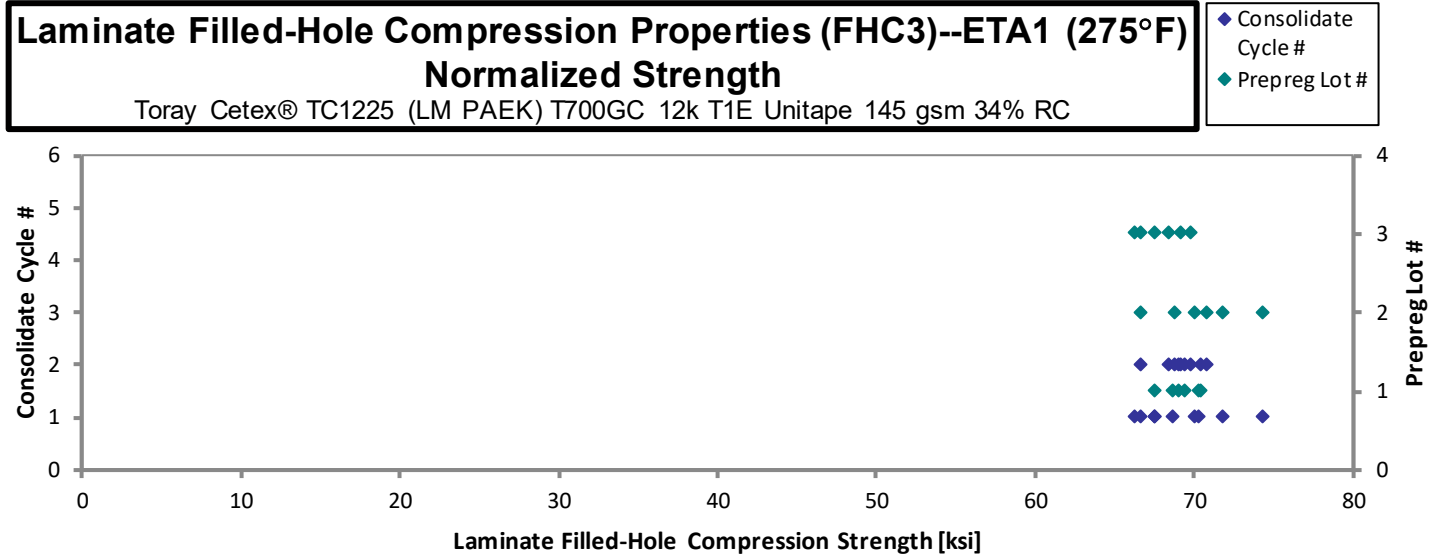
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA9A111C	A	C1	1	1	71.67	0.2118	40	LGM, LGF
TCA9A112C	A	C1	1	1	69.02	0.2112	40	LGM, LGF
TCA9A113C	A	C1	1	1	70.59	0.2099	40	LGF
TCA9A211C	A	C2	1	2	70.32	0.2163	40	LGM, LGF
TCA9A212C	A	C2	1	2	69.28	0.2151	40	LGM, LGF
TCA9A213C	A	C2	1	2	69.85	0.2144	40	LGM, LGF
TCA9B111C	B	C1	2	1	74.31	0.2035	40	LGF
TCA9B112C	B	C1	2	1	76.25	0.2034	40	LGF
TCA9B113C	B	C1	2	1	78.86	0.2036	40	M(A,L)WB
TCA9B211C	B	C2	2	2	71.40	0.2015	40	LGM, LGF
TCA9B212C	B	C2	2	2	74.01	0.2008	40	LGM, LGF
TCA9B213C	B	C2	2	2	76.58	0.1995	40	LGM, LGF
TCA9C111C	C	C1	3	1	69.51	0.2072	40	LGM, LGF
TCA9C112C	C	C1	3	1	69.08	0.2072	40	LGM, LGF
TCA9C113C	C	C1	3	1	70.69	0.2062	40	LGM, LGF
TCA9C211C	C	C2	3	2	73.42	0.2053	40	LGM, LGF
TCA9C213C	C	C2	3	2	72.13	0.2048	40	LGM, LGF
TCA9C214C	C	C2	3	2	73.14	0.2041	40	LGM, LGF

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	70.27
0.0053	67.50
0.0052	68.58
0.0054	70.41
0.0054	68.99
0.0054	69.33
0.0051	69.99
0.0051	71.79
0.0051	74.33
0.0050	66.59
0.0050	68.79
0.0050	70.72
0.0052	66.67
0.0052	66.26
0.0052	67.47
0.0051	69.78
0.0051	68.40
0.0051	69.11

Average 72.23
Standard Dev. 2.874
Coeff. of Var. [%] 3.979
Min. 69.02
Max. 78.86
Number of Spec. 18

Average_{norm} 0.0052 69.17
Standard Dev._{norm} 1.998
Coeff. of Var. [%]_{norm} 2.889
Min. 0.0050 66.26
Max. 0.0054 74.33
Number of Spec. 18 18



4.31 “25/50/25” Single-Shear Bearing 1, Proc. C Properties (SSB1)

Laminate Single-Shear Bearing Proc. C Properties (SSB1)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

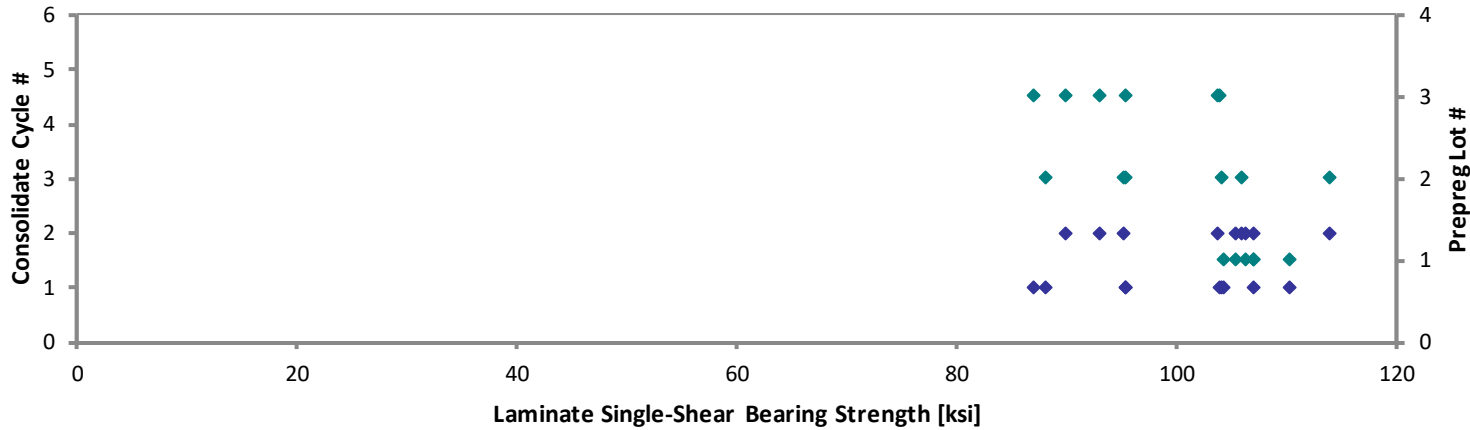
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA1A111A	A	C1	1	1	108.4	130.1	0.08322	16	B1I
TCA1A112A	A	C1	1	1	112.6	132.5	0.08462	16	B1I
TCA1A113A	A	C1	1	1	109.7	136.4	0.08425	16	B1I
TCA1A211A	A	C2	1	2	111.5	132.0	0.08238	16	B1I
TCA1A212A	A	C2	1	2	112.8	134.2	0.08205	16	B1I
TCA1A213A	A	C2	1	2	110.5	134.6	0.08240	16	B1I
TCA1B111A	B	C1	2	1	100.5	134.6	0.08203	16	B1I
TCA1B112A	B	C1	2	1	92.64	124.4	0.08213	16	B1I
TCA1B113A	B	C1	2	1	108.0	127.4	0.08318	16	B1I
TCA1B211A	B	C2	2	2	119.5	136.0	0.08233	16	B1I
TCA1B212A	B	C2	2	2	111.0	140.6	0.08245	16	B1I
TCA1B213A	B	C2	2	2	99.47	140.6	0.08263	16	B1I
TCA1C111A	C	C1	3	1	104.5	135.7	0.07888	16	B1I
TCA1C112A	C	C1	3	1	95.47	135.2	0.07877	16	B1I
TCA1C113A	C	C1	3	1	114.1	139.4	0.07870	16	B1I
TCA1C211A	C	C2	3	2	100.1	140.4	0.07760	16	B1I
TCA1C212A	C	C2	3	2	102.8	139.8	0.07813	16	B1I
TCA1C213A	C	C2	3	2	115.3	134.7	0.07777	16	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]
0.0052	104.4	125.3
0.0053	110.3	129.8
0.0053	107.0	133.0
0.0051	106.3	125.9
0.0051	107.1	127.4
0.0052	105.4	128.3
0.0051	95.37	127.8
0.0051	88.07	118.2
0.0052	104.0	122.6
0.0051	113.8	129.6
0.0052	106.0	134.2
0.0052	95.14	134.5
0.0049	95.42	123.9
0.0049	87.04	123.2
0.0049	103.9	126.9
0.0049	89.92	126.1
0.0049	92.96	126.5
0.0049	103.8	121.3

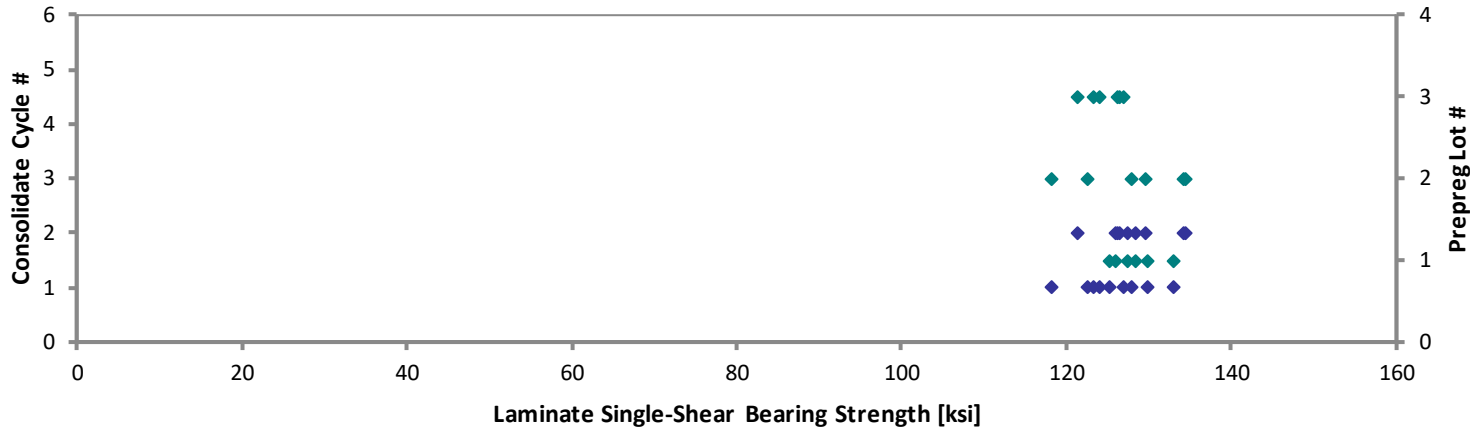
Average 107.2 134.9
 Standard Dev. 7.308 4.529
 Coeff. of Var. [%] 6.820 3.357
 Min. 92.64 124.4
 Max. 119.5 140.6
 Number of Spec. 18 18

Average_{norm} 0.0051 100.9 126.9
 Standard Dev._{norm} 7.969 4.328
 Coeff. of Var. [%]_{norm} 7.900 3.410
 Min. 0.0049 87.04 118.2
 Max. 0.0053 113.8 134.5
 Number of Spec. 18 18 18

Laminate Single-Shear Bearing Proc. C Properties (SSB1)--RTA (70°F)
Normalized 2% Offset Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



Laminate Single-Shear Bearing Proc.C Properties (SSB1)--RTA (70°F)
Normalized Ultimate Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



**Laminate Single-Shear Bearing Proc. C Properties (SSB1)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

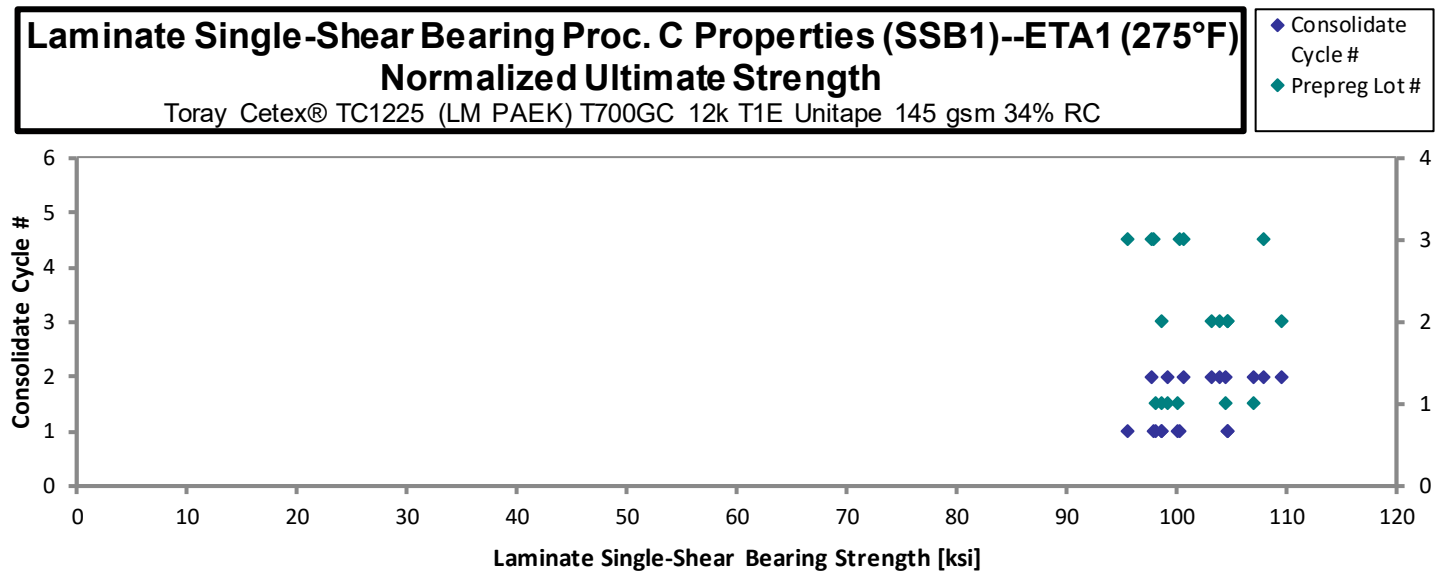
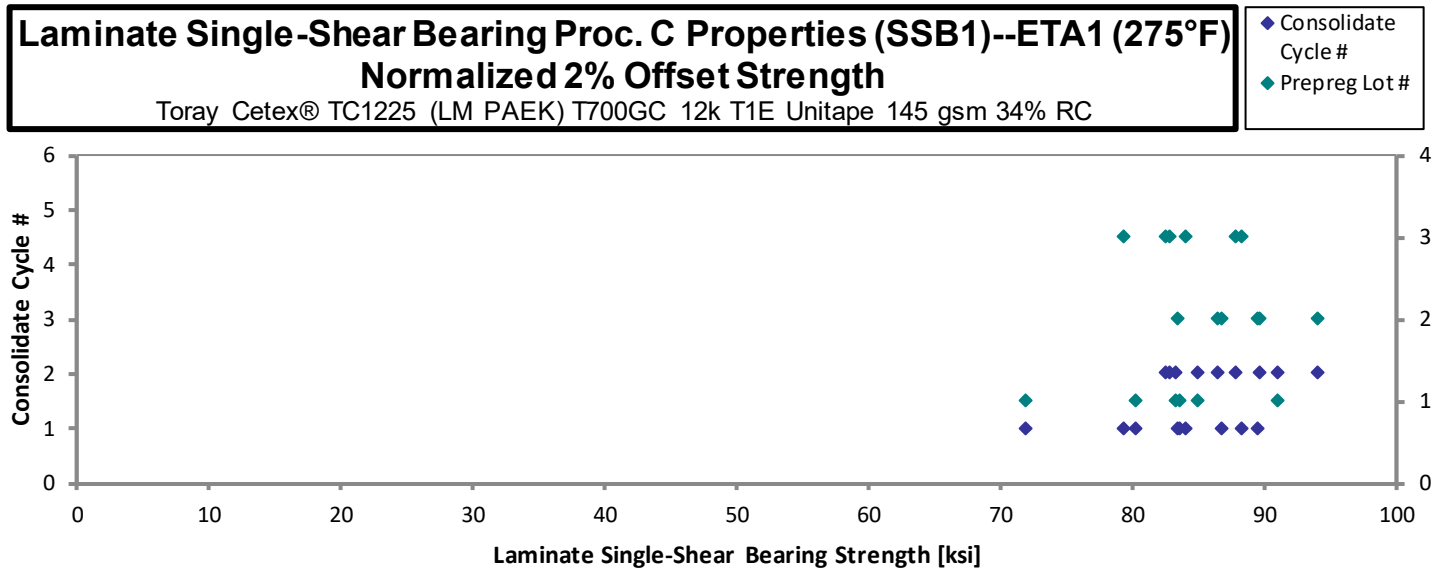
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA1A111C	A	C1	1	1	85.69	101.0	0.08432	16	B1I
TCA1A112C	A	C1	1	1	75.08	102.5	0.08272	16	B1I
TCA1A113C	A	C1	1	1	82.46	102.9	0.08413	16	B1I
TCA1A211C	A	C2	1	2	88.70	103.6	0.08270	16	B1I
TCA1A212C	A	C2	1	2	94.88	109.0	0.08287	16	B1I
TCA1A213C	A	C2	1	2	87.23	112.0	0.08255	16	B1I
TCA1B111C	B	C1	2	1	91.14	103.7	0.08218	16	B1I
TCA1B112C	B	C1	2	1	86.41	108.5	0.08338	16	B1I
TCA1B113C	B	C1	2	1	90.66	106.1	0.08527	16	B1I
TCA1B211C	B	C2	2	2	96.56	106.8	0.08413	16	B1I
TCA1B212C	B	C2	2	2	92.55	106.5	0.08375	16	B1I
TCA1B213C	B	C2	2	2	88.91	112.6	0.08407	16	B1I
TCA1C111C	C	C1	3	1	87.54	105.6	0.07823	16	B1I
TCA1C112C	C	C1	3	1	95.67	108.5	0.07978	16	B1I
TCA1C113C	C	C1	3	1	90.89	105.9	0.07985	16	B1I
TCA1C211C	C	C2	3	2	89.46	105.5	0.08005	16	B1I
TCA1C212C	C	C2	3	2	94.59	116.2	0.08023	16	B1I
TCA1C213C	C	C2	3	2	88.60	108.1	0.08042	16	B1I

Avg. t _{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]
0.0053	83.62	98.60
0.0052	71.88	98.13
0.0053	80.30	100.2
0.0052	84.90	99.17
0.0052	91.00	104.5
0.0052	83.34	107.0
0.0051	86.69	98.64
0.0052	83.39	104.7
0.0053	89.47	104.7
0.0053	94.02	104.0
0.0052	89.71	103.3
0.0053	86.51	109.5
0.0049	79.27	95.60
0.0050	88.35	100.2
0.0050	84.00	97.87
0.0050	82.89	97.73
0.0050	87.84	107.9
0.0050	82.47	100.6

Average 89.28 106.9
Standard Dev. 5.142 3.850
Coeff. of Var. [%] 5.759 3.600
Min. 75.08 101.0
Max. 96.56 116.2
Number of Spec. 18 18

Average_{norm} 0.0051 84.98 101.8
Standard Dev._{norm} 5.031 4.004
Coeff. of Var. [%]_{norm} 5.920 3.933
Min. 0.0049 71.88 95.60
Max. 0.0053 94.02 109.5
Number of Spec. 18 18 18



**Laminate Single-Shear Bearing Proc.C Properties (SSB1)--ETA2 (400°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA1A111D	A	C1	1	1	56.36	69.92	0.08547	16	B1I
TCA1A112D	A	C1	1	1	48.19	68.34	0.08428	16	B1I
TCA1A113D	A	C1	1	1	53.16	69.93	0.08543	16	B1I
TCA1A211D	A	C2	1	2	50.00	74.48	0.08203	16	B1I
TCA1A212D	A	C2	1	2	52.11	75.06	0.08180	16	B1I
TCA1A213D	A	C2	1	2	54.10	73.08	0.08202	16	B1I

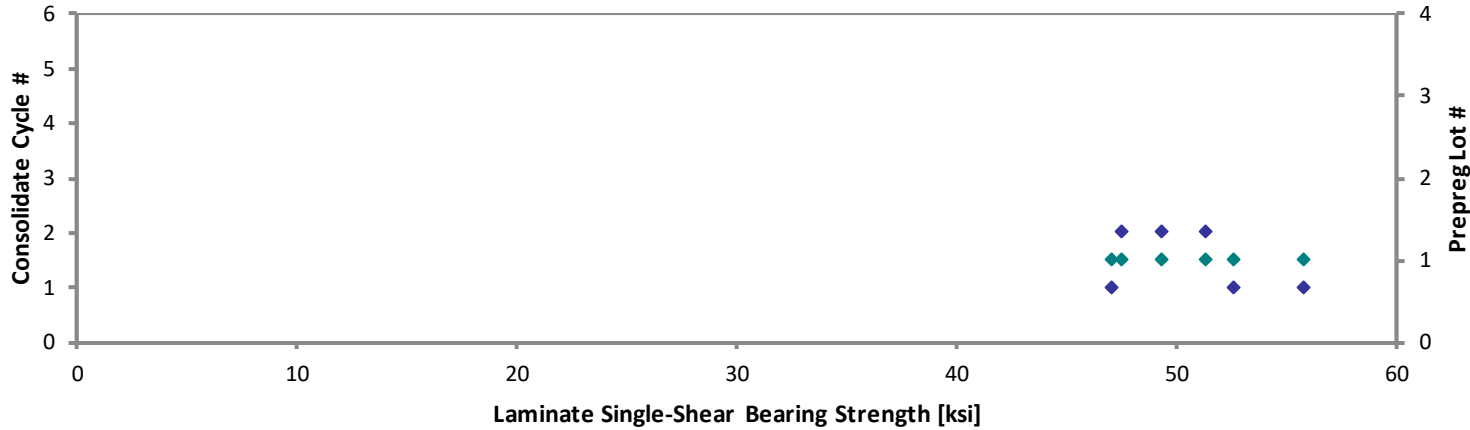
Avg. t _{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]
0.0053	55.75	69.17
0.0053	47.01	66.66
0.0053	52.56	69.15
0.0051	47.47	70.71
0.0051	49.33	71.06
0.0051	51.36	69.37

Average 52.32 71.80
Standard Dev. 2.921 2.771
Coeff. of Var. [%] 5.582 3.859
Min. 48.19 68.34
Max. 56.36 75.06
Number of Spec. 6 6

Average_{norm} 0.0052 50.58 69.35
Standard Dev._{norm} 3.323 1.553
Coeff. of Var. [%]_{norm} 6.569 2.240
Min. 0.0051 47.01 66.66
Max. 0.0053 55.75 71.06
Number of Spec. 6 6 6

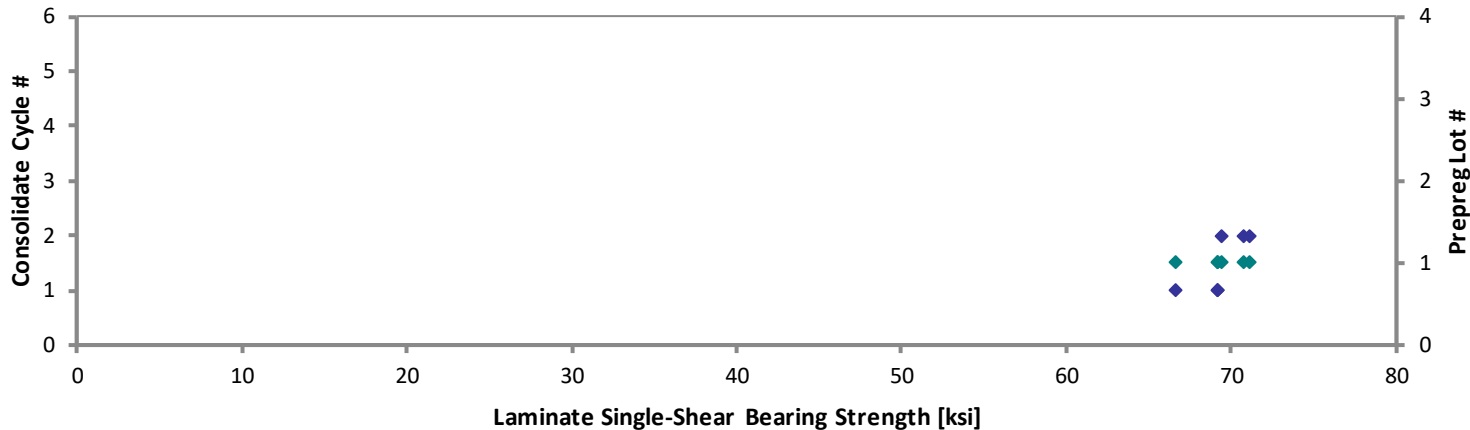
Laminate Single-Shear Bearing Proc. C Properties (SSB1)--ETA2 (400°F)
Normalized 2% Offset Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
◆ Prepreg Lot #



Laminate Single-Shear Bearing Proc. C Properties (SSB1)--ETA2 (400°F)
Normalized Ultimate Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

◆ Consolidate Cycle #
◆ Prepreg Lot #



**Laminate Single-Shear Bearing Proc. C Properties (SSB1)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

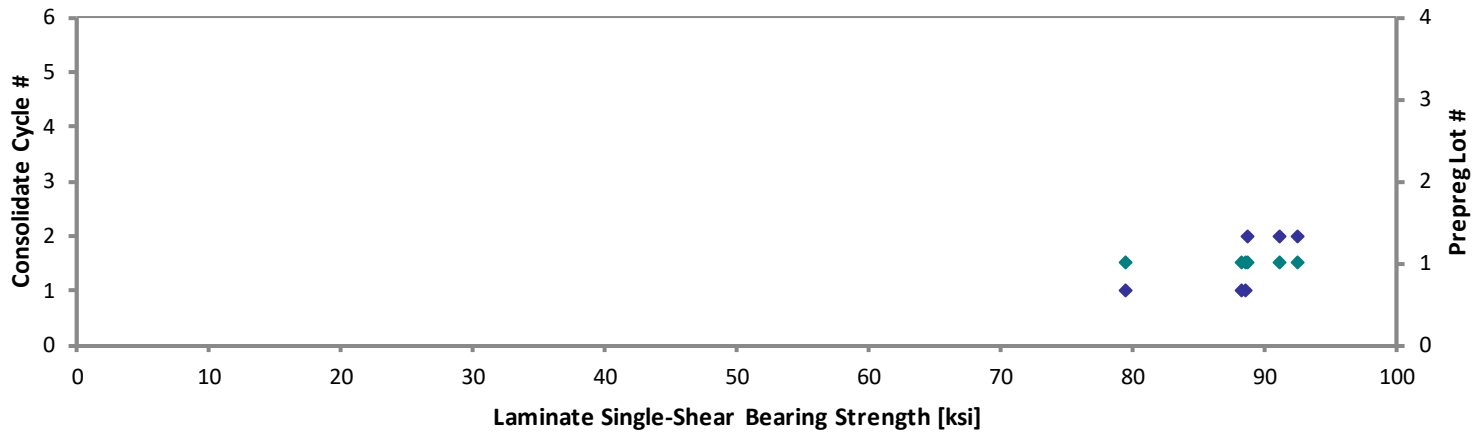
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA1A111E	A	C1	1	1	89.56	94.11	0.08518	16	B1I
TCA1A112E	A	C1	1	1	91.02	96.24	0.08402	16	B1I
TCA1A113E	A	C1	1	1	81.38	93.83	0.08442	16	B1I
TCA1A211E	A	C2	1	2	95.05	105.2	0.08285	16	B1I
TCA1A212E	A	C2	1	2	92.95	101.2	0.08243	16	B1I
TCA1A213E	A	C2	1	2	96.52	103.6	0.08287	16	B1I

Avg. t _{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]
0.0053	88.30	92.79
0.0053	88.51	93.59
0.0053	79.51	91.68
0.0052	91.14	100.9
0.0052	88.68	96.55
0.0052	92.57	99.38

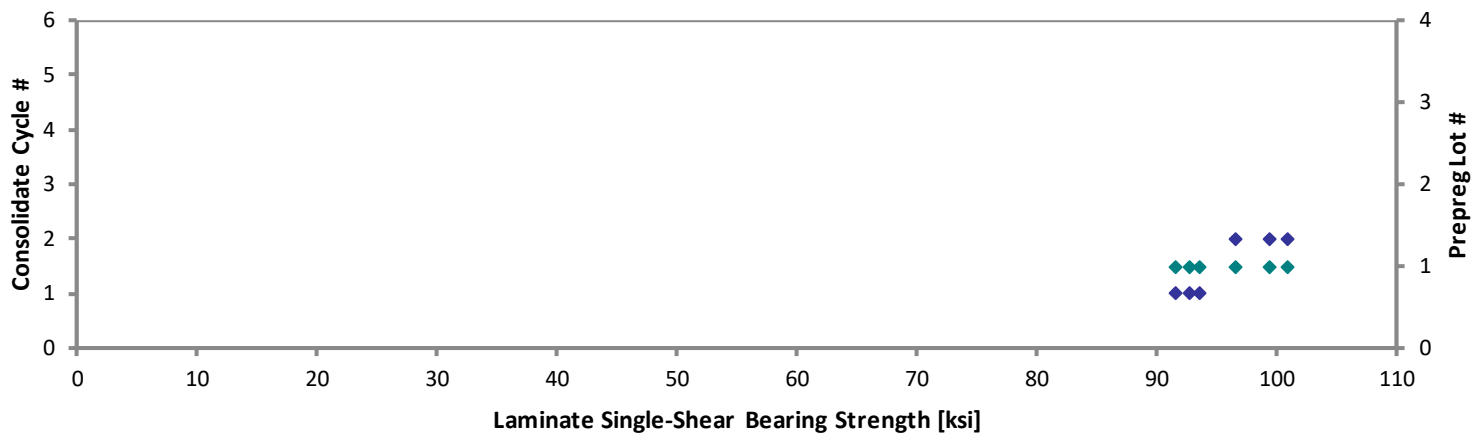
Average **91.08** **99.04**
 Standard Dev. **5.390** **4.964**
 Coeff. of Var. [%] **5.918** **5.012**
 Min. **81.38** **93.83**
 Max. **96.52** **105.2**
 Number of Spec. **6** **6**

Average_{norm} **0.0052** **88.12** **95.82**
 Standard Dev._{norm} **4.552** **3.754**
 Coeff. of Var. [%]_{norm} **5.166** **3.918**
 Min. **0.0052** **79.51** **91.68**
 Max. **0.0053** **92.57** **100.9**
 Number of Spec. **6** **6** **6**

Laminate Single-Shear Bearing Proc. C Properties (SSB1)--ETW (275°F)
Normalized 2% Offset Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



Laminate Single-Shear Bearing Proc. C Properties (SSB1)--ETW (275°F)
Normalized Ultimate Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



4.32 “10/80/10” Single-Shear Bearing 2, Proc. C Properties (SSB2)

Laminate Single-Shear Bearing Proc. C Properties (SSB2)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
 t_{ply} [in]
 0.0054

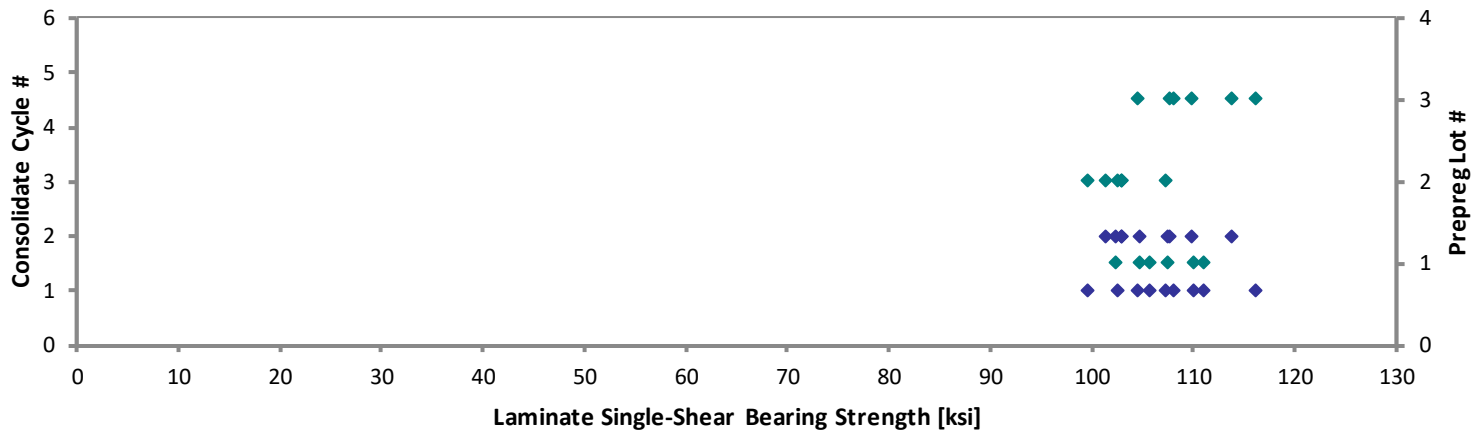
Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA2A111A	A	C1	1	1	114.8	143.1	0.1035	20	B1I
TCA2A112A	A	C1	1	1	116.8	141.1	0.1026	20	B1I
TCA2A113A	A	C1	1	1	110.5	139.8	0.1033	20	B1I
TCA2A211A	A	C2	1	2	107.4	138.0	0.1053	20	B1I
TCA2A212A	A	C2	1	2	112.2	141.1	0.1034	20	B1I
TCA2A213A	A	C2	1	2	107.1	138.6	0.1032	20	B1I
TCA2B111A	B	C1	2	1	112.8	143.9	0.1026	20	B1I
TCA2B112A	B	C1	2	1	107.7	134.4	0.1028	20	B1I
TCA2B113A	B	C1	2	1	104.1	141.4	0.1033	20	B1I
TCA2B211A	B	C2	2	2	107.1	137.5	0.1022	20	B1I
TCA2B212A	B	C2	2	2	109.1	136.3	0.1019	20	B1I
TCA2B213A	B	C2	2	2	108.5	139.7	0.1025	20	B1I
TCA2C111A	C	C1	3	1	124.9	151.9	0.1004	20	B1I
TCA2C112A	C	C1	3	1	116.2	147.1	0.1004	20	B1I
TCA2C113A	C	C1	3	1	112.1	145.7	0.1007	20	B1I
TCA2C211A	C	C2	3	2	116.0	142.6	0.1003	20	B1I
TCA2C212A	C	C2	3	2	123.1	152.6	0.09973	20	B1I
TCA2C213A	C	C2	3	2	118.6	143.0	0.10000	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]
0.0052	110.0	137.1
0.0051	111.0	134.1
0.0052	105.8	133.8
0.0053	104.7	134.5
0.0052	107.4	135.1
0.0052	102.3	132.4
0.0051	107.2	136.7
0.0051	102.5	127.9
0.0052	99.57	135.3
0.0051	101.3	130.0
0.0051	102.9	128.5
0.0051	103.0	132.7
0.0050	116.1	141.2
0.0050	108.0	136.7
0.0050	104.5	135.9
0.0050	107.7	132.3
0.0050	113.7	141.0
0.0050	109.8	132.4

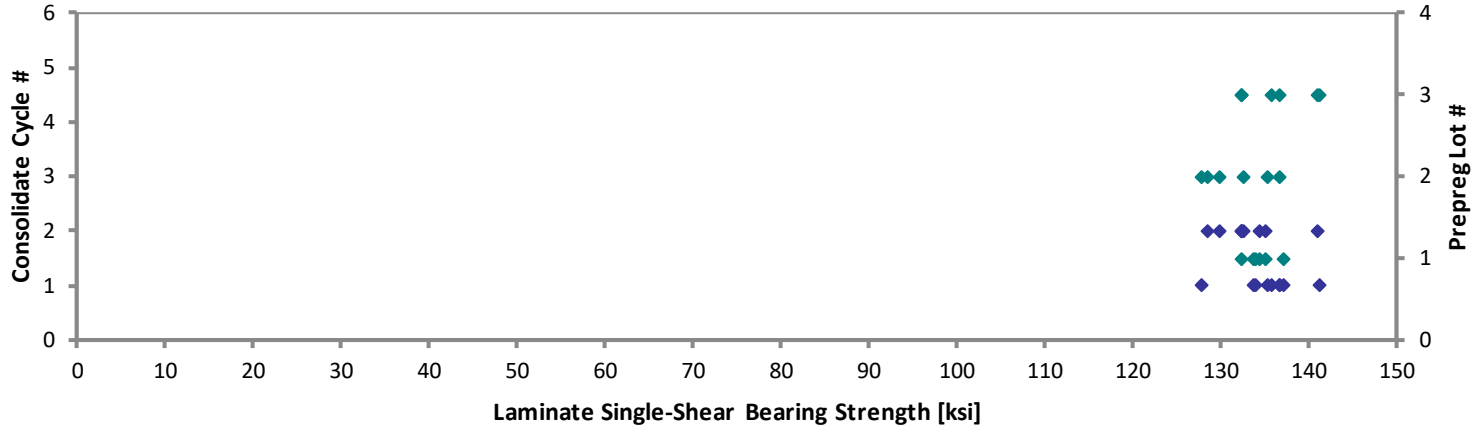
Average 112.7 142.1
 Standard Dev. 5.757 4.886
 Coeff. of Var. [%] 5.107 3.438
 Min. 104.1 134.4
 Max. 124.9 152.6
 Number of Spec. 18 18

Average_{norm} 0.0051 106.5 134.3
 Standard Dev._{norm} 4.438 3.613
 Coeff. of Var. [%]_{norm} 4.166 2.690
 Min. 0.0050 99.57 127.9
 Max. 0.0053 116.1 141.2
 Number of Spec. 18 18 18

Laminate Single-Shear Bearing Proc. C Properties (SSB2)--RTA (70°F)
Normalized 2% Offset Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



Laminate Single-Shear Bearing Proc. C Properties (SSB2)--RTA (70°F)
Normalized Ultimate Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC



**Laminate Single-Shear Bearing Proc. C Properties (SSB2)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

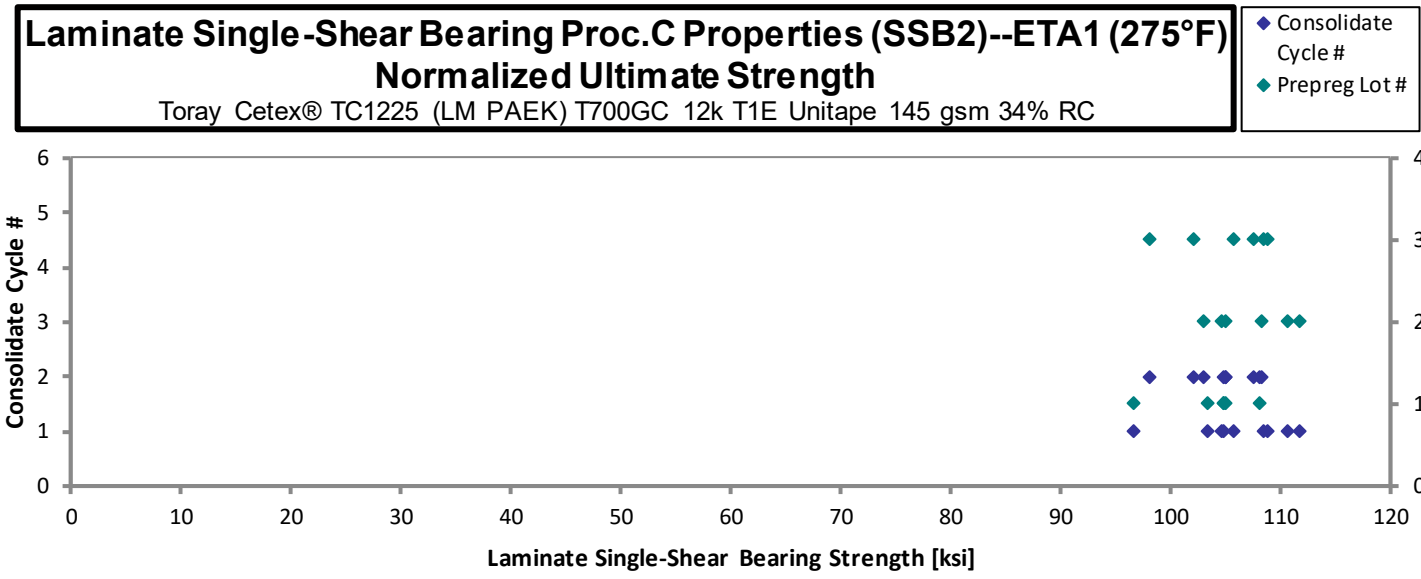
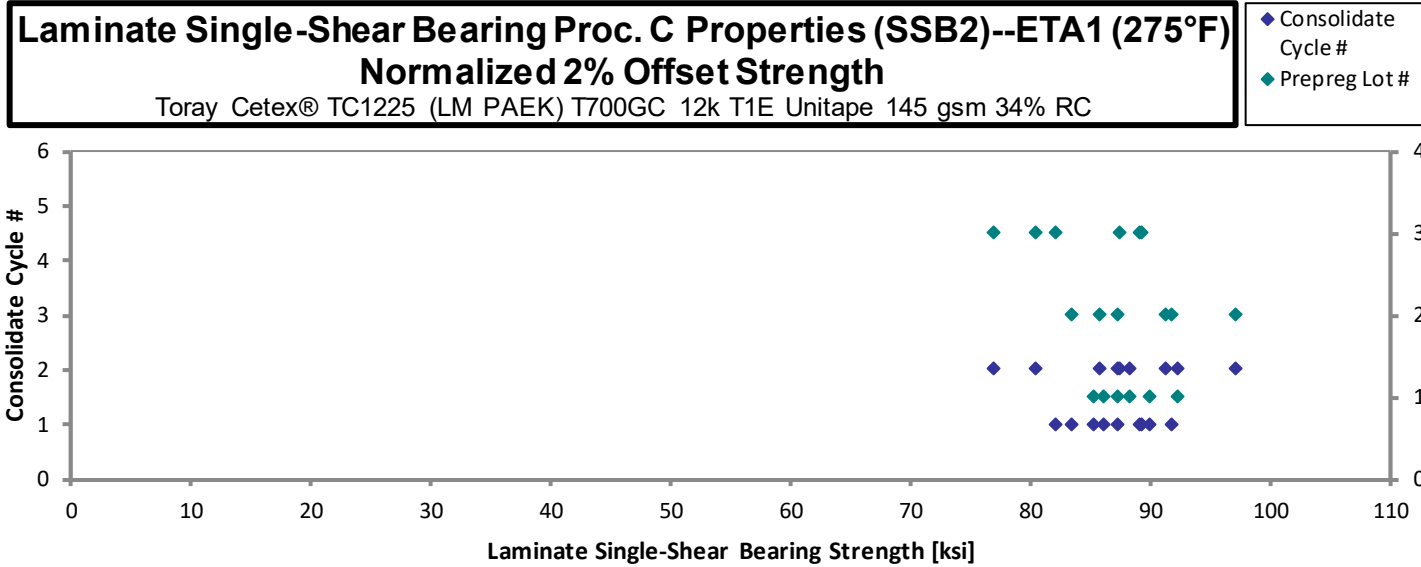
normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA2A111C	A	C1	1	1	88.79	106.5	0.1048	20	B1I
TCA2A112C	A	C1	1	1	94.49	110.0	0.1029	20	B1I
TCA2A113C	A	C1	1	1	89.37	101.2	0.1031	20	B1I
TCA2A211C	A	C2	1	2	93.35	106.2	0.1068	20	B1I
TCA2A212C	A	C2	1	2	88.49	106.4	0.1065	20	B1I
TCA2A213C	A	C2	1	2	89.63	109.6	0.1064	20	B1I
TCA2B111C	B	C1	2	1	84.23	105.6	0.1070	20	B1I
TCA2B112C	B	C1	2	1	87.58	111.2	0.1075	20	B1I
TCA2B113C	B	C1	2	1	91.58	111.5	0.1082	20	B1I
TCA2B211C	B	C2	2	2	97.67	108.9	0.1074	20	B1I
TCA2B212C	B	C2	2	2	91.69	105.7	0.1074	20	B1I
TCA2B213C	B	C2	2	2	85.36	102.5	0.1084	20	B1I
TCA2C111C	C	C1	3	1	87.02	112.1	0.1019	20	B1I
TCA2C112C	C	C1	3	1	94.46	115.0	0.1019	20	B1I
TCA2C113C	C	C1	3	1	94.16	114.8	0.1024	20	B1I
TCA2C211C	C	C2	3	2	81.74	104.1	0.1018	20	B1I
TCA2C212C	C	C2	3	2	84.42	107.2	0.1030	20	B1I
TCA2C213C	C	C2	3	2	91.56	112.7	0.1031	20	B1I

Avg. t _{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]
0.0052	86.13	103.3
0.0051	89.98	104.8
0.0052	85.35	96.63
0.0053	92.33	105.0
0.0053	87.25	104.9
0.0053	88.33	108.0
0.0054	83.45	104.6
0.0054	87.20	110.7
0.0054	91.78	111.7
0.0054	97.13	108.3
0.0054	91.20	105.1
0.0054	85.70	102.9
0.0051	82.12	105.8
0.0051	89.11	108.5
0.0051	89.30	108.8
0.0051	77.01	98.05
0.0051	80.50	102.2
0.0052	87.38	107.5

Average **89.76** **108.4**
Standard Dev. **4.252** **4.002**
Coeff. of Var. [%] **4.737** **3.692**
Min. **81.74** **101.2**
Max. **97.67** **115.0**
Number of Spec. **18** **18**

Average_{norm} **0.0053** **87.29** **105.4**
Standard Dev._{norm} **4.692** **3.930**
Coeff. of Var. [%]_{norm} **5.375** **3.729**
Min. **0.0051** **77.01** **96.63**
Max. **0.0054** **97.13** **111.7**
Number of Spec. **18** **18** **18**



4.33 “50/40/10” Single-Shear Bearing 3, Proc. C Properties (SSB3)

Laminate Single-Shear Bearing Proc. C Properties (SSB3)--RTA (70°F)
Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

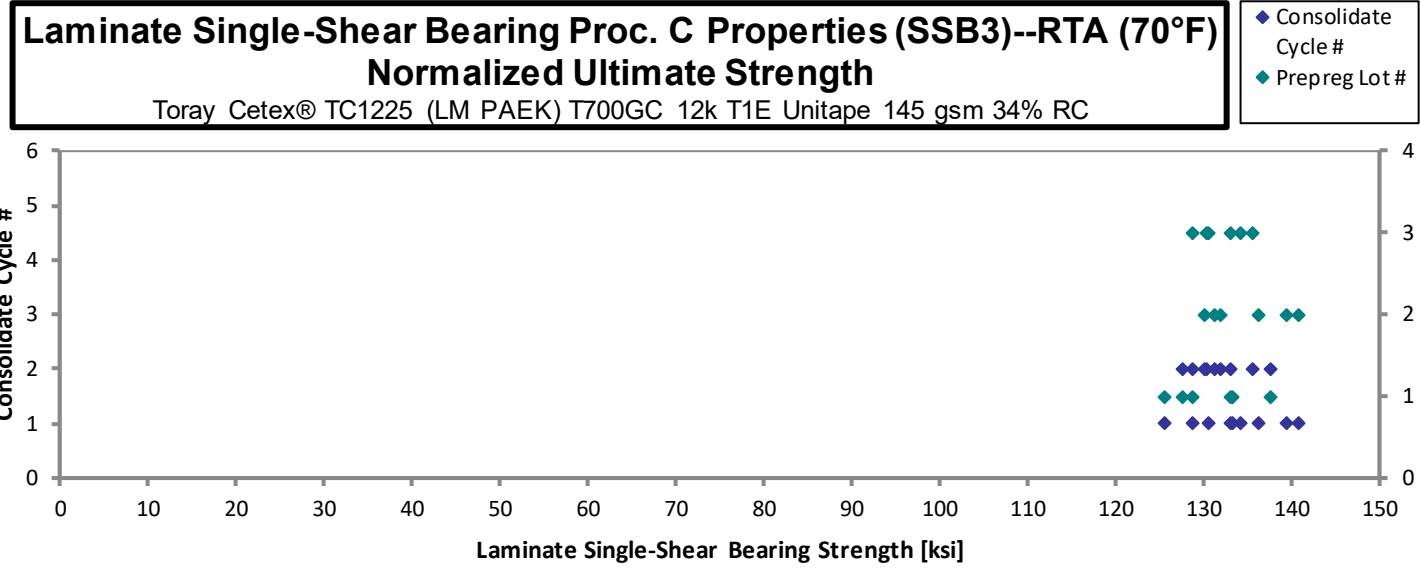
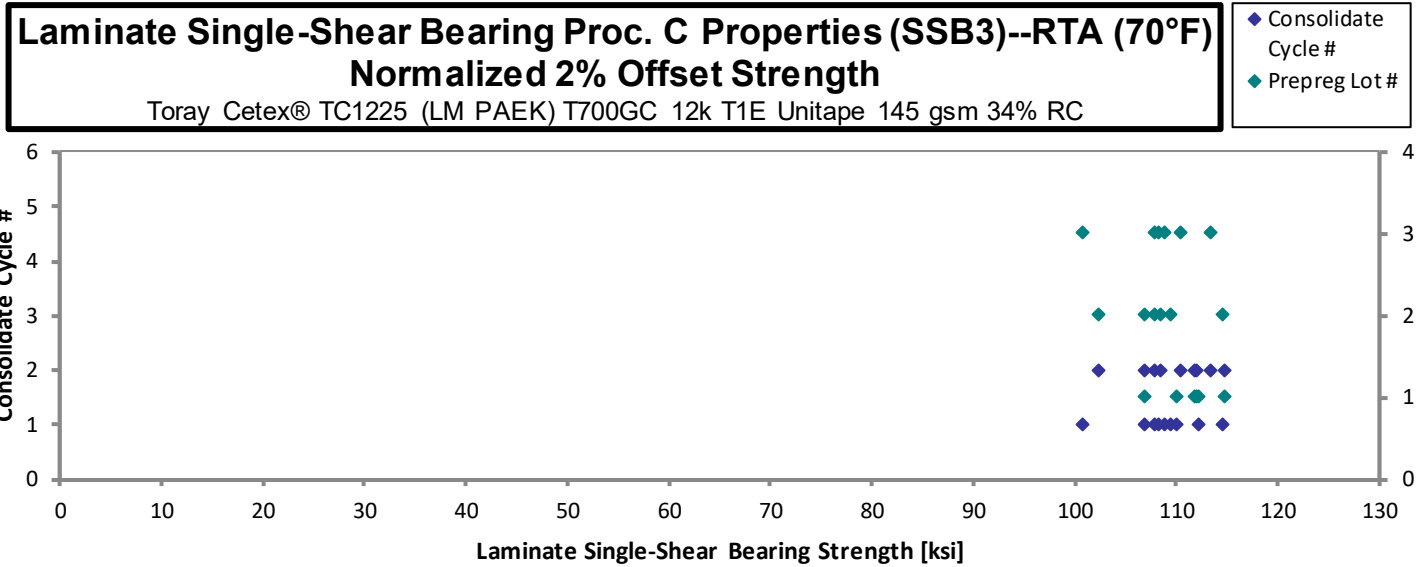
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 t_{ply} [in]
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Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA3A111A	A	C1	1	1	122.4	137.2	0.09888	20	B1I
TCA3A112A	A	C1	1	1	117.1	141.9	0.1014	20	B1I
TCA3A113A	A	C1	1	1	114.3	142.5	0.1009	20	B1I
TCA3A211A	A	C2	1	2	116.6	132.8	0.1038	20	B1I
TCA3A212A	A	C2	1	2	119.2	133.9	0.1040	20	B1I
TCA3A213A	A	C2	1	2	116.0	142.8	0.1041	20	B1I
TCA3B111A	B	C1	2	1	115.3	145.6	0.1010	20	B1I
TCA3B112A	B	C1	2	1	116.8	148.9	0.1012	20	B1I
TCA3B113A	B	C1	2	1	122.0	150.0	0.1015	20	B1I
TCA3B211A	B	C2	2	2	115.8	143.0	0.09970	20	B1I
TCA3B212A	B	C2	2	2	116.6	141.1	0.1005	20	B1I
TCA3B213A	B	C2	2	2	110.0	139.8	0.1006	20	B1I
TCA3C111A	C	C1	3	1	119.9	144.6	0.09748	20	B1I
TCA3C112A	C	C1	3	1	111.7	148.9	0.09738	20	B1I
TCA3C113A	C	C1	3	1	120.5	142.4	0.09767	20	B1I
TCA3C211A	C	C2	3	2	118.8	149.4	0.09807	20	B1I
TCA3C212A	C	C2	3	2	123.4	141.8	0.09927	20	B1I
TCA3C213A	C	C2	3	2	119.4	143.9	0.09990	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]
0.0049	112.1	125.6
0.0051	110.0	133.3
0.0050	106.8	133.2
0.0052	112.1	127.7
0.0052	114.7	128.9
0.0052	111.8	137.6
0.0051	107.8	136.2
0.0051	109.5	139.6
0.0051	114.6	140.9
0.0050	106.9	132.0
0.0050	108.5	131.3
0.0050	102.4	130.2
0.0049	108.2	130.5
0.0049	100.7	134.2
0.0049	108.9	128.8
0.0049	107.8	135.6
0.0050	113.5	130.4
0.0050	110.5	133.1

Average 117.5 142.8
 Standard Dev. 3.553 4.880
 Coeff. of Var. [%] 3.022 3.417
 Min. 110.0 132.8
 Max. 123.4 150.0
 Number of Spec. 18 18

Average_{norm} 0.0050 109.3 132.7
 Standard Dev._{norm} 3.730 4.104
 Coeff. of Var. [%]_{norm} 3.414 3.092
 Min. 0.0049 100.7 125.6
 Max. 0.0052 114.7 140.9
 Number of Spec. 18 18 18



**Laminate Single-Shear Bearing Proc. C Properties (SSB3)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

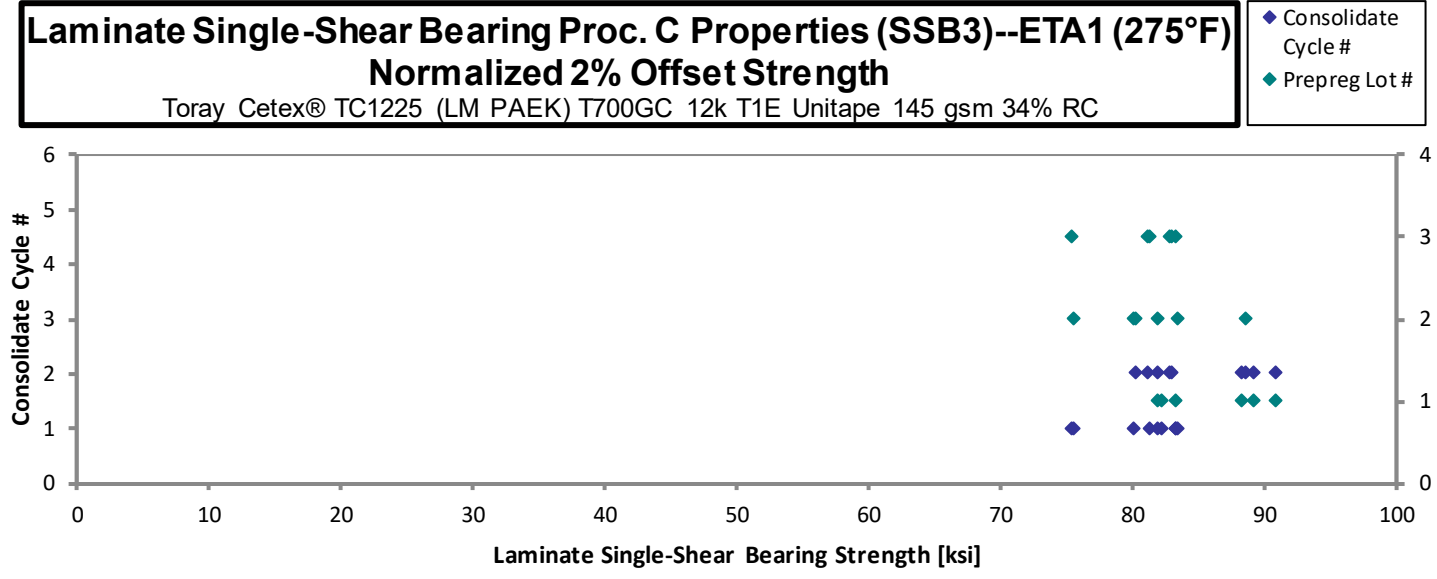
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCA3A111C	A	C1	1	1	88.60	108.7	0.1003	20	B1I
TCA3A112C	A	C1	1	1	87.93	103.6	0.1006	20	B1I
TCA3A113C	A	C1	1	1	89.38	105.3	0.1007	20	B1I
TCA3A211C	A	C2	1	2	90.92	100.7	0.1060	20	B1I
TCA3A212C	A	C2	1	2	89.84	102.1	0.1060	20	B1I
TCA3A213C	A	C2	1	2	91.76	104.2	0.1069	20	B1I
TCA3B111C	B	C1	2	1	81.71	97.54	0.09983	20	B1I
TCA3B112C	B	C1	2	1	86.33	100.6	0.1002	20	B1I
TCA3B113C	B	C1	2	1	88.88	99.70	0.1013	20	B1I
TCA3B211C	B	C2	2	2	87.40	101.8	0.09912	20	B1I
TCA3B212C	B	C2	2	2	95.24	102.8	0.1004	20	B1I
TCA3B213C	B	C2	2	2	87.53	101.1	0.1012	20	B1I
TCA3C111C	C	C1	3	1	90.41	103.1	0.09712	20	B1I
TCA3C112C	C	C1	3	1	91.97	114.6	0.09778	20	B1I
TCA3C113C	C	C1	3	1	81.83	102.2	0.09942	20	B1I
TCA3C211C	C	C2	3	2	90.78	102.9	0.09873	20	B1I
TCA3C212C	C	C2	3	2	90.52	103.1	0.09873	20	B1I
TCA3C213C	C	C2	3	2	88.27	100.8	0.09923	20	B1I

Avg. t _{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]
0.0050	82.24	100.9
0.0050	81.92	96.53
0.0050	83.30	98.15
0.0053	89.26	98.88
0.0053	88.20	100.3
0.0053	90.79	103.1
0.0050	75.53	90.16
0.0050	80.09	93.35
0.0051	83.35	93.50
0.0050	80.21	93.39
0.0050	88.57	95.56
0.0051	81.98	94.70
0.0049	81.30	92.68
0.0049	83.27	103.8
0.0050	75.33	94.12
0.0049	82.99	94.03
0.0049	82.76	94.29
0.0050	81.10	92.64

Average **88.85** **103.1**
 Standard Dev. **3.301** **3.739**
 Coeff. of Var. [%] **3.715** **3.628**
 Min. **81.71** **97.54**
 Max. **95.24** **114.6**
 Number of Spec. **18** **18**

Average_{norm} **0.0050** **82.90** **96.12**
 Standard Dev._{norm} **4.190** **3.874**
 Coeff. of Var. [%]_{norm} **5.054** **4.031**
 Min. **0.0049** **75.33** **90.16**
 Max. **0.0053** **90.79** **103.8**
 Number of Spec. **18** **18** **18**



4.34 “25/50/25” Compression After Impact 1 Properties (CAI1)

Additional information (dent depth etc.) is available in Section 5.

**Laminate Compression After Impact 1 Properties (CAI1)--RTA (70°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

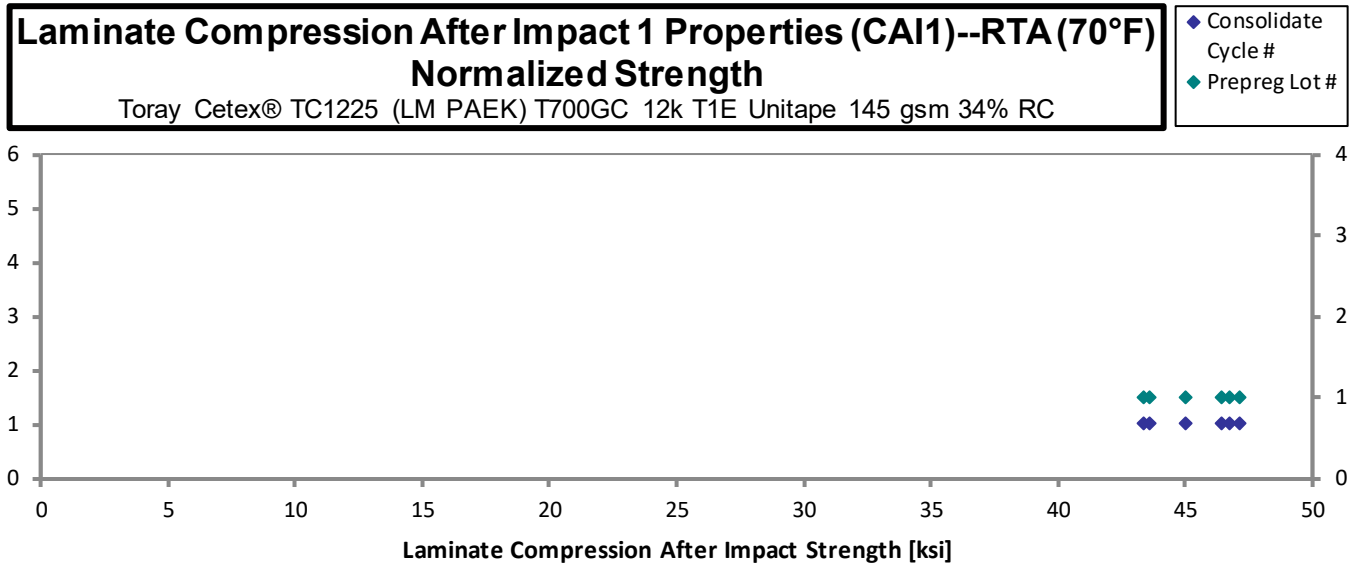
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t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAKA111A	A	C1	1	1	46.19	254.9	0.1685	32	LDM
TCAKA112A	A	C1	1	1	44.48	259.2	0.1695	32	LDM
TCAKA113A	A	C1	1	1	48.06	251.6	0.1680	32	LDM
TCAKA114A	A	C1	1	1	43.65	261.3	0.1718	32	LDM
TCAKA115A	A	C1	1	1	47.48	259.3	0.1714	32	LDM
TCAKA116A	A	C1	1	1	46.71	259.4	0.1717	32	LDM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	45.05
0.0053	43.64
0.0053	46.73
0.0054	43.39
0.0054	47.10
0.0054	46.40

Average 46.10
Standard Dev. 1.719
Coeff. of Var. [%] 3.730
Min. 43.65
Max. 48.06
Number of Spec. 6

Average_{norm} 0.0053 45.38
Standard Dev._{norm} 1.609
Coeff. of Var. [%]_{norm} 3.544
Min. 0.0053 43.39
Max. 0.0054 47.10
Number of Spec. 6 6



**Laminate Compression After Impact 1 Properties (CAI1)--ETA1 (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAKA211C	A	C2	1	2	37.13	257.9	0.1709	32	LDM
TCAKA212C	A	C2	1	2	34.17	258.5	0.1710	32	LDM
TCAKA213C	A	C2	1	2	34.59	257.1	0.1701	32	LDM
TCAKA214C	A	C2	1	2	34.05	255.6	0.1707	32	LDM
TCAKA215C	A	C2	1	2	33.25	255.1	0.1712	32	LDM
TCAKA216C	A	C2	1	2	33.45	255.1	0.1710	32	LDM

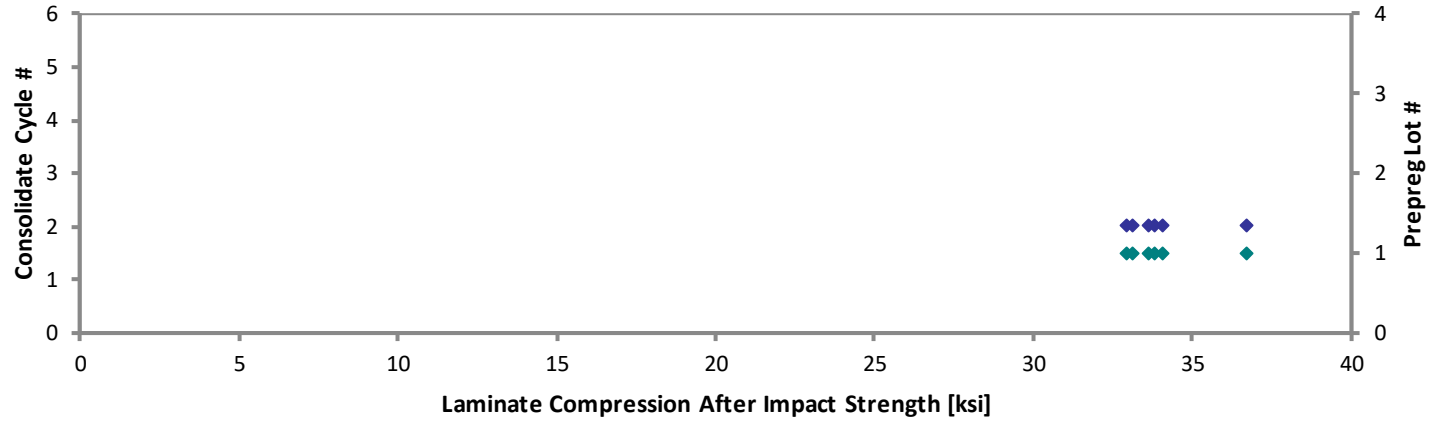
Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0053	36.71
0.0053	33.81
0.0053	34.06
0.0053	33.64
0.0053	32.94
0.0053	33.10

Average 34.44
Standard Dev. 1.404
Coeff. of Var. [%] 4.077
Min. 33.25
Max. 37.13
Number of Spec. 6

Average_{norm} 0.0053 34.04
Standard Dev._{norm} 1.374
Coeff. of Var. [%]_{norm} 4.035
Min. 0.0053 32.94
Max. 0.0053 36.71
Number of Spec. 6 6

Laminate Compression After Impact 1 Properties (CAI1)--ETA1 (275°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

- ◆ Consolidate Cycle #
- ◆ Prepreg Lot #



**Laminate Compression After Impact 1 Properties (CAI1)--ETA2 (400°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAKA311D	A	C3	1	3	14.76	247.1	0.1639	32	LDM
TCAKA312D	A	C3	1	3	13.94	248.5	0.1674	32	LDM
TCAKA313D	A	C3	1	3	13.88	255.3	0.1685	32	LDM
TCAKA315D	A	C3	1	3	14.11	255.1	0.1697	32	LDM
TCAKA316D	A	C3	1	3	14.33	255.7	0.1694	32	LDM
TCAKA511D	A	C5	1	5	14.57	255.2	0.1694	32	LDM
TCAKA512D	A	C5	1	5	13.37	256.0	0.1703	32	LDM

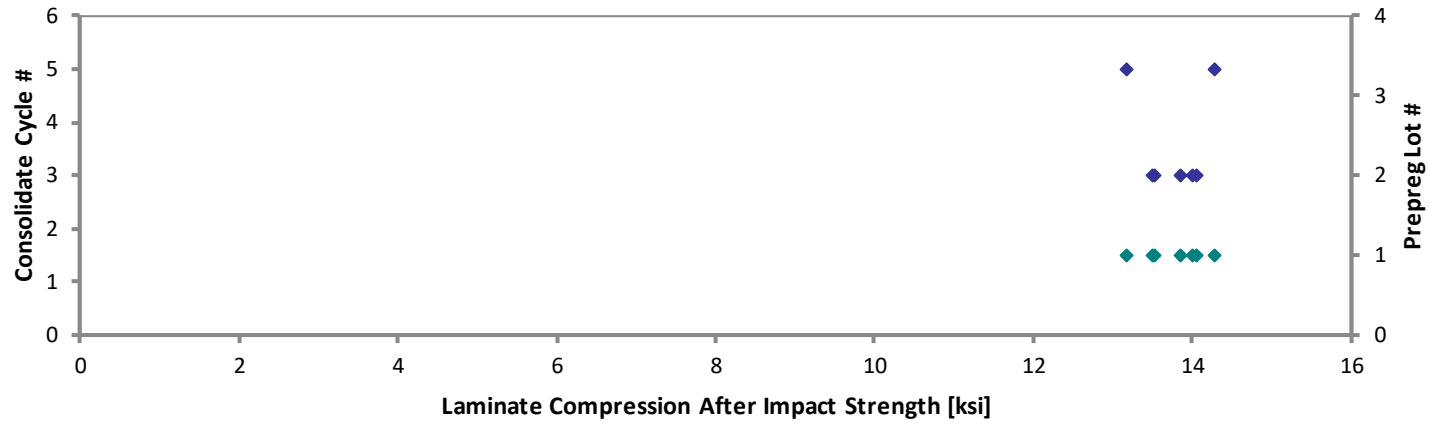
Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0051	13.99
0.0052	13.51
0.0053	13.54
0.0053	13.85
0.0053	14.05
0.0053	14.29
0.0053	13.17

Average 14.14
Standard Dev. 0.4658
Coeff. of Var. [%] 3.295
Min. 13.37
Max. 14.76
Number of Spec. 7

Average_{norm} 0.0053 13.77
Standard Dev_{norm} 0.3824
Coeff. of Var. [%]_{norm} 2.777
Min. 0.0051 13.17
Max. 0.0053 14.29
Number of Spec. 7 7

Laminate Compression After Impact 1 Properties (CAI1)--ETA2 (400°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

- ◆ Consolidate Cycle #
- ◆ Prepreg Lot #



**Laminate Compression After Impact 1 Properties (CAI1)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

normalizing
t_{ply} [in]
0.0054

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCAKA411E	A	C4	1	4	32.25	252.5	0.1675	32	LDM
TCAKA412E	A	C4	1	4	33.12	254.7	0.1693	32	LDM
TCAKA413E	A	C4	1	4	32.12	252.6	0.1694	32	LDM
TCAKA414E	A	C4	1	4	32.68	252.4	0.1684	32	LDM
TCAKA415E	A	C4	1	4	32.07	255.8	0.1699	32	LDM
TCAKA416E	A	C4	1	4	33.13	254.7	0.1700	32	LDM

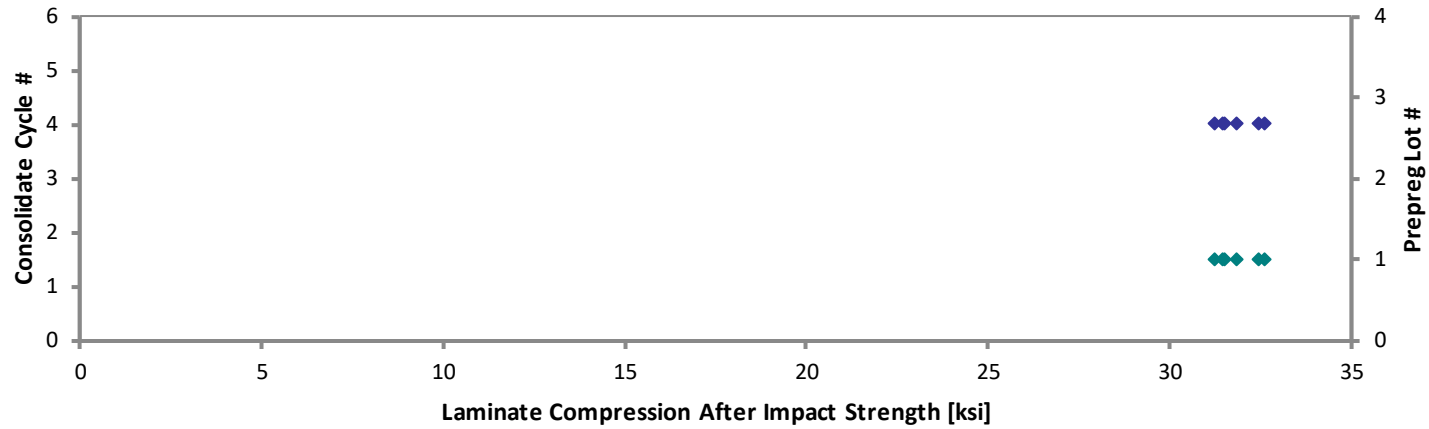
Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.0052	31.25
0.0053	32.44
0.0053	31.48
0.0053	31.84
0.0053	31.54
0.0053	32.60

Average 32.56
Standard Dev. 0.4867
Coeff. of Var. [%] 1.495
Min. 32.07
Max. 33.13
Number of Spec. 6

Average_{norm} 0.0053 31.86
Standard Dev._{norm} 0.5476
Coeff. of Var. [%]_{norm} 1.719
Min. 0.0052 31.25
Max. 0.0053 32.60
Number of Spec. 6 6

Laminate Compression After Impact 1 Properties (CAI1)--ETW (275°F)
Normalized Strength
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

- ◆ Consolidate
- ◆ Cycle #
- ◆ Prepreg Lot #



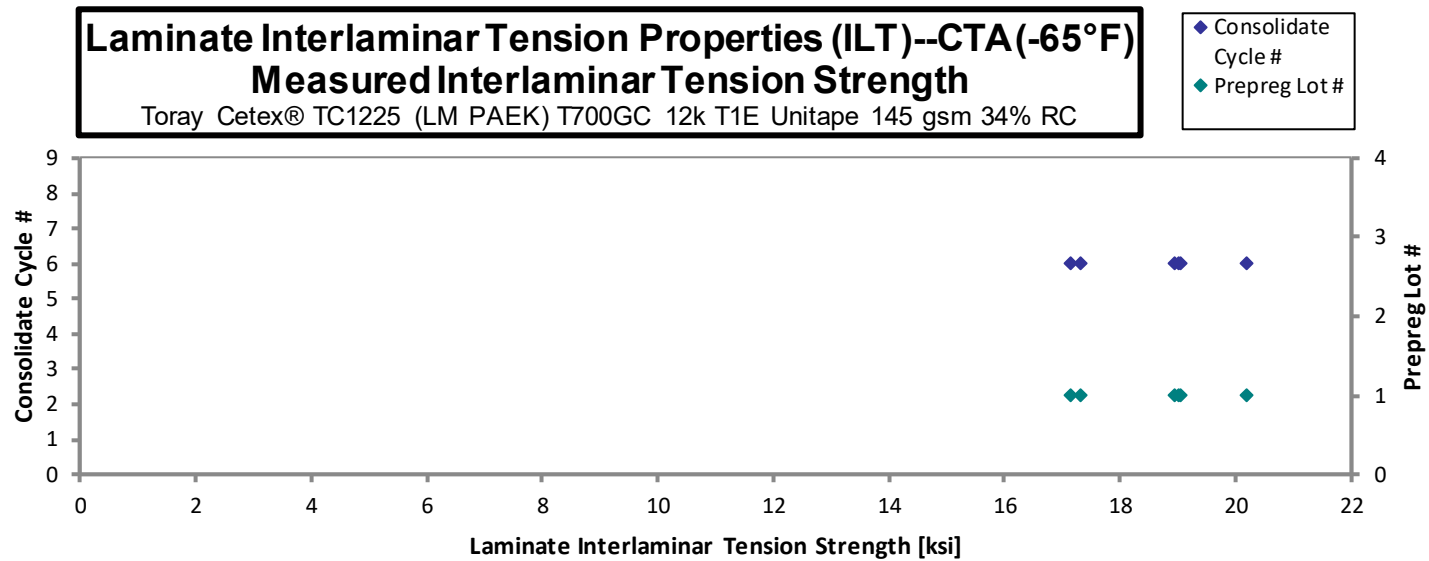
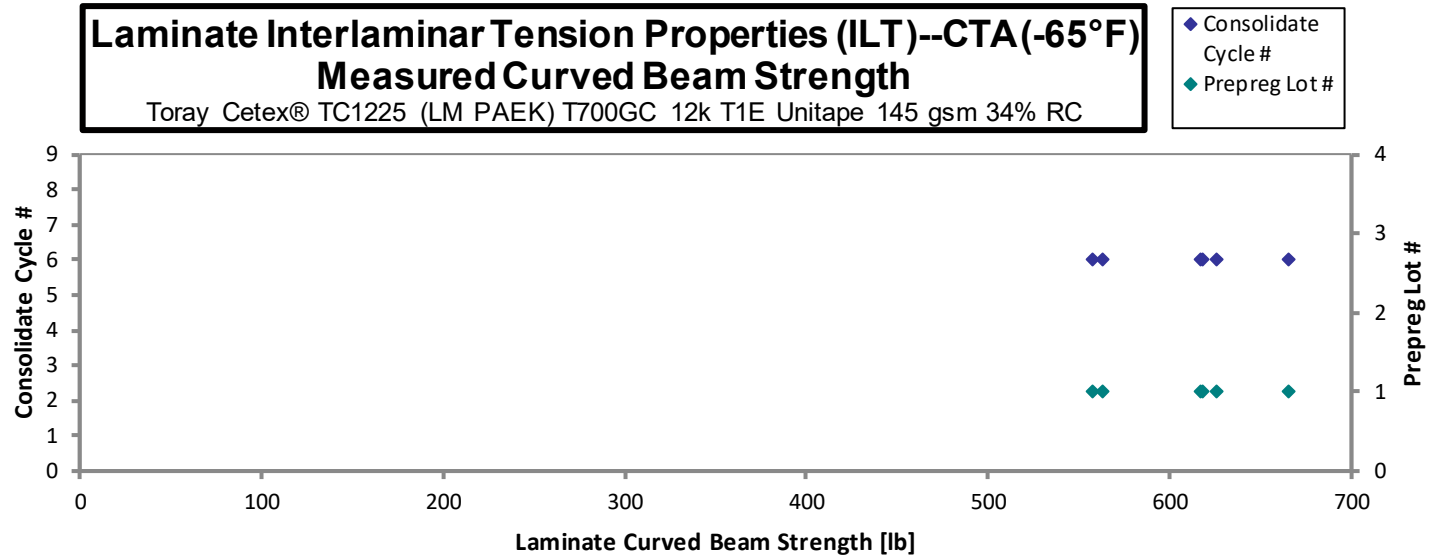
4.35 Interlaminar Tension Properties (ILT)

**Laminate Interlaminar Tension Properties (ILT)--CTA (-65°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksij]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAMA611B*	A	C6	1	6	557.8	17.15	0.1516	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA612B*	A	C6	1	6	626.3	19.01	0.1532	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA613B*	A	C6	1	6	616.8	18.93	0.1530	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA614B*	A	C6	1	6	665.2	20.18	0.1534	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA615B*	A	C6	1	6	617.8	19.06	0.1525	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA616B*	A	C6	1	6	562.6	17.33	0.1528	30	0.0051	INTERLAMINAR TENSILE FAILURE

*Cross head displacement exceeds 0.2in.

Average	607.7	18.61	0.0051
Standard Dev.	40.88	1.159	
Coeff. of Var. [%]	6.727	6.228	
Min.	557.8	17.15	0.0051
Max.	665.2	20.18	0.0051
Number of Spec.	6	6	6

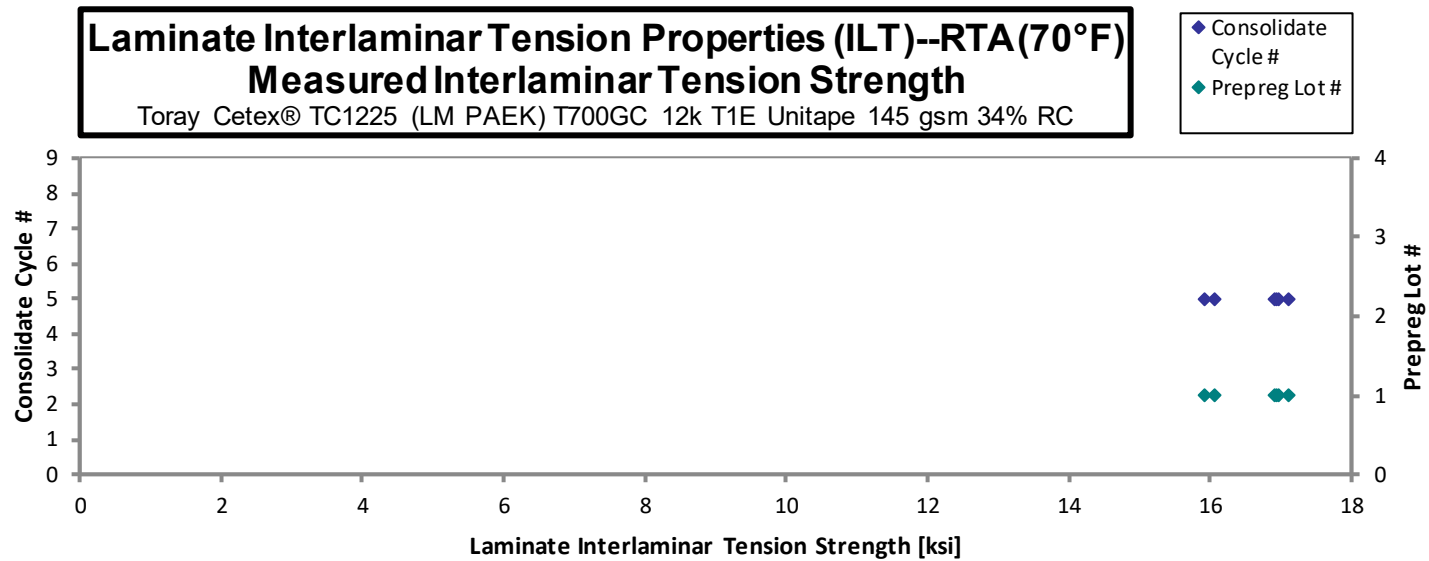
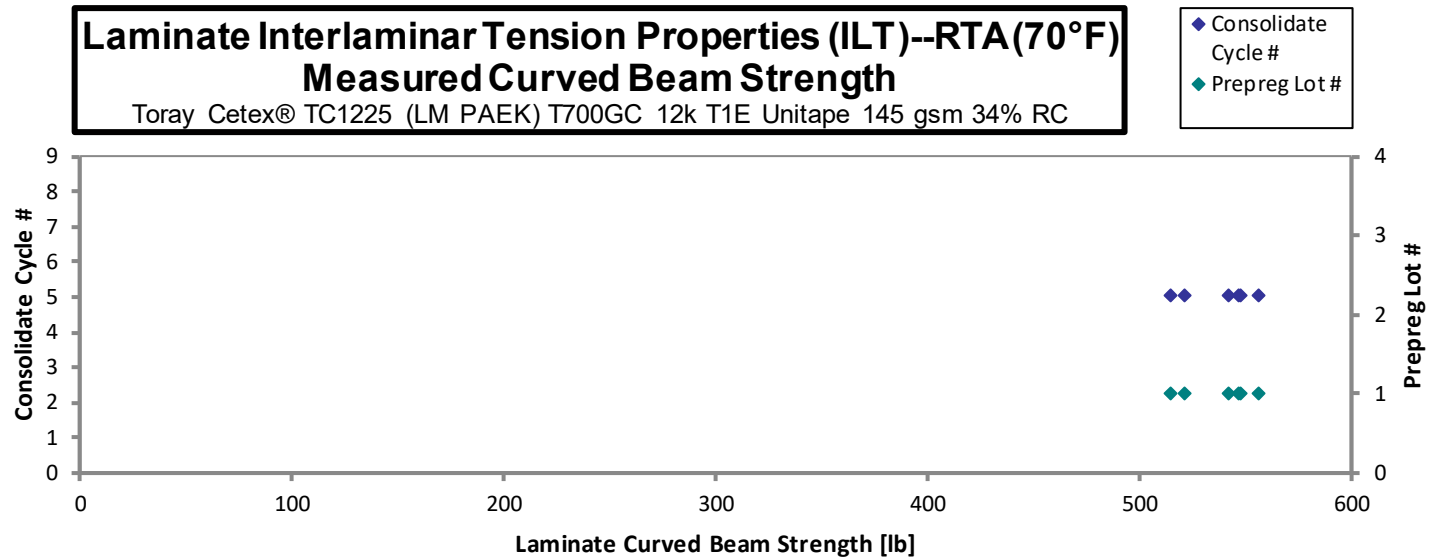


Laminate Interlaminar Tension Properties (ILT)--RTA (70°F) Strength Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAMA511A*	A	C5	1	5	514.4	15.92	0.1506	30	0.0050	INTERLAMINAR TENSILE FAILURE
TCAMA512A*	A	C5	1	5	555.9	17.12	0.1514	30	0.0050	INTERLAMINAR TENSILE FAILURE
TCAMA513A*	A	C5	1	5	547.1	16.95	0.1512	30	0.0050	INTERLAMINAR TENSILE FAILURE
TCAMA514A*	A	C5	1	5	520.9	16.06	0.1514	30	0.0050	INTERLAMINAR TENSILE FAILURE
TCAMA515A*	A	C5	1	5	547.4	16.98	0.1508	30	0.0050	INTERLAMINAR TENSILE FAILURE
TCAMA516A*	A	C5	1	5	541.9	16.92	0.1504	30	0.0050	INTERLAMINAR TENSILE FAILURE

*Cross head displacement exceeds 0.2in.

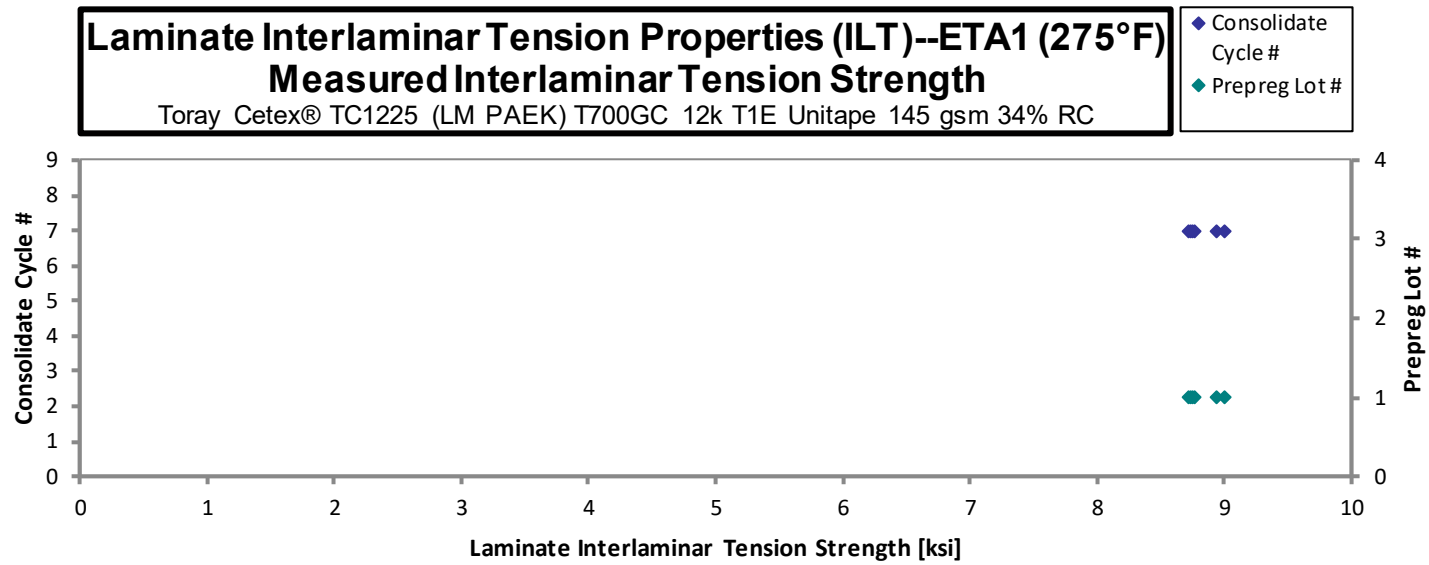
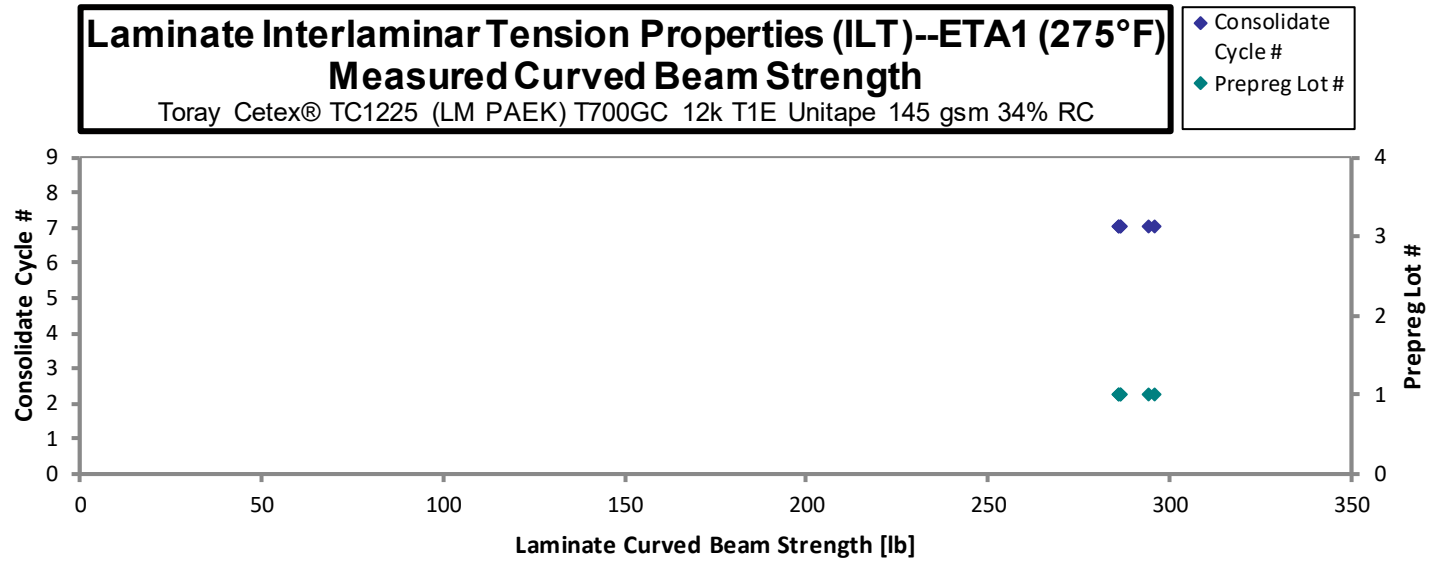
Average	537.9	16.66	0.0050
Standard Dev.	16.46	0.5235	
Coeff. of Var. [%]	3.060	3.143	
Min.	514.4	15.92	0.0050
Max.	555.9	17.12	0.0050
Number of Spec.	6	6	6



Laminate Interlaminar Tension Properties (ILT)--ETA1 (275°F) Strength Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCAMA711C	A	C7	1	7	295.7	9.006	0.1536	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA712C	A	C7	1	7	294.3	8.939	0.1540	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA713C	A	C7	1	7	286.3	8.742	0.1533	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA714C	A	C7	1	7	286.6	8.719	0.1540	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA715C	A	C7	1	7	286.0	8.748	0.1534	30	0.0051	INTERLAMINAR TENSILE FAILURE
TCAMA716C	A	C7	1	7	285.8	8.775	0.1528	30	0.0051	INTERLAMINAR TENSILE FAILURE

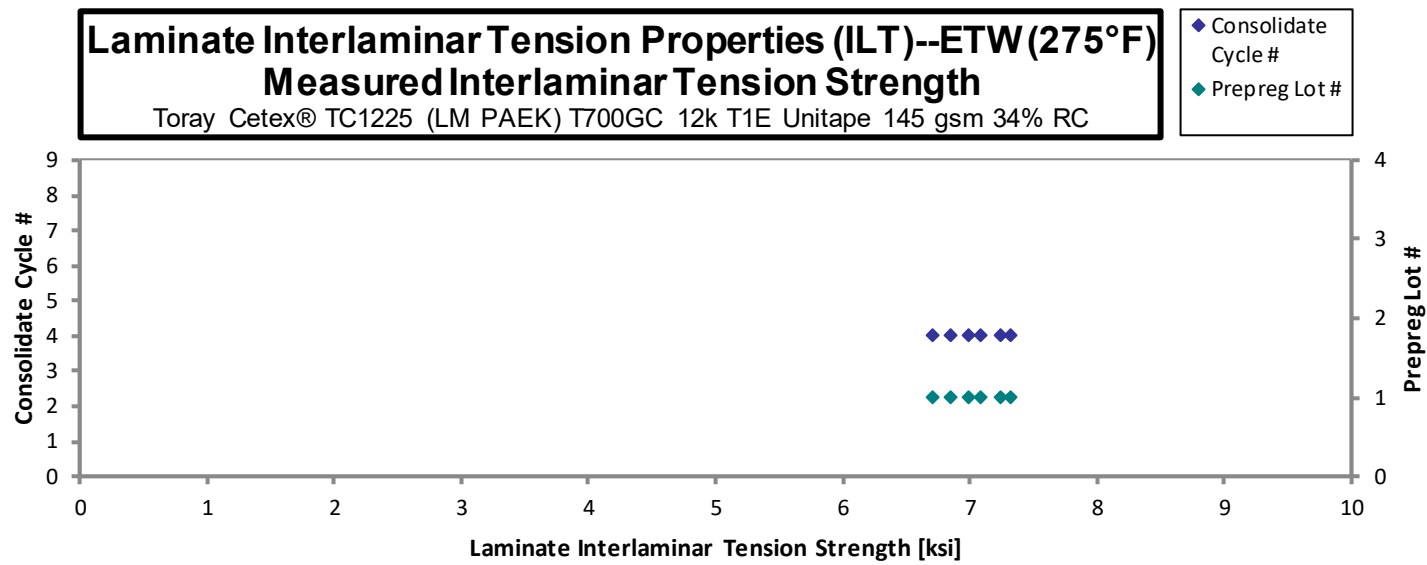
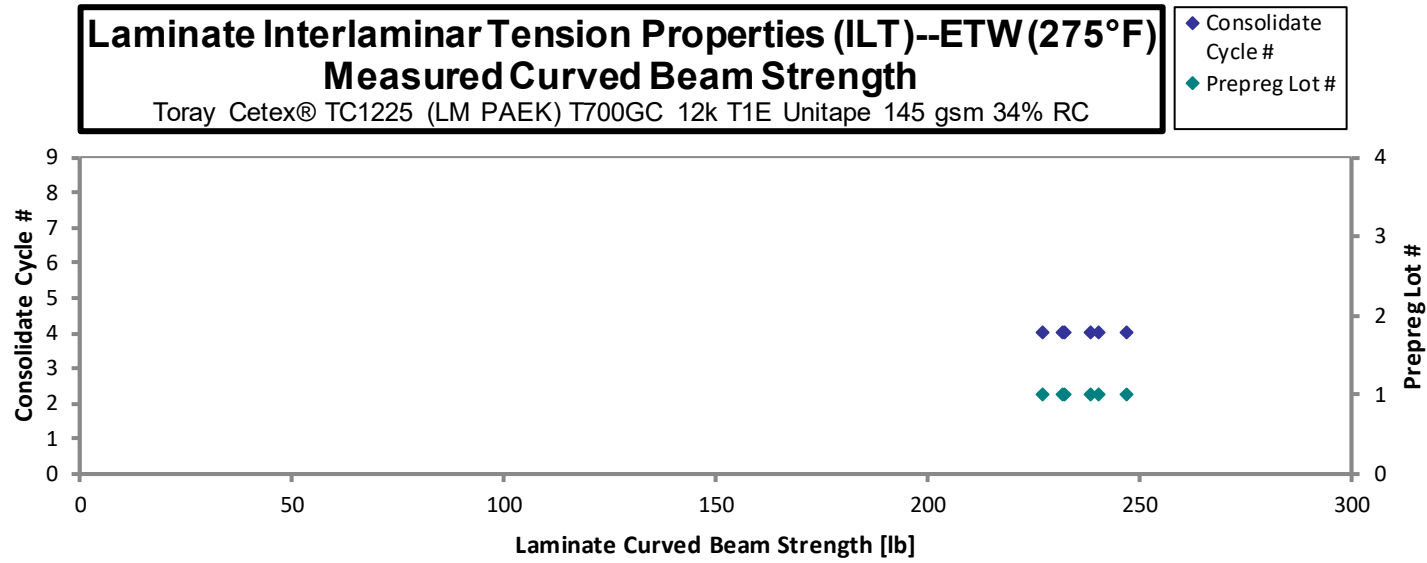
Average	289.1	8.821	0.0051
Standard Dev.	4.590	0.1202	
Coeff. of Var. [%]	1.588	1.363	
Min.	285.8	8.719	0.0051
Max.	295.7	9.006	0.0051
Number of Spec.	6	6	6



**Laminate Interlaminar Tension Properties (ILT)--ETW (275°F)
Strength**
Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCAMA411E	A	C4	1	4	232.2	6.995	0.1563	30	0.0052	INTERLAMINAR TENSILE FAILURE, COMPRESSION FAILURE AT OUTER CURVE
TCAMA412E	A	C4	1	4	240.6	7.247	0.1558	30	0.0052	INTERLAMINAR TENSILE FAILURE, COMPRESSION FAILURE AT OUTER CURVE
TCAMA413E	A	C4	1	4	247.1	7.323	0.1576	30	0.0053	INTERLAMINAR TENSILE FAILURE
TCAMA414E	A	C4	1	4	238.5	7.089	0.1573	30	0.0052	INTERLAMINAR TENSILE FAILURE, COMPRESSION FAILURE AT OUTER CURVE
TCAMA415E	A	C4	1	4	232.0	6.855	0.1583	30	0.0053	INTERLAMINAR TENSILE FAILURE, COMPRESSION FAILURE AT OUTER CURVE
TCAMA416E	A	C4	1	4	227.1	6.711	0.1577	30	0.0053	INTERLAMINAR TENSILE FAILURE

Average	236.2	7.036	0.0052
Standard Dev.	7.218	0.2322	
Coeff. of Var. [%]	3.055	3.299	
Min.	227.1	6.711	0.0052
Max.	247.1	7.323	0.0053
Number of Spec.	6	6	6

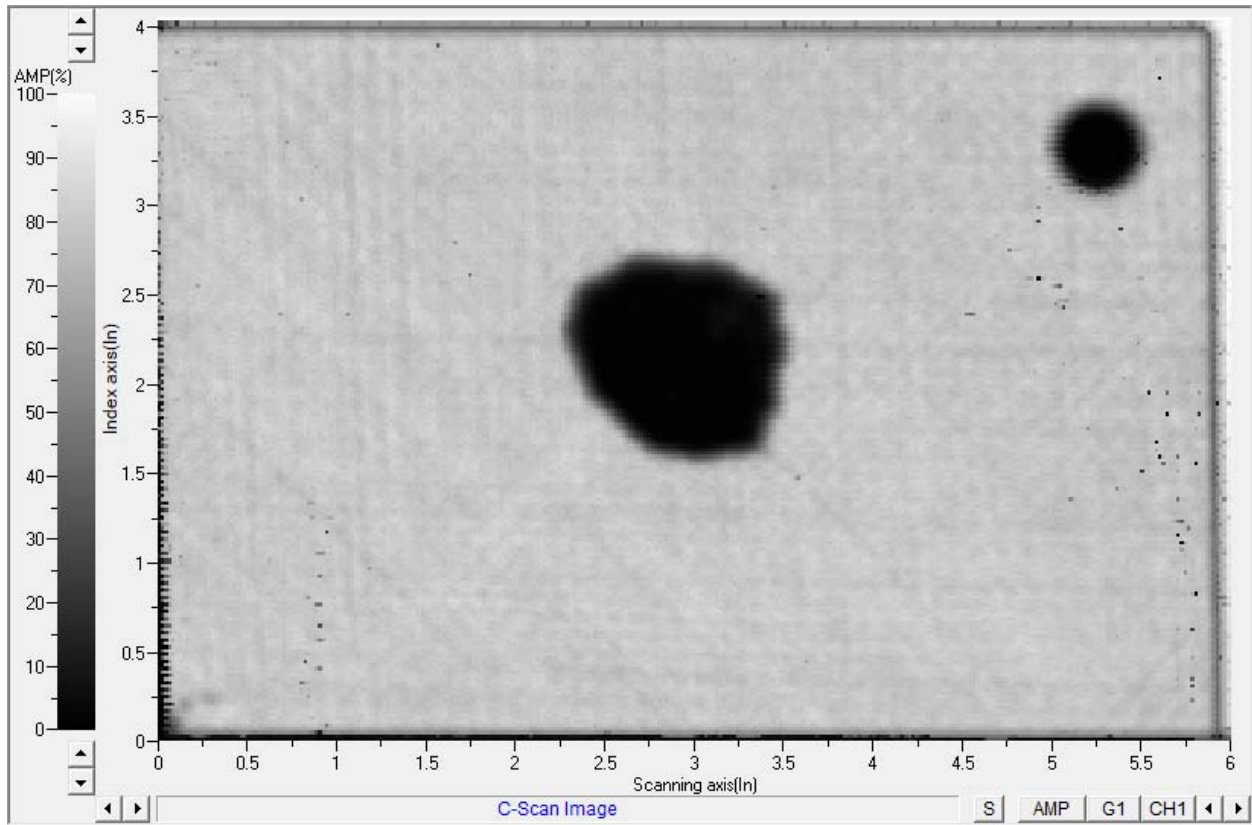


5 Additional Compression After Impact Data

Target Impact Energy Level: 1500 in-lb/in

Impactor Diameter: 0.625"

Representative of Damage Area:



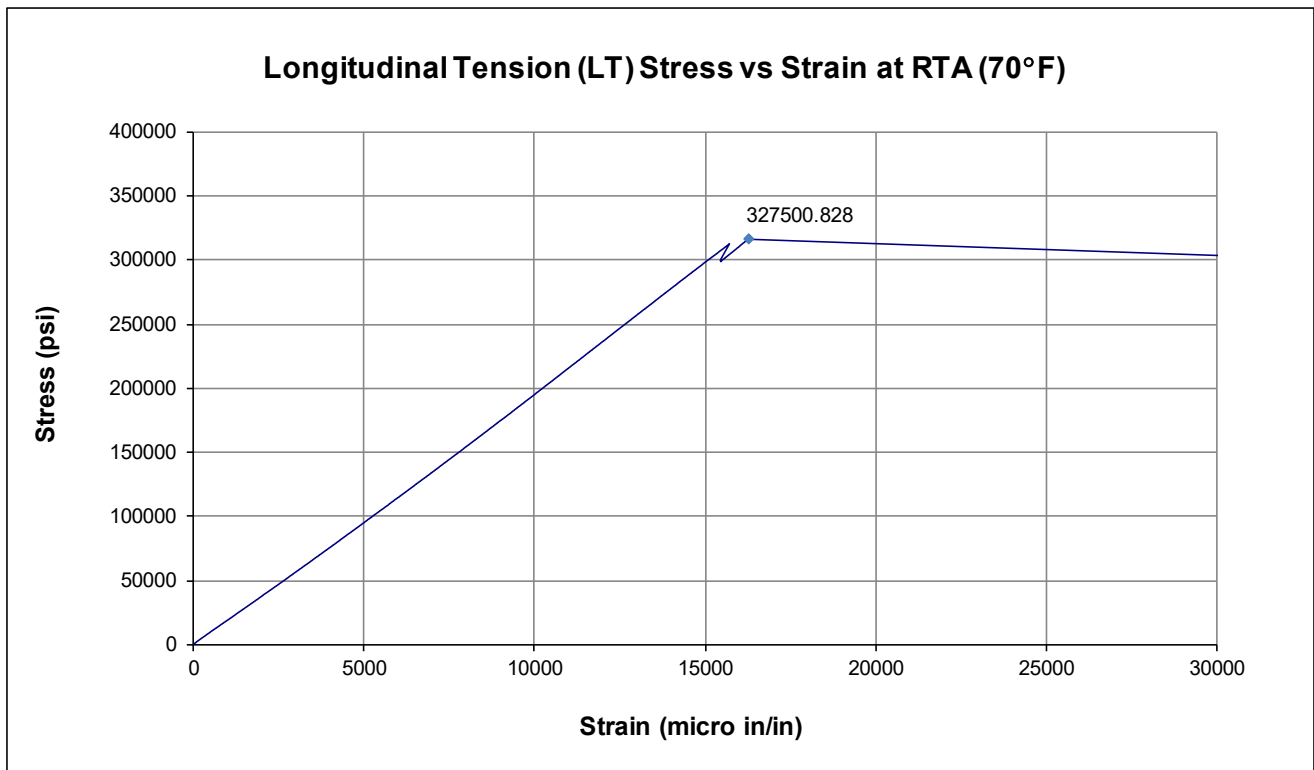
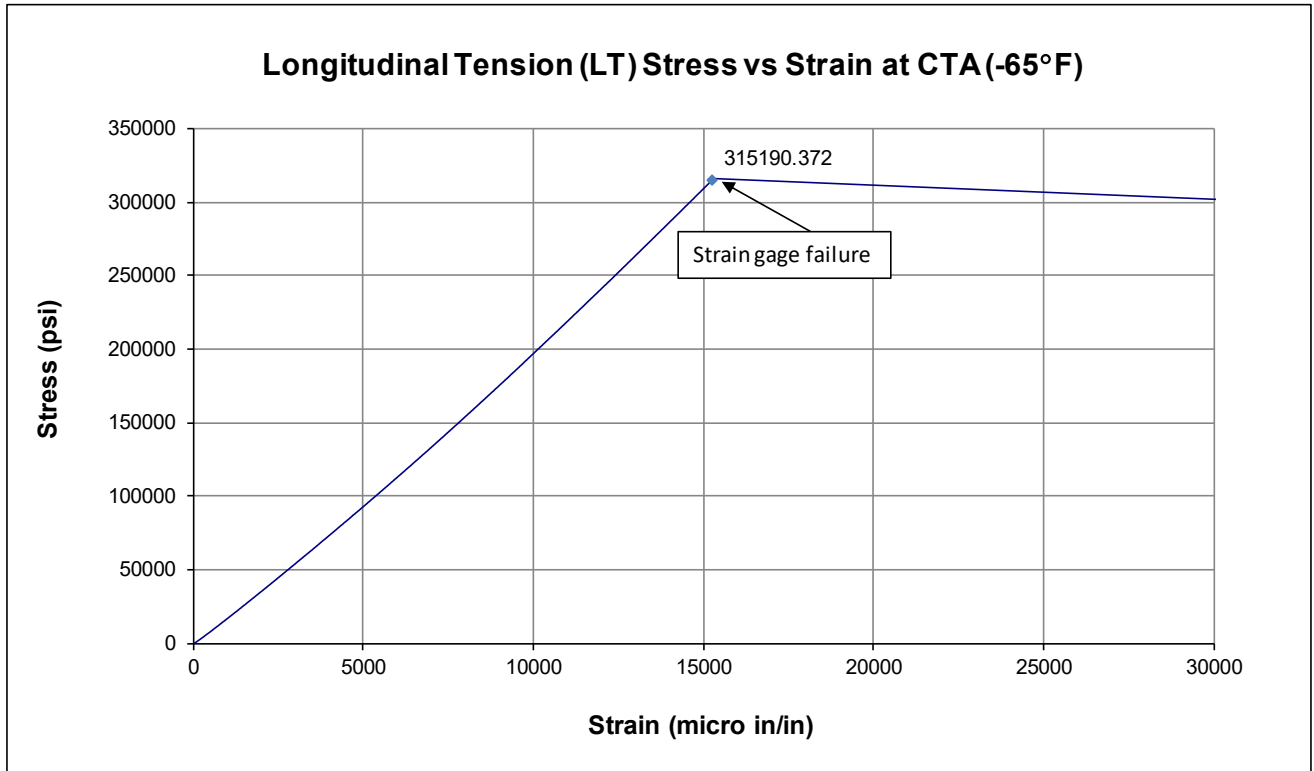
Damage Area and Dent Depth Summary:

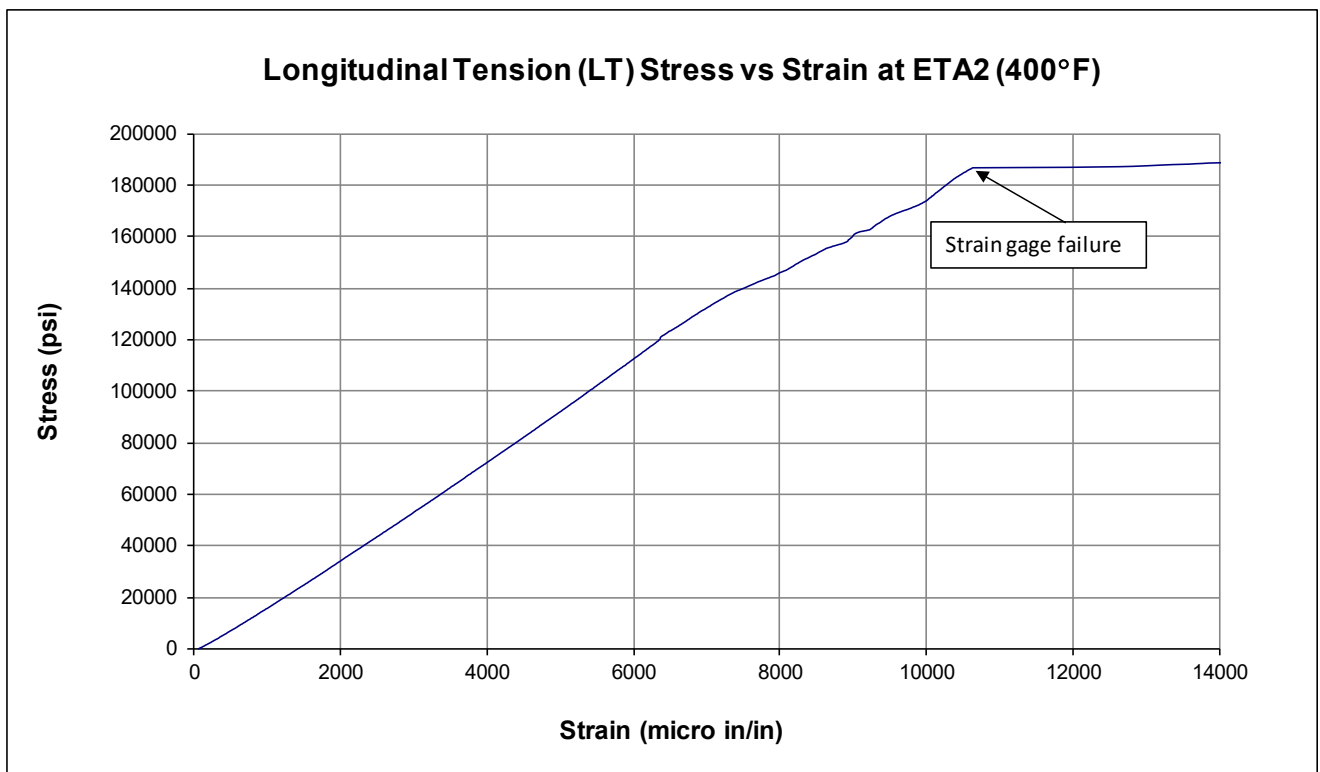
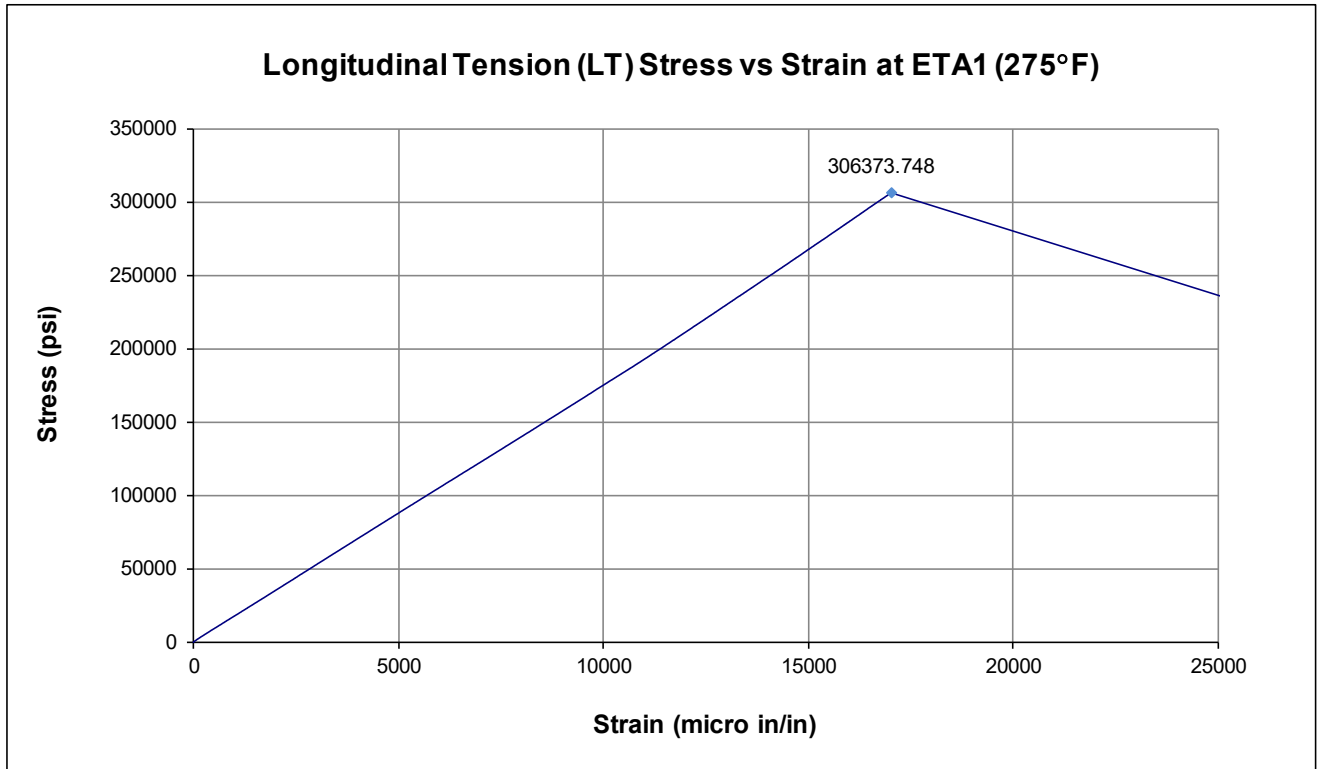
Specimen ID	Damage Area (inch²)	Dent Depth (inch)
TCAKA111A	1.0856	0.0155
TCAKA112A	1.2740	0.0155
TCAKA113A	1.2484	0.0145
TCAKA114A	1.8760	0.0155
TCAKA115A	1.0988	0.0155
TCAKA116A	1.0864	0.0155
TCAKA211C	1.4844	0.0140
TCAKA212C	1.3868	0.0145
TCAKA213C	1.8572	0.0165
TCAKA214C	1.3480	0.0145
TCAKA215C	1.3912	0.0145
TCAKA216C	1.5924	0.0145
TCAKA311D	1.2132	0.0155
TCAKA312D	1.1492	0.0150
TCAKA313D	1.8720	0.0145
TCAKA314D	1.4668	0.0145
TCAKA315D	1.1432	0.0155
TCAKA316D	1.0800	0.0150
TCAKA511D	1.0424	0.0145
TCAKA512D	1.5836	0.0155
TCAKA411E	1.0516	0.0145
TCAKA412E	1.1364	0.0155
TCAKA413E	1.5340	0.0150
TCAKA414E	1.2260	0.0165
TCAKA415E	1.2432	0.0150
TCAKA416E	1.0944	0.0150

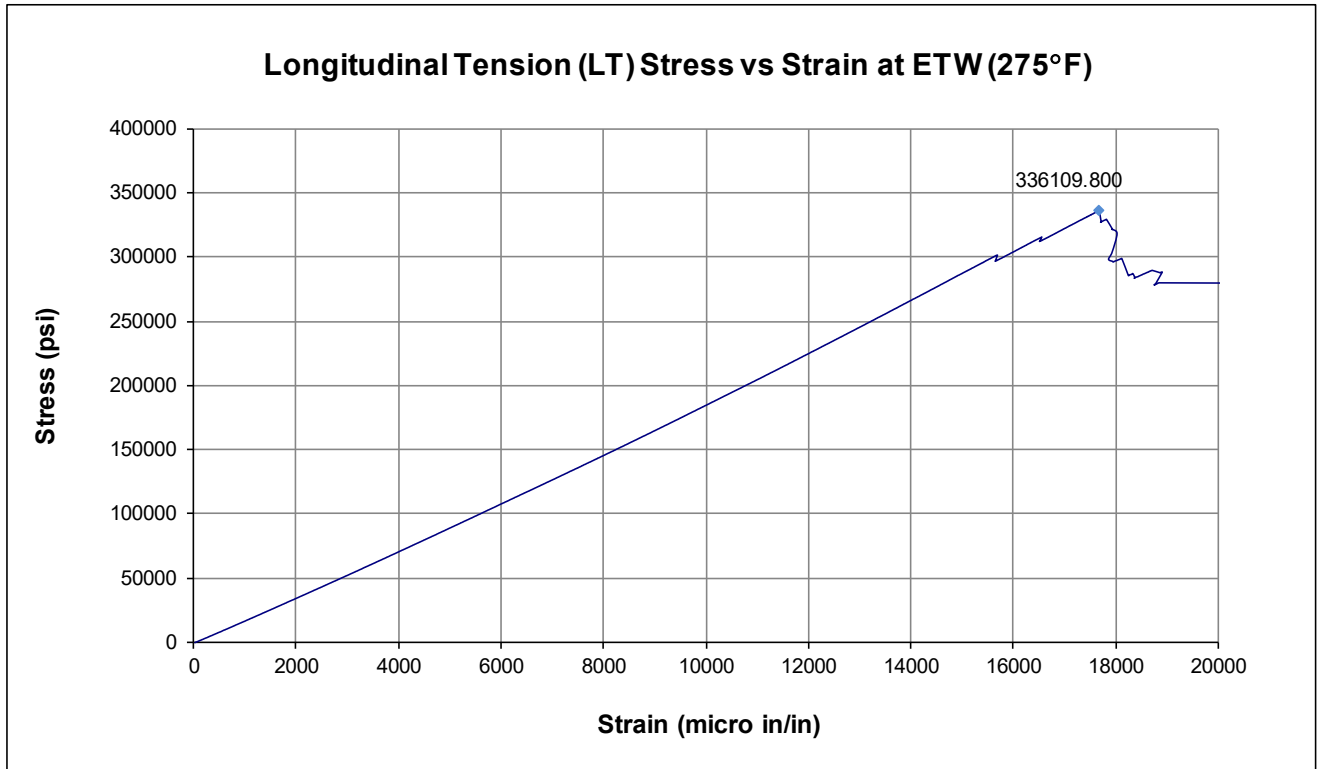
6 Full Stress vs. Strain Curve

This section provides charts to display the stress-strain curves of the material for the environmental conditions tested. Representative curves for each configuration are provided in the sections below.

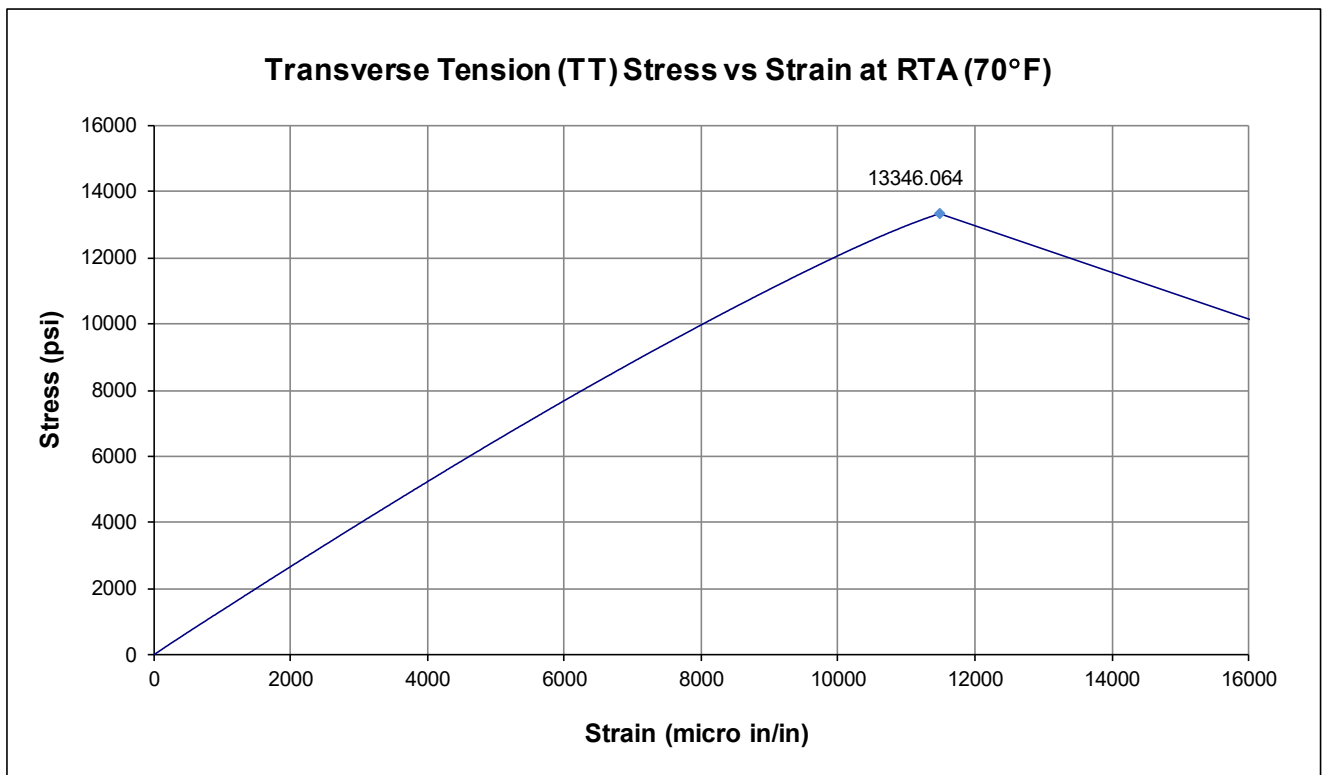
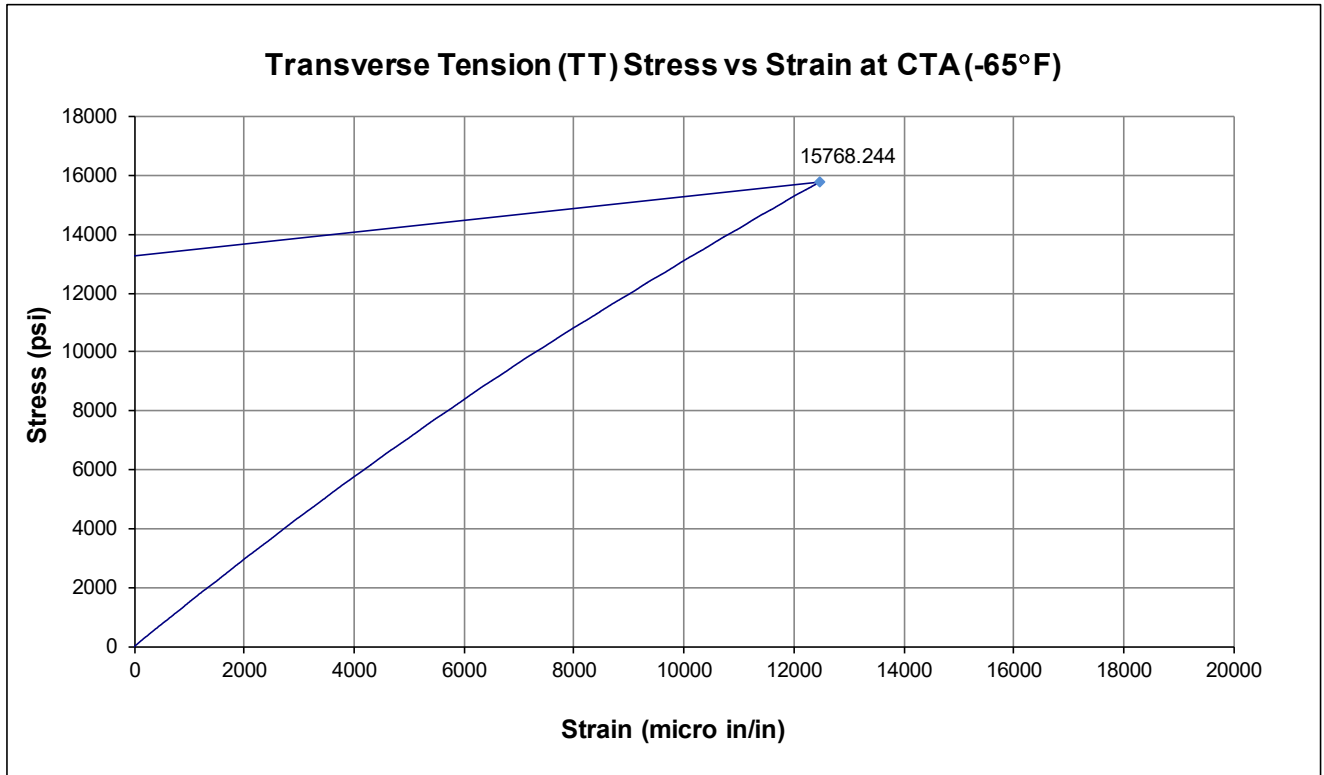
6.1 Longitudinal Tension (LT)

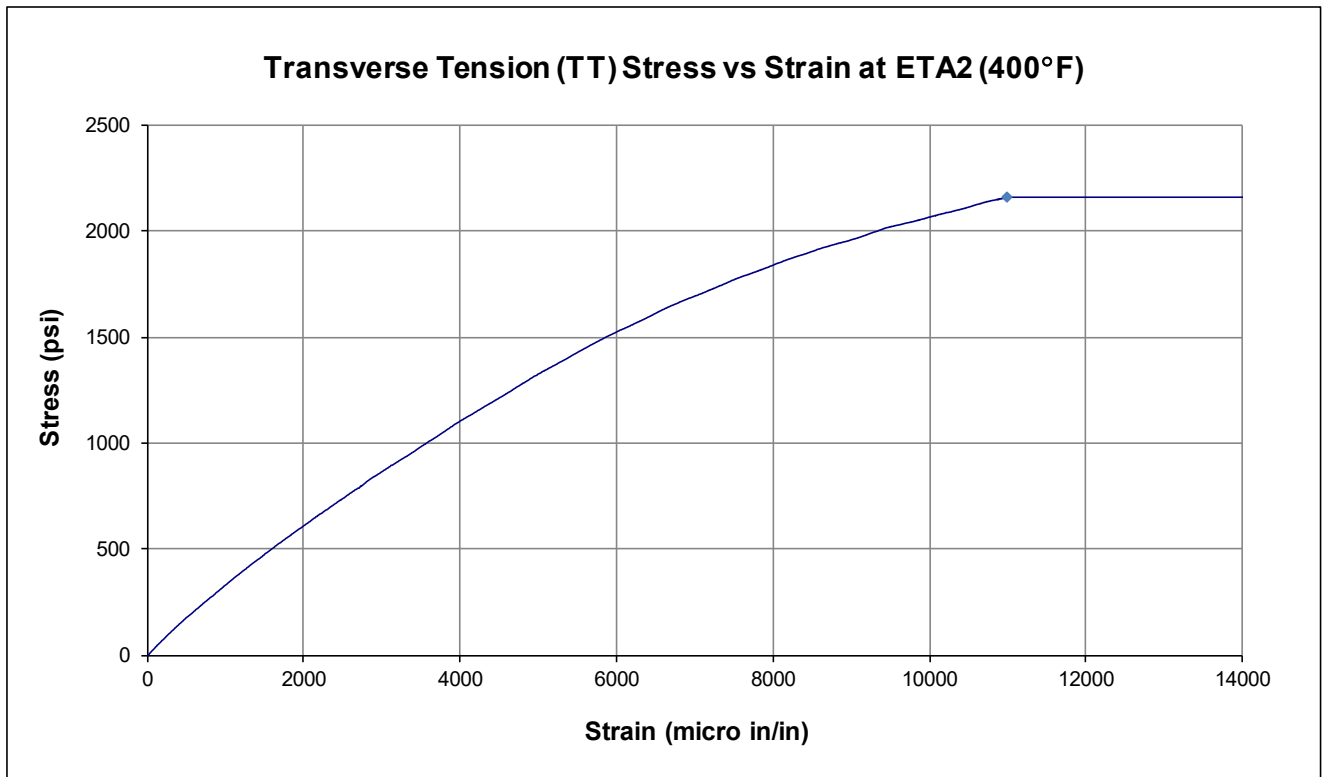
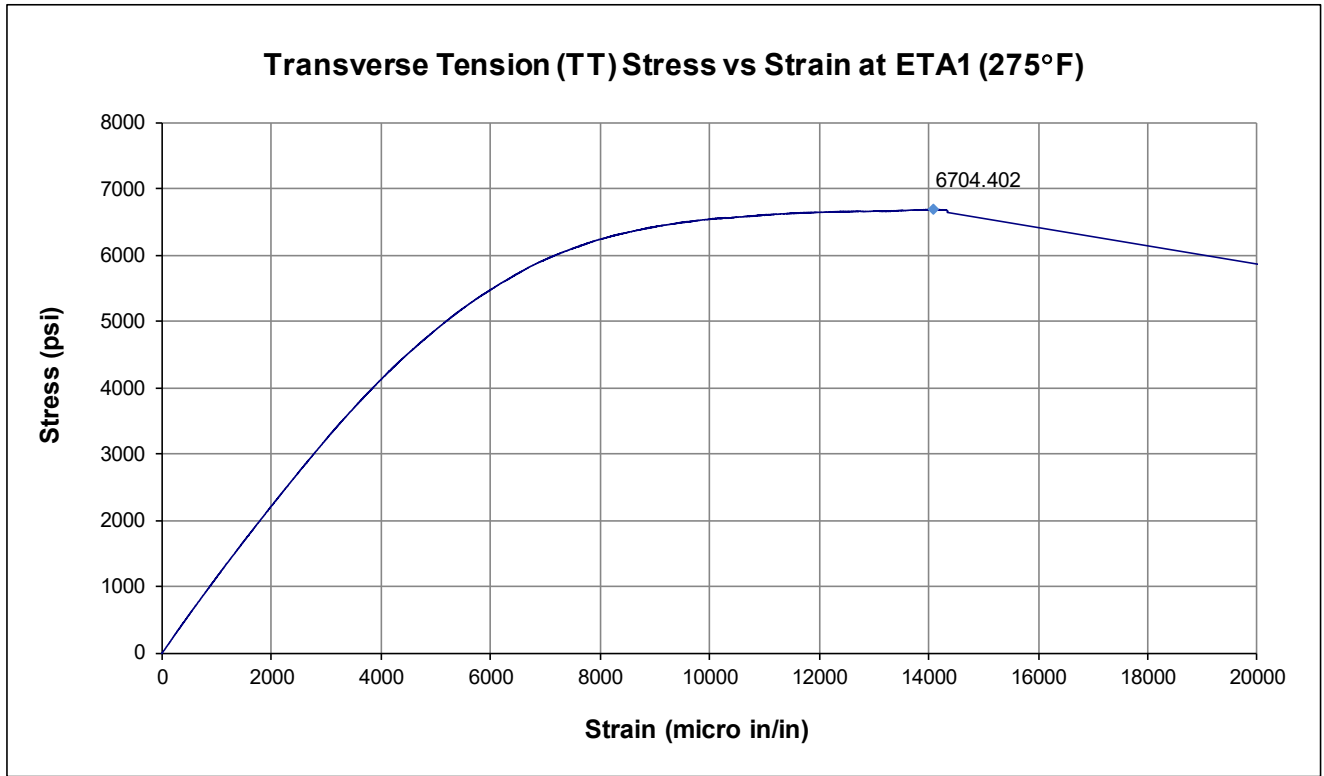


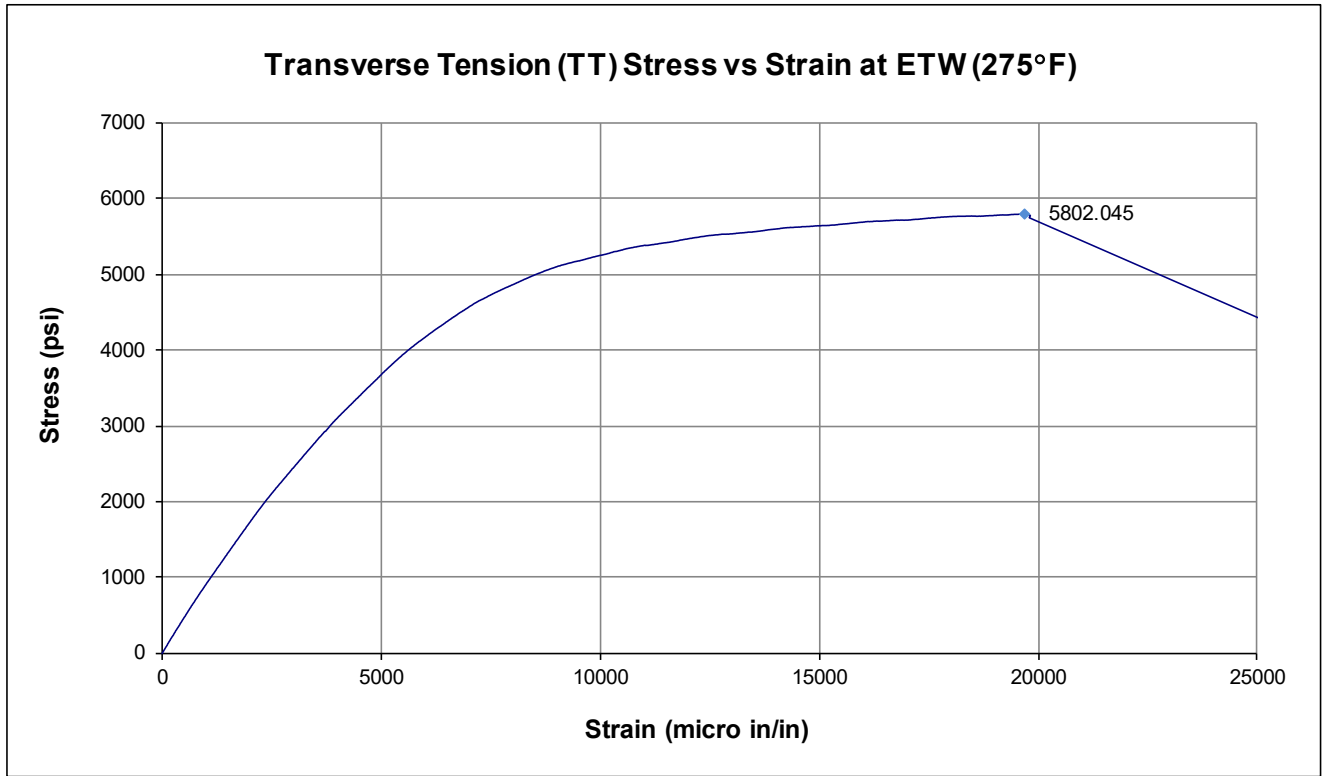




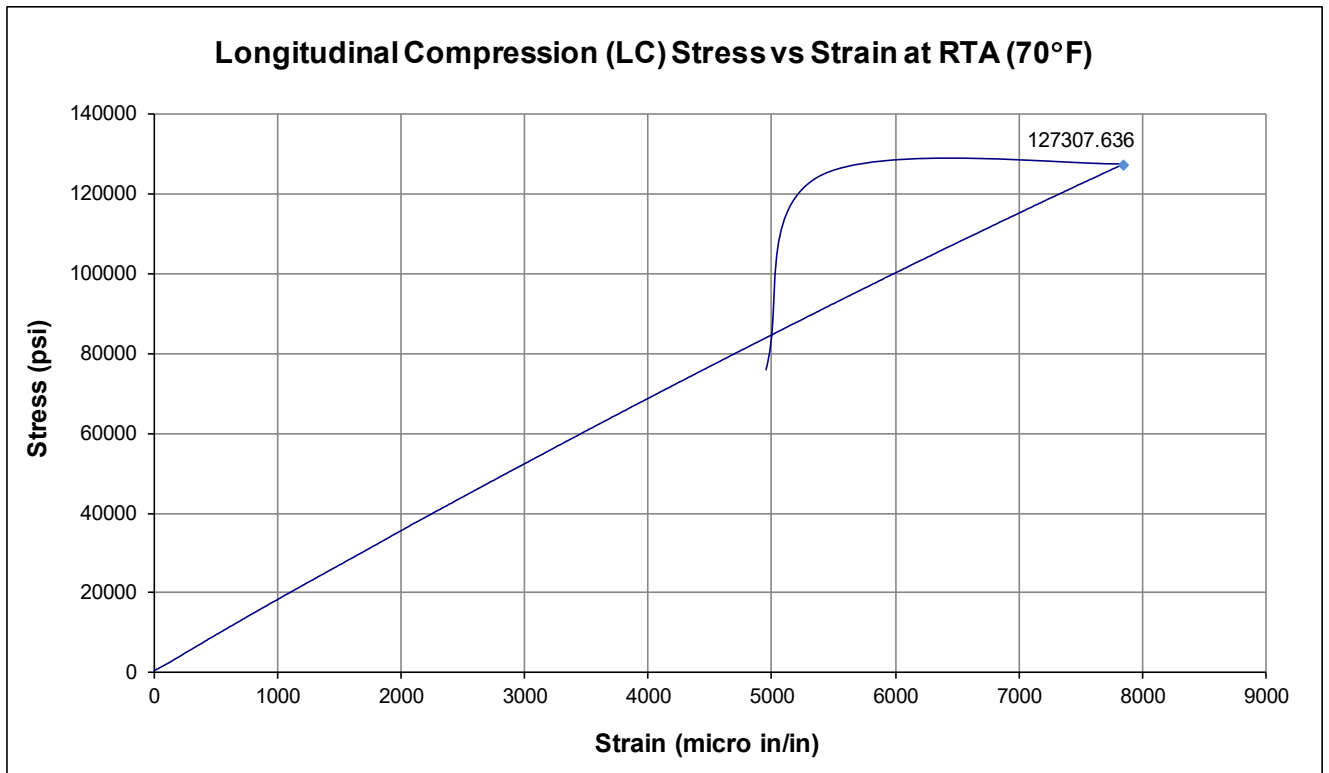
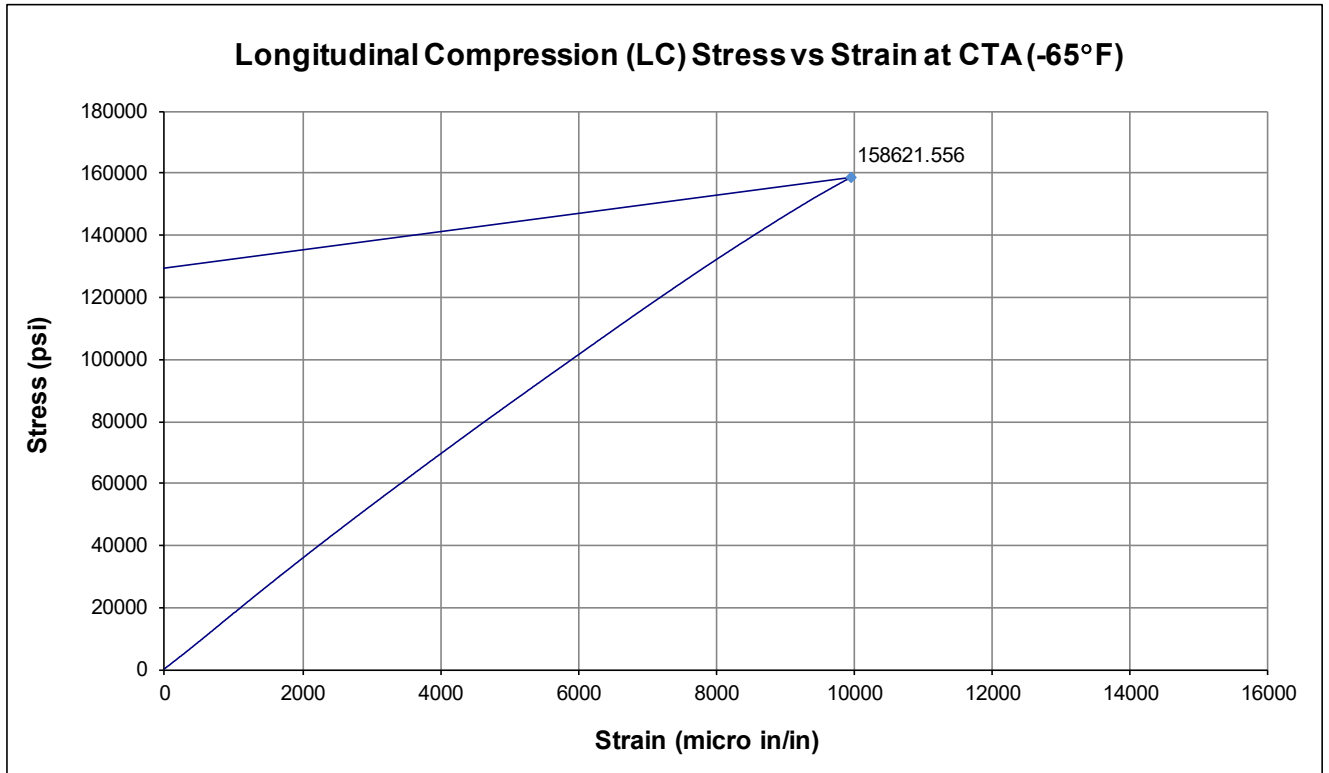
6.2 Transverse Tension (TT)

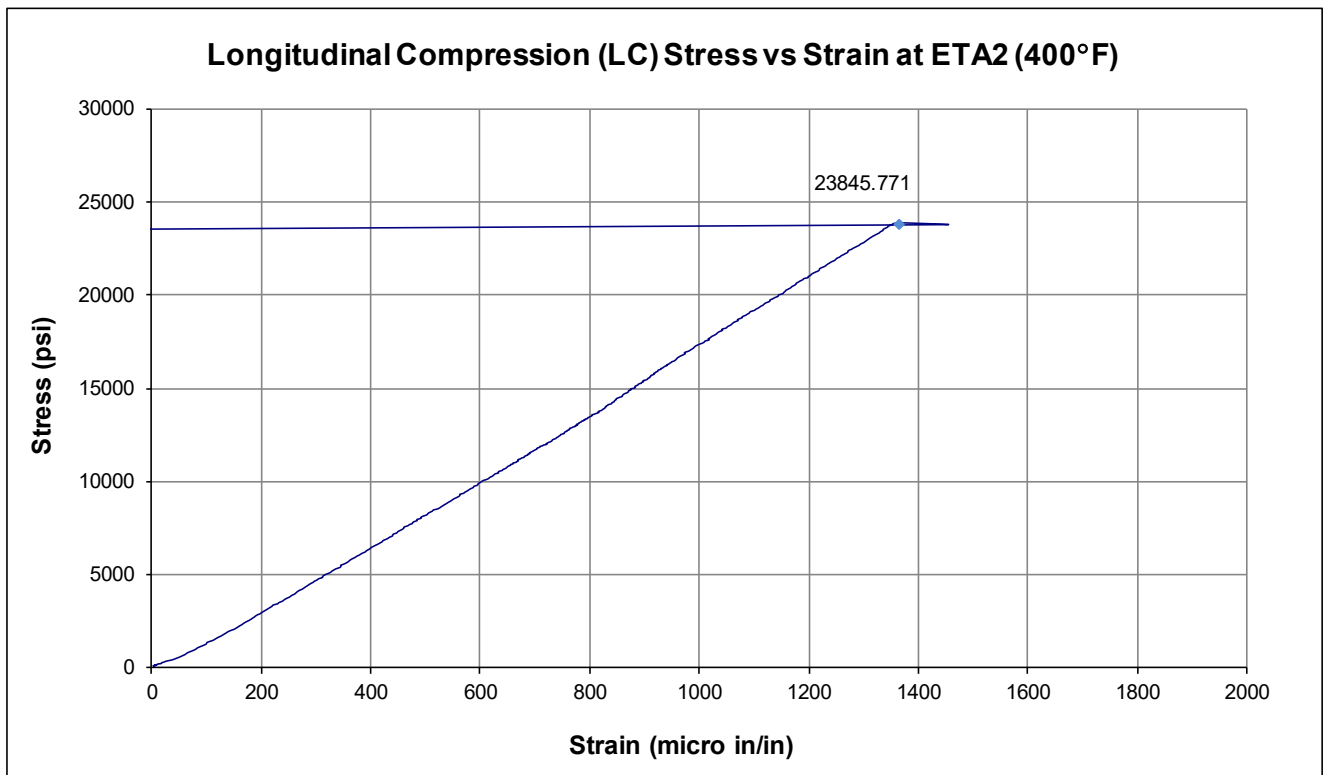
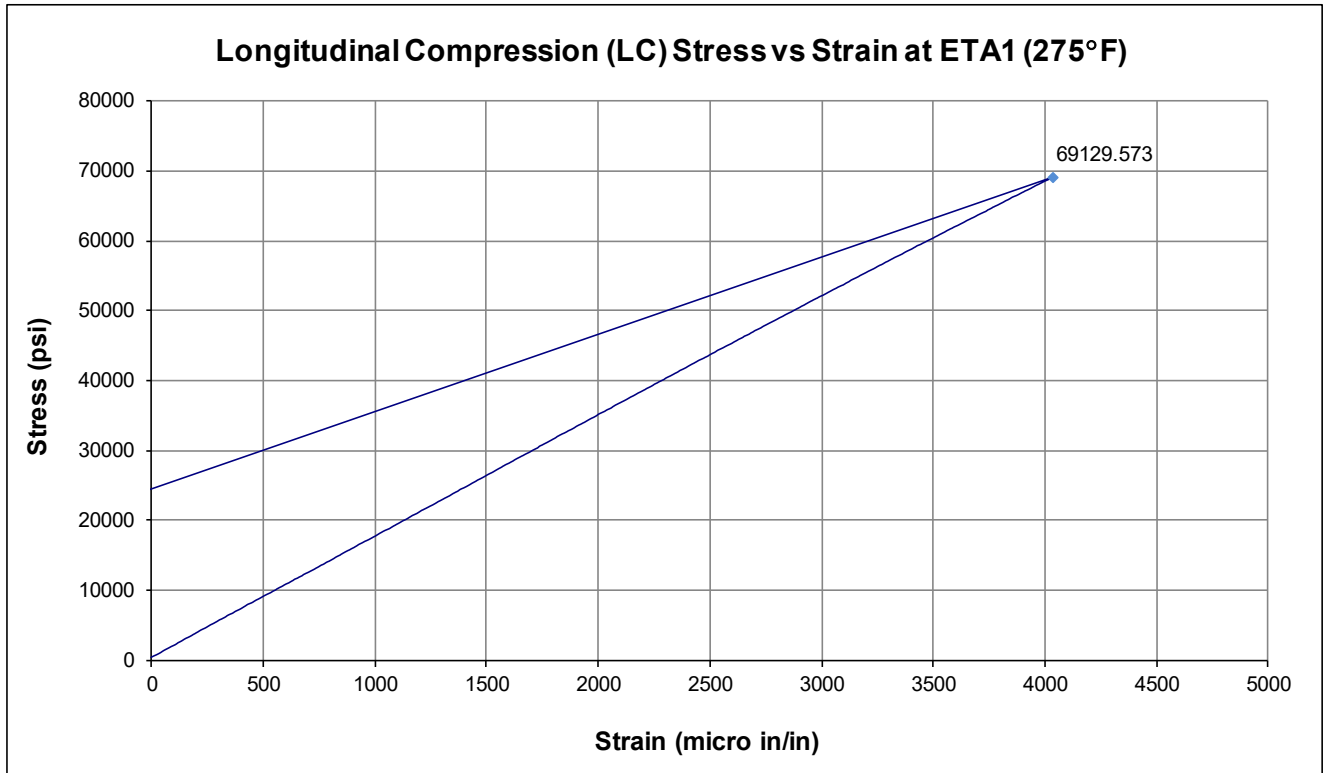


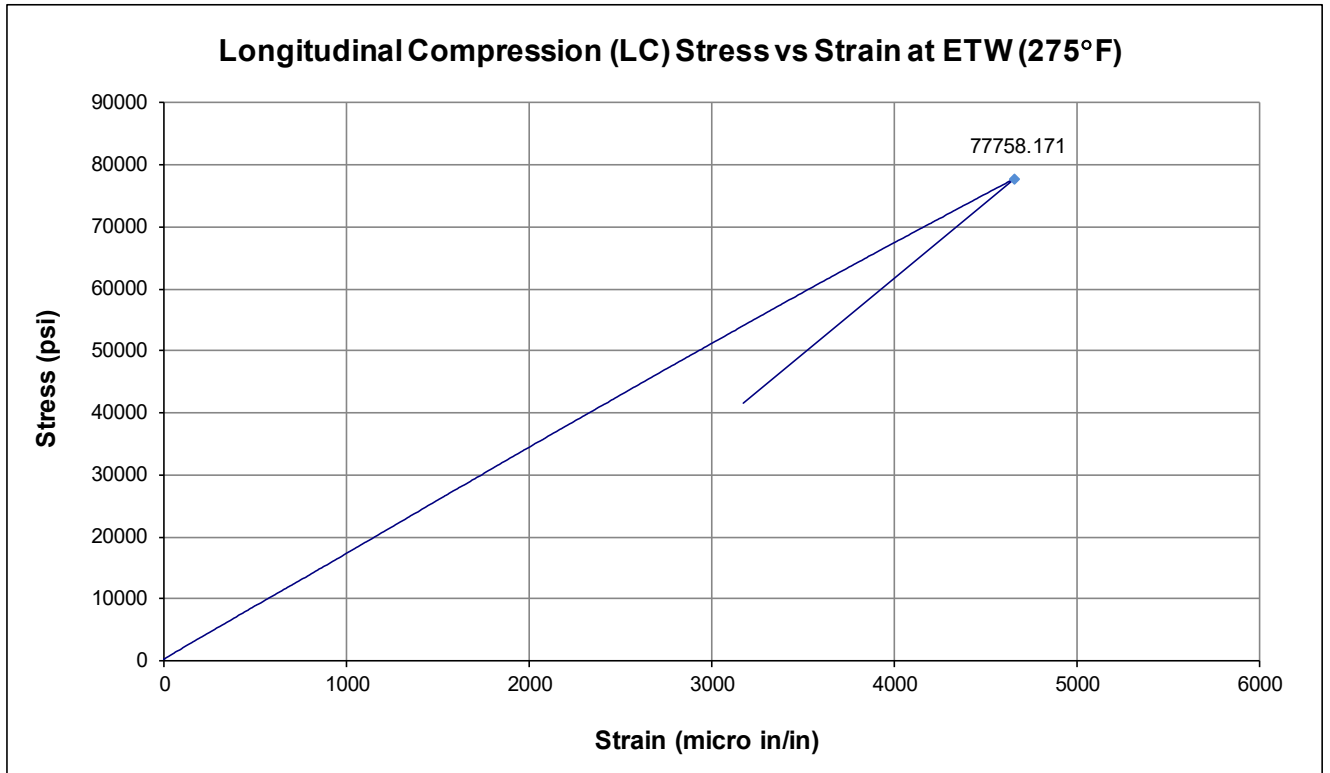




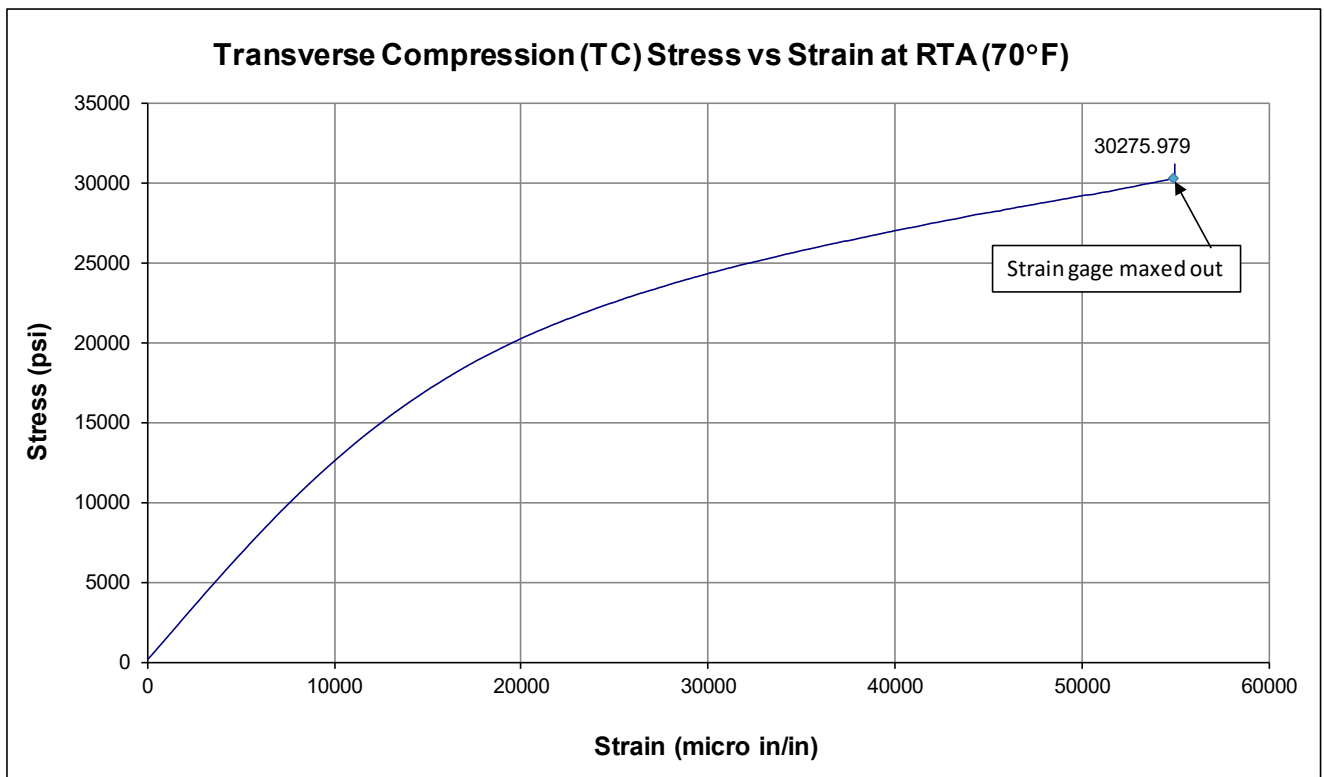
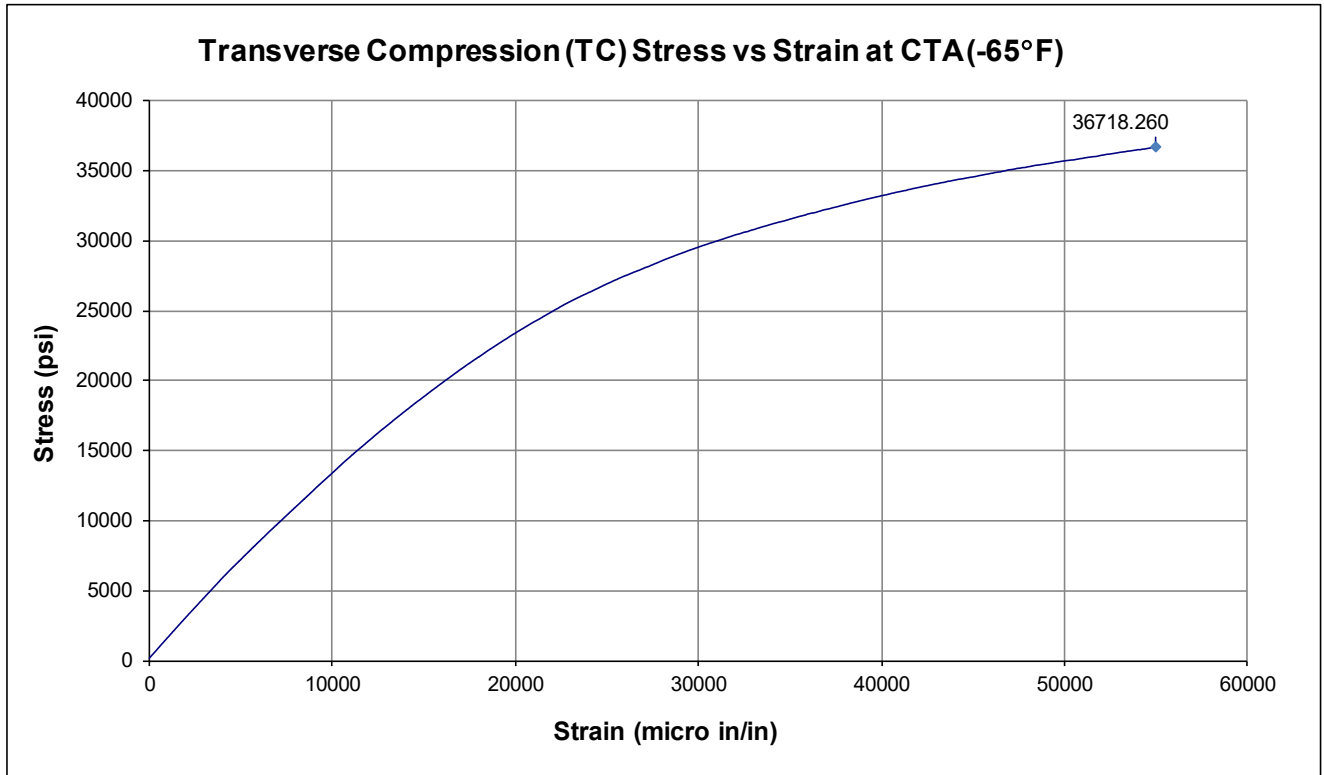
6.3 Longitudinal Compression (LC)

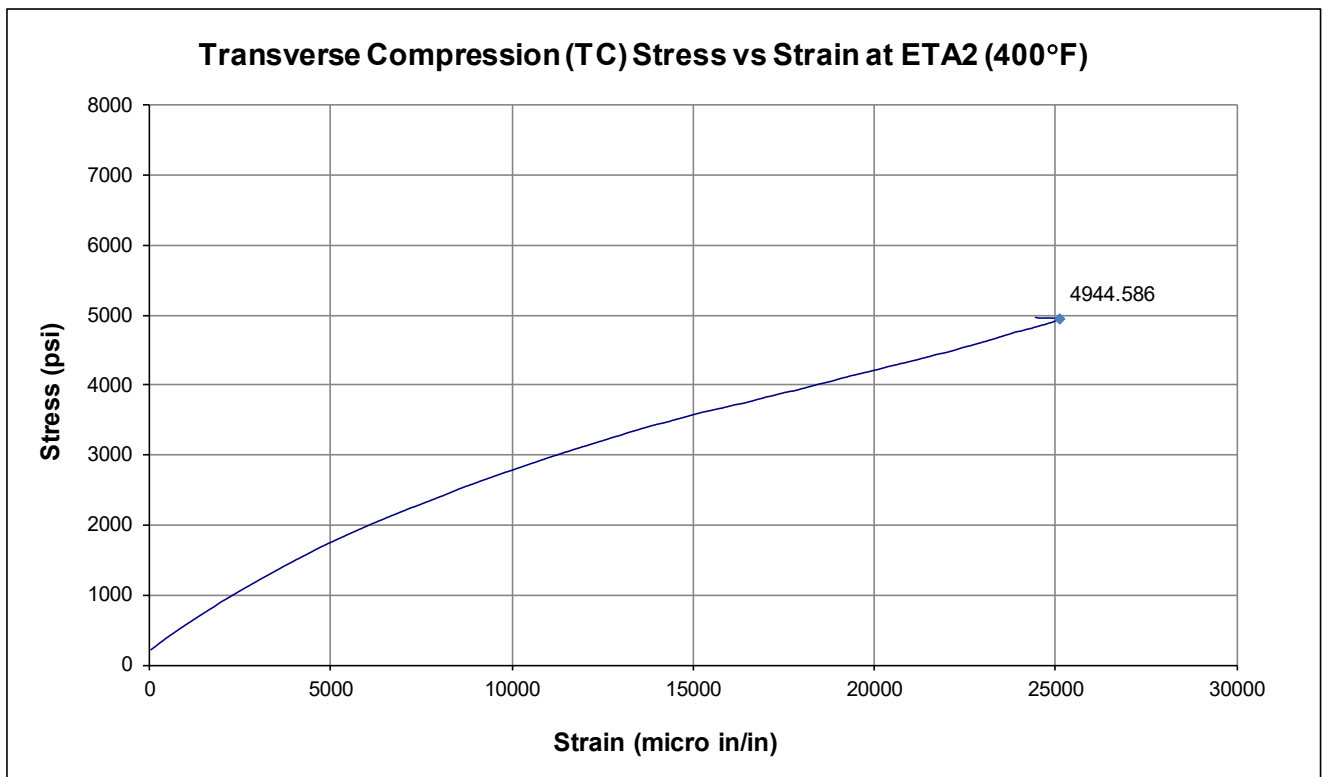
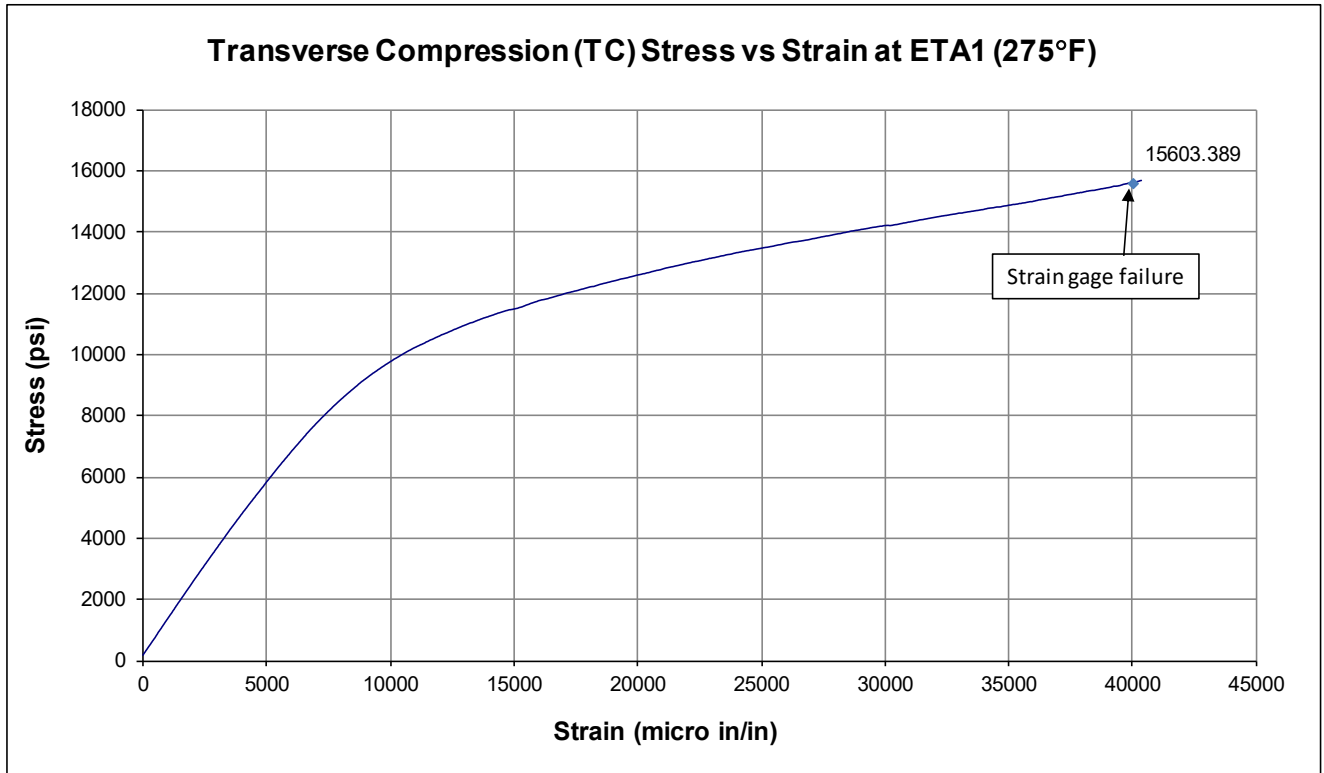


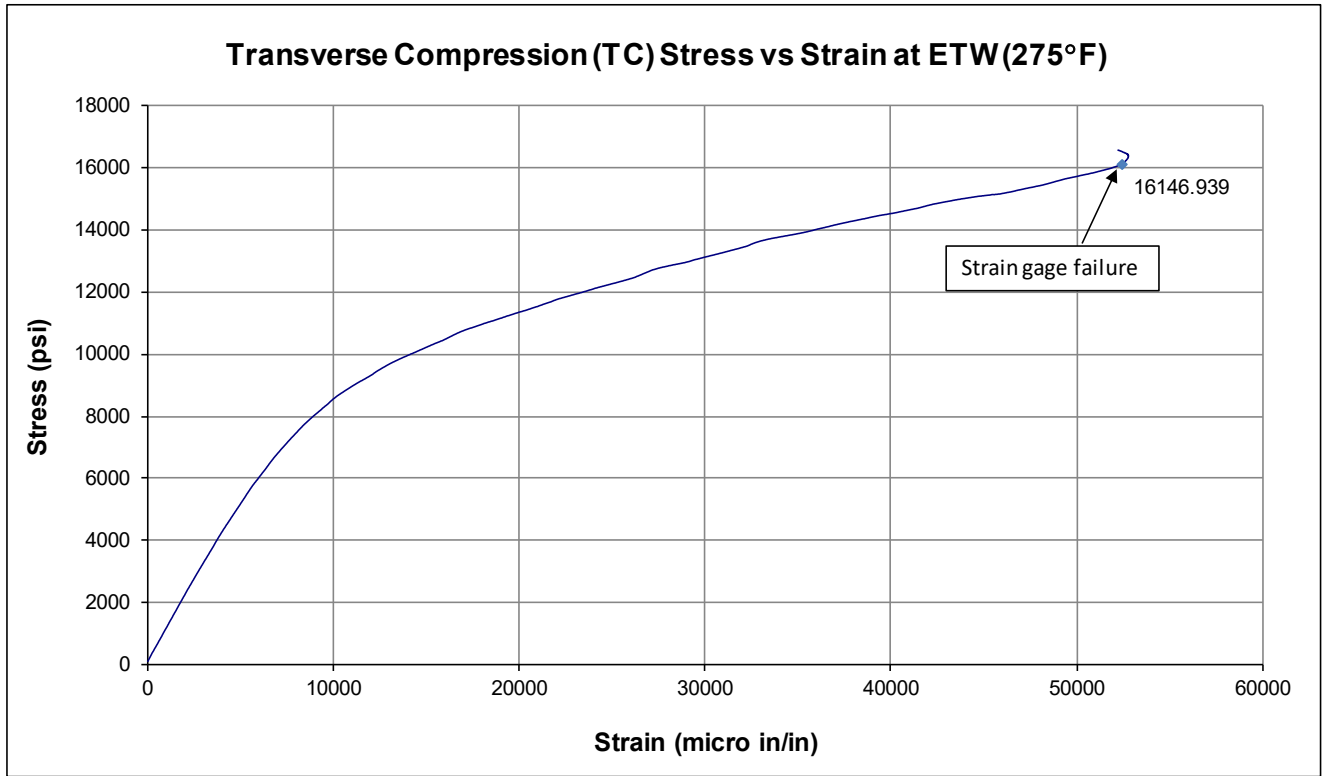




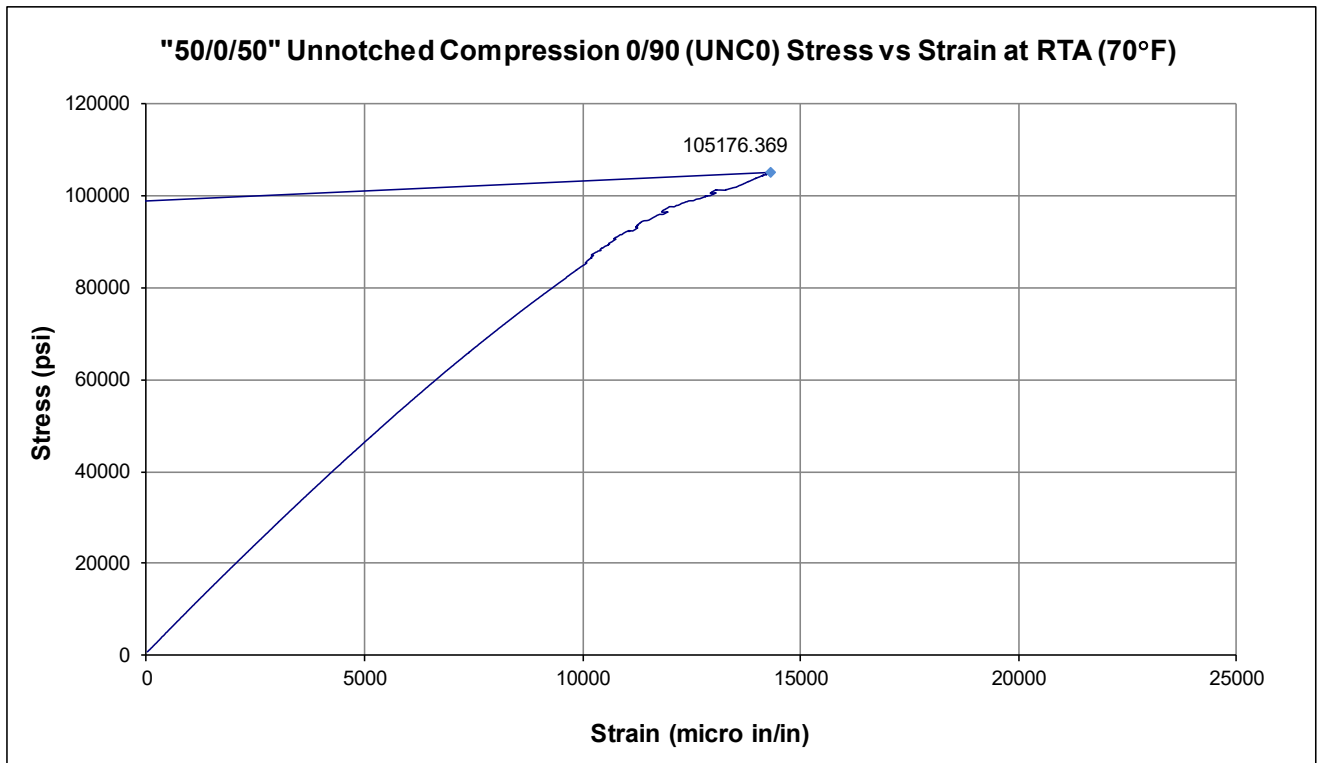
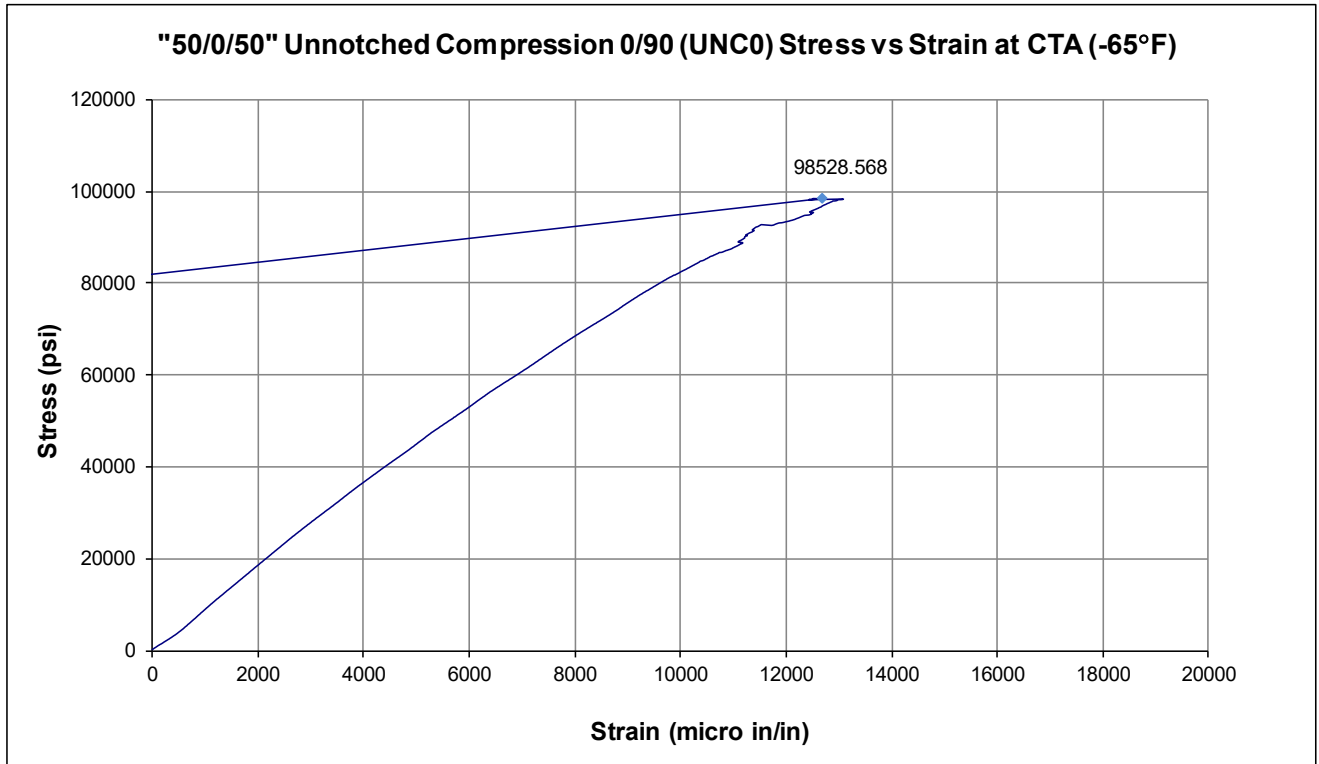
6.4 Transverse Compression (TC)

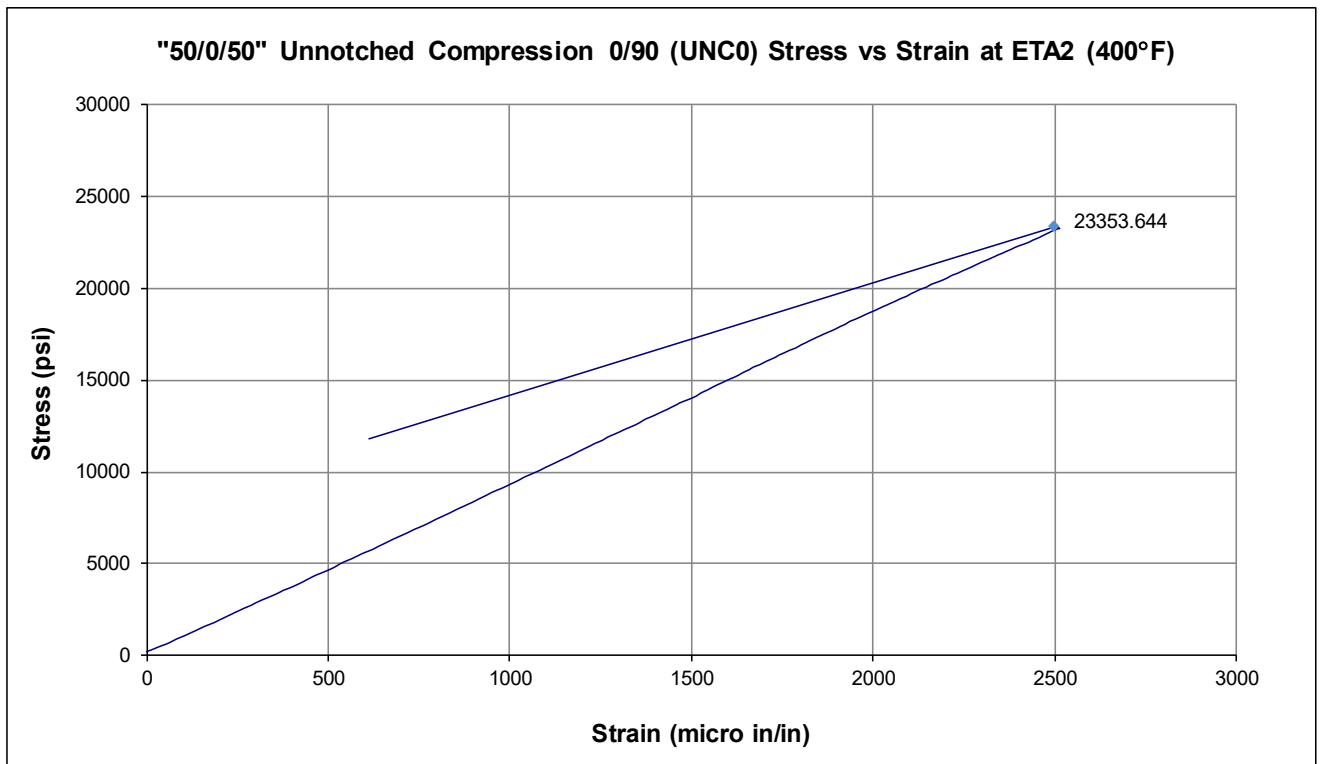
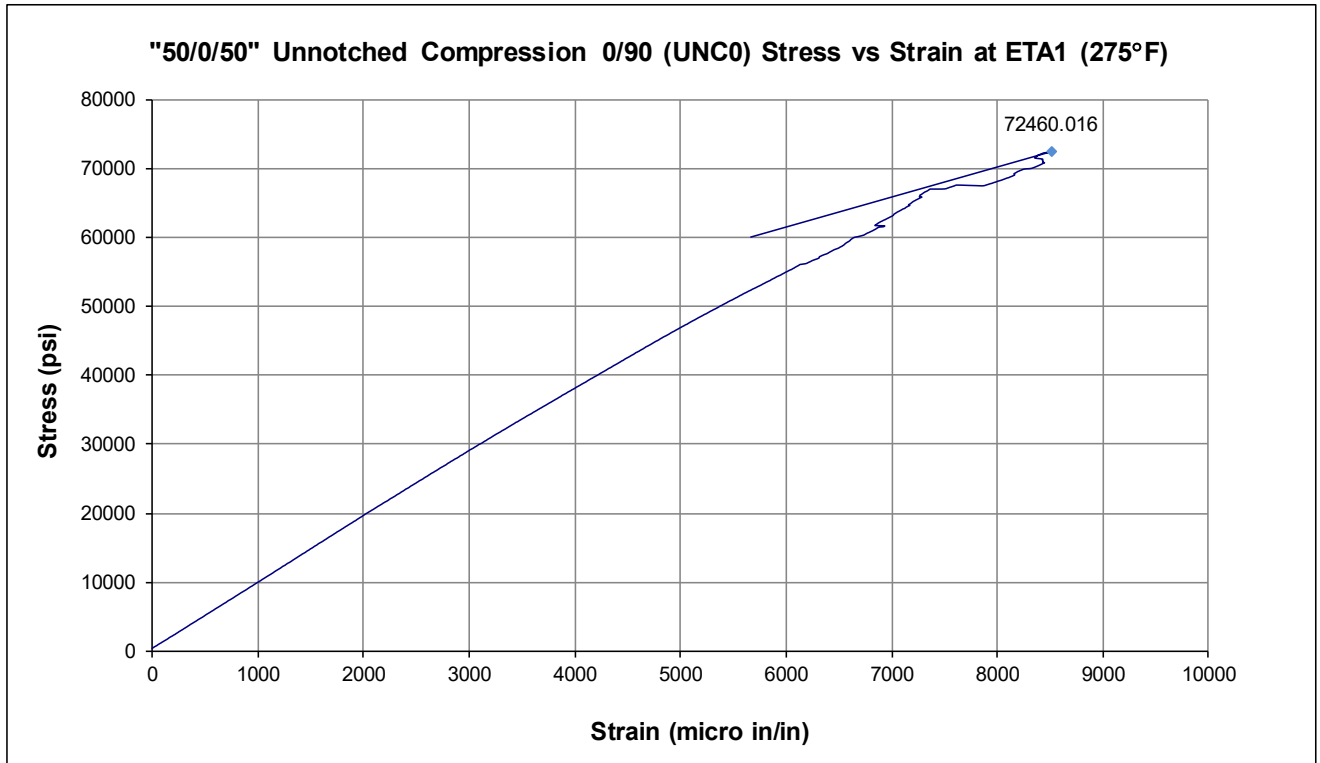


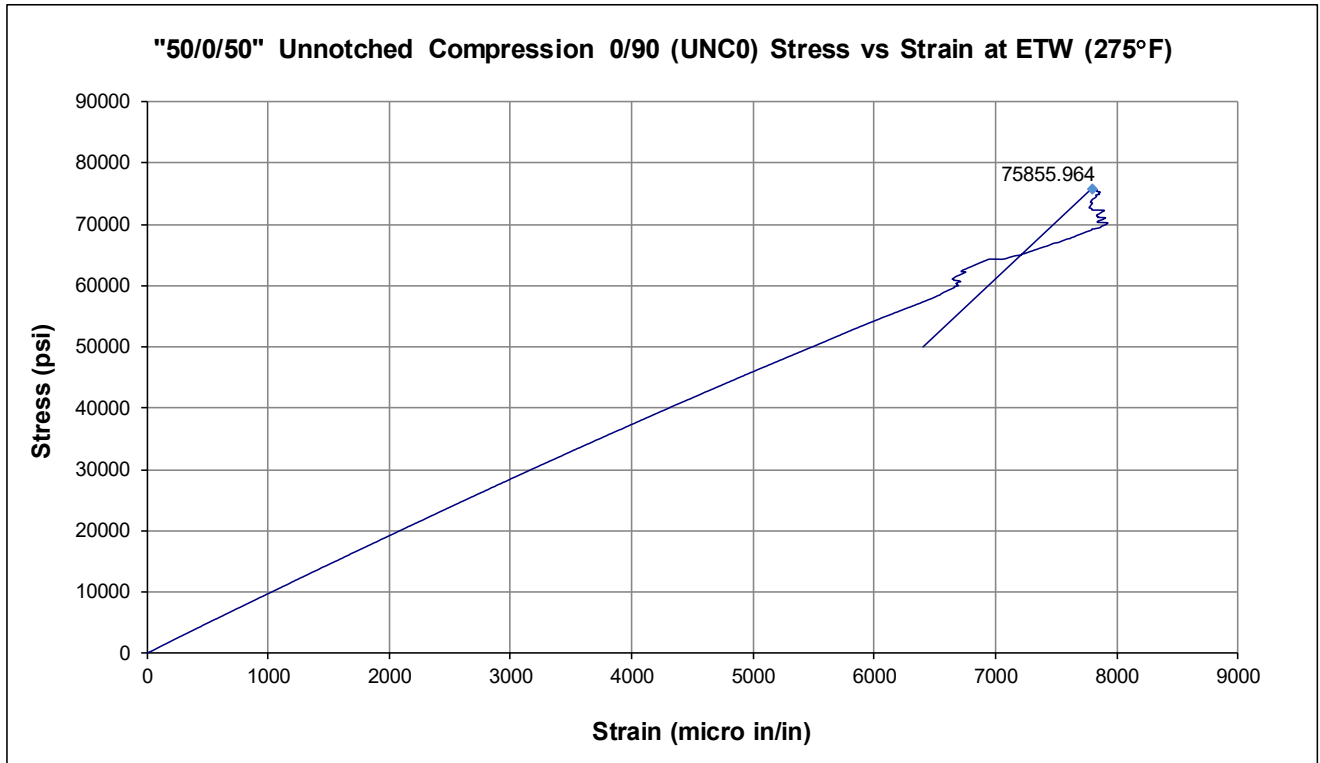




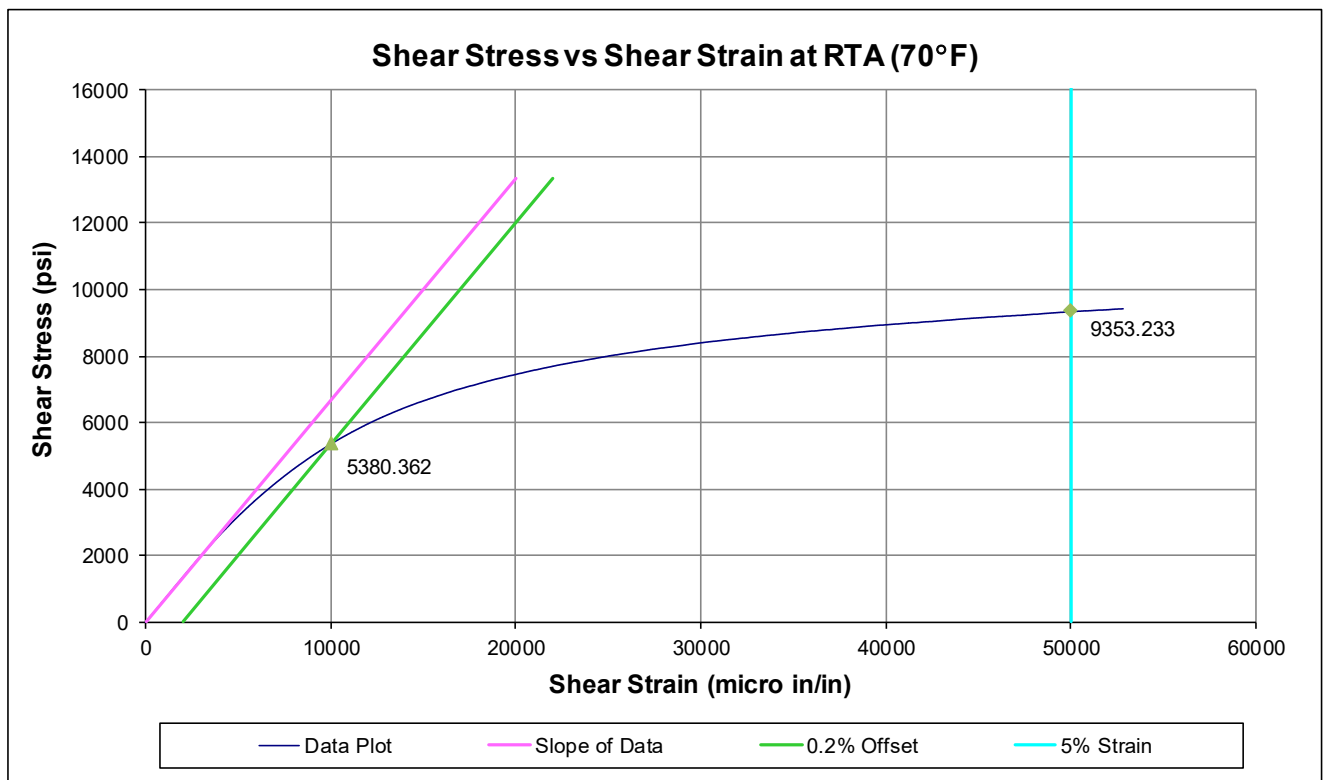
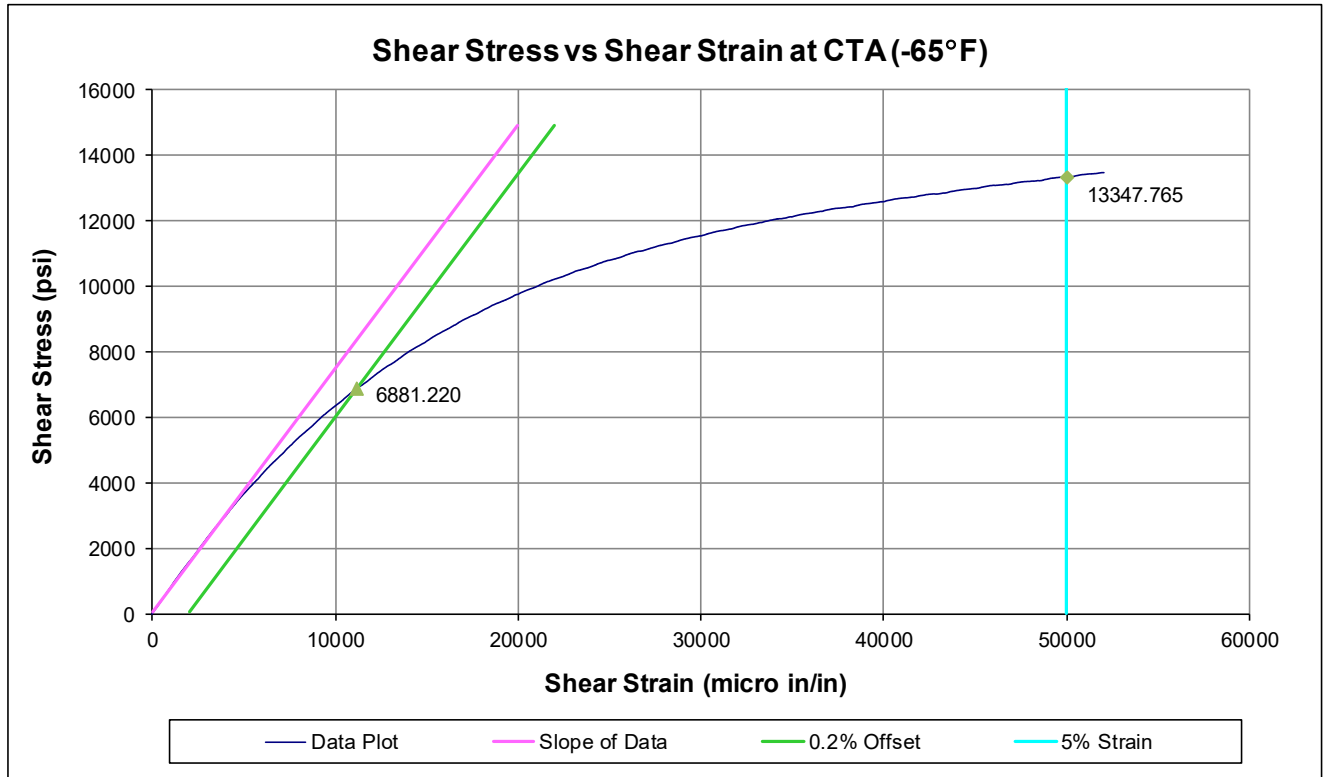
6.5 "50/0/50" Unnotched Compression 0/90 (UNC0)

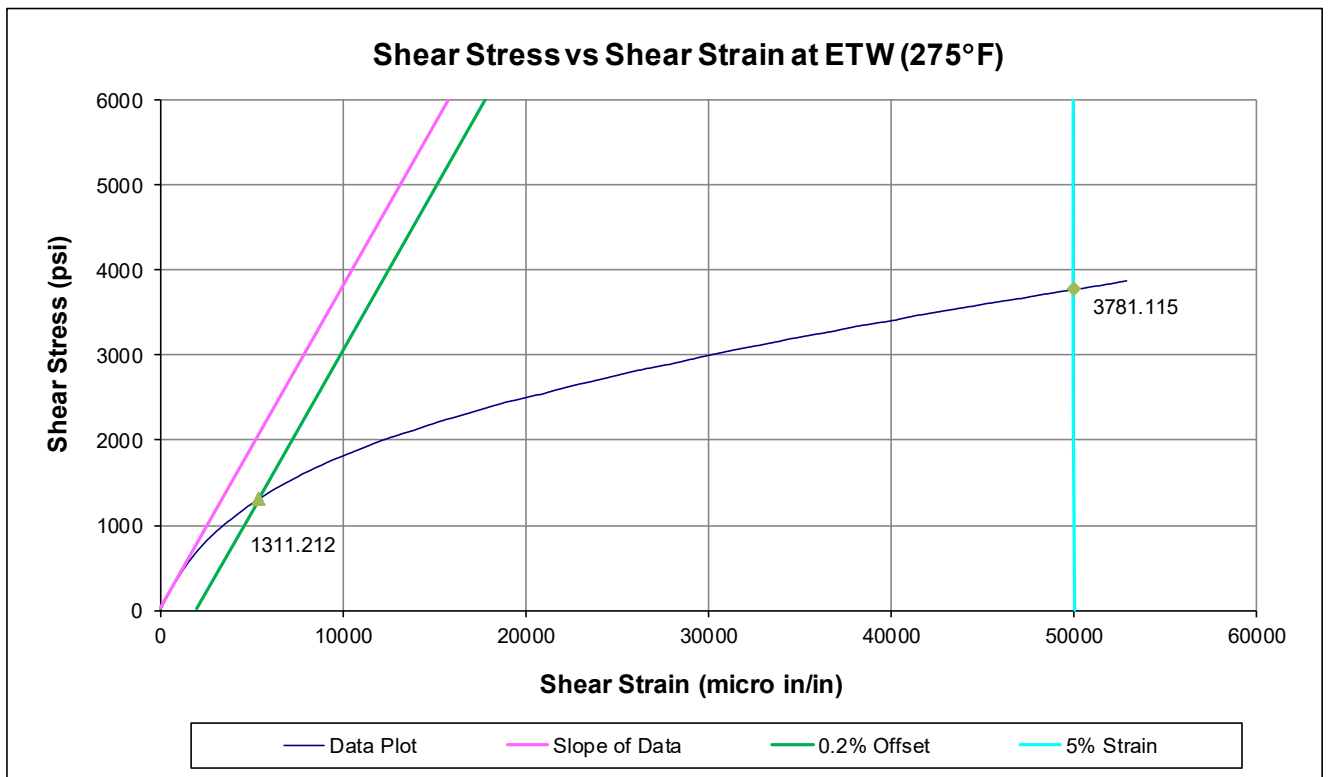
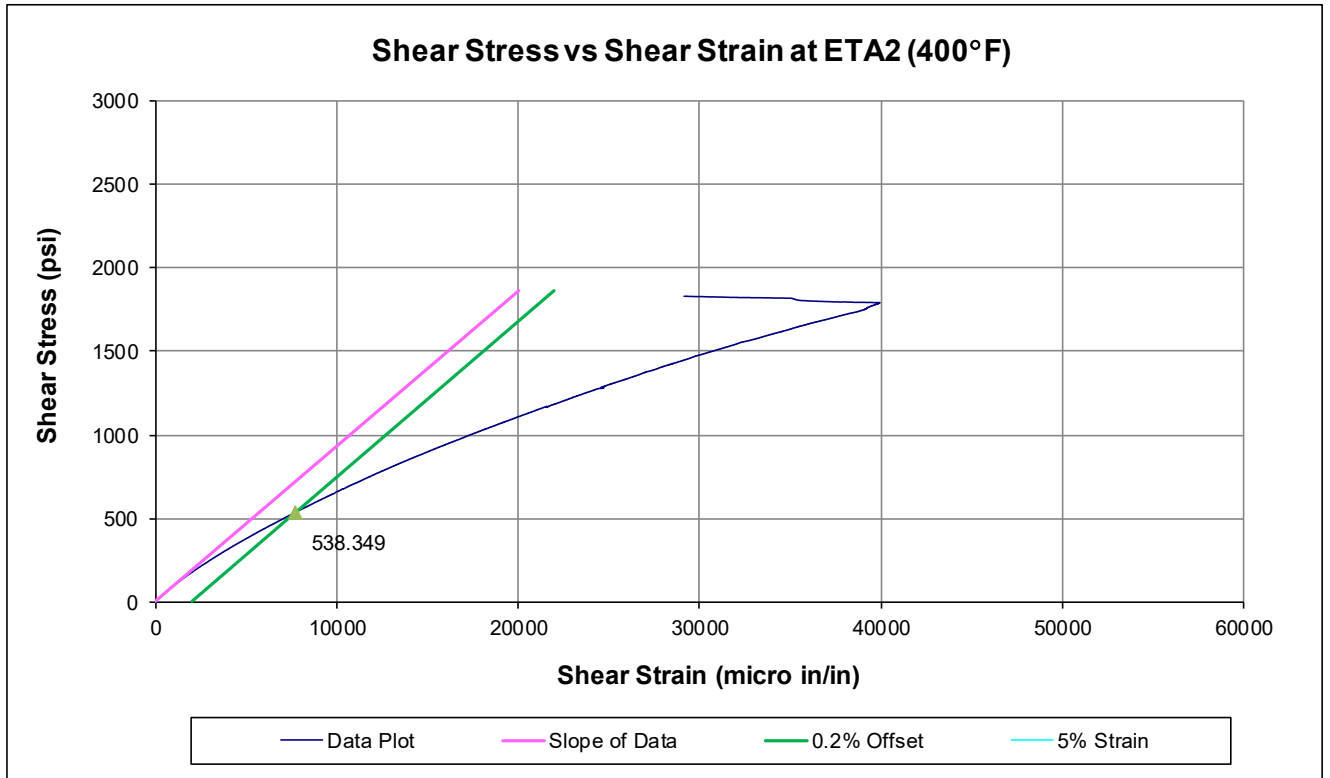




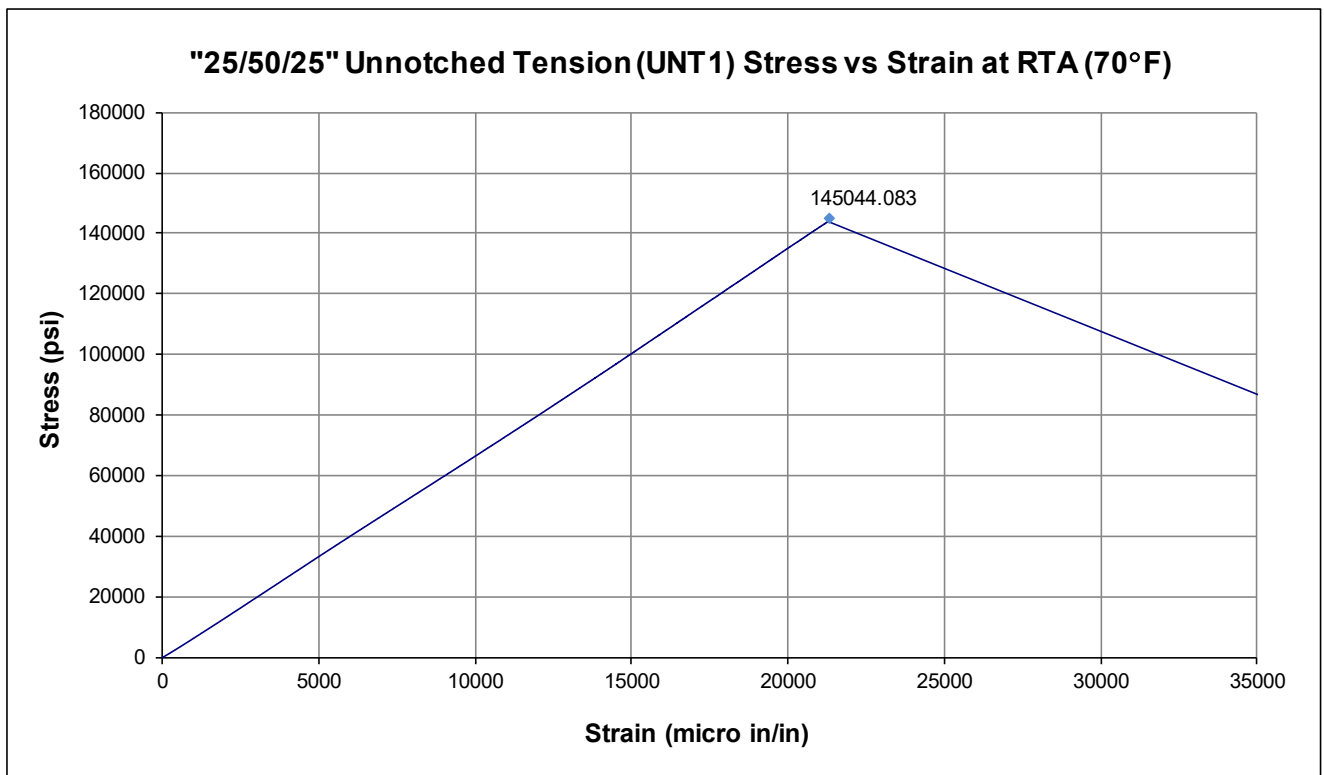
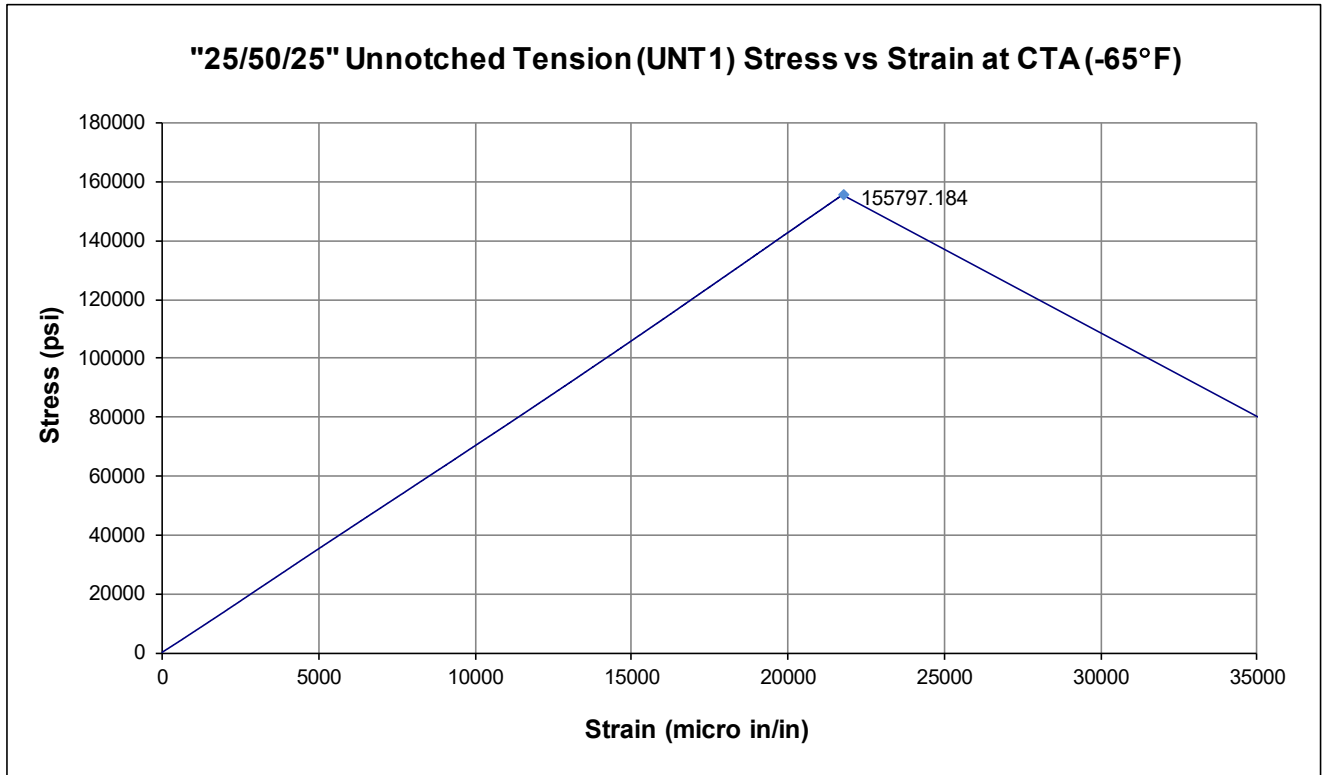


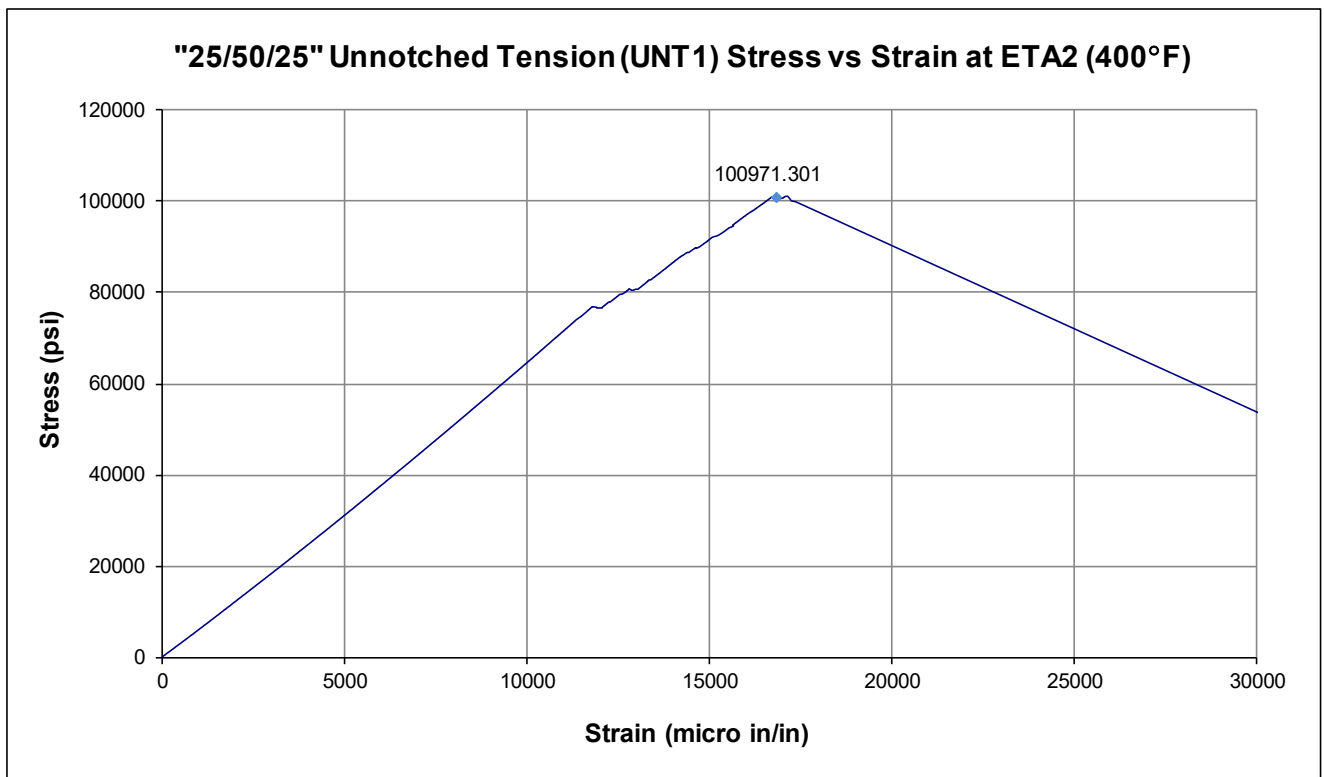
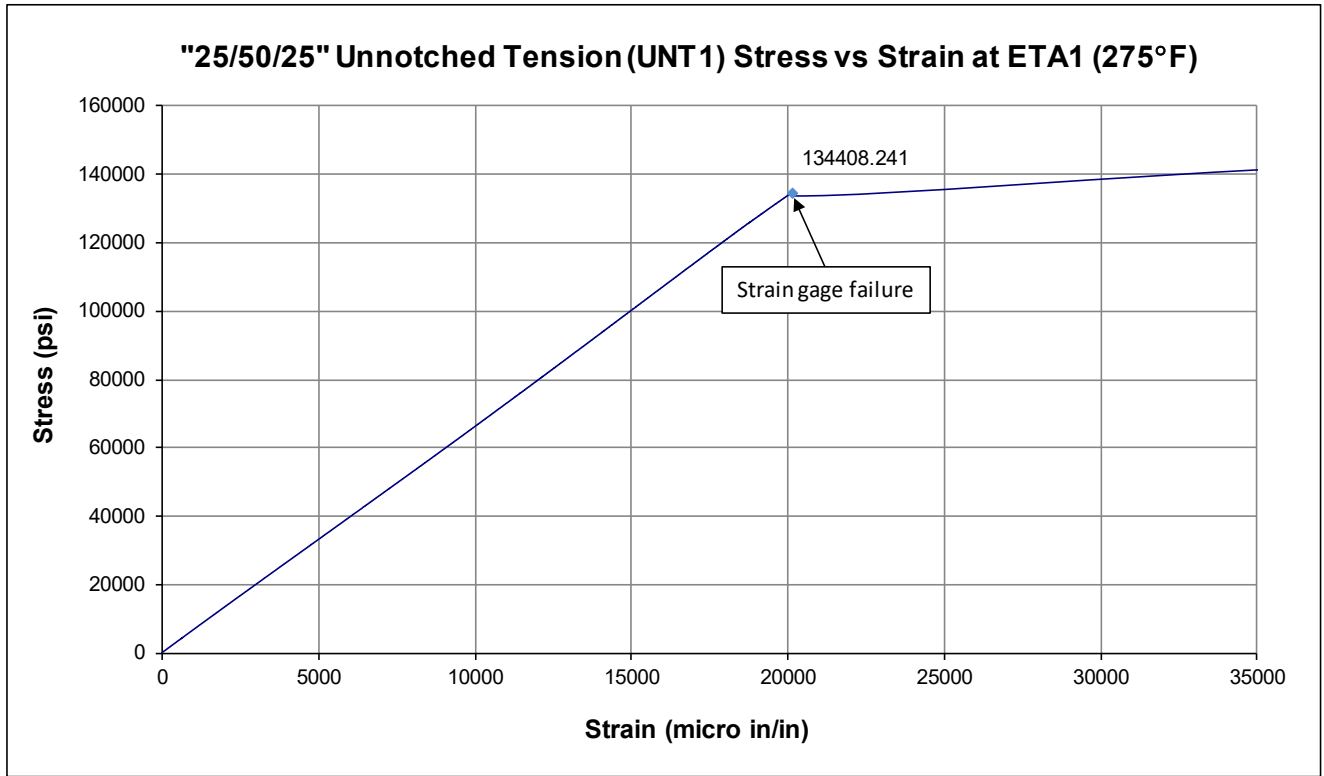
6.6 In-Plane Shear (IPS)

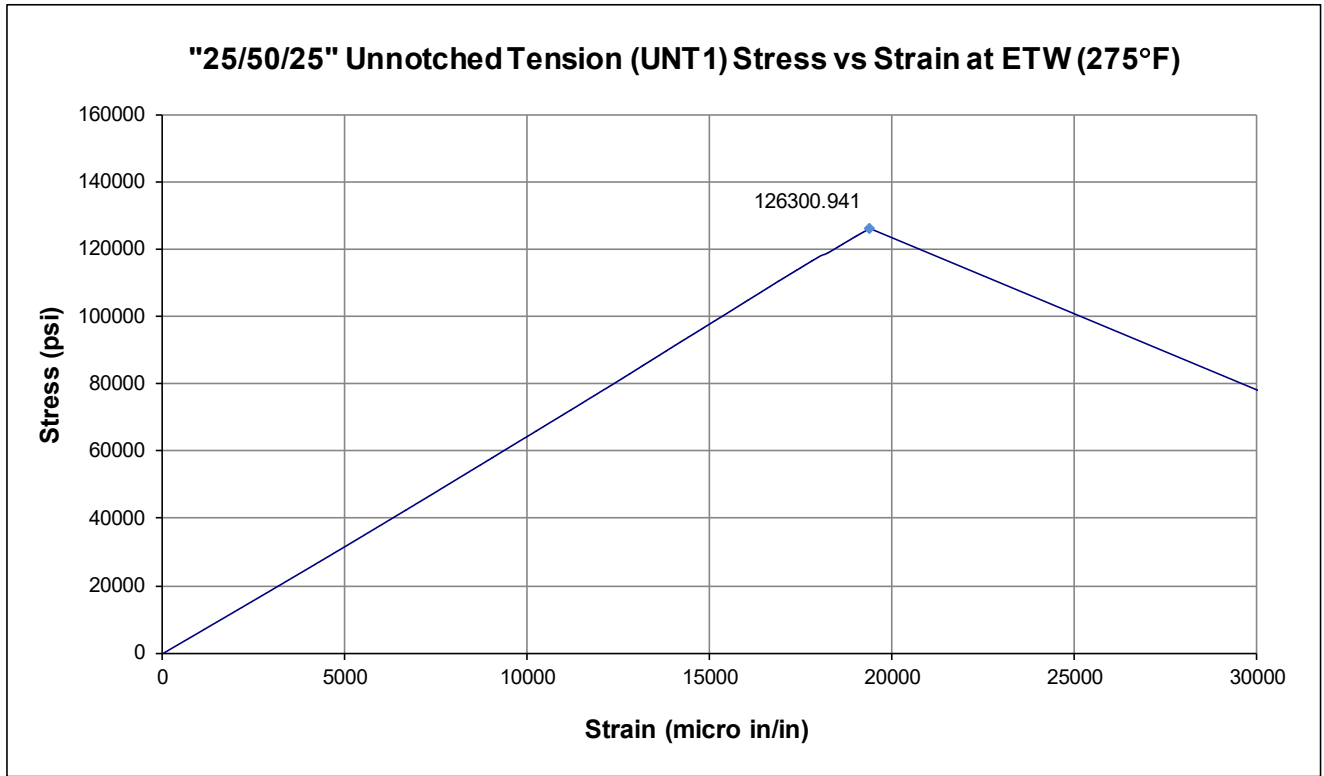




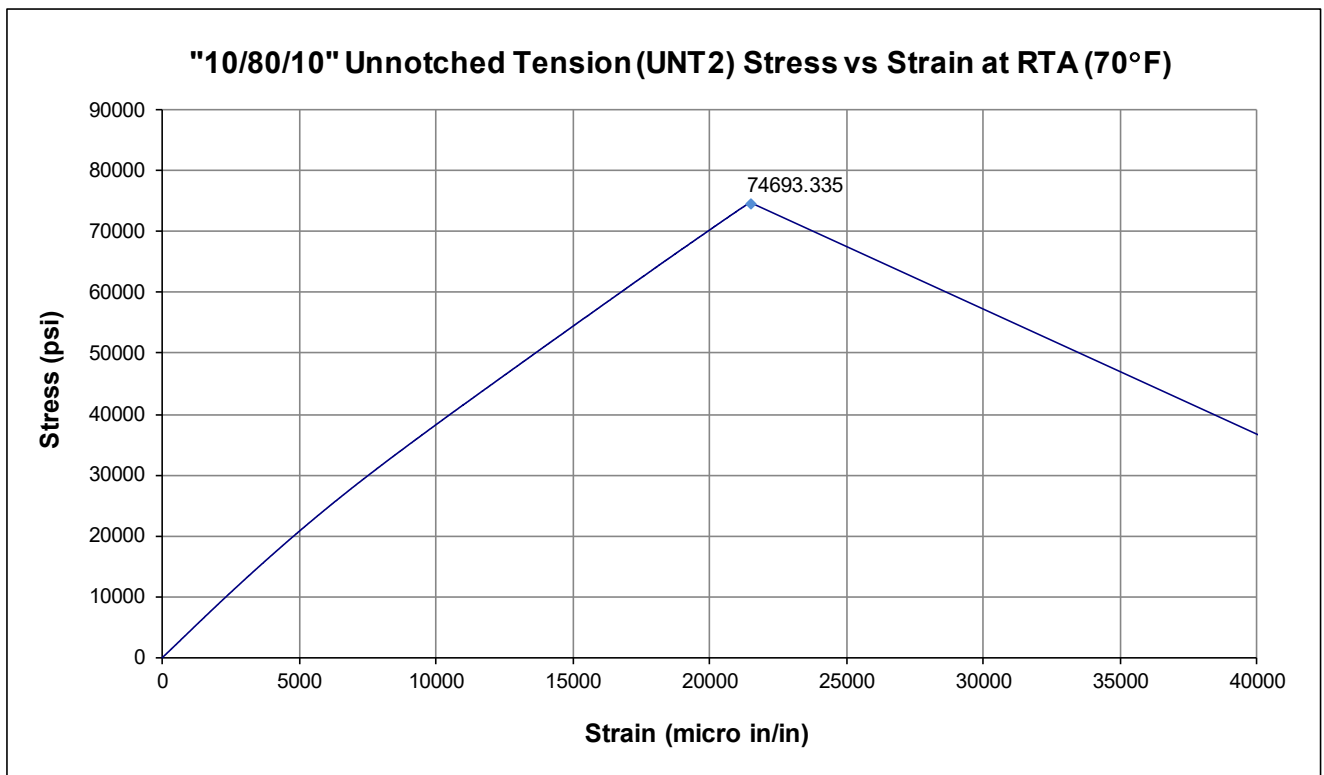
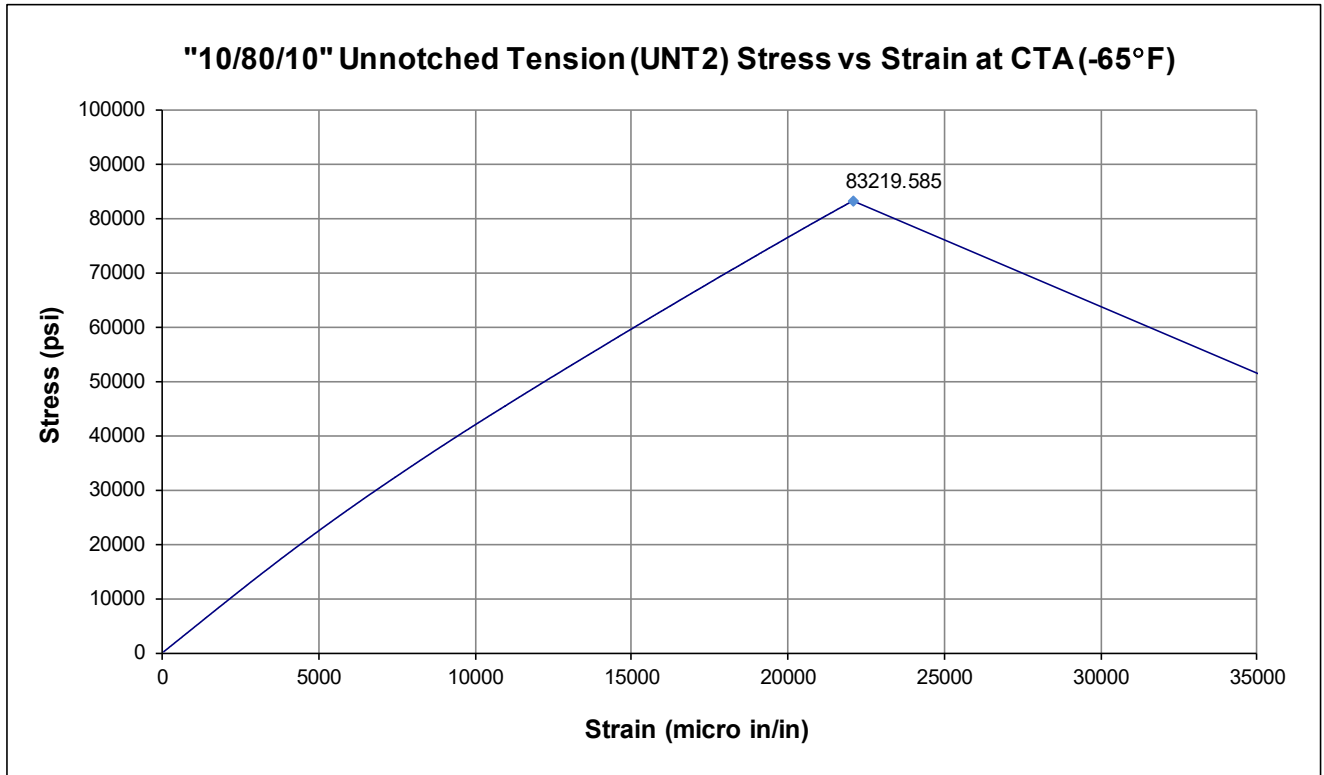
6.7 "25/50/25" Unnotched Tension (UNT1)

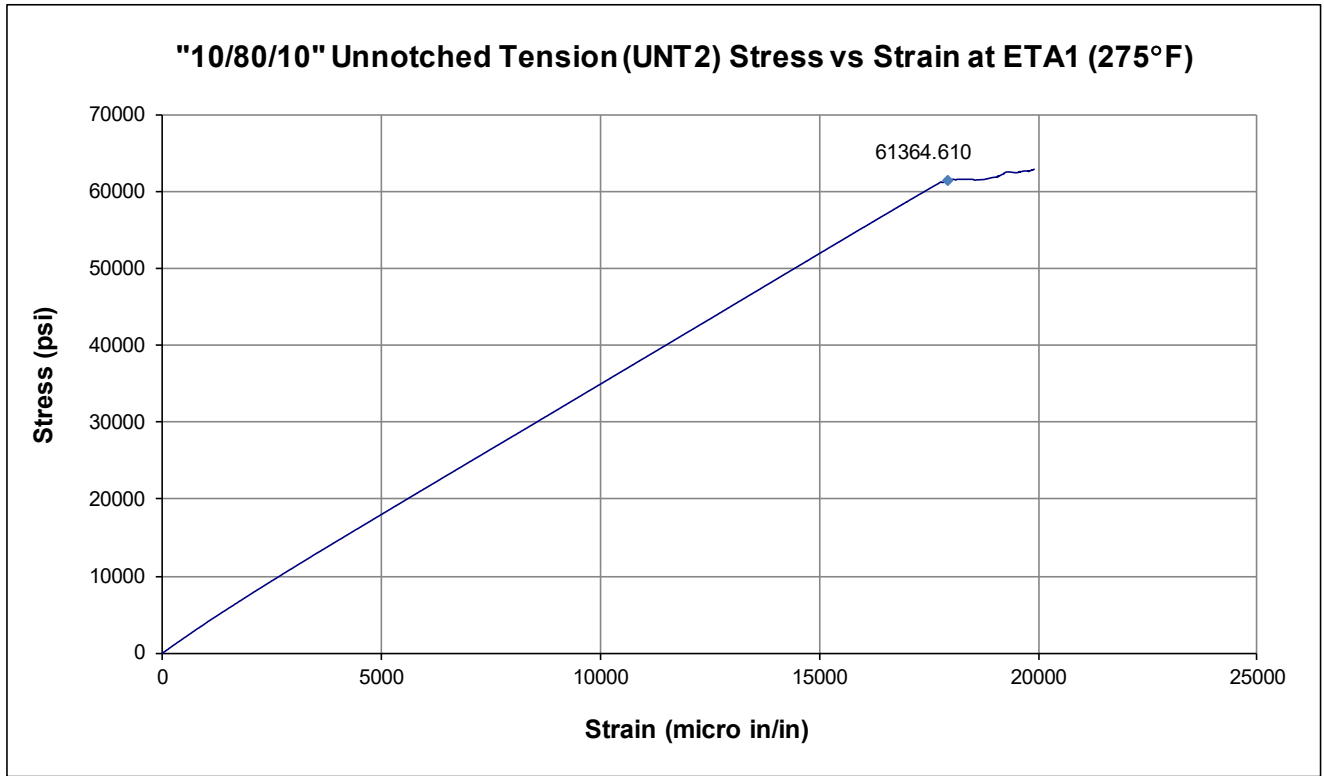




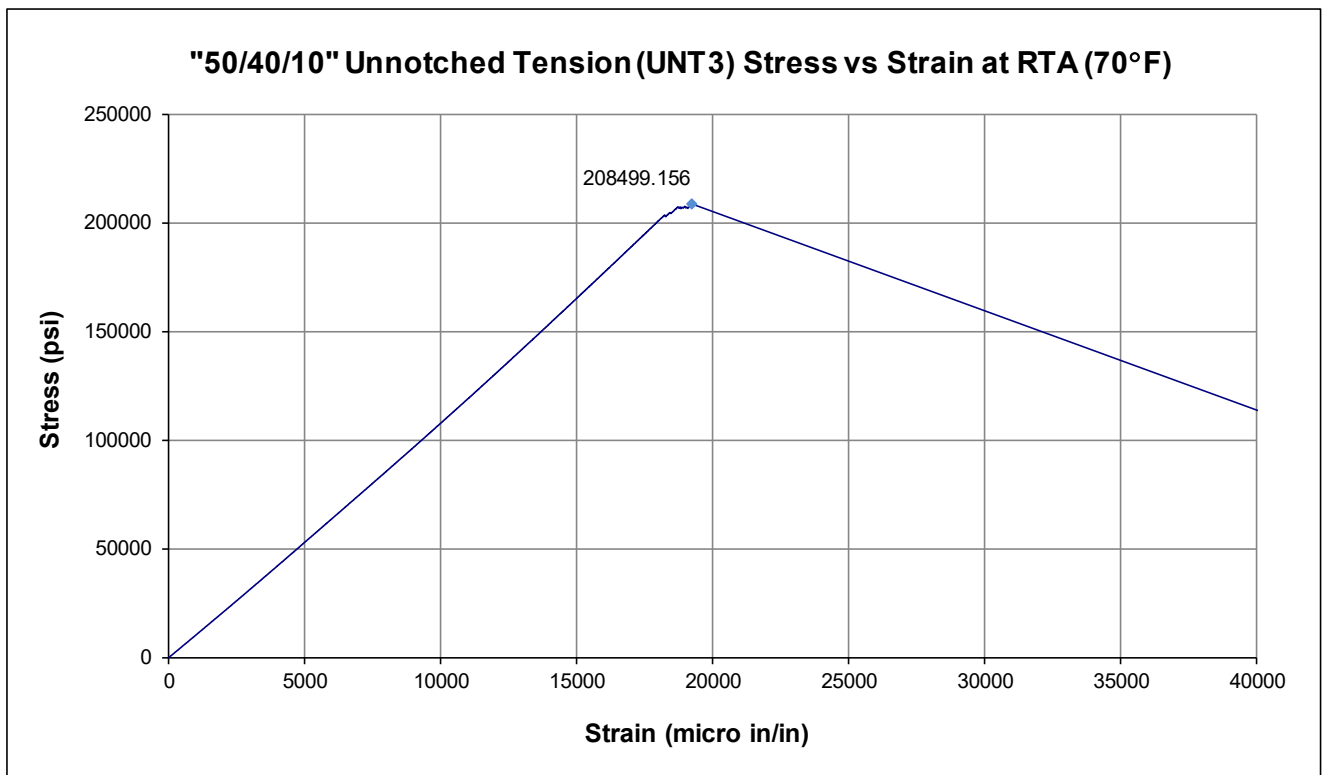
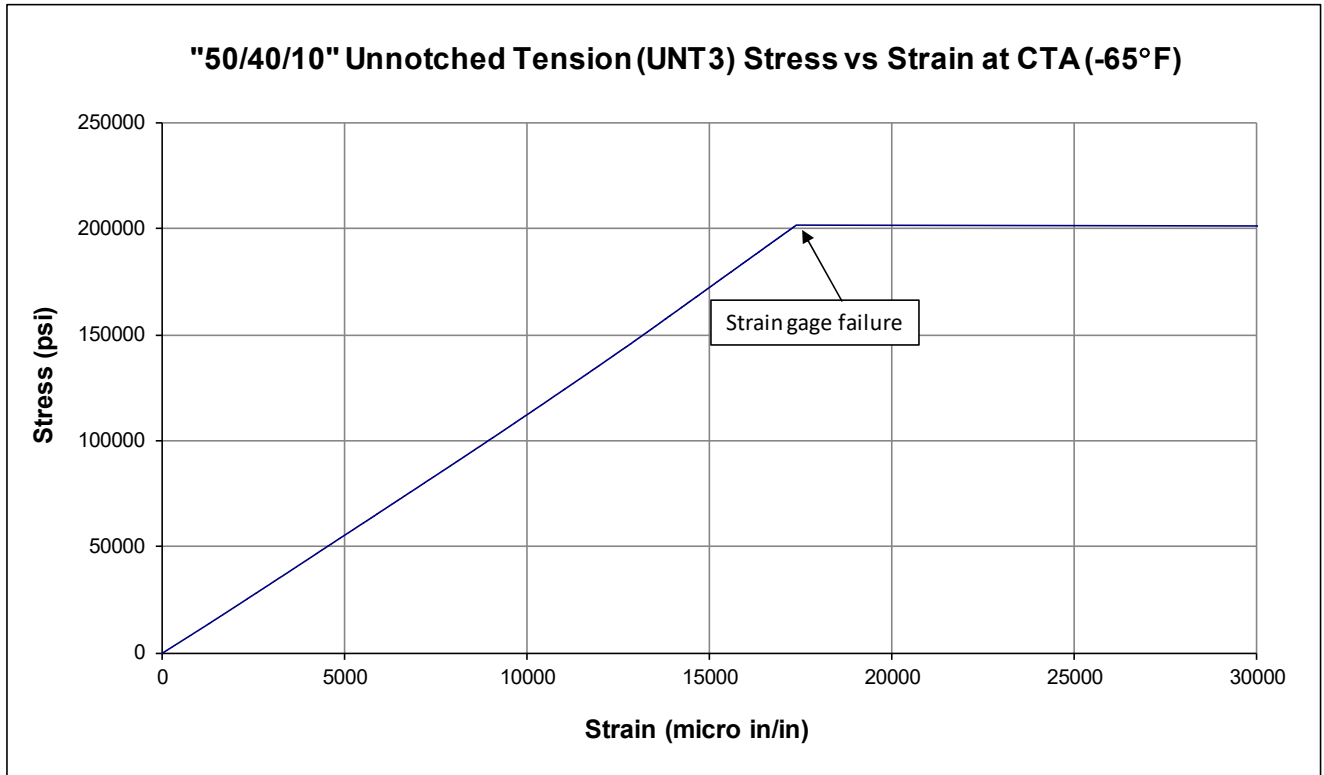


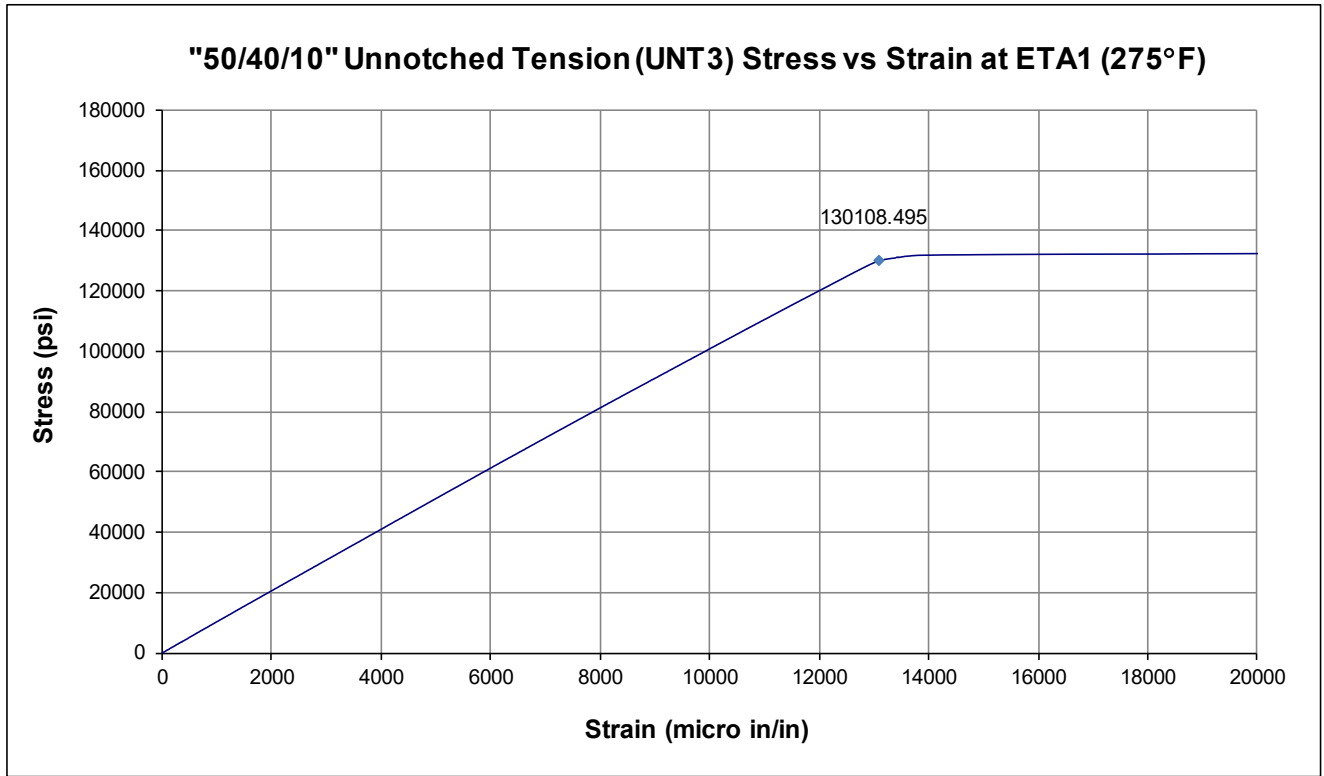
6.8 "10/80/10" Unnotched Tension (UNT2)



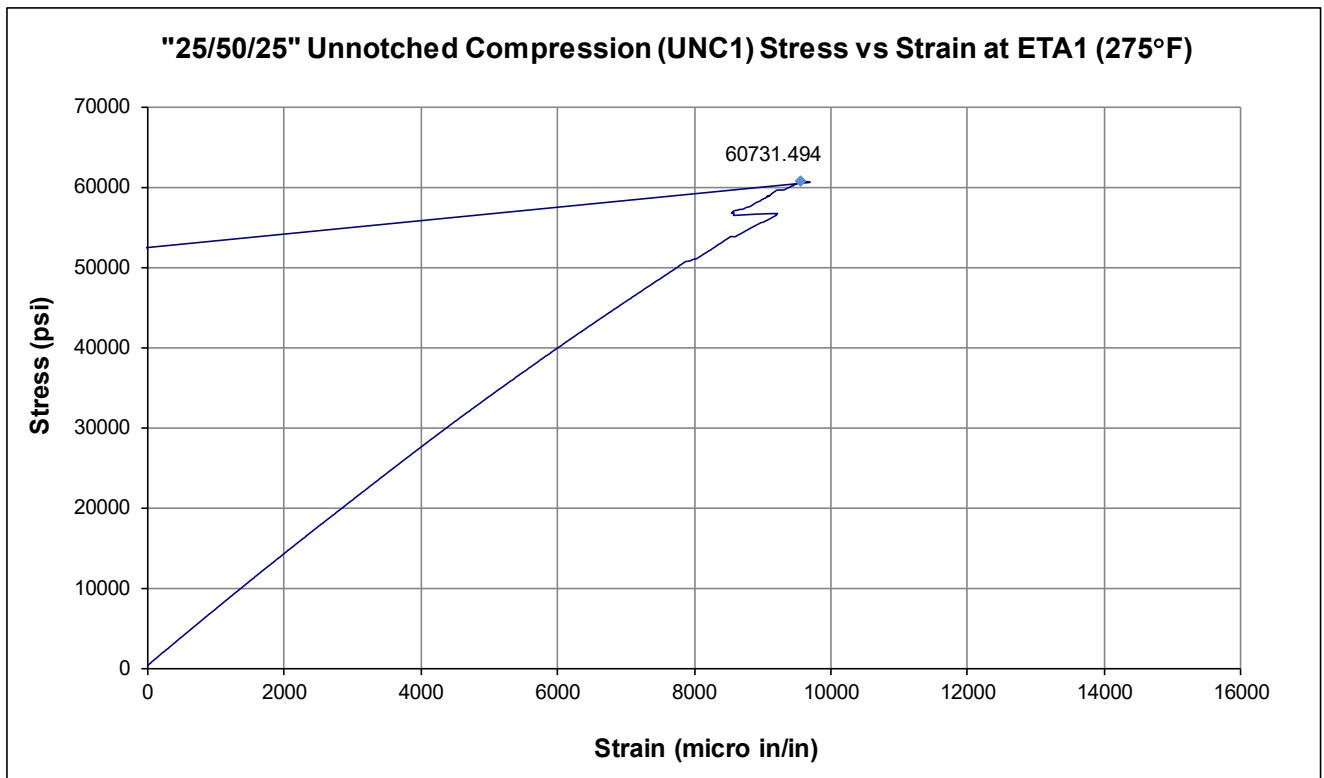
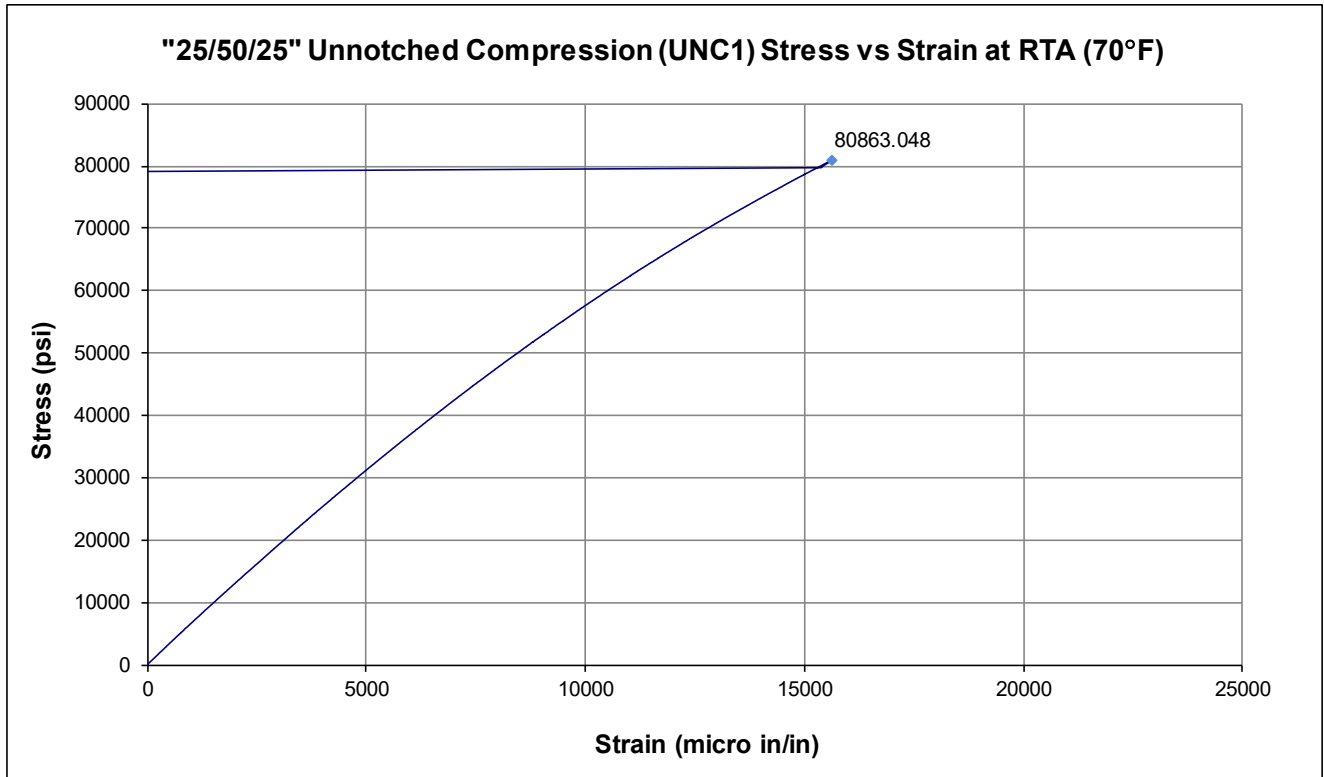


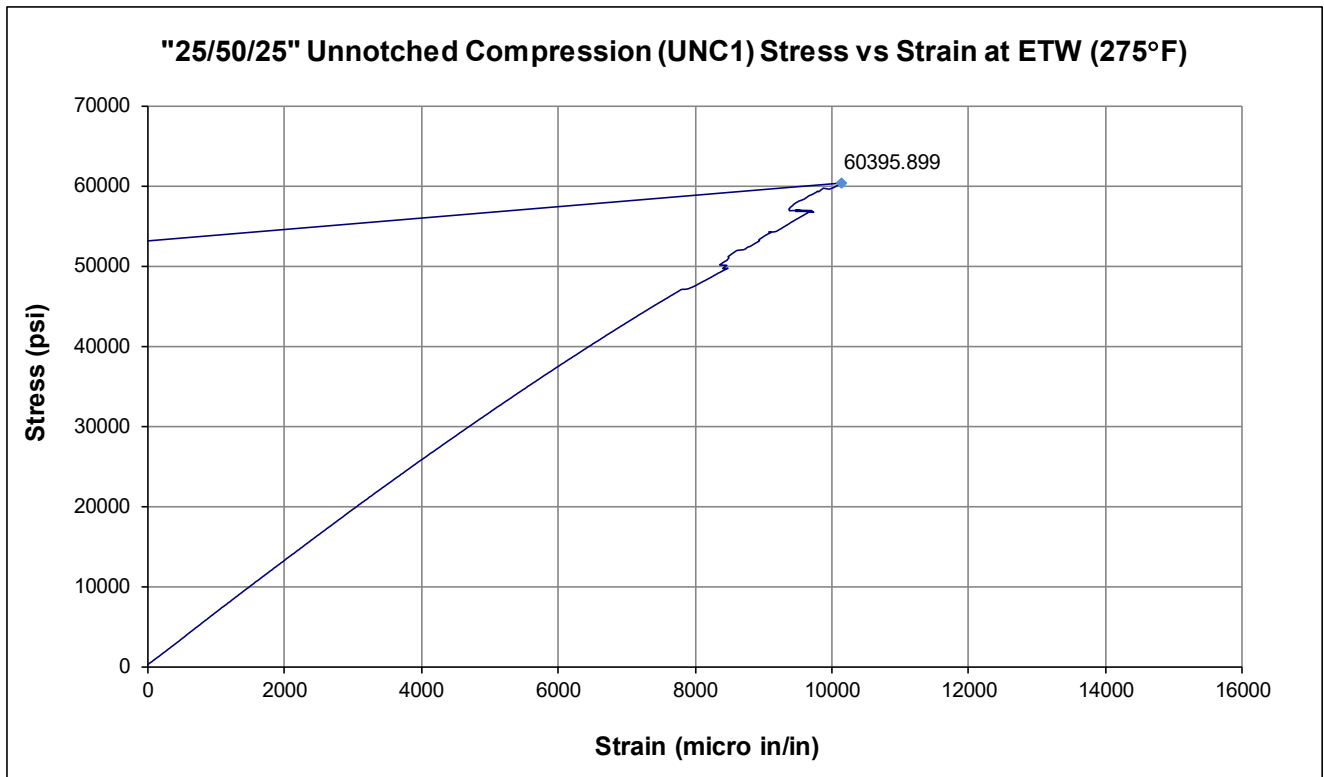
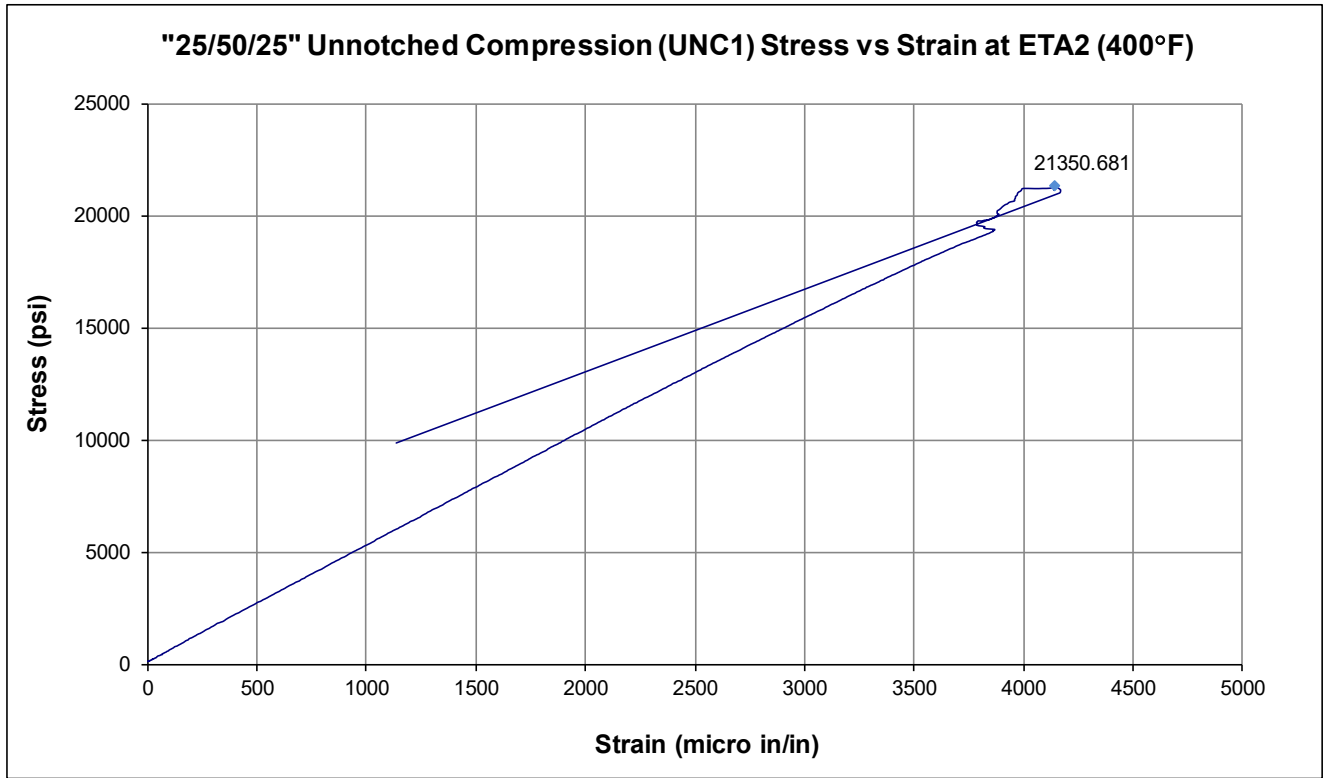
6.9 "50/40/10" Unnotched Tension (UNT3)



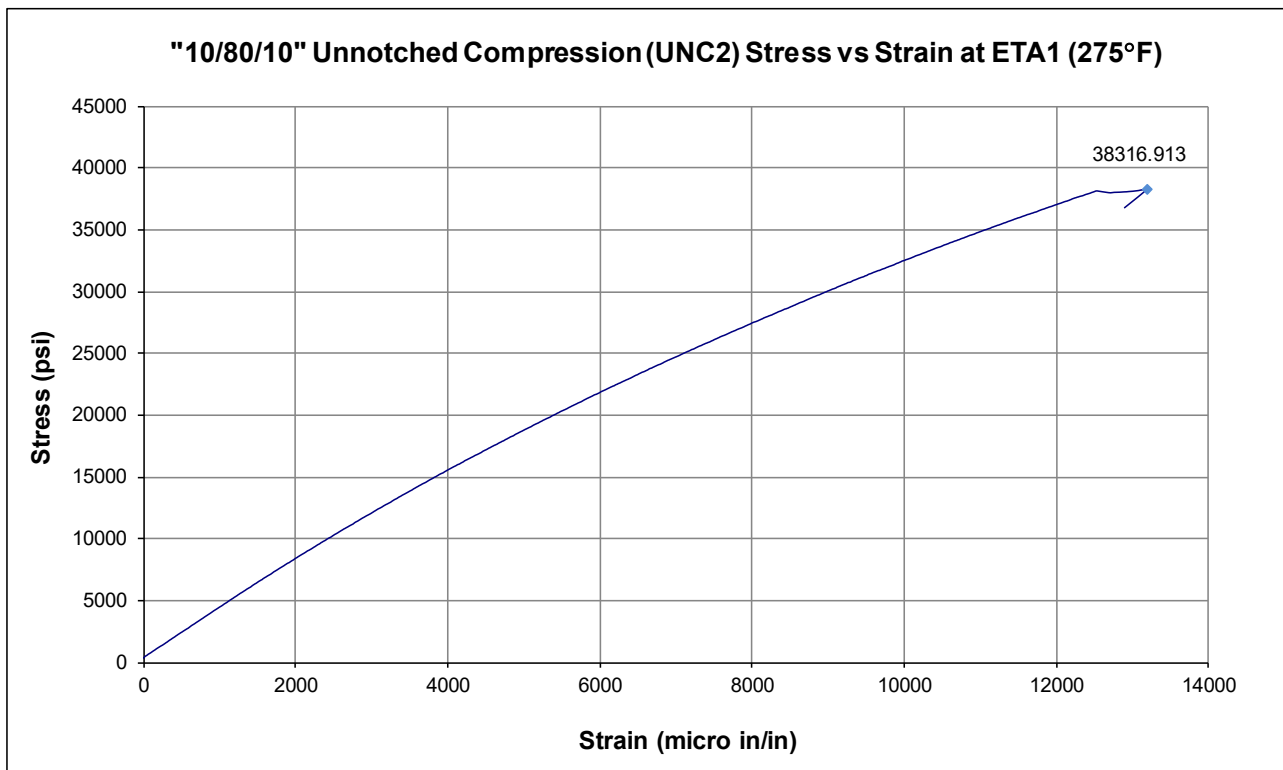
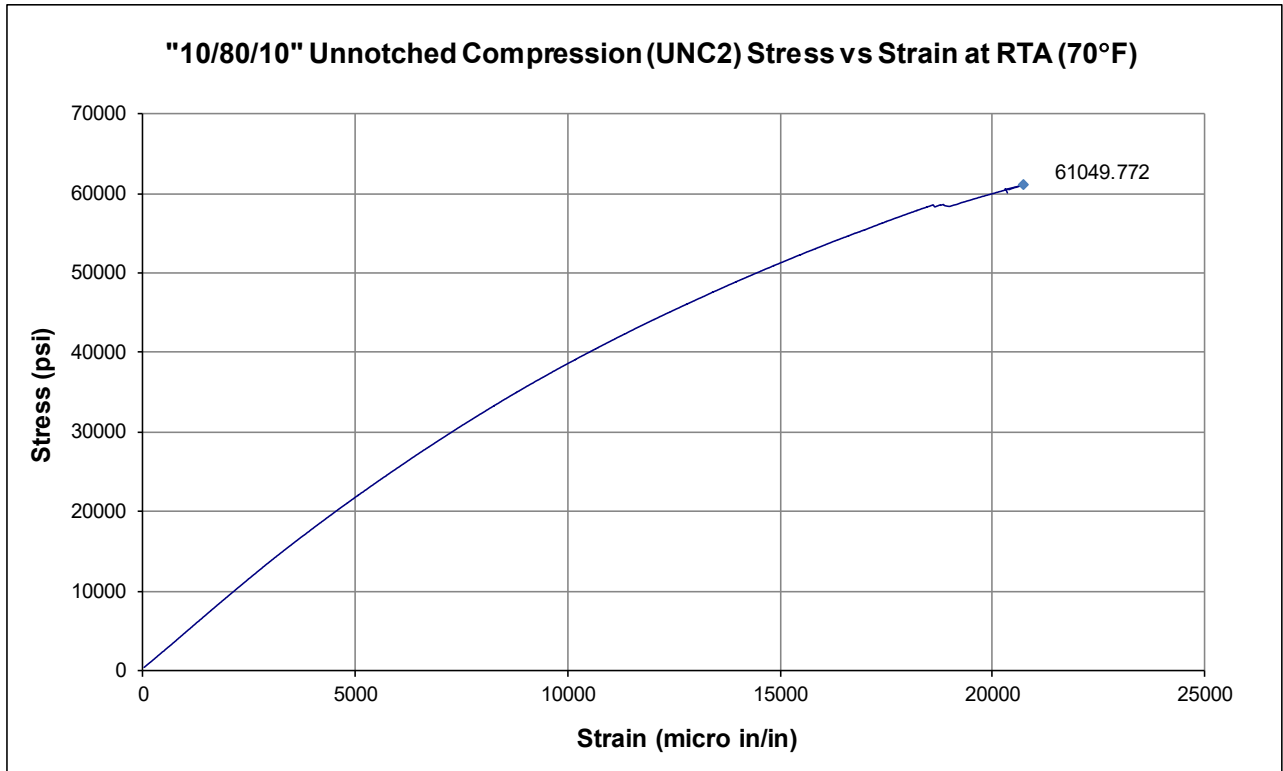


6.10 "25/50/25" Unnotched Compression (UNC1)

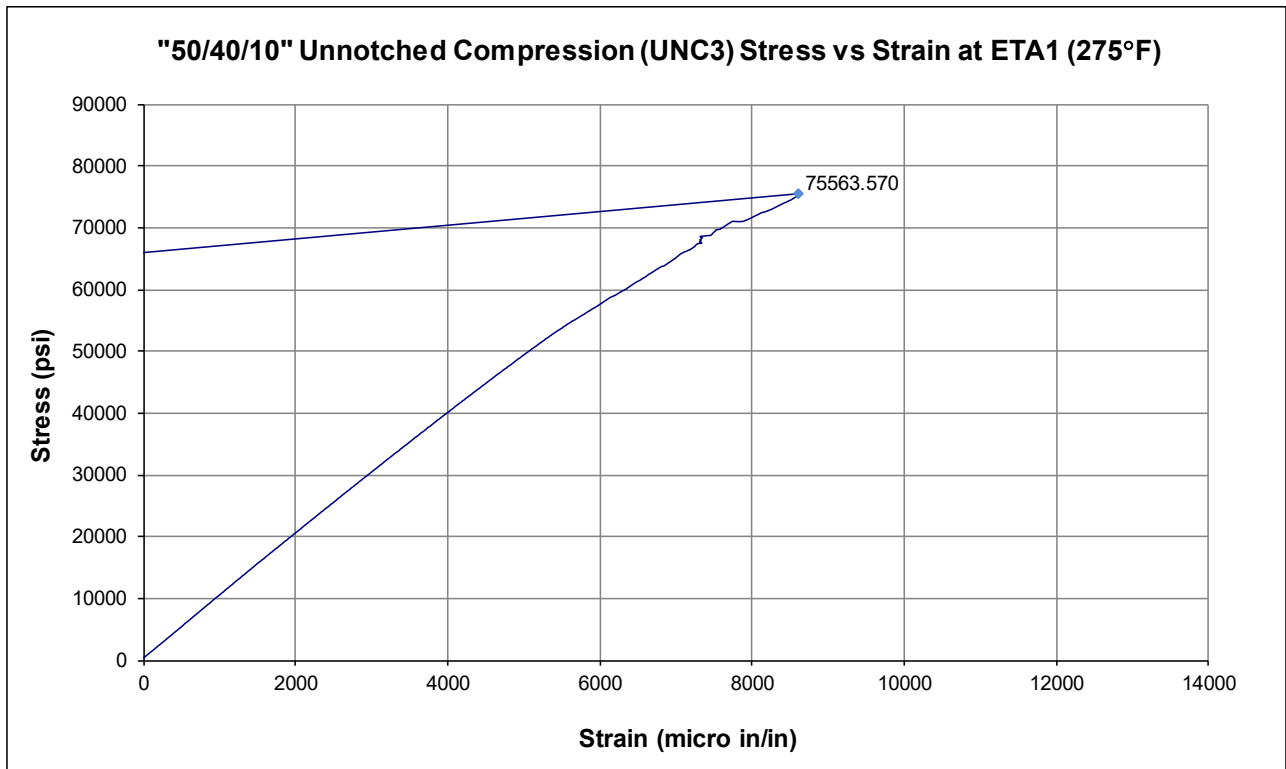
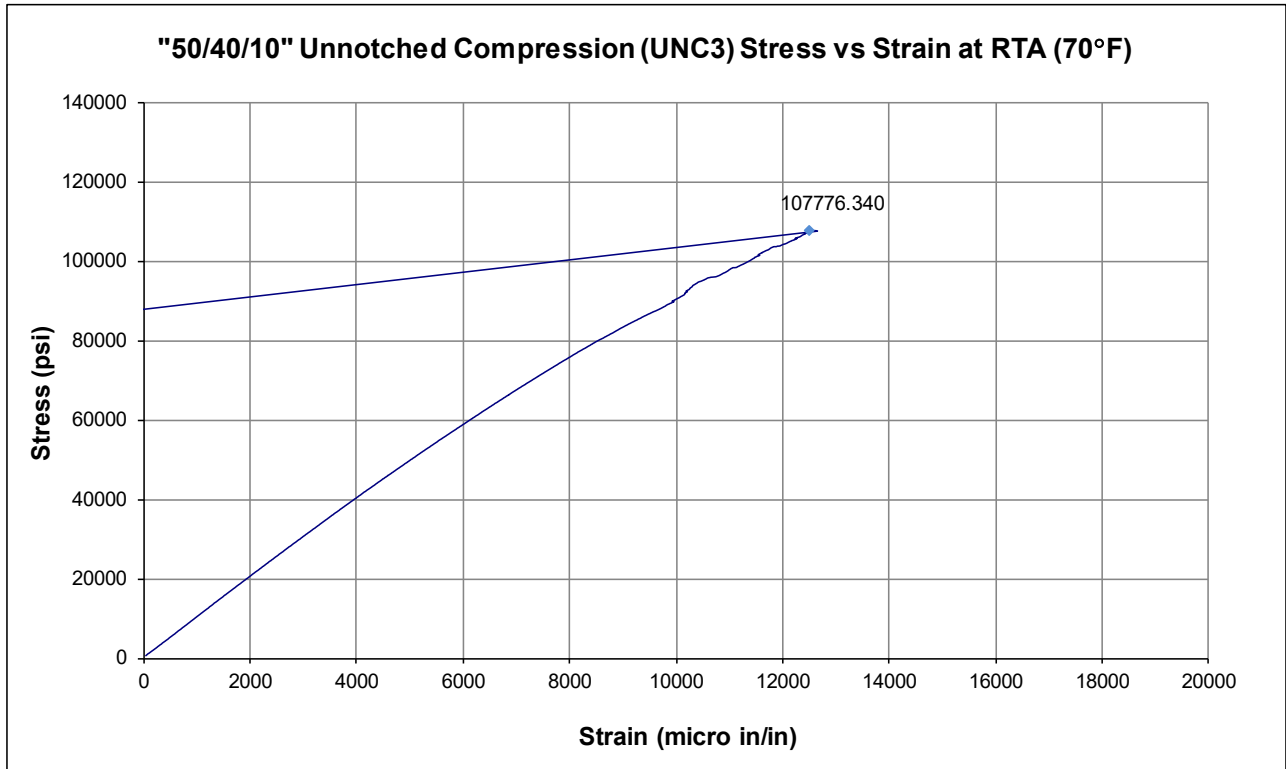




6.11 "10/80/10" Unnotched Compression (UNC2)



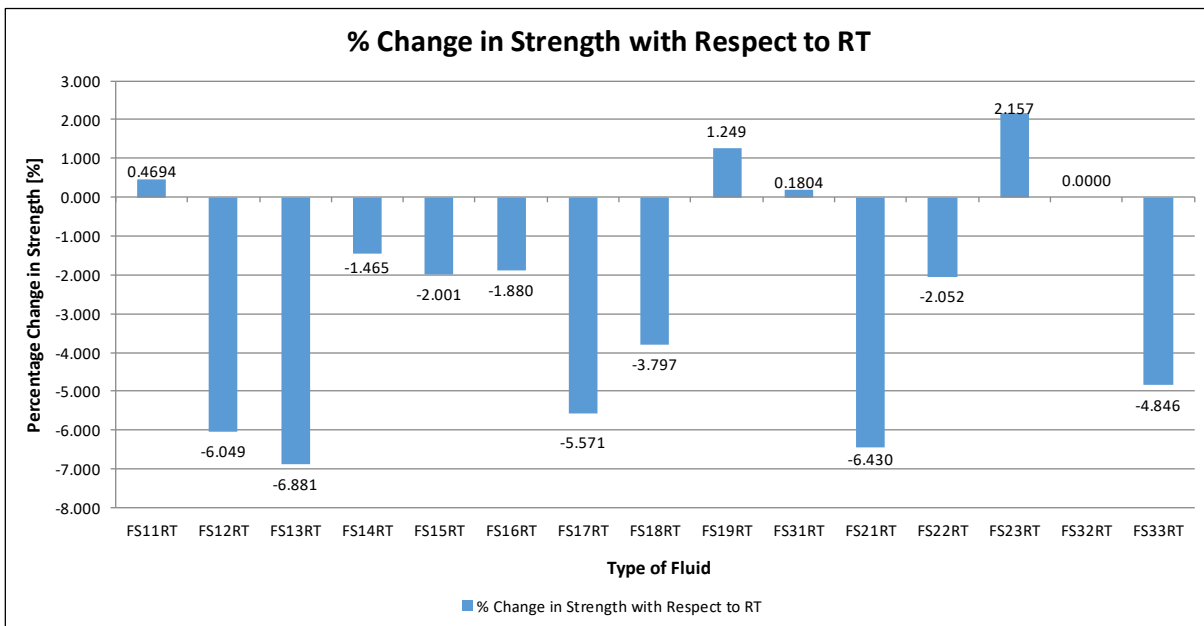
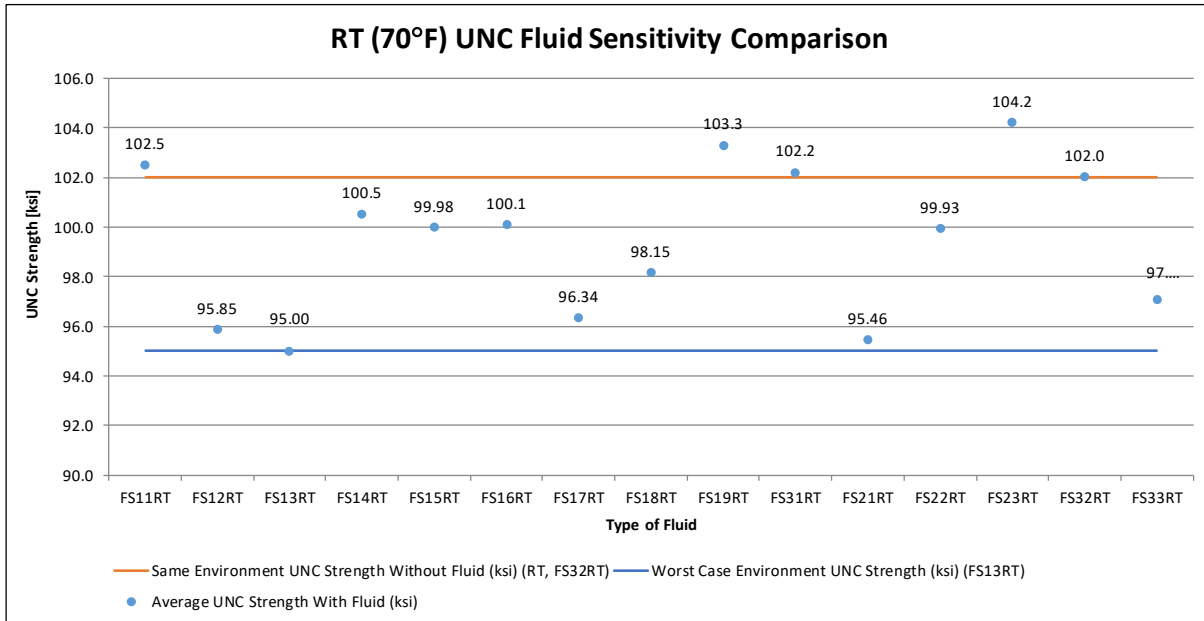
6.12 "50/40/10" Unnotched Compression (UNC3)



7 Fluid Sensitivity Comparison

7.1 Room Temperature Test Data

Code	Type of Fluid	Exposure
FS11RT	100 Low Lead Fuel	90 days min @ 70°F ± 10F
FS12RT	Jet A Fuel	
FS13RT	MIL-PRF-5606 Hydraulic Oil	
FS14RT	MIL-PRF-83282 Hydraulic Oil	
FS15RT	MIL-PRF-7808 Engine Oil	
FS16RT	MIL-PRF-23699 Engine Oil	
FS17RT	Salt Water	
FS18RT	Skydrol LD-4	
FS19RT	50% Water w/ 50% Skydrol	
FS31RT	Distilled Water	
FS21RT	MEK washing fluid	90 mins @ 70°F ± 10F
FS22RT	Polypropylene Glycol Deicer	
FS23RT	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F ± 10F
FS32RT	Dry	Per section 6.1 Test Plan
FS33RT	85% Relative Humidity	

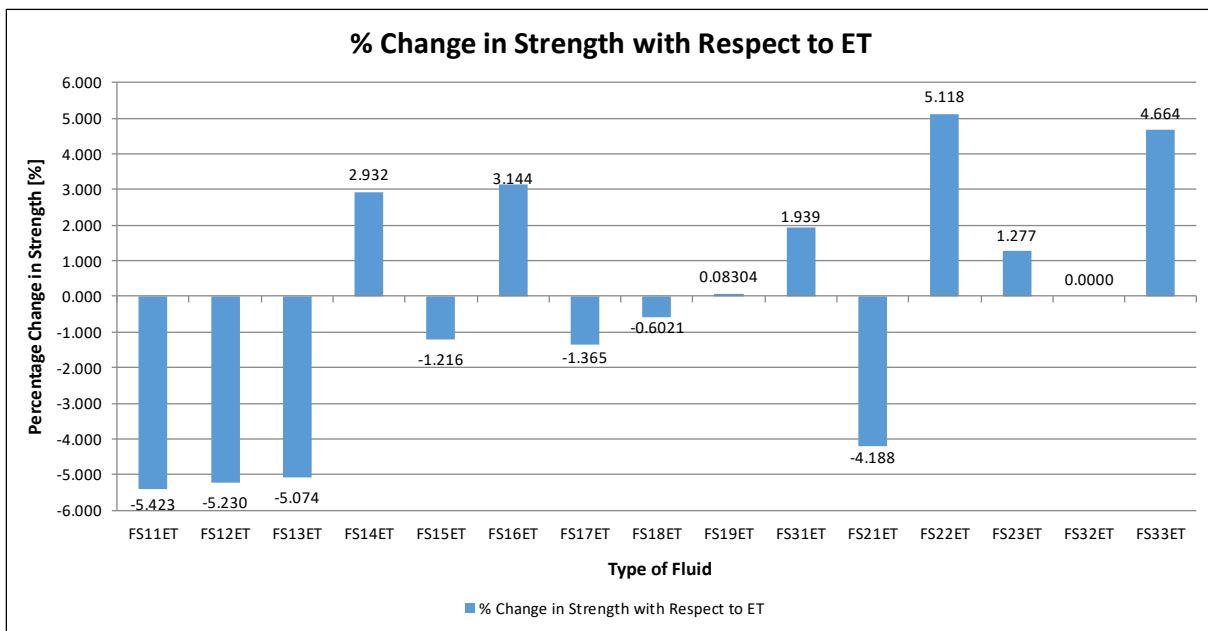
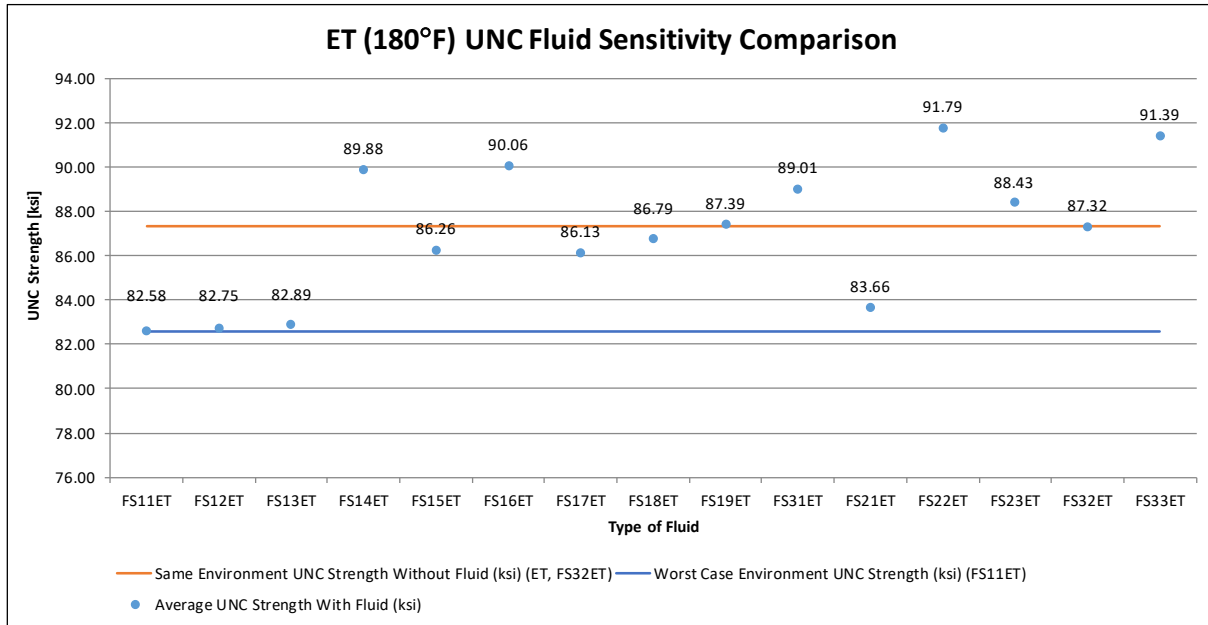


Fluid Sensitivity Screening
Un-Notched Compression 0/90 Properties (FSUNC)--RT (70°F) Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

Fluid Code	Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksj]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode	Average
FS11RT	TCARA111FS11RT	1	C1	1	1	100.3	0.08653	16	0.0054	BAT	102.5
	TCARA112FS11RT	1	C1	1	1	104.7	0.08753	16	0.0055	BAB	
	TCARA113FS11RT	1	C1	1	1	104.7	0.08460	16	0.0053	M(B,H)AT	
	TCARA114FS11RT	1	C1	1	1	100.3	0.08472	16	0.0053	HAT, HAB	
FS12RT	TCARA111FS12RT	1	C1	1	1	92.29	0.08472	16	0.0053	BGM, HAT	95.85
	TCARA112FS12RT	1	C1	1	1	86.06	0.08527	16	0.0053	BGM	
	TCARA113FS12RT	1	C1	1	1	101.1	0.08737	16	0.0055	M(B,H)AT	
	TCARA114FS12RT	1	C1	1	1	104.0	0.08513	16	0.0053	BGM	
FS13RT	TCARA212FS13RT	1	C2	1	1	101.7	0.08538	16	0.0053	BAB	95.00
	TCARA213FS13RT	1	C2	1	1	94.67	0.08372	16	0.0052	BAT	
	TCARA214FS13RT	1	C2	1	1	92.72	0.08337	16	0.0052	BAB	
	TCARA215FS13RT	1	C2	1	1	90.91	0.08355	16	0.0052	BAT	
FS14RT	TCARB111FS14RT	1	C1	2	1	94.43	0.08548	16	0.0053	BAB	100.5
	TCARB112FS14RT	1	C1	2	1	101.6	0.08352	16	0.0052	M(B,H)AT	
	TCARB113FS14RT	1	C1	2	1	104.9	0.08447	16	0.0053	M(B,H)AB	
	TCARB114FS14RT	1	C1	2	1	101.2	0.08448	16	0.0053	M(B,H)AT	
FS15RT	TCARB111FS15RT	1	C1	2	1	99.17	0.08282	16	0.0052	BGM	99.98
	TCARB112FS15RT	1	C1	2	1	101.8	0.08288	16	0.0052	BAT	
	TCARB113FS15RT	1	C1	2	1	98.79	0.08360	16	0.0052	BAT	
	TCARB114FS15RT	1	C1	2	1	100.1	0.08423	16	0.0053	BGM	
FS16RT	TCARB111FS16RT	1	C1	2	1	97.65	0.08317	16	0.0052	BGM	100.1
	TCARB112FS16RT	1	C1	2	1	102.1	0.08367	16	0.0052	BAB	
	TCARB113FS16RT	1	C1	2	1	99.84	0.08382	16	0.0052	M(B,H)AB	
	TCARB114FS16RT	1	C1	2	1	100.8	0.08302	16	0.0052	M(B,H)AB	
FS17RT	TCARB211FS17RT	1	C2	2	1	94.15	0.08455	16	0.0053	M(B,H)AT	96.34
	TCARB212FS17RT	1	C2	2	1	94.66	0.08522	16	0.0053	BAT	
	TCARB213FS17RT	1	C2	2	1	99.21	0.08512	16	0.0053	M(B,H)AB	
	TCARB214FS17RT	1	C2	2	1	97.34	0.08405	16	0.0053	BAT	
FS18RT	TCARB211FS18RT	1	C2	2	1	98.85	0.08500	16	0.0053	BAT	98.15
	TCARB212FS18RT	1	C2	2	1	89.76	0.08413	16	0.0053	BAB	
	TCARB213FS18RT	1	C2	2	1	104.1	0.08352	16	0.0052	BAT	
	TCARB214FS18RT	1	C2	2	1	99.89	0.08278	16	0.0052	M(B,H)AB	
FS19RT	TCARC111FS19RT	1	C1	3	1	104.1	0.08375	16	0.0052	M(B,H)AB	103.3
	TCARC112FS19RT	1	C1	3	1	103.9	0.08278	16	0.0052	M(B,H)AT	
	TCARC113FS19RT	1	C1	3	1	104.1	0.08305	16	0.0052	BAT, HIT	
	TCARC114FS19RT	1	C1	3	1	101.0	0.08273	16	0.0052	M(B,H)AB, HIT	
FS31RT	TCARC211FS31RT	1	C2	3	1	104.8	0.08245	16	0.0052	M(B,H)AT	102.2
	TCARC212FS31RT	1	C2	3	1	94.31	0.08278	16	0.0052	BAT	
	TCARC213FS31RT	1	C2	3	1	106.1	0.08323	16	0.0052	HAT	
	TCARC214FS31RT	1	C2	3	1	103.6	0.08303	16	0.0052	M(B,H)AT	
FS21RT	TCARC111FS21RT	1	C1	3	1	100.4	0.08357	16	0.0052	M(B,H)AT	95.46
	TCARC112FS21RT	1	C1	3	1	102.4	0.08293	16	0.0052	BAT	
	TCARC113FS21RT	1	C1	3	1	92.55	0.08163	16	0.0051	BAT, HIT	
	TCARC114FS21RT	1	C1	3	1	86.45	0.08058	16	0.0050	BGM	
FS22RT	TCARC111FS22RT	1	C1	3	1	98.93	0.08275	16	0.0052	BAT	99.93
	TCARC112FS22RT	1	C1	3	1	104.1	0.08297	16	0.0052	M(B,H)AT	
	TCARC113FS22RT	1	C1	3	1	97.02	0.08258	16	0.0052	BAT	
	TCARC114FS22RT	1	C1	3	1	99.66	0.08313	16	0.0052	BAT	
FS23RT	TCARC211FS23RT	1	C2	3	1	102.5	0.08287	16	0.0052	M(B,H)AT	104.2
	TCARC212FS23RT	1	C2	3	1	109.8	0.08255	16	0.0052	BAT	
	TCARC213FS23RT	1	C2	3	1	103.5	0.08160	16	0.0051	BAB	
	TCARC214FS23RT	1	C2	3	1	101.1	0.08113	16	0.0051	BAT	
FS32RT	TCARC211FS32RT	1	C2	3	1	101.3	0.08458	16	0.0053	BAT	102.0
	TCARC212FS32RT	1	C2	3	1	96.99	0.08542	16	0.0053	BAT	
	TCARC213FS32RT	1	C2	3	1	104.9	0.08507	16	0.0053	M(B,H)AT	
	TCARC214FS32RT	1	C2	3	1	104.9	0.08440	16	0.0053	M(B,H)AB	
FS33RT	TCARC211FS33RT	1	C2	3	1	104.8	0.08440	16	0.0053	BGM	97.08
	TCARC212FS33RT	1	C2	3	1	95.91	0.08335	16	0.0052	BAB, HIB	
	TCARC213FS33RT	1	C2	3	1	91.16	0.08375	16	0.0052	BAT, HIT	
	TCARC214FS33RT	1	C2	3	1	96.48	0.08402	16	0.0053	BAT	

7.2 Elevated Temperature Test Data

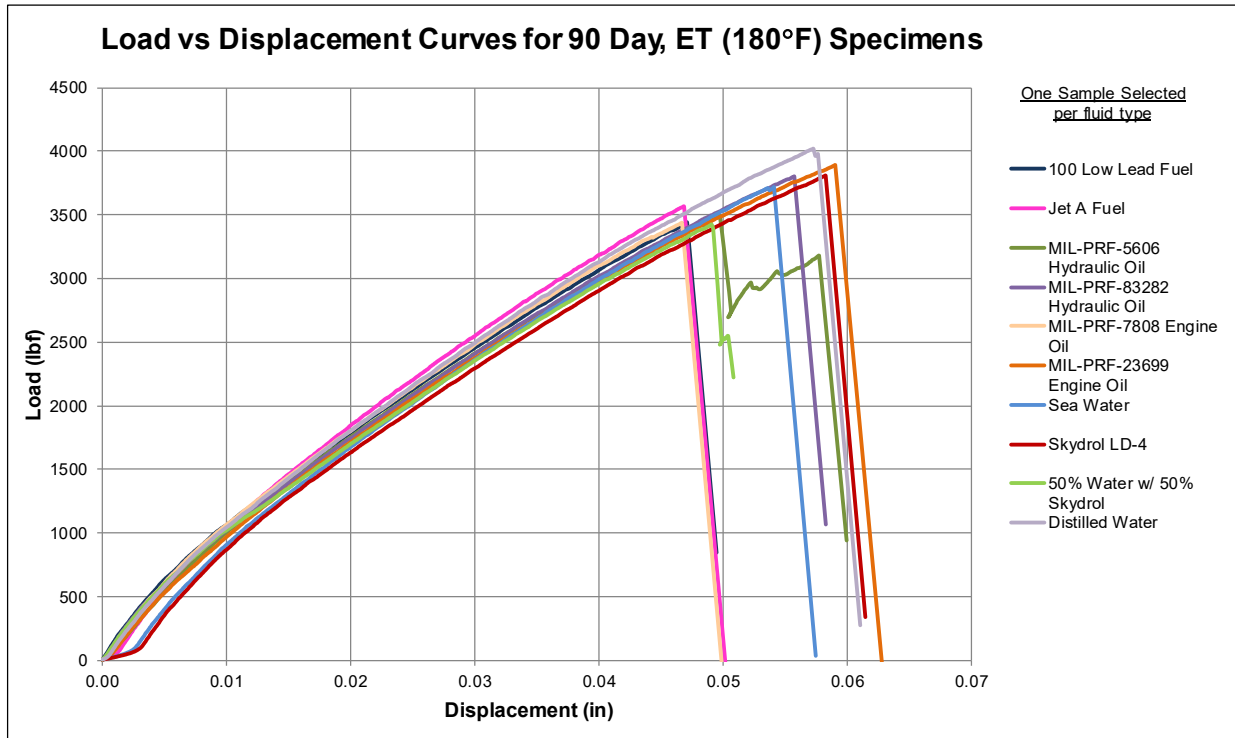
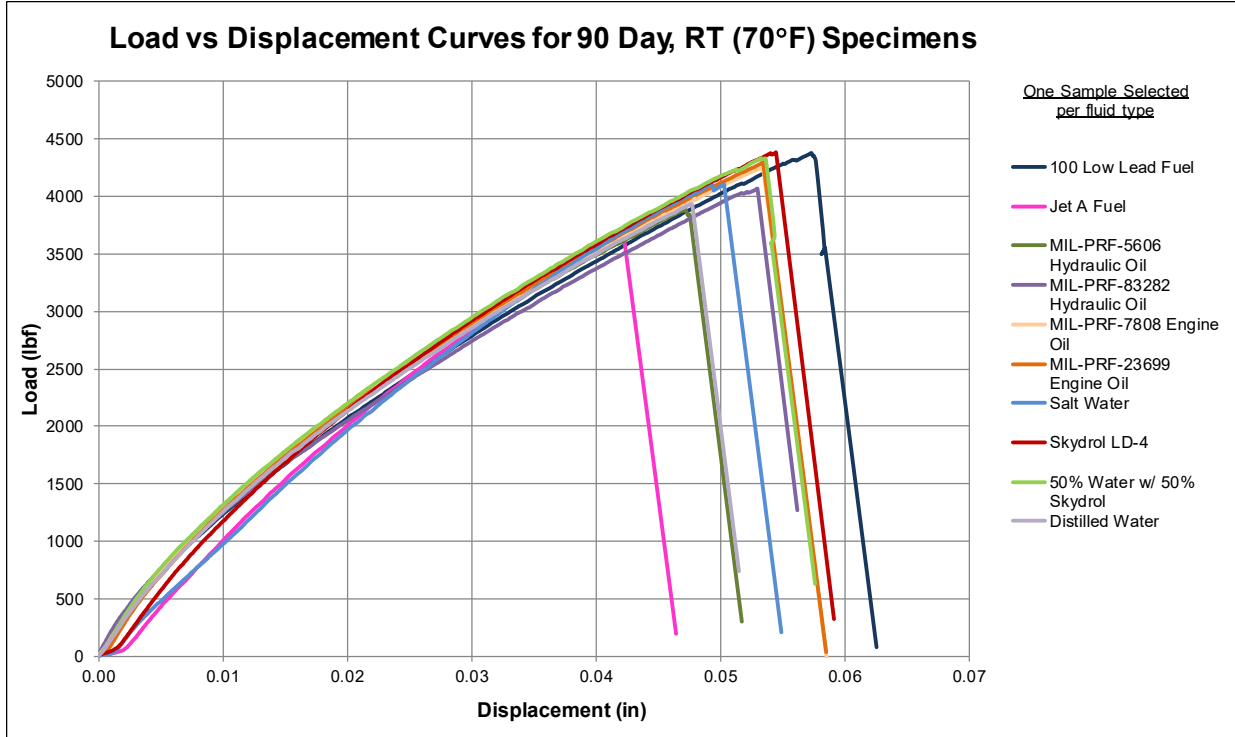
Code	Type of Fluid	Exposure
FS11ET	100 Low lead Fuel	90 days min @ 70°F ± 10F
FS12ET	Jet A Fuel	
FS13ET	MIL-PRF-5606 Hydraulic Oil	
FS14ET	MIL-PRF-83282 Hydraulic Oil	
FS15ET	MIL-PRF-7808 Engine Oil	
FS16ET	MIL-PRF-23699 Engine Oil	
FS17ET	Salt Water	
FS18ET	Skydrol LD-4	
FS19ET	50% Water w/ 50% Skydrol	
FS31ET	Distilled Water	
FS21ET	MEK washing fluid	90 mins @ 70°F ± 10F
FS22ET	Polypropylene Glycol Deicer	
FS23ET	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F ± 10F
FS32ET	Dry	Per section 6.1 Test Plan
FS33ET	85% Relative Humidity	

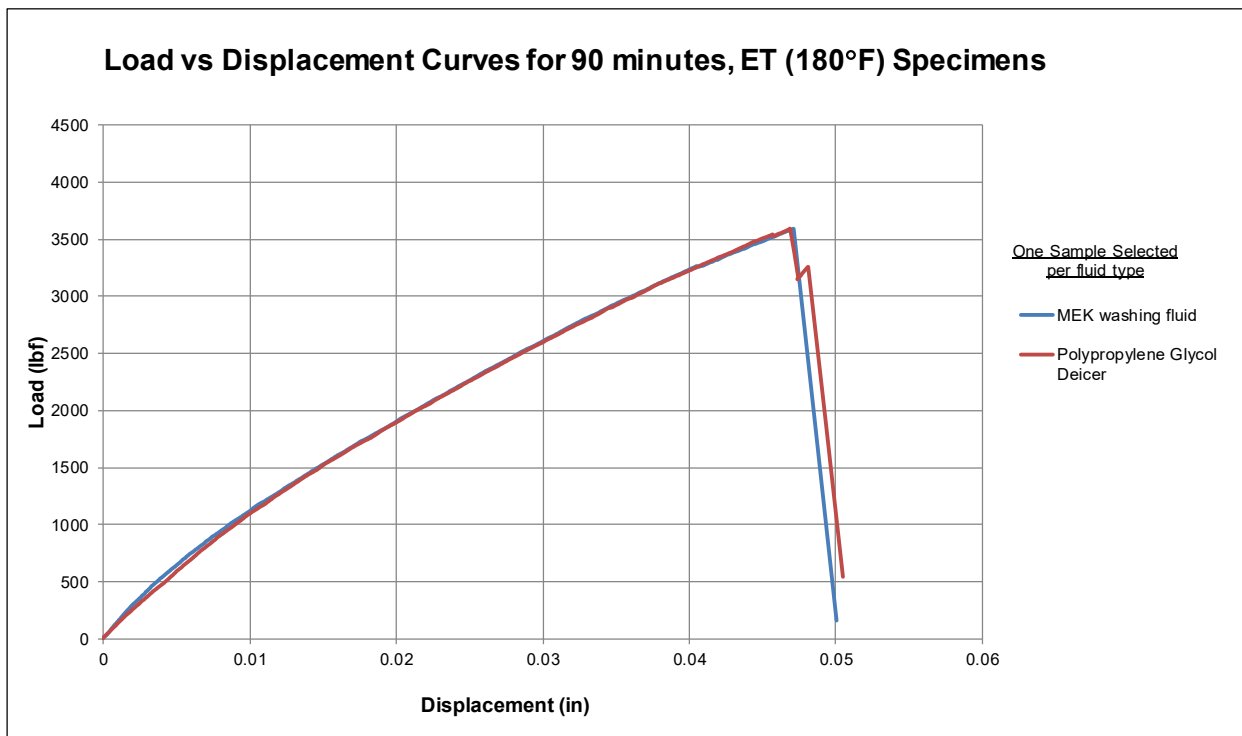
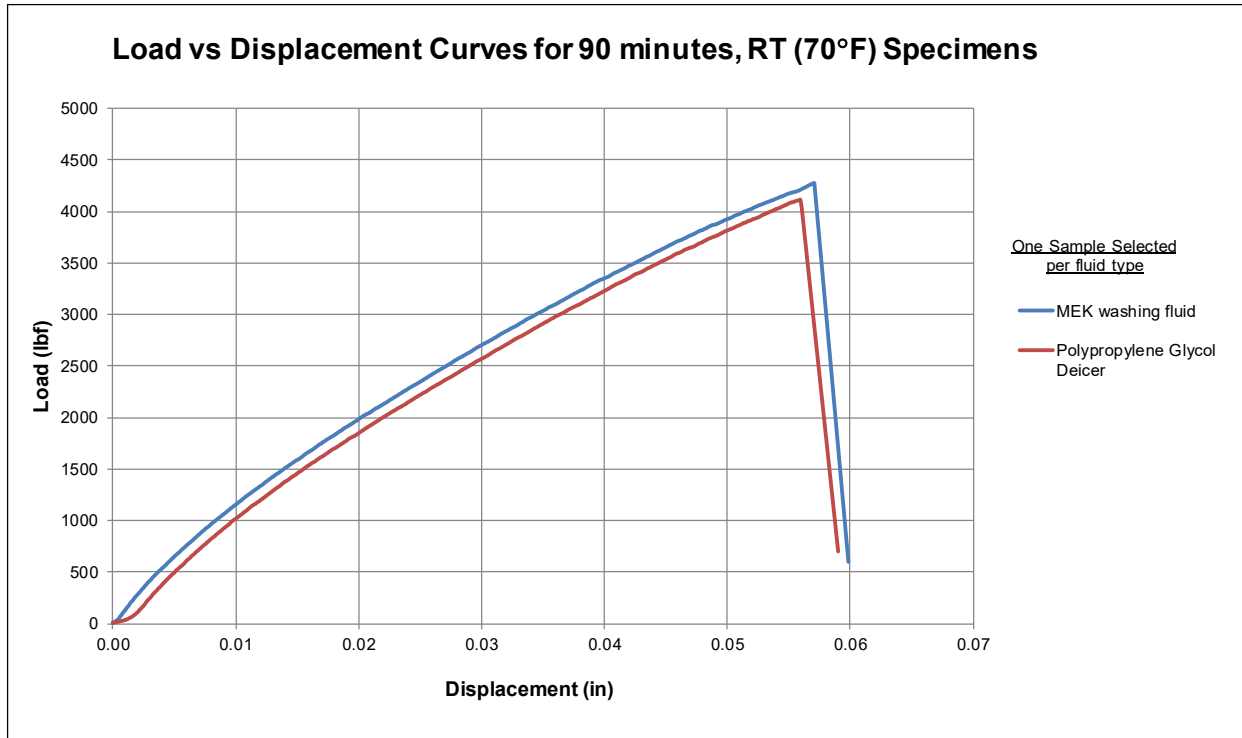


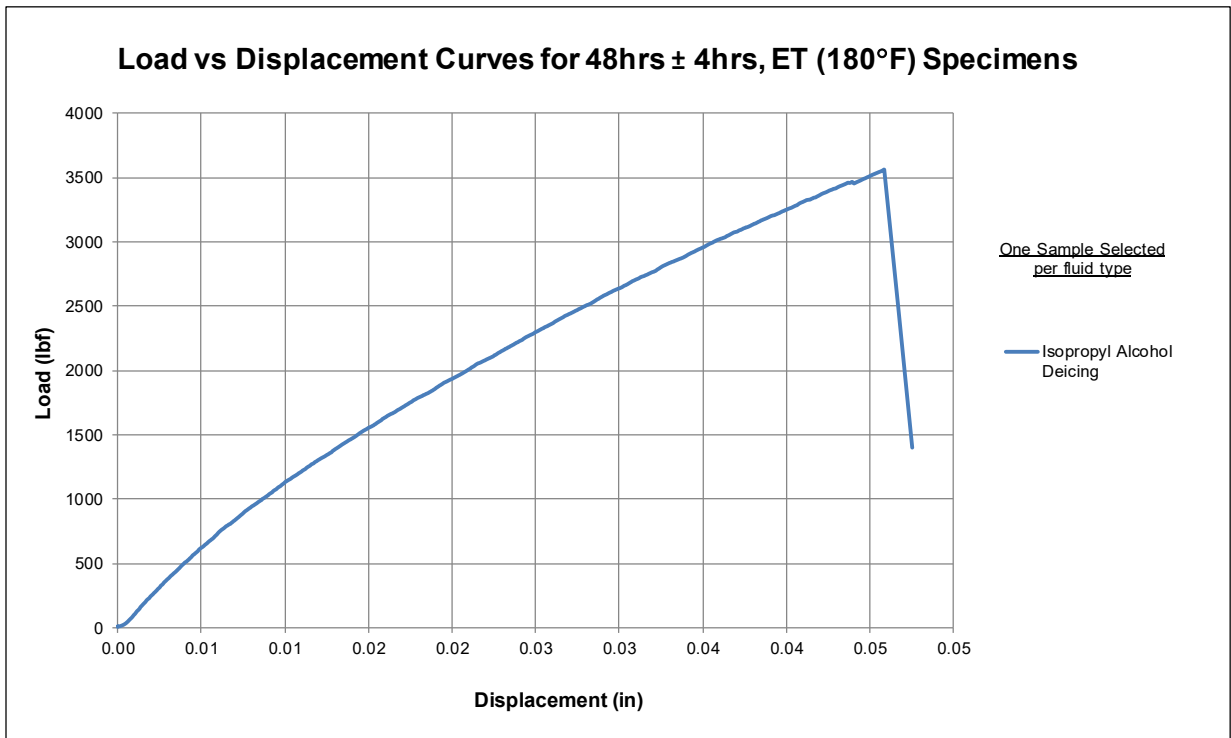
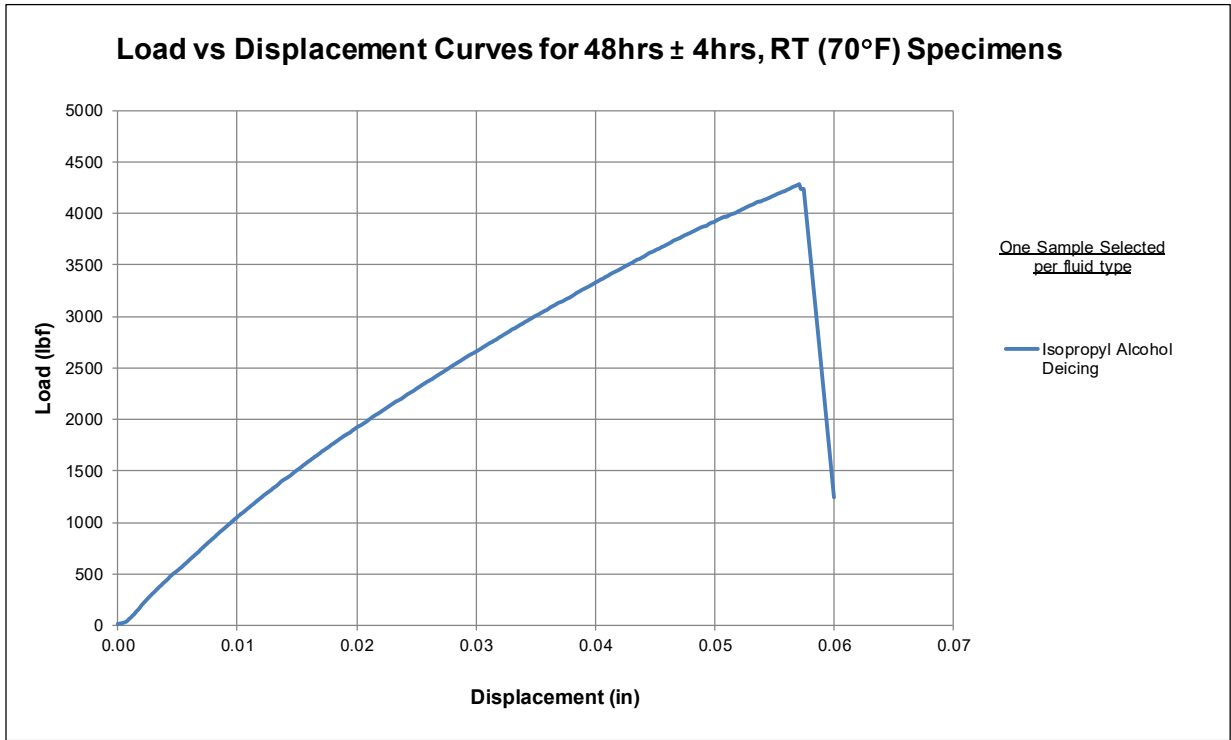
Fluid Sensitivity Screening
Un-Notched Compression 0/90 Properties (FSSBS)--ET (180°F) Strength
 Toray Cetex® TC1225 (LM PAEK) T700GC 12k T1E Unitape 145 gsm 34% RC

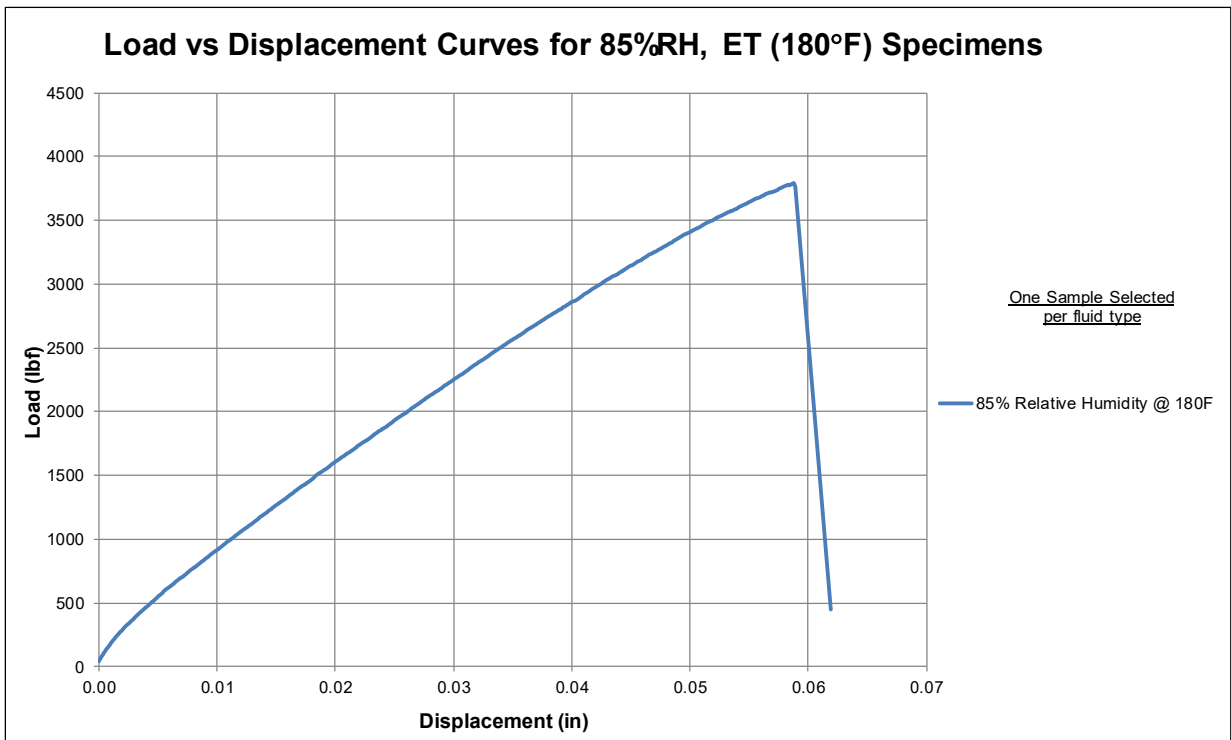
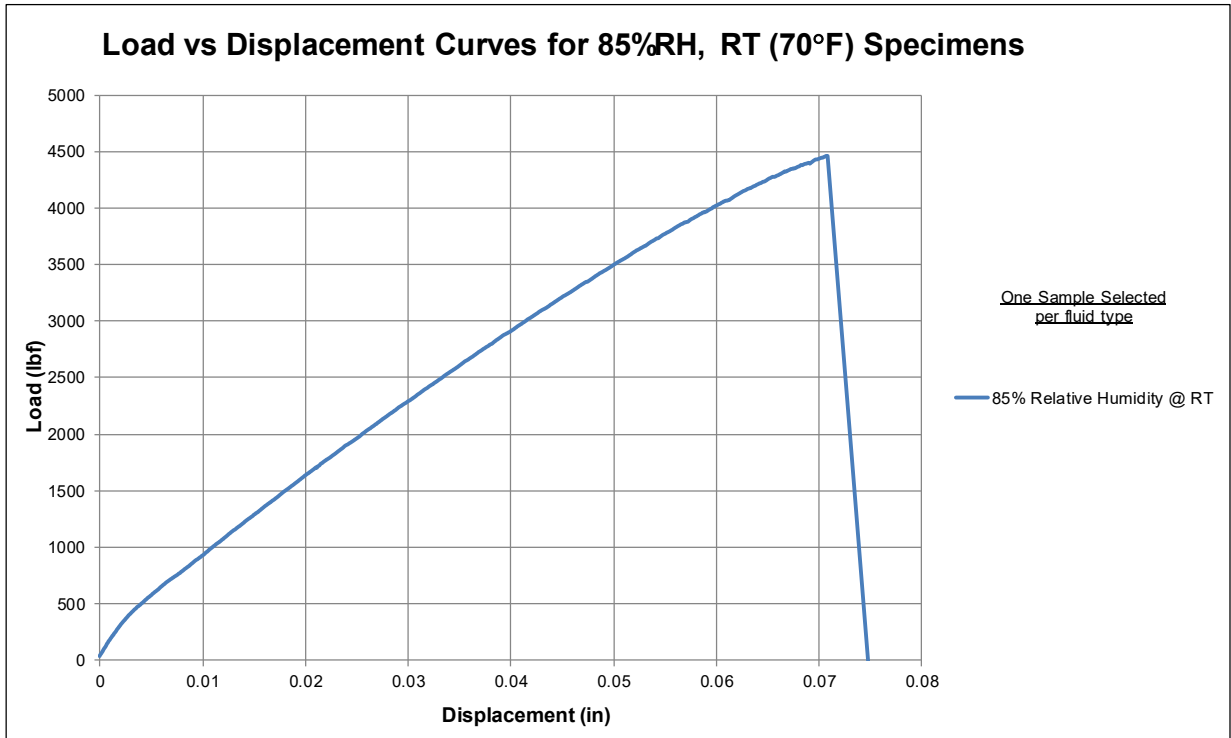
Fluid Code	Specimen Number	Toray Batch #	Toray Consolidate Cycle	Prepreg Lot #	Consolidate Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode	Average
FS11ET	TCARA111FS11ET	1	C1	1	1	82.51	0.0837	16	0.0052	BAB, HAT	82.58
	TCARA112FS11ET	1	C1	1	1	83.26	0.0836	16	0.0052	M(B,H)AB	
	TCARA113FS11ET	1	C1	1	1	80.78	0.0845	16	0.0053	BAT	
	TCARA114FS11ET	1	C1	1	1	83.78	0.0850	16	0.0053	M(B,H)AB	
FS12ET	TCARA211FS12ET	1	C2	1	1	85.96	0.0859	16	0.0054	M(B,H)AB	82.75
	TCARA212FS12ET	1	C2	1	1	82.15	0.0862	16	0.0054	BGM	
	TCARA213FS12ET	1	C2	1	1	81.48	0.0852	16	0.0053	BAB	
	TCARA214FS12ET	1	C2	1	1	81.42	0.0865	16	0.0054	BAB	
FS13ET	TCARA211FS13ET	1	C2	1	1	82.42	0.0842	16	0.0053	M(B,H)AT	82.89
	TCARA212FS13ET	1	C2	1	1	80.07	0.0843	16	0.0053	BGM, HAB	
	TCARA213FS13ET	1	C2	1	1	80.65	0.0856	16	0.0053	M(B,H)AT	
	TCARA214FS13ET	1	C2	1	1	88.41	0.0864	16	0.0054	M(B,H)AB	
FS14ET	TCARB111FS14ET	1	C1	2	1	86.26	0.0845	16	0.0053	HAT, HAB	89.88
	TCARB112FS14ET	1	C1	2	1	93.06	0.0833	16	0.0052	M(B,H)AB	
	TCARB113FS14ET	1	C1	2	1	91.13	0.0832	16	0.0052	M(B,H)AT	
	TCARB114FS14ET	1	C1	2	1	89.07	0.0847	16	0.0053	BAB	
FS15ET	TCARB111FS15ET	1	C1	2	1	88.31	0.0841	16	0.0053	BGM	86.26
	TCARB112FS15ET	1	C1	2	1	81.42	0.0838	16	0.0052	BGM	
	TCARB113FS15ET	1	C1	2	1	87.95	0.0835	16	0.0052	BGM	
	TCARB114FS15ET	1	C1	2	1	87.35	0.0835	16	0.0052	BGM	
FS16ET	TCARB211FS16ET	1	C2	2	1	91.09	0.0836	16	0.0052	M(B,H)AB	90.06
	TCARB212FS16ET	1	C2	2	1	91.21	0.0847	16	0.0053	BAT	
	TCARB213FS16ET	1	C2	2	1	89.60	0.0850	16	0.0053	BAT	
	TCARB214FS16ET	1	C2	2	1	88.35	0.0844	16	0.0053	M(B,H)AT	
FS17ET	TCARB211FS17ET	1	C2	2	1	88.87	0.0843	16	0.0053	M(B,H)AT	86.13
	TCARB212FS17ET	1	C2	2	1	86.30	0.0838	16	0.0052	BAB, HAT	
	TCARB213FS17ET	1	C2	2	1	81.94	0.0844	16	0.0053	M(B,H)AT	
	TCARB214FS17ET	1	C2	2	1	87.39	0.0845	16	0.0053	BAT	
FS18ET	TCARB211FS18ET	1	C2	2	1	87.76	0.0833	16	0.0052	M(B,H)AT	86.79
	TCARB212FS18ET	1	C2	2	1	85.07	0.0839	16	0.0052	BGM	
	TCARB213FS18ET	1	C2	2	1	90.74	0.0833	16	0.0052	M(B,H)AT	
	TCARB214FS18ET	1	C2	2	1	83.60	0.0834	16	0.0052	M(B,H)AB	
FS19ET	TCARC111FS19ET	1	C1	3	1	86.95	0.0824	16	0.0052	M(B,H)AT	87.39
	TCARC112FS19ET	1	C1	3	1	81.46	0.0835	16	0.0052	HAB	
	TCARC113FS19ET	1	C1	3	1	85.08	0.0839	16	0.0052	HAB	
	TCARC114FS19ET	1	C1	3	1	96.08	0.0821	16	0.0051	HAT	
FS31ET	TCARC211FS31ET	1	C2	3	1	86.54	0.0826	16	0.0052	BAB	89.01
	TCARC212FS31ET	1	C2	3	1	83.99	0.0824	16	0.0052	BAB	
	TCARC213FS31ET	1	C2	3	1	91.32	0.0846	16	0.0053	M(B,H)AT	
	TCARC214FS31ET	1	C2	3	1	94.20	0.0847	16	0.0053	M(B,H)AT	
FS21ET	TCARC111FS21ET	1	C1	3	1	76.79	0.0813	16	0.0051	BAT	83.66
	TCARC112FS21ET	1	C1	3	1	85.44	0.0823	16	0.0051	M(B,H)AB	
	TCARC113FS21ET	1	C1	3	1	85.71	0.0831	16	0.0052	M(B,H)AT	
	TCARC114FS21ET	1	C1	3	1	86.70	0.0835	16	0.0052	BAT	
FS22ET	TCARC111FS22ET	1	C1	3	1	94.55	0.0825	16	0.0052	BAT, HIT	91.79
	TCARC112FS22ET	1	C1	3	1	95.16	0.0822	16	0.0051	BAB, HIB	
	TCARC113FS22ET	1	C1	3	1	92.09	0.0823	16	0.0051	M(B,H)AB	
	TCARC114FS22ET	1	C1	3	1	85.36	0.0834	16	0.0052	HGM, HAT	
FS23ET	TCARC211FS23ET	1	C2	3	1	90.78	0.0820	16	0.0051	BAT	88.43
	TCARC212FS23ET	1	C2	3	1	88.67	0.0829	16	0.0052	BGM, HAB	
	TCARC213FS23ET	1	C2	3	1	84.65	0.0836	16	0.0052	BAB	
	TCARC214FS23ET	1	C2	3	1	89.64	0.0832	16	0.0052	BAT	
FS32ET	TCARC211FS32ET	1	C2	3	1	88.61	0.0834	16	0.0052	HAT	87.32
	TCARC212FS32ET	1	C2	3	1	82.07	0.0841	16	0.0053	HAT, HAB	
	TCARC213FS32ET	1	C2	3	1	87.53	0.0851	16	0.0053	HAB	
	TCARC214FS32ET	1	C2	3	1	91.06	0.0857	16	0.0054	HAB	
FS33ET	TCARC211FS33ET	1	C2	3	1	92.49	0.0839	16	0.0052	HAT	91.39
	TCARC212FS33ET	1	C2	3	1	90.41	0.0832	16	0.0052	BGM, HAT	
	TCARC213FS33ET	1	C2	3	1	87.49	0.0834	16	0.0052	BAT, HIT	
	TCARC214FS33ET	1	C2	3	1	95.17	0.0858	16	0.0054	BAT	

7.3 Load Displacement Curves



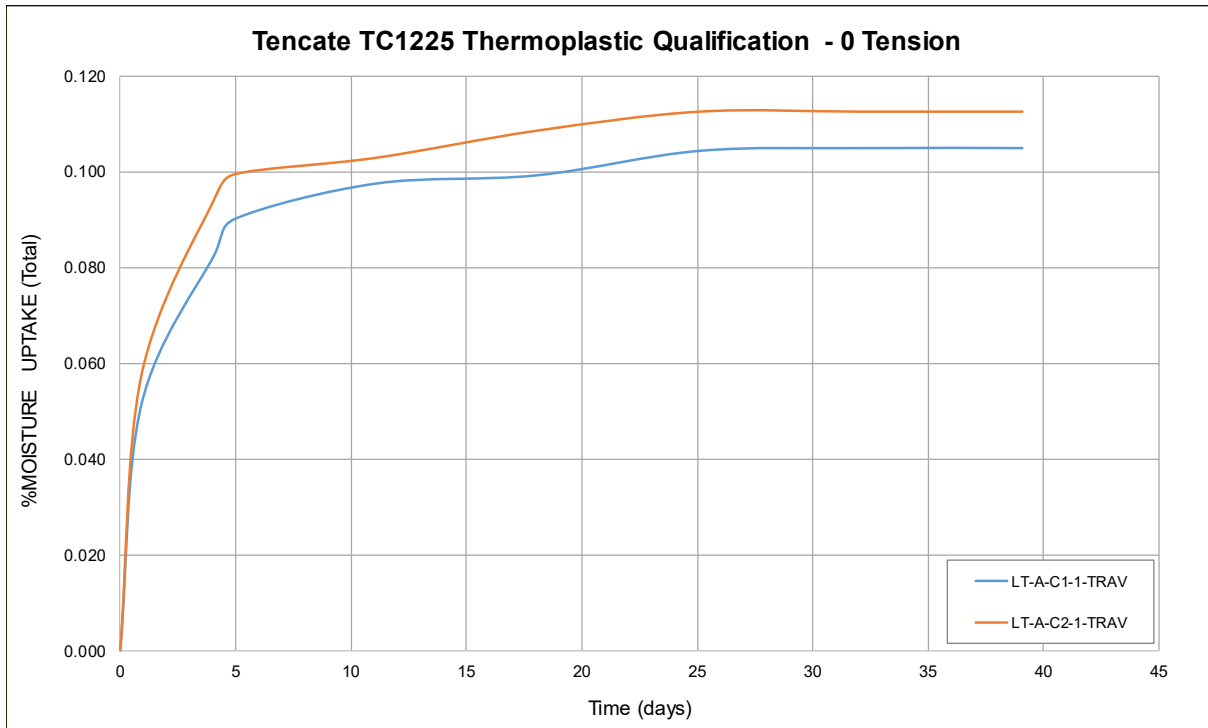




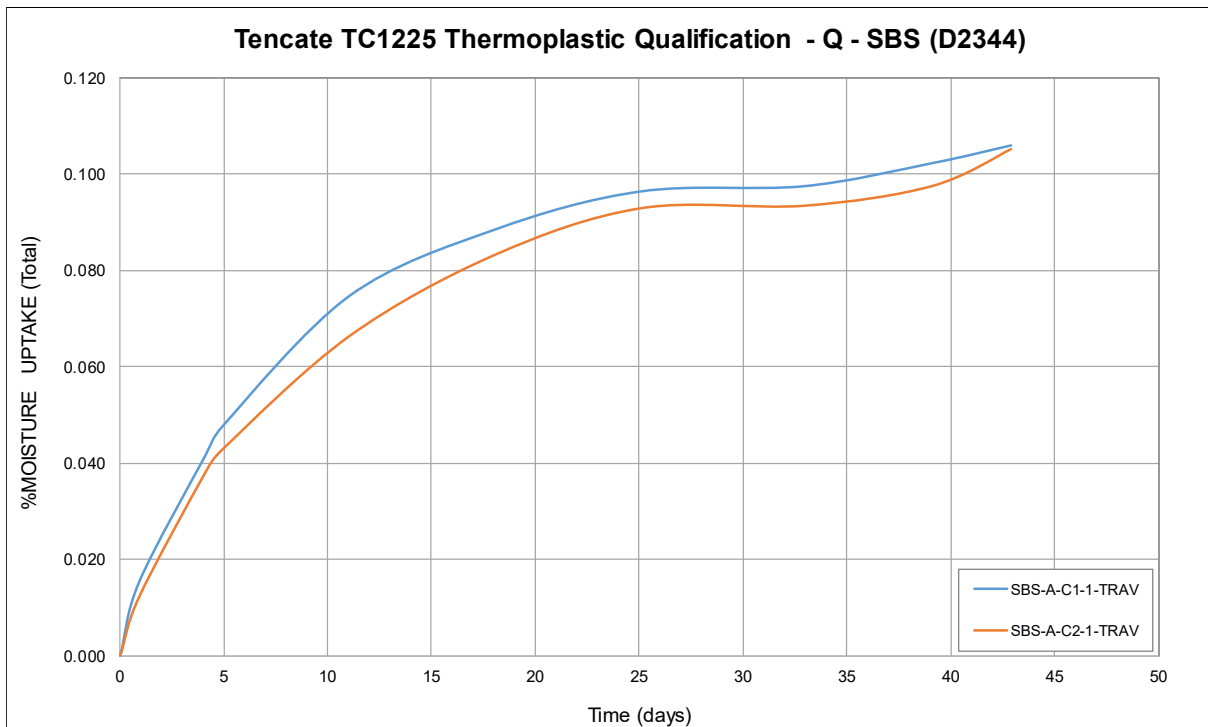


8 Moisture Conditioning Charts

8.1 Longitudinal Tension – Thinnest Panel



8.2 Short-Beam Strength – Thickest Panel



9 DMA Results

DMA Results Summary				
Tencate TC1225 Thermoplastic Qualification DMA Ambient				
Sample #	Onset Storage Modulus		Peak of Tangent Delta	
	T _g [°C]	T _g [°F]	T _g [°C]	T _g [°F]
FHT3-A-C1-1-D	141.78	287.20	163.00	325.40
FHT3-B-C1-1-D	141.06	285.91	163.53	326.35
FHT3-C-C1-1-D	140.53	284.95	163.22	325.80
FLEX-A-C1-1-D	146.99	296.58	167.24	333.03
FLEX-B-C1-1-D	147.99	298.38	165.90	330.62
FLEX-C-C1-1-D	145.38	293.68	176.24	349.23
OHT1-A-C1-1-D	136.21	277.18	157.97	316.35
OHT1-B-C1-1-D	134.31	273.76	157.69	315.84
OHT1-C-C1-1-D	136.37	277.47	157.81	316.06
SBS-A-C1-1-D	151.33	304.39	161.97	323.55
SBS-A-C2-1-D	150.81	303.46	165.12	329.22
SBS-B-C1-1-D	149.95	301.91	165.20	329.36
SBS-B-C2-1-D	148.19	298.74	166.68	332.02
SBS-C-C1-1-D	147.79	298.02	161.92	323.46
SBS-C-C2-1-D	147.79	298.02	162.63	324.73
UNC0-A-C2-1-D	140.74	285.33	162.39	324.30
UNC0-B-C2-1-D	140.11	284.20	161.97	323.55
UNC0-C-C2-1-D	139.72	283.50	166.41	331.54
UNC1/SBS1-A-C2-1-D	139.32	282.78	161.56	322.81
UNC1/SBS1-B-C2-1-D	138.72	281.70	160.73	321.31
UNC1/SBS1-C-C2-1-D	139.52	283.14	161.30	322.34
UNT1-A-C1-1-D	137.52	279.54	160.12	320.22
UNT1-B-C1-1-D	137.39	279.30	159.32	318.78
UNT1-C-C1-1-D	134.67	274.41	157.44	315.39
Average	142.26	288.06	162.81	325.05
Standard Deviation	5.36	9.65	4.08	7.34

DMA Results Summary				
Tencate TC1225 Thermoplastic Qualification DMA Wet				
Sample #	Onset Storage Modulus		Peak of Tangent Delta	
	T _g [°C]	T _g [°F]	T _g [°C]	T _g [°F]
FHT3-A-C1-1-W	132.67	270.81	155.39	311.70
FHT3-B-C1-1-W	133.60	272.48	152.71	306.88
FHT3-C-C1-1-W	131.76	269.17	155.88	312.58
FLEX-A-C1-1-W	137.58	279.64	158.14	316.65
FLEX-B-C1-1-W	141.24	286.23	158.37	317.07
FLEX-C-C1-1-W	135.81	276.46	162.23	324.01
OHT1-A-C1-1-W	128.82	263.88	152.62	306.72
OHT1-B-C1-1-W	127.24	261.03	151.80	305.24
OHT1-C-C1-1-W	129.30	264.74	152.62	306.72
SBS-A-C1-1-W	141.74	287.13	155.93	312.67
SBS-A-C2-1-W	138.22	280.80	156.92	314.46
SBS-B-C1-1-W	140.99	285.78	157.19	314.94
SBS-B-C2-1-W	138.98	282.16	156.06	312.91
SBS-C-C1-1-W	139.48	283.06	156.11	313.00
SBS-C-C2-1-W	139.48	283.06	154.66	310.39
UNC0-A-C2-1-W	132.75	270.95	156.57	313.83
UNC0-B-C2-1-W	131.68	269.02	154.53	310.15
UNC0-C-C2-1-W	130.55	266.99	154.62	310.32
UNC1/SBS1-A-C2-1-W	128.92	264.06	155.09	311.16
UNC1/SBS1-B-C2-1-W	128.78	263.80	154.39	309.90
UNC1/SBS1-C-C2-1-W	132.03	269.65	151.48	304.66
UNT1-A-C1-1-W	129.63	265.33	152.66	306.79
UNT1-B-C1-1-W	128.26	262.87	151.36	304.45
UNT1-C-C1-1-W	128.80	263.84	150.47	302.85
Average	133.68	272.62	154.91	310.84
Standard Deviation	4.82	8.67	2.70	4.86

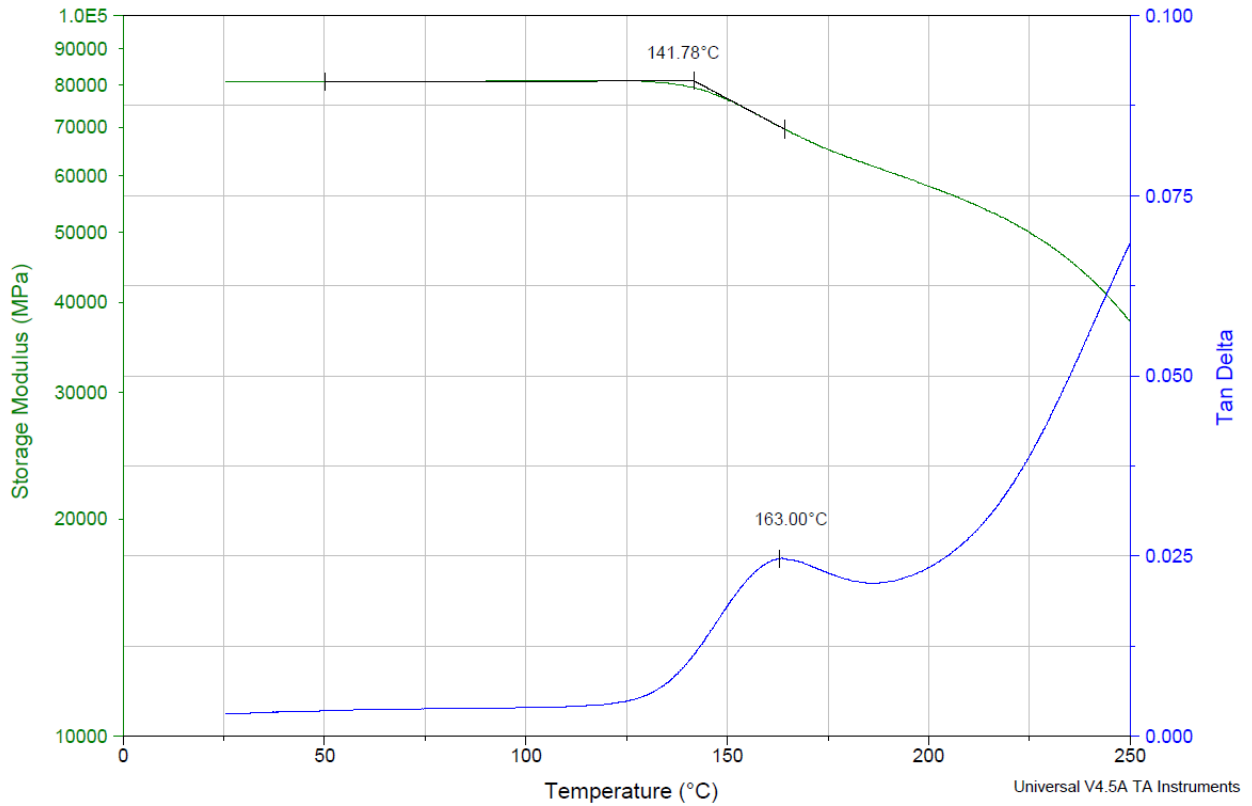
9.1 DMA Ambient Batch A

A representative of DMA Ambient profile from Batch A is provided below.

Sample: FHT3-A-C1-1-D
Size: 50.0000 x 13.2300 x 2.5500 mm
Method: Strain Controlled Ramp @5C/min
Comment: Tencate TC1225 Thermoplastic Qualification FHT3-A-C1-1-D-X DMA

DMA

File: Y:\...\FHT3-A-C1-1-D.001
Operator: Ping Q800-SN0188
Run Date: 23-Jan-2019 09:33
Instrument: DMA Q800 V7.5 Build 127



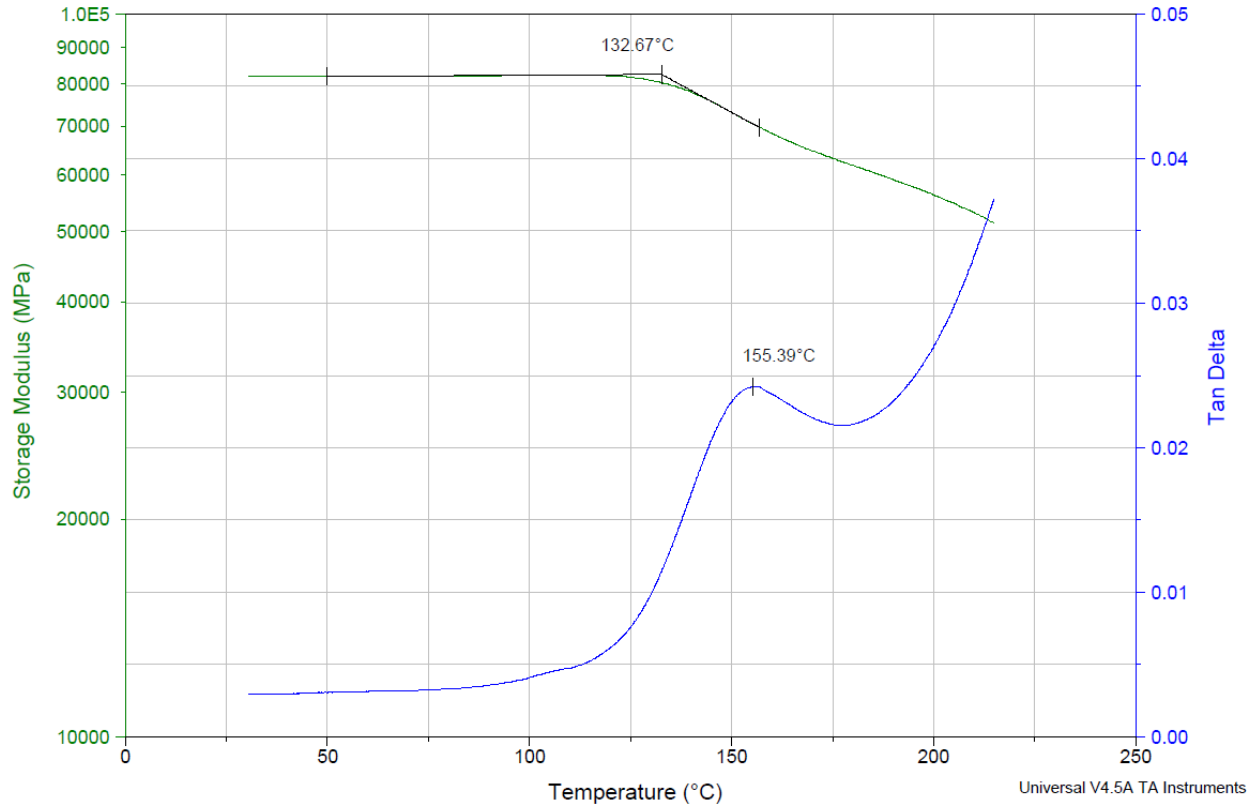
9.2 DMA Wet Batch A

A representative of DMA Wet profile from Batch A is provided below.

Sample: FHT3-A-C1-1-W
Size: 50.0000 x 13.2600 x 2.5500 mm
Method: Strain Controlled Ramp @5C/min
Comment: Tencate TC1225 Thermoplastic Qualification FHT3-A-C1-1-W-X DMA

DMA

File: Y:\...\Wet\FHT3-A-C1-1-W.001
Operator: Ping Q800-SN0188
Run Date: 13-May-2019 16:45
Instrument: DMA Q800 V7.5 Build 127



10 DSC Results

DSC Results												
Tencate TC1225 Thermoplastic Qualification DSC												
Sample #	Glass Transition Temperature		Melting Onset Temperature		Melting Peak Temperature		Enthalpy of Melting ΔH_m [J/g]	Crystallization Onset Temperature		Hot Crystallization Peak Temperature		Enthalpy of Crystallization ΔH_c [J/g]
	T_g [°C]	T_g [°F]	T_{mo} [°C]	T_{mo} [°F]	T_{mp} [°C]	T_{mp} [°F]		T_{co} [°C]	T_{co} [°F]	T_{cp} [°C]	T_{cp} [°F]	
FHT3-A-C1-1-DSC	145.66	294.19	293.15	559.67	305.73	582.31	7.284	254.96	490.93	240.48	464.86	11.15
FHT3-B-C1-1-DSC	142.83	289.09	294.30	561.74	306.21	583.18	6.842	256.69	494.04	247.54	477.57	10.14
FHT3-C-C1-1-DSC	142.39	288.30	293.33	559.99	305.66	582.19	6.905	255.96	492.73	244.94	472.89	10.34
FLEX-A-C1-1-DSC	144.40	291.92	295.06	563.11	307.26	585.07	7.545	254.85	490.73	241.00	465.80	10.07
FLEX-B-C1-1-DSC	145.00	293.00	293.88	560.98	305.63	582.13	6.232	256.36	493.45	246.87	476.37	10.86
FLEX-C-C1-1-DSC	146.19	295.14	294.78	562.60	306.54	583.77	5.987	256.87	494.37	248.92	480.06	10.14
OHT1-A-C2-1-DSC	142.78	289.00	295.26	563.47	308.10	586.58	7.500	255.27	491.49	242.32	468.18	10.19
OHT1-B-C2-1-DSC	141.71	287.08	292.99	559.38	305.70	582.26	6.677	255.65	492.17	245.60	474.08	9.341
OHT1-C-C2-1-DSC	141.68	287.02	294.25	561.65	306.26	583.27	7.365	257.11	494.80	249.29	480.72	9.563
SBS-A-C1-1-DSC	143.58	290.44	292.15	557.87	305.41	581.74	6.701	253.58	488.44	242.64	468.75	10.07
SBS-A-C2-1-DSC	143.85	290.93	293.65	560.57	305.57	582.03	6.702	254.12	489.42	244.14	471.45	9.905
SBS-B-C1-1-DSC	143.38	290.08	293.81	560.86	306.38	583.48	6.406	257.02	494.64	249.35	480.83	10.41
SBS-B-C2-1-DSC	142.81	289.06	292.97	559.35	305.84	582.51	5.907	256.05	492.89	248.44	479.19	9.941
SBS-C-C1-1-DSC	142.46	288.43	294.40	561.92	305.43	581.77	6.946	256.31	493.36	247.71	477.88	10.67
SBS-C-C2-1-DSC	144.05	291.29	293.80	560.84	306.40	583.52	6.649	255.99	492.78	248.58	479.44	9.699
UNC0-A-C2-1-DSC	143.38	290.08	292.54	558.57	305.43	581.77	7.478	253.58	488.44	240.25	464.45	10.29
UNC0-B-C2-1-DSC	141.80	287.24	293.90	561.02	306.03	582.85	6.795	257.08	494.74	248.60	479.48	10.30
UNC0-C-C2-1-DSC	139.73	283.51	292.91	559.24	305.59	582.06	7.295	254.64	490.35	244.29	471.72	10.03
UNC1/SBS1-A-C2-1-DSC	138.61	281.50	293.56	560.41	305.97	582.75	6.416	254.88	490.78	243.13	469.63	9.427
UNC1/SBS1-B-C2-1-DSC	140.22	284.40	293.58	560.44	305.67	582.21	7.342	255.45	491.81	246.55	475.79	9.853
UNC1/SBS1-C-C2-1-DSC	140.43	284.77	294.08	561.34	306.12	583.02	6.227	257.52	495.54	246.76	476.17	9.163
UNT1-A-C1-1-DSC	142.01	287.62	293.42	560.16	306.05	582.89	6.722	255.73	492.31	243.60	470.48	10.10
UNT1-B-C1-1-DSC	143.49	290.28	294.04	561.27	306.18	583.12	7.296	256.21	493.18	247.09	476.76	10.02
UNT1-C-C1-1-DSC	142.07	287.73	293.30	559.94	305.87	582.57	6.569	255.82	492.48	246.67	476.01	9.354
Average	142.69	288.84	293.71	560.68	306.04	582.88	6.825	255.74	492.33	245.62	474.11	10.043
Standard Deviation	1.81	3.26	0.75	1.36	0.61	1.10	0.484	1.09	1.97	2.87	5.17	0.476

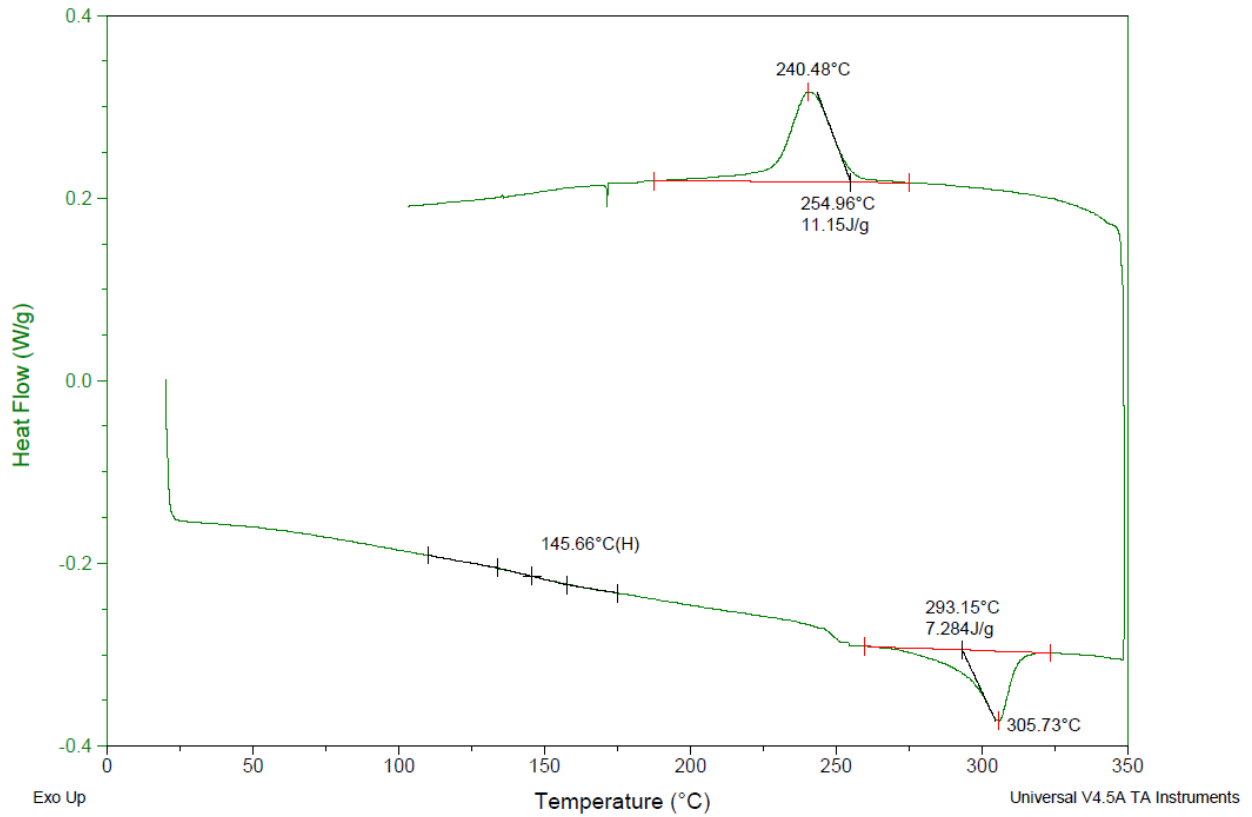
10.1 DSC Graph

A representative of DSC Ambient profile from Batch A is provided below.

Sample: FHT3-A-C1-1-DSC
Size: 20.2000 mg
Method: Ramp
Comment: Tencate TC1225 Thermoplastic Qualification FHT3-A-C1-1-DSC-X

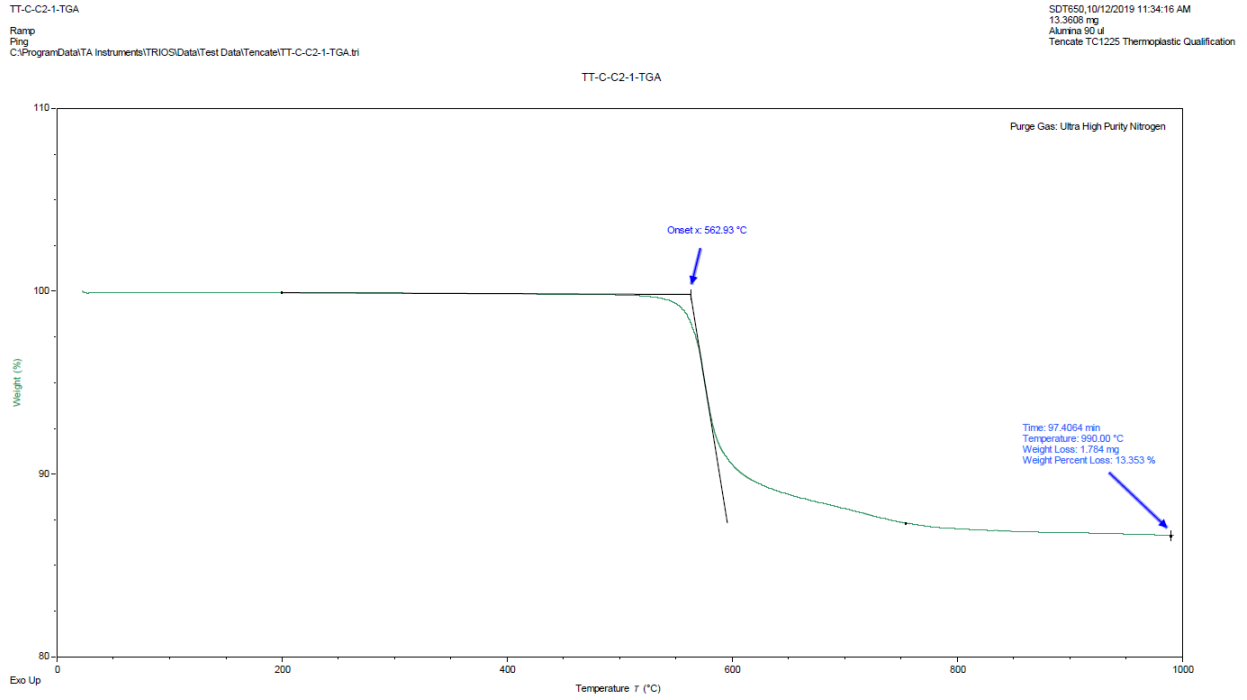
DSC

File: Y:\...\Redo\FHT3-A-C1-1-DSC.001
Operator: Ping Q1000-0285
Run Date: 25-Sep-2019 14:25
Instrument: DSC Q1000 V9.9 Build 303



11 TGA Graph

A representative of TGA Ambient profile from Batch C is provided below.



TA Instruments Trios V5.0.0.44616

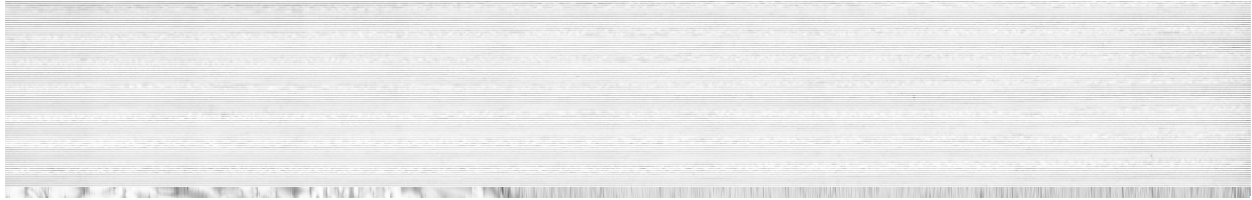
12 Moisture Loss

A representative specimen was used to measure the moisture loss.

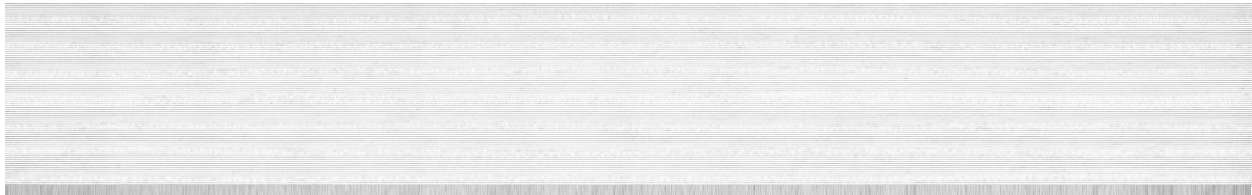
Layup	Test Type	Specimen ID	Weight Pre-Test (g)	Weight Post-Test (g)	Moisture Loss (g)
[0]8	LT	LT-A-C1-1-TRAV	17.6151	17.6087	0.0064
[0]20	LC	TCALA115E	7.5314	7.5300	0.0014
[90]16	TT	TCAUA211E	22.2762	22.2707	0.0055
[90]20	TC	TCAZA115E	7.5395	7.5381	0.0014
[90/0]4S	UNC0	TCARA115E	6.2546	6.2527	0.0019
[+45/-45]4S	IPS	TCANA211E	21.9081	21.8694	0.0387
[0]22	FLEX	TCATA115E	7.5874	7.5846	0.0028
[0]34	SBS	SBS-A-C1-1-TRAV	18.8810	18.8778	0.0032
[45/0/-45/90]2S	UNT1	TCAAA211E	21.8571	21.8523	0.0048
[45/0/-45/90]3S	UNC1	TCAWA115E	8.9173	8.9148	0.0025
[45/0/-45/90]3S	SBS1	UNC1/SBS1-A-C1-1-TRV	20.4590	20.4558	0.0032
[45/0/-45/90]2S	OHT1	TCADA414E	38.7411	38.7221	0.0190
[45/0/-45/90]4S	OHC1	TCAGA314E	78.7809	78.7562	0.0247
[45/0/-45/90]2S	FHT1	TCA4A414E	38.9918	38.9751	0.0167
[0]30	ILT	TCAMA418E	37.8233	37.8137	0.0096
[45/0/-45/90]4S	CAI1	TCAKA511E	105.5557	105.5273	0.0284

13 Photomicrograph

13.1 Panel ID: TC-A11-FHC-1-B-C2-1-0DEG



13.2 Panel ID: TC-A11-FHC-1-B-C2-1-90DEG



13.3 Panel ID: TC-A11-TCND-TT-B-C1-1-0DEG



13.4 Panel ID: TC-A11-TCND-TT-B-C1-1-90DEG



14 Deviations/Program Notes

- ETA2 data not available for ILT, CBS and DNS1 due to unacceptable failure mode.

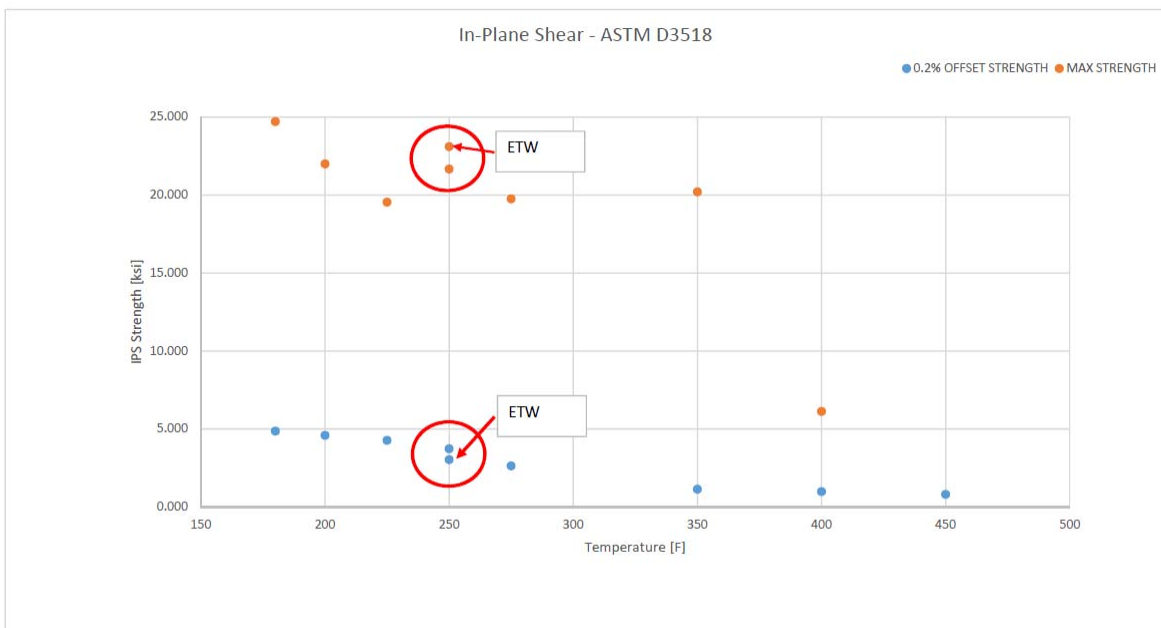
Appendix A – Preliminary Screening Data

Advanced Fiber (TenCate) Screening Data Summary

Screening Data

2-5 coupons @ each condition

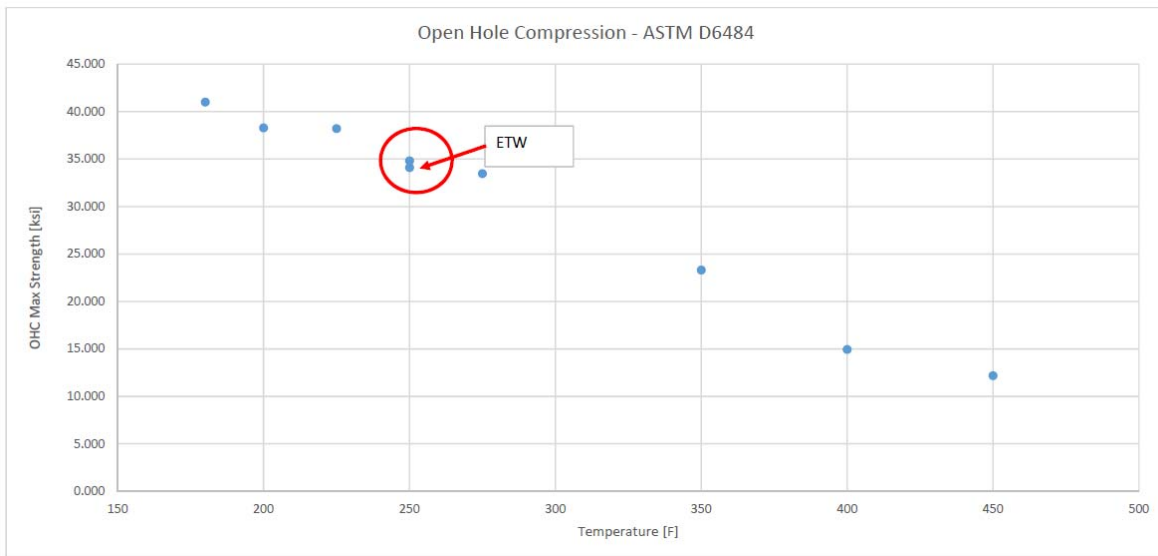
		ASTM D 3518 IN-PLANE SHEAR RESPONSE OF POLYMER MATRIX COMPOSITE MATERIALS BY TENSILE TEST OF A ±45° LAMINATE				
		0.2% offset [ksi]	5% Strain [ksi]	Max [ksi]	Modulus [Msi]	
180	Average	4.859	7.598	24.710	0.514	5 specimens
	CV	2.234	4.792	10.431	1.519	
200	Average	4.585	7.042	21.994	0.491	5 specimens
	CV	3.415	6.982	8.357	1.704	
225	Average	4.263	6.724	19.546	0.462	5 specimens
	CV	2.103	2.622	4.662	1.615	
250	Average	3.727	6.031	21.661	0.404	5 specimens
	CV	1.663	2.003	4.502	1.250	
250 Wet	Average	3.030	5.749	23.104	0.302	4 specimens
	CV	8.477	10.140	6.399	7.981	
275	Average	2.625	4.753	19.753	0.258	5 specimens
	CV	7.252	5.905	7.386	4.490	
350	Average	1.132	2.637	20.200	0.091	5 specimens
	CV	15.415	11.157	8.259	17.393	
400	Average	0.977		6.118	0.071	4 specimens
	CV	8.246		9.995	8.124	
450	Average	0.806			0.058	4 specimens
	CV	0.697			2.427	



2-4 coupons @ each condition

ASTM D6484 (PROCEDURE A)
OPEN HOLE COMPRESSIVE STRENGTH OF POLYMER MATRIX
COMPOSITE LAMINATES

		Max [ksi]			
180	Average	41.004			2 specimens
	CV	8.95%			
200	Average	38.291			2 specimens
	CV	1.603			
225	Average	38.206			2 specimens
	CV	8.483			
250	Average	34.823			3 specimens
	CV	1.24%			
250 WET	Average	34.100			1 specimen
	CV				
275	Average	33.475			3 specimens
	CV	1.719			
350	Average	23.310			2 specimens
	CV	8.45%			
400	Average	14.942			4 specimens
	CV	5.56%			
450	Average	12.179			3 specimens
	CV	6.71%			



Appendix B – Phase 1 Investigation: SBS Lamina, SBS Laminate, Flex and ILT

Phase 1 Investigation: SBS Lamina, SBS Laminate, Flex, and ILT

These investigations were conducted to analyze the failure modes on some of the test methods and test conditions listed in the scope of the Qualification testing.

The reasons for the investigations were:

- Significant load drop was not observed.
- Excessive yielding.
- Maximum loads were inconsistent from specimen to specimen that resulted in high variability.
- Unacceptable failure modes.

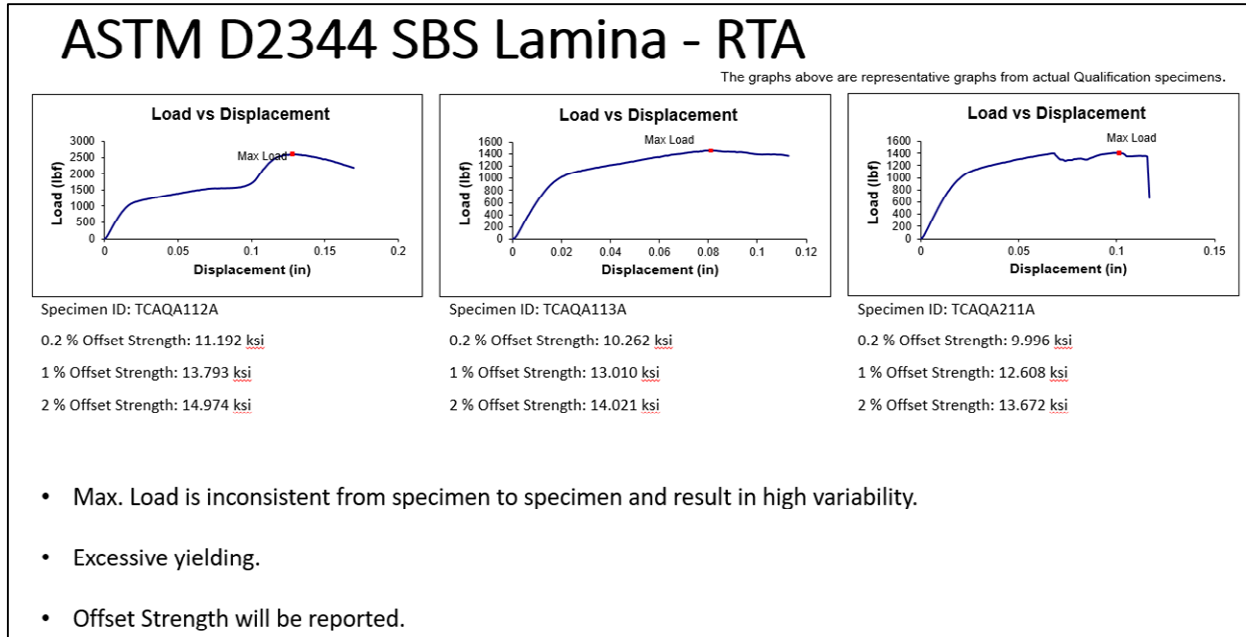
The following test methods and test conditions were selected in these investigations:

- SBS Lamina (CTA, RTA*, ETA1*, ETA2)
- SBS Laminate (RTA*, ETA1*, ETW, ETA2)
- 0° Flex (CTA**, RTA**, ETA1**, ETW**, ETA2**)
- ILT (ETA2**)

*Additional specimens were tested as part of this investigation. The specimens were taken from the same panels with NCAMP Qualification, it took place after Qualification specimens were tested.

**Failure modes from the Qualification tested specimens were analyzed.

1. SBS Lamina – RTA



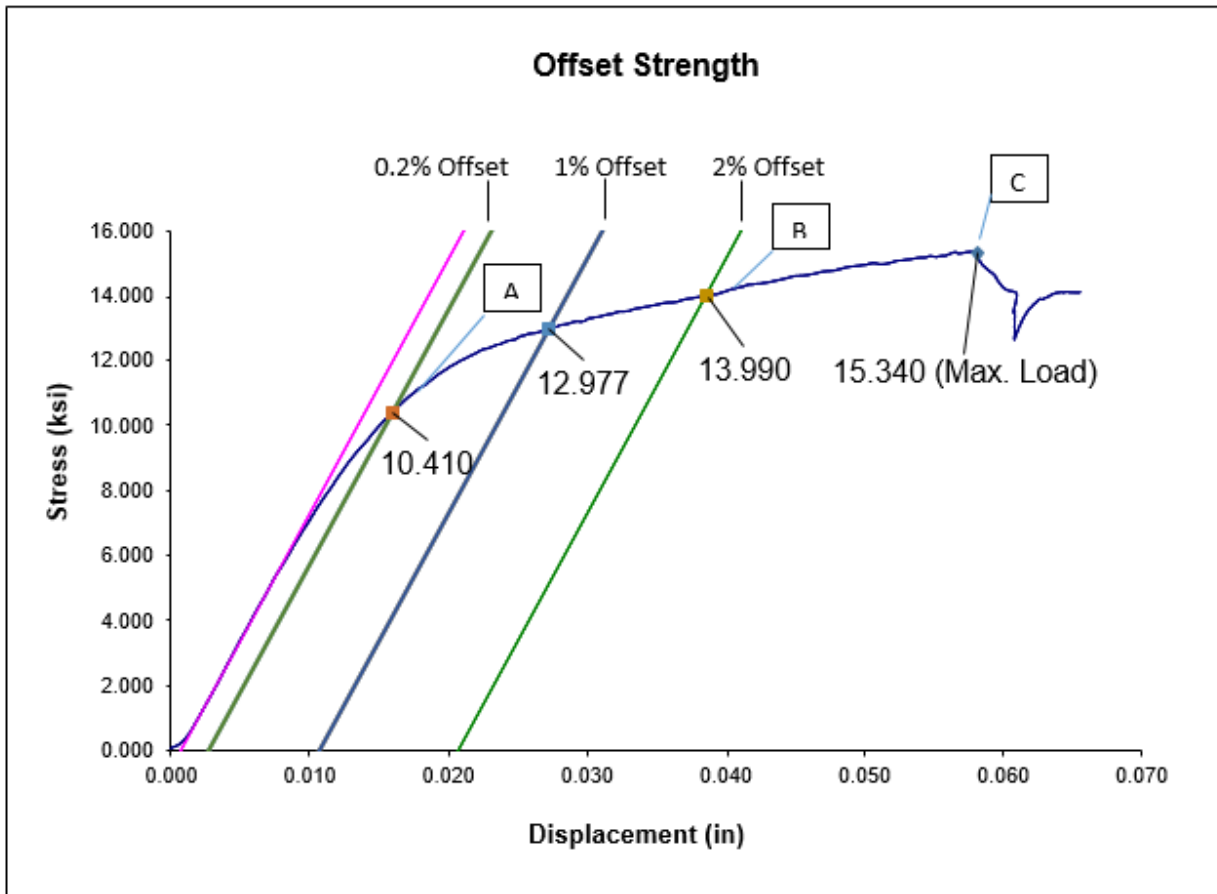
1.1 Layup

[0]₃₄

1.2 Objective

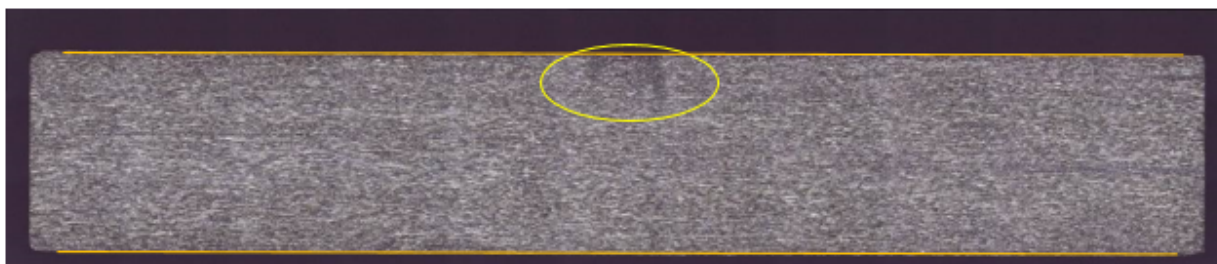
To investigate the failure mode at/around 0.2% Offset, 1% Offset, and 2% Offset Strength.

1.3 Result

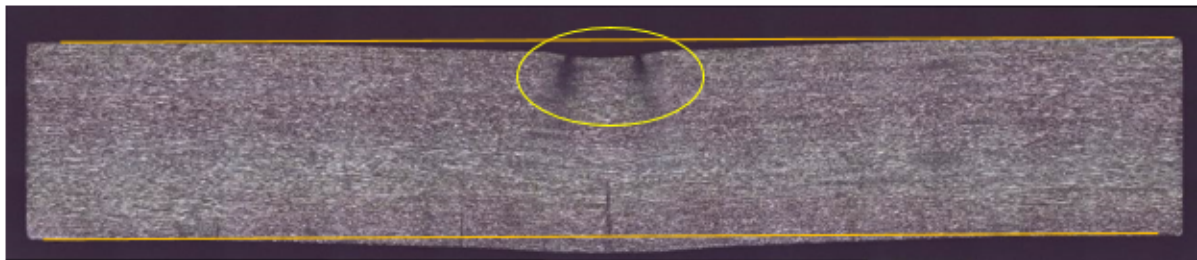


Representative failure modes below were taken from multiple specimens, each specimen was tested up to a specific point [A], [B], and [C] indicated in the graph in order to analyze the failure mode that was done under a microscope.

[A] Failure mode at 0.2% Offset Strength: Compression.



[B] Failure mode at 2% Offset Strength: Inelastic and Compression.



[C] Failure mode at Max. Load: Inelastic and Compression.

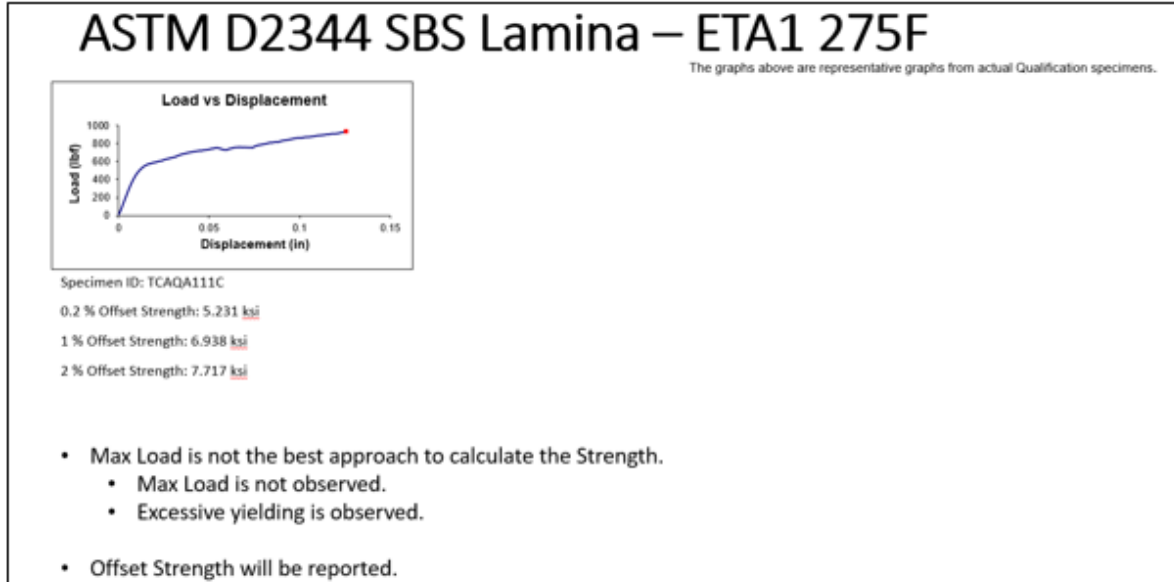


1.4 Conclusion

Based on this investigation, SBS Lamina at RTA primary failure modes were inelastic and compression, these are not the desired primary failure mode for ASTM D2344.

“Consequently, unless mid-plane interlaminar failure has been clearly observed, the short-beam strength determined from this test method cannot be attributed to a shear property, and the use of Eq. 1 will not yield an accurate value for shear strength.”, ASTM D2344/D2344M – 16.

2. SBS Lamina – 275F ETA1



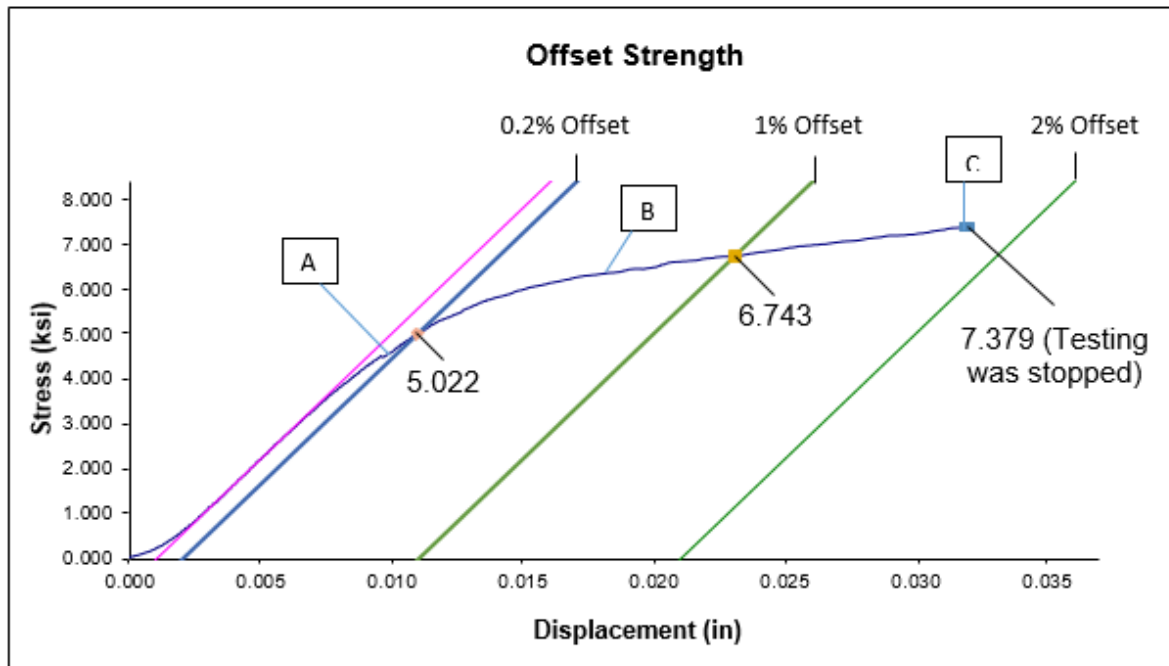
2.1 Layup

[0]₃₄

2.2 Objective

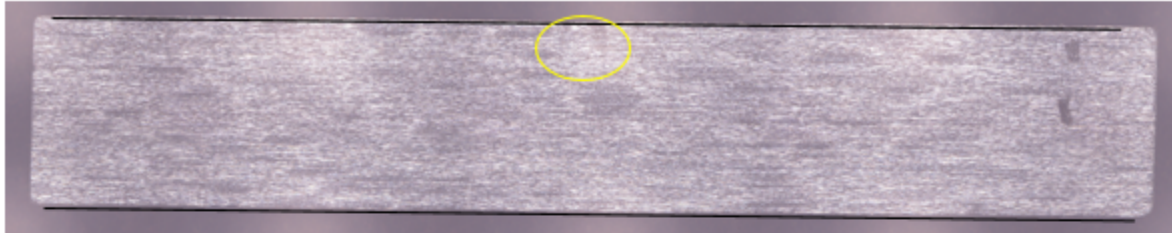
To investigate the failure mode at/around 0.2% Offset, 1% Offset, and 2% Offset Strength.

2.3 Result

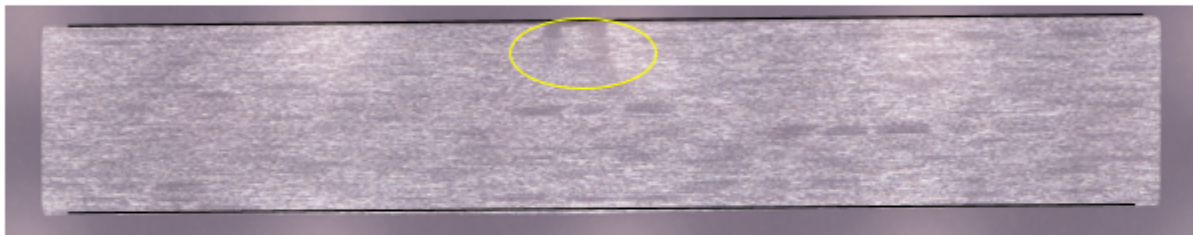


Representative failure modes below were taken from multiple specimens, each specimen was tested up to a specific point [A], [B], and [C] indicated in the graph in order to analyze the failure mode that was done under a microscope.

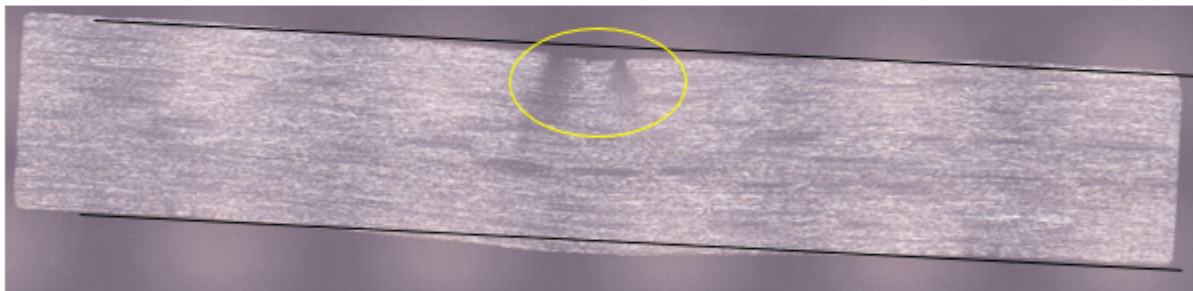
[A] Failure mode at slightly before 0.2% Offset Strength: Compression.



[B] Failure mode between 0.2% Offset and 1% Offset Strength: Compression.



[C] Failure mode at slightly before 2% Offset: Inelastic and Compression.

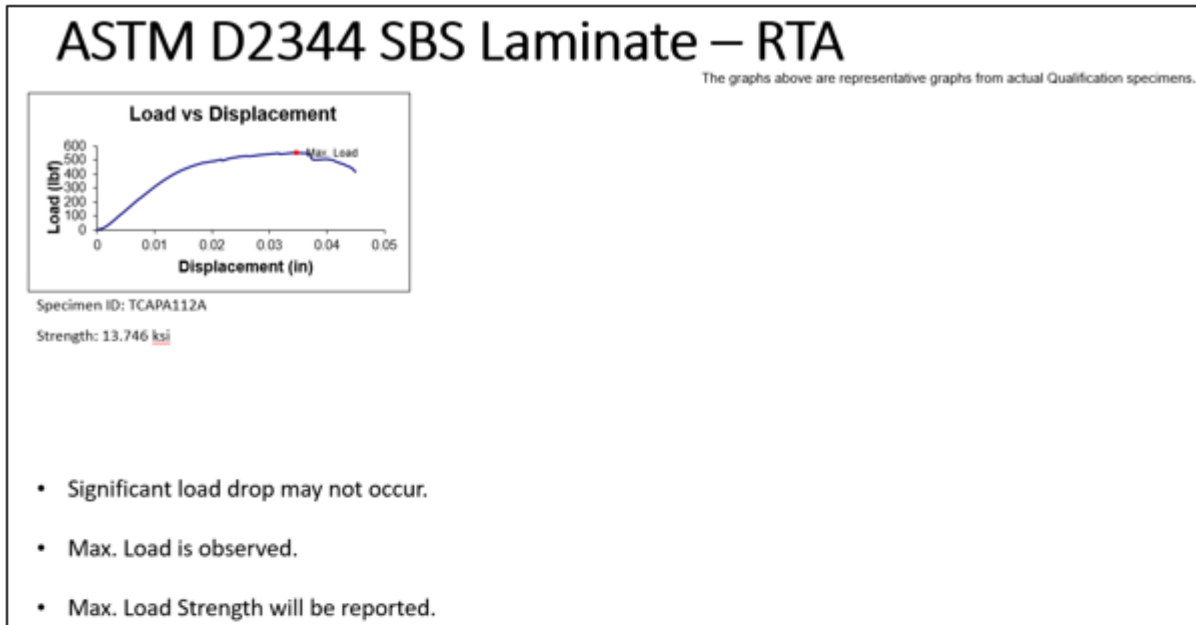


2.4 Conclusion

Based on this investigation, SBS Lamina at 275F ETA1 primary failure modes were inelastic and compression, those are not the desired primary failure mode for ASTM D2344.

“Consequently, unless mid-plane interlaminar failure has been clearly observed, the short-beam strength determined from this test method cannot be attributed to a shear property, and the use of Eq. 1 will not yield an accurate value for shear strength.”, ASTM D2344/D2344M – 16.

3. SBS Laminate – RTA



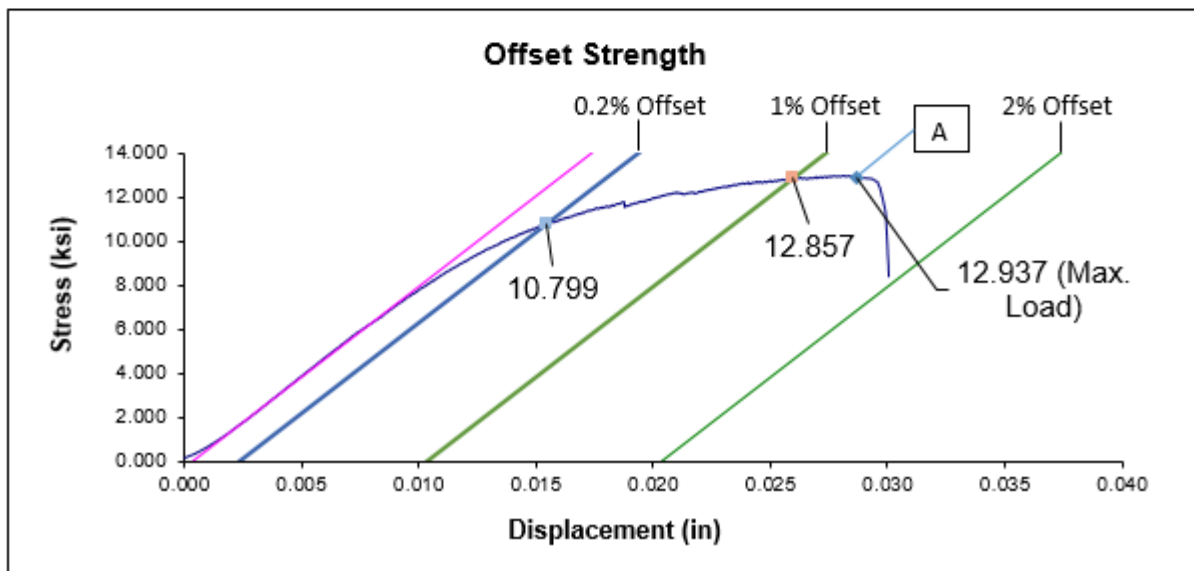
3.1 Layup

[45/0/-45/90]3S

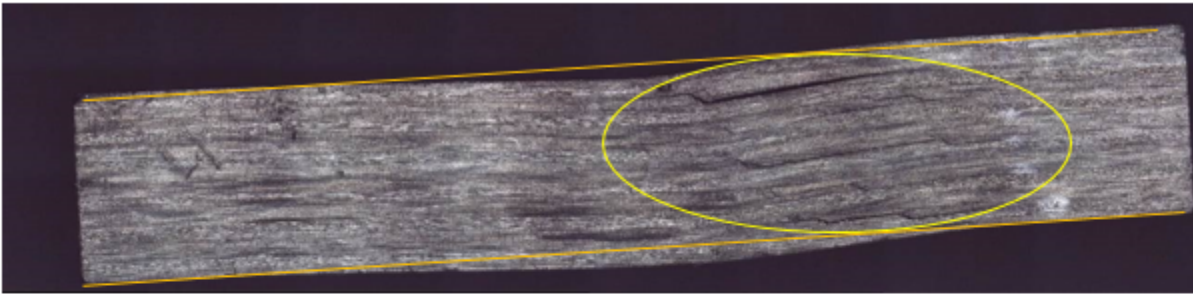
3.2 Objective

To investigate the failure mode at Max. Load. Investigation specimens were taken from the same panels with NCAMP Qualification and it took place after Qualification specimens were tested.

3.3 Result



[A] Failure mode at Max. Load: Inelastic and Interlaminar Shear.

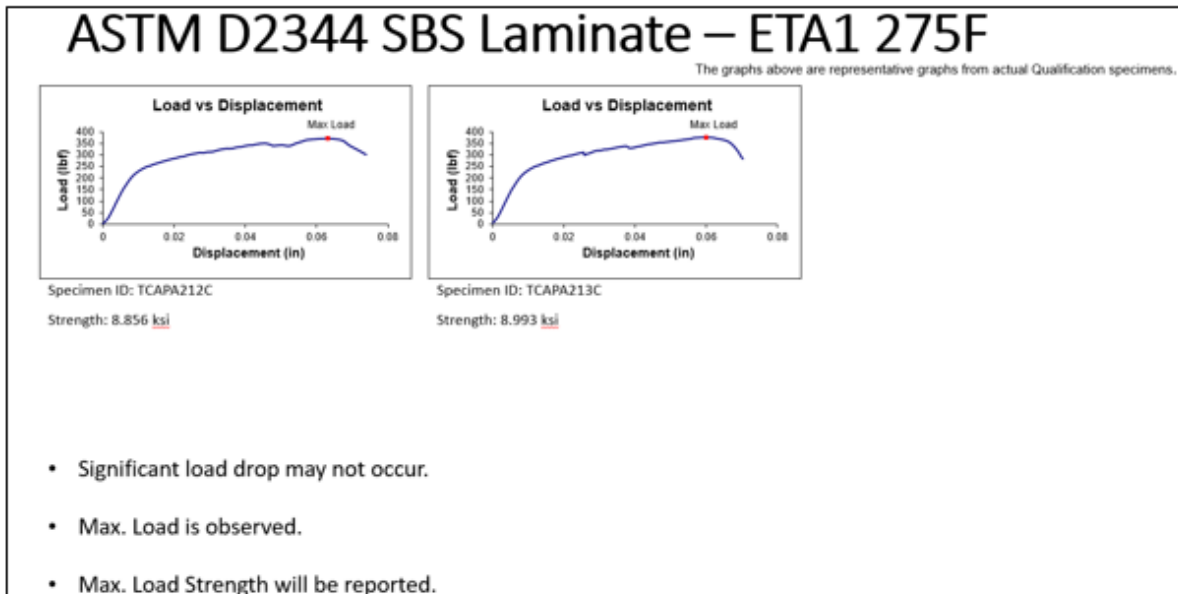


3.4 Conclusion

Based on this investigation, SBS Laminate at RTA primary failure modes were inelastic and interlaminar shear at Max. Load, interlaminar shear was the desired primary failure mode for ASTM D2344.

“Consequently, unless mid-plane interlaminar failure has been clearly observed, the short-beam strength determined from this test method cannot be attributed to a shear property, and the use of Eq. 1 will not yield an accurate value for shear strength.”, ASTM D2344/D2344M – 16.

4. SBS Laminate – ETA1 (275F)



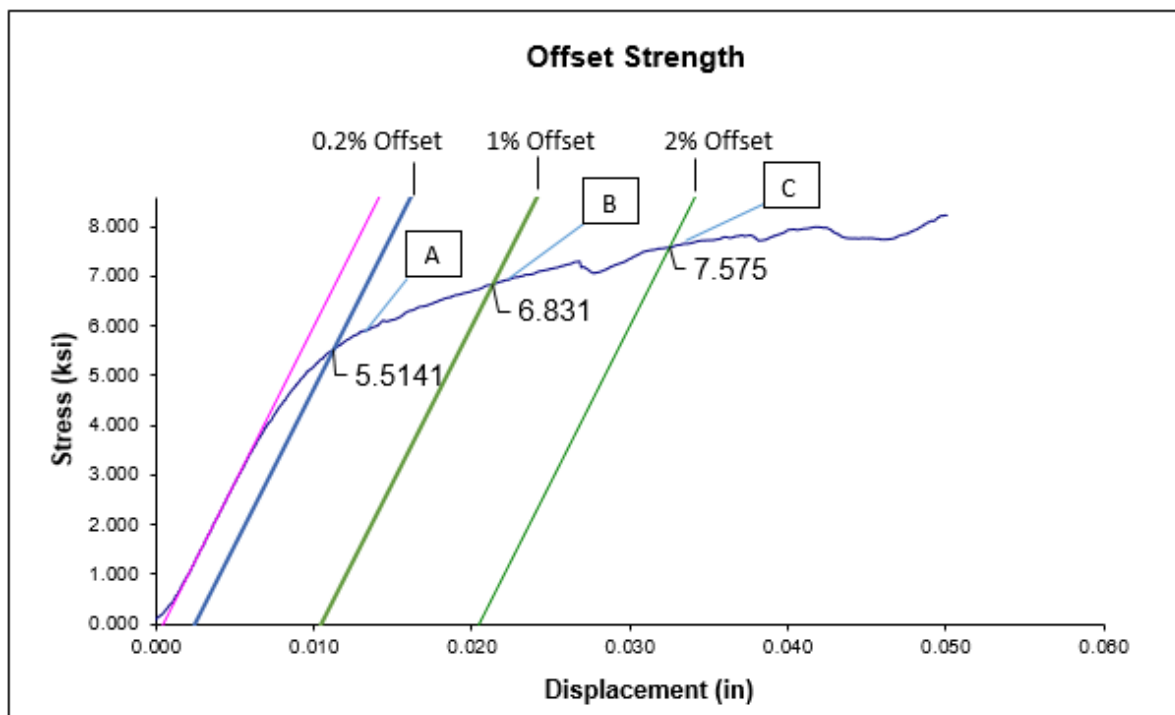
4.1 Layup

[45/0/-45/90]3S

4.2 Objective

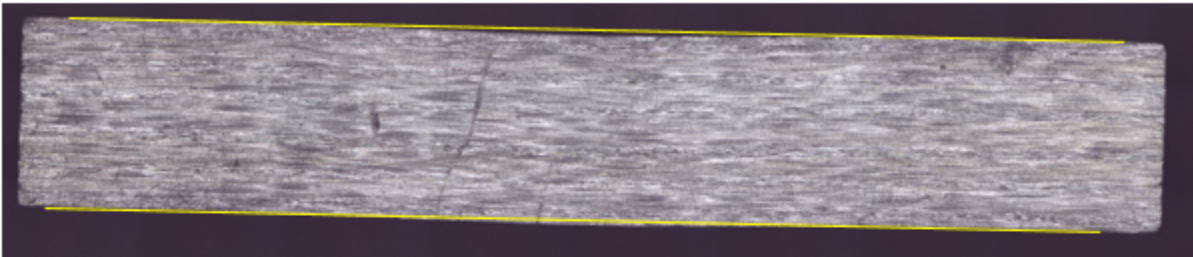
To investigate the failure mode at 0.2% Offset, 1% Offset, and 2% Offset Strength.

4.3 Result

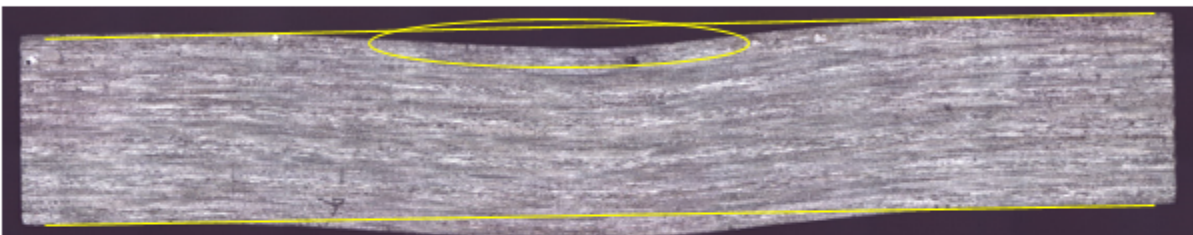


Representative failure modes below were taken from multiple specimens, each specimen was tested up to a specific point [A], [B], and [C] indicated in the graph in order to analyze the failure mode that was done under a microscope.

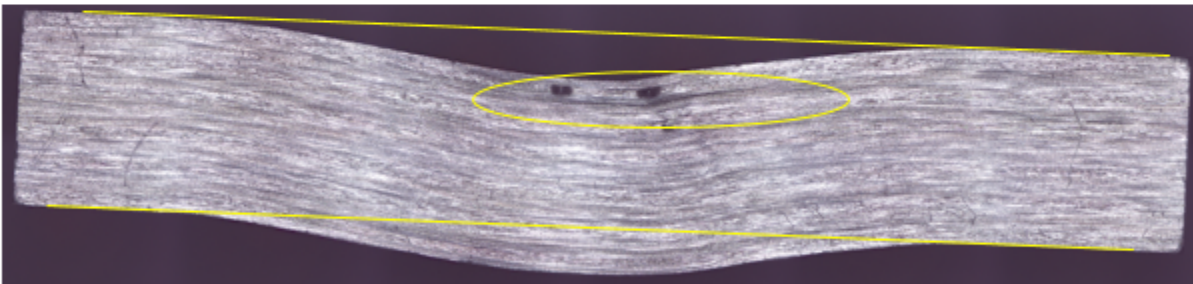
[A] Failure mode at slightly after 0.2% Offset Strength: Inelastic.



[B] Failure mode at slightly after 1% Offset Strength: Inelastic.



[C] Failure mode at slightly after 2% Offset Strength: Inelastic and Interlaminar Shear.



4.4 Conclusion

Based on this investigation, SBS Laminate at 275F ETA1 failure mode was started with inelastic although interlinear shear (minimal) was observed at 2% Offset load, inelastic was not the desired primary failure mode for ASTM D2344.

“Consequently, unless mid-plane interlaminar failure has been clearly observed, the short-beam strength determined from this test method cannot be attributed to a shear property, and the use of Eq. 1 will not yield an accurate value for shear strength.”, ASTM D2344/D2344M – 16.

5. 0 degree Flex – CTA

ASTM D790 Flex – CTA

The graphs above are representative graphs from actual Qualification specimens.

Load vs. Displacement

Specimen ID: TCATA111D
Strength: 239.258 ksi

- Significant load drop is observed.
- Max. Load is observed.
- Max. Load Strength will be reported.

5.1 Layup

[0]₂₂

5.2 Objective

To analyze the failure mode at Max. Load.

5.3 Qualification Failure Mode Specimen Picture

- Failure mode: Compression and Tension.



6. 0 degree Flex – RTA

ASTM D790 Flex – RTA

The graphs above are representative graphs from actual Qualification specimens.

Load vs. Displacement

Specimen ID: TCATA113AD
Strength: 218.258 ksi

- Significant load drop is observed.
- Max. Load is observed.
- Max. Load Strength will be reported.

6.1 Layup

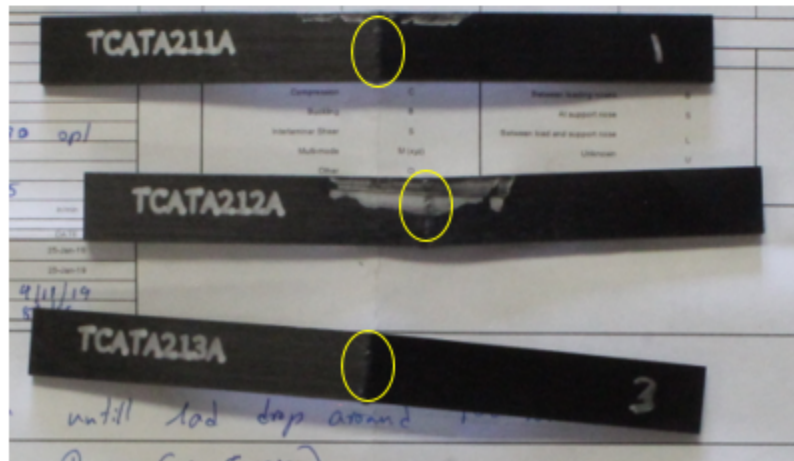
[0]₂₂

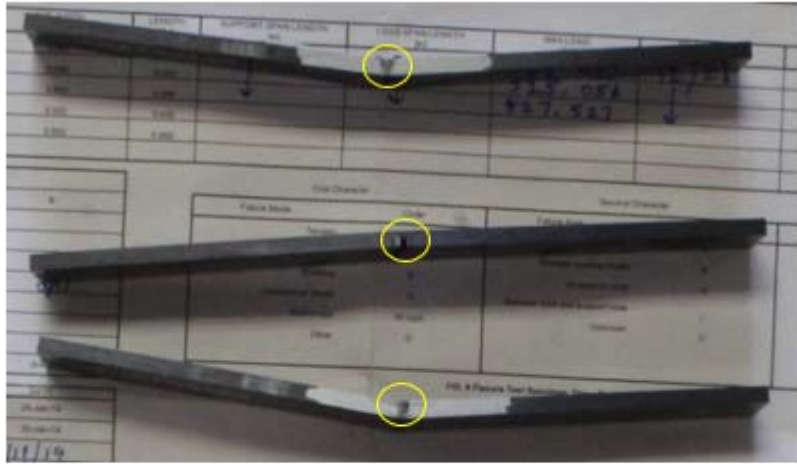
6.2 Objective

To analyze the failure mode at Max. Load.

6.3 Qualification Failure Mode Specimen Picture

- Failure mode: Compression and Tension.





7. 0 degree Flex – ETA1 (275F)

ASTM D790 Flex – ETA1 275F

The graphs above are representative graphs from actual Qualification specimens.

Load vs. Displacement

Specimen ID: TCATB211C
Strength: 140.079 ksi

- Significant load drop is observed.
- Max. Load is observed.
- Max. Load Strength will be reported.

7.1 Layup

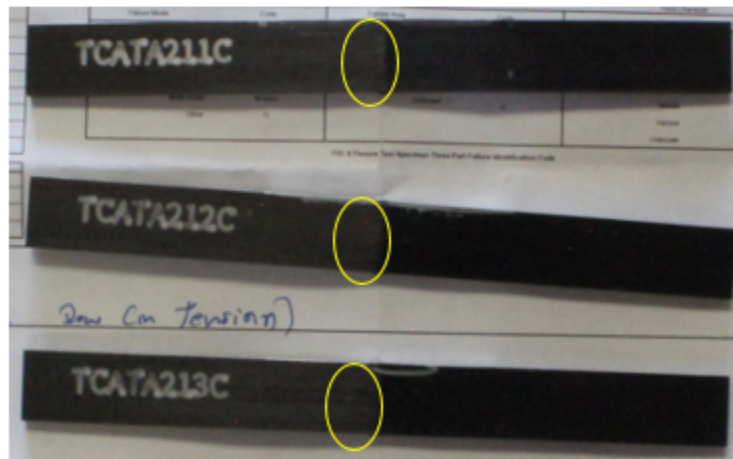
[0]₂₂

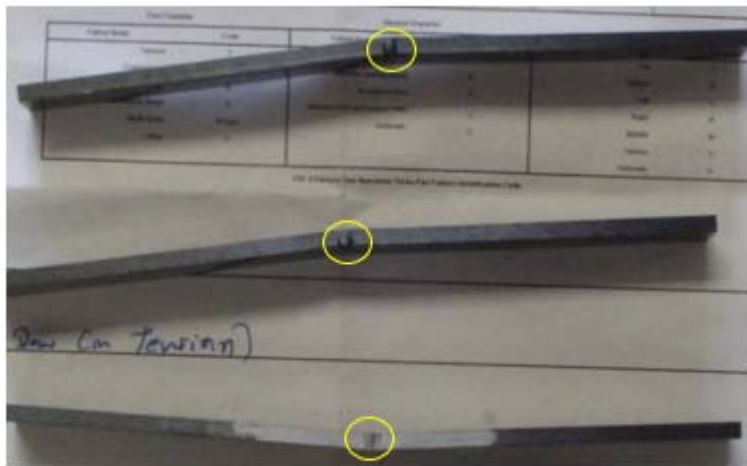
7.2 Objective

To analyze the failure mode at Max. Load.

7.3 Qualification Failure Mode Specimen Picture

- Failure mode: Compression.





8. 0 degree Flex – ETW (275F)

ASTM D790 Flex – ETW 275F

The graphs above are representative graphs from actual Qualification specimens.

Load vs. Displacement

Specimen ID: TCATA212E

Strength: 117.779 ksi

- Significant load drop is observed.
- Max. Load is observed.
- Max. Load Strength will be reported.

8.1 Layup

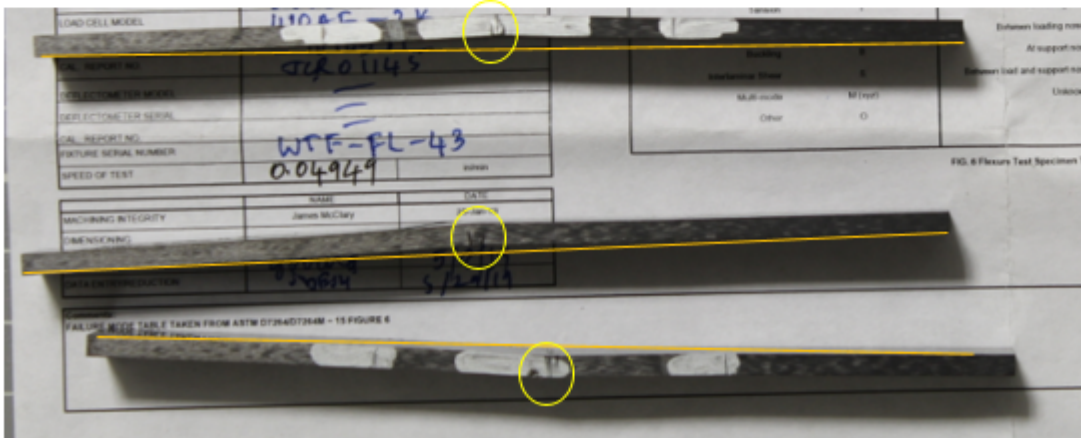
[0]₂₂

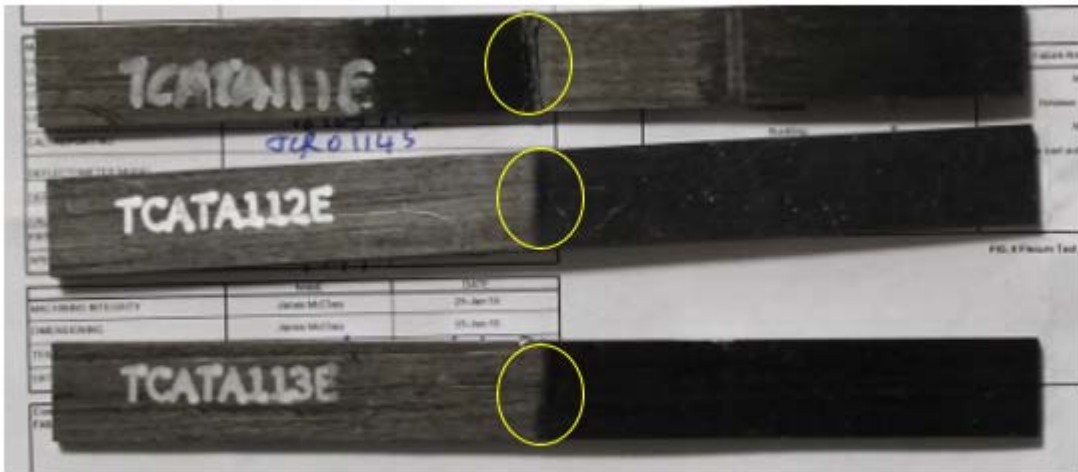
8.2 Objective

To analyze the failure mode at Max. Load.

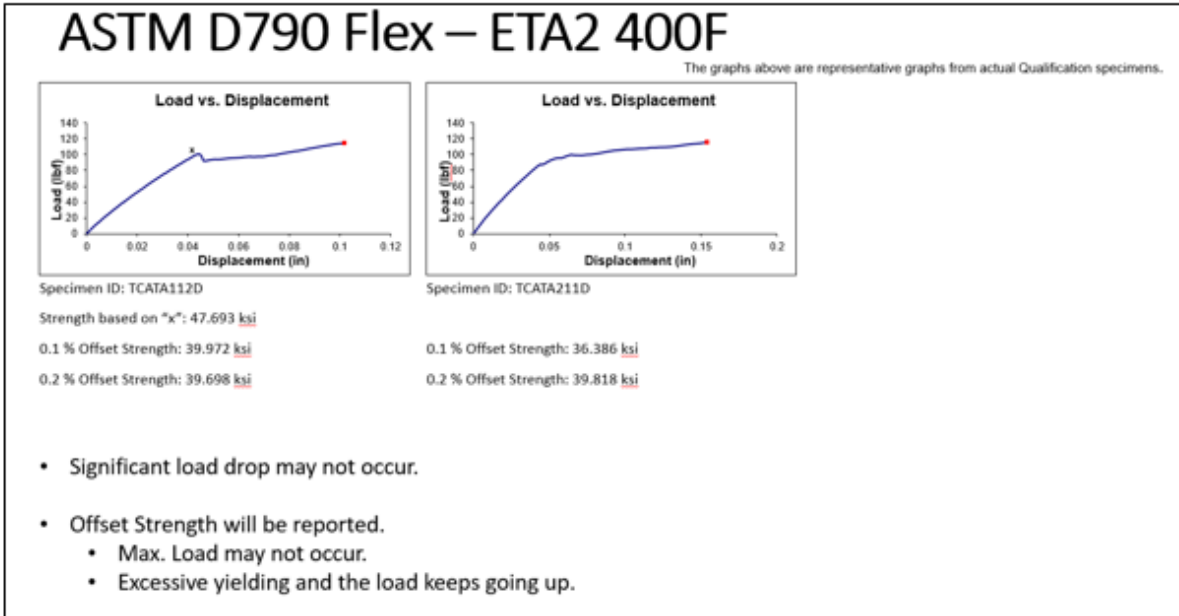
8.3 Qualification Failure Mode Specimen Picture

- Failure mode: Compression.





9. 0 degree Flex - ETA2 (400F)



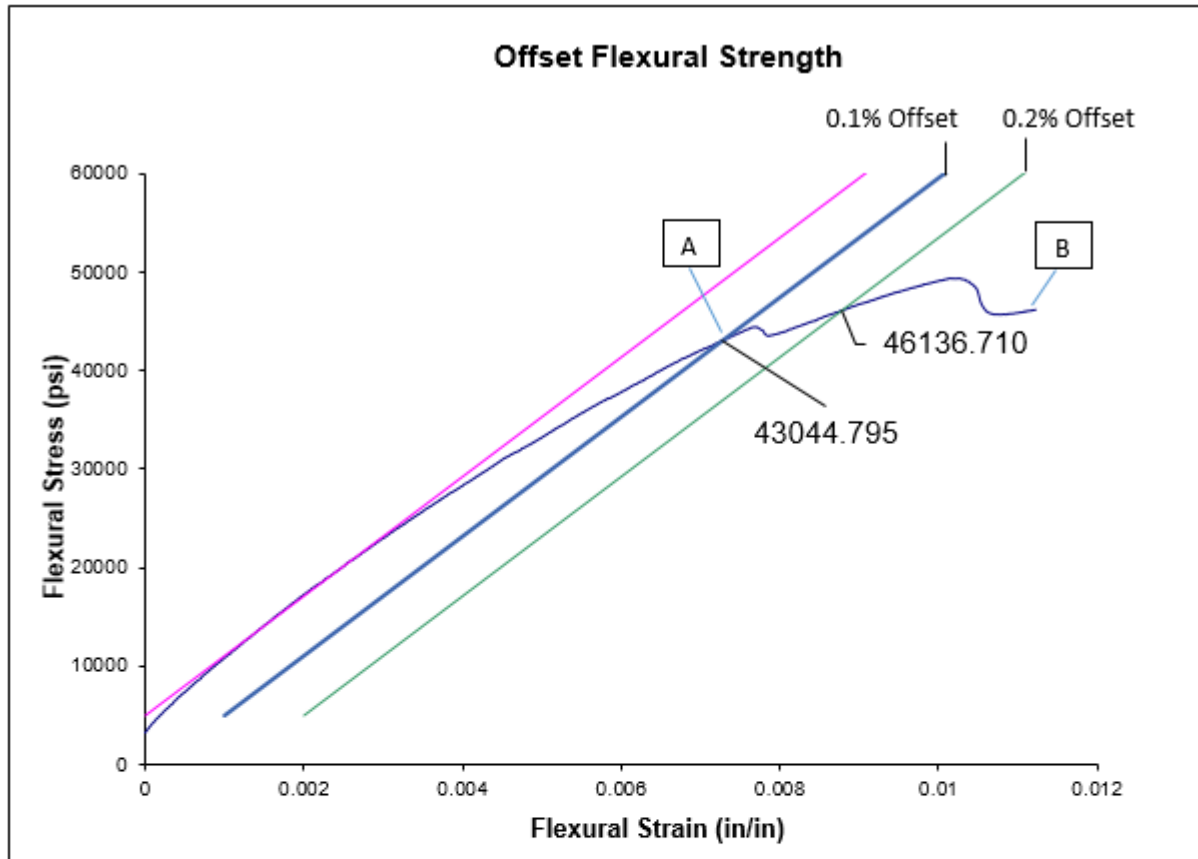
9.1 Layup

[0]₂₂

9.2 Objective

To investigate the failure mode at/around 0.1% Offset and 0.2% Offset Strength.

9.3 Results

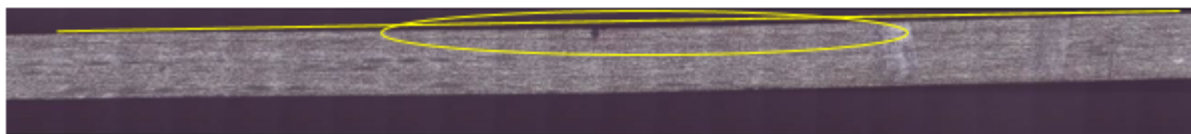


Representative failure modes below were taken from multiple specimens, each specimen was tested up to a specific point [A] and [B] indicated in the graph in order to analyze the failure mode that was done under a microscope.

[A] Failure mode at 0.1% Offset Strength: none.

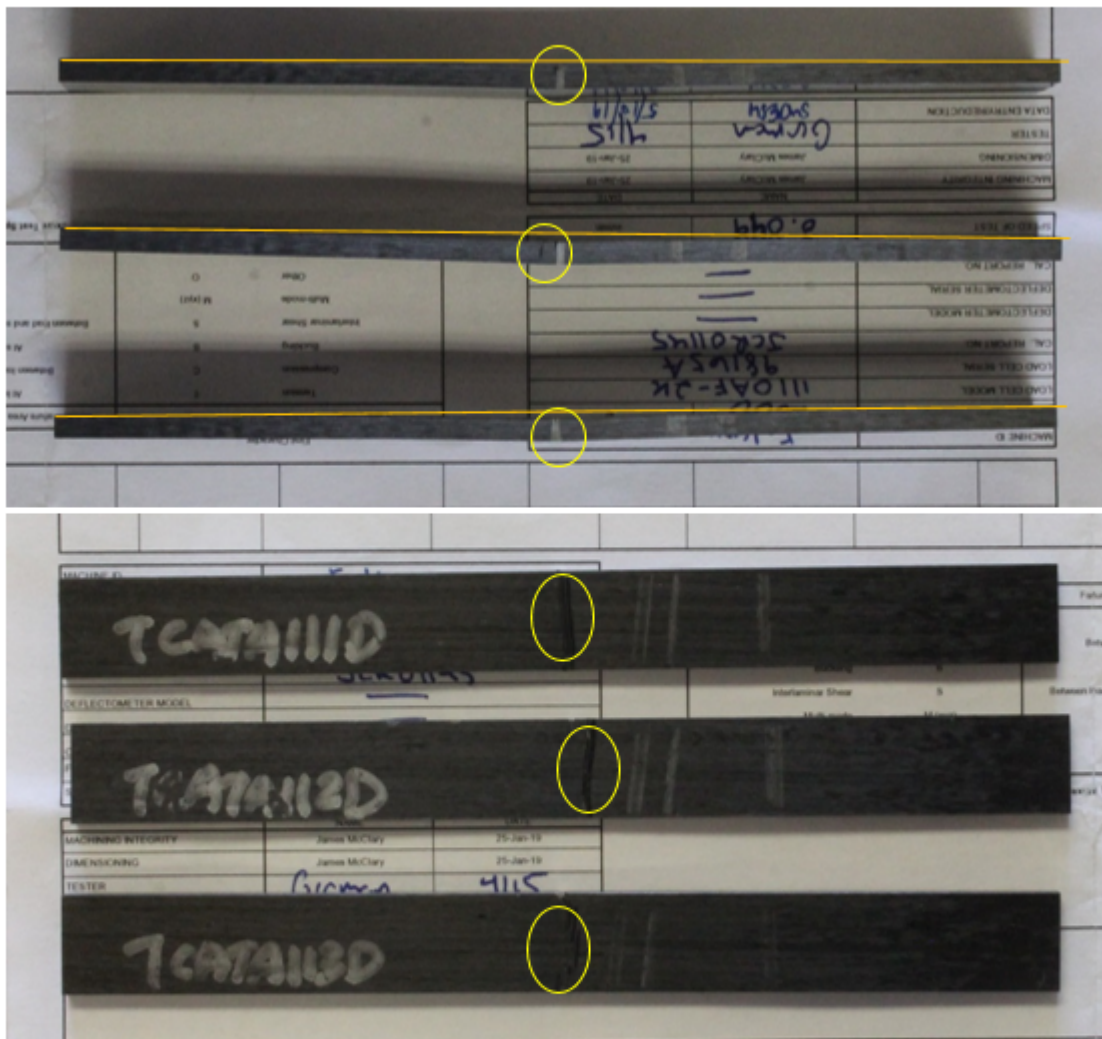


[B] Failure mode at slightly after 0.2% Offset Strength: Inelastic.



9.4 Qualification Failure Mode Specimen Picture

- Failure mode: Compression.



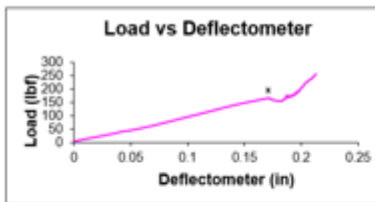
9.5 Conclusion

Based on this investigation, 0 degree Flex at 400F ETA2 failure mode was initiated with inelastic at 0.2% Offset Strength from the investigation testing. However, Qualification specimen testing was stopped at 0.1" to 0.15" displacement and compression failure mode was observed even though there may no significant load drop represented in the graph.

10. ILT - ETA2 (400F)

ASTM D6415 ILT – ETA2 400F

The graphs above are representative graphs from actual Qualification specimens.



Specimen ID: TCAMAB11D

Strength based on "x": 3.524 ksi

- Significant load drop is not observed.
- Max. Load is not observed.
- **Invalid failure mode (compression) at the curve area is observed at "x".**
- **Strength will NOT be reported. The material and test did no deliver any useful data, the material softening.**

10.1 Layup

[0]₃₀

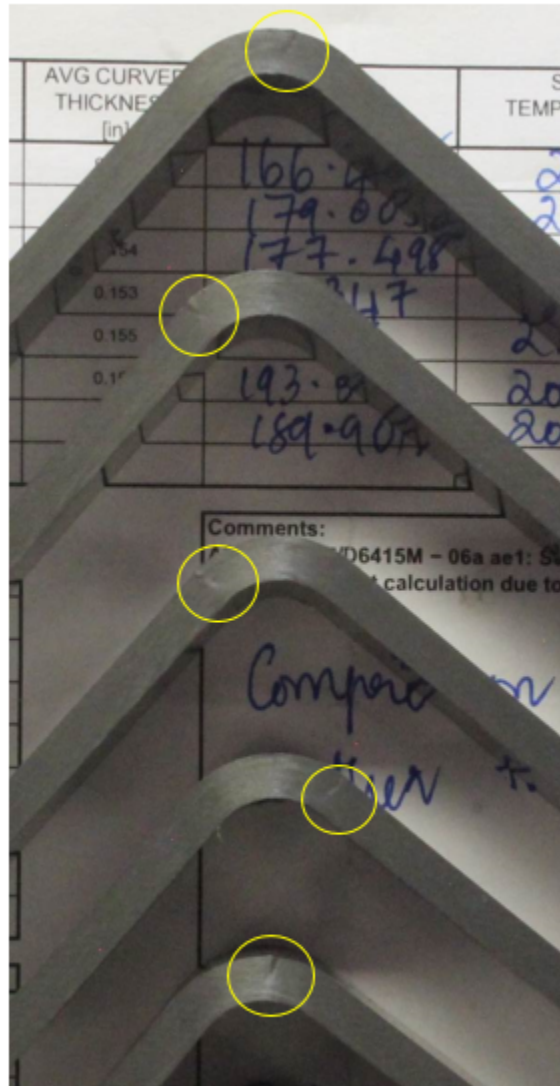
10.2 Objective

To analyze the failure mode at "x".

10.3 Result

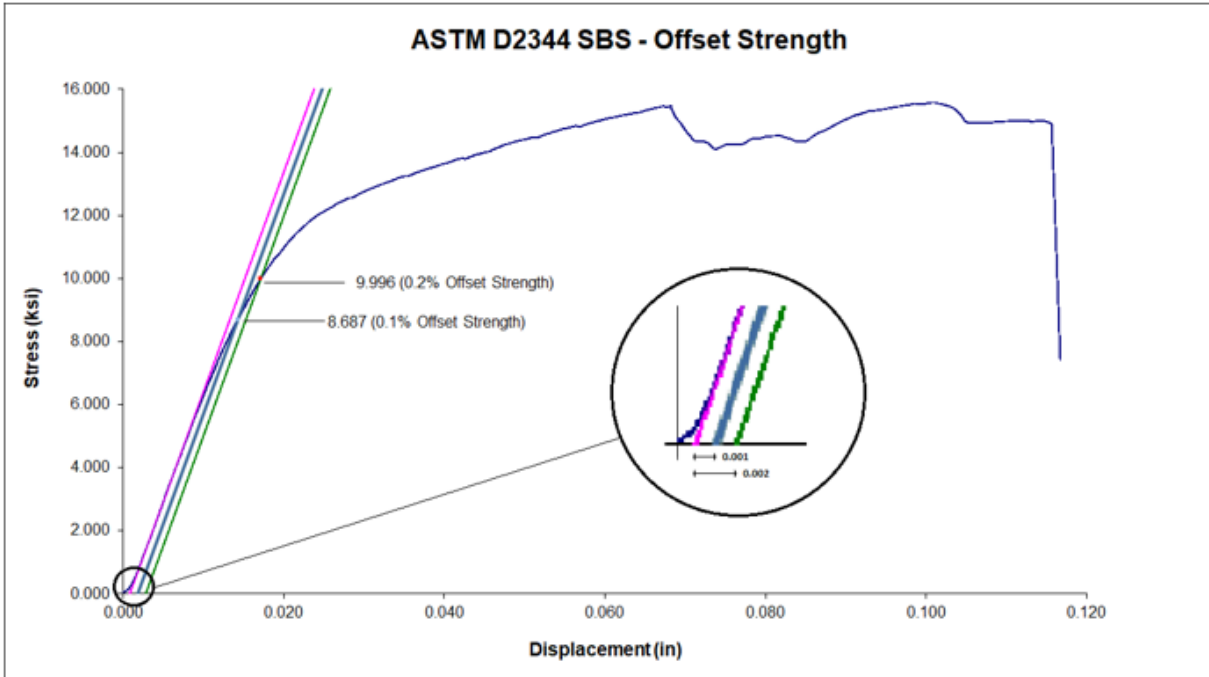
None. After the Qualification specimens were tested, there was insufficient materials/specimens for further study.

10.4 Qualification Failure Mode Pictures



Note: Testing was stopped at 170-190lb.

11. Offset Strength Guideline on how to Calculate Offset Strength



Appendix C – Phase 2 Investigation: ASTM D3846

Phase 2 Investigation: ASTM D3846

1. Objective

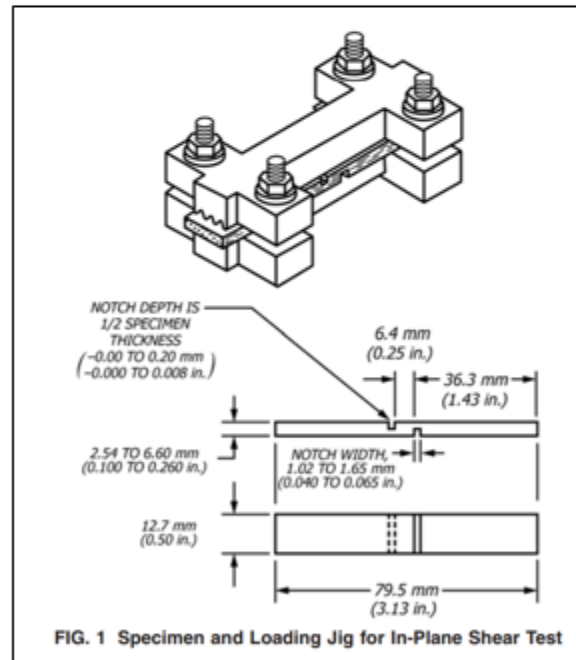
To search for an alternative test method that is comparable to ASTM D2344 that yields in an acceptable shear failure mode. ASTM D3846 Standard Test Method for In-Plane Shear Strength of Reinforced Plastics was selected for this study.

2. ASTM D3846 Background

2.1 ASTM Scope

1.1 This test method covers the determination of the in-plane shear strength of reinforced thermosetting plastics in flat sheet form in thicknesses ranging from 2.54 to 6.60 mm (0.100 to 0.260 in.). This protocol is not for reinforced pultruded thermoset products, which may use Test Method [D2344/D2344M](#).

2.2 ASTM Specimen and Loading Jig



“Compression Tool—A compression tool for applying the load to the test specimen, such as those shown in Figs. 1 of Test Method D695.”, ASTM D3846.

3. ASTM D3846 Investigation Test Plan

3.1 Test Matrix

Test Method	Specimen Configuration	RTA	ETA 275F
D3846 0 deg	Square Notch*	2 specimens	2 specimens
D3846 0 deg	Round Notch**	2 specimens	2 specimens



Note: The radius target of the notch is 0.03"

3.2 Specimen/Panel Traceability

All of the specimens were machined from the same panel.

3.3 Additional Apparatus

Microscope/digital camera were used to record the testing.

3.4 Layup Sequence

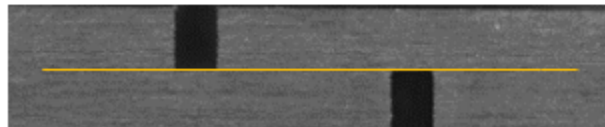
[0]₃₄

3.5 Nominal Thickness

0.1836"

4 Actual ASTM D3846 Specimen Picture – Notches

4.1 Square Notch



4.2 Round Notch



5 ASTM D3846 Test Result

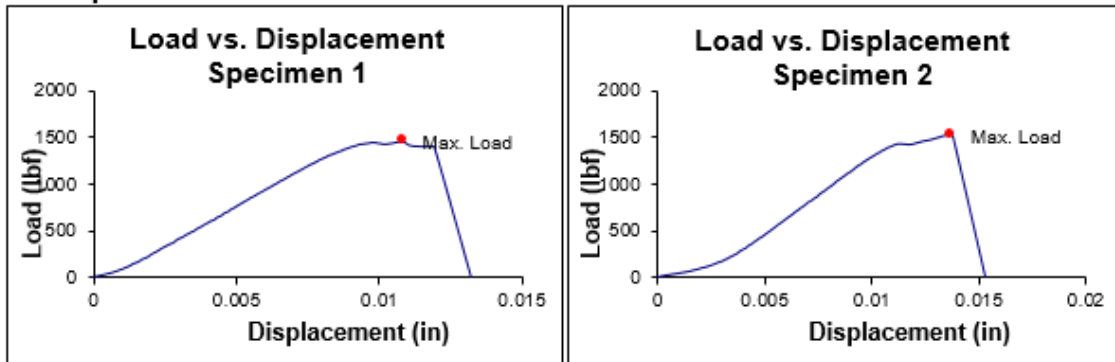
Test Method	Specimen Configuration	Specimen #	In-Plane Shear Strength [ksi]	
			RTA (Failure Mode)	275F ETA (Failure Mode)
D3846 0 deg	Square Notch	1	11.685 (Gage Section Shear)	6.786 (Gage Section Shear)
		2	12.190 (Gage Section Shear)	7.261 (Gage Section Shear)
D3846 0 deg	Round Notch	1	13.472 (Gage Section Shear)	8.695 (Gage Section Shear)
		2	13.463 (Gage Section Shear)	7.267 (Gage Section Shear)

Note: D3846 and D2344 Strength comparison tables are available on the last page.

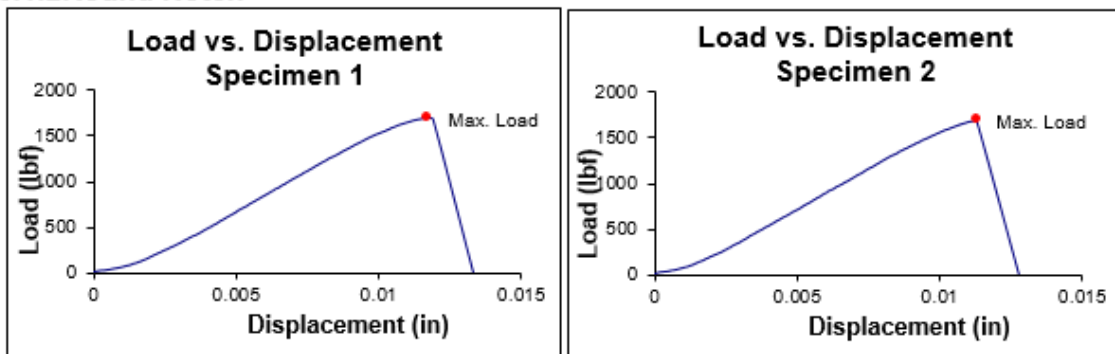
6 ASTM D3846 Load vs Displacement Graphs

6.1 RTA

6.1.1 Square Notch

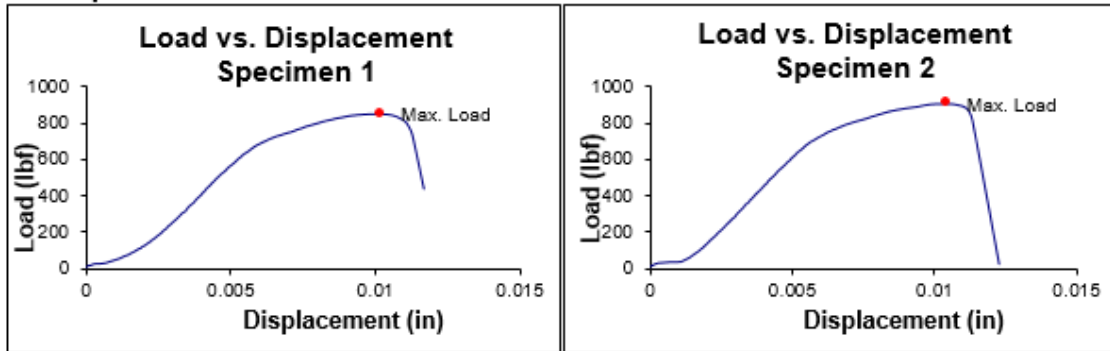


6.1.2 Round Notch

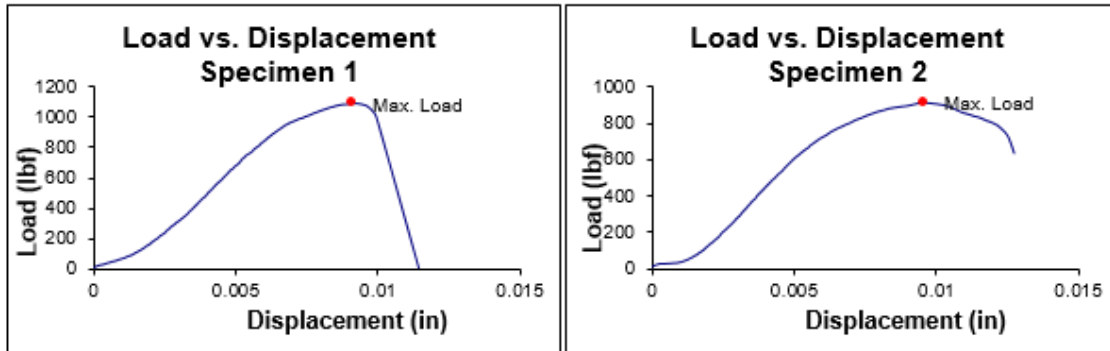


6.2 ETA (275F)

6.2.1 Square Notch



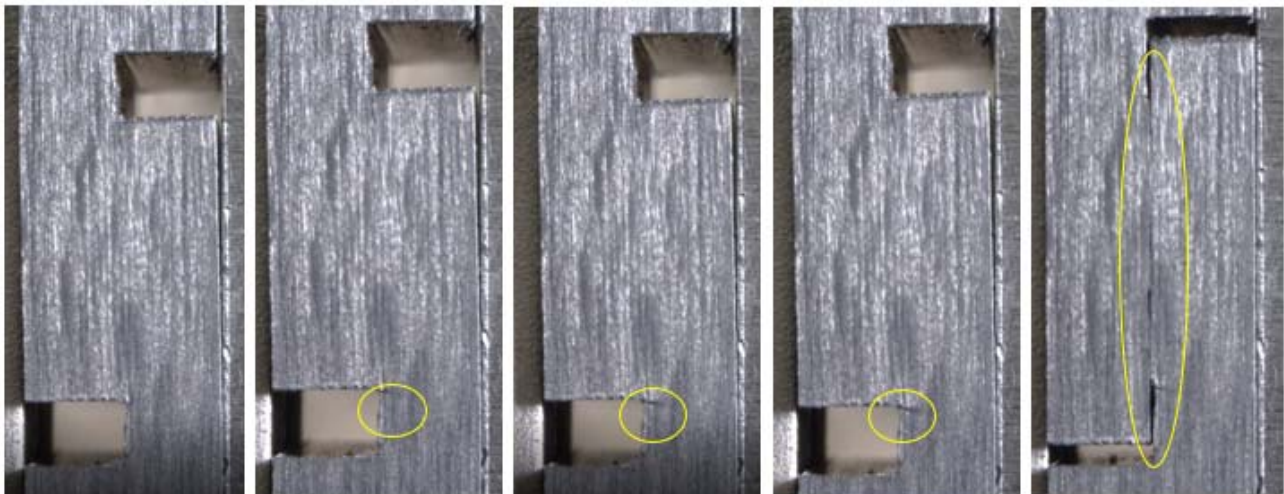
6.2.2 Round Notch



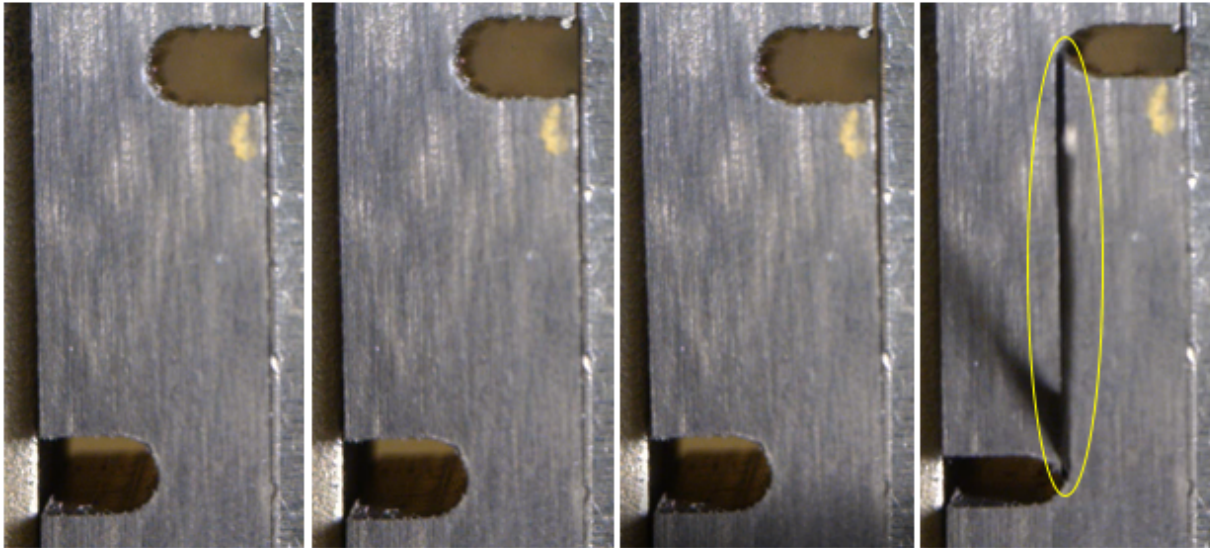
7 ASTM D3846 Specimen Pictures During Testing (Taken from Recorded Videos)

7.1 RTA

7.1.1 Square Notch

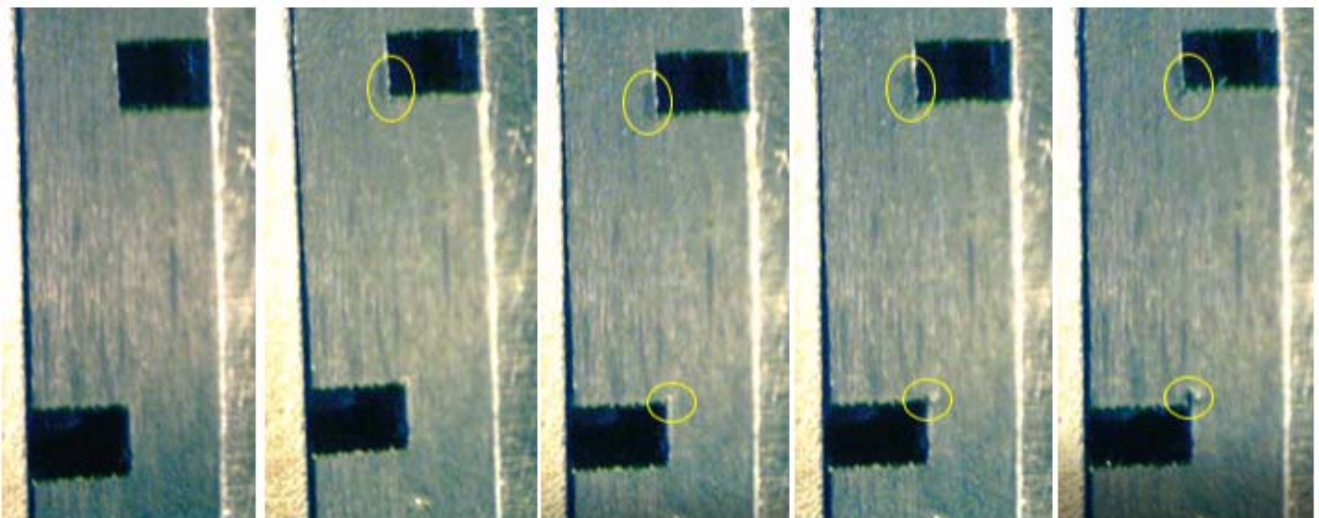


7.1.2 Round Notch

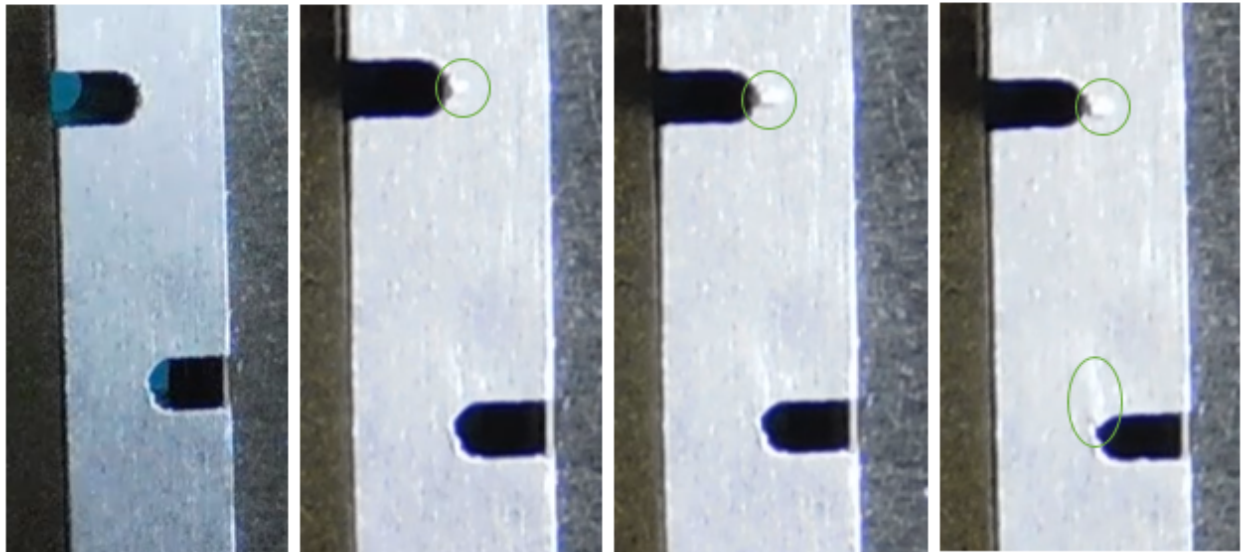


7.2 ETA1 (275F)

7.2.1 Square Notch



7.2.2 Round Notch

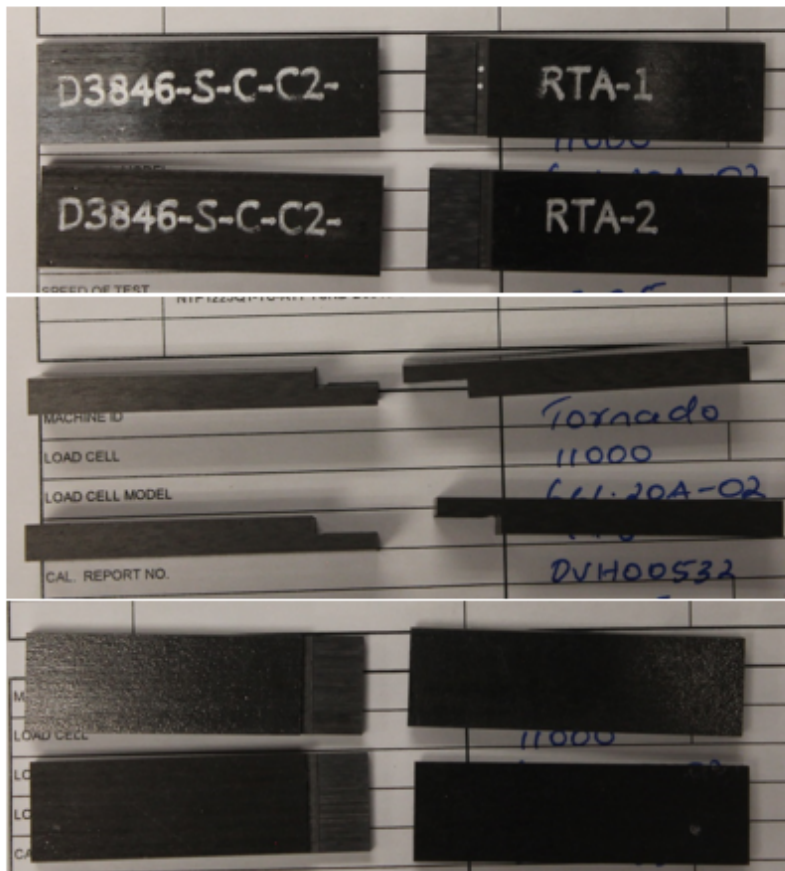


8 ASTM D3846 Failure Mode Pictures

8.1 RTA

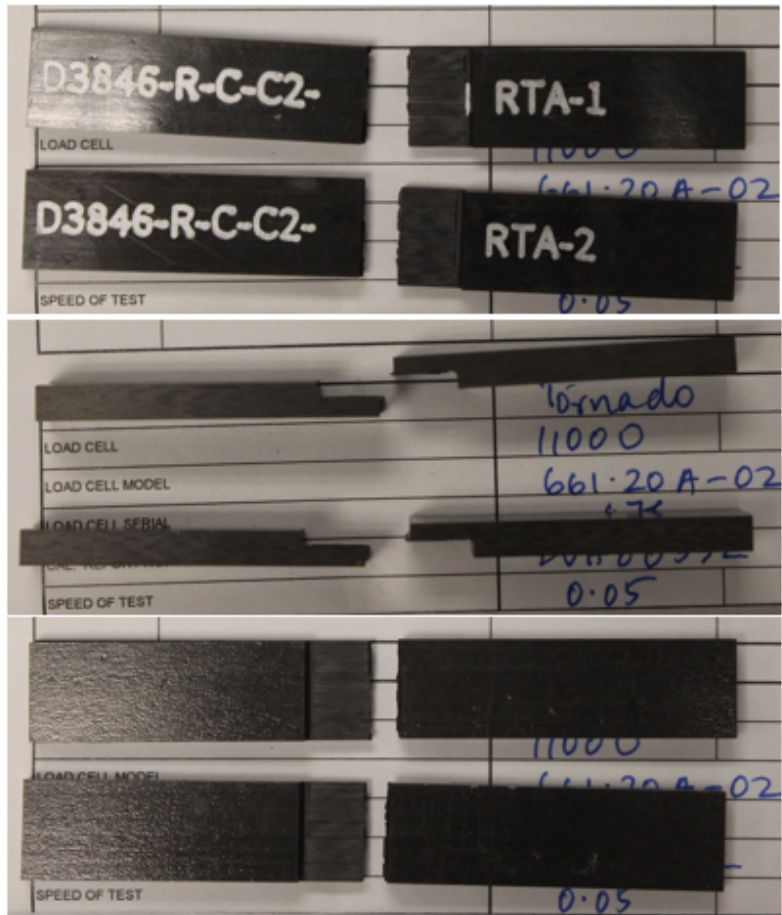
8.1.1 Square Notch

Failure mode: Gage Section Shear



8.1.2 Round Notch

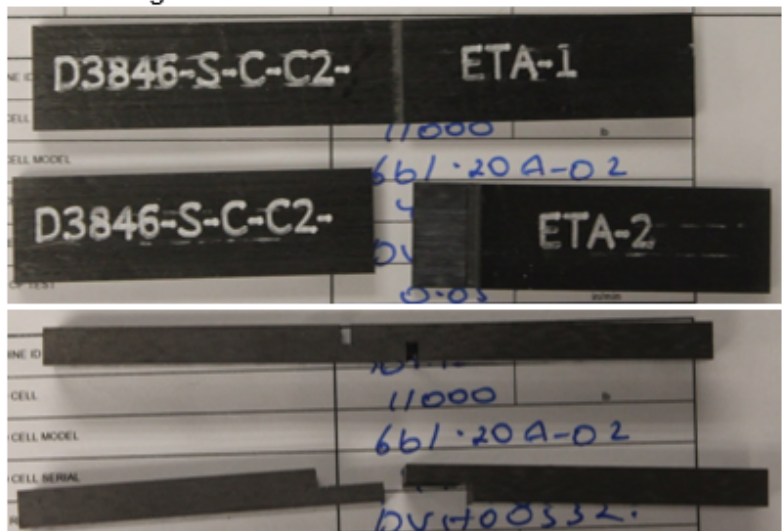
Failure mode: Gage Section Shear

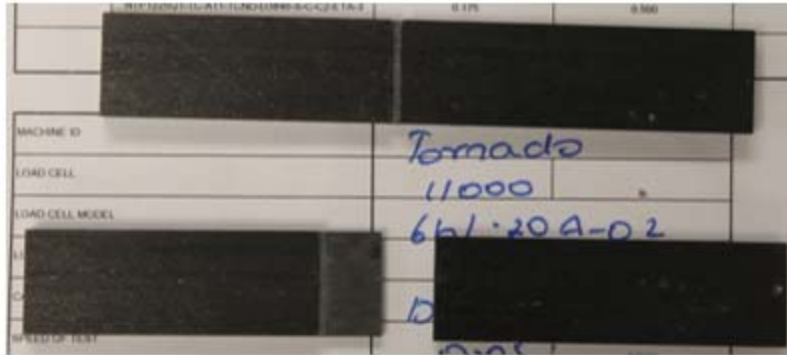


8.2 ETA (275F)

8.2.1 Square Notch

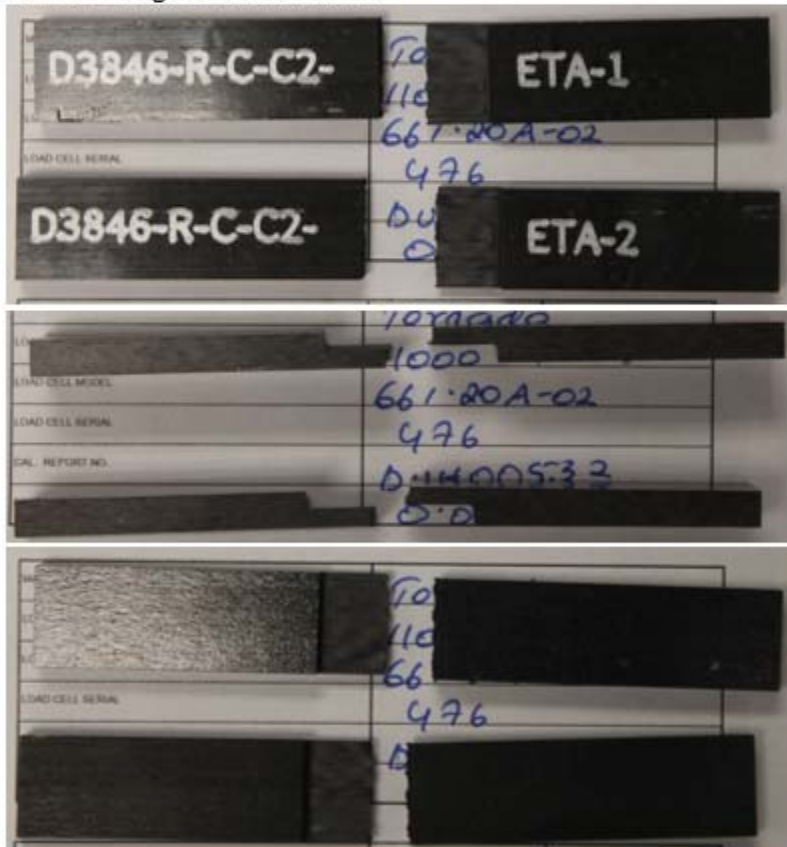
Failure mode: Gage Section Shear





8.2.2 Round Notch

Failure mode: Gage Section Shear



9 ASTM D3846 and D2344 Comparison Tables

ASTM D2344 (taken from Qualification Data)

		RTA		ETA	
Test Temperature [°F]		70		275	
Moisture Conditioning Equilibrium at T, RH		Ambient		Ambient	
		Normalized	Measured	Normalized	Measured
SBS 0.2% Offset Strength [ksi]	Mean		10.370		5.277
	Minimum		9.861		4.512
	Maximum		11.236		5.826
	C.V.(%)		2.773		6.190
	No. Specimens	19		19	
	No. Prepreg Lots	3		3	
SBS 1% Offset Strength [ksi]	Mean		13.057		6.355
	Minimum		12.506		5.352
	Maximum		13.802		6.938
	C.V.(%)		2.125		5.489
	No. Specimens	19		19	
	No. Prepreg Lots	3		3	
SBS 2% Offset Strength [ksi]	Mean		14.126		7.065
	Minimum		13.484		6.002
	Maximum		14.983		7.703
	C.V.(%)		2.218		5.282
	No. Specimens	19		19	
	No. Prepreg Lots	3		3	

ASTM D3846 – Square Notch

		RTA		ETA	
Test Temperature [°F]		70		275	
Moisture Conditioning Equilibrium at T, RH		Ambient		Ambient	
		Normalized	Measured	Normalized	Measured
Double Notch Shear Strength [ksi]	Mean		11.937		7.024
	Minimum		11.685		6.786
	Maximum		12.190		7.261
	C.V.(%)		2.993		4.783
	No. Specimens	2		2	
	No. Prepreg Lots	1		1	

ASTM D3846 – Round Notch

		RTA		ETA	
Test Temperature [°F]		70		275	
Moisture Conditioning Equilibrium at T, RH		Ambient		Ambient	
		Normalized	Measured	Normalized	Measured
Double Notch Shear Strength [ksi]	Mean		13.467		7.981
	Minimum		13.463		7.267
	Maximum		13.472		8.695
	C.V.(%)		0.047		12.648
	No. Specimens	2		2	
	No. Prepreg Lots	1		1	

10 Conclusion

- ASTM D3846 is an appropriate test method for TC1225 T700GC UNI material because it provides an acceptable failure mode and shear property.
- Round notch configuration with 0.03” radius target of the notch appears to yield in less stress concentration at the notch areas. This configuration was selected by the steering committee for ASTM D3846 data listed in the Qualification. This was added as the Qualification program was progressing.