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Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35% RC Prepreg 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 Volume 1 – 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, Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35% RC Material Allowables Statistical Analysis Report NCP-RP-2025-010 Rev –. The qualification material was procured to NCAMP Material Specification NMS 380/1 Rev – dated May 2, 2024. The qualification test panels were cured in accordance with NCAMP Process Specification NPS 83800 Rev B dated October 22, 2024 using baseline cure cycle “C”. The NCAMP Test Plan NTP 3800Q1 Rev C 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 Volume 1. 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 Volume 1 are adequate for the given program.

Aircraft companies should not use the data published in this report without specifying NCAMP Material Specification NMS 380/1. NMS 380/1 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 380/1.* NMS 380/1 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
ν_{21}^c	minor 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	Cured 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

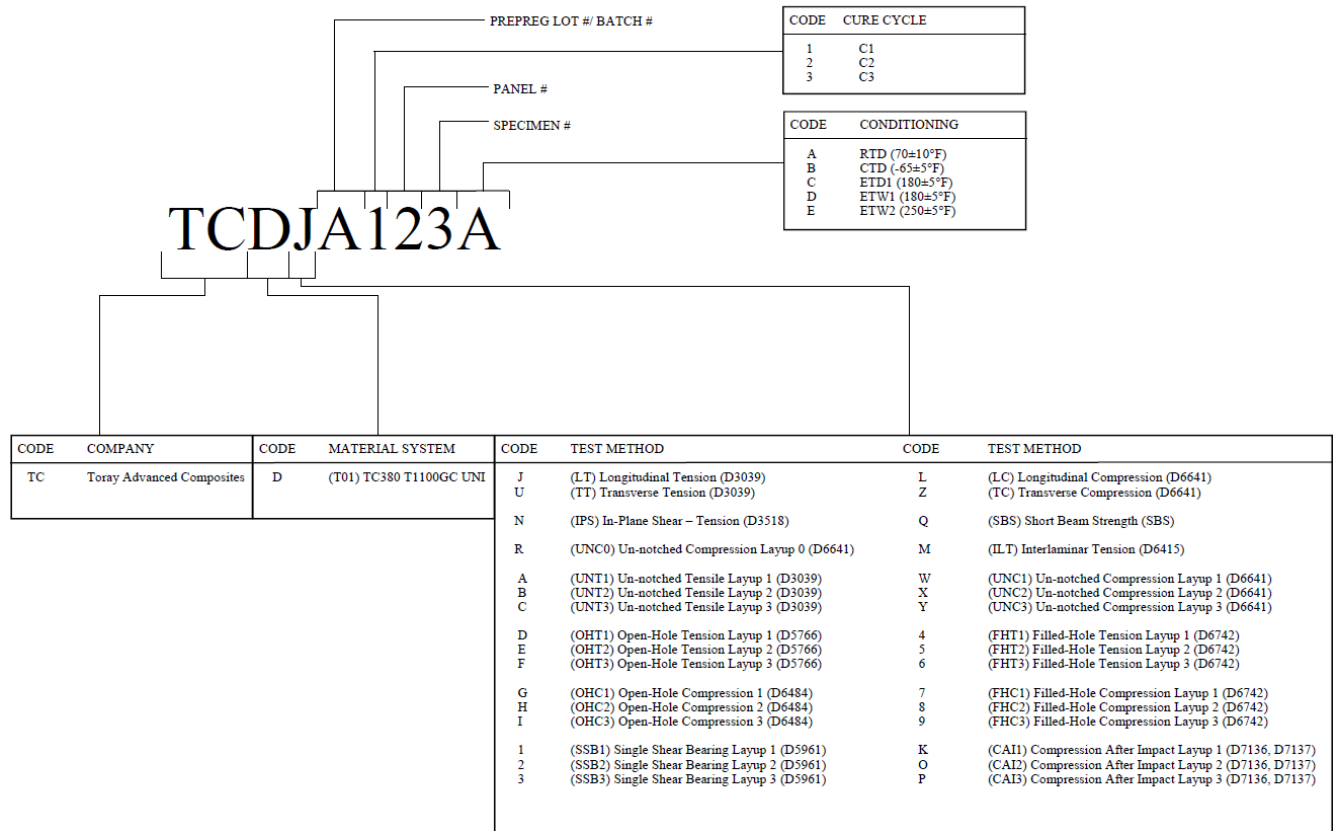


Figure 1-1: Naming Format

1.4 References

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:

Cured Laminate Physical Testing

- ASTM D792-20 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- ASTM D2734-16 – Standard Test Methods for Void Content of Reinforced Plastics
- ASTM D3171-22 – Standard Test Methods for Constituent Content of Composite Materials
- ASTM D7028-07(2024) – Standard Test Method for Glass Transition Temperature (DMA T_g) of Polymer Matrix Composites by Dynamic Mechanical Analysis (DMA)
- ASTM E2580-24 – Standard Practice for Ultrasonic Testing of Flat Panel Composites and Sandwich Core Materials Used in Aerospace Applications

Lamina/Laminate Level Testing and Fluid Sensitivity Testing

- ASTM D2344/D2344M-22 – 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 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 D5766/D5766M-23 – Standard Test Method for Open Hole Tensile Strength of Polymer Matrix Composite Laminates
- ASTM D5961/D5961M-23 – Standard Test Method for Bearing Response of Polymer Matrix Composite Laminates
- ASTM D6415/D6415M-22 – Standard Test Method for Measuring the Curved Beam Strength of a Fiber-Reinforced Polymer-Matrix Composite
- ASTM D6484/D6484M-23 – Standard Test Method for Open-Hole Compressive Strength of Polymer Matrix Composite Laminates
- ASTM D6641/D6641M-23 – Standard Test Method for Compressive Properties of Polymer Matrix Composite Laminates Using a Combined Loading Compression (CLC) Test Fixture
- ASTM D6742/D6742M-23 – Standard Practice for Filled-Hole Tension and Compression Testing of Polymer Matrix Composite Laminates

- ASTM D7136/D7136M-20 – Standard Test Method for Measuring the Damage Resistance of a Fiber-Reinforced Polymer Matrix Composite to a Drop-Weight Impact Event
- ASTM D7137/D7137M-23 – Standard Test Method for Compressive Residual Strength Properties of Damaged Polymer Matrix Composite Plates
- ASTM D910-21 – Standard Specification for Leaded Aviation Gasolines
- ASTM D1141-98(2021) – Standard Practice for Preparation of Substitute Ocean Water

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 cured separately as shown in Figure 1-2 unless otherwise specified. Panels 1, 3, and 5 were cured in a single cure cycle. Panels 2, 4, and 6 were cured in a single cure cycle separate from panels 1, 3, and 5.

The term "cure cycle" means a single run through the autoclave or oven, with same processing parameters. The specimen selection methodology in Figure 1-2 are presented in "Number of Batches x Number of Cure Process x Number of Specimens" format throughout this document. Specifically, Figure 1-2 depicts a 3x2x3 specimen selection methodology.

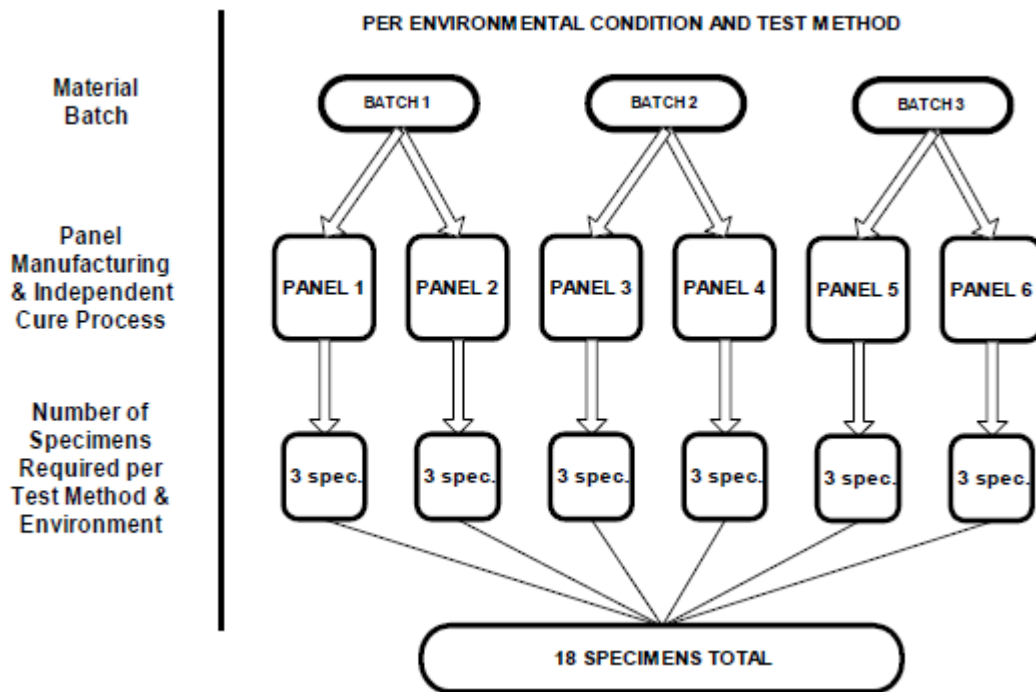


Figure 1-2: Specimen Selection Methodology

All panels were fabricated in accordance with NCAMP Process Specification NPS 83800 using baseline cure cycle "C".

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

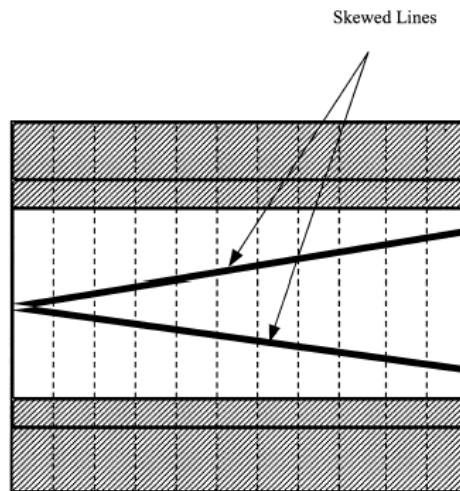


Figure 1-3: Specimen Traceability Line

1.5.2 Specimen & Testing Details

1.5.2.1 Tabbing

1.5.2.1.1 Longitudinal Tension (LT)

Longitudinal Tension specimens were tabbed (beveled) with FM300-2M and Epoxyglass™ G10/FR4 material, cured at 250°F for 90 minutes.

1.5.2.2 Specimen Dimensions & Test Configuration

For SBS specimens, a span of 4T was used where T was the average thickness of the 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.

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

1.5.2.4 Specimen Strain Device Used

Corresponding Gage ID can be obtained from Appendix 1 of NTP3800Q1 Rev B.

Uniaxial gages were used on:

- All of CTD Tension specimens except Longitudinal Tension specimens.
- All conditions of combined loading compression specimens except Longitudinal Compression specimens.
- Two RTD Tension specimens except Longitudinal Tension for obtaining full stress strain curves.
- 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 of CTD Longitudinal Tension specimens.
- All conditions of Longitudinal Compression specimens.
- Two RTD Longitudinal Tension specimens for obtaining full stress strain curves.

Uniaxial extensometers were used on:

- All of RTD, ETD1, ETW1 and ETW2 Tension specimens except Longitudinal Tension specimens.

Biaxial extensometers were used on:

- All of RTD, ETD1, ETW1 and ETW2 Longitudinal Tension specimens.
- All conditions of IPS Fluid Sensitivity 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 Code	Test Type and Direction	Property	Number of Batches x No. of Panels x No. of Specimens				
				Test Temperature/Moisture Condition				
				CTD (-65°F)	RTD (70°F)	ETD1 (180°F)	ETW1 (180°F)	ETW2 (250°F)
[0] ₁₀	LT	ASTM D3039 Longitudinal Tension	Strength, Modulus & Poisson's Ratio	3x2x3	3x2x3 ³	3x2x3	3x2x3	3x2x3
[0] ₂₀	LC	ASTM D6641 Longitudinal Compression	Modulus & Poisson's Ratio	3x2x3	3x2x3 ^{1&3}	3x2x3	3x2x3	3x2x3
[90] ₁₈	TT	ASTM D3039 Transverse Tension	Strength & Modulus	3x2x3	3x2x3 ³	3x2x3	3x2x3	3x2x3
[90] ₂₀	TC	ASTM D6641 Transverse Compression	Strength & Modulus	3x2x3	3x2x3 ^{1&3}	3x2x3	3x2x3	3x2x3
[90/0/90] ₇	UNC0	ASTM D6641 Unnotched Cross-Ply Compression 0 ⁴	Strength & Modulus	3x2x3	3x2x3 ^{1&3}	3x2x3	3x2x3	3x2x3
[45/-45] _{4S}	IPS	ASTM D3518 In-Plane Shear ²	0.2% Offset Strength, 5% Strain Strength & Modulus	3x2x3	3x2x3 ³	3x2x3	3x2x3	3x2x3
[0] ₃₂	SBS	ASTM D2344 Short Beam Strength	Strength	3x2x3	3x2x3	1x2x3 ⁵	3x2x3	3x2x3

Notes:

1. Back-to-back strain gages are needed on the first two specimens. If no buckling is observed, the remaining modulus specimens will require a strain gage on one side of the specimens only.
2. Gripped length is 1.5 to 2.5 inches on each end of the 10 inches 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.
3. 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.
4. Derive the 0° lamina compressive strength $F_{0^\circ plies}^{cu}$ as follows:

$$F_{0^\circ plies}^{cu} = BF \frac{Pf}{wh}$$

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

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 $[0/90]_n$ s 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

5. Specimens were machined from Batch A panels.

Table 1-2: Lamina Level Test Matrix

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°) Test Type Code	Test Type and Layout ²	Property	Number of Batches x Number of Panels x Number of Test Specimens				
			Test Temperature/Moisture Condition				
			CTD (-65°F)	RTD (70°F)	ETD1 (180°F)	ETW1 (180°F)	ETW2 (250°F)
(25/50/25 - QI) UNT1	ASTM D3039 Un-notched Tension [45/0/-45/90] _{3S}	Strength & Modulus	3x2x3	3x2x3 ³		3x2x3	3x2x3
(10/80/10 - SF) UNT2	ASTM D3039 Un-notched Tension [45/-45/0/45/-45/45/-45/90/45/-45] _S	Strength & Modulus	3x2x3	3x2x3 ³		3x2x3	3x2x3
(50/40/10 - HD) UNT3	ASTM D3039 Un-notched Tension [45/90/-45/0/0/45/0/0/-45/0] _S	Strength & Modulus	3x2x3	3x2x3 ³		3x2x3	3x2x3
(25/50/25 - QI) UNC1	ASTM D6641 Un-notched Compression [45/0/-45/90] _{3S}	Strength & Modulus	3x2x3	3x2x3 ^{1&3}	1x2x3 ⁵	3x2x3	3x2x3
(10/80/10 - SF) UNC2	ASTM D6641 Un-notched Compression [45/-45/0/45/-45/45/-45/90/45/-45] _S	Strength & Modulus	3x2x3	3x2x3 ^{1&3}	1x2x3 ⁵	3x2x3	3x2x3
(50/40/10 - HD) UNC3	ASTM D6641 Un-notched Compression [45/90/-45/0/0/45/0/0/-45/0] _S	Strength & Modulus	3x2x3	3x2x3 ^{1&3}	1x2x3 ⁵	3x2x3	3x2x3
(25/50/25 - QI) OHT1	ASTM D5766 Open Hole Tension [45/0/-45/90] _{3S}	Strength	3x2x3	3x2x3	3x2x3	3x2x3	3x2x3
(10/80/10 - SF) OHT2	ASTM D5766 Open Hole Tension [45/-45/0/45/-45/45/-45/90/45/-45] _S	Strength	3x2x3	3x2x3	1x2x3 ⁵	3x2x3	3x2x3
(50/40/10 - HD) OHT3	ASTM D5766 Open Hole Tension [45/90/-45/0/0/45/0/0/-45/0] _S	Strength	3x2x3	3x2x3	1x2x3 ⁵	3x2x3	3x2x3
(25/50/25 - QI) FHT1	ASTM D6742 Filled Hole Tension [45/0/-45/90] _{3S}	Strength	3x2x3	3x2x3		3x2x3	3x2x3
(10/80/10 - SF) FHT2	ASTM D6742 Filled Hole Tension [45/-45/0/45/-45/45/-45/90/45/-45] _S	Strength	3x2x3	3x2x3		3x2x3	3x2x3
(50/40/10 - HD) FHT3	ASTM D6742 Filled Hole Tension [45/90/-45/0/0/45/0/0/-45/0] _S	Strength	3x2x3	3x2x3		3x2x3	3x2x3
(25/50/25 - QI) OHC1	ASTM D6484 Open Hole Compression [45/0/-45/90] _{3S}	Strength	1x2x3 ⁵	3x2x3 ¹	3x2x3	3x2x3	3x2x3
(10/80/10 - SF) OHC2	ASTM D6484 Open Hole Compression [45/-45/0/45/-45/45/-45/90/45/-45] _S	Strength	1x2x3 ⁵	3x2x3 ¹	1x2x3 ⁵	3x2x3	3x2x3
(50/40/10 - HD) OHC3	ASTM D6484 Open Hole Compression [45/90/-45/0/0/45/0/0/-45/0] _S	Strength	1x2x3 ⁵	3x2x3 ¹	1x2x3 ⁵	3x2x3	3x2x3
(25/50/25 - QI) FHC1	ASTM D6742 Filled Hole Compression [45/0/-45/90] _{3S}	Strength	1x2x3 ⁵	3x2x3		3x2x3	3x2x3
(10/80/10 - SF) FHC2	ASTM D6742 Filled Hole Compression [45/-45/0/45/-45/45/-45/90/45/-45] _S	Strength	1x2x3 ⁵	3x2x3		3x2x3	3x2x3
(50/40/10 - HD) FHC3	ASTM D6742 Filled Hole Compression [45/90/-45/0/0/45/0/0/-45/0] _S	Strength	1x2x3 ⁵	3x2x3		3x2x3	3x2x3
(25/50/25 - QI) SSB1	ASTM D5961 Single Shear Bearing (Proc. C) [45/0/-45/90] _{3S}	2% Offset Strength, Ultimate Strength & Chord Stiffness		3x2x3		3x2x3	3x2x3
(10/80/10 - SF) SSB2	ASTM D5961 Single Shear Bearing (Proc. C) [45/-45/0/45/-45/45/-45/90/45/-45] _S	2% Offset Strength, Ultimate Strength & Chord Stiffness		3x2x3		3x2x3	3x2x3
(50/40/10 - HD) SSB3	ASTM D5961 Single Shear Bearing (Proc. C) [45/90/-45/0/0/45/0/0/-45/0] _S	2% Offset Strength, Ultimate Strength & Chord Stiffness		3x2x3		3x2x3	3x2x3

(%0°/%±45°/%90°) Test Type Code	Test Type and Layup ²	Property	Number of Batches x Number of Panels x Number of Test Specimens				
			Test Temperature/Moisture Condition				
			CTD (-65°F)	RTD (70°F)	ETD1 (180°F)	ETW1 (180°F)	ETW2 (250°F)
(100/0/0) ILT	ASTM D6415 Interlaminar Tension [0] _{16S}	Strength	1x2x3 ⁵	1x2x3 ⁵		1x2x3 ⁵	
(25/50/25 - QI) CAI1	ASTM D7136 & D7137 Compression After Impact (1500 in.lb/in) ⁴ [45/0/-45/90] _{5S}	Strength	3x2x3	3x2x3			
(10/80/10 - SF) CAI2	ASTM D7136 & D7137 Compression After Impact (1500 in.lb/in) ⁴ [45/-45/0/45/-45/45/-45/90/45/-45] _{2S}	Strength	1x2x3 ⁵	1x2x3 ⁵			
(50/40/10 - HD) CAI3	ASTM D7136 & D7137 Compression After Impact (1500 in.lb/in) ⁴ [45/90/-45/0/0/45/0/0/-45/0] _{2S}	Strength	1x2x3 ⁵	1x2x3 ⁵			
Notes: 1. Back-to-back strain gages needed on the first two specimens. If no buckling is observed, the remaining modulus specimens will require strain gage on one side of the specimens only. 2. Loading direction is generally along the 0° direction. 3. 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. 4. 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 ±0.25mm [±.010 in.], may be used. 5. Specimens were machined from Batch A panels.							

Table 1-3: Laminate Level Test Matrix

1.5.4 Cured Laminate Physical Testing

The properties in Table 1-4 were determined for each panel used for test coupons with the exception of Tg by DMA which were conducted on one laminate per batch from each cure cycle 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 ¹	Min Replicates per Panel
Cured Ply Thickness	ASTM D3171-22 Section 14.3.6	Every test panel and mechanical test specimens
Laminate Density	ASTM D792-20	3
Fiber Volume, % by Volume	ASTM D3171-22 ²	3
Resin Content, % by Weight	ASTM D3171-22 ²	3
Void Content, % by Volume	ASTM D2734-16	3 Per ⁵
Ultrasonic Through Transmission, C-Scan	ASTM E2580-24 ³	1
Glass Transition Temperature, Tg by DMA Flexural Loading	Dry and Wet ASTM D7028-07(2024)	1 Dry, 1 Wet ⁴
Notes: 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. 2. Method II. 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. 4. DRY: minimum 24 dry DMA per batch. One DMA specimen is to be machined from a panel, these specimens are to be machined from Lamina and Laminate panels. WET: minimum 24 wet DMA per batch. One DMA specimen is to be machined from a panel, these specimens are to be machined from Lamina and Laminate panels 5. Required on panels that appear voidy in C-scan or visually only via ASTM D3171 Method 1.		

Table 1-4: Cured Laminate Physical Test Matrix

1.5.5 Environmental Conditioning

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

Specimen dimensions were taken before moisture conditioning.

Test environments are defined as:

CTD = -65°F±5°F, dry (drying per section 1.5.5)
 RTD = 70°F±10°F, dry (drying per section 1.5.5)
 ETD1 = 180°F±5°F, dry (drying per section 1.5.5)
 ETW1 = 180°F±5°F, wet (equilibrium moisture content per section 1.5.5)
 ETW2 = 250°F±5°F, wet (equilibrium moisture content per section 1.5.5)

Within each test method and test environment, the failure mode was evaluated immediately after each test by an NCAMP staff engineer or NCAMP AER. Obvious improper failure modes was logged. If a second improper failure mode occurs, testing was cease until the test setup and test data was reviewed by NCAMP. Retain the samples until data review was completed and the test report was finalized. All tested specimens were digitally photographed after each test in order to pictorially document failure modes.

For dry testing, specimens were dried at 250°F±5°F for a minimum of 24 hours. After drying, specimens were kept in a desiccator until mechanical testing. Alternatively, the specimens may have been left ambient laboratory condition for a maximum of 14 days until mechanical testing (no drying was required if the specimens were tested within 14 days from the date they were cured). The specimens shall be re-dried if the specimens were not tested within 14 days period after drying.

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

For wet conditioning, specimens were dried at 250°F±5°F for a minimum of 24 hours before 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 two 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 two 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 and Table 1-6 listed the requirements for fluid sensitivity screening, which requires ASTM D2344 Short Beam Strength testing on $[0^\circ]_{32}$ – Table 1-5: SBS Fluid Sensitivity Screening Matrix and ASTM D3518 In-Plane Shear on $[+45/-45]_{4S}$ – Table 1-6: IPS Fluid Sensitivity Screening Matrix lamina level specimens were dried at $250^\circ\text{F} \pm 5^\circ\text{F}$ for 24 hours before being subjected to the conditions indicated in the test matrix.

Five replicates with a single cure cycle per each fluid type was subjected to fluid exposure. Specimens were cleaned with a dry towel prior to the tests. In addition to short beam strength, load versus displacement curves, in-plane shear modulus, 0.2% offset strength, 5% strength and stress strain 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. It was intended that the fluid resistance testing was performed on a limited number of reinforcement types and that engineering judgement was used to determine the necessity of repetition for other reinforcement configurations.

Experience suggested that for the vast majority of epoxy resins, water is the fluid with the most deleterious effect on properties. Should screening tests for fluid sensitivity indicate this to be the case, further testing of this type might be unnecessary since exposure to water moisture to equilibrium level is an inherent part of the multi batch allowables test program. However, users must evaluate the applicability of the exposure conditions and time on case-by-case basis.

	Exposure	Test Condition	Code
Extended Contact:			
100 Low Lead Aviation Fuel (ASTM D910)	90 days min. @ 70°F±10°F	70°F	SBSFS11RT
	90 days min. @ 70°F±10°F	250°F	SBSFS11ET2
ASTM D1655 Jet A Fuel	90 days min. @ 70°F±10°F	70°F	SBSFS12RT
	90 days min. @ 70°F±10°F	180°F	SBSFS12ET1
	90 days min. @ 70°F±10°F	250°F	SBSFS12ET2
MIL-PRF-5606 Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	SBSFS13RT
	90 days min. @ 70°F±10°F	180°F	SBSFS13ET1
	90 days min. @ 70°F±10°F	250°F	SBSFS13ET2
MIL-PRF-83282 Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	SBSFS14RT
	90 days min. @ 70°F±10°F	180°F	SBSFS14ET1
	90 days min. @ 70°F±10°F	250°F	SBSFS14ET2
MIL-PRF-7808 Engine Oil	90 days min. @ 70°F±10°F	70°F	SBSFS15RT
	90 days min. @ 70°F±10°F	250°F	SBSFS15ET2
MIL-PRF-23699, Class STD Engine Oil	90 days min. @ 70°F±10°F	70°F	SBSFS16RT
	90 days min. @ 70°F±10°F	250°F	SBSFS16ET2
Sea Water (ASTM D1141 or equiv.)	90 days min. @ 70°F±10°F	70°F	SBSFS17RT
	90 days min. @ 70°F±10°F	180°F	SBSFS17ET1
	90 days min. @ 70°F±10°F	250°F	SBSFS17ET2
Skydrol LD-4 (SAE AS1241, Type IV, Class 1)	90 days min. @ 70°F±10°F	70°F	SBSFS18RT
	90 days min. @ 70°F±10°F	180°F	SBSFS18ET1
	90 days min. @ 70°F±10°F	250°F	SBSFS18ET2
50% Water with 50% Skydrol LD-4 (SAE AS1241, Type IV, Class 1)	90 days min. @ 70°F±10°F	70°F	SBSFS19RT
	90 days min. @ 70°F±10°F	250°F	SBSFS19ET2
MIL-PRF-87252 PAO (Poly Alphaolefin) Cooling Fluid	90 days min. @ 70°F±10°F	70°F	SBSFS20RT
	90 days min. @ 70°F±10°F	180°F	SBSFS20ET1
	90 days min. @ 70°F±10°F	250°F	SBSFS20ET2
E85 Fuel (Alternative aircraft fuel)	90 days min. @ 70°F±10°F	70°F	SBSFS21RT
	90 days min. @ 70°F±10°F	250°F	SBSFS21ET2
SAE AMS 2629 Jet Reference Fluid	90 days min. @ 70°F±10°F	70°F	SBSFS22RT
	90 days min. @ 70°F±10°F	250°F	SBSFS22ET2
MIL-PRF-87257B Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	SBSFS23RT
	90 days min. @ 70°F±10°F	180°F	SBSFS23ET1
	90 days min. @ 70°F±10°F	250°F	SBSFS23ET2
60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	90 days min. @ 70°F±10°F	70°F	SBSFS24RT
	90 days min. @ 70°F±10°F	180°F	SBSFS24ET1
	90 days min. @ 70°F±10°F	250°F	SBSFS24ET2
Short Duration Contact:			
MEK Washing Fluid (ASTM D740)	90 minutes min. @ 70°F±10°F	70°F	SBSFS31RT
	90 minutes min. @ 70°F±10°F	250°F	SBSFS31ET2

De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	90 minutes min. @ 70°F±10°F	70°F	SBSFS32RT
	90 minutes min. @ 70°F±10°F	180°F	SBSFS32ET1
	90 minutes min. @ 70°F±10°F	250°F	SBSFS32ET2
De-icing Fluid SAE AMS 1428 (Type II)	90 minutes min. @ 70°F±10°F	70°F	SBSFS33RT
	90 minutes min. @ 70°F±10°F	180°F	SBSFS33ET1
	90 minutes min. @ 70°F±10°F	250°F	SBSFS33ET2
De-icing Fluid SAE AMS 1428 (Type IV)	90 minutes min. @ 70°F±10°F	70°F	SBSFS34RT
	90 minutes min. @ 70°F±10°F	180°F	SBSFS34ET1
	90 minutes min. @ 70°F±10°F	250°F	SBSFS34ET2
Isopropyl Alcohol Deicing Agent (TT-I-735)	48±4 hours @70°F±10°F	70°F	SBSFS35RT
	48±4 hours @70°F±10°F	180°F	SBSFS35ET1
	48±4 hours @70°F±10°F	250°F	SBSFS35ET2
Control Tests:			
Distilled Water	90 days min. at 70°F±10°F	70°F	SBSFS41RT
	90 days min. at 70°F±10°F	180°F	SBSFS41ET1
	90 days min. at 70°F±10°F	250°F	SBSFS41ET2
Dry	Dry per section 6.1 Test Plan NTP 3800Q1	70°F	SBSFS42RT
	Dry per section 6.1 Test Plan NTP 3800Q1	180°F	SBSFS42ET1
	Dry per section 6.1 Test Plan NTP 3800Q1	250°F	SBSFS42ET2
85% Relative Humidity	Per section 6.1 Test Plan NTP 3800Q1	70°F	SBSFS43RT
	Per section 6.1 Test Plan NTP 3800Q1	180°F	SBSFS43ET1
Notes:			
1. Specimens were machined from Batch A panels.			

Table 1-5: SBS Fluid Sensitivity Screening Matrix

	Exposure	Test Condition	Code
Extended Contact:			
100 Low Lead Aviation Fuel (ASTM D910)	90 days min. @ 70°F±10°F	70°F	IPSFS11RT
	90 days min. @ 70°F±10°F	250°F	IPSFS11ET2
ASTM D1655 Jet A Fuel	90 days min. @ 70°F±10°F	70°F	IPSFS12RT
	90 days min. @ 70°F±10°F	180°F	IPSFS12ET1
	90 days min. @ 70°F±10°F	250°F	IPSFS12ET2
MIL-PRF-5606 Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	IPSFS13RT
	90 days min. @ 70°F±10°F	180°F	IPSFS13ET1
	90 days min. @ 70°F±10°F	250°F	IPSFS13ET2
MIL-PRF-83282 Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	IPSFS14RT
	90 days min. @ 70°F±10°F	180°F	IPSFS14ET1
	90 days min. @ 70°F±10°F	250°F	IPSFS14ET2
MIL-PRF-7808 Engine Oil	90 days min. @ 70°F±10°F	70°F	IPSFS15RT
	90 days min. @ 70°F±10°F	250°F	IPSFS15ET2
MIL-PRF-23699, Class STD Engine Oil	90 days min. @ 70°F±10°F	70°F	IPSFS16RT
	90 days min. @ 70°F±10°F	250°F	IPSFS16ET2
Sea Water (ASTM D1141 or equiv.)	90 days min. @ 70°F±10°F	70°F	IPSFS17RT
	90 days min. @ 70°F±10°F	180°F	IPSFS17ET1
	90 days min. @ 70°F±10°F	250°F	IPSFS17ET2
Skydrol LD-4 (SAE AS1241, Type IV, Class 1)	90 days min. @ 70°F±10°F	70°F	IPSFS18RT
	90 days min. @ 70°F±10°F	180°F	IPSFS18ET1
	90 days min. @ 70°F±10°F	250°F	IPSFS18ET2
50% Water with 50% Skydrol LD-4 (SAE AS1241, Type IV, Class 1)	90 days min. @ 70°F±10°F	70°F	IPSFS19RT
	90 days min. @ 70°F±10°F	250°F	IPSFS19ET2
MIL-PRF-87252 PAO (Poly Alphaolefin) Cooling Fluid	90 days min. @ 70°F±10°F	70°F	IPSFS20RT
	90 days min. @ 70°F±10°F	180°F	IPSFS20ET1
	90 days min. @ 70°F±10°F	250°F	IPSFS20ET2
E85 Fuel (Alternative aircraft fuel)	90 days min. @ 70°F±10°F	70°F	IPSFS21RT
	90 days min. @ 70°F±10°F	250°F	IPSFS21ET2
SAE AMS 2629 Jet Reference Fluid	90 days min. @ 70°F±10°F	70°F	IPSFS22RT
	90 days min. @ 70°F±10°F	250°F	IPSFS22ET2
MIL-PRF-87257B Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	IPSFS23RT
	90 days min. @ 70°F±10°F	180°F	IPSFS23ET1
	90 days min. @ 70°F±10°F	250°F	IPSFS23ET2
60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	90 days min. @ 70°F±10°F	70°F	IPSFS24RT
	90 days min. @ 70°F±10°F	180°F	IPSFS24ET1
	90 days min. @ 70°F±10°F	250°F	IPSFS24ET2
Short Duration Contact:			
MEK Washing Fluid (ASTM D740)	90 minutes min. @ 70°F±10°F	70°F	IPSFS31RT
	90 minutes min. @ 70°F±10°F	250°F	IPSFS31ET2

De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	90 minutes min. @ 70°F±10°F	70°F	IPSFS32RT
	90 minutes min. @ 70°F±10°F	180°F	IPSFS32ET1
	90 minutes min. @ 70°F±10°F	250°F	IPSFS32ET2
De-icing Fluid SAE AMS 1428 (Type II)	90 minutes min. @ 70°F±10°F	70°F	IPSFS33RT
	90 minutes min. @ 70°F±10°F	180°F	IPSFS33ET1
	90 minutes min. @ 70°F±10°F	250°F	IPSFS33ET2
De-icing Fluid SAE AMS 1428 (Type IV)	90 minutes min. @ 70°F±10°F	70°F	IPSFS34RT
	90 minutes min. @ 70°F±10°F	180°F	IPSFS34ET1
	90 minutes min. @ 70°F±10°F	250°F	IPSFS34ET2
Isopropyl Alcohol Deicing Agent (TT-I-735)	48±4 hours @70°F±10°F	70°F	IPSFS35RT
	48±4 hours @70°F±10°F	180°F	IPSFS35ET1
	48±4 hours @70°F±10°F	250°F	IPSFS35ET2
Control Tests:			
Distilled Water	90 days min. at 70°F±10°F	70°F	IPSFS41RT
	90 days min. at 70°F±10°F	180°F	IPSFS41ET1
	90 days min. at 70°F±10°F	250°F	IPSFS41ET2
Dry	Dry per section 6.1 Test Plan NTP 3800Q1	70°F	IPSFS42RT
	Dry per section 6.1 Test Plan NTP 3800Q1	180°F	IPSFS42ET1
	Dry per section 6.1 Test Plan NTP 3800Q1	250°F	IPSFS42ET2
85% Relative Humidity	Per section 6.1 Test Plan NTP 3800Q1	70°F	IPSFS43RT
	Per section 6.1 Test Plan NTP 3800Q1	180°F	IPSFS43ET1
Notes:			
1. Specimens were machined from Batch A panels.			

Table 1-6: IPS Fluid Sensitivity Screening 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 cured ply thickness. Lamina level properties that were not normalized include:

- 90° Tensile strength and modulus
- 90° Compressive strength and modulus
- In-Plane Shear strength and modulus
- SBS
- ILT
- Poisson's ratio

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 cured ply thickness of 0.004800 inches has been used as the nominal cured ply thickness (CPT) for normalization purpose. The following normalization formula was used:

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

For Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35% RC Prepreg material the defined CPT was 0.004800 inches. The average as measured CPT of the qualification panels was 0.004763 inches. The lowest and highest CPT measured were 0.004546 inches and 0.005060 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 AER. 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 is in Microsoft Excel file format.

2. Test Results

2.1 Lamina Level Test Summary

Prepreg Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg Material Specification: NMS 380/1 Process Specification: NPS 83800 Fabric: T1100GC 24K 71E Resin: TC380 Tg(dry): 408.21°F Tg(wet): 332.38°F Tg METHOD: ASTM D7028							Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg Lamina Properties Summary			
Fiber Lot	Lot #1	Lot #2	Lot #3							
Date of fiber manufacture	A1122J2	A1123M1	A1123B3				Date of testing	1/14/2025 - 9/2/2025		
Resin Lot	9/1/2022	12/1/2023	2/1/2023				Date of data submittal	9/4/2025		
Date of resin manufacture	032624-47M	052024-75M	061224-21M							
Prepreg Lot	3/26/2024	3/26/2024	3/26/2024							
Date of prepreg manufacture	041124-1T2	052924-1T3	061924-1T2							
Date of composite manufacture	4/11/2024	5/29/2024	6/19/2024							
LAMINA MECHANICAL PROPERTY SUMMARY Data reported as: Normalized & Measured (Normalized by CPT=0.004800 inch)										
Properties	CTD (-65°F) Mean		RTD (70°F) Mean		ETD1 (180°F) Mean		ETW1 (180°F) Mean		ETW2 (250°F) Mean	
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F ₁ ^{tu} [ksi]	470.6	452.9	472.6	475.3	475.0	463.2	478.9	469.8	450.9	437.2
E ₁ ^t [Msi]	23.91	23.02	22.84	22.97	23.20	22.64	23.48	23.04	23.76	23.03
ν ₁₂ ^t		0.3251		0.3132		0.3142		0.3076		0.2952
F ₂ ^{tu} [ksi]		11.86		10.70		10.04		5.145		4.199
E ₂ ^t [Msi]		1.273		1.111		1.013		0.9254		0.7605
F ₁ ^{cu} [ksi] from UNC0*	251.4	246.2	226.7	236.2	206.3	201.3	172.8	174.2	150.2	151.9
E ₁ ^c [Msi]	21.66	21.13	20.85	20.83	21.44	20.79	21.44	20.96	21.25	21.23
ν ₁₂ ^c		0.3880		0.3621		0.3862		0.3847		0.4063
F ₂ ^{cu} [ksi]		41.47		29.33		22.78		17.29		13.07
E ₂ ^c [Msi]		1.313		1.198		1.098		1.030		0.8591
(0/90) UNC0 Strength [ksi]	93.84	92.12	84.16	87.69	75.72	74.12	63.10	63.70	54.09	54.68
(0/90) UNC0 Modulus [Msi]	7.818	7.671	7.729	8.079	7.858	7.627	7.760	7.829	7.688	7.762
F ₁₂ ^{s0.2%} [ksi]		8.201		6.369		5.311		4.118		3.097
F ₁₂ ^{s5%strain} [ksi]		14.86		11.16		8.857		6.425		4.956
G ₁₂ ^s [Msi]		0.6923		0.5740		0.4882		0.3900		0.3051
SBS [ksi]		19.21		14.40		11.15		8.892		7.013

* Derived from cross-ply using back-out factor.

Table 2-1: Lamina Summary Data

2.2 Laminate Level Test Summary

Prepreg Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg Material Specification: NMS 380/1 Process Specification: NPS 83800 Fabric: T1100GC 24K 71E Resin: TC380 Tg(dry): 408.21°F Tg(wet): 332.38°F						Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg Laminate Properties Summary Tg METHOD: ASTM D7028	
Fiber Lot		Lot #1	Lot #2	Lot #3			
Date of fiber manufacture		A1122J2	A1123M1	A1123B3		Date of testing 1/14/2025 - 9/2/2025	
Resin Lot		032624-47M	052024-75M	061224-21M		Date of data submittal 9/4/2025	
Date of resin manufacture		3/26/2024	3/26/2024	3/26/2024			
Prepreg Lot		041124-1T2	052924-1T3	061924-1T2			
Date of prepreg manufacture		4/11/2024	5/29/2024	6/19/2024			
Date of composite manufacture		9/16/2024 - 1/23/2025					
LAMINATE MECHANICAL PROPERTY SUMMARY Data reported as: Normalized & Measured (Normalized by CPT=0.004800 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]	CTD (-65°F)	75.88	73.46	60.58	58.99	117.9	114.3
	RTD (70°F)	80.97	79.56	55.09	53.86	127.7	124.6
	ETD1 (180°F)	83.39	81.61	52.78	52.61	135.2	134.5
	ETW1 (180°F)	88.15	85.26	52.50	51.54	151.5	148.6
	ETW2 (250°F)	91.07	88.13	51.51	50.45	166.3	162.6
OHC Strength [ksi]	CTD (-65°F)	48.89	48.90	43.69	43.94	64.57	63.89
	RTD (70°F)	43.04	42.29	37.42	36.93	57.23	56.29
	ETD1 (180°F)	39.09	38.10	31.92	31.77	52.95	52.73
	ETW1 (180°F)	37.67	37.04	30.05	29.51	48.83	47.57
	ETW2 (250°F)	32.87	32.10	25.42	24.75	42.37	40.92
UNT Strength [ksi]	CTD (-65°F)	168.5	166.1	92.00	91.53	264.0	261.2
	RTD (70°F)	169.7	169.6	85.68	88.03	271.1	275.1
	ETW1 (180°F)	162.3	164.8	75.76	77.54	266.0	267.2
	ETW2 (250°F)	157.4	152.6	70.87	69.14	269.0	260.9
UNT Modulus [Msi]	CTD (-65°F)	8.600	8.481	5.349	5.322	13.62	13.48
	RTD (70°F)	8.254	8.254	4.933	5.070	13.14	13.34
	ETW1 (180°F)	8.299	8.426	4.699	4.811	13.36	13.40
	ETW2 (250°F)	8.128	7.888	4.480	4.371	13.59	13.18
UNC Strength [ksi]	CTD (-65°F)	100.9	100.6	72.30	71.28	156.3	154.8
	RTD (70°F)	86.75	89.70	60.99	63.93	138.3	142.4
	ETD1 (180°F)	77.70	78.42	51.13	51.74	119.1	119.4
	ETW1 (180°F)	65.48	64.97	43.29	42.95	97.71	97.46
	ETW2 (250°F)	57.80	58.99	34.55	34.97	73.87	75.28
UNC Modulus [Msi]	CTD (-65°F)	8.047	8.021	5.125	5.055	12.57	12.46
	RTD (70°F)	7.882	8.191	4.865	5.101	12.41	12.97
	ETD1 (180°F)	7.878	7.952	4.683	4.740	12.46	12.50
	ETW1 (180°F)	7.545	7.488	4.411	4.383	11.98	11.90
	ETW2 (250°F)	7.446	7.579	4.216	4.267	12.06	12.27
FHT Strength [ksi]	CTD (-65°F)	81.91	79.72	69.97	68.50	117.8	114.5
	RTD (70°F)	84.29	82.78	60.28	59.45	126.0	123.1
	ETW1 (180°F)	91.79	90.63	57.14	56.72	141.1	138.3
	ETW2 (250°F)	91.56	89.52	54.75	54.07	146.2	143.0
FHC Strength [ksi]	CTD (-65°F)	81.42	81.92	65.41	65.94	101.5	100.8
	RTD (70°F)	68.03	66.91	55.34	54.61	83.98	82.84
	ETW1 (180°F)	56.58	55.65	45.84**	45.23**	67.44	66.15
	ETW2 (250°F)	49.16	47.54	37.23**	36.37**	56.72	55.08
SSB Proc. C 2% Offset Strength [ksi]	RTD (70°F)	114.0	118.8	119.0	123.7	113.5	119.3
	ETW1 (180°F)	107.7	111.9	103.1	107.3	96.88	100.6
	ETW2 (250°F)	96.06	93.47	96.10	93.64	88.21	86.05
SSB Proc. C Ultimate Strength [ksi]	RTD (70°F)	147.8	154.1	141.2	146.8	140.7	147.9
	ETW1 (180°F)	123.8	128.6	121.7	126.6	114.6	119.0
	ETW2 (250°F)	112.2	109.1	113.6	110.7	106.0	103.5
SSB Proc. C Chord Stiffness [Msi]	RTD (70°F)	1.829	1.907	1.500	1.560	2.305	2.421
	ETW1 (180°F)	1.721	1.789	1.397	1.454	2.211	2.296
	ETW2 (250°F)	1.689	1.640	1.354	1.318	2.109	2.055
CBS* [lb]	CTD (-65°F)		831.1				
	RTD (70°F)		588.7				
	ETW1 (180°F)		219.7				
ILT* [ksi]	CTD (-65°F)		24.98				
	RTD (70°F)		17.78				
	ETW1 (180°F)		6.422				
CAI Strength [ksi]	CTD (-65°F)	55.71	54.94	46.91	47.53	64.65	63.48
	RTD (70°F)	50.29	50.28	41.13	41.99	58.38	58.31

* The actual layup for ILT is [0]16S, (100/0/0).

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

Table 2-2: Laminate Summary Data

2.3 Fluid Sensitivity Test Summary

2.3.1 Short Beam Strength Fluid Sensitivity Test (SBSFS)

Fluid Sensitivity Screening Short Beam Strength Properties (SBSFS)--RT(70°F) Strength Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

Exposure	Type of Fluid	Fluid Code	Average Strength [ksi]
90 days min @ 70°F±10°F	100 Low lead Fuel	SBSFS11RT	13.58
	Jet A Fuel	SBSFS12RT	13.35
	MIL-PRF-5606 Hydraulic Oil	SBSFS13RT	13.36
	MIL-PRF-83282 Hydraulic Oil	SBSFS14RT	13.44
	MIL-PRF-7808 Engine Oil	SBSFS15RT	13.55
	MIL-PRF-23699 Engine Oil	SBSFS16RT	13.53
	Sea Water	SBSFS17RT	12.33
	Skydrol LD-4	SBSFS18RT	13.97
	50% Water with 50% Skydrol LD-4	SBSFS19RT	12.48
	MIL-PRF-87252 PAO Cooling Fluid	SBSFS20RT	13.73
	E85 Fuel (Alternate aircraft fuel)	SBSFS21RT	13.69
	SAE AMS 2629 Jet Reference Fluid	SBSFS22RT	13.68
	MIL-PRF-87257B Hydraulic Oil	SBSFS23RT	13.80
	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	SBSFS24RT	12.85
	Distilled Water	SBSFS41RT	11.95
90 mins @ 70°F±10°F	MEK washing fluid	SBSFS31RT	13.75
	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	SBSFS32RT	13.80
	De-icing Fluid SAE AMS 1428 (Type II)	SBSFS33RT	13.77
	De-icing Fluid SAE AMS 1428 (Type IV)	SBSFS34RT	13.81
48±4 hrs @ 70°F±10°F	Isopropyl Alcohol Deicing (TT-I-735)	SBSFS35RT	13.95
Per section 6.1 Test Plan NTP 3800Q1	Dry	SBSFS42RT	13.91
Per section 6.1 Test Plan NTP 3800Q1	85% Relative Humidity	SBSFS43RT	11.44

Table 2-3: SBS Fluid Sensitivity Summary Data – RT(70°F)

Fluid Sensitivity Screening
Short Beam Strength Properties (SBSFS)--ET1(180°F) Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

Exposure	Type of Fluid	Fluid Code	Average Strength [ksi]
90 days min @ 70°F±10°F	Jet A Fuel	SBSFS12ET1	10.27
	MIL-PRF-5606 Hydraulic Oil	SBSFS13ET1	10.21
	MIL-PRF-83282 Hydraulic Oil	SBSFS14ET1	10.12
	Sea Water	SBSFS17ET1	8.619
	Skydrol LD-4	SBSFS18ET1	11.01
	MIL-PRF-87252 PAO Cooling Fluid	SBSFS20ET1	10.44
	MIL-PRF-87257B Hydraulic Oil	SBSFS23ET1	10.54
	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	SBSFS24ET1	9.332
	Distilled Water	SBSFS41ET1	8.205
90 mins @ 70°F±10°F	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	SBSFS32ET1	10.73
	De-icing Fluid SAE AMS 1428 (Type II)	SBSFS33ET1	10.71
	De-icing Fluid SAE AMS 1428 (Type IV)	SBSFS34ET1	10.88
48±4 hrs @ 70°F±10°F	Isopropyl Alcohol Deicing (TT-I-735)	SBSFS35ET1	10.75
Per section 6.1 Test Plan NTP 3800Q1	Dry	SBSFS42ET1	11.09
Per section 6.1 Test Plan NTP 3800Q1	85% Relative Humidity	SBSFS43ET1	7.977

Table 2-4: SBS Fluid Sensitivity Summary Data – ET1(180°F)

Fluid Sensitivity Screening
Short Beam Strength Properties (SBSFS)--ET2(250°F) Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

Exposure	Type of Fluid	Fluid Code	Average Strength [ksi]
90 days min @ 70°F±10°F	100 Low lead Fuel	SBSFS11ET2	8.016
	Jet A Fuel	SBSFS12ET2	8.309
	MIL-PRF-5606 Hydraulic Oil	SBSFS13ET2	7.925
	MIL-PRF-83282 Hydraulic Oil	SBSFS14ET2	8.088
	MIL-PRF-7808 Engine Oil	SBSFS15ET2	8.454
	MIL-PRF-23699 Engine Oil	SBSFS16ET2	8.312
	Sea Water	SBSFS17ET2	6.518
	Skydrol LD-4	SBSFS18ET2	8.882
	50% Water with 50% Skydrol LD-4	SBSFS19ET2	6.551
	MIL-PRF-87252 PAO Cooling Fluid	SBSFS20ET2	8.376
	E85 Fuel (Alternate aircraft fuel)	SBSFS21ET2	8.747
	SAE AMS 2629 Jet Reference Fluid	SBSFS22ET2	8.189
	MIL-PRF-87257B Hydraulic Oil	SBSFS23ET2	8.358
	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	SBSFS24ET2	7.156
	Distilled Water	SBSFS41ET2	6.092
90 mins @ 70°F±10°F	MEK washing fluid	SBSFS31ET2	8.897
	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	SBSFS32ET2	8.791
	De-icing Fluid SAE AMS 1428 (Type II)	SBSFS33ET2	8.792
	De-icing Fluid SAE AMS 1428 (Type IV)	SBSFS34ET2	8.687
48±4 hrs @ 70°F±10°F	Isopropyl Alcohol Deicing (TT-I-735)	SBSFS35ET2	8.637
Per section 6.1 Test Plan NTP 3800Q1	Dry	SBSFS42ET2	9.205

Table 2-5: SBS Fluid Sensitivity Summary Data – ET2(250°F)

2.3.2 In-Plane Shear Fluid Sensitivity Test (IPSFS)

Fluid Sensitivity Screening In-Plane Shear Properties (IPSFS)--RT(70°F) Strength and Modulus Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC					
Exposure	Type of Fluid	Fluid Code	Average		
			0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]
90 days min @ 70°F±10°F	100 Low lead Fuel	IPSFS11RT	5.758	10.11	0.5359
	Jet A Fuel	IPSFS12RT	5.761	10.29	0.5326
	MIL-PRF-5606 Hydraulic Oil	IPSFS13RT	5.954	10.47	0.5551
	MIL-PRF-83282 Hydraulic Oil	IPSFS14RT	5.906	10.46	0.5510
	MIL-PRF-7808 Engine Oil	IPSFS15RT	5.697	9.984	0.5321
	MIL-PRF-23699 Engine Oil	IPSFS16RT	5.736	10.07	0.5336
	Sea Water	IPSFS17RT	5.214	9.043	0.4916
	Skydrol LD-4	IPSFS18RT	5.621	10.10	0.5221
	50% Water with 50% Skydrol LD-4	IPSFS19RT	5.436	9.345	0.5096
	MIL-PRF-87252 PAO Cooling Fluid	IPSFS20RT	5.897	10.38	0.5493
	E85 Fuel (Alternate aircraft fuel)	IPSFS21RT	5.370	9.597	0.5061
	SAE AMS 2629 Jet Reference Fluid	IPSFS22RT	5.520	9.792	0.5161
	MIL-PRF-87257B Hydraulic Oil	IPSFS23RT	5.682	10.13	0.5288
	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	IPSFS24RT	5.541	9.753	0.5157
90 mins @ 70°F±10°F	Distilled Water	IPSFS31RT	6.140	10.75	0.5698
	MEK washing fluid	IPSFS32RT	6.242	10.88	0.5759
	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	IPSFS33RT	6.227	10.99	0.5740
	De-icing Fluid SAE AMS 1428 (Type II)	IPSFS34RT	6.123	10.81	0.5666
48±4 hrs @ 70°F±10°F	De-icing Fluid SAE AMS 1428 (Type IV)	IPSFS35RT	6.330	11.08	0.5863
	Isopropyl Alcohol Deicing (TT-I-735)	IPSFS41RT	5.392	9.311	0.5051
Per section 6.1 Test Plan NTP 3800Q1	Dry	IPSFS42RT	6.346	11.09	0.5725
Per section 6.1 Test Plan NTP 3800Q1	85% Relative Humidity	IPSFS43RT	5.799	9.501	0.5176

Table 2-6: IPS Fluid Sensitivity Summary Data – RT(70°F)

Fluid Sensitivity Screening In-Plane Shear Properties (IPSFS)--ET1(180°F) Strength and Modulus Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC					
Exposure	Type of Fluid	Fluid Code	Average		
			0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]
90 days min @ 70°F±10°F	Jet A Fuel	IPSFS12ET1	4.635	7.765	0.4126
	MIL-PRF-5606 Hydraulic Oil	IPSFS13ET1	4.867	8.153	0.4348
	MIL-PRF-83282 Hydraulic Oil	IPSFS14ET1	4.862	8.091	0.4340
	Sea Water	IPSFS17ET1	3.754	6.278	0.3454
	Skydrol LD-4	IPSFS18ET1	4.470	7.638	0.3877
	MIL-PRF-87252 PAO Cooling Fluid	IPSFS20ET1	4.763	7.858	0.4230
	MIL-PRF-87257B Hydraulic Oil	IPSFS23ET1	4.624	7.706	0.4098
	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	IPSFS24ET1	4.010	6.727	0.3641
	Distilled Water	IPSFS41ET1	3.859	6.551	0.3507
90 mins @ 70°F±10°F	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	IPSFS32ET1	5.176	8.667	0.4725
	De-icing Fluid SAE AMS 1428 (Type II)	IPSFS33ET1	5.286	8.829	0.4815
	De-icing Fluid SAE AMS 1428 (Type IV)	IPSFS34ET1	5.347	8.945	0.4870
48±4 hrs @ 70°F±10°F	Isopropyl Alcohol Deicing (TT-I-735)	IPSFS35ET1	5.256	8.914	0.4826
Per section 6.1 Test Plan NTP 3800Q1	Dry	IPSFS42ET1	5.385	9.030	0.4966
Per section 6.1 Test Plan NTP 3800Q1	85% Relative Humidity	IPSFS43ET1	4.476	6.920	0.4228

Table 2-7: IPS Fluid Sensitivity Summary Data – ET1(180°F)

Fluid Sensitivity Screening In-Plane Shear Properties (IPSFS)--ET2(250°F) Strength and Modulus Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC					
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Exposure	Type of Fluid	Fluid Code	Average		
			0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]
90 days min @ 70°F±10°F	100 Low lead Fuel	IPSFS11ET2	3.759	6.057	0.3527
	Jet A Fuel	IPSFS12ET2	3.925	6.272	0.3652
	MIL-PRF-5606 Hydraulic Oil	IPSFS13ET2	4.248	6.780	0.3930
	MIL-PRF-83282 Hydraulic Oil	IPSFS14ET2	4.108	6.655	0.3796
	MIL-PRF-7808 Engine Oil	IPSFS15ET2	3.748	6.006	0.3536
	MIL-PRF-23699 Engine Oil	IPSFS16ET2	3.828	6.079	0.3544
	Sea Water	IPSFS17ET2	2.942	4.877	0.2797
	Skydrol LD-4	IPSFS18ET2	3.691	6.173	0.3322
	50% Water with 50% Skydrol LD-4	IPSFS19ET2	2.984	4.961	0.2825
	MIL-PRF-87252 PAO Cooling Fluid	IPSFS20ET2	4.131	6.578	0.3828
	E85 Fuel (Alternate aircraft fuel)	IPSFS21ET2	3.000	4.967	0.2808
	SAE AMS 2629 Jet Reference Fluid	IPSFS22ET2	3.365	5.530	0.3216
	MIL-PRF-87257B Hydraulic Oil	IPSFS23ET2	3.877	6.155	0.3594
	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	IPSFS24ET2	3.250	5.335	0.3091
	Distilled Water	IPSFS41ET2	3.028	4.970	0.2873
90 mins @ 70°F±10°F	MEK washing fluid	IPSFS31ET2	4.530	7.374	0.4190
	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	IPSFS32ET2	4.642	7.521	0.4343
	De-icing Fluid SAE AMS 1428 (Type II)	IPSFS33ET2	4.650	7.454	0.4284
	De-icing Fluid SAE AMS 1428 (Type IV)	IPSFS34ET2	4.541	7.401	0.4220
48±4 hrs @ 70°F±10°F	Isopropyl Alcohol Deicing (TT-I-735)	IPSFS35ET2	4.633	7.480	0.4295
Per section 6.1 Test Plan NTP 3800Q1	Dry	IPSFS42ET2	4.575	7.545	0.4256

Table 2-8: IPS Fluid Sensitivity Summary Data – ET2(250°F)

2.4 Cured Laminate Physical Test Summary

2.4.1 DMA

DMA Results Summary				
Toray Advanced Composites TC380 T1100GC Unitape Qualification				
Test Temperature	Mean			
	Onset Storage Modulus		Peak of Tangent Delta	
	T _g [°C]	T _g [°F]	T _g [°C]	T _g [°F]
DMA T _g (Dry)	209.01	408.21	217.15	422.87
DMA T _g (Wet)	166.88	332.38	190.49	374.89

Table 2-9: DMA Summary Data

2.5 Individual Test Summaries

2.5.1 Longitudinal Tension Properties (LT)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitaqe w ith 35%RC prepreg		Tension, 1-axis Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitaqe w ith 35%RC prepreg [0]10									
Resin content:	34.01 %wt	Comp. density: 1.518 g/cc									
Fiber volume:	55.96 %vol										
Ply count:	10										
Test method:	ASTMD3039-17	Modulus calculation: 1000-3000 microstrain									
Normalized by:	0.004800	in. CPT									
		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDJX XXXB		TCDJX XXXA		TCDJX XXXC		TCDJX XXXD		TCDJX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₁^{tu} [ksi]	Mean	470.6	452.9	472.6	475.3	475.0	463.2	478.9	469.8	450.9	437.2
	Minimum	405.0	389.2	442.4	440.4	408.7	421.6	456.6	444.0	405.2	390.4
	Maximum	517.7	503.4	510.7	514.6	525.1	506.6	502.3	493.5	513.3	492.0
	C.V.(%)	6.935	6.869	3.715	4.028	6.536	4.921	3.093	2.691	6.538	6.571
	No. Specimens	18		18		18		18		18	
	No. Prepreg Lots	3		3		3		3		3	
E₁^t [Msi]	Mean	23.91	23.02	22.84	22.97	23.20	22.64	23.48	23.04	23.76	23.03
	Minimum	22.92	21.79	21.30	21.53	21.34	21.78	22.09	22.15	23.12	22.35
	Maximum	25.51	24.99	23.84	24.42	24.30	23.74	24.38	23.84	24.85	24.08
	C.V.(%)	2.714	3.264	2.924	3.280	3.375	2.516	2.513	1.837	2.076	2.068
	No. Specimens	18		18		18		18		18	
	No. Prepreg Lots	3		3		3		3		3	
v₁₂^t	Mean		0.3251		0.3132		0.3142		0.3076		0.2952
	Minimum		0.2689		0.2896		0.2939		0.2913		0.2654
	Maximum		0.3813		0.3531		0.3308		0.3196		0.3272
	C.V.(%)		8.329		5.196		3.779		2.559		5.281
	No. Specimens	18		18		18		18		18	
	No. Prepreg Lots	3		3		3		3		3	

2.5.2 Transverse Tension Properties (TT)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg		Tension, 2-axis Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [90]18				
Resin content:	32.65 %wt	Comp. density: 1.537 g/cc				
Fiber volume:	57.83 %vol					
Ply count:	18					
Test method:	ASTM D3039-17	Modulus calculation: 1000-3000 microstrain				
Normalized by:	NA					
	CTD	RTD	ETD1	ETW1	ETW2	
Test Temperature [°F]	-65	70	180	180	250	
Moisture Conditioning	Dry	Dry	Dry	Equilibrium	Equilibrium	
Equilibrium at T, RH				160F,85%	160F,85%	
Source code	TCDUX XXXB	TCDUX XXXA	TCDUX XXXC	TCDUX XXXD	TCDUX XXXE	
	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₂^u [ksi]	Mean	11.86	10.70	10.04	5.145	4.199
	Minimum	10.32	9.548	8.654	4.380	3.654
	Maximum	13.18	11.94	11.61	5.699	4.744
	C.V.(%)	6.464	6.904	7.729	7.034	8.629
	No. Specimens	19	18	20	18	21
	No. Prepreg Lots	3	3	3	3	3
E₂^t [Msi]	Mean	1.273	1.111	1.013	0.9254	0.7605
	Minimum	1.207	1.055	0.9859	0.8870	0.7302
	Maximum	1.371	1.209	1.033	0.9795	0.8008
	C.V.(%)	3.264	3.888	1.467	3.391	3.011
	No. Specimens	18	18	20	18	21
	No. Prepreg Lots	3	3	3	3	3

2.5.3 Longitudinal Compression Properties (LC)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg		Compression, 1-axis Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [0]20							
Resin content:	37.47 %wt	Comp. density: 1.509 g/cc							
Fiber volume:	52.73 %vol								
Ply count:	20								
Test method:	ASTM D6641-23	Modulus calculation: 1000-3000 microstrain							
Normalized by:	0.004800	in. CPT							
		CTD		RTD		ETD1		ETW1	
Test Temperature [°F]	-65	70		180		180		250	
Moisture Conditioning	Dry	Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code	TCDLX XXXB	TCDLX XXXA		TCDLX XXXC		TCDLX XXXD		TCDLX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
E₁^c [Msi]	Mean	21.66	21.13	20.85	20.83	21.44	20.79	21.44	20.96
	Minimum	20.58	20.05	20.22	20.02	20.67	19.73	20.48	20.24
	Maximum	23.04	22.20	21.87	21.59	22.25	21.61	22.27	21.81
	C.V.(%)	3.054	3.105	2.215	1.790	2.412	2.650	2.717	2.230
	No. Specimens	18		18		18		18	
	No. Prepreg Lots	3		3		3		3	
v₁₂^c	Mean	0.3880		0.3621		0.3862		0.3847	
	Minimum	0.3420		0.3069		0.3098		0.3445	
	Maximum	0.4603		0.4110		0.4276		0.4599	
	C.V.(%)	8.029		8.246		7.318		7.731	
	No. Specimens	18		18		18		18	
	No. Prepreg Lots	3		3		3		3	

2.5.4 Longitudinal Compression (LC) Back-out Factor Properties

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		Compression, 1-axis, Back-out Factor Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg UNC0 Layup: [90/0/90]7							
		CTD		RTD		ETD1		ETW1	
Test Temperature [°F]	-65	70		180		180		250	
Moisture Conditioning	Dry	Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code	TCDRX XXXB	TCDRX XXXA		TCDRX XXXC		TCDRX XXXD		TCDRX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₁^{cu} [ksi] from UNC0	Mean	251.4	246.2	226.7	236.2	206.3	201.3	172.8	174.2
	Minimum	225.7	221.3	203.5	211.1	183.9	176.6	153.3	151.6
	Maximum	269.9	270.1	245.5	255.2	232.2	232.5	193.5	196.0
	C.V.(%)	4.756	5.648	5.000	5.073	6.622	6.918	6.894	7.496
	No. Specimens	18		20		20		19	
	No. Prepreg Lots	3		3		3		3	

2.5.5 Transverse Compression Properties (TC)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		Compression, 2-axis Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [90]20					
Resin content:	37.47 %wt	Comp. density: 1.509 g/cc					
Fiber volume:	52.73 %vol						
Ply count:	20						
Test method: ASTM D6641-23		Modulus calculation: 1000-3000 microstrain					
Normalized by: NA							
		CTD	RTD	ETD1	ETW1	ETW2	
Test Temperature [°F]		-65	70	180	180	250	
Moisture Conditioning		Dry	Dry	Dry	Equilibrium	Equilibrium	
Equilibrium at T, RH					160F,85%	160F,85%	
Source code		TCDZX XXXB	TCDZX XXXA	TCDZX XXXC	TCDZX XXXD	TCDZX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured
F₂^{cu} [ksi]	Mean	41.47	29.33	22.78	17.29	13.07	
	Minimum	39.14	27.65	21.86	16.06	12.17	
	Maximum	43.42	31.24	23.53	18.32	14.02	
	C.V.(%)	2.809	3.153	1.941	2.923	3.442	
	No. Specimens	20	18	20	22	28	
	No. Prepreg Lots	3	3	3	3	3	
E₂^c [Msi]	Mean	1.313	1.198	1.098	1.030	0.8591	
	Minimum	1.250	1.131	1.030	0.9537	0.8093	
	Maximum	1.411	1.242	1.173	1.080	0.9332	
	C.V.(%)	2.997	2.941	3.167	3.179	3.368	
	No. Specimens	20	18	20	22	28	
	No. Prepreg Lots	3	3	3	3	3	

2.5.6 In-Plane Shear Properties (IPS)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				In-Plane Shear Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/-45]4S					
Resin content:	34.11 %wt	Comp. density: 1.522 g/cc									
Fiber volume:	56.03 %vol										
Ply count:	16										
Test method:	ASTM D3518-18	Modulus calculation: 2000-6000 microstrain									
Normalized by:	NA										
		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDNX XXXB		TCDNX XXXA		TCDNX XXXC		TCDNX XXXD		TCDNX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F ₁₂ ^{s0.2%} [ksi]	Mean	8.201		6.369		5.311		4.118		3.097	
	Minimum	7.419		5.754		4.920		3.730		2.764	
	Maximum	10.42		7.109		5.742		4.864		3.595	
	C.V.(%)	8.785		6.083		4.239		7.088		8.177	
	No. Specimens	19		18		18		18		19	
No. Prepreg Lots		3		3		3		3		3	
F ₁₂ ^{s5% strain} [ksi]	Mean	14.86		11.16		8.857		6.425		4.956	
	Minimum	14.23		10.44		8.427		5.960		4.461	
	Maximum	17.08		11.87		9.304		6.851		5.681	
	C.V.(%)	4.245		3.753		2.854		4.832		7.350	
	No. Specimens	19		18		18		18		19	
No. Prepreg Lots		3		3		3		3		3	
G ₁₂ ^s [Msi]	Mean	0.6923		0.5740		0.4882		0.3900		0.3051	
	Minimum	0.6154		0.5112		0.4481		0.3445		0.2718	
	Maximum	0.9841		0.6475		0.5218		0.4168		0.3462	
	C.V.(%)	12.27		7.152		4.632		5.315		7.100	
	No. Specimens	19		18		18		18		19	
No. Prepreg Lots		3		3		3		3		3	

2.5.7 Lamina Short-Beam Strength Properties (SBS)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		Short-Beam Strength Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [0]32								
Resin content:	34.47 %wt	Comp. density: 1.522 g/cc								
Fiber volume:	55.72 %vol									
Ply count:	32									
Test method:	ASTM D2344-22									
Normalized by:	NA									
	CTD	RTD		ETD1		ETW1		ETW2		
Test Temperature [°F]	-65	70		180		180		250		
Moisture Conditioning	Dry	Dry		Dry		Equilibrium		Equilibrium		
Equilibrium at T, RH						160F,85%		160F,85%		
Source code	TCDQX XXXB	TCDQX XXXA		TCDQX XXXC		TCDQX XXXD		TCDQX XXXE		
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
SBS [ksi]	Mean	19.21	14.40	11.15	8.892	7.013				
	Minimum	18.46	13.81	10.72	7.866	6.026				
	Maximum	20.11	14.79	11.41	9.590	7.760				
	C.V.(%)	2.236	2.139	2.345	7.641	9.682				
	No. Specimens	18	18	6	18	18				
No. Prepreg Lots	3	3	1	3	3					

2.5.8 “25/50/25” Unnotched Tension 1 Properties (UNT1)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Unnotched Tension 1 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/0/-45/90]3S			
Resin content:	35.16 %wt	Comp. density: 1.515 g/cc							
Fiber volume:	54.88 %vol								
Ply count:	24								
Test method:		ASTM D3039-17		Modulus calculation: 1000-3000 microstrain					
Normalized by:		0.004800		in. CPT					
		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCDAX XXXB		TCDAX XXXA		TCDAX XXXD		TCDAX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT1 Strength [ksi]	Mean	168.5	166.1	169.7	169.6	162.3	164.8	157.4	152.6
	Minimum	156.7	156.6	162.9	160.0	154.8	157.3	145.9	138.6
	Maximum	177.0	182.4	174.8	183.6	169.6	176.6	165.1	161.5
	C.V.(%)	3.934	4.192	2.196	3.974	2.522	2.990	3.277	3.640
	No. Specimens	18		18		18		18	
	No. Prepreg Lots	3		3		3		3	
UNT1 Modulus [Msi]	Mean	8.600	8.481	8.254	8.254	8.299	8.426	8.128	7.888
	Minimum	8.316	8.053	7.937	7.723	8.162	8.071	7.949	7.518
	Maximum	8.926	9.198	8.599	9.079	8.474	8.806	8.329	8.421
	C.V.(%)	1.959	4.067	2.005	4.319	0.9786	2.677	1.570	3.792
	No. Specimens	18		18		18		18	
	No. Prepreg Lots	3		3		3		3	

2.5.9 “10/80/10” Unnotched Tension 2 Properties (UNT2)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Unnotched Tension 2 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S					
Resin content: 34.10 %wt		Comp. density: 1.525 g/cc							
Fiber volume: 56.14 %vol									
Ply count: 20									
Test method: ASTM D3039-17		Modulus calculation: 1000-3000 microstrain							
Normalized by: 0.004800		in. CPT							
		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCDBX XXXB		TCDBX XXXA		TCDBX XXXD		TCDBX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT2 Strength [ksi]	Mean	92.00	91.53	85.68	88.03	75.76	77.54	70.87	69.14
	Minimum	88.00	86.72	77.16	81.96	72.14	74.38	68.14	65.55
	Maximum	95.41	97.82	89.21	95.43	79.07	81.48	75.67	73.90
	C.V.(%)	2.551	4.187	3.184	3.862	2.719	2.525	3.125	4.028
	No. Specimens	18		18		18		18	
	No. Prepreg Lots	3		3		3		3	
UNT2 Modulus [Msi]	Mean	5.349	5.322	4.933	5.070	4.699	4.811	4.480	4.371
	Minimum	5.188	5.025	4.710	4.667	4.572	4.594	4.306	4.146
	Maximum	5.581	5.696	5.192	5.508	4.762	4.966	4.685	4.734
	C.V.(%)	2.274	4.064	2.562	4.420	1.180	2.615	2.524	3.832
	No. Specimens	18		18		18		18	
	No. Prepreg Lots	3		3		3		3	

2.5.10 “50/40/10” Unnotched Tension 3 Properties (UNT3)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Unnotched Tension 3 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/90/-45/0/0/45/0/0/-45/0]S			
Resin content:	35.01 %wt	Comp. density: 1.519 g/cc							
Fiber volume:	55.17 %vol								
Ply count:	20								
Test method:		ASTM D3039-17		Modulus calculation: 1000-3000 microstrain					
Normalized by:		0.004800		in. CPT					
		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCDCX XXXB		TCDCX XXXA		TCDCX XXXD		TCDCX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT3 Strength [ksi]	Mean	264.0	261.2	271.1	275.1	266.0	267.2	269.0	260.9
	Minimum	249.9	243.4	247.0	246.7	234.9	224.8	252.5	241.2
	Maximum	275.9	273.8	280.6	295.4	279.5	292.5	280.3	274.0
	C.V.(%)	2.603	3.084	3.079	4.549	4.094	5.887	3.152	3.576
	No. Specimens	18		19		22		18	
	No. Prepreg Lots	3		3		3		3	
UNT3 Modulus [Msi]	Mean	13.62	13.48	13.14	13.34	13.36	13.40	13.59	13.18
	Minimum	13.10	12.93	12.41	12.16	12.70	12.15	12.93	12.44
	Maximum	13.96	14.21	13.79	14.23	15.14	15.34	15.51	14.84
	C.V.(%)	1.936	2.965	2.898	4.065	4.592	5.401	4.603	4.356
	No. Specimens	18		19		20		18	
	No. Prepreg Lots	3		3		3		3	

2.5.11 “33/0/67” Unnotched Compression 0/90 Properties (UNC0)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg						Unnotched Compression 0/90 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [90/0/90]7			
Resin content:	35.50 %wt	Comp. density: 1.513 g/cc									
Fiber volume:	54.52 %vol										
Ply count:	21										
Test method:	ASTM D6641-23	Modulus calculation: 1000-3000 microstrain									
Normalized by:	0.004800	in. CPT									
		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDRX XXXB		TCDRX XXXA		TCDRX XXXC		TCDRX XXXD		TCDRX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
(0/90) UNC0 Strength [ksi]	Mean	93.84	92.12	84.16	87.69	75.72	74.12	63.10	63.70	54.09	54.68
	Minimum	84.26	82.83	75.57	78.37	67.52	65.02	55.98	55.44	50.34	48.43
	Maximum	100.7	101.1	91.16	94.76	85.26	85.58	70.65	71.68	63.13	62.16
	C.V.(%)	4.756	5.648	5.000	5.073	6.622	6.918	6.894	7.496	6.123	5.869
	No. Specimens	18		20		20		19		19	
	No. Prepreg Lots	3		3		3		3		3	
(0/90) UNC0 Modulus [Msi]	Mean	7.818	7.671	7.729	8.079	7.858	7.627	7.760	7.829	7.688	7.762
	Minimum	7.131	6.981	7.069	7.293	6.867	6.612	7.286	7.208	7.125	6.777
	Maximum	8.283	8.085	8.249	8.595	8.433	8.129	8.351	8.473	8.348	8.964
	C.V.(%)	4.245	4.013	3.715	3.638	5.450	5.751	3.803	4.900	4.507	6.689
	No. Specimens	18		18		18		18		18	
	No. Prepreg Lots	3		3		3		3		3	

2.5.12 “25/50/25” Unnotched Compression 1 Properties (UNC1)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		Unnotched Compression 1 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/0/-45/90]3S							
Resin content:	34.40 %wt	Comp. density: 1.524 g/cc							
Fiber volume:	55.85 %vol								
Ply count:	24								
Test method:	ASTM D6641-23	Modulus calculation: 1000-3000 microstrain							
Normalized by:	0.004800	in. CPT							
		CTD		RTD		ETD1		ETW1	
Test Temperature [°F]	-65			70		180		180	
Moisture Conditioning	Dry			Dry		Dry		Equilibrium	
Equilibrium at T, RH								160F,85%	
Source code		TCDWX XXXB		TCDWX XXXA		TCDWX XXXC		TCDWX XXXD	
								TCDWX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNC1 Strength [ksi]	Mean	100.9	100.6	86.75	89.70	77.70	78.42	65.48	64.97
	Minimum	90.18	92.45	81.77	78.67	75.66	76.61	56.74	54.40
	Maximum	106.5	107.2	93.29	98.90	79.75	80.40	71.87	74.08
	C.V.(%)	4.372	4.226	3.698	4.970	2.470	2.395	5.389	7.611
	No. Specimens	18		21		6		18	
	No. Prepreg Lots	3		3		1		3	
UNC1 Modulus [Msi]	Mean	8.047	8.021	7.882	8.191	7.878	7.952	7.545	7.488
	Minimum	7.635	7.440	7.603	7.715	7.645	7.688	6.974	6.687
	Maximum	8.516	8.568	8.099	8.547	8.185	8.252	8.071	8.466
	C.V.(%)	2.900	3.818	1.873	3.283	2.318	2.351	3.940	7.157
	No. Specimens	18		18		6		18	
	No. Prepreg Lots	3		3		1		3	

2.5.13 “10/80/10” Unnotched Compression 2 Properties (UNC2)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg		Unnotched Compression 2 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S							
Resin content:	34.28 %wt	Comp. density: 1.524 g/cc							
Fiber volume:	55.97 %vol								
Ply count:	20								
Test method:	ASTM D6641-23	Modulus calculation: 1000-3000 microstrain							
Normalized by:	0.004800	in. CPT							
		CTD		RTD		ETD1		ETW1	
Test Temperature [°F]	-65	70		180		180		250	
Moisture Conditioning	Dry	Dry		Dry		Dry		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code	TCDXX XXXB	TCDXX XXXA		TCDXX XXXC		TCDXX XXXD		TCDXX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNC2 Strength [ksi]	Mean	72.30	71.28	60.99	63.93	51.13	51.74	43.29	42.95
	Minimum	63.61	61.25	55.78	58.46	50.57	51.00	38.67	39.31
	Maximum	76.17	76.18	64.31	69.12	51.73	52.33	46.60	47.49
	C.V.(%)	4.373	4.938	3.635	3.841	0.9003	1.066	4.397	4.647
	No. Specimens	18		18		6		18	
	No. Prepreg Lots	3		3		1		3	
UNC2 Modulus [Msi]	Mean	5.125	5.055	4.865	5.101	4.683	4.740	4.411	4.383
	Minimum	4.881	4.743	4.642	4.882	4.561	4.600	4.106	3.916
	Maximum	5.305	5.417	5.004	5.370	4.759	4.828	4.580	4.778
	C.V.(%)	2.588	4.282	2.179	3.090	1.605	1.682	3.038	6.213
	No. Specimens	18		18		6		18	
	No. Prepreg Lots	3		3		1		3	

2.5.14 “50/40/10” Unnotched Compression 3 Properties (UNC3)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		Unnotched Compression 3 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/90/-45/0/0/45/0/0/-45/0]S									
Resin content:	34.22 %wt	Comp. density: 1.525 g/cc									
Fiber volume:	56.04 %vol										
Ply count:	20										
Test method:	ASTM D6641-23	Modulus calculation: 1000-3000 microstrain									
Normalized by:	0.004800	in. CPT									
		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]	-65	-65		70		180		180		250	
Moisture Conditioning	Dry	Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDYX XXXB		TCDYX XXXA		TCDYX XXXC		TCDYX XXXD		TCDYX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNC3 Strength [ksi]	Mean	156.3	154.8	138.3	142.4	119.1	119.4	97.71	97.46	73.87	75.28
	Minimum	136.9	135.2	122.2	129.5	105.4	105.8	80.21	80.21	63.16	65.94
	Maximum	169.2	166.6	151.5	154.4	129.5	129.3	113.8	113.4	84.20	87.32
	C.V.(%)	5.273	4.955	5.133	4.174	5.289	5.124	10.00	10.56	10.00	9.656
	No. Specimens	19		18		10		20		21	
	No. Prepreg Lots	3		3		1		3		3	
UNC3 Modulus [Msi]	Mean	12.57	12.46	12.41	12.97	12.46	12.50	11.98	11.90	12.06	12.27
	Minimum	11.85	11.47	11.85	11.92	12.19	12.24	10.86	10.47	11.44	11.54
	Maximum	13.30	13.24	13.13	13.91	12.90	13.03	12.96	13.21	12.88	13.35
	C.V.(%)	2.974	3.687	2.687	3.770	1.885	2.043	4.801	6.407	3.658	4.920
	No. Specimens	18		19		9		20		18	
	No. Prepreg Lots	3		3		1		3		3	

2.5.15 “25/50/25” Open-Hole Tension 1 Properties (OHT1)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg						Open-Hole Tension 1 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/0/-45/90]3S					
Resin content:		33.62 %wt		Comp. density: 1.534 g/cc							
Fiber volume:		56.88 %vol									
Ply count:		24									
Test method:		ASTMD5766-23									
Normalized by:		0.004800		in. CPT							
		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDDX XXXB		TCDDX XXXA		TCDDX XXXC		TCDDX XXXD		TCDDX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT1 Strength [ksi]	Mean	75.88	73.46	80.97	79.56	83.39	81.61	88.15	85.26	91.07	88.13
	Minimum	72.57	68.30	78.26	72.58	78.60	73.28	85.92	81.14	87.67	82.43
	Maximum	79.62	78.76	84.27	86.41	87.82	87.71	90.20	88.71	95.41	93.71
	C.V.(%)	2.786	4.462	2.458	4.843	2.993	4.847	1.494	2.247	3.015	4.206
	No. Specimens	18		18		18		18		18	
No. Prepreg Lots		3		3		3		3		3	

2.5.16 “10/80/10” Open-Hole Tension 2 Properties (OHT2)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg		Open-Hole Tension 2 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S							
Resin content:	32.99 %wt	Comp. density: 1.534 g/cc							
Fiber volume:	57.41 %vol								
Ply count:	20								
Test method:	ASTM D5766-23								
Normalized by:	0.004800 in. CPT								
		CTD		RTD		ETD1		ETW1	
Test Temperature [°F]	-65	-65		70		180		180	
Moisture Conditioning	Dry	Dry		Dry		Dry		Equilibrium	
Equilibrium at T, RH								160F,85%	
Source code		TCDEX XXXB		TCDEX XXXA		TCDEX XXXC		TCDEX XXXD	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT2 Strength [ksi]	Mean	60.58	58.99	55.09	53.86	52.78	52.61	52.50	51.54
	Minimum	58.41	56.66	52.51	50.66	52.16	51.02	50.40	47.55
	Maximum	63.74	61.45	56.62	56.61	53.72	54.11	55.03	55.35
	C.V.(%)	2.171	2.205	1.857	3.081	1.172	2.329	2.600	3.871
	No. Specimens	18		18		6		18	
	No. Prepreg Lots	3		3		1		3	

2.5.17 “50/40/10” Open-Hole Tension 3 Properties (OHT3)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg						Open-Hole Tension 3 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/90/-45/0/0/45/0/0/-45/0]S			
Resin content:	32.84 %wt	Comp. density: 1.534 g/cc									
Fiber volume:	57.54 %vol										
Ply count:	20										
Test method:	ASTMD5766-23										
Normalized by:	0.004800	in. CPT									
		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDFX XXXB		TCDFX XXXA		TCDFX XXXC		TCDFX XXXD		TCDFX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT3 Strength [ksi]	Mean	117.9	114.3	127.7	124.6	135.2	134.5	151.5	148.6	166.3	162.6
	Minimum	112.3	106.5	120.6	113.7	125.2	123.3	138.8	129.6	145.8	140.3
	Maximum	123.6	123.5	136.7	134.2	143.4	147.6	172.4	174.6	190.0	186.9
	C.V.(%)	3.072	3.810	3.882	5.462	4.501	6.130	7.279	8.933	9.467	10.80
	No. Specimens	18		18		6		18		18	
No. Prepreg Lots		3		3		1		3		3	

2.5.18 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg				Filled-Hole Tension 1 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/0/-45/90]3S				
Resin content:	32.70 %wt		Comp. density: 1.535 g/cc						
Fiber volume:	57.73 %vol								
Ply count:	24								
Test method:	ASTM D6742-23								
Normalized by:	0.004800		in. CPT						
		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCD4X XXXB		TCD4X XXXA		TCD4X XXXD		TCD4X XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHT1 Strength [ksi]	Mean	81.91	79.72	84.29	82.78	91.79	90.63	91.56	89.52
	Minimum	78.46	73.56	79.74	76.27	88.48	82.59	88.09	84.68
	Maximum	85.46	84.75	87.27	88.16	95.05	96.08	96.07	94.73
	C.V.(%)	2.611	4.260	2.102	4.116	2.212	4.795	2.514	3.448
	No. Specimens	18		18		18		18	
No. Prepreg Lots		3		3		3		3	

2.5.19 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Filled-Hole Tension 2			
Resin content:		33.13 %wt		Comp. density: 1.535 g/cc		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg			
Fiber volume:		57.34 %vol				[45/-45/0/45/-45/45/-45/90/45/-45]S			
Ply count:		20							
Test method:		ASTM D6742-23							
Normalized by:		0.004800		in. CPT					
		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCD5X XXXB		TCD5X XXXA		TCD5X XXXD		TCD5X XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHT2 Strength [ksi]	Mean	69.97	68.50	60.28	59.45	57.14	56.72	54.75	54.07
	Minimum	67.24	65.98	57.19	55.69	55.41	53.70	52.08	50.64
	Maximum	71.12	73.03	63.44	62.58	59.55	59.65	57.79	56.65
	C.V.(%)	1.567	2.586	2.795	3.116	2.107	3.237	2.749	2.904
	No. Specimens	18		18		18		18	
No. Prepreg Lots		3		3		3		3	

2.5.20 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Filled-Hole Tension 3 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/90/-45/0/0/45/0/0/-45/0]S				
Resin content:	33.01 %wt		Comp. density: 1.532 g/cc						
Fiber volume:	57.34 %vol								
Ply count:	20								
Test method:	ASTM D6742-23								
Normalized by:	0.004800		in. CPT						
		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCD6X XXXB		TCD6X XXXA		TCD6X XXXD		TCD6X XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHT3 Strength [ksi]	Mean	117.8	114.5	126.0	123.1	141.1	138.3	146.2	143.0
	Minimum	111.2	106.9	117.0	109.8	132.7	126.1	134.3	131.5
	Maximum	125.6	122.8	133.4	133.0	149.5	149.5	154.4	152.8
	C.V.(%)	3.860	4.119	3.885	5.281	4.137	5.506	4.032	4.700
	No. Specimens	18		18		19		18	
No. Prepreg Lots		3		3		3		3	

2.5.21 “25/50/25” Open-Hole Compression 1 Properties (OHC1)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg						Open-Hole Compression 1 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/0/-45/90]3S			
Resin content:	32.91 %wt	Comp. density: 1.534 g/cc									
Fiber volume:	57.49 %vol										
Ply count:	24										
Test method:	ASTMD6484-23										
Normalized by:	0.004800	in. CPT									
		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDGX XXXB		TCDGX XXXA		TCDGX XXXC		TCDGX XXXD		TCDGX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHC1 Strength [ksi]	Mean	48.89	48.90	43.04	42.29	39.09	38.10	37.67	37.04	32.87	32.10
	Minimum	47.70	47.68	41.25	40.85	37.12	36.55	34.44	34.07	30.95	30.22
	Maximum	50.89	50.99	44.77	44.19	40.76	39.30	39.48	40.02	34.92	33.36
	C.V.(%)	2.586	2.672	1.995	2.387	2.398	2.034	4.090	4.892	2.998	3.031
	No. Specimens	6		18		19		18		18	
No. Prepreg Lots		1		3		3		3		3	

2.5.22 “10/80/10” Open-Hole Compression 2 Properties (OHC2)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg		Open-Hole Compression 2 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S							
Resin content:	32.89 %wt	Comp. density: 1.537 g/cc							
Fiber volume:	57.63 %vol								
Ply count:	20								
Test method:	ASTM D6484-23								
Normalized by:	0.004800	in. CPT							
		CTD		RTD		ETD1		ETW1	
Test Temperature [°F]	-65	-65		70		180		180	
Moisture Conditioning	Dry	Dry		Dry		Dry		Equilibrium	
Equilibrium at T, RH								160F,85%	
Source code		TCDHX XXXB		TCDHX XXXA		TCDHX XXXC		TCDHX XXXD	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHC2 Strength [ksi]	Mean	43.69	43.94	37.42	36.93	31.92	31.77	30.05	29.51
	Minimum	42.12	42.24	35.90	35.58	31.37	30.92	27.83	27.82
	Maximum	45.90	46.24	40.90	39.19	32.78	32.56	32.00	31.20
	C.V.(%)	3.631	3.759	3.331	3.015	1.524	1.846	3.869	3.525
	No. Specimens	6		18		6		18	
	No. Prepreg Lots	1		3		1		3	

2.5.23 “50/40/10” Open-Hole Compression 3 Properties (OHC3)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg						Open-Hole Compression 3 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/90/-45/0/0/45/0/0/-45/0]S					
Resin content: 33.01 %wt		Comp. density: 1.532 g/cc									
Fiber volume: 57.35 %vol											
Ply count: 20											
Test method: ASTM D6484-23											
Normalized by: 0.004800		in. CPT									
		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDIX XXXB		TCDIX XXXA		TCDIX XXXC		TCDIX XXXD		TCDIX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHC3 Strength [ksi]	Mean	64.57	63.89	57.23	56.29	52.95	52.73	48.83	47.57	42.37	40.92
	Minimum	61.23	60.74	51.89	52.11	50.83	50.74	43.65	42.34	38.88	38.32
	Maximum	67.11	66.75	62.01	60.99	56.64	55.01	54.05	53.93	44.59	43.13
	C.V.(%)	3.855	3.951	4.033	4.646	3.930	3.092	6.065	6.046	3.824	3.817
	No. Specimens	6		18		7		18		18	
No. Prepreg Lots		1		3		1		3		3	

2.5.24 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg				Filled-Hole Compression 1 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/0/-45/90]3S				
Resin content:	32.93 %w t		Comp. density: 1.535 g/cc						
Fiber volume:	57.52 %vol								
Ply count:	24								
Test method:	ASTM D6742-23								
Normalized by:	0.004800		in. CPT						
		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCD7X XXXB		TCD7X XXXA		TCD7X XXXD		TCD7X XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHC1 Strength [ksi]	Mean	81.42	81.92	68.03	66.91	56.58	55.65	49.16	47.54
	Minimum	77.86	78.62	64.26	62.19	52.79	50.00	47.26	44.84
	Maximum	85.89	86.29	73.45	70.25	59.23	59.19	51.83	51.91
	C.V.(%)	3.983	3.686	3.801	3.678	3.075	3.983	2.944	5.001
	No. Specimens	6		18		18		18	
No. Prepreg Lots		1		3		3		3	

2.5.25 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w with 35%RC prepreg				Filled-Hole Compression 2 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w with 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S				
Resin content:	32.84 %wt		Comp. density: 1.535 g/cc						
Fiber volume:	57.60 %vol								
Ply count:	20								
Test method:	ASTM D6742-23								
Normalized by:	0.004800		in. CPT						
			CTD		RTD		ETW1		ETW2
Test Temperature [°F]			-65		70		180		250
Moisture Conditioning			Dry		Dry		Equilibrium		Equilibrium
Equilibrium at T, RH							160F,85%		160F,85%
Source code			TCD8X XXXB		TCD8X XXXA		TCD8X XXXD		TCD8X XXXE
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHC2 Strength [ksi]	Mean	65.41	65.94	55.34	54.61	45.84	45.23	37.23	36.37
	Minimum	63.63	63.62	51.78	51.59	41.32	42.00	34.77	32.88
	Maximum	67.69	67.82	60.21	57.21	48.46	48.85	39.25	39.36
	C.V.(%)	2.478	2.628	4.567	3.079	4.566	3.740	3.290	4.187
	No. Specimens	6		20		18		18	
	No. Prepreg Lots	1		3		3		3	

In some cases of FHC2>UNC2, UNC2 data is recommended for design. The FHC2 data is for informational purposes only and is not appropriate to be used for design. Shaded values indicated that FHC2>UNC2.

2.5.26 “50/40/10” Filled-Hole Compression 3 Properties (FHC3)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Filled-Hole Compression 3 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/90/-45/0/0/45/0/0/-45/0]S				
Resin content:	33.02 %wt		Comp. density: 1.534 g/cc						
Fiber volume:	57.39 %vol								
Ply count:	20								
Test method:	ASTM D6742-23								
Normalized by:	0.004800		in. CPT						
		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCD9X XXXB		TCD9X XXXA		TCD9X XXXD		TCD9X XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHC3 Strength [ksi]	Mean	101.5	100.8	83.98	82.84	67.44	66.15	56.72	55.08
	Minimum	97.29	96.78	75.72	73.39	61.44	58.76	50.95	49.96
	Maximum	109.2	108.6	89.26	88.66	74.60	74.41	60.08	59.84
	C.V.(%)	4.014	4.073	4.088	5.453	5.174	6.086	4.643	5.605
	No. Specimens	7		19		18		18	
	No. Prepreg Lots	1		3		3		3	

2.5.27 “25/50/25” Single-Shear Bearing 1 Properties (SSB1, Proc. C)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Single-Shear Bearing 1 Proc. C Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/0/-45/90]3S			
Resin content: 34.39 %wt		Comp. density: 1.523 g/cc					
Fiber volume: 55.84 %vol							
Ply count: 24							
Test method: ASTM D5961-23, Proc. C							
Normalized by: 0.004800 in. CPT							
		RTD		ETW1		ETW2	
Test Temperature [°F]		70		180		250	
Moisture Conditioning		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH		160F,85%		160F,85%		160F,85%	
Source code		TCD1X XXXA		TCD1X XXXD		TCD1X XXXE	
		Normalized Measured		Normalized Measured		Normalized Measured	
SSB1, Proc. C 2% Offset Strength [ksi]	Mean	114.0	118.8	107.7	111.9	96.06	93.47
	Minimum	104.4	108.5	99.33	100.5	88.04	83.51
	Maximum	119.7	125.8	119.1	124.1	104.5	106.2
	C.V.(%)	3.479	3.612	4.717	5.031	4.569	6.475
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	
SSB1, Proc. C Ultimate Strength [ksi]	Mean	147.8	154.1	123.8	128.6	112.2	109.1
	Minimum	141.3	147.7	115.6	120.9	107.2	104.8
	Maximum	154.6	160.5	137.7	139.7	117.9	113.4
	C.V.(%)	2.499	2.818	4.247	3.823	2.721	2.448
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	
SSB1, Proc. C Chord Stiffness [Msi]	Mean	1.829	1.907	1.721	1.789	1.689	1.640
	Minimum	1.738	1.821	1.538	1.594	1.465	1.463
	Maximum	1.919	2.032	1.868	1.940	1.892	1.817
	C.V.(%)	2.338	3.196	6.288	6.432	7.075	5.700
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	

2.5.28 “10/80/10” Single-Shear Bearing 2 Properties (SSB2, Proc. C)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Single-Shear Bearing 2 Proc. C Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S			
Resin content: 34.11 %wt		Comp. density: 1.524 g/cc					
Fiber volume: 56.12 %vol							
Ply count: 20							
Test method: ASTM D5961-23, Proc. C							
Normalized by: 0.004800 in. CPT							
		RTD		ETW1		ETW2	
Test Temperature [°F]		70		180		250	
Moisture Conditioning		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH		160F,85%		160F,85%		160F,85%	
Source code		TCD2X XXXA		TCD2X XXXD		TCD2X XXXE	
		Normalized Measured		Normalized Measured		Normalized Measured	
SSB2, Proc. C 2% Offset Strength [ksi]	Mean	119.0	123.7	103.1	107.3	96.10	93.64
	Minimum	114.3	118.5	89.23	95.53	85.32	82.06
	Maximum	126.5	128.1	111.0	118.4	103.2	103.1
	C.V.(%)	2.937	2.790	5.973	6.145	4.818	6.018
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	
SSB2, Proc. C Ultimate Strength [ksi]	Mean	141.2	146.8	121.7	126.6	113.6	110.7
	Minimum	135.8	140.0	114.0	119.5	106.2	102.8
	Maximum	149.7	158.0	131.9	137.3	122.1	121.9
	C.V.(%)	2.884	2.942	4.424	4.602	3.612	4.988
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	
SSB2, Proc. C Chord Stiffness [Msi]	Mean	1.500	1.560	1.397	1.454	1.354	1.318
	Minimum	1.426	1.392	1.292	1.352	1.253	1.204
	Maximum	1.567	1.645	1.507	1.596	1.480	1.423
	C.V.(%)	2.824	4.213	5.601	5.563	5.393	4.222
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	

2.5.29 “50/40/10” Single-Shear Bearing 3 Properties (SSB3, Proc. C)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Single-Shear Bearing 3 Proc. C Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape w ith 35%RC prepreg [45/90/-45/0/0/45/0/0/-45/0]S			
Resin content:		33.10 %wt		Comp. density: 1.526 g/cc					
Fiber volume:		57.07 %vol							
Ply count:		20							
Test method:		ASTM D5961-23, Proc. C							
Normalized by:		0.004800		in. CPT					
		RTD		ETW1		ETW2			
Test Temperature [°F]		70		180		250			
Moisture Conditioning		Dry		Equilibrium		Equilibrium			
Equilibrium at T, RH		160F,85%		160F,85%		160F,85%			
Source code		TCD3X XXXA		TCD3X XXXD		TCD3X XXXE			
		Normalized		Measured		Normalized		Measured	
SSB3, Proc. C 2% Offset Strength [ksi]	Mean	113.5	119.3	96.88	100.6	88.21	86.05		
	Minimum	106.4	110.3	87.91	91.47	81.50	77.92		
	Maximum	121.6	128.3	112.1	115.3	96.23	92.67		
	C.V.(%)	4.137	4.297	7.047	6.212	4.555	5.056		
	No. Specimens	18		18		18			
	No. Prepreg Lots	3		3		3			
SSB3, Proc. C Ultimate Strength [ksi]	Mean	140.7	147.9	114.6	119.0	106.0	103.5		
	Minimum	126.9	132.2	106.4	110.7	97.62	93.26		
	Maximum	151.2	159.6	124.9	130.1	111.7	108.8		
	C.V.(%)	4.100	4.515	4.455	4.178	3.540	4.243		
	No. Specimens	18		18		18			
	No. Prepreg Lots	3		3		3			
SSB3, Proc. C Chord Stiffness [Msi]	Mean	2.305	2.421	2.211	2.296	2.109	2.055		
	Minimum	2.206	2.321	1.890	1.972	1.890	1.836		
	Maximum	2.392	2.536	2.383	2.522	2.418	2.312		
	C.V.(%)	2.492	2.705	7.235	7.310	6.844	5.603		
	No. Specimens	18		18		18			
	No. Prepreg Lots	3		3		3			

2.5.30 “25/50/25” Compression After Impact 1 Properties (CAI1)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Compression After Impact 1 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/0/-45/90]5S			
Resin content:		33.27 %wt		Comp. density: 1.536 g/cc					
Fiber volume:		57.26 %vol							
Ply count:		40							
Test method:		ASTM D7136-20/D7137-23							
Normalized by:		0.004800		in. CPT					
		CTD		RTD					
Test Temperature [°F]		-65		70					
Moisture Conditioning		Dry		Dry					
Equilibrium at T, RH									
Source code		TCDKX XXXB		TCDKX XXXA					
		Normalized	Measured	Normalized	Measured				
CAI1 Strength [ksi]	Mean	55.71	54.94	50.29	50.28				
	Minimum	50.94	50.94	45.10	45.78				
	Maximum	60.60	60.27	55.93	55.69				
	C.V.(%)	5.350	4.302	6.358	5.369				
	No. Specimens	18		18					
	No. Prepreg Lots	3		3					

2.5.31 “10/80/10” Compression After Impact 2 Properties (CAI2)

Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Compression After Impact 2 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]2S			
Resin content: 33.11 %wt		Comp. density: 1.539 g/cc					
Fiber volume: 57.51 %vol							
Ply count: 40							
Test method: ASTM D7136-20/D7137-23							
Normalized by: 0.004800		in. CPT					
		CTD		RTD			
Test Temperature [°F]		-65		70			
Moisture Conditioning		Dry		Dry			
Equilibrium at T, RH							
Source code		TCDOX XXXB		TCDOX XXXA			
		Normalized	Measured	Normalized	Measured		
CAI2 Strength [ksi]	Mean	46.91	47.53	41.13	41.99		
	Minimum	45.30	46.08	40.31	41.05		
	Maximum	48.57	49.05	42.46	42.98		
	C.V.(%)	2.448	2.382	1.811	1.601		
	No. Specimens	6		6			
No. Prepreg Lots		1		1			

2.5.32 “50/40/10” Compression After Impact 3 Properties (CAI3)

Material:		Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg				Compression After Impact 3 Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/90/-45/0/0/45/0/0/-45/0]2S			
Resin content:		33.65 %wt		Comp. density: 1.537 g/cc					
Fiber volume:		56.96 %vol							
Ply count:		40							
Test method:		ASTM D7136-20/D7137-23							
Normalized by:		0.004800		in. CPT					
		CTD		RTD					
Test Temperature [°F]		-65		70					
Moisture Conditioning		Dry		Dry					
Equilibrium at T, RH									
Source code		TCDPX XXXB		TCDPX XXXA					
		Normalized	Measured	Normalized	Measured				
CAI3 Strength [ksi]	Mean	64.65	63.48	58.38	58.31				
	Minimum	62.03	60.16	54.74	54.73				
	Maximum	68.01	66.51	61.47	61.07				
	C.V.(%)	3.508	4.098	3.851	3.641				
	No. Specimens	6		6					
No. Prepreg Lots		1		1					

2.5.33 Interlaminar Tension Properties (ILT)

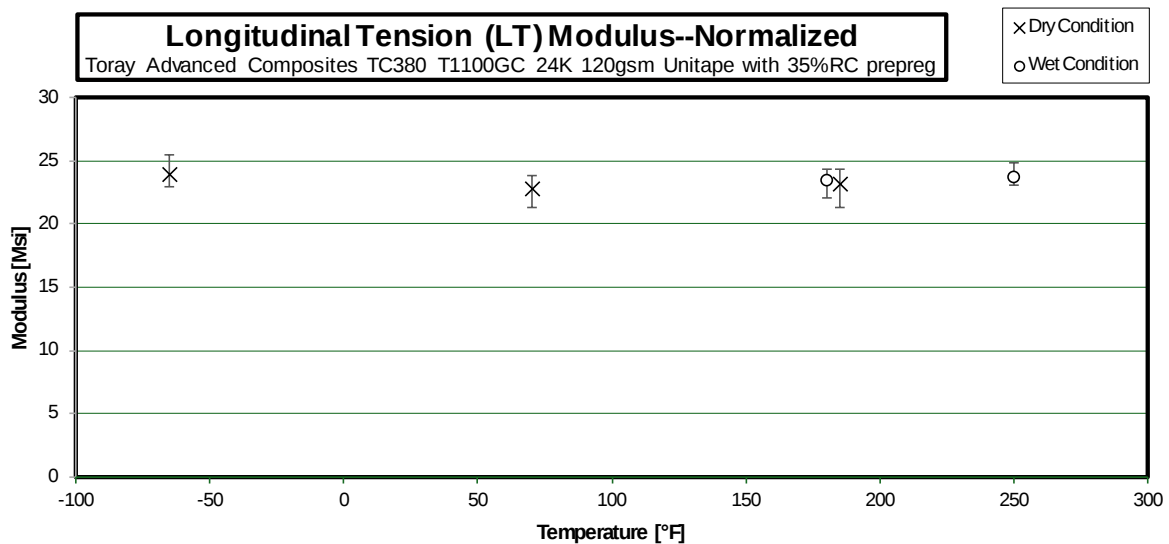
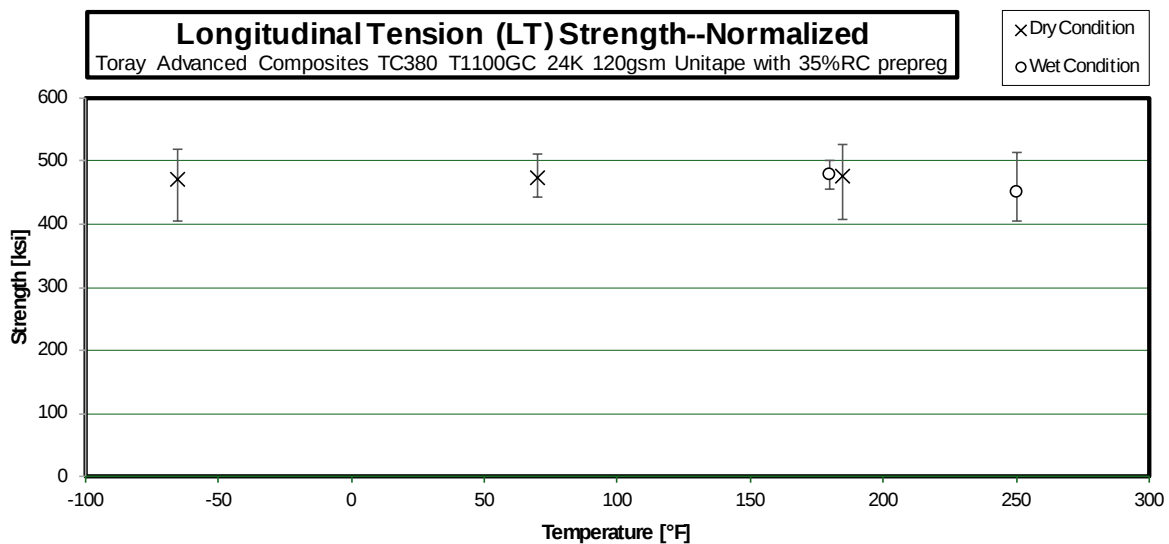
Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg			Interlaminar Tension Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [0]16S			
Resin content:	36.85 %wt	Comp. density: 1.521 g/cc					
Fiber volume:	53.67 %vol						
Ply count:	32						
Test method:	ASTM D6415-22						
Normalized by:	NA						
		CTD		RTD		ETW1	
Test Temperature [°F]		-65		70		180	
Moisture Conditioning		Dry		Dry		Equilibrium	
Equilibrium at T, RH						160F,85%	
Source code		TCDMX XXXB		TCDMX XXXA		TCDMX XXXD	
		Normalized	Measured	Normalized	Measured	Normalized	Measured
CBS [lb]	Mean	831.1		588.7		219.7	
	Minimum	695.0		434.5		128.2	
	Maximum	953.8		693.8		316.4	
	C.V.(%)	13.99		17.86		26.15	
	No. Specimens	6		8		12	
	No. Prepreg Lots	1		1		1	
ILT [ksi]	Mean	24.98		17.78		6.422	
	Minimum	23.69		14.73		4.340	
	Maximum	25.92		19.74		8.681	
	C.V.(%)	3.699		9.839		20.33	
	No. Specimens	6		8		12	
	No. Prepreg Lots	1		1		1	

3. Individual Test Charts

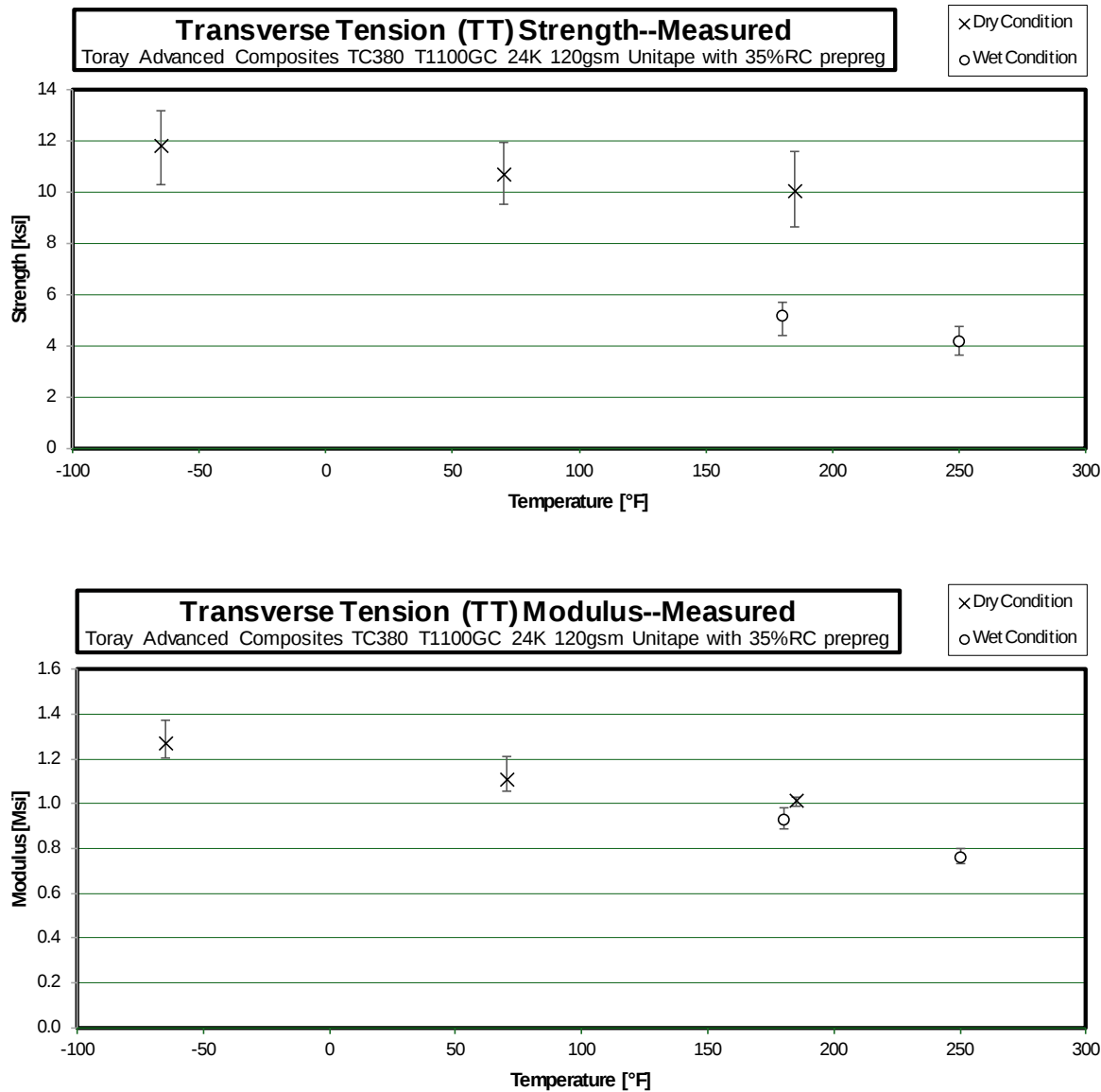
The material property test charts display a combination of all three batches and both cure cycles for a particular property as a function of test temperature for dry and wet test conditions. The average is plotted for each material property and the minimum to maximum range is represented by vertical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

Plots have been offset for ETD1 to 185°F (from 180°F) to improve clarity and readability.

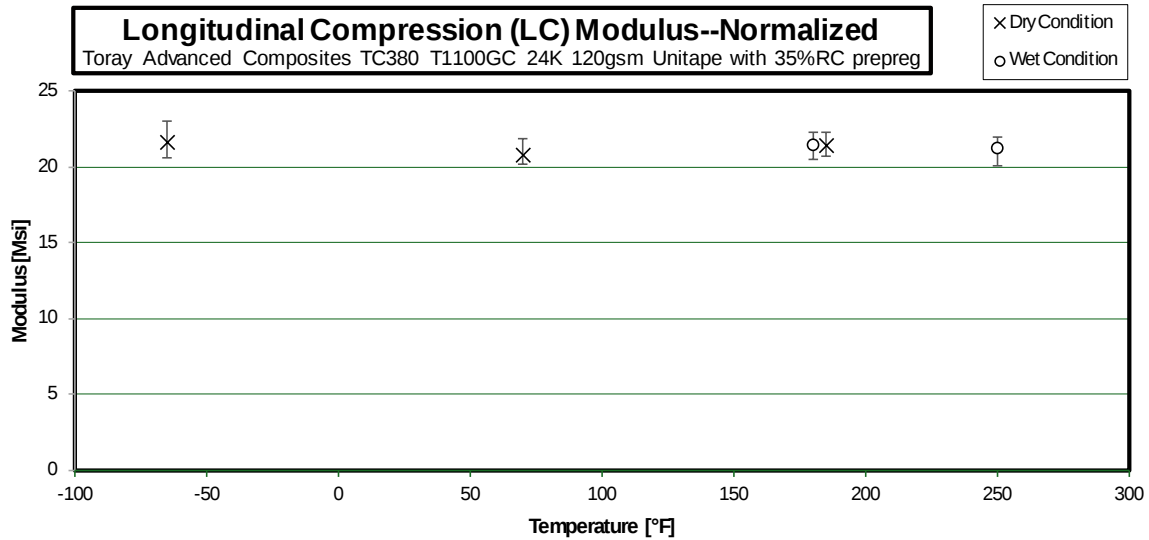
3.1 Longitudinal Tension Properties (LT)



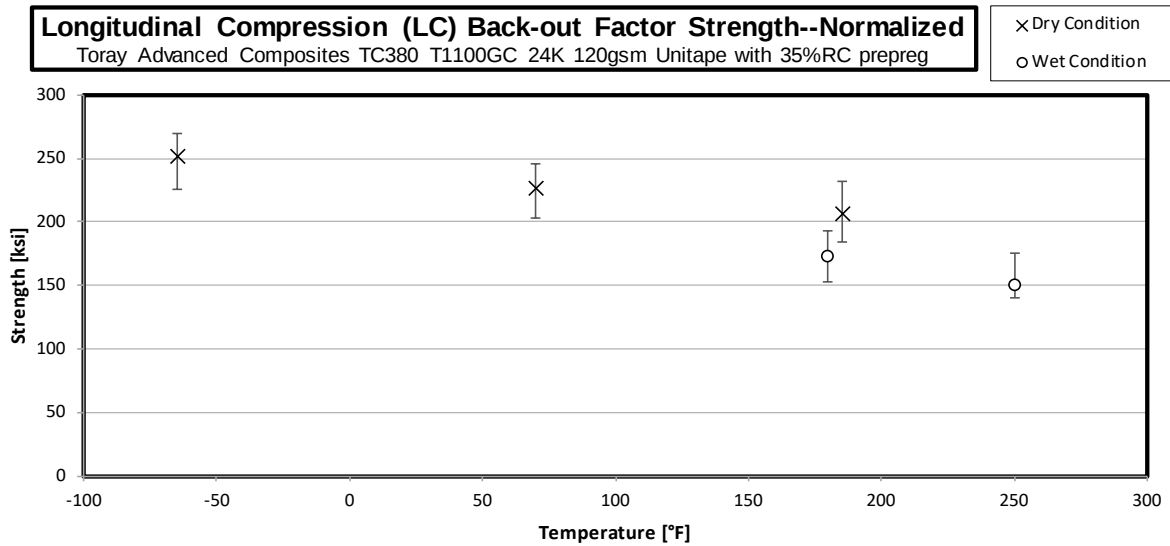
3.2 Transverse Tension Properties (TT)



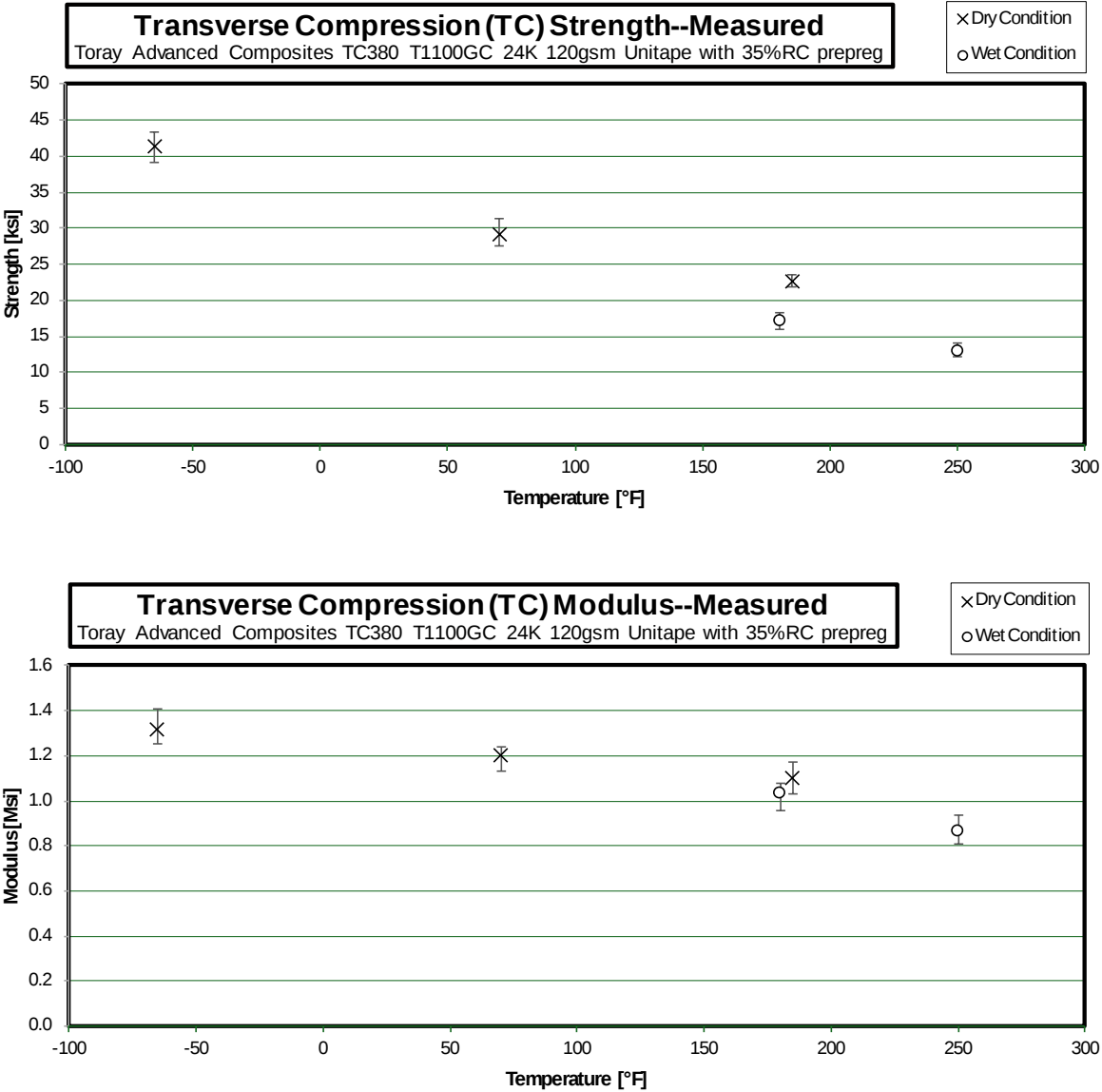
3.3 Longitudinal Compression Properties (LC)



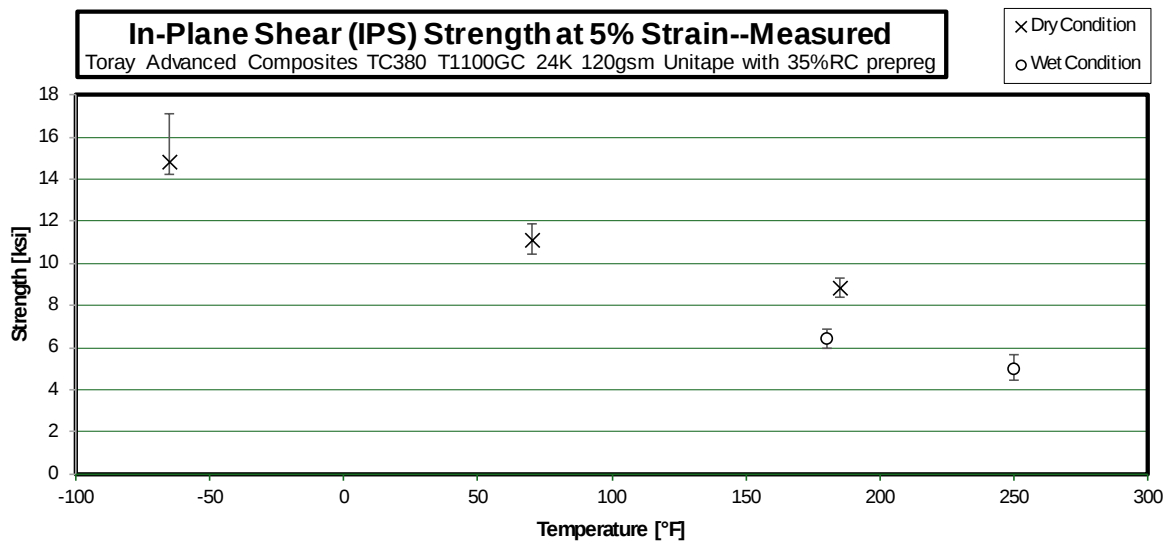
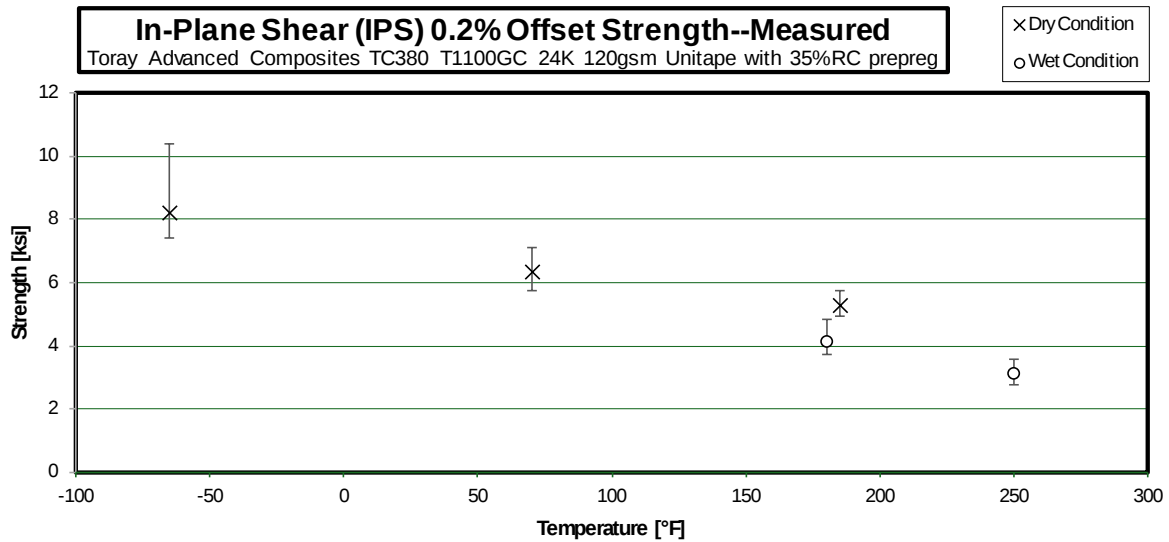
3.4 Longitudinal Compression (LC) Back-out Factor Properties

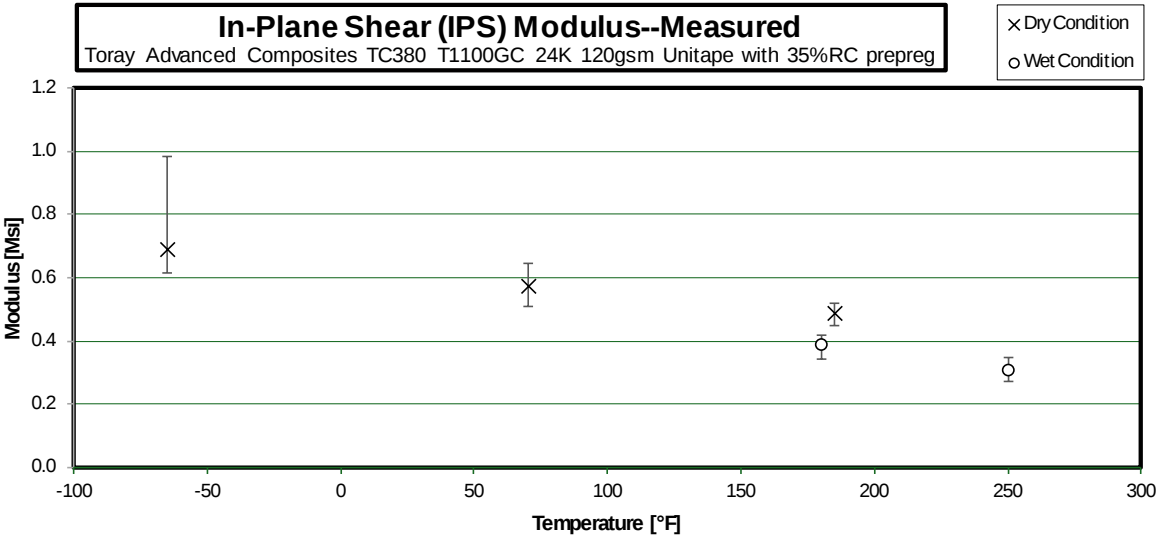


3.5 Transverse Compression Properties (TC)

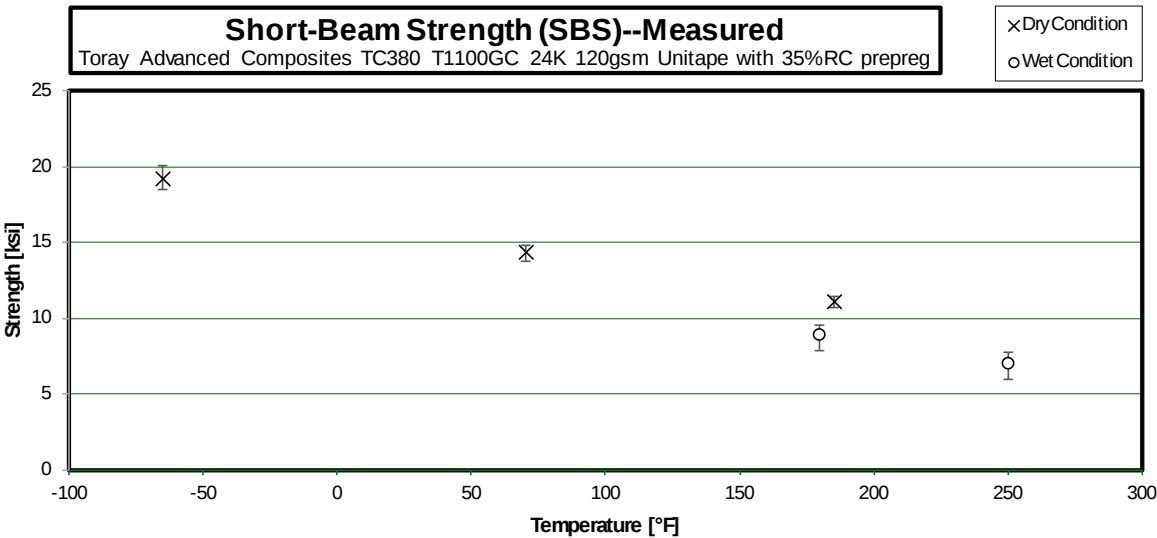


3.6 In-Plane Shear Properties (IPS)

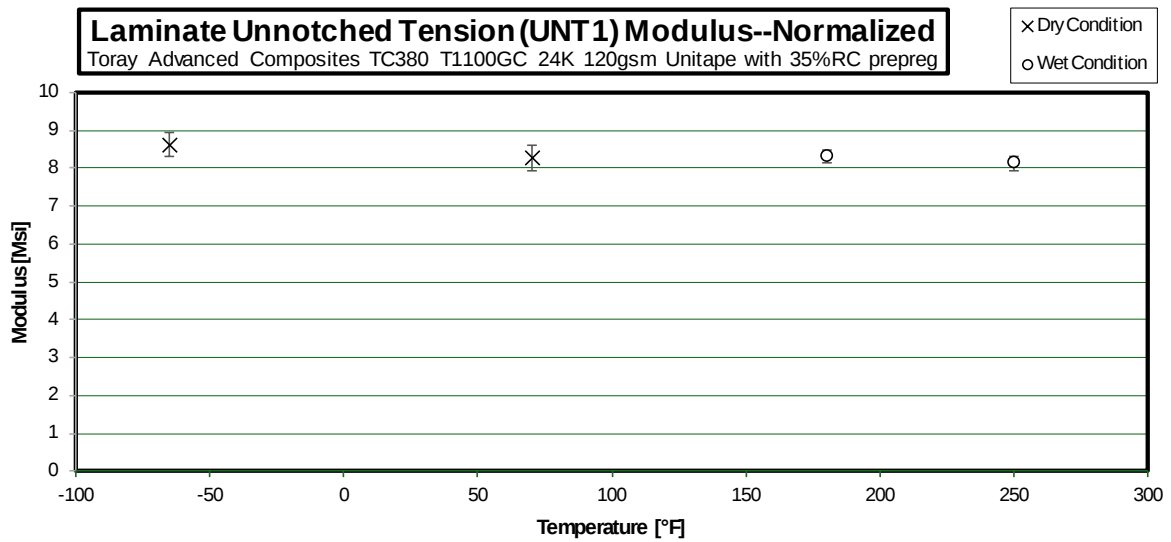
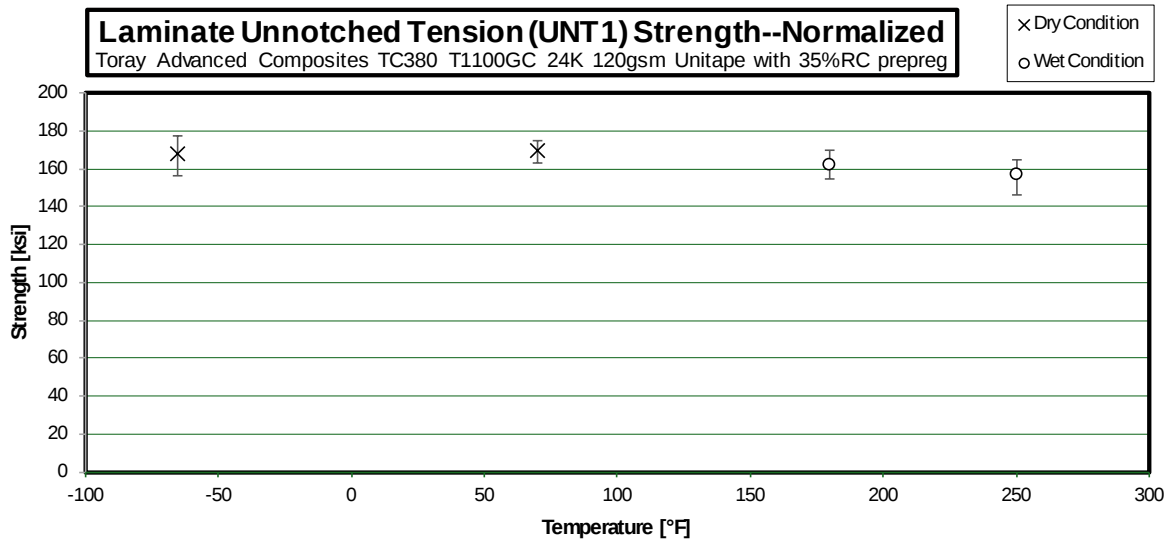




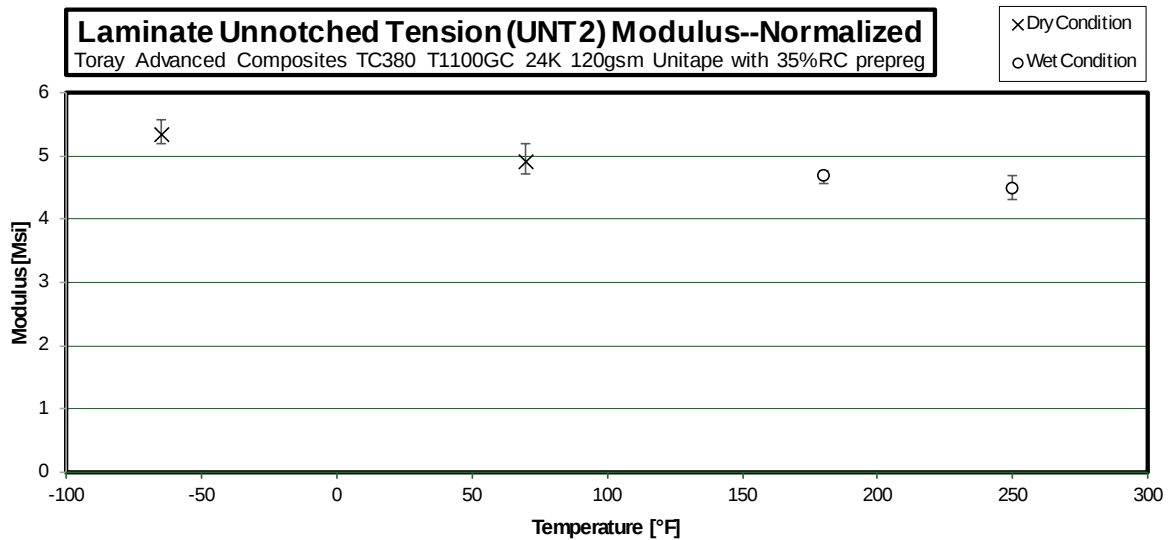
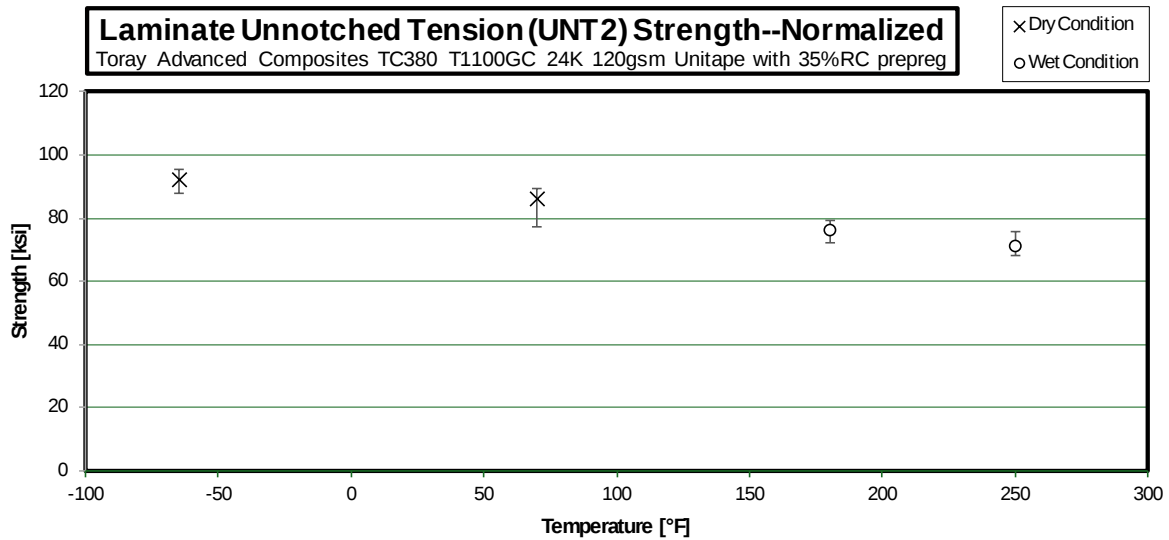
3.7 Lamina Short-Beam Shear Properties (SBS)



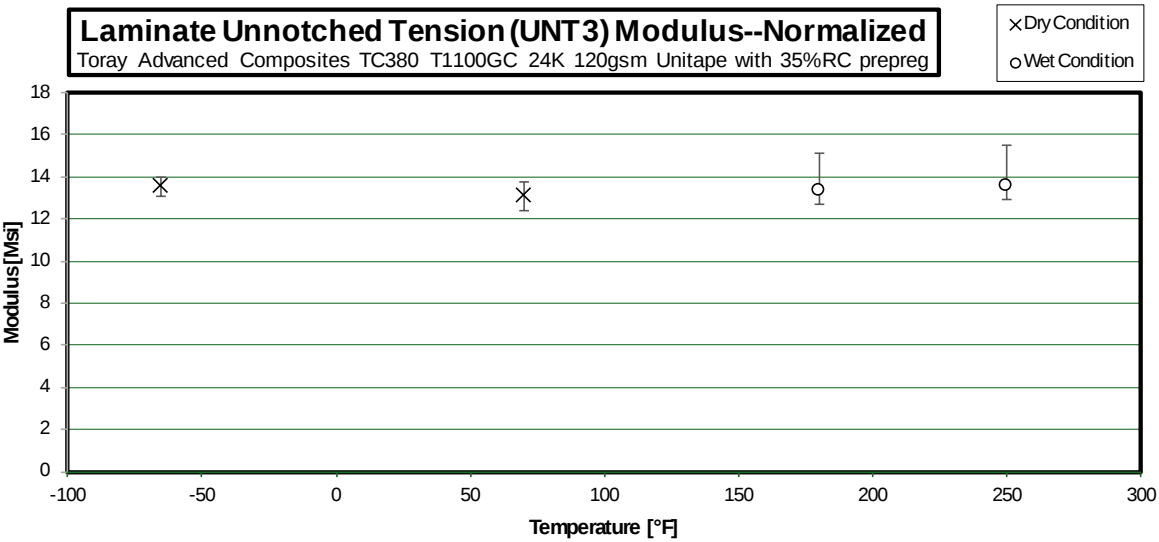
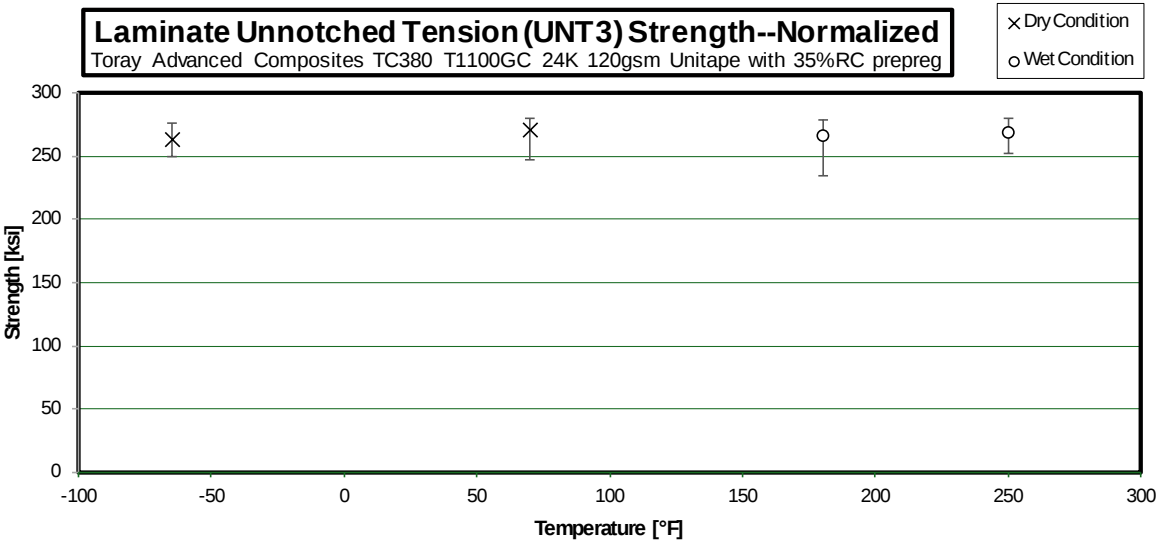
3.8 “25/50/25” Unnotched Tension 1 Properties (UNT1)



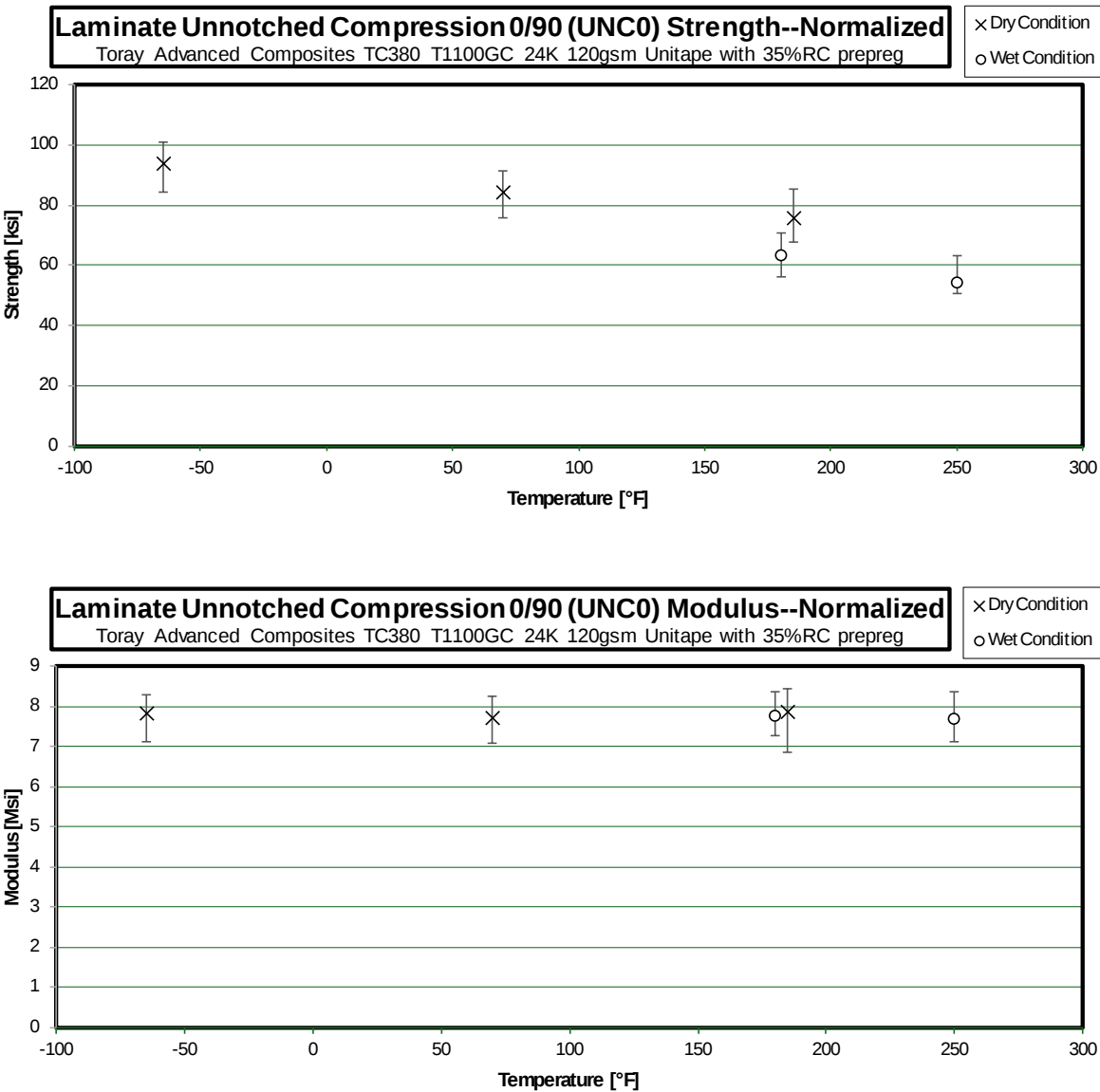
3.9 “10/80/10” Unnotched Tension 2 Properties (UNT2)



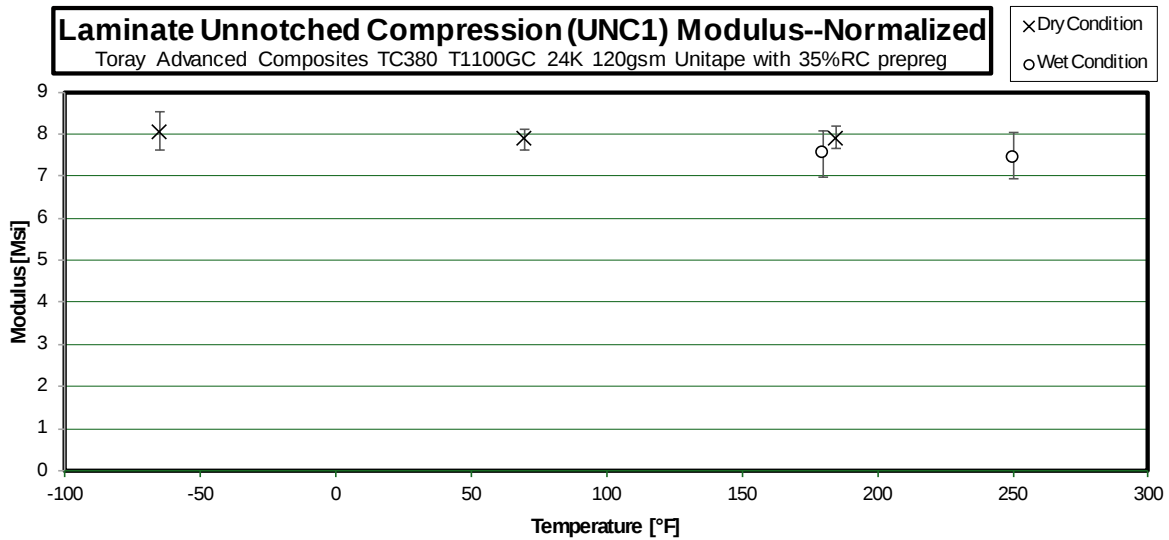
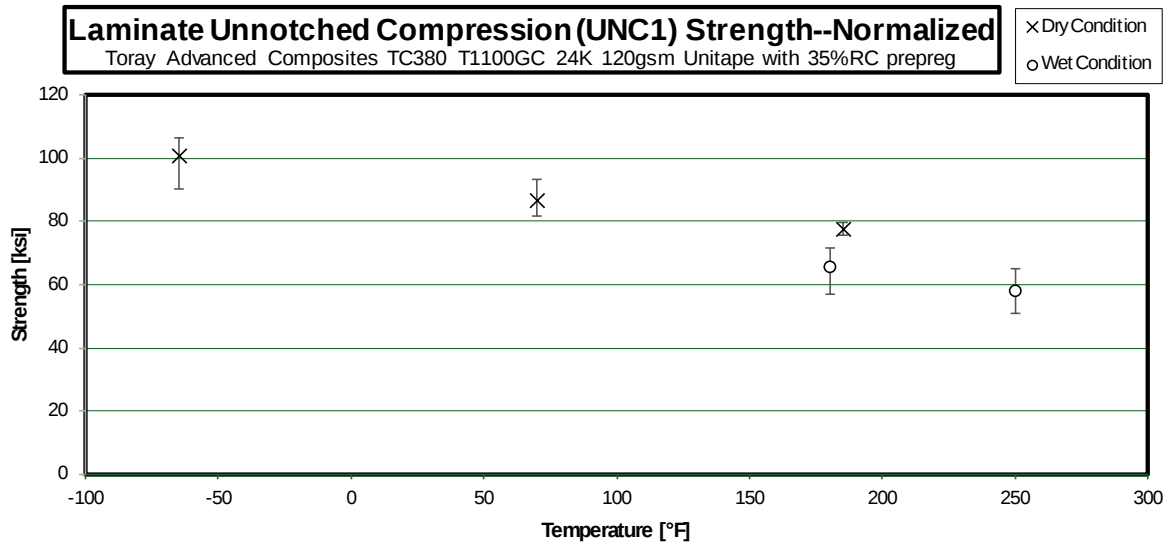
3.10 “50/40/10” Unnotched Tension 3 Properties (UNT3)



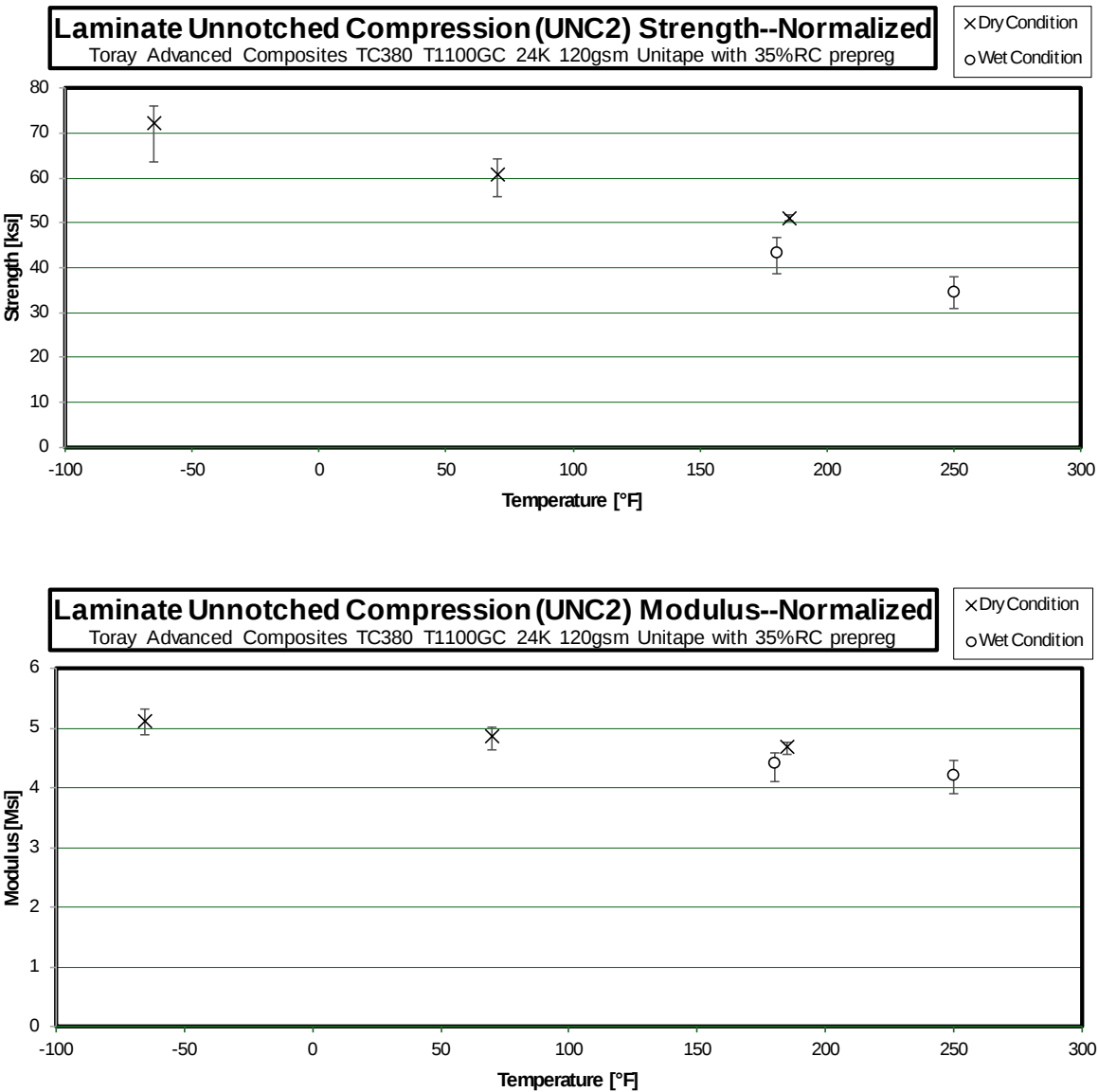
3.11 “33/0/67” Unnotched Compression 0/90 Properties (UNC0)



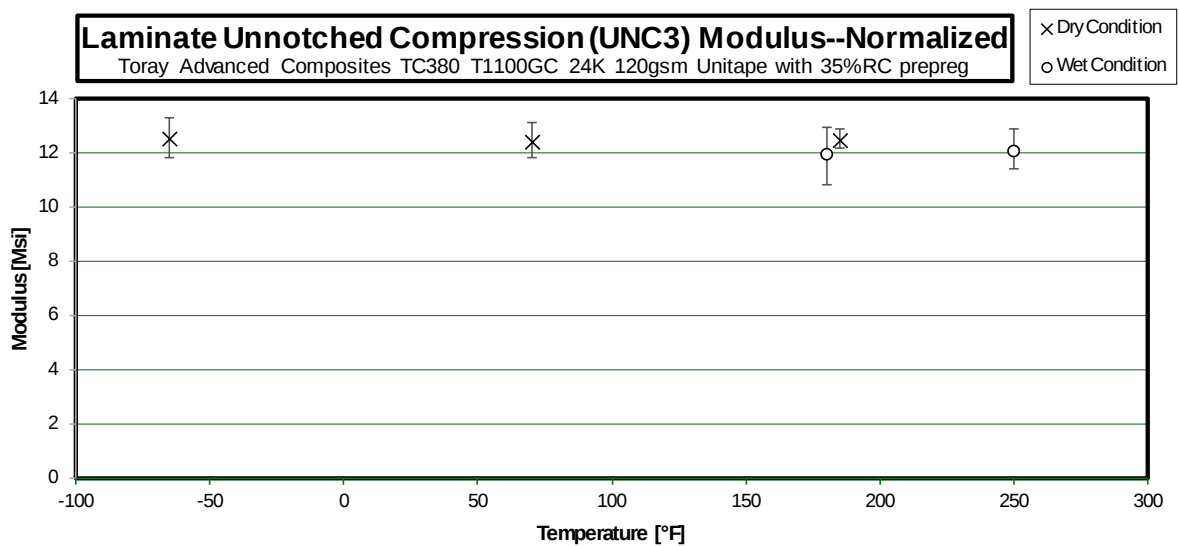
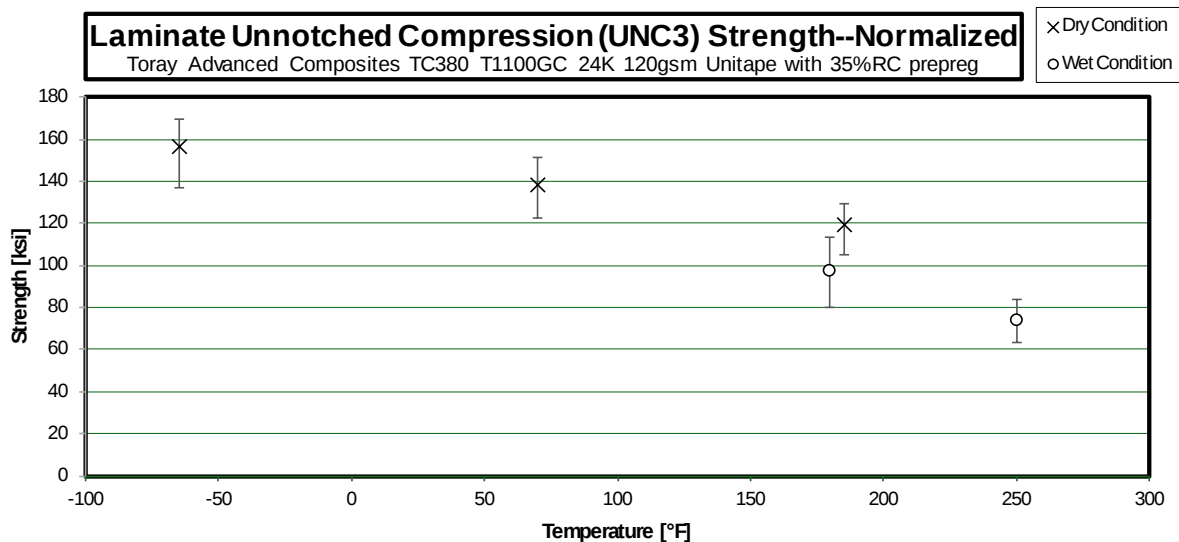
3.12 “25/50/25” Unnotched Compression 1 Properties (UNC1)



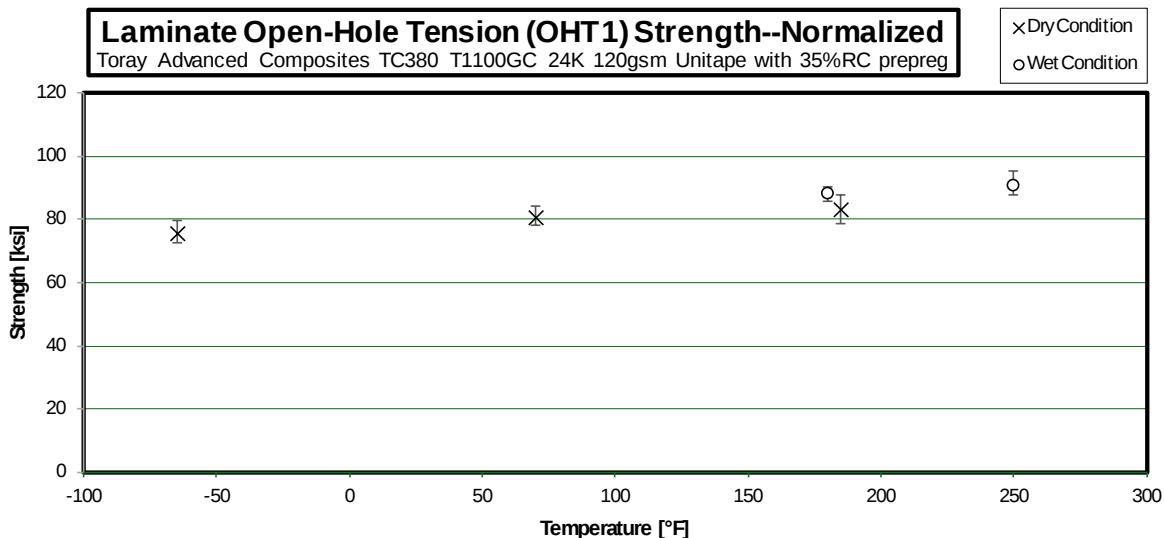
3.13 “10/80/10” Unnotched Compression 2 Properties (UNC2)



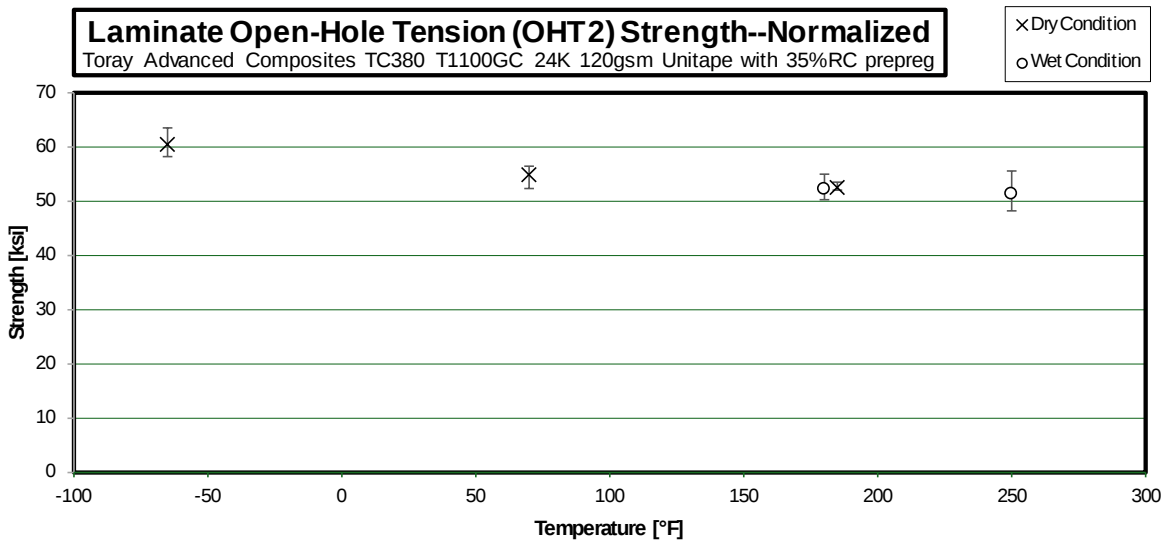
3.14 “50/40/10” Unnotched Compression 3 Properties (UNC3)



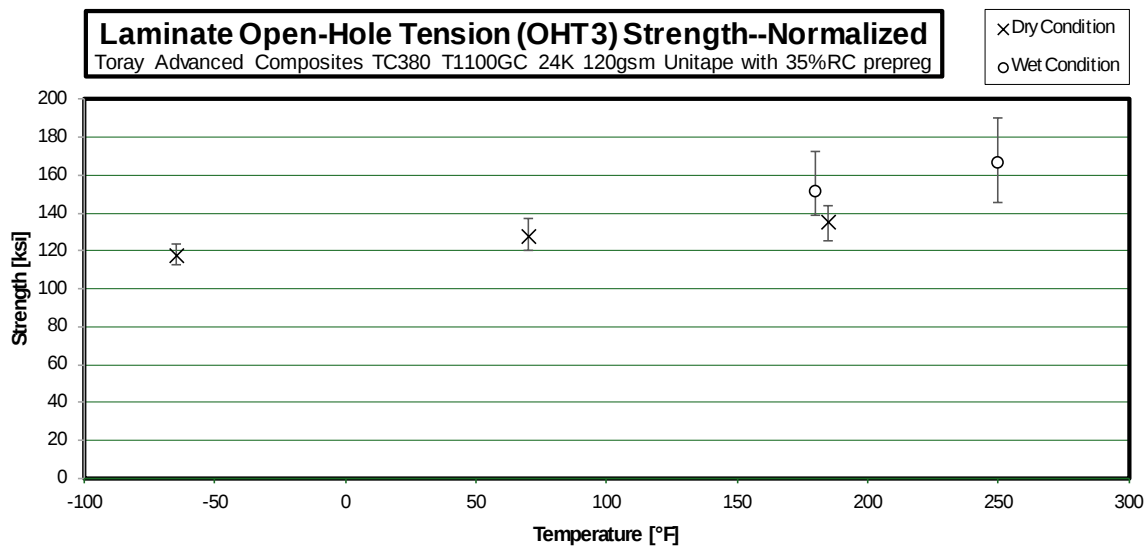
3.15 “25/50/25” Open-Hole Tension 1 Properties (OHT1)



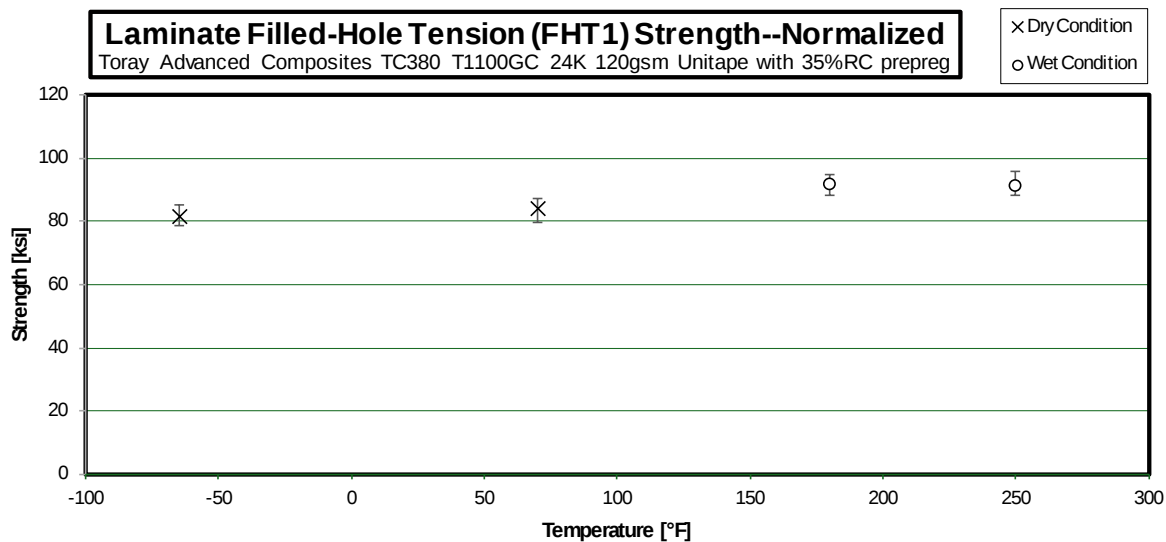
3.16 “10/80/10” Open-Hole Tension 2 Properties (OHT2)



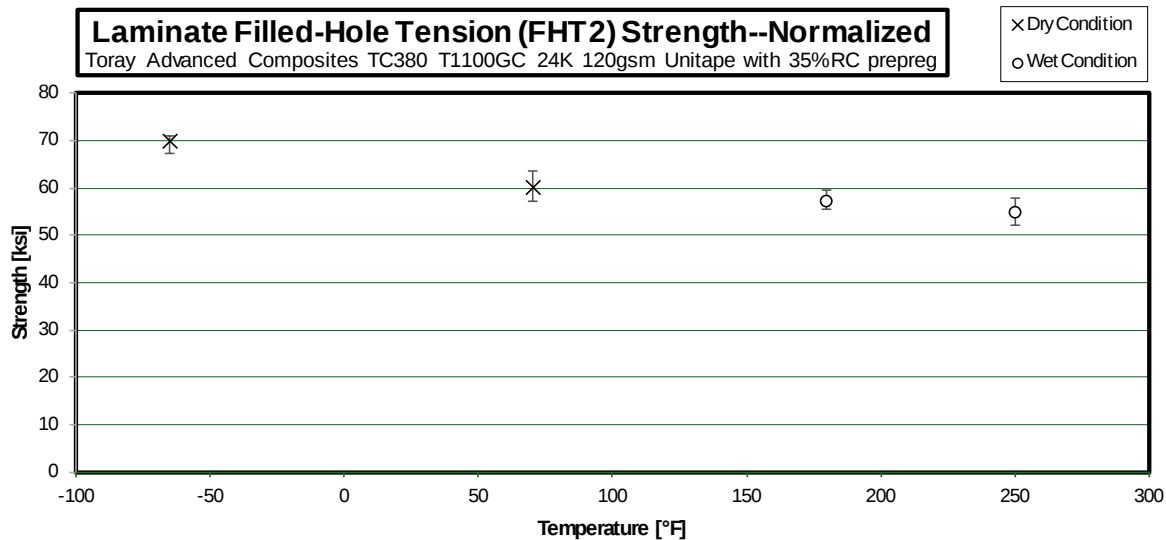
3.17 “50/40/10” Open-Hole Tension 3 Properties (OHT3)



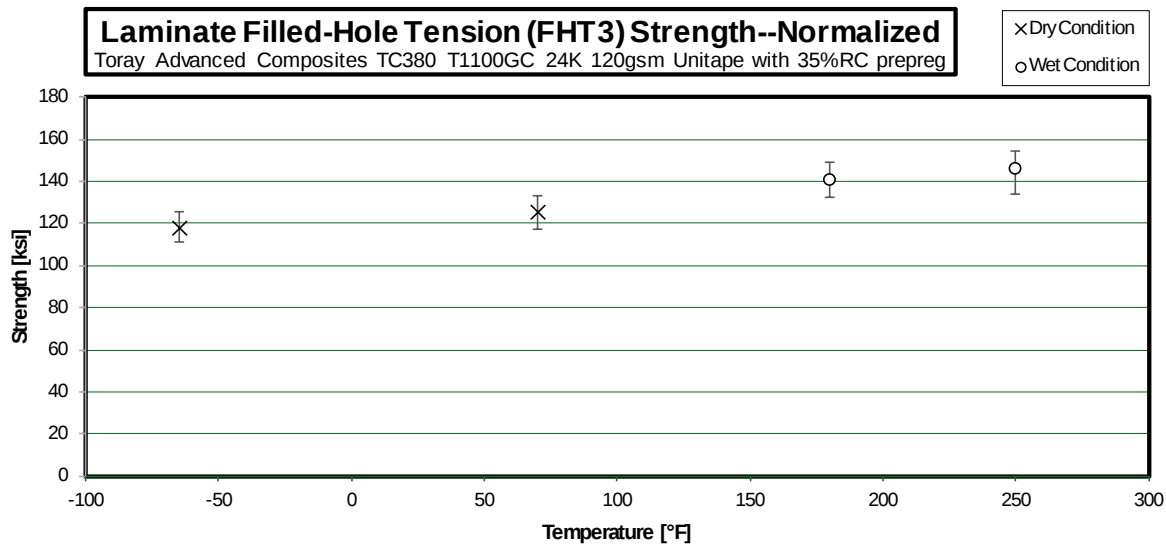
3.18 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)



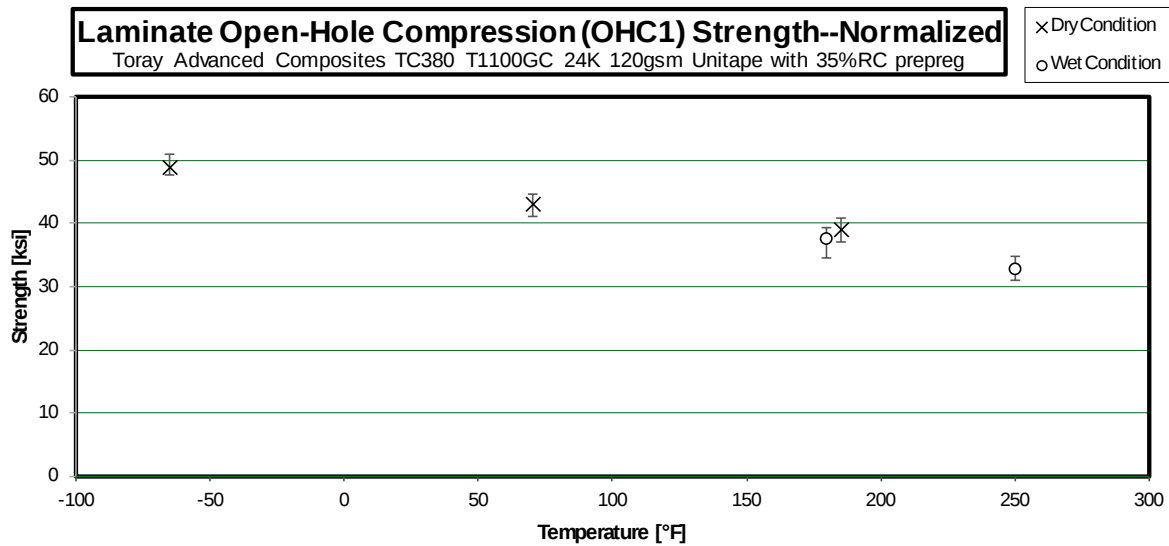
3.19 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)



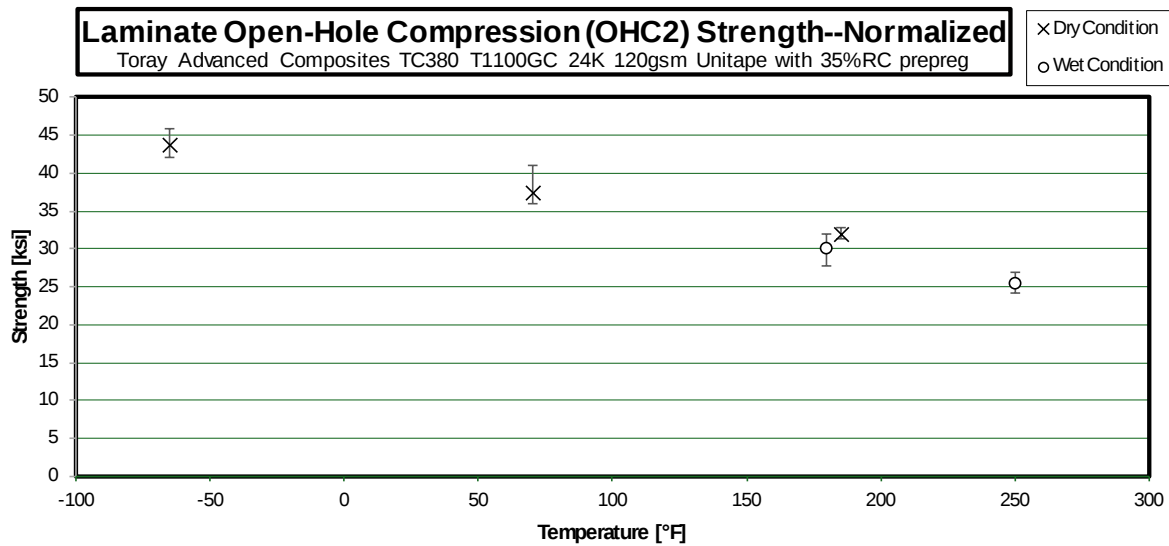
3.20 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)



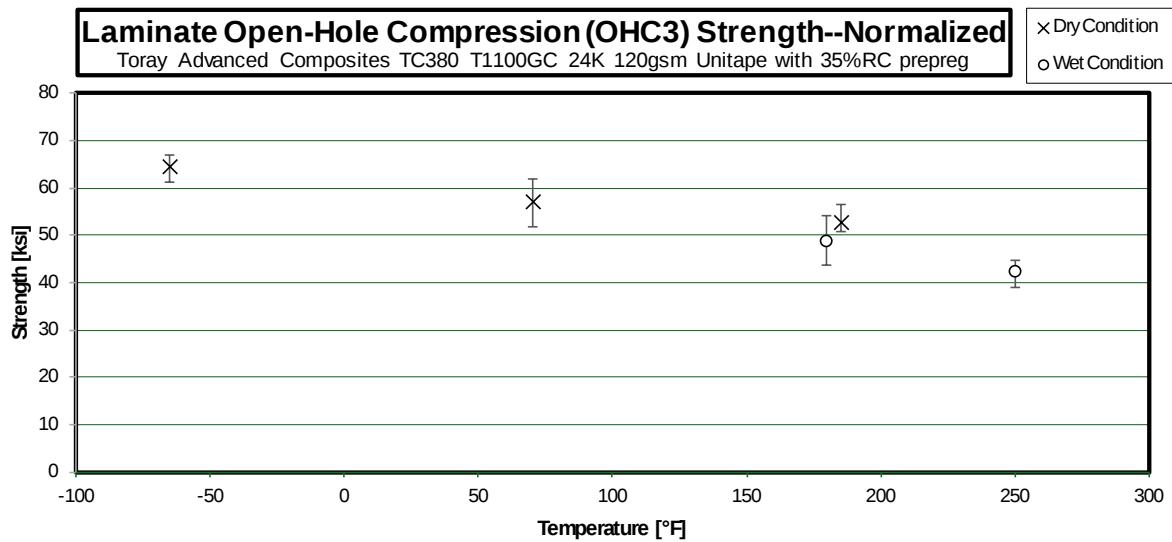
3.21 “25/50/25” Open-Hole Compression 1 Properties (OHC1)



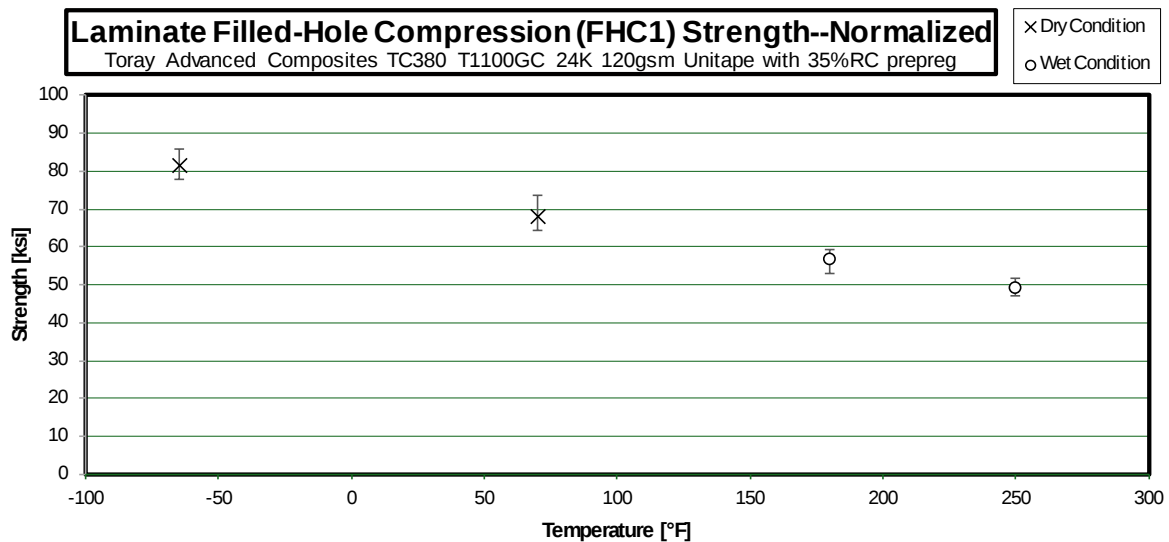
3.22 “10/80/10” Open-Hole Compression 2 Properties (OHC2)



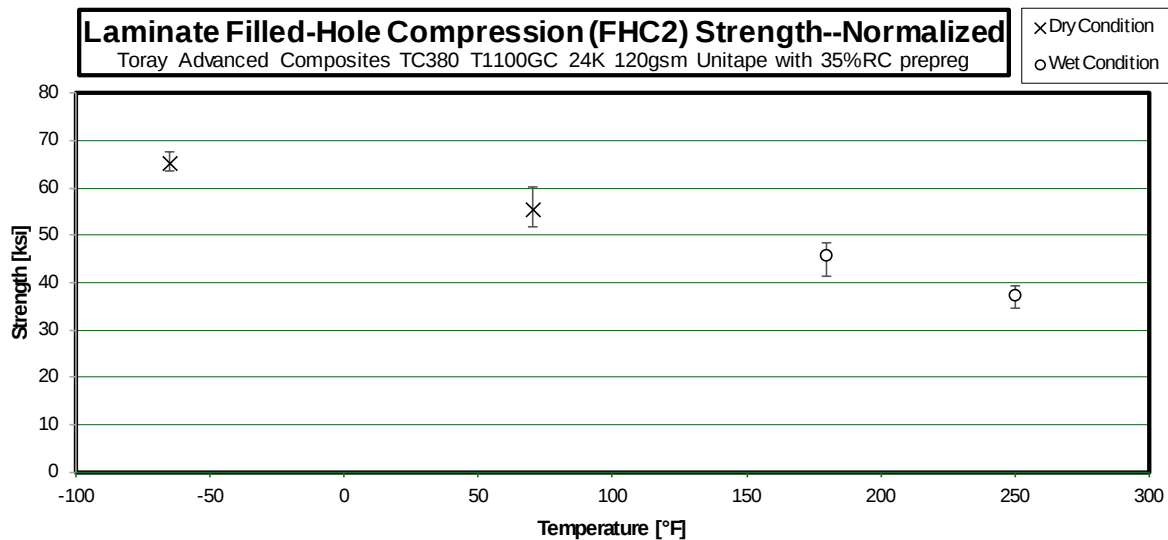
3.23 “50/40/10” Open-Hole Compression 3 Properties (OHC3)



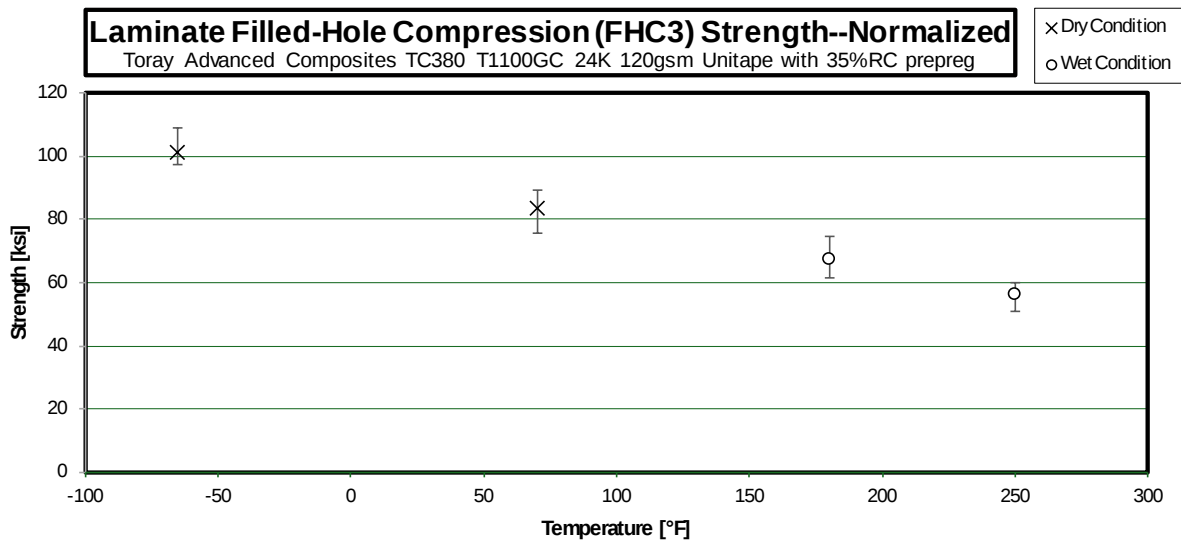
3.24 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)



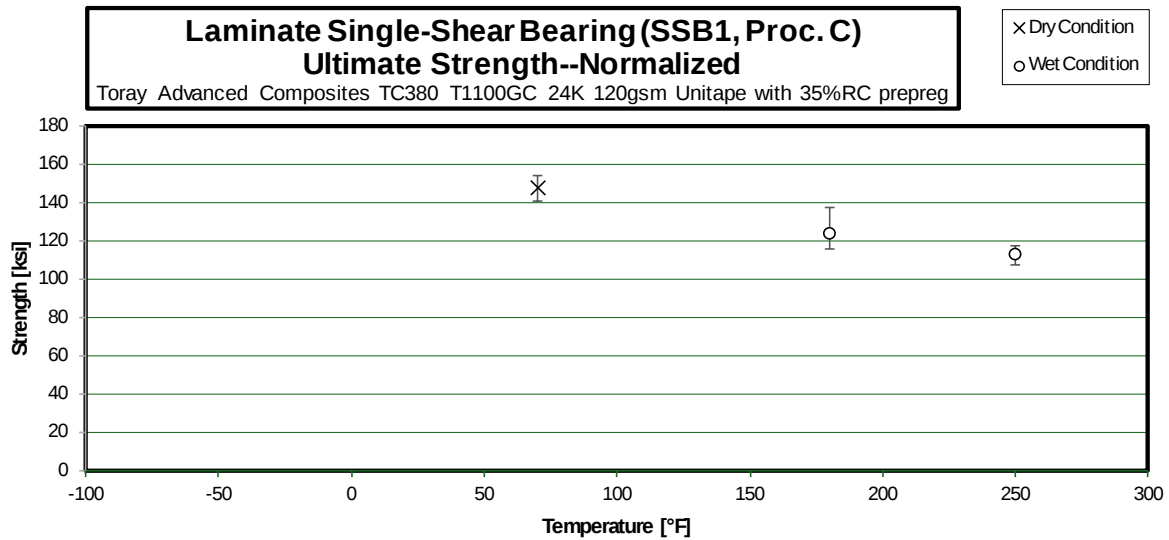
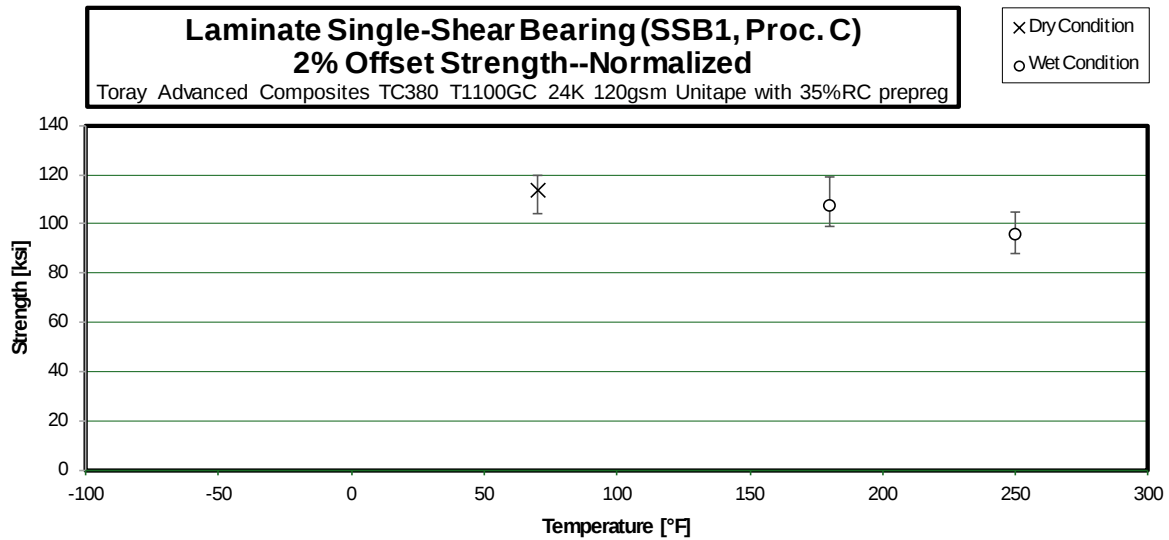
3.25 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

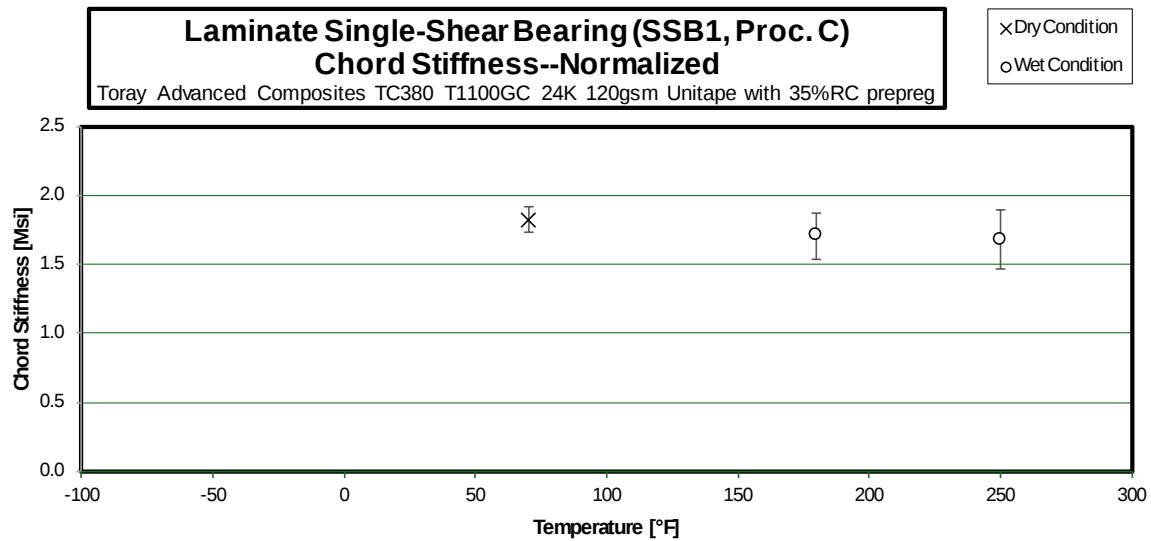


3.26 “50/40/10” Filled-Hole Compression 3 Properties (FHC3)

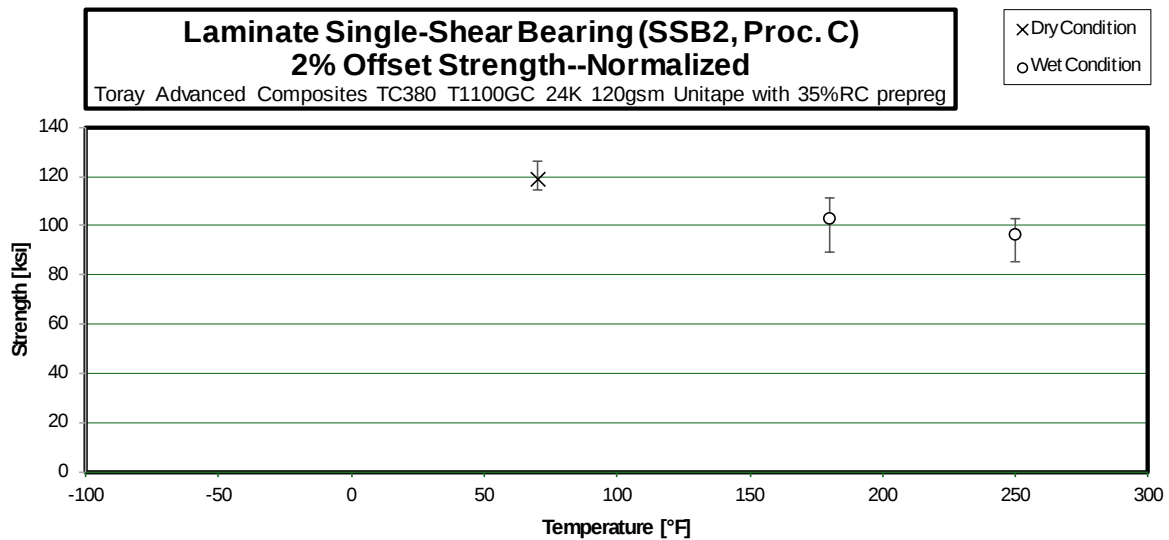


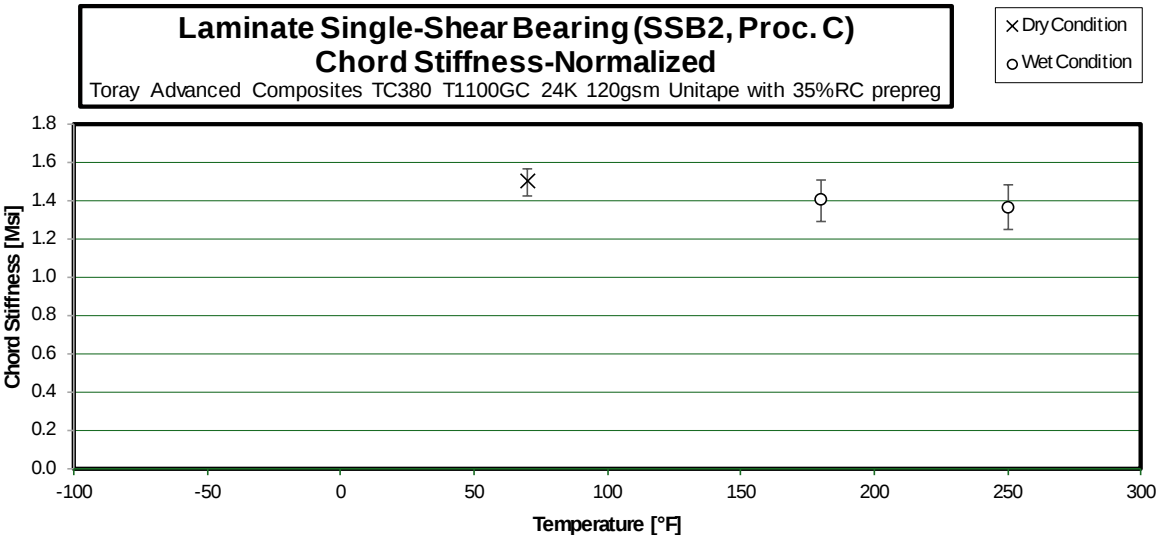
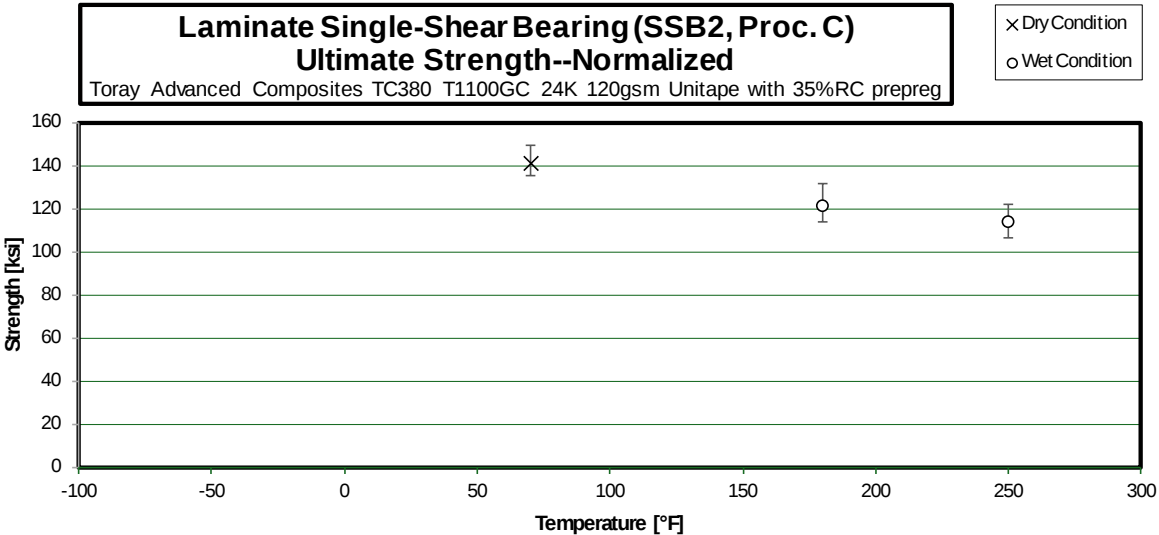
3.27 “25/50/25” Single-Shear Bearing 1 Properties (SSB1, Proc. C)



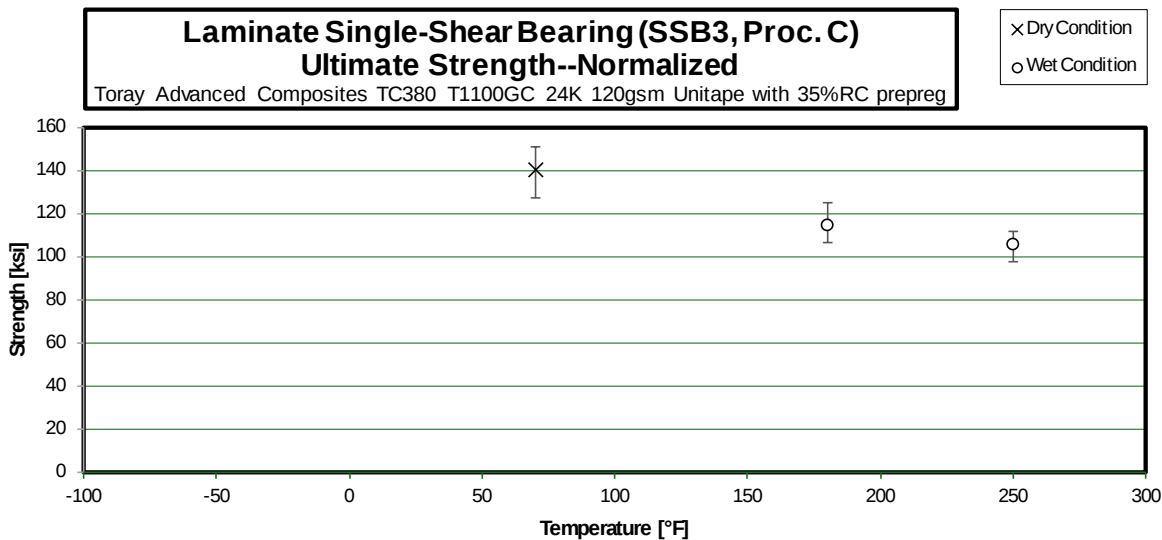
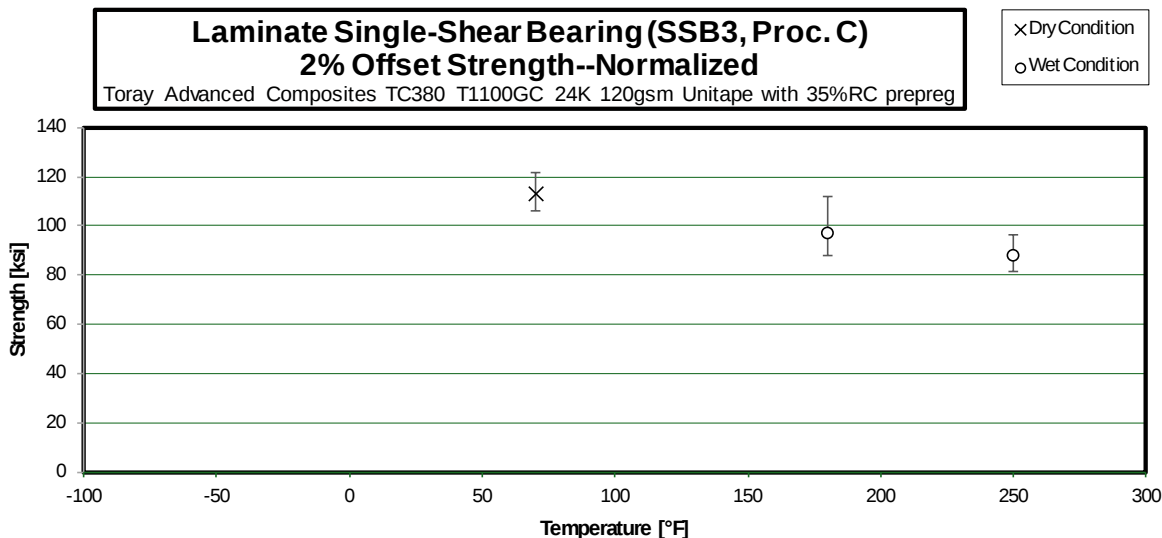


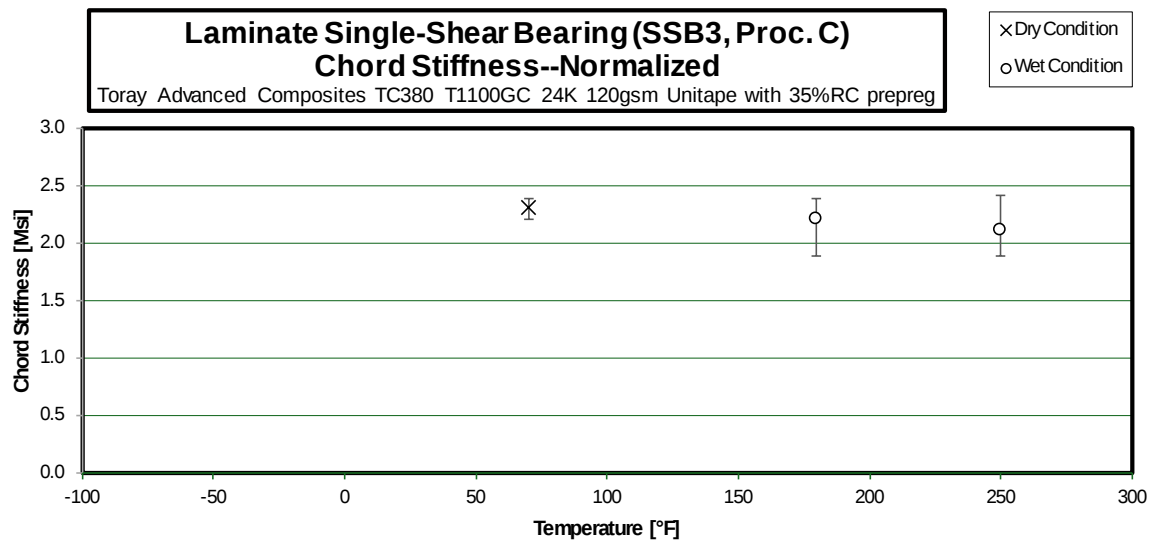
3.28 “10/80/10” Single-Shear Bearing 2 Properties (SSB2, Proc. C)



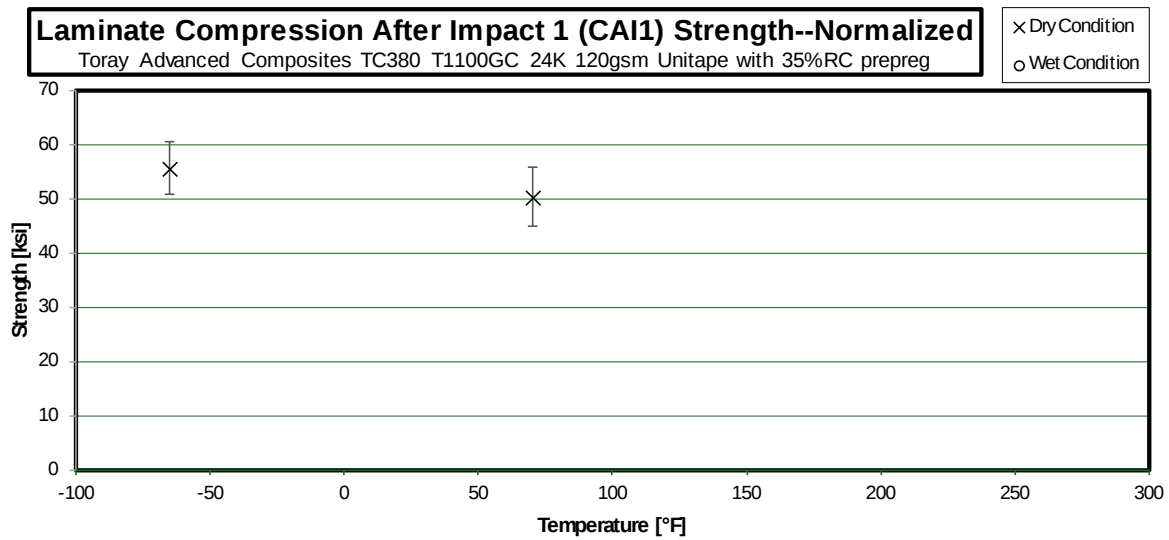


3.29 “50/40/10” Single-Shear Bearing 3 Properties (SSB3, Proc. C)

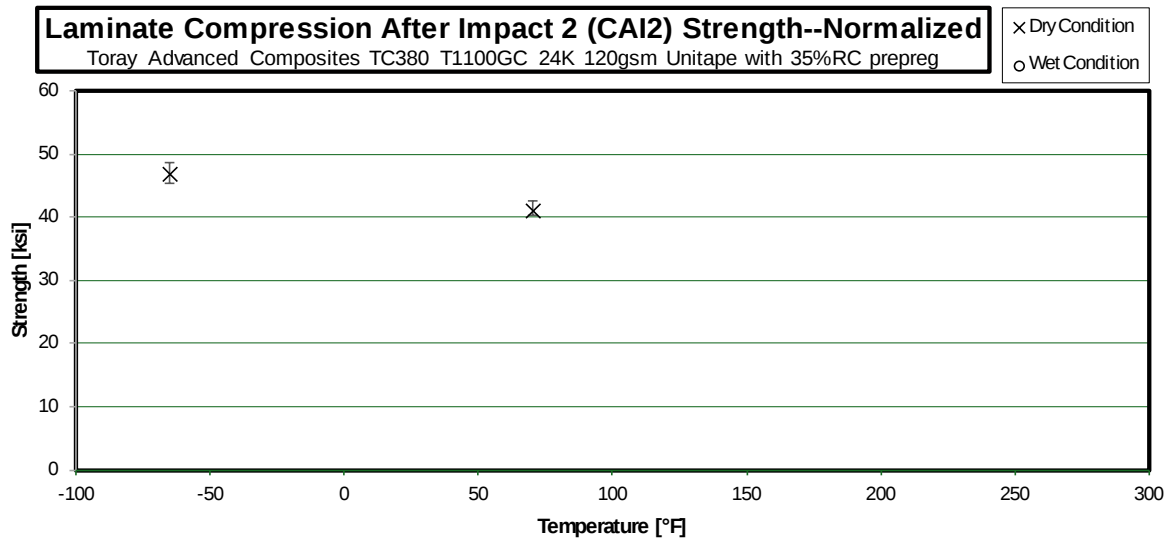




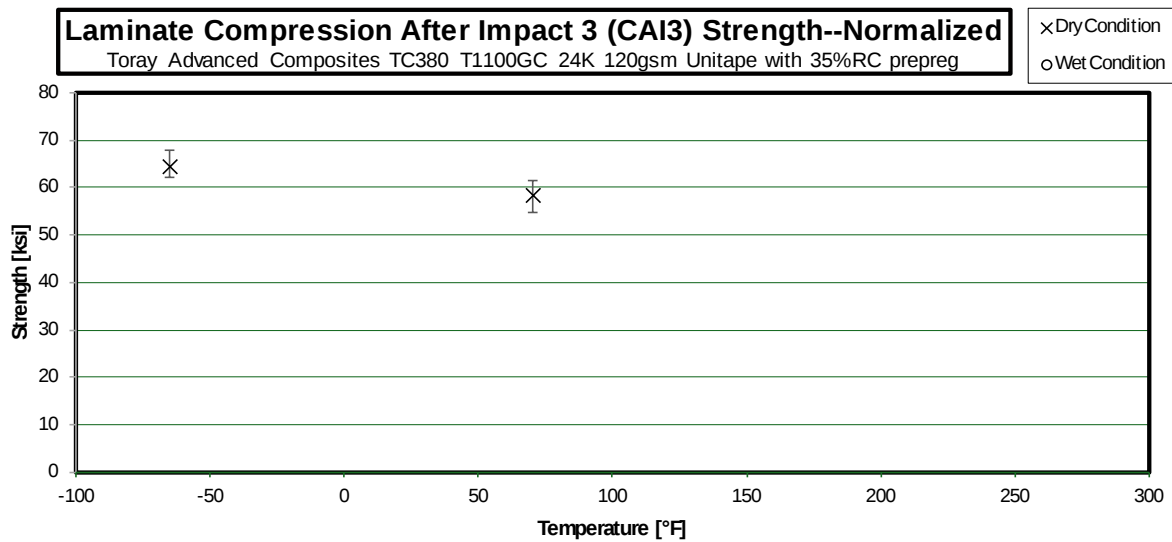
3.30 “25/50/25” Compression After Impact 1 Properties (CAI1)



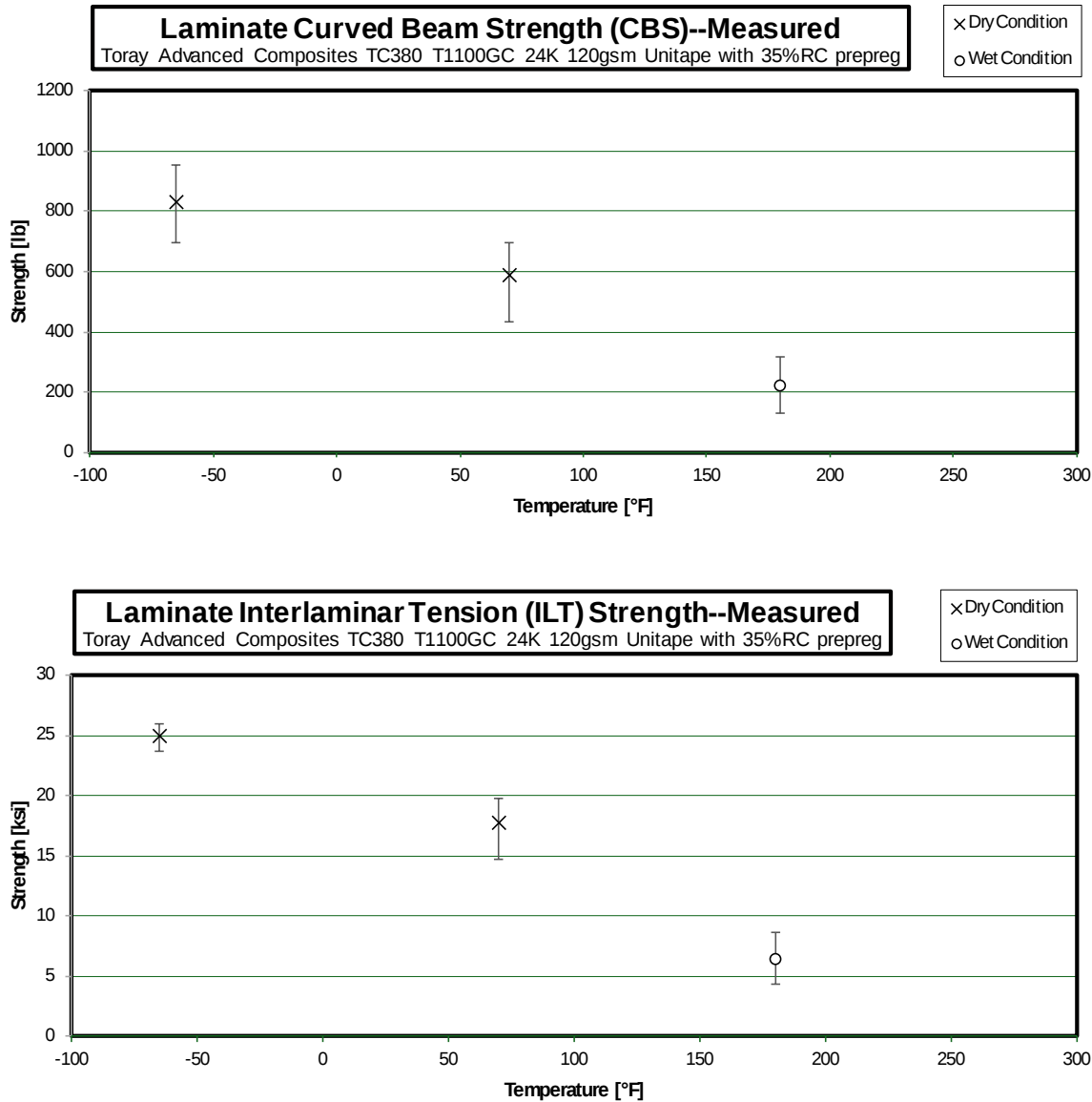
3.31 “10/80/10” Compression After Impact 2 Properties (CAI2)



3.32 “50/40/10” Compression After Impact 3 Properties (CAI3)



3.33 Interlaminar Tension Properties (ILT)



4. Raw Data

4.1 Longitudinal Tension Properties (LT)

Longitudinal Tension Properties (LT)--CTD (-65°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

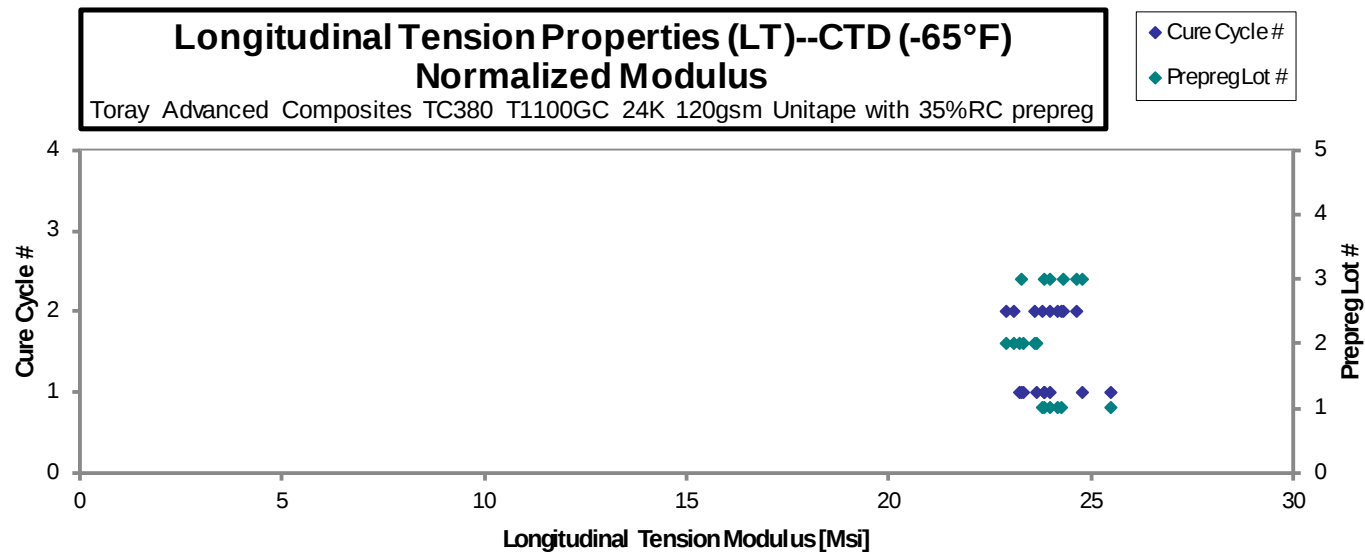
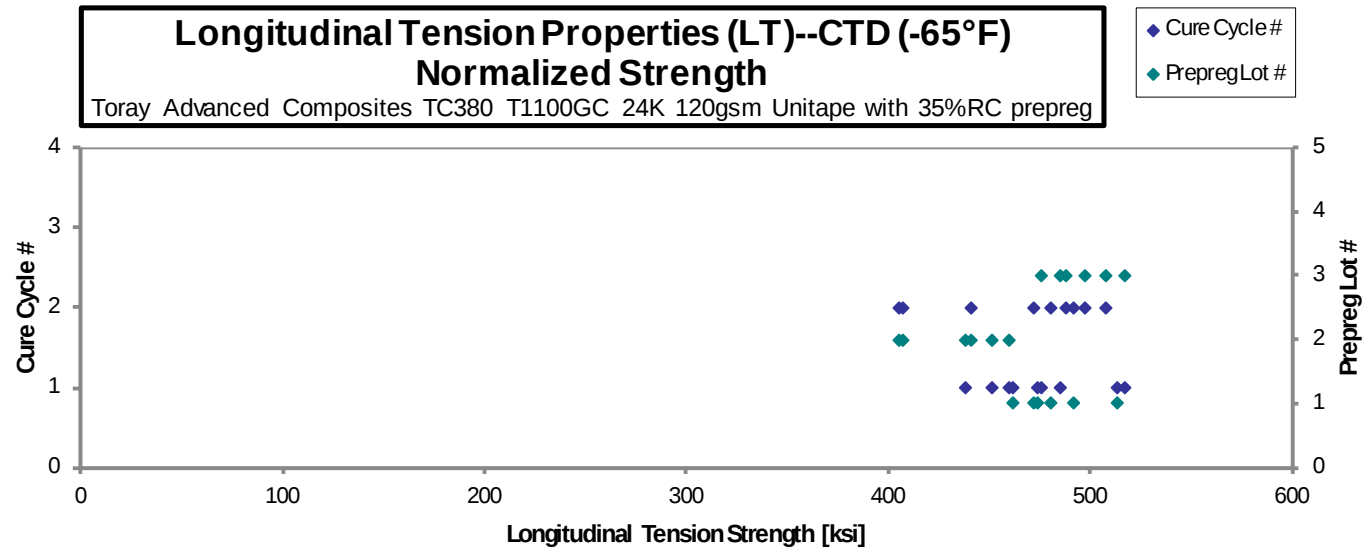
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDJA111B	A	C1	1	1	461.7	23.35	0.2734	0.04932	10	XGM
TCDJA112B	A	C1	1	1	503.4	24.99	0.3813	0.04898	10	XGM
TCDJA113B	A	C1	1	1	456.3	23.58	0.3383	0.04855	10	XGM
TCDJA211B	A	C2	1	2	460.0	23.27	0.3327	0.05012	10	XGM
TCDJA212B	A	C2	1	2	479.1	23.52	0.3188	0.04932	10	XGM
TCDJA213B	A	C2	1	2	465.9	23.51	0.2689	0.04862	10	XGM
TCDJB111B	B	C1	2	1	452.7	22.86	0.3277	0.04880	10	XGM
TCDJB112B	B	C1	2	1	423.1	22.53	0.3245	0.04972	10	XGM
TCDJB113B	B	C1	2	1	427.6	22.42	0.3334	0.05063	10	XGM
TCDJB211B	B	C2	2	2	390.7	22.65	0.3343	0.05008	10	XGM
TCDJB212B	B	C2	2	2	389.2	22.02	0.3008	0.04995	10	XGM
TCDJB213B	B	C2	2	2	430.8	22.57	0.3204	0.04918	10	XGM
TCDJC111B	C	C1	3	1	483.3	23.14	0.3223	0.05142	10	XGM
TCDJC112B	C	C1	3	1	445.4	21.79	0.3577	0.05133	10	XGM
TCDJC113B	C	C1	3	1	451.0	22.14	0.3432	0.05168	10	XGM
TCDJC211B	C	C2	3	2	485.1	23.53	0.3455	0.05027	10	XGM
TCDJC212B	C	C2	3	2	466.1	22.94	0.3283	0.05025	10	XGM
TCDJC213B	C	C2	3	2	480.4	23.47	0.3006	0.04975	10	XGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004932	474.4	23.99
0.004898	513.7	25.51
0.004855	461.6	23.85
0.005012	480.3	24.29
0.004932	492.2	24.17
0.004862	471.9	23.81
0.004880	460.2	23.24
0.004972	438.2	23.33
0.005063	451.0	23.65
0.005008	407.6	23.63
0.004995	405.0	22.92
0.004918	441.4	23.13
0.005142	517.7	24.79
0.005133	476.3	23.30
0.005168	485.6	23.84
0.005027	508.0	24.64
0.005025	488.0	24.02
0.004975	497.9	24.33

Average 452.9 23.02 0.3251
 Standard Dev. 31.11 0.7512 0.02708
 Coeff. of Var. [%] 6.869 3.264 8.329
 Min. 389.2 21.79 0.2689
 Max. 503.4 24.99 0.3813
 Number of Spec. 18 18 18

Average_{norm} 0.004989 470.6 23.91
 Standard Dev._{norm} 32.63 0.6491
 Coeff. of Var. [%]_{norm} 6.935 2.714
 Min. 0.004855 405.0 22.92
 Max. 0.005168 517.7 25.51
 Number of Spec. 18 18 18



**Longitudinal Tension Properties (LT)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

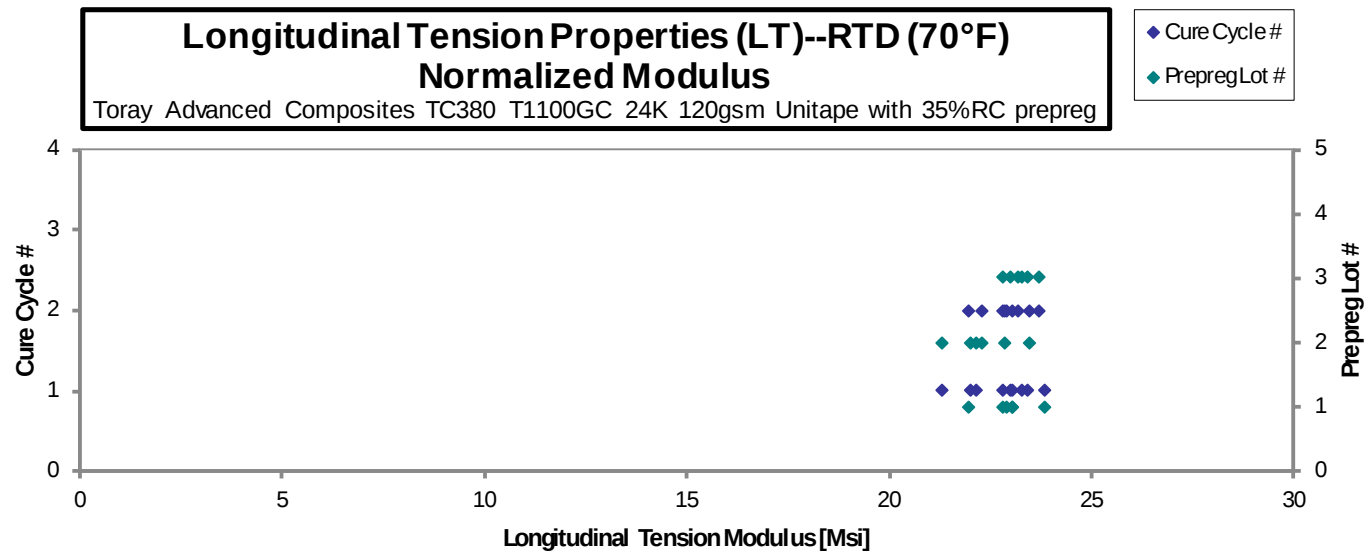
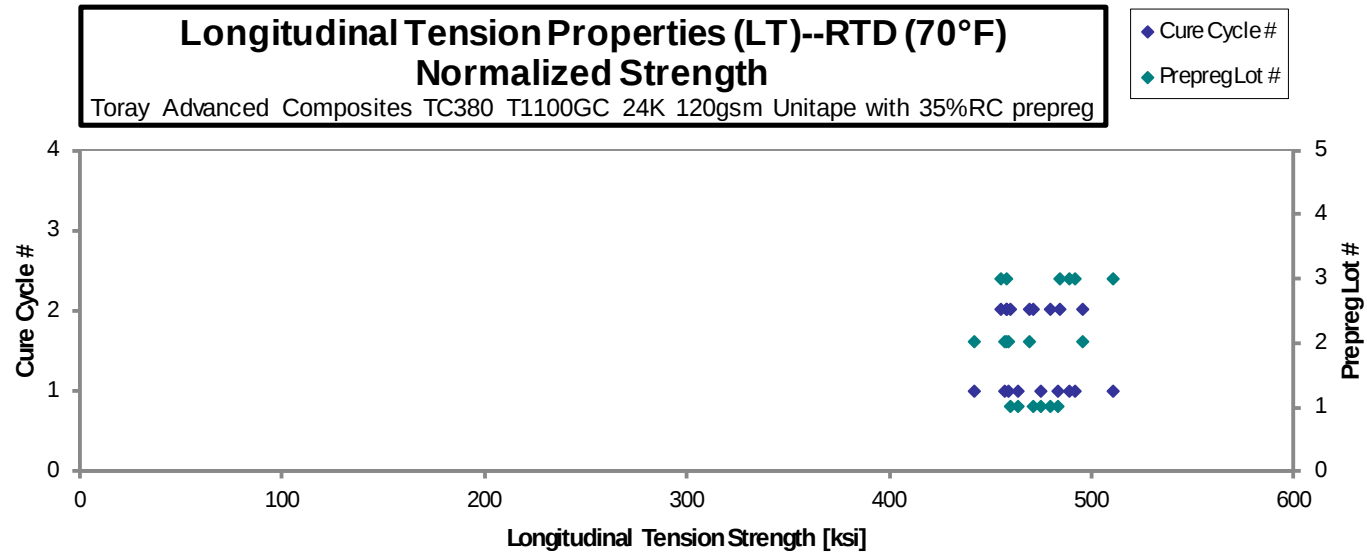
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDJA111A	A	C1	1	1	489.7	23.48	0.3531	0.04660	10	XGM
TCDJA112A	A	C1	1	1	465.2	23.92	0.3324	0.04783	10	XGM
TCDJA113A	A	C1	1	1	478.7	22.81	0.3202	0.04852	10	XGM
TCDJA211A	A	C2	1	2	485.5	23.17	0.3252	0.04550	10	XGM
TCDJA212A	A	C2	1	2	474.7	23.23	0.3143	0.04763	10	XGM
TCDJA213A	A	C2	1	2	469.5	22.41	0.3406	0.04902	10	XGM
TCDJB111A	B	C1	2	1	467.1	23.22	0.3012	0.04547	10	XGM
TCDJB112A	B	C1	2	1	473.0	22.01	0.3117	0.04645	10	XGM
TCDJB113A	B	C1	2	1	467.1	22.54	0.3062	0.04715	10	XGM
TCDJB211A	B	C2	2	2	453.1	21.53	0.3004	0.04975	10	XGM
TCDJB212A	B	C2	2	2	475.4	22.52	0.3061	0.05005	10	XGM
TCDJB213A	B	C2	2	2	440.4	21.98	0.2960	0.04997	10	XGM
TCDJC111A	C	C1	3	1	514.6	24.02	0.3052	0.04593	10	XGM
TCDJC112A	C	C1	3	1	485.3	23.08	0.2998	0.04840	10	XGM
TCDJC113A	C	C1	3	1	492.7	22.63	0.3068	0.04975	10	XGM
TCDJC211A	C	C2	3	2	510.1	24.42	0.2896	0.04555	10	XGM
TCDJC212A	C	C2	3	2	463.0	23.07	0.3094	0.04748	10	XGM
TCDJC213A	C	C2	3	2	450.7	23.46	0.3193	0.04853	10	XGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004660	475.4	22.80
0.004783	463.6	23.84
0.004852	483.8	23.05
0.004550	460.2	21.97
0.004763	471.1	23.05
0.004902	479.4	22.89
0.004547	442.4	22.00
0.004645	457.7	21.30
0.004715	458.8	22.14
0.004975	469.6	22.31
0.005005	495.7	23.48
0.004997	458.4	22.88
0.004593	492.5	22.99
0.004840	489.3	23.27
0.004975	510.7	23.45
0.004555	484.1	23.18
0.004748	458.0	22.82
0.004853	455.7	23.72

Average 475.3 22.97 0.3132
 Standard Dev. 19.15 0.7536 0.01628
 Coeff. of Var. [%] 4.028 3.280 5.196
 Min. 440.4 21.53 0.2896
 Max. 514.6 24.42 0.3531
 Number of Spec. 18 18 18

Average_{norm} 0.004775 472.6 22.84
 Standard Dev._{norm} 17.56 0.6679
 Coeff. of Var. [%]_{norm} 3.715 2.924
 Min. 0.004547 442.4 21.30
 Max. 0.005005 510.7 23.84
 Number of Spec. 18 18 18



**Longitudinal Tension Properties (LT)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 $t_{ply} [in]$

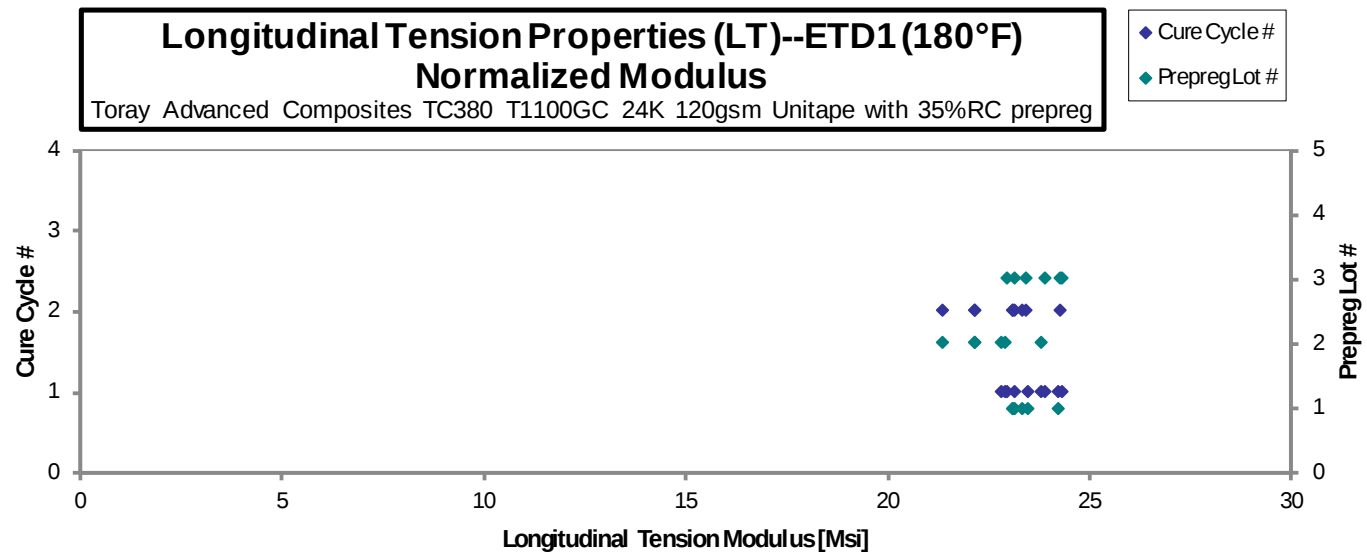
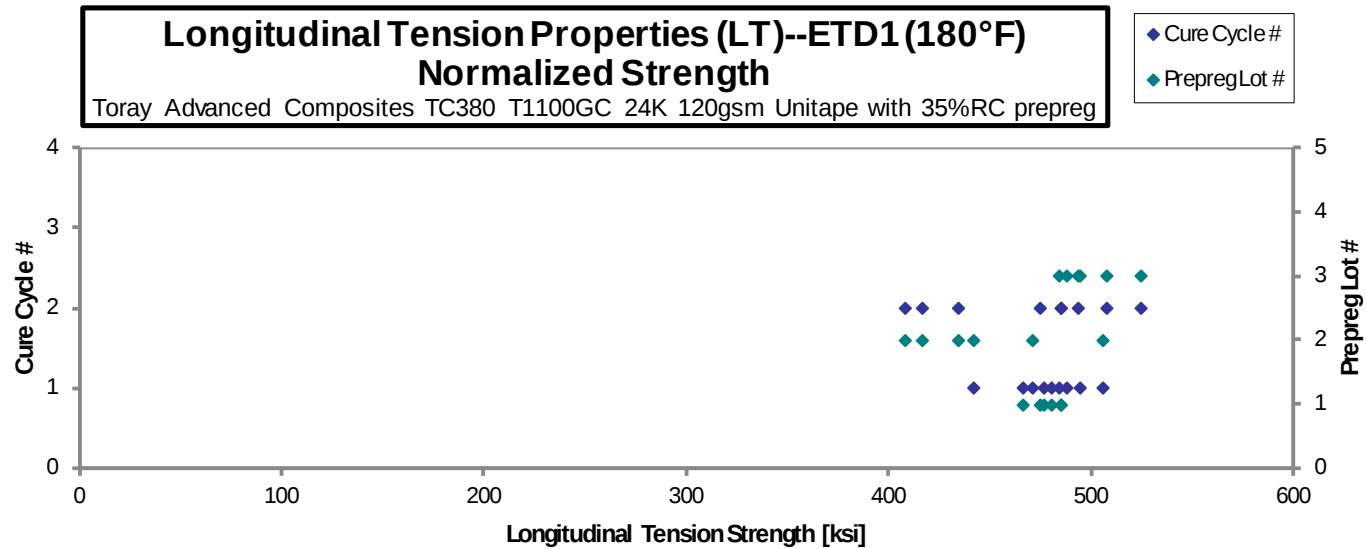
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDJA111C	A	C1	1	1	466.3	22.62	0.3278	0.04908	10	XGM
TCDJA112C	A	C1	1	1	467.2	23.52	0.2939	0.04945	10	XGM
TCDJA113C	A	C1	1	1	449.9	22.61	0.3077	0.04985	10	XGM
TCDJA211C	A	C2	1	2	475.4	22.61	0.2949	0.04908	10	XGM
TCDJA212C	A	C2	1	2	474.2	22.52	0.3250	0.04918	10	XGM
TCDJA213C	A	C2	1	2	461.7	22.68	0.3219	0.04938	10	XGM
TCDJB111C	B	C1	2	1	480.7	21.78	0.3118	0.05053	10	XGM
TCDJB112C	B	C1	2	1	447.5	22.58	0.3286	0.05063	10	XGM
TCDJB113C	B	C1	2	1	424.0	21.87	0.3142	0.05007	10	XGM
TCDJB211C	B	C2	2	2	423.6	22.49	0.3175	0.04727	10	XGM
TCDJB212C	B	C2	2	2	421.6	22.01	0.3308	0.04653	10	XGM
TCDJB213C	B	C2	2	2	466.7	23.74	0.3308	0.04477	10	XGM
TCDJC111C	C	C1	3	1	461.6	21.86	0.3148	0.05038	10	XGM
TCDJC112C	C	C1	3	1	473.6	23.24	0.3055	0.05018	10	XGM
TCDJC113C	C	C1	3	1	469.6	22.98	0.2988	0.04993	10	XGM
TCDJC211C	C	C2	3	2	477.3	22.35	0.3168	0.04967	10	XGM
TCDJC212C	C	C2	3	2	490.0	22.58	0.3041	0.04982	10	XGM
TCDJC213C	C	C2	3	2	506.6	23.40	0.3111	0.04975	10	XGM

Avg. $t_{ply} [in]$	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004908	476.8	23.13
0.004945	481.3	24.23
0.004985	467.2	23.48
0.004908	486.1	23.12
0.004918	485.9	23.08
0.004938	475.0	23.34
0.005053	506.1	22.92
0.005063	472.1	23.82
0.005007	442.3	22.81
0.004727	417.1	22.15
0.004653	408.7	21.34
0.004477	435.3	22.14
0.005038	484.5	22.95
0.005018	495.2	24.30
0.004993	488.5	23.91
0.004967	493.8	23.13
0.004982	508.5	23.43
0.004975	525.1	24.25

Average 463.2 22.64 0.3142
 Standard Dev. 22.79 0.5695 0.01187
 Coeff. of Var. [%] 4.921 2.516 3.779
 Min. 421.6 21.78 0.2939
 Max. 506.6 23.74 0.3308
 Number of Spec. 18 18 18

Average_{norm} 0.004920 475.0 23.20
 Standard Dev._{norm} 31.04 0.7829
 Coeff. of Var. [%]_{norm} 6.536 3.375
 Min. 0.004477 408.7 21.34
 Max. 0.005063 525.1 24.30
 Number of Spec. 18 18 18



**Longitudinal Tension Properties (LT)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

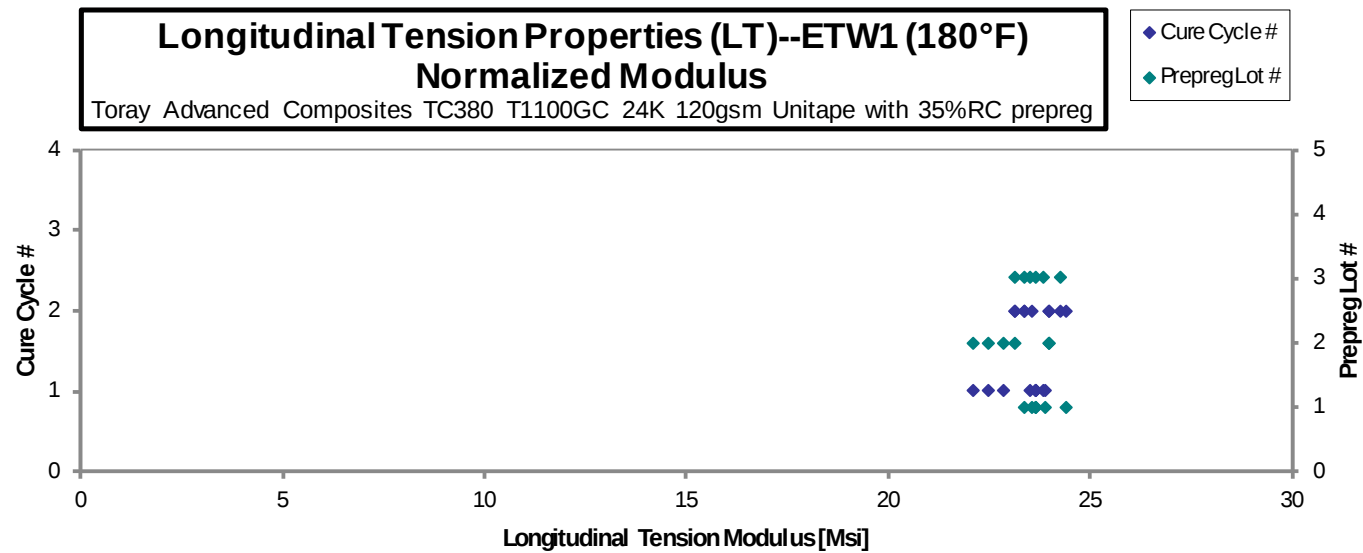
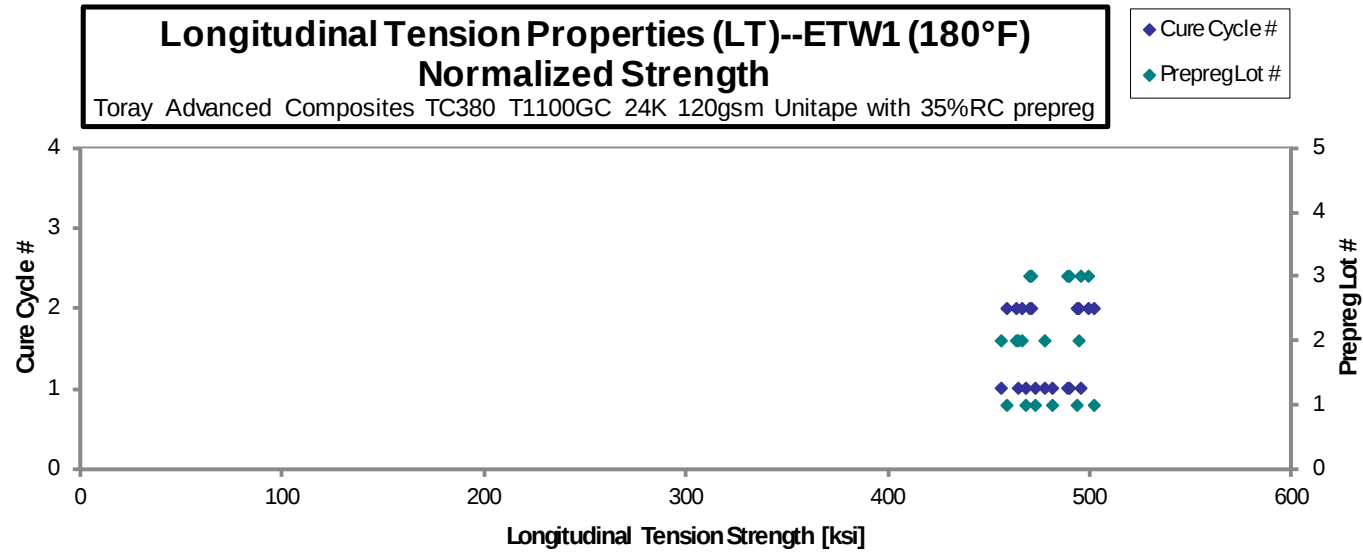
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDJA111D	A	C1	1	1	472.4	23.84	0.3071	0.04762	10	XGM
TCDJA112D	A	C1	1	1	468.1	23.36	0.3033	0.04855	10	XGM
TCDJA113D	A	C1	1	1	467.2	23.18	0.3196	0.04943	10	XGM
TCDJA211D	A	C2	1	2	455.6	23.34	0.2934	0.04842	10	XGM
TCDJA212D	A	C2	1	2	482.9	22.84	0.3174	0.04913	10	XGM
TCDJA213D	A	C2	1	2	474.0	23.01	0.3073	0.05087	10	XGM
TCDJB111D	B	C1	2	1	481.7	22.89	0.3074	0.04632	10	XGM
TCDJB112D	B	C1	2	1	460.7	23.06	0.3068	0.04757	10	XGM
TCDJB113D	B	C1	2	1	475.0	22.34	0.3045	0.04825	10	XGM
TCDJB211D	B	C2	2	2	448.2	23.05	0.2913	0.04993	10	XGM
TCDJB212D	B	C2	2	2	444.0	22.15	0.3103	0.05010	10	XGM
TCDJB213D	B	C2	2	2	475.4	23.04	0.3055	0.05000	10	XGM
TCDJC111D	C	C1	3	1	493.5	23.79	0.3130	0.04770	10	XGM
TCDJC112D	C	C1	3	1	480.8	22.78	0.3106	0.04950	10	XGM
TCDJC113D	C	C1	3	1	466.7	22.72	0.2978	0.05032	10	XGM
TCDJC211D	C	C2	3	2	471.1	23.13	0.3133	0.04802	10	XGM
TCDJC212D	C	C2	3	2	459.5	22.84	0.3093	0.04915	10	XGM
TCDJC213D	C	C2	3	2	479.7	23.30	0.3192	0.04995	10	XGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004762	468.6	23.65
0.004855	473.4	23.63
0.004943	481.2	23.87
0.004842	459.5	23.54
0.004913	494.3	23.38
0.005087	502.3	24.38
0.004632	464.8	22.09
0.004757	456.6	22.85
0.004825	477.5	22.46
0.004993	466.3	23.98
0.005010	463.5	23.12
0.005000	495.2	24.00
0.004770	490.4	23.64
0.004950	495.8	23.49
0.005032	489.2	23.82
0.004802	471.3	23.14
0.004915	470.5	23.39
0.004995	499.2	24.24

Average 469.8 23.04 0.3076
 Standard Dev. 12.64 0.4231 0.007871
 Coeff. of Var. [%] 2.691 1.837 2.559
 Min. 444.0 22.15 0.2913
 Max. 493.5 23.84 0.3196
 Number of Spec. 18 18 18

Average_{norm} 0.004893 478.9 23.48
 Standard Dev._{norm} 14.81 0.5901
 Coeff. of Var. [%]_{norm} 3.093 2.513
 Min. 0.004632 456.6 22.09
 Max. 0.005087 502.3 24.38
 Number of Spec. 18 18 18



**Longitudinal Tension Properties (LT)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 $t_{ply} [in]$

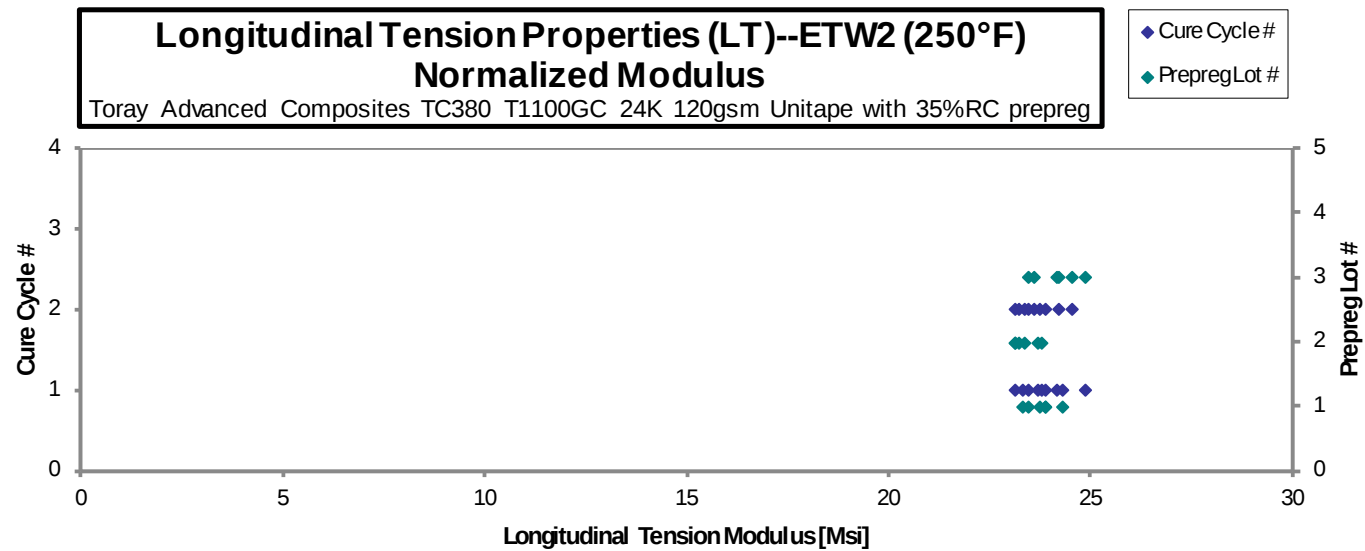
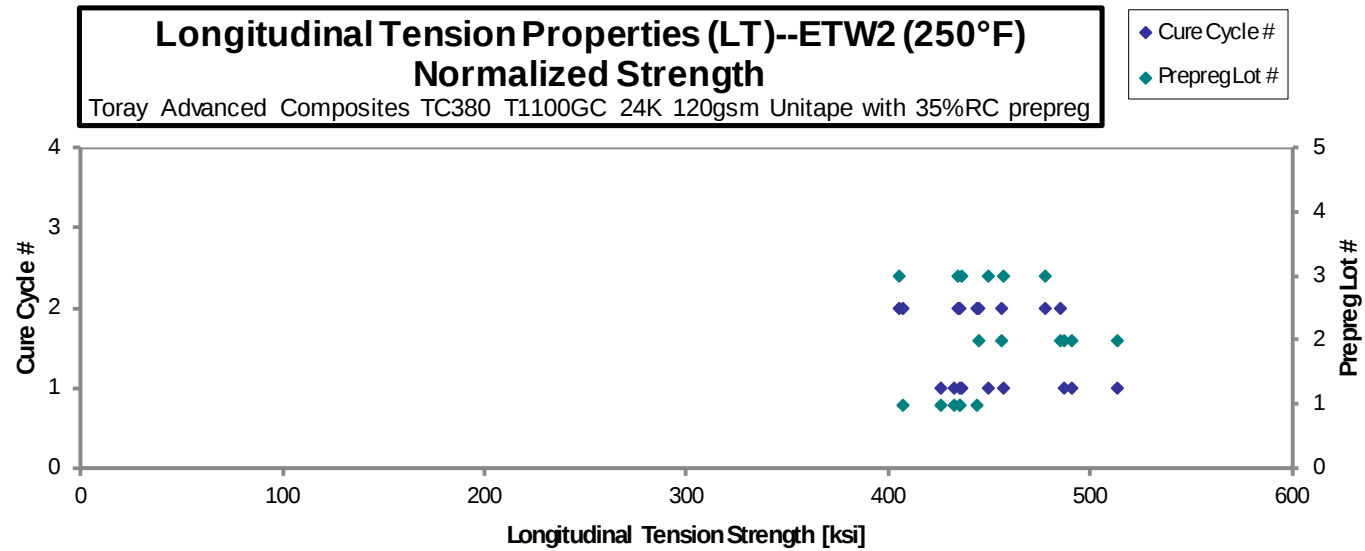
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDJA111E	A	C1	1	1	426.0	23.39	0.3272	0.04903	10	XGM
TCDJA112E	A	C1	1	1	422.1	24.08	0.2971	0.04843	10	XGM
TCDJA113E	A	C1	1	1	425.9	22.97	0.3200	0.04872	10	XGM
TCDJA211E	A	C2	1	2	424.4	23.28	0.3097	0.04923	10	XGM
TCDJA212E	A	C2	1	2	430.0	22.70	0.2654	0.04958	10	XGM
TCDJA213E	A	C2	1	2	392.6	22.88	0.3077	0.04978	10	XGM
TCDJB111E	B	C1	2	1	470.3	22.35	0.2742	0.04970	10	XGM
TCDJB112E	B	C1	2	1	472.5	22.88	0.2913	0.04987	10	XGM
TCDJB113E	B	C1	2	1	492.0	22.71	0.2950	0.05008	10	XGM
TCDJB211E	B	C2	2	2	471.5	22.74	0.2929	0.04935	10	XGM
TCDJB212E	B	C2	2	2	441.0	23.02	0.2849	0.04837	10	XGM
TCDJB213E	B	C2	2	2	461.8	23.43	0.2760	0.04737	10	XGM
TCDJC111E	C	C1	3	1	414.3	22.91	0.2822	0.05057	10	XGM
TCDJC112E	C	C1	3	1	437.1	23.75	0.2995	0.05023	10	XGM
TCDJC113E	C	C1	3	1	428.3	22.36	0.3001	0.05033	10	XGM
TCDJC211E	C	C2	3	2	461.3	23.70	0.2906	0.04972	10	XGM
TCDJC212E	C	C2	3	2	390.4	22.73	0.2976	0.04982	10	XGM
TCDJC213E	C	C2	3	2	408.4	22.74	0.3027	0.05103	10	XGM

Avg. $t_{ply} [in]$	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004903	435.2	23.90
0.004843	425.9	24.30
0.004872	432.2	23.31
0.004923	435.3	23.88
0.004958	444.2	23.45
0.004978	407.2	23.73
0.004970	486.9	23.14
0.004987	490.9	23.77
0.005008	513.3	23.69
0.004935	484.8	23.37
0.004837	444.4	23.19
0.004737	455.7	23.12
0.005057	436.5	24.13
0.005023	457.4	24.85
0.005033	449.2	23.45
0.004972	477.8	24.55
0.004982	405.2	23.59
0.005103	434.2	24.18

Average 437.2 23.03 0.2952
 Standard Dev. 28.73 0.4763 0.01559
 Coeff. of Var. [%] 6.571 2.068 5.281
 Min. 390.4 22.35 0.2654
 Max. 492.0 24.08 0.3272
 Number of Spec. 18 18 18

Average_{norm} 0.004951 450.9 23.76
 Standard Dev._{norm} 29.48 0.4933
 Coeff. of Var. [%]_{norm} 6.538 2.076
 Min. 0.004737 405.2 23.12
 Max. 0.005103 513.3 24.85
 Number of Spec. 18 18 18



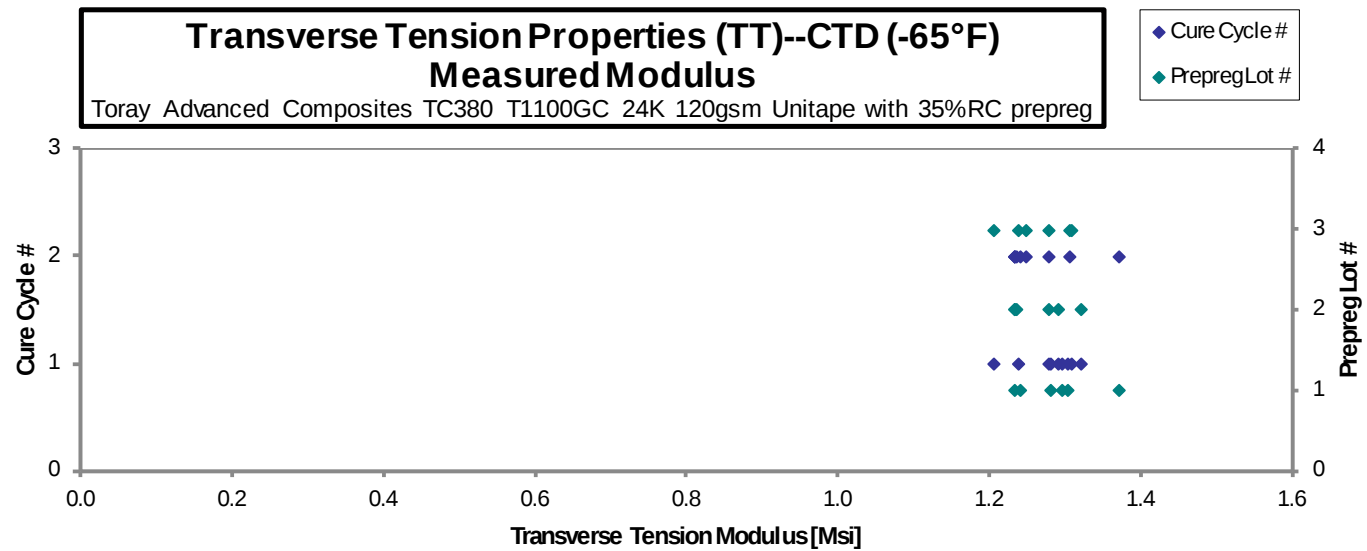
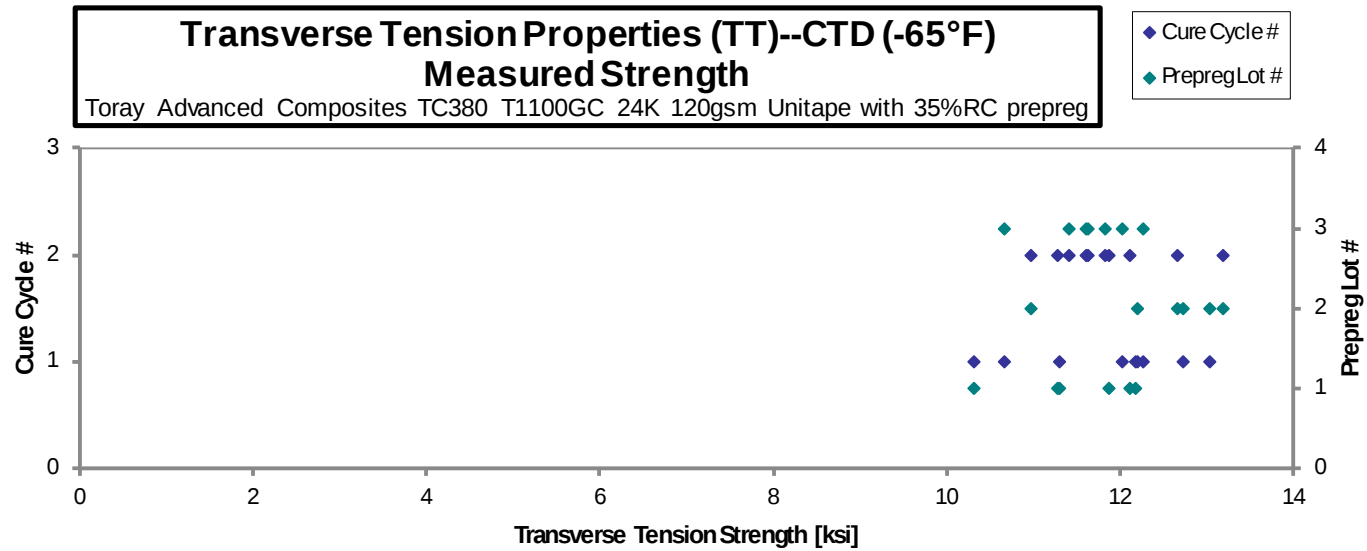
4.2 Transverse Tension Properties (TT)

Transverse Tension Properties (TT)--CTD (-65°F)										
Strength & Modulus										
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg										

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDUA111B	A	C1	1	1	10.32	1.296	0.08818	18	0.004899	LAT
TCDUA112B	A	C1	1	1	11.31	1.303	0.08805	18	0.004892	LAT
TCDUA113B	A	C1	1	1	12.19	1.280	0.08782	18	0.004879	LAT
TCDUA211B	A	C2	1	2	11.88	1.233	0.08823	18	0.004902	LAT
TCDUA212B	A	C2	1	2	11.29	1.371	0.08812	18	0.004895	LGM
TCDUA213B	A	C2	1	2	12.13	1.241	0.08768	18	0.004871	LGT
TCDUB111B	B	C1	2	1	13.05	1.279	0.08862	18	0.004923	LAT
TCDUB112B	B	C1	2	1	12.20	1.293	0.08908	18	0.004949	LAT
TCDUB113B	B	C1	2	1	12.74	1.322	0.08773	18	0.004874	LAT
TCDUB211B	B	C2	2	2	10.97	1.234	0.08873	18	0.004930	LAT
TCDUB212B	B	C2	2	2	13.18	1.234	0.08805	18	0.004892	LAT
TCDUB213B	B	C2	2	2	12.67	1.237	0.08762	18	0.004868	LAT
TCDUC111B	C	C1	3	1	10.67	1.240	0.08945	18	0.004969	LWB
TCDUC112B	C	C1	3	1	12.04	1.207	0.09138	18	0.005077	LWB
TCDUC113B	C	C1	3	1	12.27	1.308	0.08783	18	0.004880	LAB
TCDUC211B	C	C2	3	2	11.65	1.280	0.08922	18	0.004956	LAT
TCDUC212B	C	C2	3	2	11.62	1.249	0.08857	18	0.004920	LAT
TCDUC213B	C	C2	3	2	11.41	1.307	0.08903	18	0.004946	LAT
TCDUC214B*	C	C2	3	2	11.83		0.08903	18	0.004946	LAT

* Specimen was not gaged, only strength is tested.

Average	11.86	1.273	0.004919
Standard Dev.	0.7669	0.04156	
Coeff. of Var. [%]	6.464	3.264	
Min.	10.32	1.207	0.004868
Max.	13.18	1.371	0.005077
Number of Spec.	19	18	19

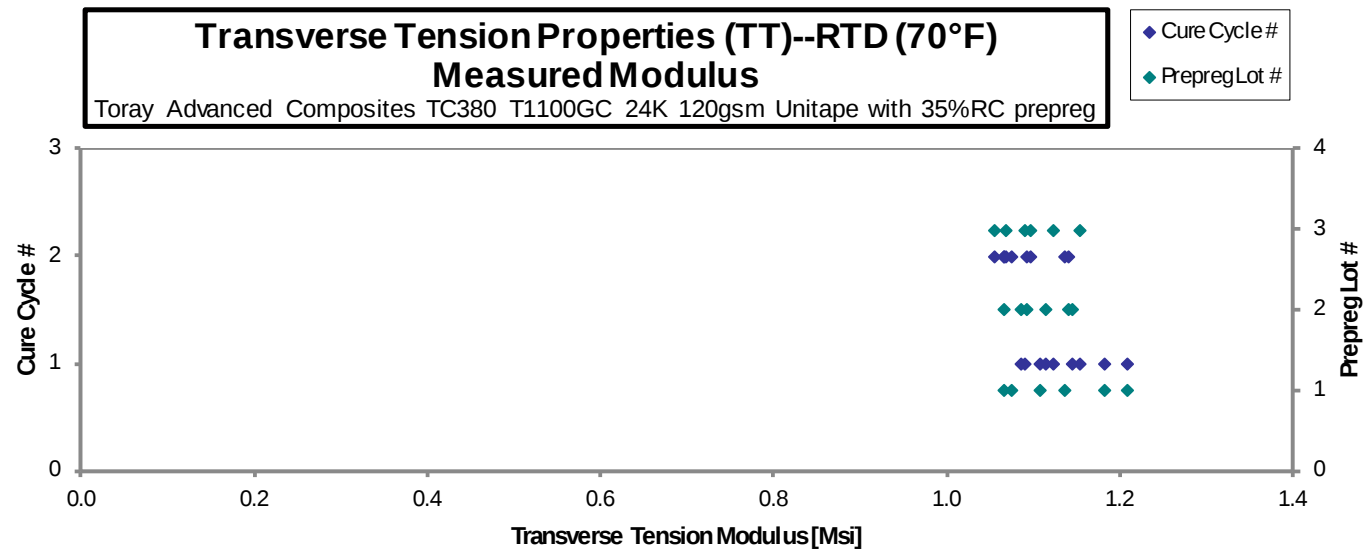
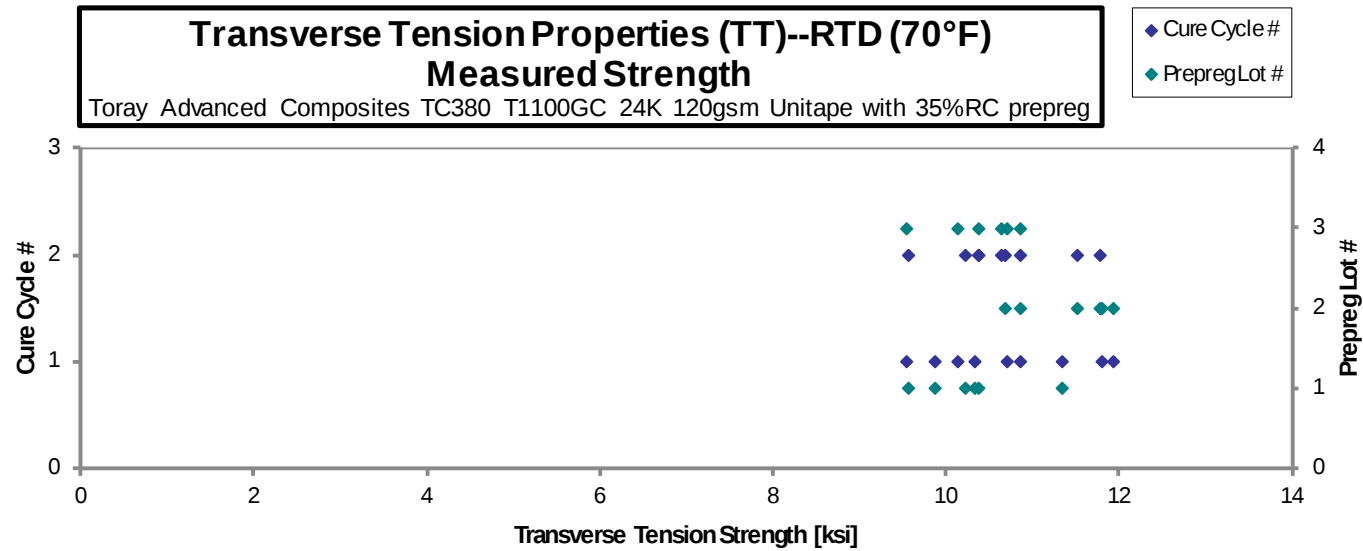


**Transverse Tension Properties (TT)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDUA111A	A	C1	1	1	9.866	1.209	0.08198	18	0.004555	LGB
TCDUA112A	A	C1	1	1	10.34	1.183	0.08562	18	0.004756	LGT
TCDUA113A	A	C1	1	1	11.34	1.108	0.08752	18	0.004862	LAT
TCDUA211A	A	C2	1	2	10.22	1.137	0.08290	18	0.004606	LGT
TCDUA212A	A	C2	1	2	9.559	1.066	0.08755	18	0.004864	LGT
TCDUA213A	A	C2	1	2	10.39	1.073	0.08918	18	0.004955	LWB
TCDUB111A	B	C1	2	1	11.94	1.145	0.08133	18	0.004519	LAT
TCDUB112A	B	C1	2	1	10.87	1.114	0.08487	18	0.004715	LAT
TCDUB113A	B	C1	2	1	11.80	1.086	0.08747	18	0.004859	LWB
TCDUB211A	B	C2	2	2	10.69	1.141	0.07953	18	0.004419	LWB
TCDUB212A	B	C2	2	2	11.53	1.093	0.08425	18	0.004681	LAB
TCDUB213A	B	C2	2	2	11.78	1.065	0.08748	18	0.004860	LWT
TCDUC111A	C	C1	3	1	10.13	1.153	0.08175	18	0.004542	LAB
TCDUC112A	C	C1	3	1	9.55	1.122	0.08505	18	0.004725	LWB
TCDUC113A	C	C1	3	1	10.72	1.090	0.08723	18	0.004846	LAB
TCDUC211A	C	C2	3	2	10.65	1.096	0.08515	18	0.004731	LWT
TCDUC212A	C	C2	3	2	10.87	1.055	0.08917	18	0.004954	LAT
TCDUC213A	C	C2	3	2	10.37	1.067	0.08902	18	0.004945	LAT

Average	10.70	1.111	0.004744
Standard Dev.	0.7387	0.04320	
Coeff. of Var. [%]	6.904	3.888	
Min.	9.548	1.055	0.004419
Max.	11.94	1.209	0.004955
Number of Spec.	18	18	18

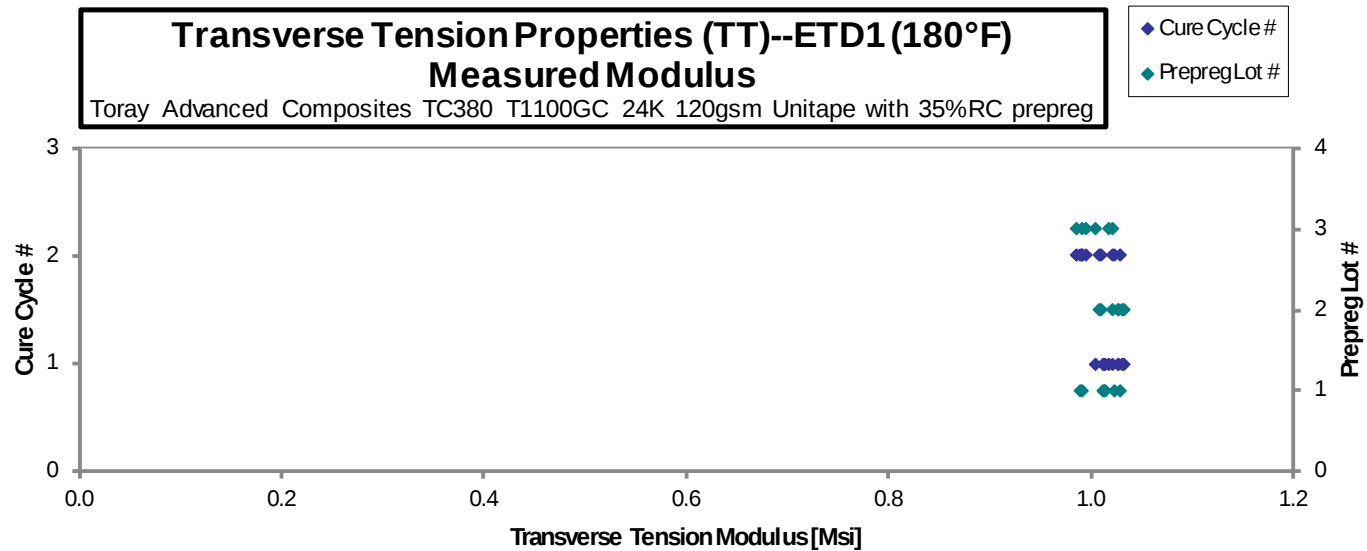
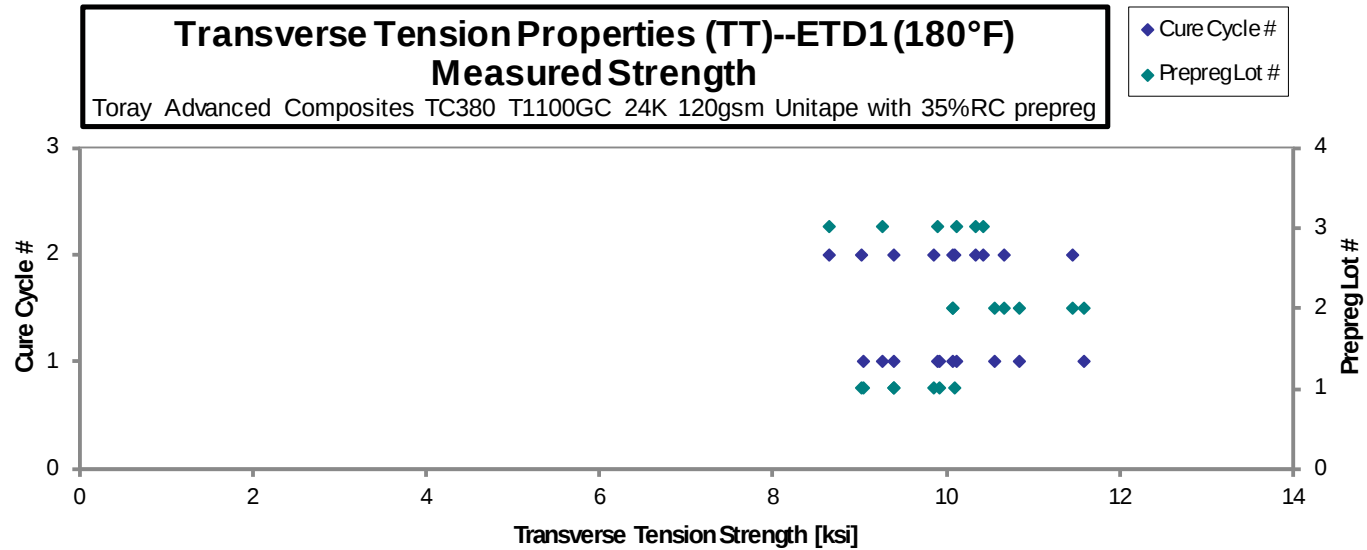


**Transverse Tension Properties (TT)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDUA111C	A	C1	1	1	9.930	1.014	0.08798	18	0.004888	LWB
TCDUA112C	A	C1	1	1	9.045	1.015	0.08778	18	0.004877	LGB, LWB
TCDUA113C	A	C1	1	1	9.401	1.015	0.08802	18	0.004890	LGB
TCDUA211C	A	C2	1	2	10.09	1.029	0.08765	18	0.004869	LAT
TCDUA212C	A	C2	1	2	9.394	1.024	0.08777	18	0.004876	LAT
TCDUA213C	A	C2	1	2	9.041	0.9908	0.08890	18	0.004939	LAB
TCDUA214C	A	C2	1	2	9.866	0.9925	0.08823	18	0.004902	LAB
TCDUB111C	B	C1	2	1	10.08	1.028	0.08758	18	0.004866	LAB
TCDUB112C	B	C1	2	1	10.56	1.032	0.08667	18	0.004815	LWT
TCDUB113C	B	C1	2	1	11.61	1.027	0.08717	18	0.004843	LAT
TCDUB114C	B	C1	2	1	10.85	1.033	0.08698	18	0.004832	LWT
TCDUB211C	B	C2	2	2	10.67	1.009	0.08673	18	0.004819	LGB
TCDUB212C	B	C2	2	2	10.09	1.022	0.08677	18	0.004820	LGB
TCDUB213C	B	C2	2	2	11.46	1.010	0.08658	18	0.004810	LGB
TCDUC111C	C	C1	3	1	10.13	1.006	0.08790	18	0.004883	LGM
TCDUC112C	C	C1	3	1	9.904	1.018	0.08837	18	0.004909	LGT
TCDUC113C	C	C1	3	1	9.268	1.022	0.08787	18	0.004881	LGM
TCDUC211C	C	C2	3	2	10.36	0.9859	0.08955	18	0.004975	LWT
TCDUC212C	C	C2	3	2	8.654	0.9921	0.08843	18	0.004913	LGT
TCDUC213C	C	C2	3	2	10.43	0.9965	0.08865	18	0.004925	LAT

Average	10.04	1.013	0.004877
Standard Dev.	0.7761	0.01486	
Coeff. of Var. [%]	7.729	1.467	
Min.	8.654	0.9859	0.004810
Max.	11.61	1.033	0.004975
Number of Spec.	20	20	20

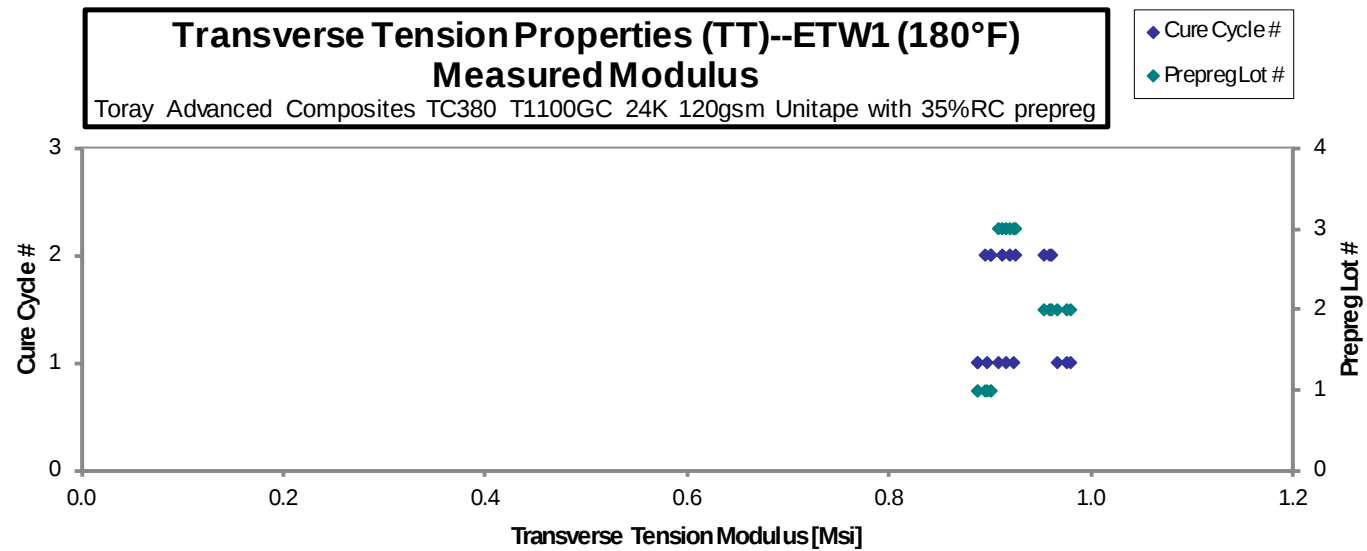
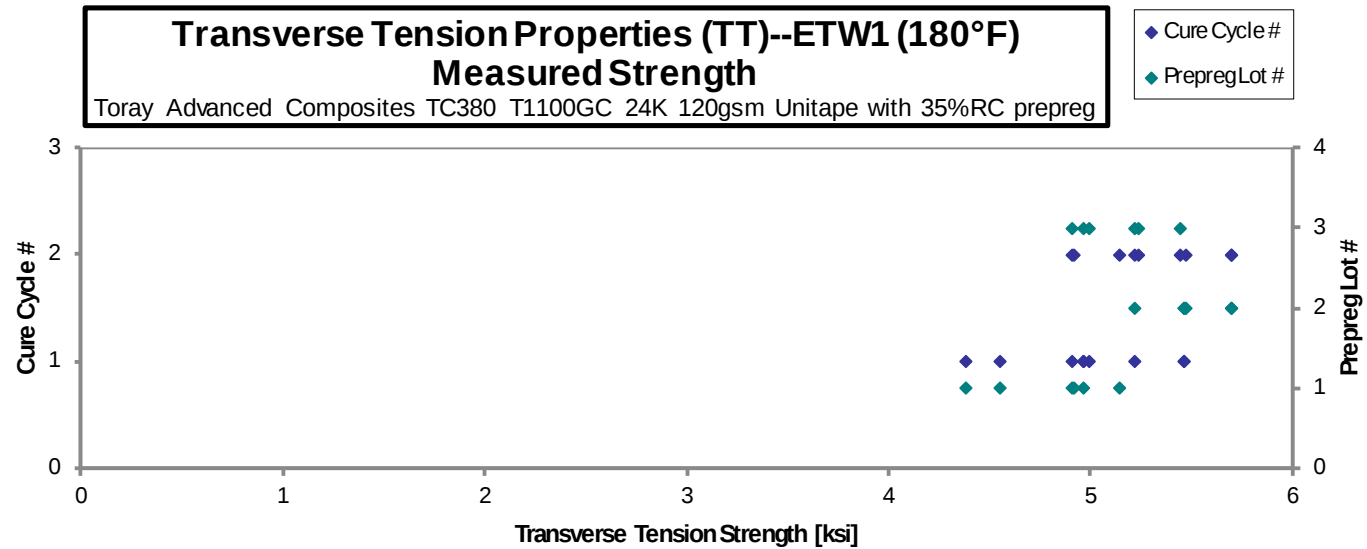


**Transverse Tension Properties (TT)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDUA111D	A	C1	1	1	4.548	0.8874	0.08795	18	0.004886	LAB
TCDUA112D	A	C1	1	1	4.964	0.8971	0.08832	18	0.004906	LGT
TCDUA113D	A	C1	1	1	4.380	0.8870	0.08815	18	0.004897	LAB
TCDUA211D	A	C2	1	2	5.139	0.8943	0.08808	18	0.004894	LGT
TCDUA212D	A	C2	1	2	4.912	0.8999	0.08763	18	0.004869	LGM
TCDUA213D	A	C2	1	2	4.907	0.9001	0.08760	18	0.004867	LWT
TCDUB111D	B	C1	2	1	5.215	0.9660	0.08712	18	0.004840	LWT
TCDUB112D	B	C1	2	1	5.461	0.9795	0.08697	18	0.004831	LWT
TCDUB113D	B	C1	2	1	5.465	0.9758	0.08682	18	0.004823	LWT
TCDUB211D	B	C2	2	2	5.696	0.9598	0.08725	18	0.004847	LWB
TCDUB212D	B	C2	2	2	5.699	0.9585	0.08698	18	0.004832	LWT
TCDUB213D	B	C2	2	2	5.466	0.9518	0.08712	18	0.004840	LGT
TCDUC111D	C	C1	3	1	4.905	0.9218	0.08817	18	0.004898	LGT
TCDUC112D	C	C1	3	1	4.993	0.9155	0.08897	18	0.004943	LGT
TCDUC113D	C	C1	3	1	4.959	0.9078	0.08943	18	0.004969	LWT
TCDUC211D	C	C2	3	2	5.214	0.9246	0.08868	18	0.004927	LGT
TCDUC212D	C	C2	3	2	5.446	0.9110	0.08852	18	0.004918	LGM
TCDUC213D	C	C2	3	2	5.239	0.9194	0.08808	18	0.004894	LWT

Average	5.145	0.9254	0.004882
Standard Dev.	0.3619	0.03138	
Coeff. of Var. [%]	7.034	3.391	
Min.	4.380	0.8870	0.004823
Max.	5.699	0.9795	0.004969
Number of Spec.	18	18	18

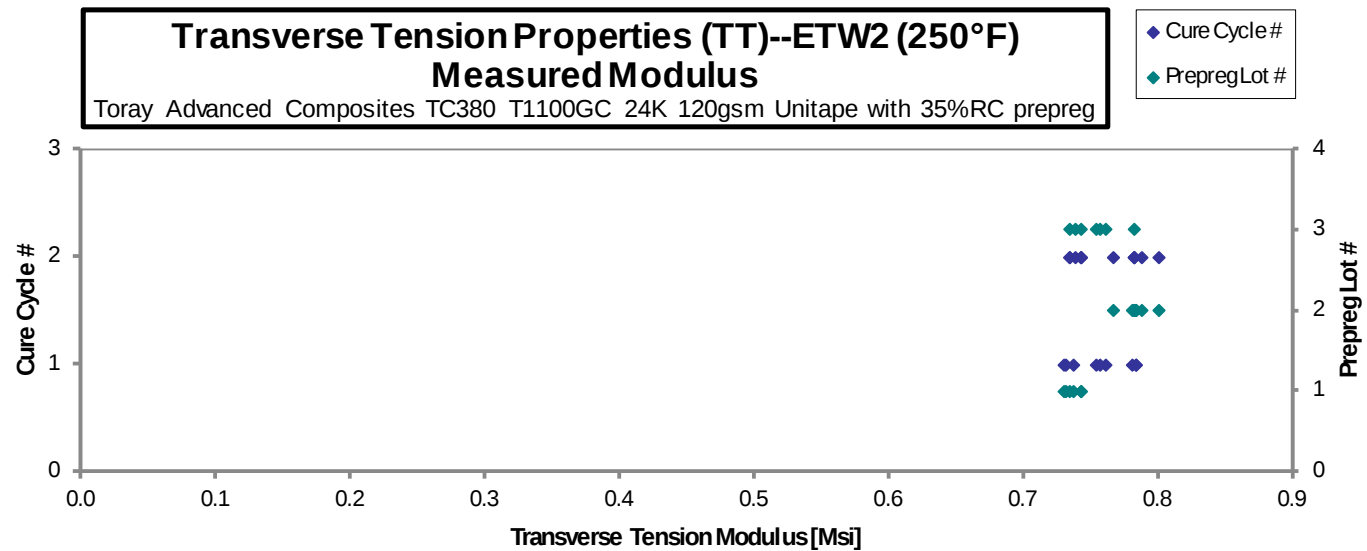
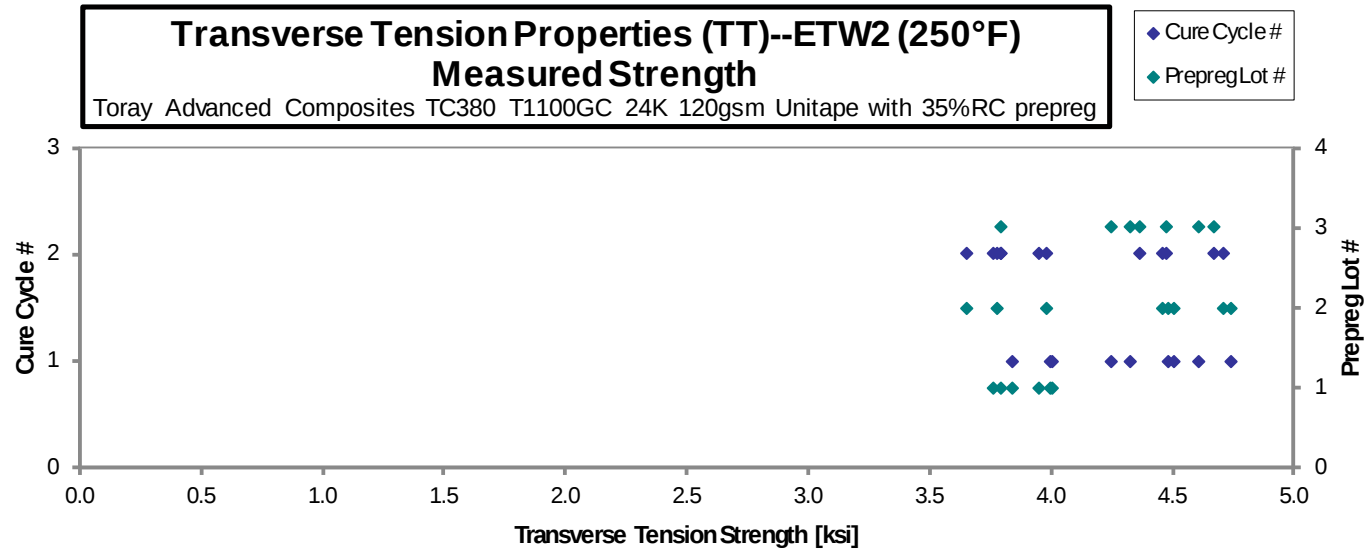


**Transverse Tension Properties (TT)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDUA111E	A	C1	1	1	3.997	0.7302	0.08858	18	0.004921	LGM
TCDUA112E	A	C1	1	1	4.006	0.7323	0.08905	18	0.004947	LWT
TCDUA113E	A	C1	1	1	3.844	0.7379	0.08928	18	0.004960	LGB
TCDUA211E	A	C2	1	2	3.766	0.7441	0.08815	18	0.004897	LGT
TCDUA212E	A	C2	1	2	3.948	0.7357	0.08843	18	0.004913	LGM
TCDUA213E	A	C2	1	2	3.792	0.7434	0.08853	18	0.004919	LGT
TCDUB111E	B	C1	2	1	4.744	0.7822	0.08778	18	0.004877	LGB
TCDUB112E	B	C1	2	1	4.510	0.7849	0.08885	18	0.004936	LGT
TCDUB113E	B	C1	2	1	4.480	0.7849	0.08868	18	0.004927	LGT
TCDUB211E	B	C2	2	2	3.781	0.7836	0.08733	18	0.004852	LGM
TCDUB212E	B	C2	2	2	4.711	0.7676	0.08833	18	0.004907	LWT
TCDUB213E	B	C2	2	2	4.462	0.7822	0.08777	18	0.004876	LWT
TCDUB214E	B	C2	2	2	3.654	0.7881	0.08697	18	0.004831	LGM
TCDUB215E	B	C2	2	2	3.982	0.8008	0.08447	18	0.004693	LGM
TCDUC111E	C	C1	3	1	4.245	0.7612	0.08850	18	0.004917	LGB
TCDUC112E	C	C1	3	1	4.610	0.7549	0.08925	18	0.004958	LGM
TCDUC113E	C	C1	3	1	4.327	0.7573	0.08895	18	0.004942	LGT
TCDUC211E	C	C2	3	2	4.676	0.7432	0.08947	18	0.004970	LGB
TCDUC212E	C	C2	3	2	4.480	0.7392	0.08907	18	0.004948	LGT
TCDUC213E	C	C2	3	2	3.797	0.7343	0.09020	18	0.005011	LGT
TCDUC214E	C	C2	3	2	4.366	0.7828	0.08583	18	0.004769	LWT

Average	4.199	0.7605	0.004903
Standard Dev.	0.3623	0.02290	
Coeff. of Var. [%]	8.629	3.011	
Min.	3.654	0.7302	0.004693
Max.	4.744	0.8008	0.005011
Number of Spec.	21	21	21



4.3 Longitudinal Compression Properties (LC)

Longitudinal Compression Properties (LC)--CTD (-65°F) Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

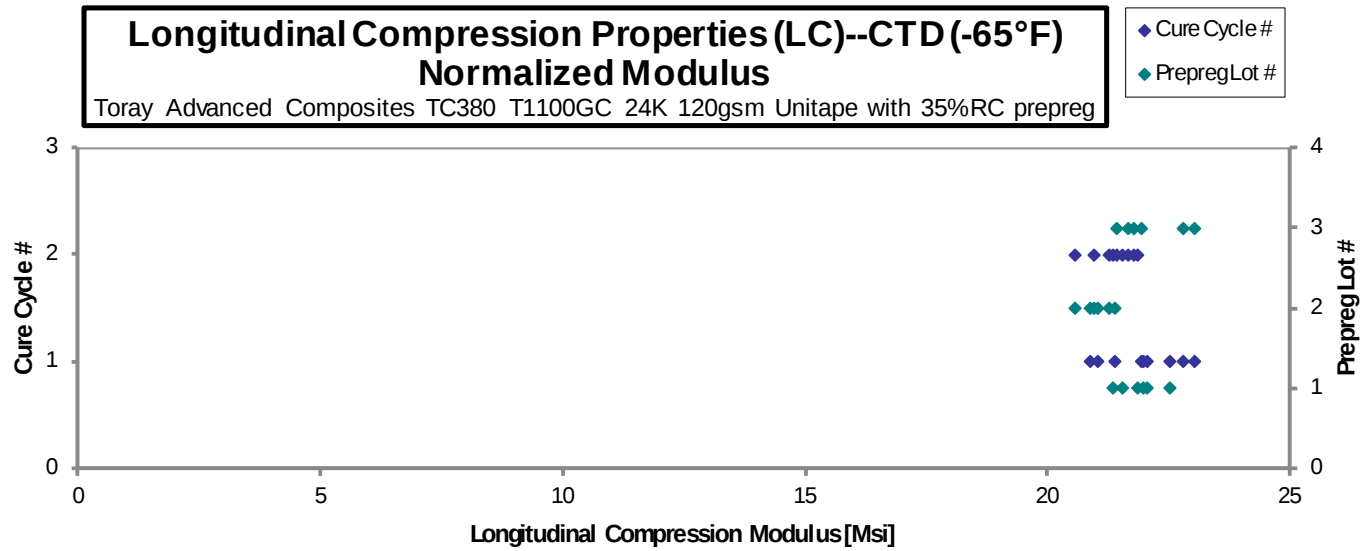
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
TCDLA111B	A	C1	1	1	21.32	0.3591	0.09890	20	0.004945	21.97
TCDLA112B	A	C1	1	1	21.88	0.4007	0.09887	20	0.004943	22.53
TCDLA113B	A	C1	1	1	21.43	0.4136	0.09883	20	0.004942	22.06
TCDLA211B	A	C2	1	2	21.34	0.4204	0.09835	20	0.004918	21.86
TCDLA212B	A	C2	1	2	20.95	0.4104	0.09865	20	0.004933	21.53
TCDLA213B	A	C2	1	2	20.76	0.4603	0.09867	20	0.004933	21.34
TCDLB111B	B	C1	2	1	20.16	0.3639	0.09937	20	0.004968	20.87
TCDLB112B	B	C1	2	1	20.84	0.3868	0.09857	20	0.004928	21.39
TCDLB113B	B	C1	2	1	20.54	0.3456	0.09827	20	0.004913	21.02
TCDLB211B	B	C2	2	2	20.05	0.3420	0.09850	20	0.004925	20.58
TCDLB212B	B	C2	2	2	20.40	0.3840	0.09857	20	0.004928	20.95
TCDLB213B	B	C2	2	2	20.67	0.3621	0.09877	20	0.004938	21.27
TCDLC111B	C	C1	3	1	22.20	0.3597	0.09962	20	0.004981	23.04
TCDLC112B	C	C1	3	1	20.97	0.4087	0.1004	20	0.005020	21.93
TCDLC113B	C	C1	3	1	21.77	0.4010	0.1005	20	0.005026	22.79
TCDLC211B	C	C2	3	2	22.10	0.3827	0.09410	20	0.004705	21.67
TCDLC212B	C	C2	3	2	21.92	0.3645	0.09532	20	0.004766	21.76
TCDLC213B	C	C2	3	2	21.13	0.4182	0.09727	20	0.004863	21.40

Average 21.13 0.3880
 Standard Dev. 0.6563 0.03115
 Coeff. of Var. [%] 3.105 8.029
 Min. 20.05 0.3420
 Max. 22.20 0.4603
 Number of Spec. 18 18

Average_{norm} 0.004921 21.66
 Standard Dev._{norm} 0.6616
 Coeff. of Var. [%]_{norm} 3.054
 Min. 0.004705 20.58
 Max. 0.005026 23.04
 Number of Spec. 18 18



Longitudinal Compression Properties (LC)--RTD (70°F)**Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

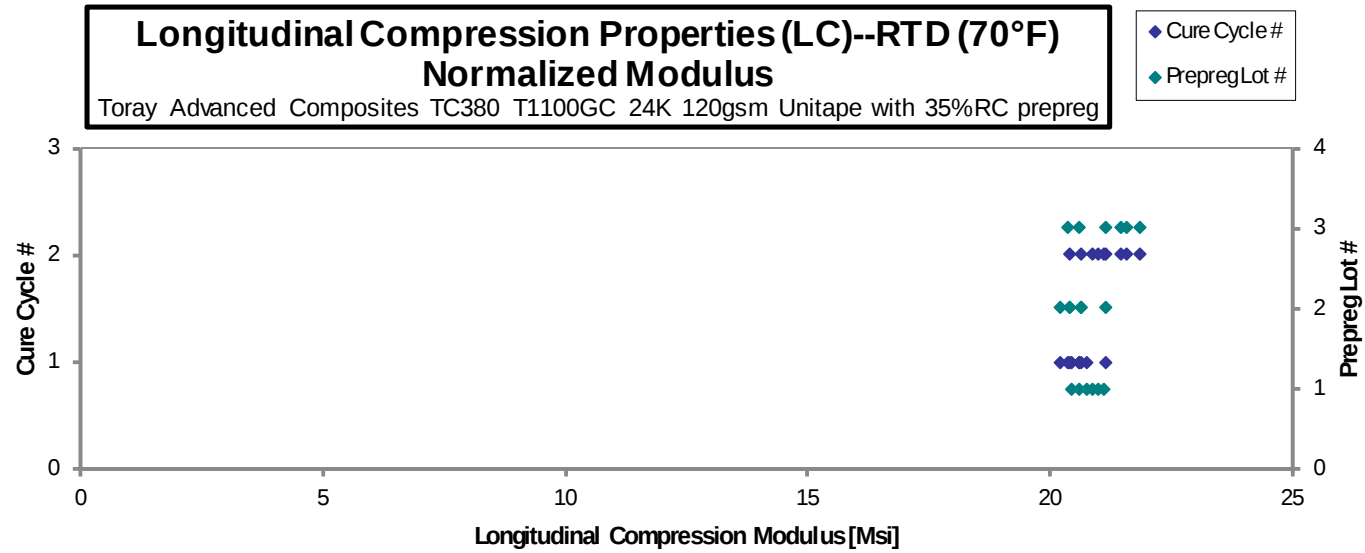
 t_{ply} [in]

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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
TCDLA111A*	A	C1	1	1	20.91	0.3601	0.09383	20	0.004692	20.43
TCDLA112A*	A	C1	1	1	20.83	0.3689	0.09500	20	0.004750	20.61
TCDLA113A	A	C1	1	1	20.68	0.3213	0.09630	20	0.004815	20.74
TCDLA211A	A	C2	1	2	21.59	0.3915	0.09387	20	0.004693	21.11
TCDLA212A	A	C2	1	2	20.96	0.4110	0.09608	20	0.004804	20.98
TCDLA213A	A	C2	1	2	20.71	0.3896	0.09687	20	0.004843	20.90
TCDLB111A	B	C1	2	1	20.84	0.3186	0.09512	20	0.004756	20.65
TCDLB112A	B	C1	2	1	20.02	0.3288	0.09697	20	0.004848	20.22
TCDLB113A	B	C1	2	1	20.11	0.3455	0.09738	20	0.004869	20.39
TCDLB211A	B	C2	2	2	21.04	0.3069	0.09420	20	0.004710	20.65
TCDLB212A	B	C2	2	2	20.44	0.3450	0.09580	20	0.004790	20.40
TCDLB213A	B	C2	2	2	21.07	0.3569	0.09643	20	0.004822	21.16
TCDLC111A	C	C1	3	1	21.15	0.3627	0.09250	20	0.004625	20.38
TCDLC112A	C	C1	3	1	20.96	0.3874	0.09437	20	0.004718	20.60
TCDLC113A	C	C1	3	1	21.14	0.3638	0.09608	20	0.004804	21.16
TCDLC211A	C	C2	3	2	20.68	0.3734	0.09957	20	0.004978	21.45
TCDLC212A	C	C2	3	2	21.06	0.3997	0.09968	20	0.004984	21.87
TCDLC213A	C	C2	3	2	20.81	0.3869	0.09958	20	0.004979	21.58

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

Average	20.83	0.3621	Average _{norm}	0.004805	20.85
Standard Dev.	0.3728	0.02986	Standard Dev. _{norm}		0.4619
Coeff. of Var. [%]	1.790	8.246	Coeff. of Var. [%] _{norm}		2.215
Min.	20.02	0.3069	Min.	0.004625	20.22
Max.	21.59	0.4110	Max.	0.004984	21.87
Number of Spec.	18	18	Number of Spec.	18	18



Longitudinal Compression Properties (LC)--ETD1 (180°F)**Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

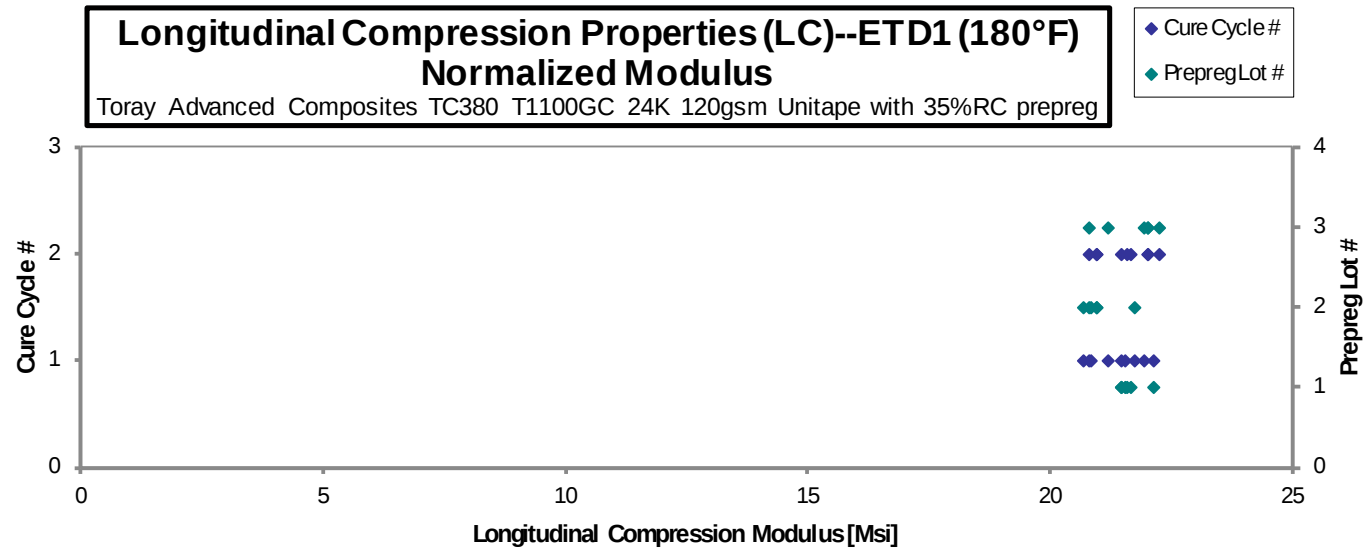
normalizing

 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
TCDLA111C	A	C1	1	1	21.02	0.4048	0.09840	20	0.004920	21.55
TCDLA112C	A	C1	1	1	21.61	0.4090	0.09837	20	0.004918	22.14
TCDLA113C	A	C1	1	1	20.90	0.3791	0.09853	20	0.004927	21.45
TCDLA211C	A	C2	1	2	21.16	0.4148	0.09825	20	0.004913	21.65
TCDLA212C	A	C2	1	2	21.01	0.3755	0.09857	20	0.004928	21.58
TCDLA213C	A	C2	1	2	21.02	0.3761	0.09800	20	0.004900	21.45
TCDLB111C	B	C1	2	1	20.97	0.3841	0.09942	20	0.004971	21.72
TCDLB112C	B	C1	2	1	20.28	0.4129	0.09865	20	0.004933	20.84
TCDLB113C	B	C1	2	1	20.12	0.3843	0.09858	20	0.004929	20.67
TCDLB211C	B	C2	2	2	20.38	0.3868	0.09873	20	0.004937	20.96
TCDLB212C	B	C2	2	2	20.21	0.4001	0.09877	20	0.004938	20.79
TCDLB213C	B	C2	2	2	20.38	0.3705	0.09870	20	0.004935	20.95
TCDLC111C	C	C1	3	1	19.73	0.3098	0.1011	20	0.005054	20.78
TCDLC112C	C	C1	3	1	20.76	0.3848	0.1014	20	0.005070	21.93
TCDLC113C	C	C1	3	1	20.28	0.4276	0.1003	20	0.005013	21.17
TCDLC211C	C	C2	3	2	21.57	0.3407	0.09800	20	0.004900	22.02
TCDLC212C	C	C2	3	2	21.38	0.3769	0.09877	20	0.004938	21.99
TCDLC213C	C	C2	3	2	21.45	0.4136	0.09957	20	0.004978	22.25

Average	20.79	0.3862	Average _{norm}	0.004950	21.44
Standard Dev.	0.5509	0.02826	Standard Dev. _{norm}		0.5170
Coeff. of Var. [%]	2.650	7.318	Coeff. of Var. [%] _{norm}		2.412
Min.	19.73	0.3098	Min.	0.004900	20.67
Max.	21.61	0.4276	Max.	0.005070	22.25
Number of Spec.	18	18	Number of Spec.	18	18



Longitudinal Compression Properties (LC)--ETW1 (180°F)**Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

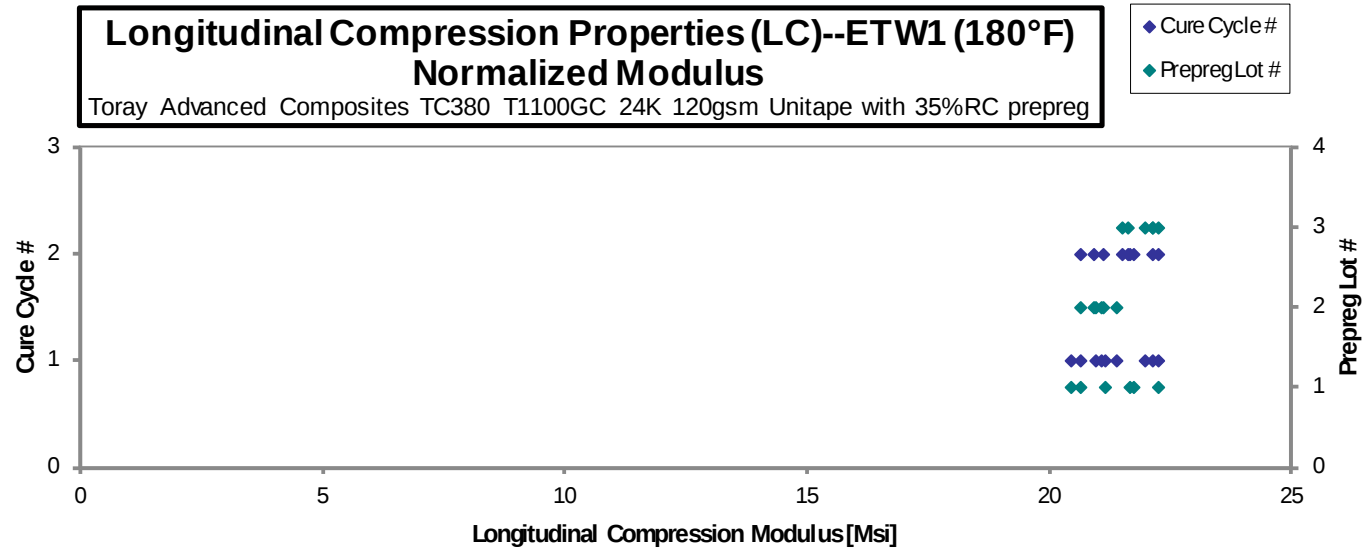
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
TCDLA111D	A	C1	1	1	20.80	0.4599	0.09450	20	0.004725	20.48
TCDLA112D	A	C1	1	1	20.67	0.3862	0.09593	20	0.004797	20.65
TCDLA113D	A	C1	1	1	20.97	0.3852	0.09687	20	0.004843	21.15
TCDLA211D	A	C2	1	2	21.81	0.4111	0.09790	20	0.004895	22.24
TCDLA212D	A	C2	1	2	21.11	0.4239	0.09865	20	0.004933	21.69
TCDLA213D	A	C2	1	2	21.25	0.3445	0.09830	20	0.004915	21.76
TCDLB111D	B	C1	2	1	20.46	0.3899	0.09835	20	0.004918	20.96
TCDLB112D	B	C1	2	1	20.50	0.3852	0.09880	20	0.004940	21.10
TCDLB113D	B	C1	2	1	20.90	0.3515	0.09840	20	0.004920	21.42
TCDLB211D	B	C2	2	2	20.42	0.3500	0.09847	20	0.004923	20.94
TCDLB212D	B	C2	2	2	20.69	0.3612	0.09807	20	0.004903	21.14
TCDLB213D	B	C2	2	2	20.24	0.3584	0.09803	20	0.004902	20.67
TCDLC111D	C	C1	3	1	21.11	0.3937	0.1000	20	0.005001	21.99
TCDLC112D	C	C1	3	1	21.61	0.3640	0.09893	20	0.004947	22.27
TCDLC113D	C	C1	3	1	21.80	0.3989	0.09757	20	0.004878	22.16
TCDLC211D	C	C2	3	2	20.71	0.3668	0.09973	20	0.004987	21.51
TCDLC212D	C	C2	3	2	20.81	0.4147	0.09988	20	0.004994	21.65
TCDLC213D	C	C2	3	2	21.39	0.3798	0.09938	20	0.004969	22.15

Average 20.96 0.3847
 Standard Dev. 0.4674 0.02974
 Coeff. of Var. [%] 2.230 7.731
 Min. 20.24 0.3445
 Max. 21.81 0.4599
 Number of Spec. 18 18

Average_{norm} 0.004911 21.44
 Standard Dev._{norm} 0.5826
 Coeff. of Var. [%]_{norm} 2.717
 Min. 0.004725 20.48
 Max. 0.005001 22.27
 Number of Spec. 18 18



Longitudinal Compression Properties (LC)--ETW2 (250°F)
Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

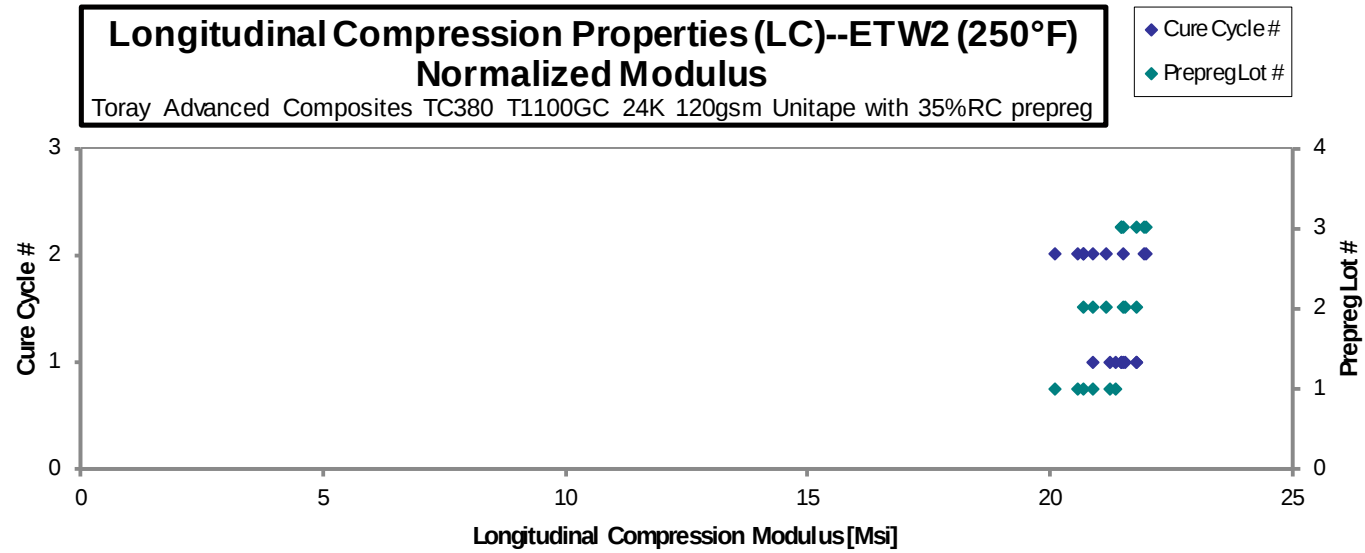
 t_{ply} [in]

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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
TCDLA111E	A	C1	1	1	20.69	0.4289	0.09850	20	0.004925	21.23
TCDLA112E	A	C1	1	1	20.36	0.3977	0.09837	20	0.004918	20.86
TCDLA113E	A	C1	1	1	20.77	0.3804	0.09863	20	0.004932	21.33
TCDLA211E	A	C2	1	2	20.99	0.4130	0.09460	20	0.004730	20.68
TCDLA212E	A	C2	1	2	21.66	0.4680	0.09118	20	0.004559	20.57
TCDLA213E	A	C2	1	2	19.63	0.3972	0.09830	20	0.004915	20.10
TCDLB111E	B	C1	2	1	21.67	0.4151	0.09643	20	0.004822	21.77
TCDLB112E	B	C1	2	1	21.72	0.3910	0.09528	20	0.004764	21.56
TCDLB113E	B	C1	2	1	20.42	0.3989	0.1011	20	0.005053	21.50
TCDLB211E	B	C2	2	2	20.64	0.4037	0.09620	20	0.004810	20.68
TCDLB212E	B	C2	2	2	21.40	0.3610	0.09493	20	0.004747	21.16
TCDLB213E	B	C2	2	2	20.12	0.4347	0.09960	20	0.004980	20.87
TCDLC111E	C	C1	3	1	22.13	0.4109	0.09312	20	0.004656	21.46
TCDLC112E	C	C1	3	1	22.88	0.4109	0.09138	20	0.004569	21.78
TCDLC113E	C	C1	3	1	21.55	0.3926	0.09557	20	0.004778	21.45
TCDLC211E	C	C2	3	2	21.69	0.3727	0.09712	20	0.004856	21.95
TCDLC212E	C	C2	3	2	21.94	0.4221	0.09612	20	0.004806	21.97
TCDLC213E	C	C2	3	2	21.92	0.4149	0.09413	20	0.004707	21.50

Average 21.23 0.4063
Standard Dev. 0.8264 0.02438
Coeff. of Var. [%] 3.892 6.001
Min. 19.63 0.3610
Max. 22.88 0.4680
Number of Spec. 18 18

Average_{norm} 0.004807 21.25
Standard Dev._{norm} 0.5194
Coeff. of Var. [%]_{norm} 2.445
Min. 0.004559 20.10
Max. 0.005053 21.97
Number of Spec. 18 18



4.4 Longitudinal Compression (LC) Back-out Factor Properties

Note: For each test condition, F_1^{cu} [ksi] derived from cross-ply compression (UNC0) was calculated using back-out factor values. The back-out factor values were calculated using E_1^c , ν_{12}^c and E_2^c values from each corresponding test condition, as shown in Table 1-2. For example, CTD F_1^{cu} [ksi] derived from CTD UNC0 was calculated using CTD E_1^c , ν_{12}^c and E_2^c , RTD F_1^{cu} [ksi] derived from RTD UNC0 was calculated using RTD E_1^c , ν_{12}^c and E_2^c , etc.

Longitudinal Compression (LC) Back-out Factor Properties--CTD (-65°F) Strength

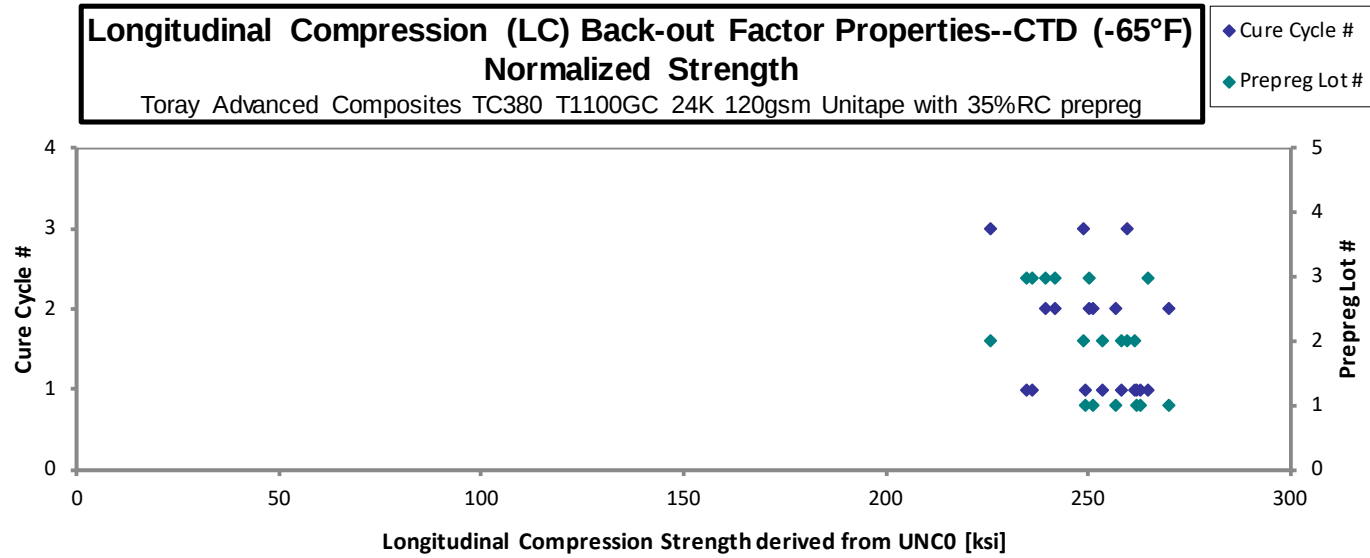
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

UNC0 Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	$F_1^{cu}_{meas}$ [ksi] from UNC0*	$F_1^{cu}_{norm}$ [ksi] from UNC0**
TCDRA111B	A	C1	1	1	249.7	249.1
TCDRA112B	A	C1	1	1	262.1	262.9
TCDRA113B	A	C1	1	1	259.1	262.0
TCDRA211B	A	C2	1	2	253.5	251.3
TCDRA212B	A	C2	1	2	270.1	269.9
TCDRA213B	A	C2	1	2	255.4	256.6
TCDRB111B	B	C1	2	1	254.3	258.2
TCDRB112B	B	C1	2	1	257.0	261.3
TCDRB113B	B	C1	2	1	244.5	253.5
TCDRB311B	B	C3	2	3	246.6	248.6
TCDRB312B	B	C3	2	3	221.3	225.7
TCDRB313B	B	C3	2	3	251.6	259.7
TCDRC111B	C	C1	3	1	226.3	234.8
TCDRC112B	C	C1	3	1	225.5	236.0
TCDRC113B	C	C1	3	1	250.8	264.6
TCDRC211B	C	C2	3	2	236.2	241.7
TCDRC212B	C	C2	3	2	229.2	239.3
TCDRC213B	C	C2	3	2	237.5	250.0

* CTD Back-out factor_{meas} = 2.672

** CTD Back-out factor_{norm} = 2.679

Average	246.2	251.4
Standard Dev.	13.90	11.96
Coeff. of Var. [%]	5.648	4.756
Min.	221.3	225.7
Max.	270.1	269.9
Number of Spec.	18	18



**Longitudinal Compression (LC) Back-out Factor Properties--RTD (70°F)
Strength**

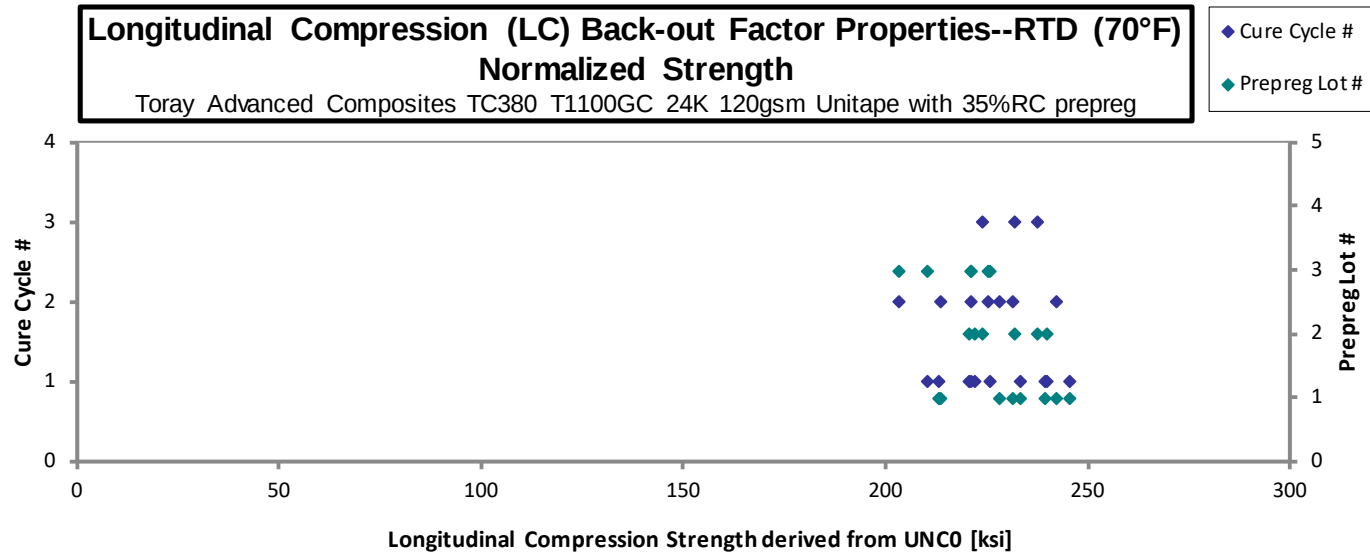
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

UNC0 Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	F ₁ ^{cu} _{meas} [ksi] from UNC0*	F ₁ ^{cu} _{norm} [ksi] from UNC0**
TCDRA111A	A	C1	1	1	225.9	213.4
TCDRA112A	A	C1	1	1	255.2	245.5
TCDRA113A	A	C1	1	1	238.7	233.5
TCDRA114A	A	C1	1	1	241.2	239.8
TCDRA211A	A	C2	1	2	227.7	213.8
TCDRA212A	A	C2	1	2	238.8	228.3
TCDRA213A	A	C2	1	2	250.3	242.5
TCDRA214A	A	C2	1	2	236.0	231.6
TCDRB111A	B	C1	2	1	241.5	220.7
TCDRB112A	B	C1	2	1	238.8	222.1
TCDRB113A	B	C1	2	1	249.1	240.2
TCDRB311A	B	C3	2	3	251.1	232.1
TCDRB312A	B	C3	2	3	249.9	237.6
TCDRB313A	B	C3	2	3	231.1	224.1
TCDRC111A	C	C1	3	1	231.0	221.2
TCDRC112A	C	C1	3	1	214.3	210.6
TCDRC113A	C	C1	3	1	225.2	225.8
TCDRC211A	C	C2	3	2	237.5	221.6
TCDRC212A	C	C2	3	2	211.1	203.5
TCDRC213A	C	C2	3	2	229.0	225.7

* RTD Back-out factor_{meas} = 2.693

** RTD Back-out factor_{norm} = 2.694

Average	236.2	226.7
Standard Dev.	11.98	11.33
Coeff. of Var. [%]	5.073	5.000
Min.	211.1	203.5
Max.	255.2	245.5
Number of Spec.	20	20



**Longitudinal Compression (LC) Back-out Factor Properties--ETD1 (180°F)
Strength**

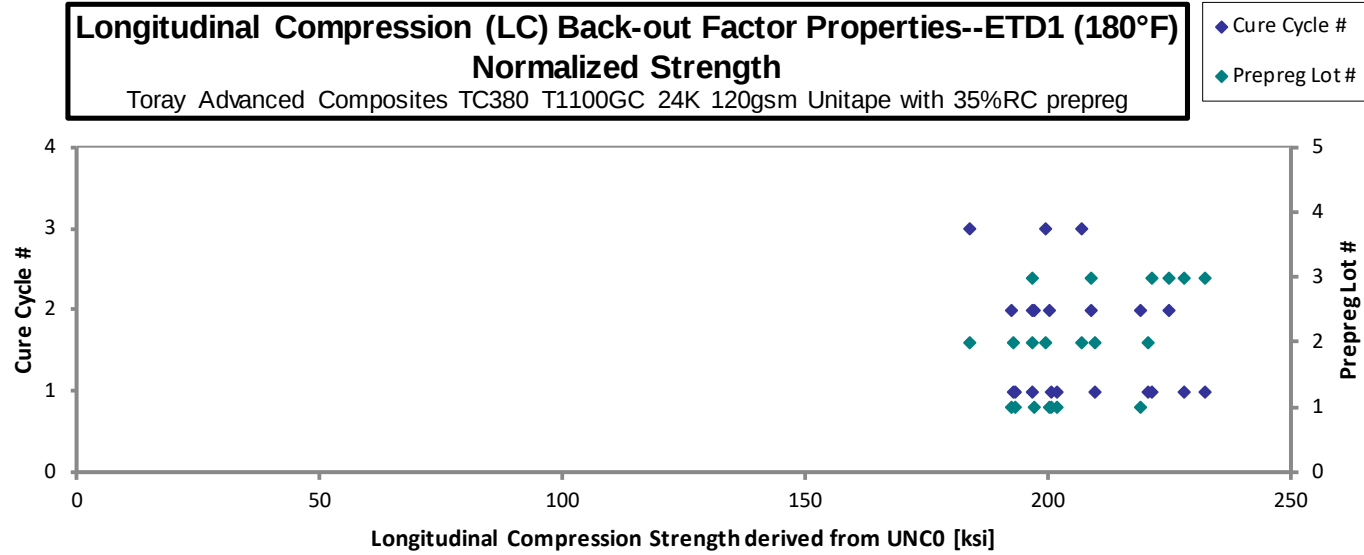
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

UNC0 Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	F ₁ ^{cu} _{meas} [ksi] from UNC0*	F ₁ ^{cu} _{norm} [ksi] from UNC0**
TCDRA111C	A	C1	1	1	198.2	200.4
TCDRA112C	A	C1	1	1	199.4	201.6
TCDRA113C	A	C1	1	1	192.1	193.3
TCDRA211C	A	C2	1	2	217.5	218.8
TCDRA212C	A	C2	1	2	199.0	200.3
TCDRA213C	A	C2	1	2	191.8	192.3
TCDRA214C	A	C2	1	2	197.5	197.1
TCDRB111C	B	C1	2	1	188.9	196.5
TCDRB112C	B	C1	2	1	212.0	220.5
TCDRB113C	B	C1	2	1	187.0	192.9
TCDRB114C	B	C1	2	1	232.5	209.6
TCDRB311C	B	C3	2	3	176.6	183.9
TCDRB312C	B	C3	2	3	191.8	199.5
TCDRB313C	B	C3	2	3	199.2	207.0
TCDRC111C	C	C1	3	1	208.5	221.4
TCDRC112C	C	C1	3	1	220.3	232.2
TCDRC113C	C	C1	3	1	217.2	227.7
TCDRC211C	C	C2	3	2	185.9	196.6
TCDRC212C	C	C2	3	2	213.7	224.9
TCDRC213C	C	C2	3	2	197.7	208.6

* ETD1 Back-out factor_{meas} = 2.716

** ETD1 Back-out factor_{norm} = 2.724

Average	201.3	206.3
Standard Dev.	13.93	13.66
Coeff. of Var. [%]	6.918	6.622
Min.	176.6	183.9
Max.	232.5	232.2
Number of Spec.	20	20



**Longitudinal Compression (LC) Back-out Factor Properties--ETW1 (180°F)
Strength**

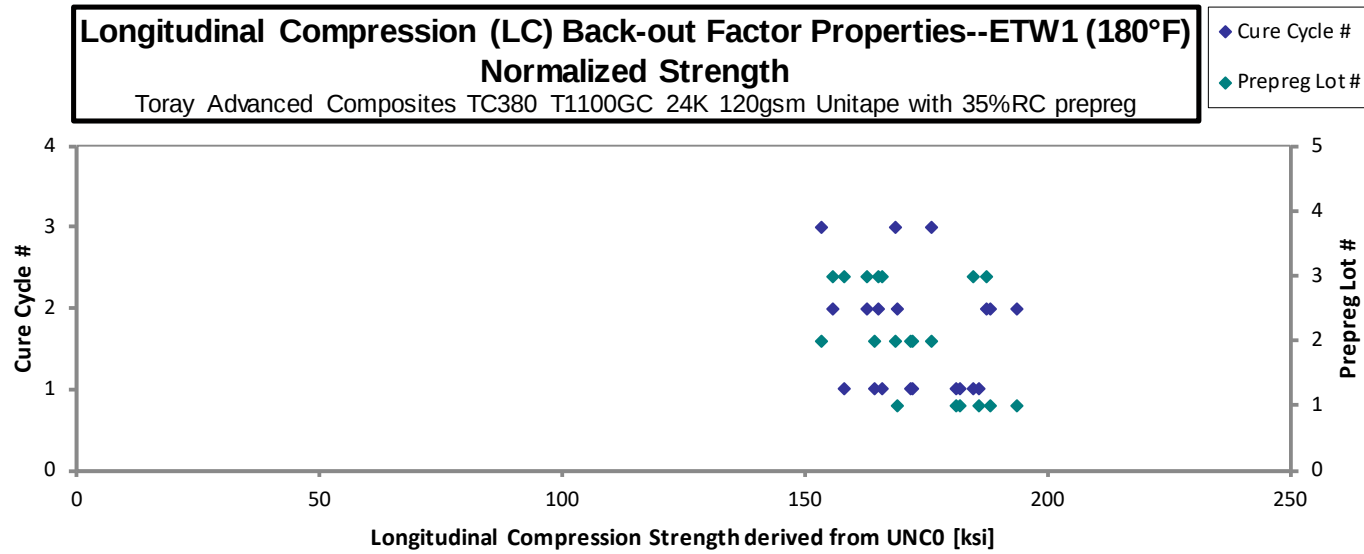
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

UNC0 Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	$F_1^{cu}_{meas}$ [ksi] from UNC0*	$F_1^{cu}_{norm}$ [ksi] from UNC0**
TCDRA111D	A	C1	1	1	188.0	181.9
TCDRA112D	A	C1	1	1	184.7	181.1
TCDRA113D	A	C1	1	1	187.0	185.9
TCDRA211D	A	C2	1	2	189.1	188.0
TCDRA212D	A	C2	1	2	170.6	169.0
TCDRA213D	A	C2	1	2	196.0	193.5
TCDRB111D	B	C1	2	1	183.8	172.1
TCDRB112D	B	C1	2	1	169.0	164.1
TCDRB113D	B	C1	2	1	172.4	171.6
TCDRB311D	B	C3	2	3	151.6	153.3
TCDRB312D	B	C3	2	3	175.3	176.0
TCDRB313D	B	C3	2	3	170.3	168.7
TCDRC111D	C	C1	3	1	161.3	165.9
TCDRC112D	C	C1	3	1	157.5	158.0
TCDRC113D	C	C1	3	1	187.4	184.5
TCDRC211D	C	C2	3	2	181.1	187.3
TCDRC212D	C	C2	3	2	160.5	162.6
TCDRC213D	C	C2	3	2	155.3	155.7
TCDRC214D	C	C2	3	2	168.3	164.9

* ETW1 Back-out factor_{meas} = 2.734

** ETW1 Back-out factor_{norm} = 2.739

Average	174.2	172.8
Standard Dev.	13.06	11.92
Coeff. of Var. [%]	7.496	6.894
Min.	151.6	153.3
Max.	196.0	193.5
Number of Spec.	19	19



**Longitudinal Compression (LC) Back-out Factor Properties--ETW2 (250°F)
Strength**

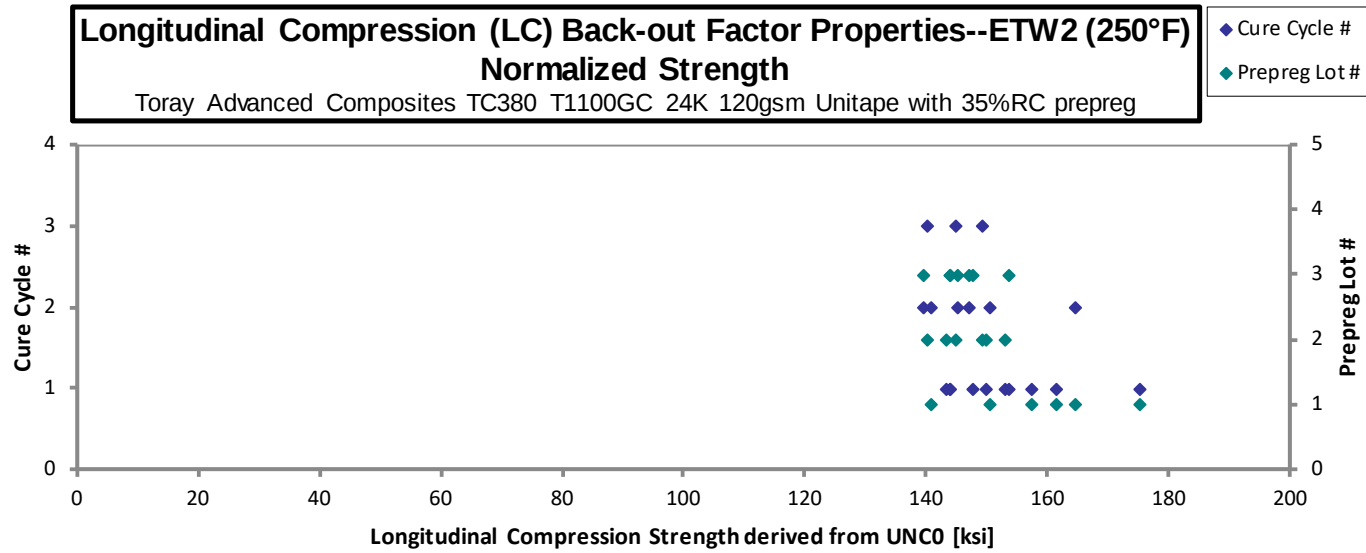
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

UNC0 Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	F ₁ ^{cu} _{meas} [ksi] from UNC0*	F ₁ ^{cu} _{norm} [ksi] from UNC0**
TCDRA111E	A	C1	1	1	154.8	157.5
TCDRA112E	A	C1	1	1	172.6	175.3
TCDRA113E	A	C1	1	1	158.8	161.7
TCDRA211E	A	C2	1	2	149.3	140.8
TCDRA212E	A	C2	1	2	157.3	150.7
TCDRA213E	A	C2	1	2	168.0	164.6
TCDRB111E	B	C1	2	1	140.5	150.0
TCDRB112E	B	C1	2	1	144.4	153.2
TCDRB113E	B	C1	2	1	134.5	143.5
TCDRB311E	B	C3	2	3	150.7	140.4
TCDRB312E	B	C3	2	3	152.2	145.2
TCDRB313E	B	C3	2	3	153.5	149.3
TCDRC111E	C	C1	3	1	145.7	147.8
TCDRC112E	C	C1	3	1	144.8	144.2
TCDRC113E	C	C1	3	1	158.3	153.8
TCDRC114E	C	C1	3	1	152.5	144.0
TCDRC211E	C	C2	3	2	150.5	139.8
TCDRC212E	C	C2	3	2	149.4	145.4
TCDRC213E	C	C2	3	2	147.7	147.2

* ETW2 Back-out factor_{meas} = 2.777

** ETW2 Back-out factor_{norm} = 2.778

Average	151.9	150.2
Standard Dev.	8.914	9.198
Coeff. of Var. [%]	5.869	6.123
Min.	134.5	139.8
Max.	172.6	175.3
Number of Spec.	19	19

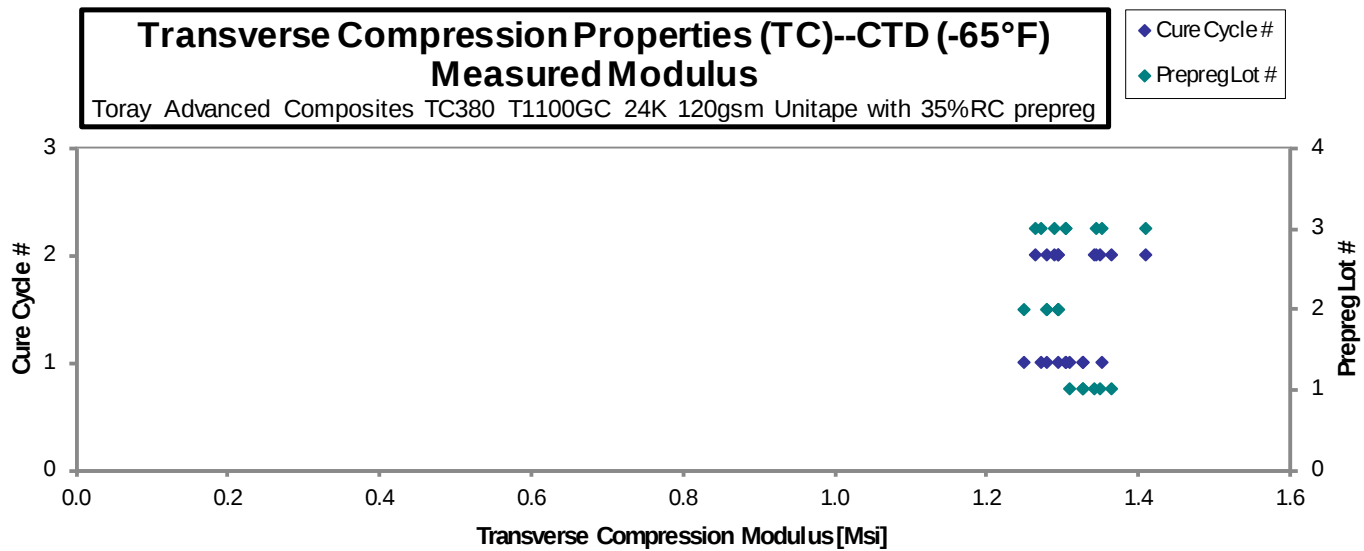
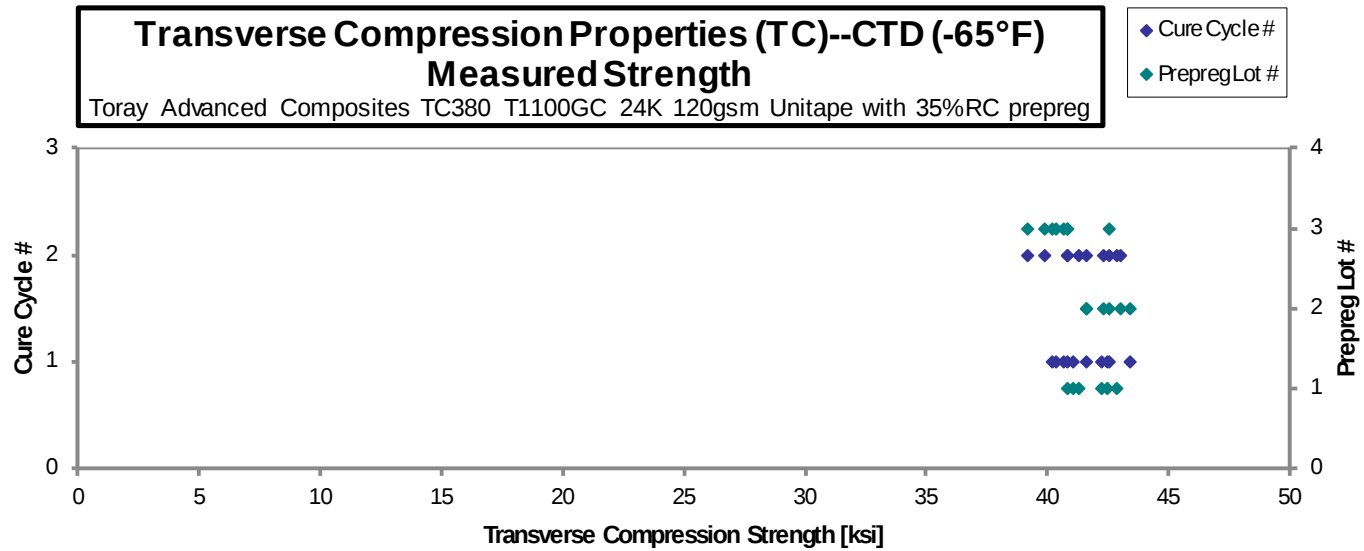


4.5 Transverse Compression Properties (TC)

Transverse Compression Properties (TC)--CTD (-65°F)										
Strength & Modulus										
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg										

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDZA111B	A	C1	1	1	42.41	1.328	0.09810	20	0.004905	BGM
TCDZA112B	A	C1	1	1	41.04	1.310	0.09827	20	0.004913	BGM
TCDZA113B	A	C1	1	1	42.24	1.328	0.09823	20	0.004912	BGM
TCDZA211B	A	C2	1	2	41.30	1.349	0.09682	20	0.004841	BGM
TCDZA212B	A	C2	1	2	40.80	1.342	0.09733	20	0.004867	BGM
TCDZA213B	A	C2	1	2	42.88	1.366	0.09698	20	0.004849	BGM
TCDZB111B	B	C1	2	1	42.54	1.250	0.09937	20	0.004968	BGM
TCDZB112B	B	C1	2	1	41.55	1.281	0.09882	20	0.004941	BGM
TCDZB113B	B	C1	2	1	43.42	1.295	0.09910	20	0.004955	BGM
TCDZB211B	B	C2	2	2	42.26	1.281	0.09797	20	0.004898	BGM
TCDZB212B	B	C2	2	2	41.63	1.294	0.09805	20	0.004903	BGM
TCDZB213B	B	C2	2	2	42.98	1.296	0.09788	20	0.004894	BGM
TCDZC111B	C	C1	3	1	40.17	1.272	0.1001	20	0.005006	HAB, HAT
TCDZC112B	C	C1	3	1	40.36	1.305	0.1000	20	0.005000	HAT
TCDZC113B	C	C1	3	1	40.79	1.353	0.1002	20	0.005009	HGM, HAT
TCDZC114B	C	C1	3	1	40.62	1.305	0.1004	20	0.005018	HGM, HAB
TCDZC211B	C	C2	3	2	39.14	1.346	0.09843	20	0.004922	HAB, HAT
TCDZC212B	C	C2	3	2	40.81	1.290	0.09877	20	0.004938	HGM, HAB
TCDZC213B	C	C2	3	2	39.83	1.265	0.09865	20	0.004933	HAB, HAT
TCDZC214B	C	C2	3	2	42.55	1.411	0.09862	20	0.004931	HGM, HAB

Average	41.47	1.313	0.004930
Standard Dev.	1.165	0.03937	
Coeff. of Var. [%]	2.809	2.997	
Min.	39.14	1.250	0.004841
Max.	43.42	1.411	0.005018
Number of Spec.	20	20	20



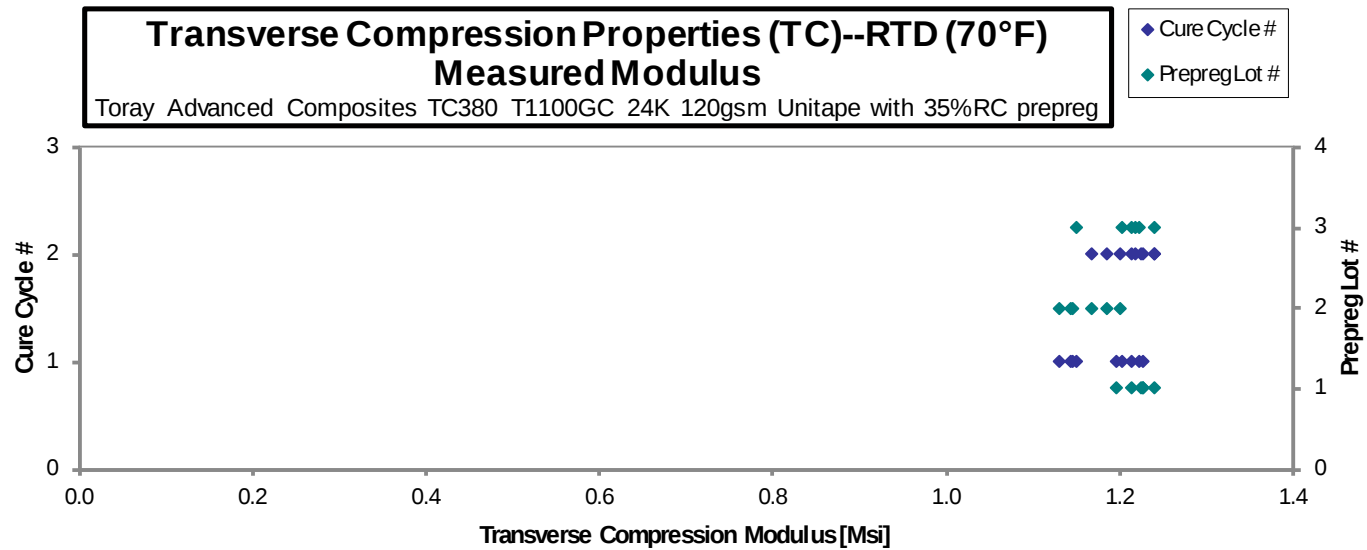
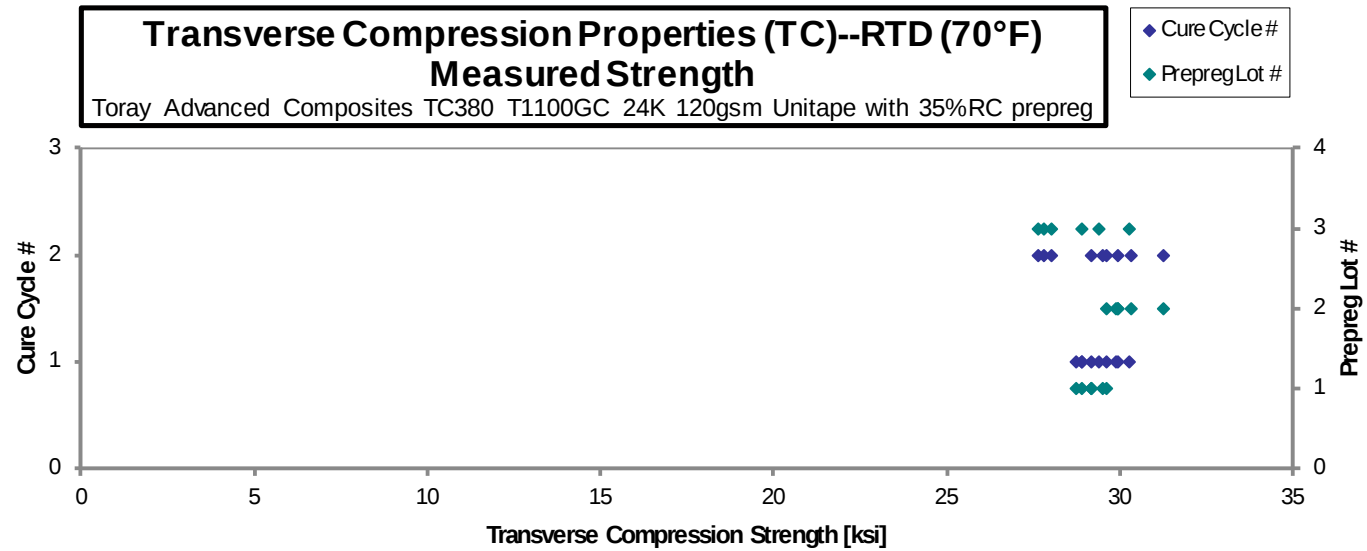
**Transverse Compression Properties (TC)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDZA111A*	A	C1	1	1	28.87	1.228	0.09860	20	0.004930	BGM
TCDZA112A*	A	C1	1	1	29.15	1.214	0.09860	20	0.004930	BGM
TCDZA113A	A	C1	1	1	28.71	1.197	0.09867	20	0.004933	BGM
TCDZA211A	A	C2	1	2	29.18	1.226	0.09762	20	0.004881	BGM
TCDZA212A	A	C2	1	2	29.58	1.242	0.09738	20	0.004869	M(B,H)AB
TCDZA213A	A	C2	1	2	29.50	1.228	0.09720	20	0.004860	M(B,H)AB
TCDZB111A	B	C1	2	1	29.88	1.147	0.09997	20	0.004998	BAT
TCDZB112A	B	C1	2	1	29.60	1.144	0.09980	20	0.004990	HGM
TCDZB113A	B	C1	2	1	29.95	1.131	0.09983	20	0.004992	BGM
TCDZB211A	B	C2	2	2	31.24	1.201	0.09882	20	0.004941	BAB
TCDZB212A	B	C2	2	2	29.92	1.169	0.09852	20	0.004926	BGM
TCDZB213A	B	C2	2	2	30.31	1.187	0.09807	20	0.004903	BAB
TCDZC111A	C	C1	3	1	30.28	1.151	0.1008	20	0.005041	BAB, HAT
TCDZC112A	C	C1	3	1	28.87	1.204	0.1004	20	0.005022	BGM
TCDZC113A	C	C1	3	1	29.39	1.224	0.09985	20	0.004993	BGM, HAT
TCDZC211A	C	C2	3	2	27.80	1.220	0.09930	20	0.004965	HGM
TCDZC212A	C	C2	3	2	27.65	1.214	0.09887	20	0.004943	HAT, HAB
TCDZC213A	C	C2	3	2	27.99	1.241	0.09898	20	0.004949	HGM, BAT

* Modulus are averaged values of 2 strain gages.

Average	29.33	1.198	0.004948
Standard Dev.	0.9245	0.03523	
Coeff. of Var. [%]	3.153	2.941	
Min.	27.65	1.131	0.004860
Max.	31.24	1.242	0.005041
Number of Spec.	18	18	18

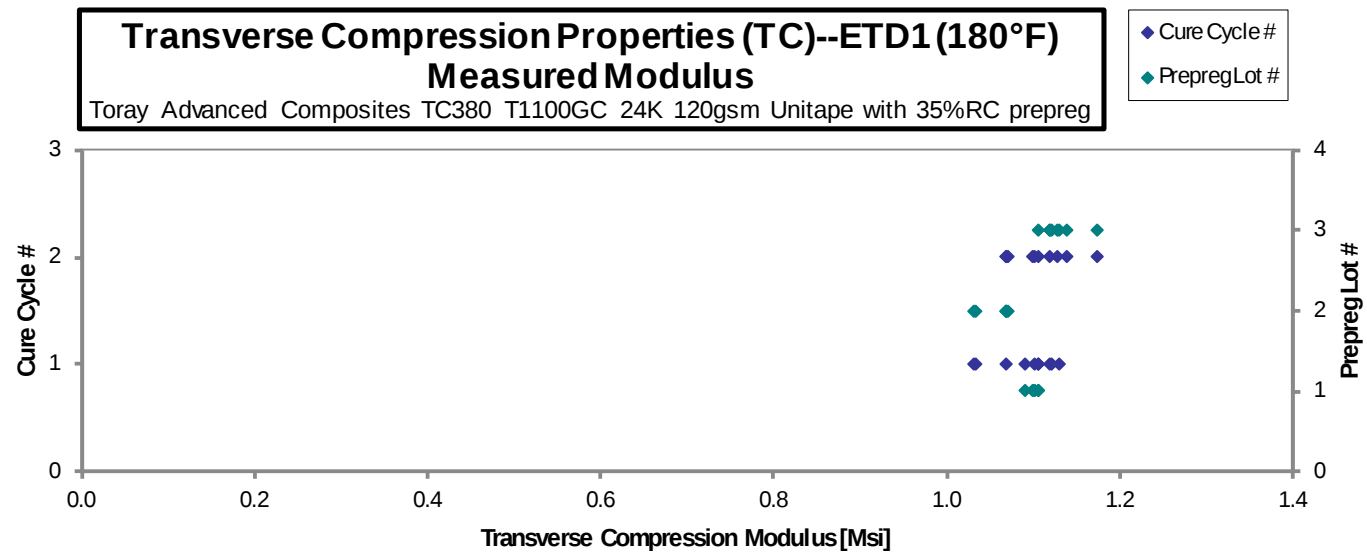
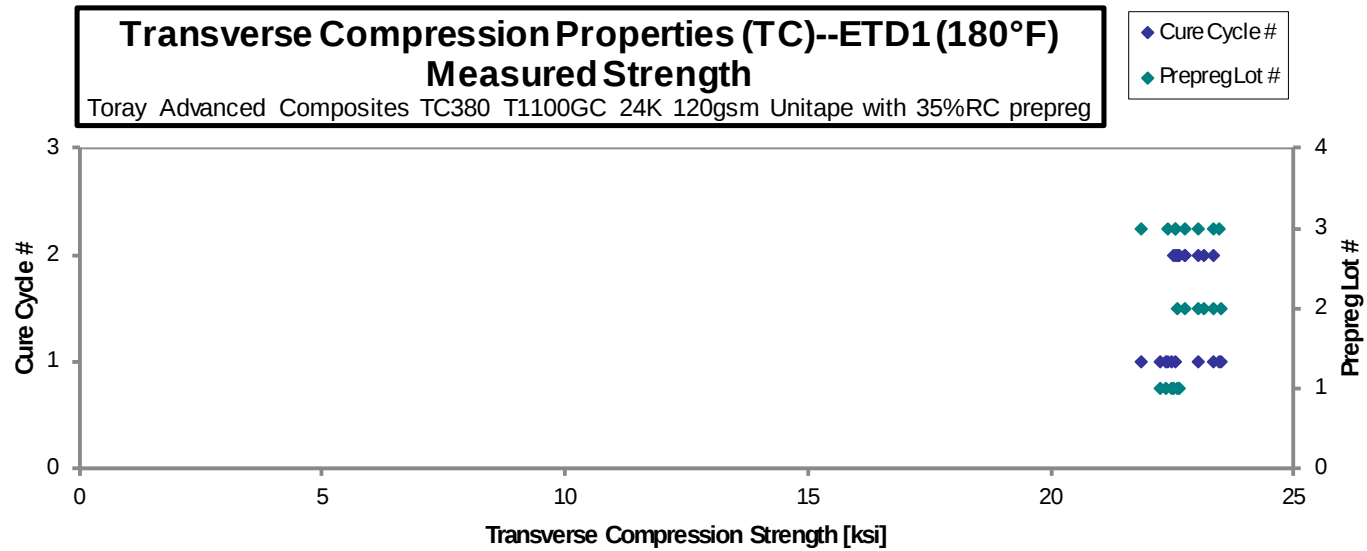


**Transverse Compression Properties (TC)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDZA111C	A	C1	1	1	22.39	1.104	0.09810	20	0.004905	HGM
TCDZA112C	A	C1	1	1	22.26	1.101	0.09790	20	0.004895	HGM
TCDZA113C	A	C1	1	1	22.51	1.090	0.09790	20	0.004895	HAT
TCDZA211C	A	C2	1	2	22.64	1.100	0.09755	20	0.004878	BGM, HAT
TCDZA212C	A	C2	1	2	22.65	1.104	0.09677	20	0.004838	HAT
TCDZA213C	A	C2	1	2	22.56	1.098	0.09747	20	0.004873	BAB
TCDZB111C	B	C1	2	1	23.53	1.030	0.09898	20	0.004949	HGM
TCDZB112C	B	C1	2	1	23.36	1.067	0.09858	20	0.004929	BAT
TCDZB113C	B	C1	2	1	23.04	1.033	0.09882	20	0.004941	BGM
TCDZB211C	B	C2	2	2	23.16	1.069	0.09782	20	0.004891	HGM
TCDZB212C	B	C2	2	2	22.64	1.068	0.09817	20	0.004908	HGM
TCDZB213C	B	C2	2	2	22.77	1.069	0.09835	20	0.004918	HAT
TCDZC111C	C	C1	3	1	22.42	1.130	0.1002	20	0.005009	HGM, HAT
TCDZC112C	C	C1	3	1	22.57	1.106	0.1000	20	0.005001	HAT
TCDZC113C	C	C1	3	1	23.50	1.119	0.1005	20	0.005027	HAT, HAB
TCDZC114C	C	C1	3	1	21.86	1.118	0.1006	20	0.005029	HAT, HAB
TCDZC211C	C	C2	3	2	22.79	1.138	0.09872	20	0.004936	HAT
TCDZC212C	C	C2	3	2	22.60	1.118	0.09913	20	0.004957	HGM, HAB
TCDZC213C	C	C2	3	2	23.38	1.128	0.09888	20	0.004944	HGM, HAT
TCDZC214C	C	C2	3	2	23.07	1.173	0.09905	20	0.004953	HAT

Average	22.78	1.098	0.004934
Standard Dev.	0.4422	0.03477	
Coeff. of Var. [%]	1.941	3.167	
Min.	21.86	1.030	0.004838
Max.	23.53	1.173	0.005029
Number of Spec.	20	20	20

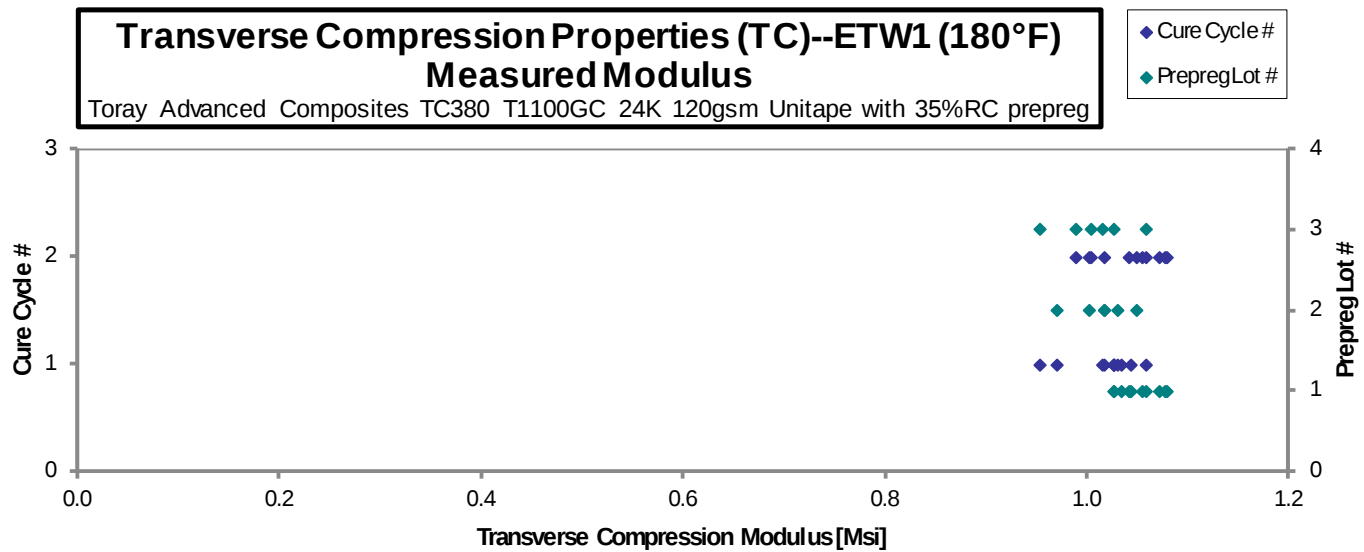
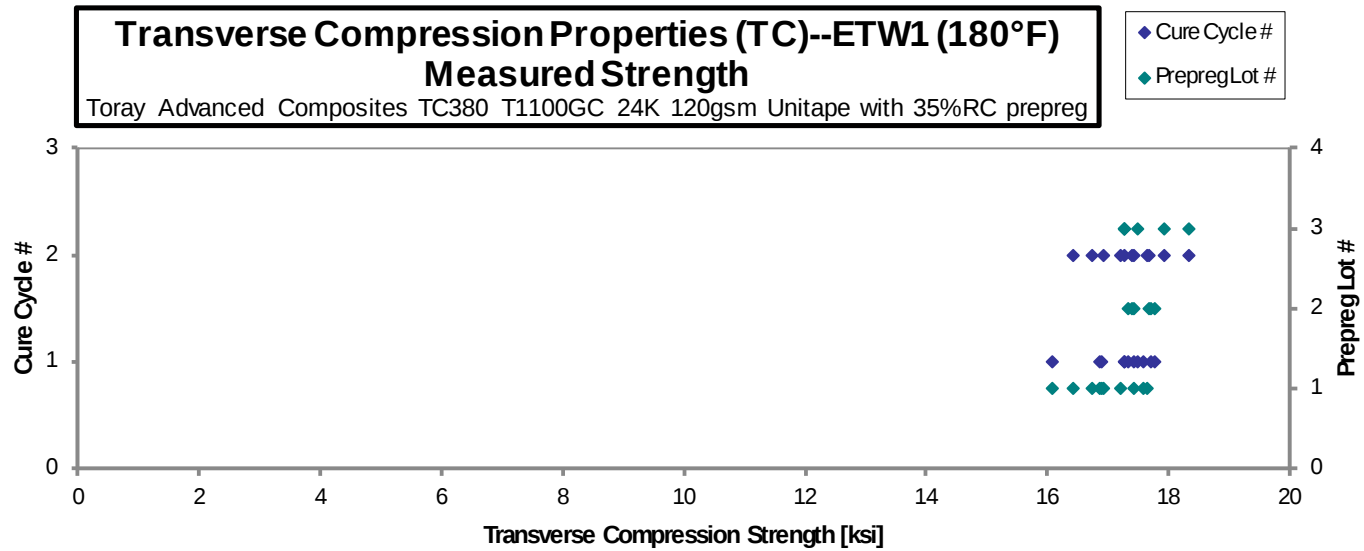


Transverse Compression Properties (TC)--ETW1 (180°F)
Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCDZA111D	A	C1	1	1	17.41	1.045	0.09767	20	0.004883	HAT
TCDZA112D	A	C1	1	1	17.58	1.035	0.09803	20	0.004902	HAT
TCDZA113D	A	C1	1	1	16.86	1.058	0.09847	20	0.004923	HAT
TCDZA114D	A	C1	1	1	16.06	1.027	0.09860	20	0.004930	BGM
TCDZA115D	A	C1	1	1	16.88	1.028	0.09853	20	0.004927	BGM
TCDZA211D	A	C2	1	2	17.64	1.072	0.09715	20	0.004858	HAT, HAB
TCDZA212D	A	C2	1	2	16.74	1.043	0.09730	20	0.004865	HAT
TCDZA213D	A	C2	1	2	16.93	1.080	0.09677	20	0.004838	HAT
TCDZA214D	A	C2	1	2	17.18	1.078	0.09707	20	0.004853	HGM
TCDZA215D	A	C2	1	2	16.40	1.056	0.09670	20	0.004835	BAT
TCDZB111D	B	C1	2	1	17.70	0.9716	0.09900	20	0.004950	HGM, HAT
TCDZB112D	B	C1	2	1	17.32	1.019	0.09937	20	0.004968	HGM, HAB
TCDZB113D	B	C1	2	1	17.75	1.031	0.09925	20	0.004963	HGM, HAB
TCDZB211D	B	C2	2	2	17.43	1.018	0.09818	20	0.004909	BGM, HAT
TCDZB212D	B	C2	2	2	17.66	1.051	0.09793	20	0.004897	BGM, HAT
TCDZB213D	B	C2	2	2	17.39	1.003	0.09778	20	0.004889	BGM, HAT
TCDZC111D	C	C1	3	1	17.25	1.027	0.1003	20	0.005015	HGM
TCDZC112D	C	C1	3	1	17.48	0.9537	0.1008	20	0.005039	BGM, HAB
TCDZC113D	C	C1	3	1	17.27	1.016	0.1006	20	0.005029	BGM, HAT
TCDZC211D	C	C2	3	2	17.26	1.059	0.09927	20	0.004963	HGM
TCDZC212D	C	C2	3	2	18.32	1.005	0.09953	20	0.004977	HGM
TCDZC213D	C	C2	3	2	17.92	0.9893	0.09898	20	0.004949	HGM

Average	17.29	1.030	0.004926
Standard Dev.	0.5055	0.03275	
Coeff. of Var. [%]	2.923	3.179	
Min.	16.06	0.9537	0.004835
Max.	18.32	1.080	0.005039
Number of Spec.	22	22	22

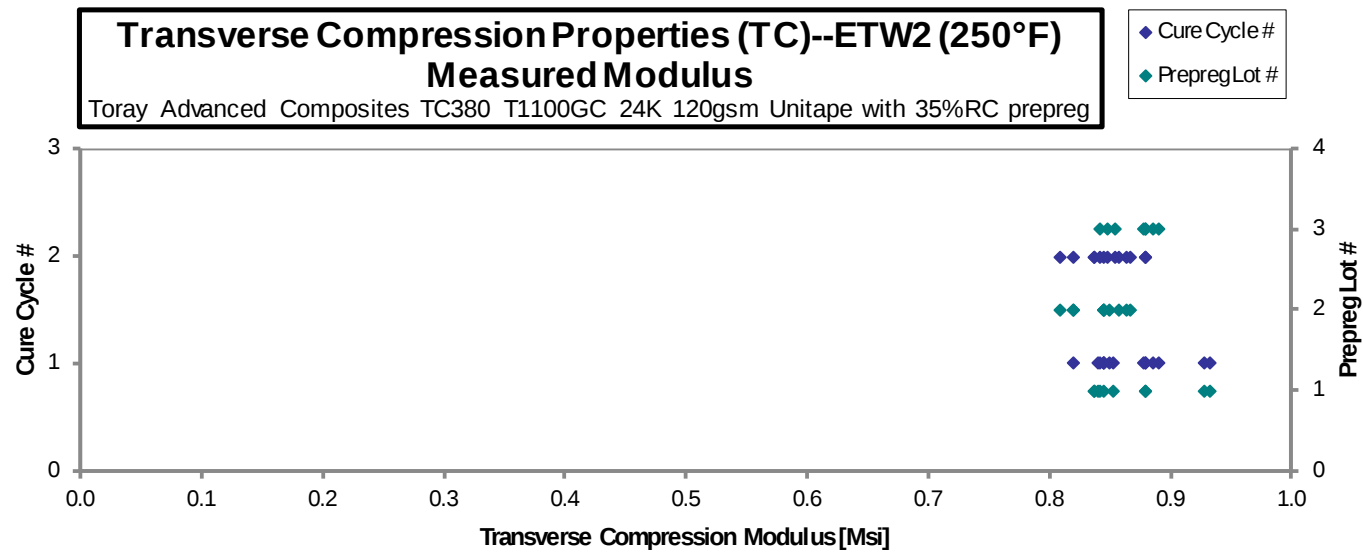
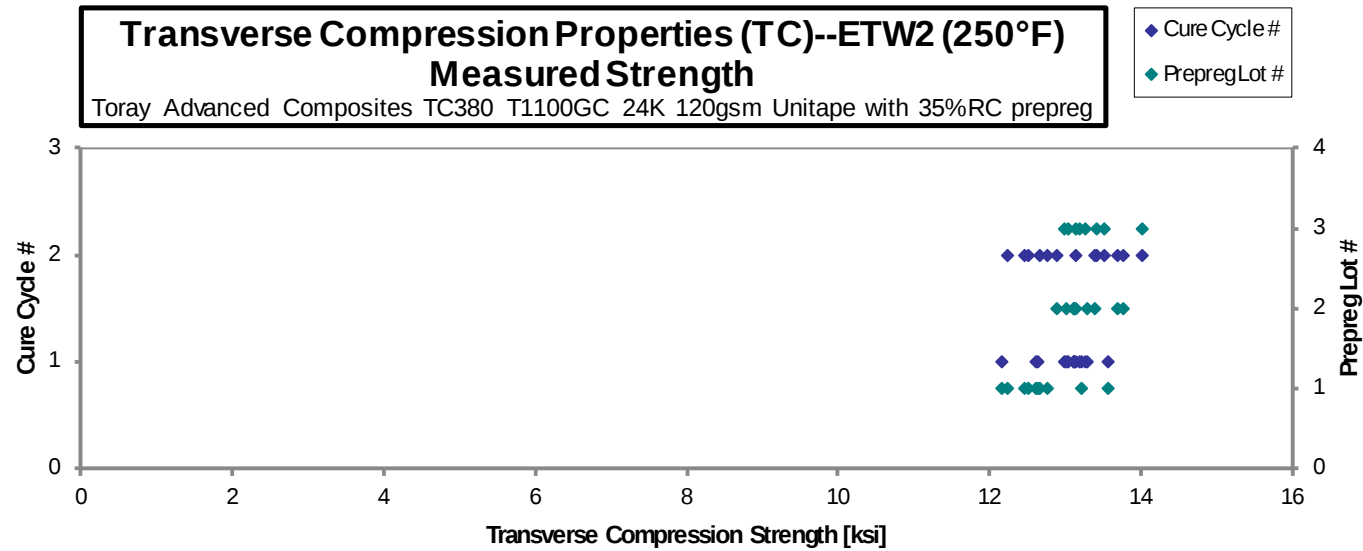


Transverse Compression Properties (TC)--ETW2 (250°F)
Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDZA114E	A	C1	1	1	13.56	0.9332	0.09607	20	0.004803	HAT
TCDZA115E	A	C1	1	1	13.21	0.9284	0.09440	20	0.004720	HGM
TCDZA116E	A	C1	1	1	12.17	0.8410	0.09922	20	0.004961	HGM
TCDZA117E	A	C1	1	1	12.61	0.8417	0.09950	20	0.004975	HAT
TCDZA118E	A	C1	1	1	12.63	0.8525	0.09910	20	0.004955	HAT
TCDZA214E	A	C2	1	2	12.23	0.8792	0.09730	20	0.004865	HGM
TCDZA215E	A	C2	1	2	12.46	0.8800	0.09730	20	0.004865	HGM
TCDZA216E	A	C2	1	2	12.77	0.8371	0.09898	20	0.004949	HGM
TCDZA217E	A	C2	1	2	12.52	0.8456	0.09917	20	0.004958	HAT
TCDZA218E	A	C2	1	2	12.66	0.8378	0.09857	20	0.004928	HAT
TCDZB111E	B	C1	2	1	13.28	0.8201	0.09893	20	0.004947	HGM
TCDZB112E	B	C1	2	1	13.12	0.8446	0.09890	20	0.004945	HGM
TCDZB113E	B	C1	2	1	13.12	0.8443	0.09915	20	0.004958	HGM
TCDZB114E	B	C1	2	1	13.00	0.8500	0.09913	20	0.004957	HGM
TCDZB115E	B	C1	2	1	13.11	0.8454	0.09895	20	0.004948	HGM
TCDZB211E	B	C2	2	2	13.68	0.8577	0.09818	20	0.004909	HGM
TCDZB212E	B	C2	2	2	12.89	0.8631	0.09733	20	0.004867	HGM
TCDZB213E	B	C2	2	2	13.13	0.8662	0.09738	20	0.004869	HGM
TCDZB214E	B	C2	2	2	13.39	0.8195	0.09797	20	0.004898	HGM
TCDZB215E	B	C2	2	2	13.77	0.8093	0.09910	20	0.004955	HGM
TCDZC111E	C	C1	3	1	13.26	0.8800	0.1006	20	0.005028	HGM
TCDZC112E	C	C1	3	1	13.14	0.8859	0.1004	20	0.005020	HGM
TCDZC113E	C	C1	3	1	13.20	0.8910	0.1004	20	0.005021	HGM
TCDZC114E	C	C1	3	1	12.99	0.8771	0.1004	20	0.005022	HGM
TCDZC115E	C	C1	3	1	13.05	0.8794	0.1008	20	0.005039	HGM
TCDZC211E	C	C2	3	2	14.02	0.8542	0.09920	20	0.004960	HGM
TCDZC212E	C	C2	3	2	13.52	0.8487	0.09900	20	0.004950	HGM
TCDZC213E	C	C2	3	2	13.42	0.8417	0.09928	20	0.004964	HGM

Average	13.07	0.8591	0.004937
Standard Dev.	0.4498	0.02893	
Coeff. of Var. [%]	3.442	3.368	
Min.	12.17	0.8093	0.004720
Max.	14.02	0.9332	0.005039
Number of Spec.	28	28	28

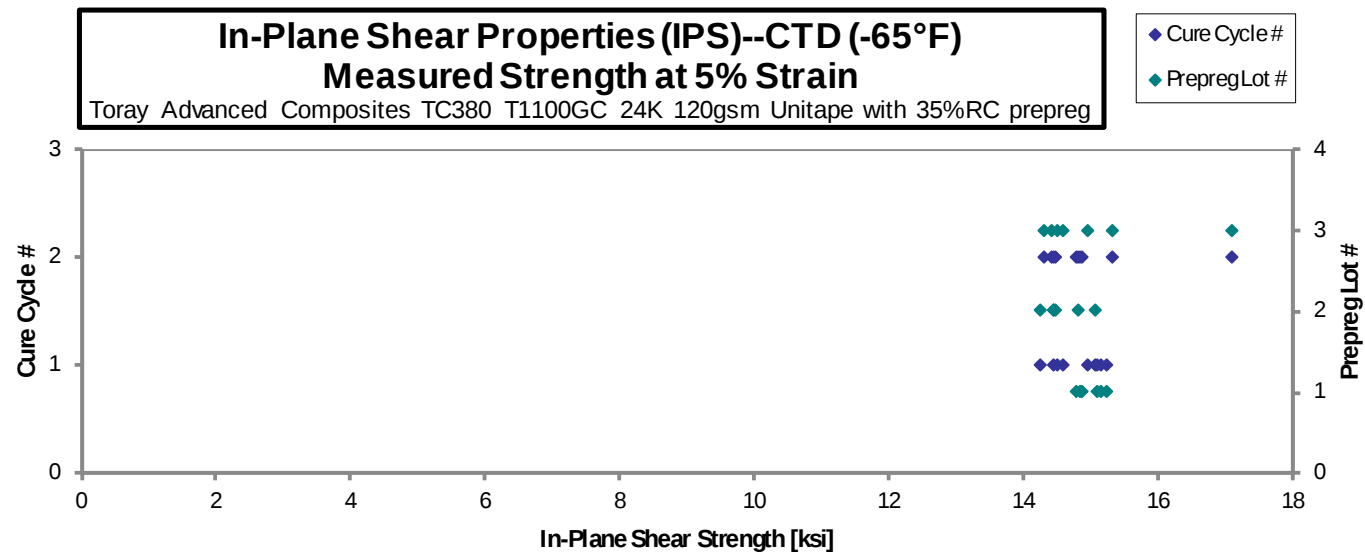
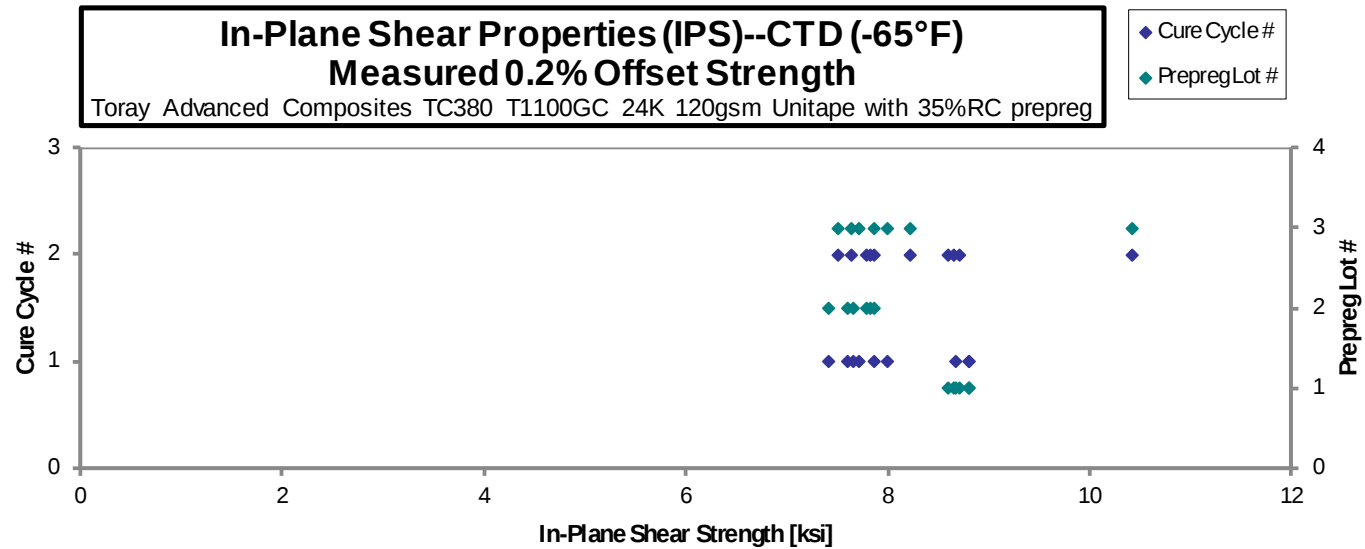


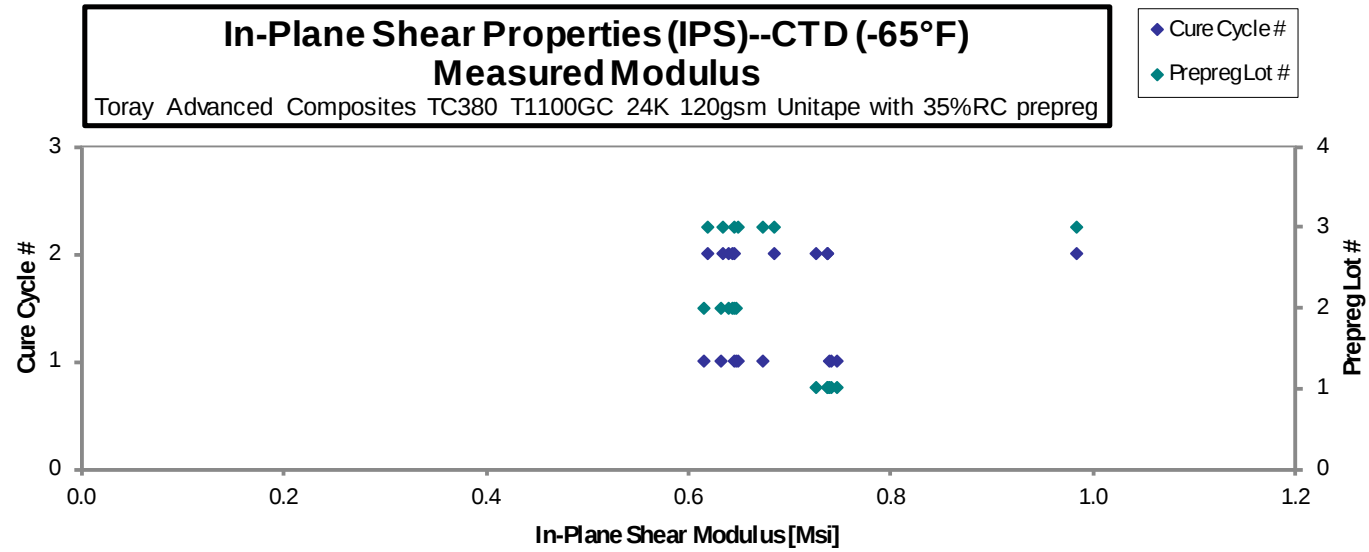
4.6 In-Plane Shear Properties (IPS)

In-Plane Shear Properties (IPS)--CTD (-65°F)										
Strength & Modulus										
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg										

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCDNA111B	A	C1	1	1	8.678	15.23	0.7406	0.07398	16	0.004624
TCDNA112B	A	C1	1	1	8.813	15.07	0.7420	0.07365	16	0.004603
TCDNA113B	A	C1	1	1	8.800	15.14	0.7474	0.07380	16	0.004613
TCDNA211B	A	C2	1	2	8.654	14.85	0.7378	0.07423	16	0.004640
TCDNA212B	A	C2	1	2	8.710	14.76	0.7379	0.07378	16	0.004611
TCDNA213B	A	C2	1	2	8.598	14.84	0.7269	0.07393	16	0.004621
TCDNB111B	B	C1	2	1	7.603	14.43	0.6329	0.07917	16	0.004948
TCDNB112B	B	C1	2	1	7.419	14.23	0.6154	0.07920	16	0.004950
TCDNB113B	B	C1	2	1	7.667	15.04	0.6481	0.07853	16	0.004908
TCDNB211B	B	C2	2	2	7.858	14.81	0.6461	0.07700	16	0.004813
TCDNB212B	B	C2	2	2	7.795	14.42	0.6399	0.07693	16	0.004808
TCDNB213B	B	C2	2	2	7.831	14.46	0.6434	0.07675	16	0.004797
TCDNC111B	C	C1	3	1	7.718	14.49	0.6469	0.08063	16	0.005040
TCDNC112B	C	C1	3	1	7.866	14.57	0.6493	0.08060	16	0.005038
TCDNC113B	C	C1	3	1	8.001	14.94	0.6752	0.07970	16	0.004981
TCDNC211B	C	C2	3	2	7.514	14.29	0.6202	0.07817	16	0.004885
TCDNC212B	C	C2	3	2	7.648	14.39	0.6344	0.07807	16	0.004879
TCDNC213B	C	C2	3	2	10.42	17.08	0.9841	0.07787	16	0.004867
TCDNC214B	C	C2	3	2	8.221	15.30	0.6849	0.07562	16	0.004726

Average	8.201	14.86	0.6923	0.004808
Standard Dev.	0.7204	0.6309	0.08493	
Coeff. of Var. [%]	8.785	4.245	12.27	
Min.	7.419	14.23	0.6154	0.004603
Max.	10.42	17.08	0.9841	0.005040
Number of Spec.	19	19	19	19



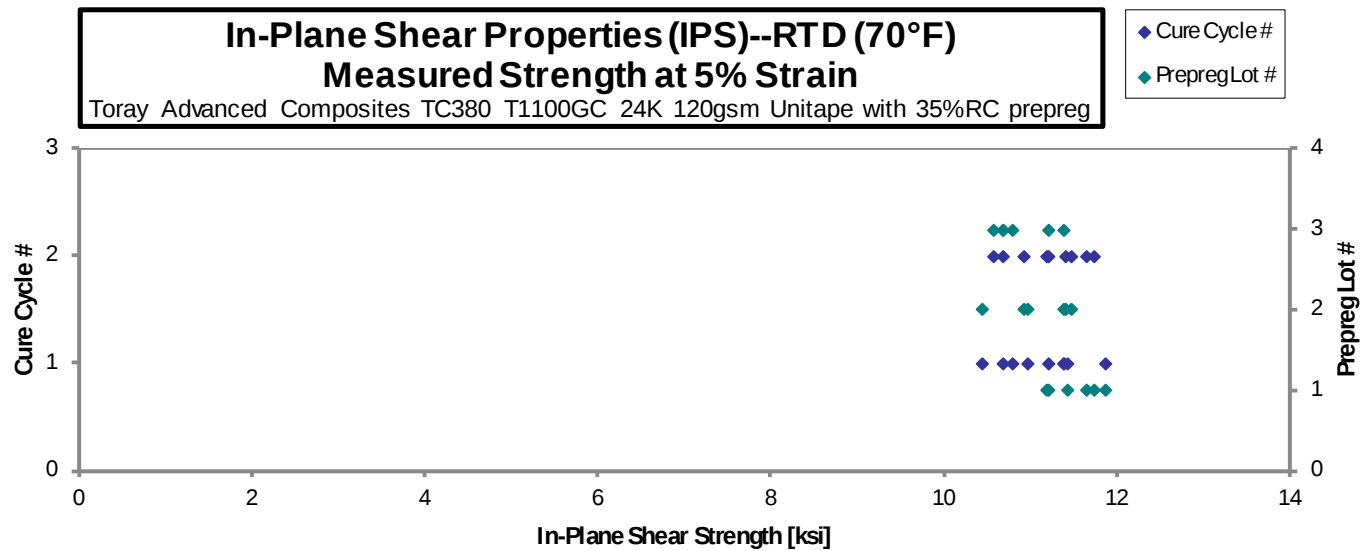
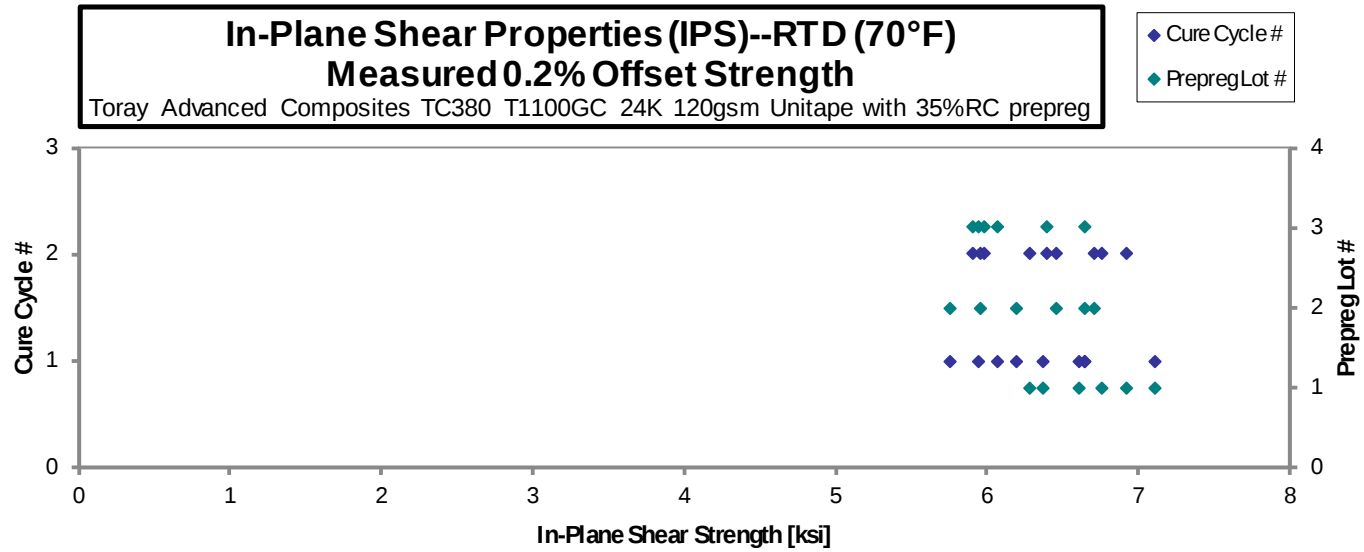


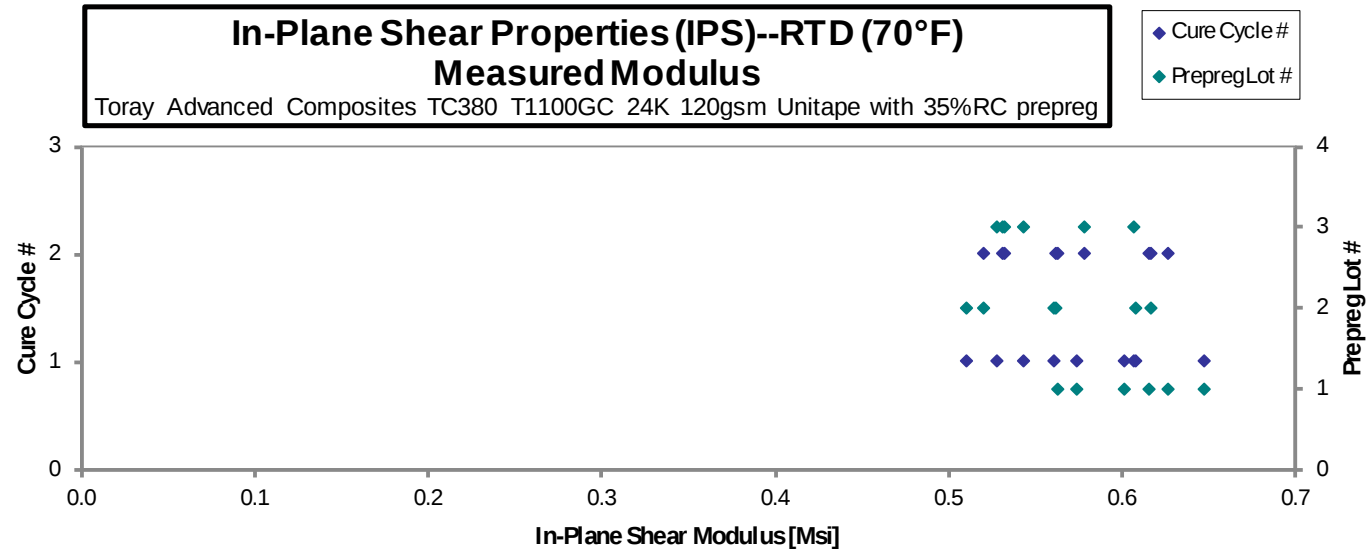
**In-Plane Shear Properties (IPS)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCDNA111A	A	C1	1	1	7.109	11.87	0.6475	0.07153	16	0.004471
TCDNA112A	A	C1	1	1	6.605	11.43	0.6019	0.07385	16	0.004616
TCDNA113A	A	C1	1	1	6.362	11.20	0.5746	0.07495	16	0.004684
TCDNA211A	A	C2	1	2	6.920	11.73	0.6274	0.07222	16	0.004514
TCDNA212A	A	C2	1	2	6.758	11.65	0.6156	0.07418	16	0.004636
TCDNA213A	A	C2	1	2	6.273	11.17	0.5629	0.07503	16	0.004690
TCDNB111A	B	C1	2	1	6.635	11.37	0.6078	0.07040	16	0.004400
TCDNB112A	B	C1	2	1	6.186	10.96	0.5615	0.07487	16	0.004679
TCDNB113A	B	C1	2	1	5.754	10.44	0.5112	0.07900	16	0.004938
TCDNB211A	B	C2	2	2	6.702	11.39	0.6173	0.06942	16	0.004339
TCDNB212A	B	C2	2	2	6.450	11.46	0.5624	0.07315	16	0.004572
TCDNB213A	B	C2	2	2	5.956	10.91	0.5203	0.07540	16	0.004713
TCDNC111A	C	C1	3	1	6.642	11.37	0.6072	0.07300	16	0.004563
TCDNC112A	C	C1	3	1	6.064	10.78	0.5441	0.07733	16	0.004833
TCDNC113A	C	C1	3	1	5.945	10.67	0.5280	0.07965	16	0.004978
TCDNC211A	C	C2	3	2	6.389	11.21	0.5785	0.07370	16	0.004606
TCDNC212A	C	C2	3	2	5.980	10.67	0.5330	0.07675	16	0.004797
TCDNC213A	C	C2	3	2	5.905	10.56	0.5316	0.07850	16	0.004906

Average	6.369	11.16	0.5740	0.004663
Standard Dev.	0.3874	0.4188	0.04105	
Coeff. of Var. [%]	6.083	3.753	7.152	
Min.	5.754	10.44	0.5112	0.004339
Max.	7.109	11.87	0.6475	0.004978
Number of Spec.	18	18	18	18



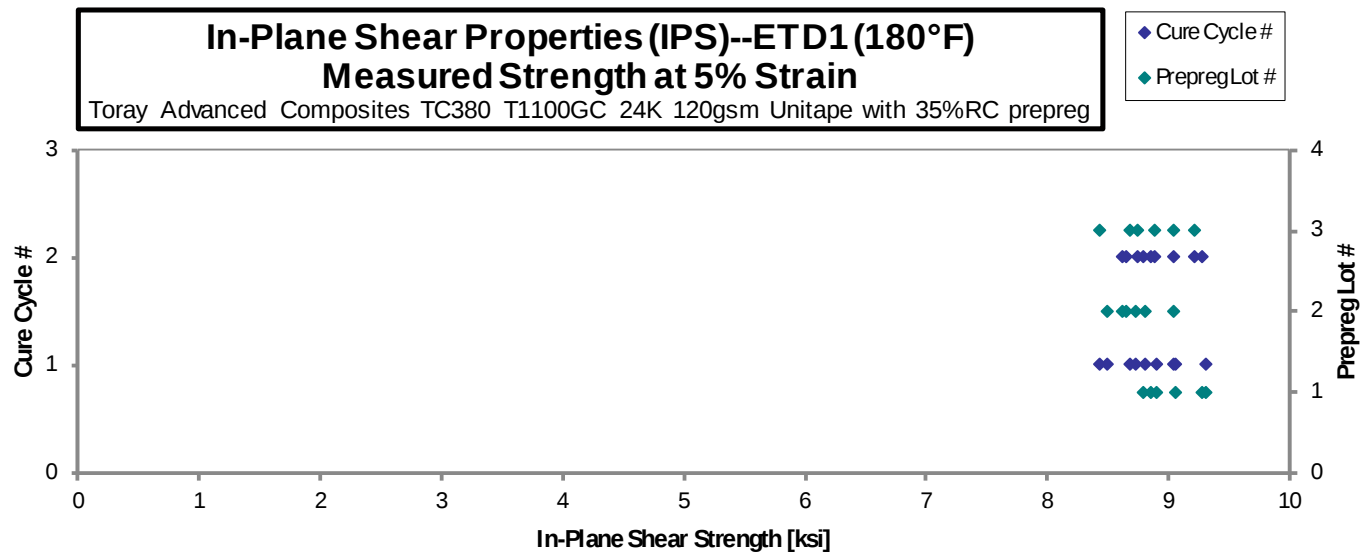
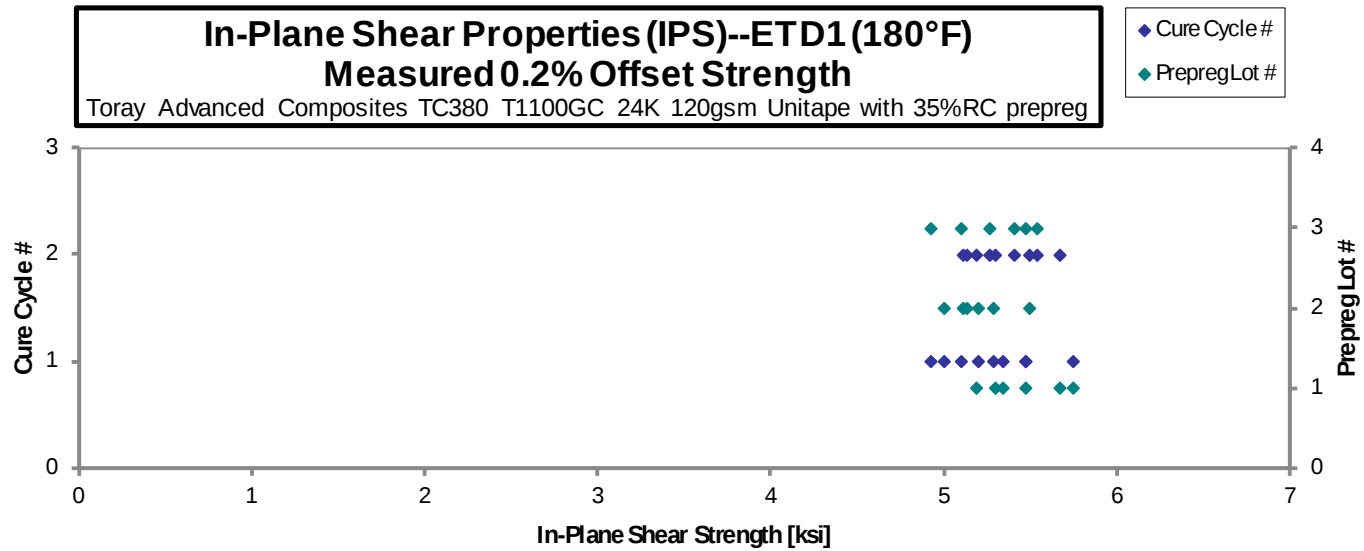


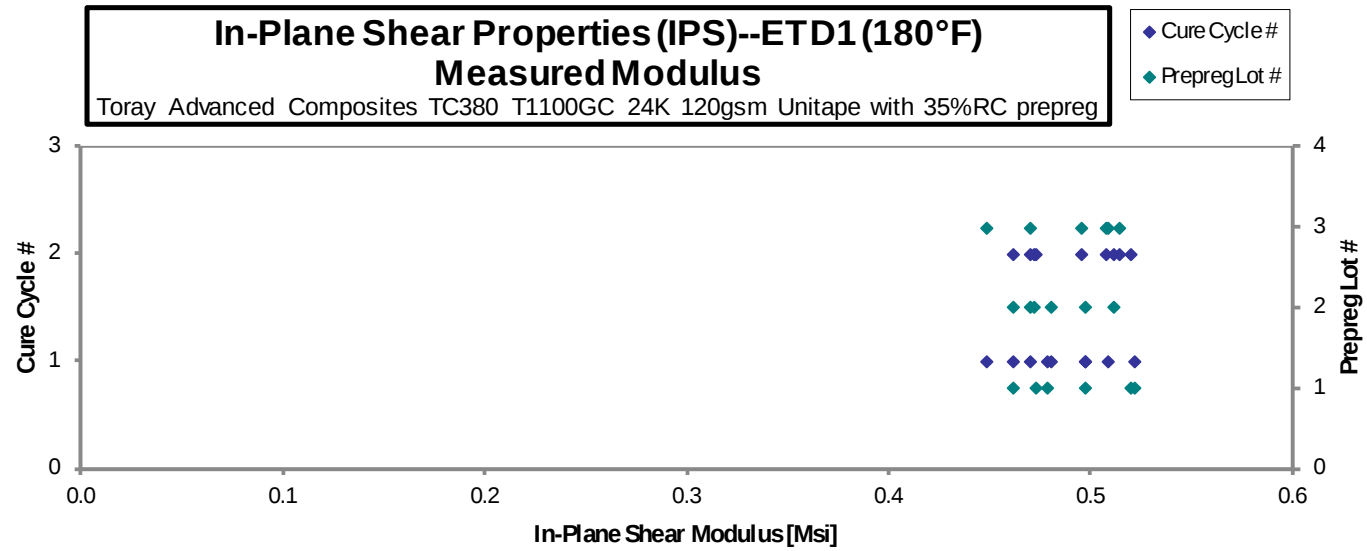
**In-Plane Shear Properties (IPS)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCDNA111C	A	C1	1	1	5.342	8.889	0.4789	0.07425	16	0.004641
TCDNA112C	A	C1	1	1	5.471	9.048	0.4970	0.07435	16	0.004647
TCDNA113C	A	C1	1	1	5.742	9.304	0.5218	0.07230	16	0.004519
TCDNA211C	A	C2	1	2	5.189	8.780	0.4618	0.07467	16	0.004667
TCDNA212C	A	C2	1	2	5.294	8.853	0.4729	0.07405	16	0.004628
TCDNA213C	A	C2	1	2	5.669	9.273	0.5201	0.07275	16	0.004547
TCDNB111C	B	C1	2	1	4.998	8.487	0.4615	0.07748	16	0.004843
TCDNB112C	B	C1	2	1	5.197	8.722	0.4803	0.07497	16	0.004685
TCDNB113C	B	C1	2	1	5.282	8.805	0.4976	0.07200	16	0.004500
TCDNB211C	B	C2	2	2	5.110	8.620	0.4698	0.07613	16	0.004758
TCDNB212C	B	C2	2	2	5.127	8.652	0.4716	0.07407	16	0.004629
TCDNB213C	B	C2	2	2	5.496	9.034	0.5116	0.07025	16	0.004391
TCDNC111C	C	C1	3	1	4.920	8.427	0.4481	0.08007	16	0.005004
TCDNC112C	C	C1	3	1	5.095	8.675	0.4699	0.07682	16	0.004801
TCDNC113C	C	C1	3	1	5.468	9.030	0.5082	0.07350	16	0.004594
TCDNC211C	C	C2	3	2	5.536	9.203	0.5142	0.07277	16	0.004548
TCDNC212C	C	C2	3	2	5.404	8.882	0.5071	0.07352	16	0.004595
TCDNC213C	C	C2	3	2	5.265	8.737	0.4953	0.07703	16	0.004815

Average	5.311	8.857	0.4882	0.004656
Standard Dev.	0.2251	0.2527	0.02261	
Coeff. of Var. [%]	4.239	2.854	4.632	
Min.	4.920	8.427	0.4481	0.004391
Max.	5.742	9.304	0.5218	0.005004
Number of Spec.	18	18	18	18



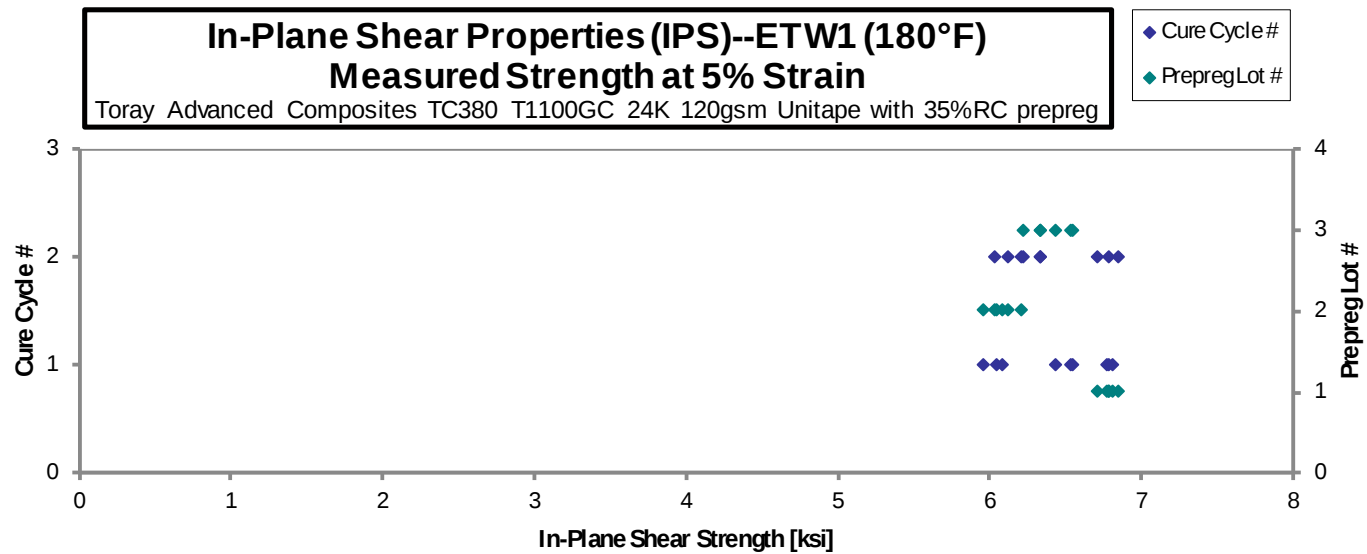
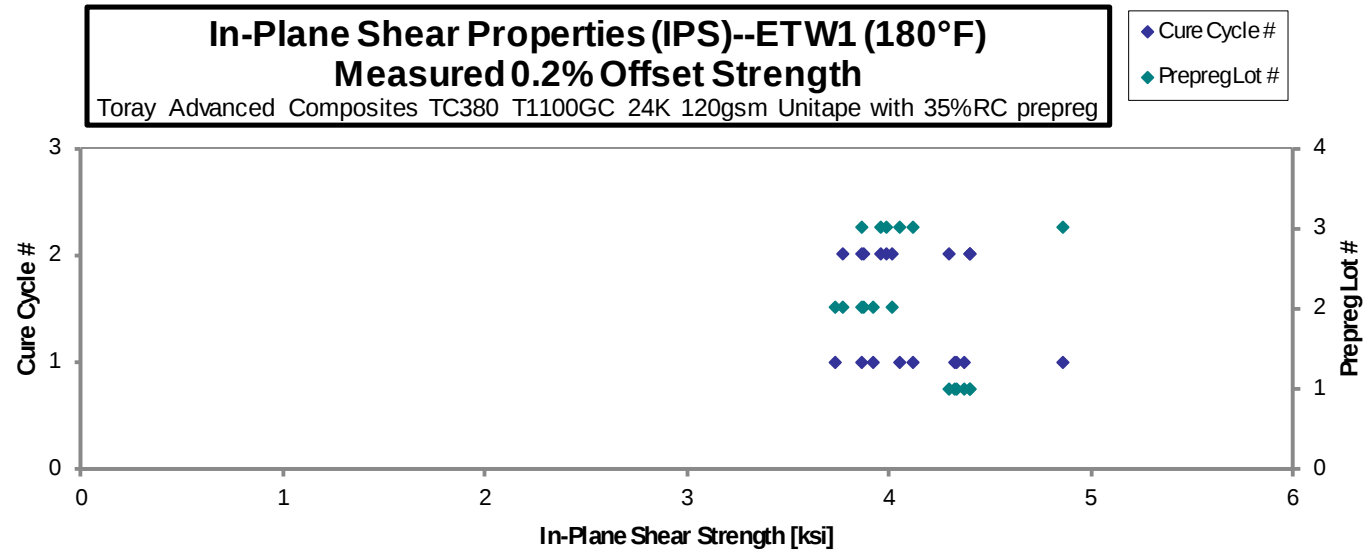


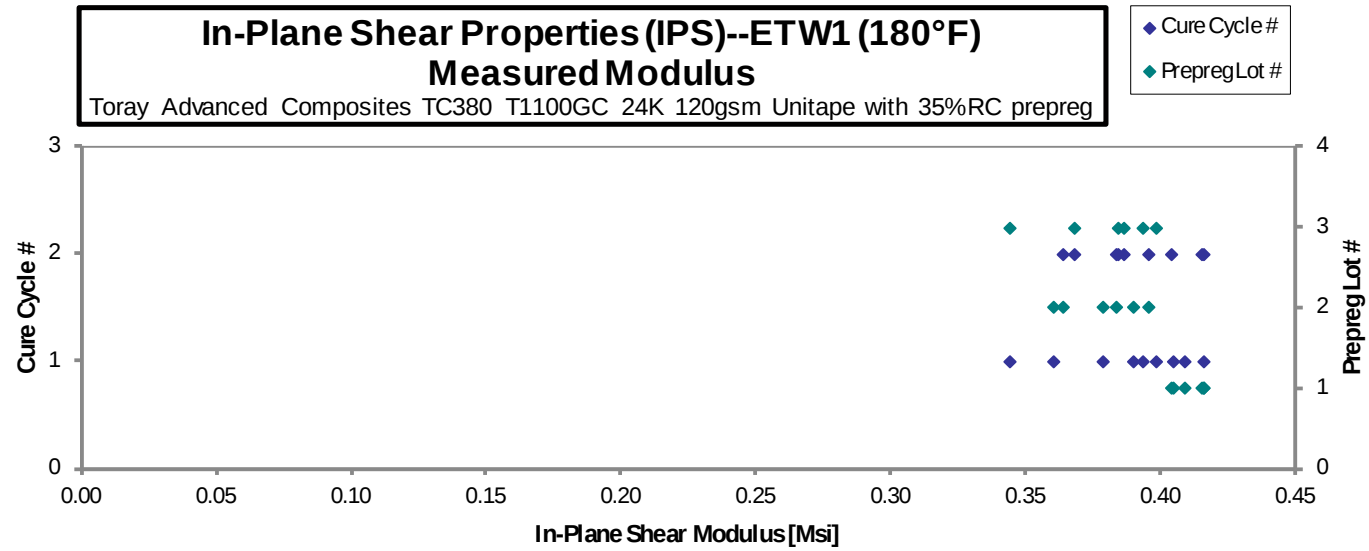
**In-Plane Shear Properties (IPS)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCDNA111D	A	C1	1	1	4.366	6.811	0.4168	0.07448	16	0.004655
TCDNA112D	A	C1	1	1	4.336	6.784	0.4094	0.07560	16	0.004725
TCDNA113D	A	C1	1	1	4.320	6.773	0.4054	0.07568	16	0.004730
TCDNA211D	A	C2	1	2	4.395	6.788	0.4157	0.07492	16	0.004682
TCDNA212D	A	C2	1	2	4.397	6.851	0.4167	0.07667	16	0.004792
TCDNA213D	A	C2	1	2	4.292	6.721	0.4046	0.07655	16	0.004784
TCDNB111D	B	C1	2	1	3.920	6.083	0.3905	0.07572	16	0.004732
TCDNB112D	B	C1	2	1	3.859	6.048	0.3790	0.07877	16	0.004923
TCDNB113D	B	C1	2	1	3.730	5.960	0.3606	0.08020	16	0.005013
TCDNB211D	B	C2	2	2	4.009	6.217	0.3957	0.07540	16	0.004713
TCDNB212D	B	C2	2	2	3.877	6.128	0.3838	0.07797	16	0.004873
TCDNB213D	B	C2	2	2	3.773	6.034	0.3643	0.07983	16	0.004990
TCDNC111D	C	C1	3	1	4.052	6.440	0.3938	0.07755	16	0.004847
TCDNC112D	C	C1	3	1	4.118	6.549	0.3988	0.07963	16	0.004977
TCDNC113D	C	C1	3	1	4.864	6.539	0.3445	0.08050	16	0.005031
TCDNC211D	C	C2	3	2	3.990	6.344	0.3868	0.07983	16	0.004990
TCDNC212D	C	C2	3	2	3.961	6.341	0.3847	0.08037	16	0.005023
TCDNC213D	C	C2	3	2	3.861	6.232	0.3685	0.08053	16	0.005033

Average	4.118	6.425	0.3900	0.004862
Standard Dev.	0.2919	0.3105	0.02073	
Coeff. of Var. [%]	7.088	4.832	5.315	
Min.	3.730	5.960	0.3445	0.004655
Max.	4.864	6.851	0.4168	0.005033
Number of Spec.	18	18	18	18



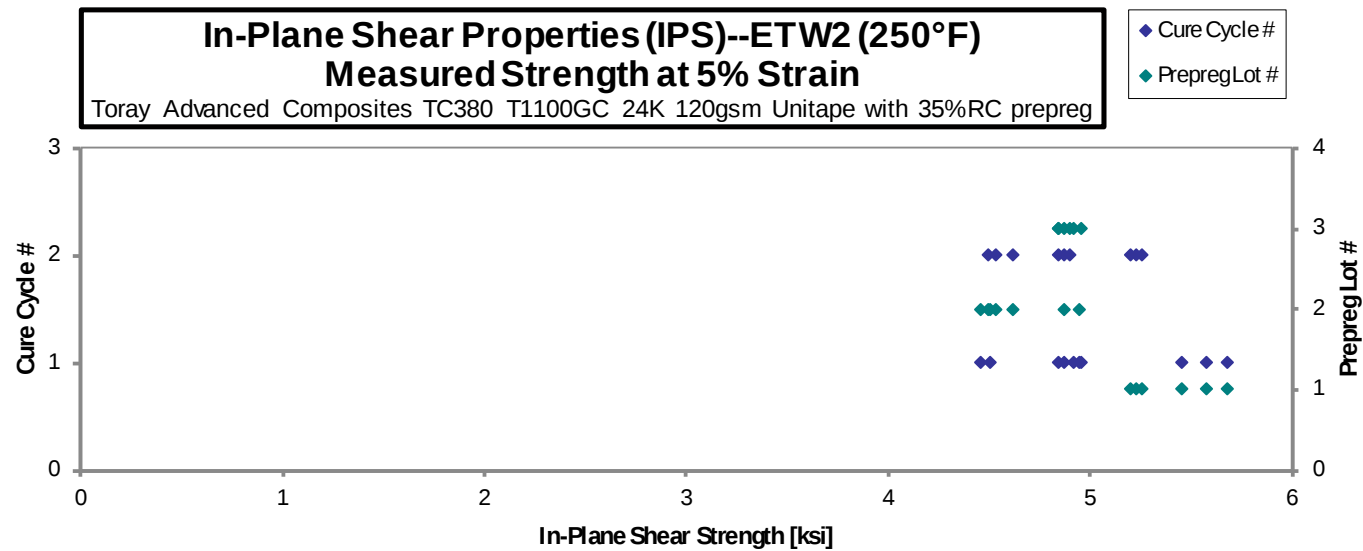
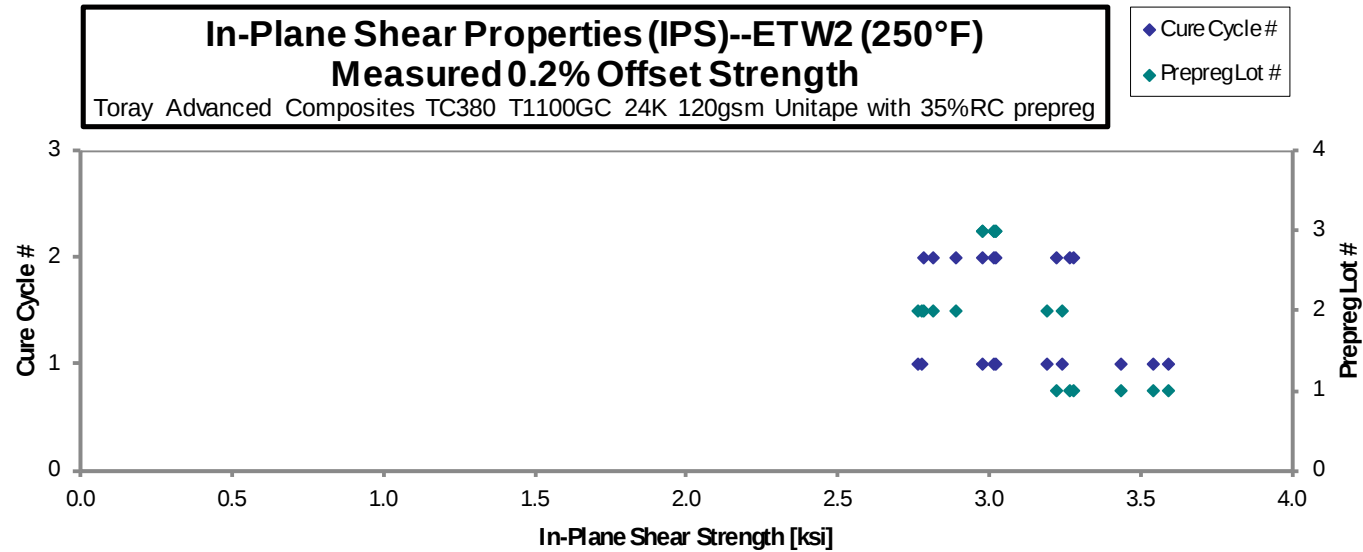


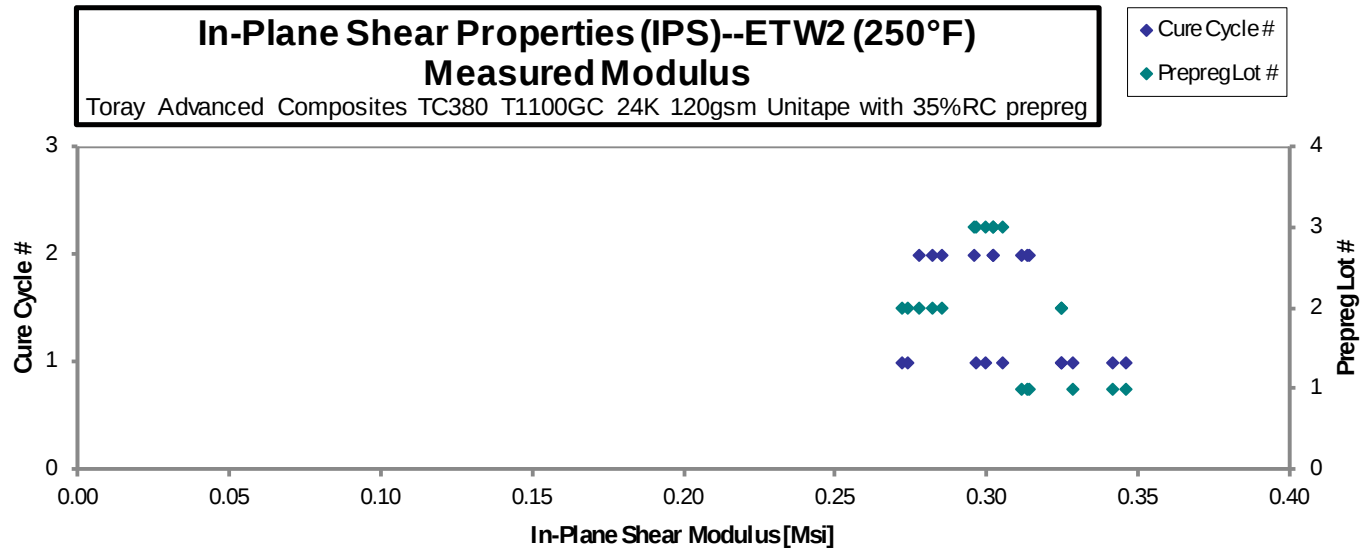
**In-Plane Shear Properties (IPS)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]
TCDNA111E	A	C1	1	1	3.544	5.580	0.3413	0.07527	16	0.004704
TCDNA112E	A	C1	1	1	3.434	5.458	0.3282	0.07528	16	0.004705
TCDNA113E	A	C1	1	1	3.595	5.681	0.3462	0.07500	16	0.004688
TCDNA211E	A	C2	1	2	3.276	5.224	0.3142	0.07560	16	0.004725
TCDNA212E	A	C2	1	2	3.224	5.201	0.3115	0.07602	16	0.004751
TCDNA213E	A	C2	1	2	3.269	5.254	0.3135	0.07595	16	0.004747
TCDNB111E	B	C1	2	1	2.780	4.461	0.2741	0.08135	16	0.005084
TCDNB112E	B	C1	2	1	2.764	4.507	0.2718	0.08102	16	0.005064
TCDNB114E	B	C1	2	1	3.240	4.943	0.3245	0.07722	16	0.004826
TCDNB115E	B	C1	2	1	3.192	4.876	0.3247	0.07307	16	0.004567
TCDNB211E	B	C2	2	2	2.783	4.492	0.2779	0.08002	16	0.005001
TCDNB212E	B	C2	2	2	2.890	4.615	0.2850	0.07978	16	0.004986
TCDNB213E	B	C2	2	2	2.812	4.536	0.2819	0.07928	16	0.004955
TCDNC111E	C	C1	3	1	2.977	4.844	0.2965	0.08017	16	0.005010
TCDNC112E	C	C1	3	1	3.022	4.958	0.3053	0.08020	16	0.005013
TCDNC113E	C	C1	3	1	3.017	4.918	0.2995	0.07950	16	0.004969
TCDNC211E	C	C2	3	2	2.981	4.842	0.2960	0.08078	16	0.005049
TCDNC212E	C	C2	3	2	3.023	4.897	0.3023	0.07930	16	0.004956
TCDNC213E	C	C2	3	2	3.018	4.868	0.3018	0.07738	16	0.004836

Average	3.097	4.956	0.3051	0.004876
Standard Dev.	0.2532	0.3642	0.02166	
Coeff. of Var. [%]	8.177	7.350	7.100	
Min.	2.764	4.461	0.2718	0.004567
Max.	3.595	5.681	0.3462	0.005084
Number of Spec.	19	19	19	19



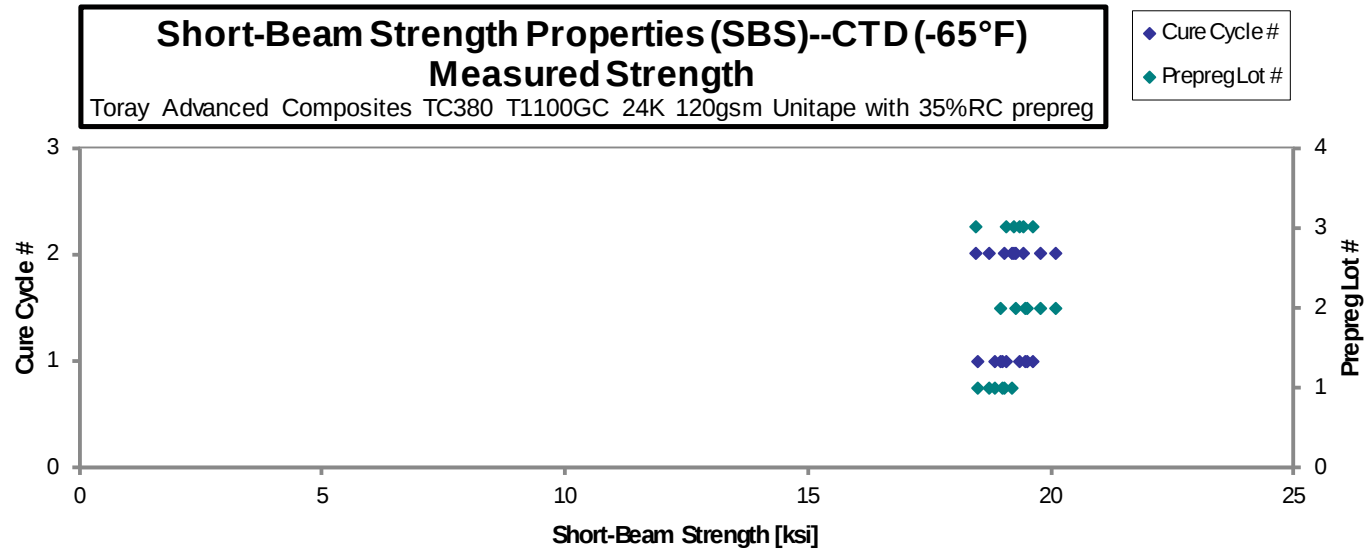


4.7 Lamina Short-Beam Strength Properties (SBS)

Short-Beam Strength Properties (SBS)--CTD (-65°F) Strength	
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg	

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDQA111B	A	C1	1	1	18.51	0.1511	32	0.004721	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA112B	A	C1	1	1	18.87	0.1503	32	0.004696	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA113B	A	C1	1	1	19.02	0.1497	32	0.004679	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA211B	A	C2	1	2	18.75	0.1444	32	0.004514	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA212B	A	C2	1	2	19.20	0.1449	32	0.004528	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA213B	A	C2	1	2	19.07	0.1454	32	0.004544	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB111B	B	C1	2	1	19.48	0.1420	32	0.004439	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB112B	B	C1	2	1	19.52	0.1427	32	0.004458	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB113B	B	C1	2	1	18.98	0.1425	32	0.004453	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB211B	B	C2	2	2	19.28	0.1413	32	0.004417	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB212B	B	C2	2	2	20.11	0.1417	32	0.004429	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB213B	B	C2	2	2	19.82	0.1427	32	0.004459	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC111B	C	C1	3	1	19.67	0.1481	32	0.004628	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC112B	C	C1	3	1	19.10	0.1486	32	0.004643	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC113B	C	C1	3	1	19.35	0.1486	32	0.004644	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC211B	C	C2	3	2	18.46	0.1470	32	0.004594	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC212B	C	C2	3	2	19.24	0.1480	32	0.004626	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC213B	C	C2	3	2	19.43	0.1485	32	0.004639	INTERLAMINAR SHEAR, INELASTIC DEFORMATION

Average	19.21	0.004562
Standard Dev.	0.4296	
Coeff. of Var. [%]	2.236	
Min.	18.46	0.004417
Max.	20.11	0.004721
Number of Spec.	18	18

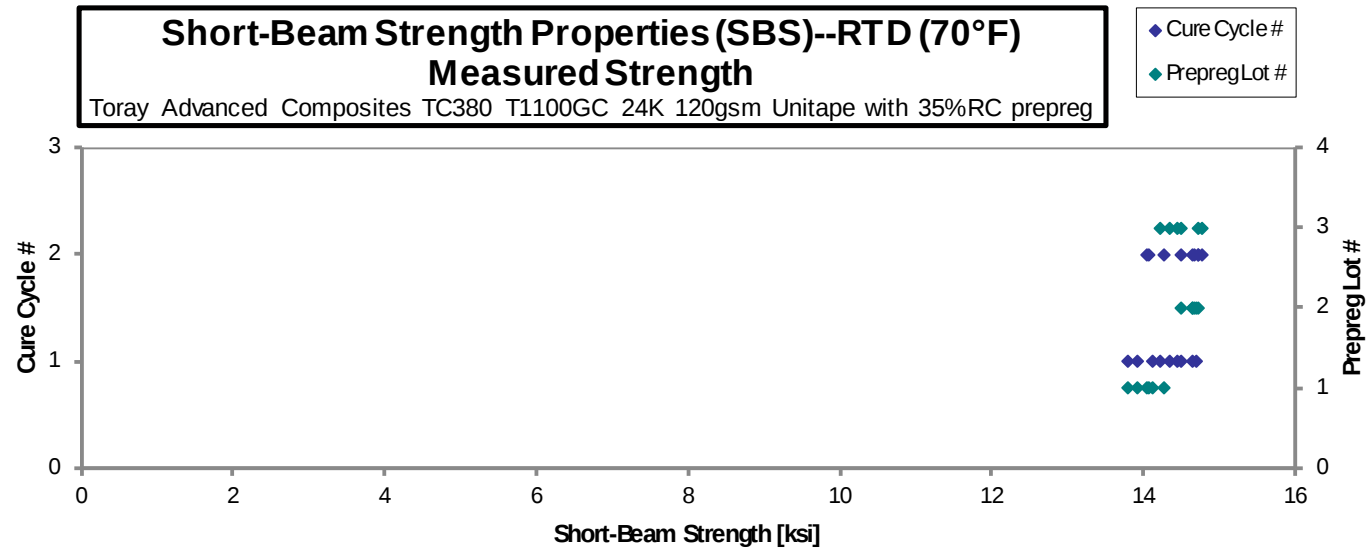


**Short-Beam Strength Properties (SBS)--RTD (70°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDQA112A	A	C1	1	1	13.81	0.1462	32	0.004570	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA113A	A	C1	1	1	14.12	0.1490	32	0.004655	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA114A	A	C1	1	1	13.92	0.1507	32	0.004708	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA211A	A	C2	1	2	14.06	0.1387	32	0.004334	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA212A	A	C2	1	2	14.08	0.1404	32	0.004388	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA213A	A	C2	1	2	14.28	0.1418	32	0.004432	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB111A	B	C1	2	1	14.66	0.1389	32	0.004341	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB112A	B	C1	2	1	14.70	0.1394	32	0.004356	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB113A	B	C1	2	1	14.52	0.1407	32	0.004396	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB212A	B	C2	2	2	14.67	0.1387	32	0.004335	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB213A	B	C2	2	2	14.73	0.1401	32	0.004379	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB214A	B	C2	2	2	14.65	0.1406	32	0.004393	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC112A	C	C1	3	1	14.46	0.1471	32	0.004595	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC113A	C	C1	3	1	14.37	0.1457	32	0.004552	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC114A	C	C1	3	1	14.22	0.1474	32	0.004605	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC211A	C	C2	3	2	14.52	0.1409	32	0.004404	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC212A	C	C2	3	2	14.72	0.1428	32	0.004463	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC213A	C	C2	3	2	14.79	0.1449	32	0.004528	INTERLAMINAR SHEAR, INELASTIC DEFORMATION

Average	14.40	0.004468
Standard Dev.	0.3081	
Coeff. of Var. [%]	2.139	
Min.	13.81	0.004334
Max.	14.79	0.004708
Number of Spec.	18	18

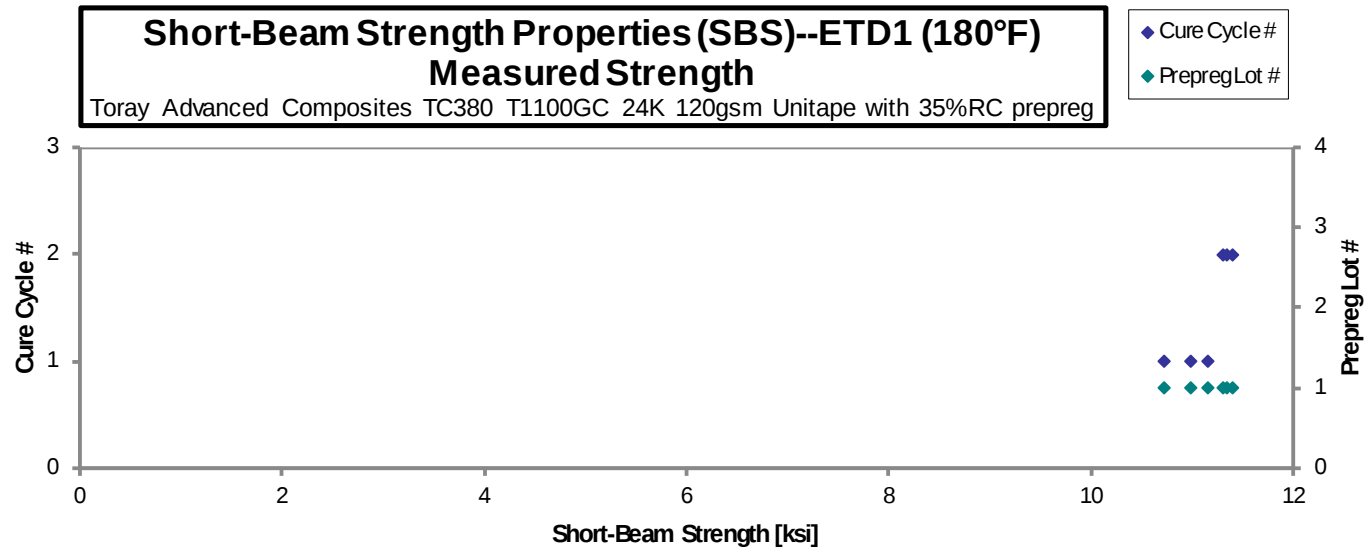


**Short-Beam Strength Properties (SBS)--ETD1 (180°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
TCDQA111C	A	C1	1	1	11.16	0.1495	32	0.004671	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA112C	A	C1	1	1	10.72	0.1487	32	0.004646	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA113C	A	C1	1	1	10.98	0.1492	32	0.004663	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA211C	A	C2	1	2	11.35	0.1459	32	0.004558	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA212C	A	C2	1	2	11.31	0.1459	32	0.004560	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA213C	A	C2	1	2	11.41	0.1457	32	0.004554	INTERLAMINAR SHEAR, INELASTIC DEFORMATION

Average	11.15	0.004609
Standard Dev.	0.2616	
Coeff. of Var. [%]	2.345	
Min.	10.72	0.004554
Max.	11.41	0.004671
Number of Spec.	6	6

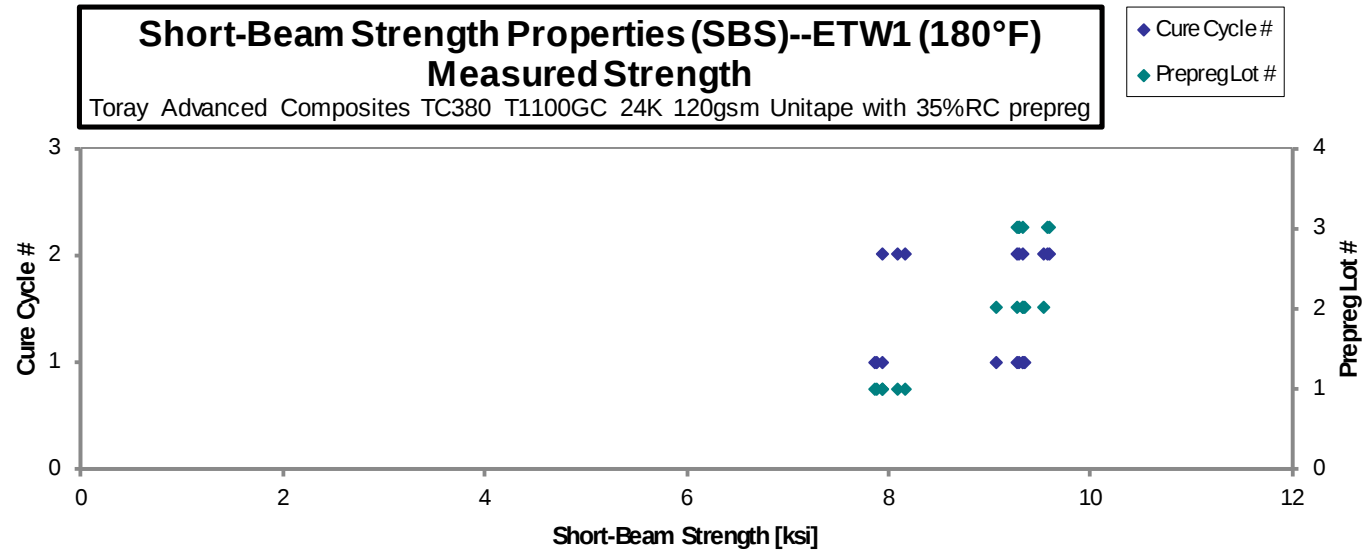


**Short-Beam Strength Properties (SBS)--ETW1 (180°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDQA111D	A	C1	1	1	7.879	0.1502	32	0.004693	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA112D	A	C1	1	1	7.939	0.1503	32	0.004698	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA113D	A	C1	1	1	7.866	0.1502	32	0.004694	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA212D	A	C2	1	2	8.159	0.1467	32	0.004585	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA213D	A	C2	1	2	8.090	0.1480	32	0.004626	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA214D	A	C2	1	2	7.931	0.1492	32	0.004663	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB111D	B	C1	2	1	9.340	0.1431	32	0.004472	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB112D	B	C1	2	1	9.056	0.1426	32	0.004457	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB113D	B	C1	2	1	9.329	0.1425	32	0.004454	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB211D	B	C2	2	2	9.528	0.1436	32	0.004486	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB212D	B	C2	2	2	9.270	0.1437	32	0.004491	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQB213D	B	C2	2	2	9.327	0.1440	32	0.004499	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC113D	C	C1	3	1	9.333	0.1472	32	0.004600	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC114D	C	C1	3	1	9.269	0.1472	32	0.004598	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC115D	C	C1	3	1	9.283	0.1459	32	0.004560	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC211D	C	C2	3	2	9.571	0.1462	32	0.004569	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC212D	C	C2	3	2	9.590	0.1456	32	0.004549	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC213D	C	C2	3	2	9.295	0.1448	32	0.004523	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION

Average	8.892	0.004568
Standard Dev.	0.6794	
Coeff. of Var. [%]	7.641	
Min.	7.866	0.004454
Max.	9.590	0.004698
Number of Spec.	18	18

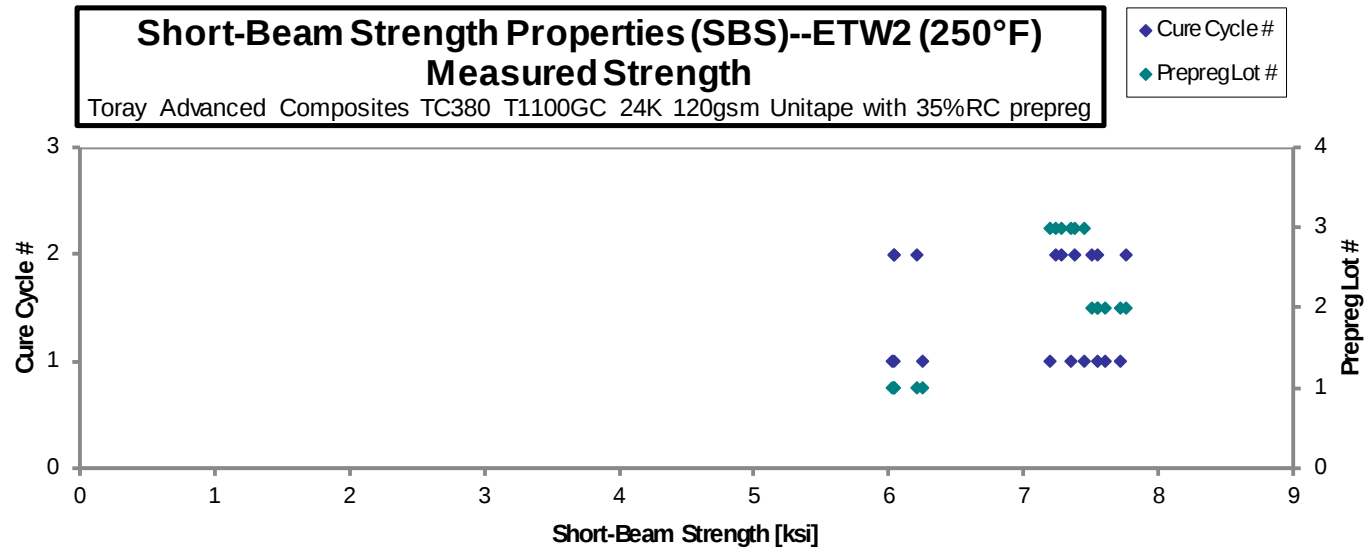


**Short-Beam Strength Properties (SBS)--ETW2 (250°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDQA111E	A	C1	1	1	6.249	0.1517	32	0.004741	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA113E	A	C1	1	1	6.045	0.1468	32	0.004586	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA114E	A	C1	1	1	6.026	0.1502	32	0.004693	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA211E	A	C2	1	2	6.043	0.1506	32	0.004707	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA212E	A	C2	1	2	6.050	0.1514	32	0.004731	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA213E	A	C2	1	2	6.216	0.1515	32	0.004733	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB111E	B	C1	2	1	7.607	0.1406	32	0.004395	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB112E	B	C1	2	1	7.717	0.1399	32	0.004373	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB113E	B	C1	2	1	7.554	0.1394	32	0.004355	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB211E	B	C2	2	2	7.552	0.1436	32	0.004489	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQB212E	B	C2	2	2	7.509	0.1434	32	0.004480	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQB213E	B	C2	2	2	7.760	0.1428	32	0.004463	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC111E	C	C1	3	1	7.195	0.1454	32	0.004545	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC112E	C	C1	3	1	7.452	0.1443	32	0.004509	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQC113E	C	C1	3	1	7.358	0.1431	32	0.004470	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQC211E	C	C2	3	2	7.280	0.1489	32	0.004653	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQC212E	C	C2	3	2	7.246	0.1493	32	0.004666	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQC213E	C	C2	3	2	7.381	0.1485	32	0.004639	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION

Average	7.013	0.004568
Standard Dev.	0.6790	
Coeff. of Var. [%]	9.682	
Min.	6.026	0.004355
Max.	7.760	0.004741
Number of Spec.	18	18



4.8 “25/50/25” Unnotched Tension 1 Properties (UNT1)

Laminate Unnotched Tension Properties (UNT1)--CTD (-65°F)
Strength & Modulus

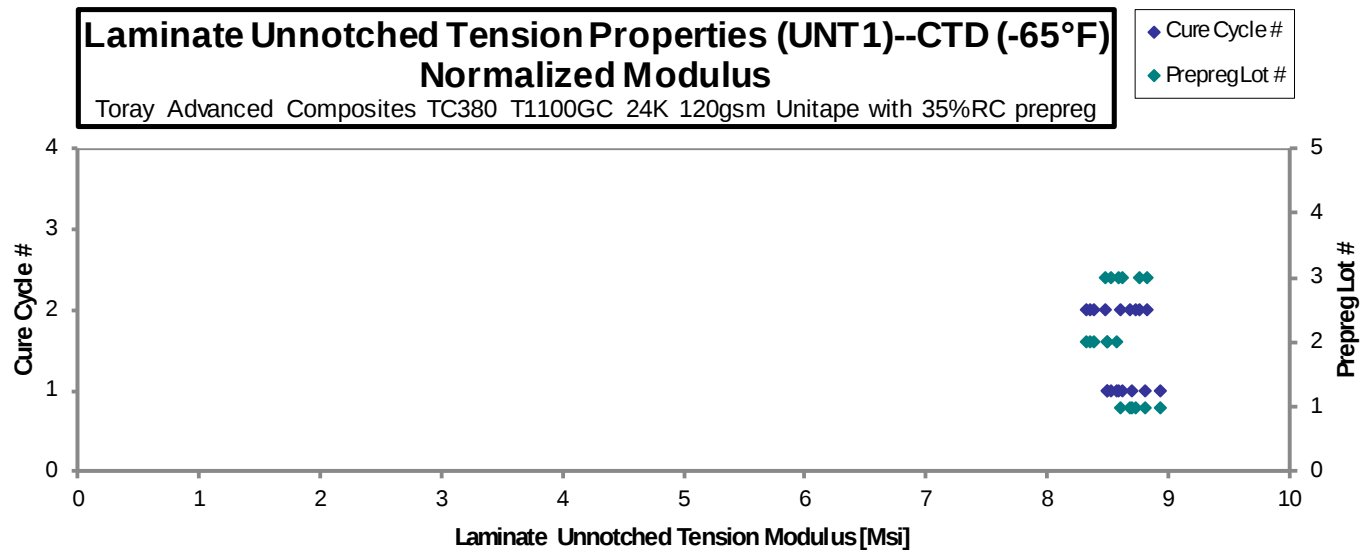
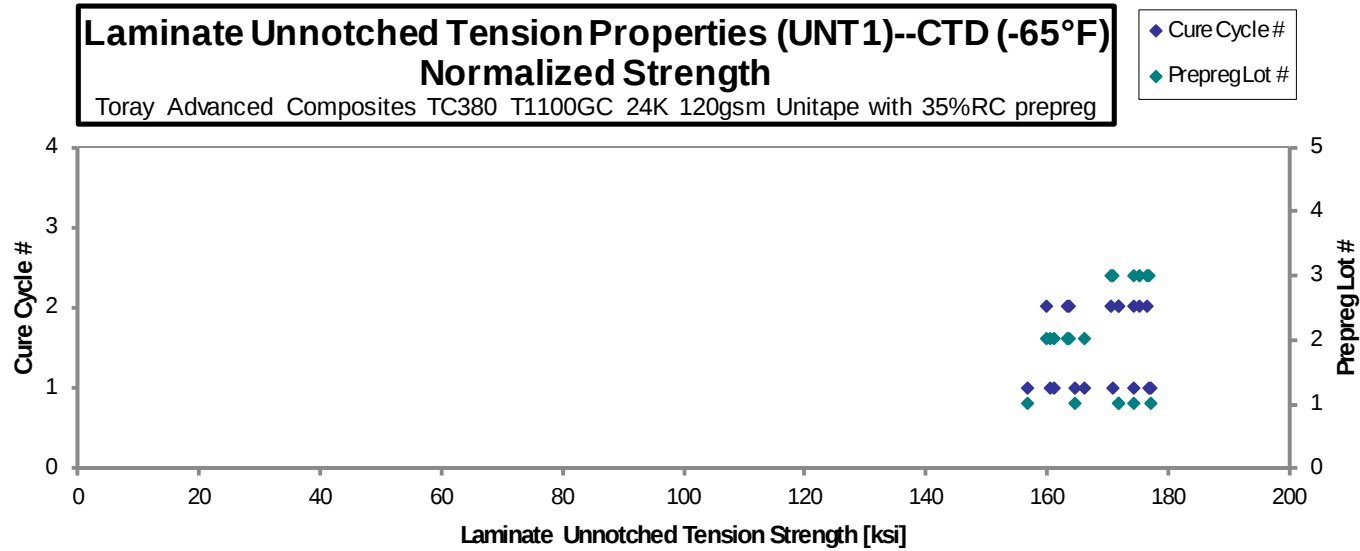
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing
 t_{ply} [in]
 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCDAA111B	A	C1	1	1	182.4	9.198	0.1118	24	M(A,D)GT	0.004658	177.0	8.926
TCDAA112B	A	C1	1	1	169.8	9.081	0.1116	24	M(D,L)WT, M(A,D)GB	0.004651	164.5	8.800
TCDAA113B	A	C1	1	1	161.7	8.971	0.1117	24	M(A,D,L)GB	0.004652	156.7	8.694
TCDAA211B	A	C2	1	2	175.0	8.714	0.1148	24	M(A,D)WT, M(A,D)GB	0.004782	174.3	8.681
TCDAA212B	A	C2	1	2	173.0	8.799	0.1143	24	M(A,D)WT, M(A,D)GM	0.004760	171.6	8.726
TCDAA213B	A	C2	1	2	174.3	8.723	0.1136	24	M(A,D)WT, M(A,D,L)WB	0.004732	171.8	8.599
TCDAB111B	B	C1	2	1	158.2	8.353	0.1172	24	DGM, M(A,D)WT, M(A,D)AB	0.004883	160.9	8.498
TCDAB112B	B	C1	2	1	156.6	8.374	0.1179	24	M(A,D)GM, M(A,D)WT	0.004913	160.3	8.571
TCDAB113B	B	C1	2	1	163.2	8.338	0.1173	24	DGB, M(A,D)WT, M(A,D)WB	0.004889	166.2	8.493
TCDAB211B	B	C2	2	2	160.9	8.181	0.1171	24	M(A,D)GT, M(A,D)WB	0.004879	163.6	8.316
TCDAB212B	B	C2	2	2	156.9	8.223	0.1174	24	M(A,D)WT, M(A,D)WB	0.004892	159.9	8.380
TCDAB213B	B	C2	2	2	161.0	8.226	0.1169	24	M(A,D)WT, M(A,D)WB	0.004872	163.4	8.348
TCDAC111B	C	C1	3	1	164.5	8.053	0.1219	24	LWT, AWB	0.005078	174.1	8.520
TCDAC112B	C	C1	3	1	168.3	8.211	0.1208	24	M(A,L)WB, LGT	0.005035	176.6	8.613
TCDAC113B	C	C1	3	1	163.7	8.232	0.1202	24	M(A,L)GT, M(A,L)WB	0.005006	170.7	8.585
TCDAC211B	C	C2	3	2	168.0	8.341	0.1209	24	AGM	0.005037	176.3	8.753
TCDAC212B	C	C2	3	2	163.6	8.455	0.1201	24	LWT, AGB	0.005003	170.5	8.814
TCDAC213B	C	C2	3	2	169.0	8.185	0.1194	24	AGM, LWB	0.004974	175.2	8.481

Average 166.1 8.481
 Standard Dev. 6.963 0.3449
 Coeff. of Var. [%] 4.192 4.067
 Min. 156.6 8.053
 Max. 182.4 9.198
 Number of Spec. 18 18

Average_{norm} 0.004872 168.5 8.600
 Standard Dev._{norm} 6.630 0.1685
 Coeff. of Var. [%]_{norm} 3.934 1.959
 Min. 0.004651 156.7 8.316
 Max. 0.005078 177.0 8.926
 Number of Spec. 18 18 18



**Laminate Unnotched Tension Properties (UNT1)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

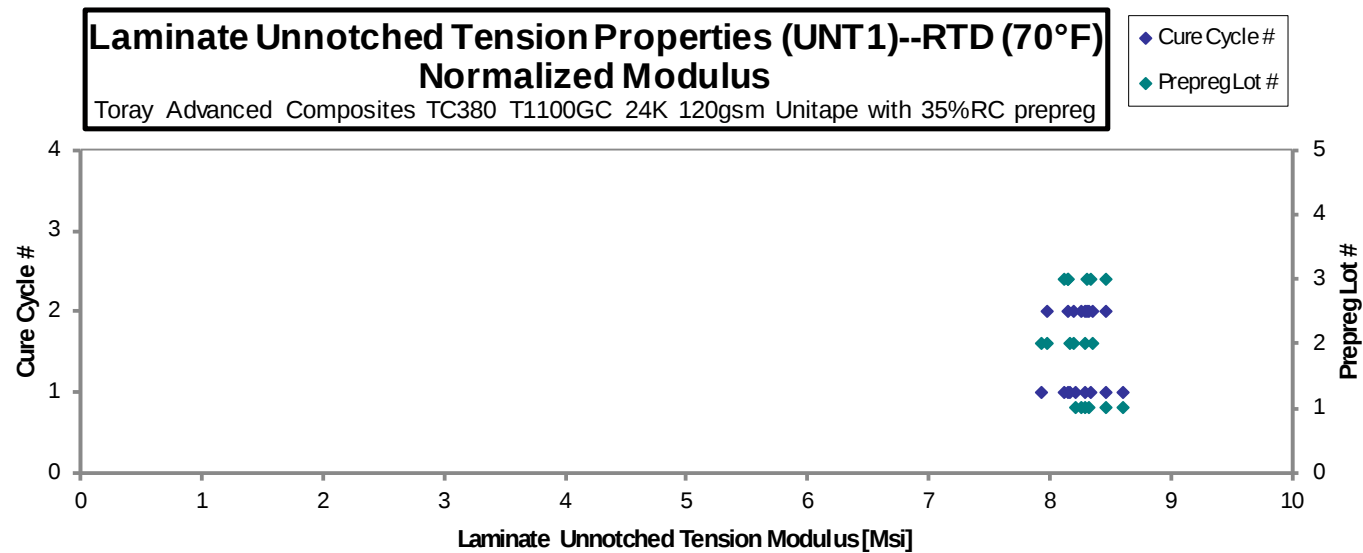
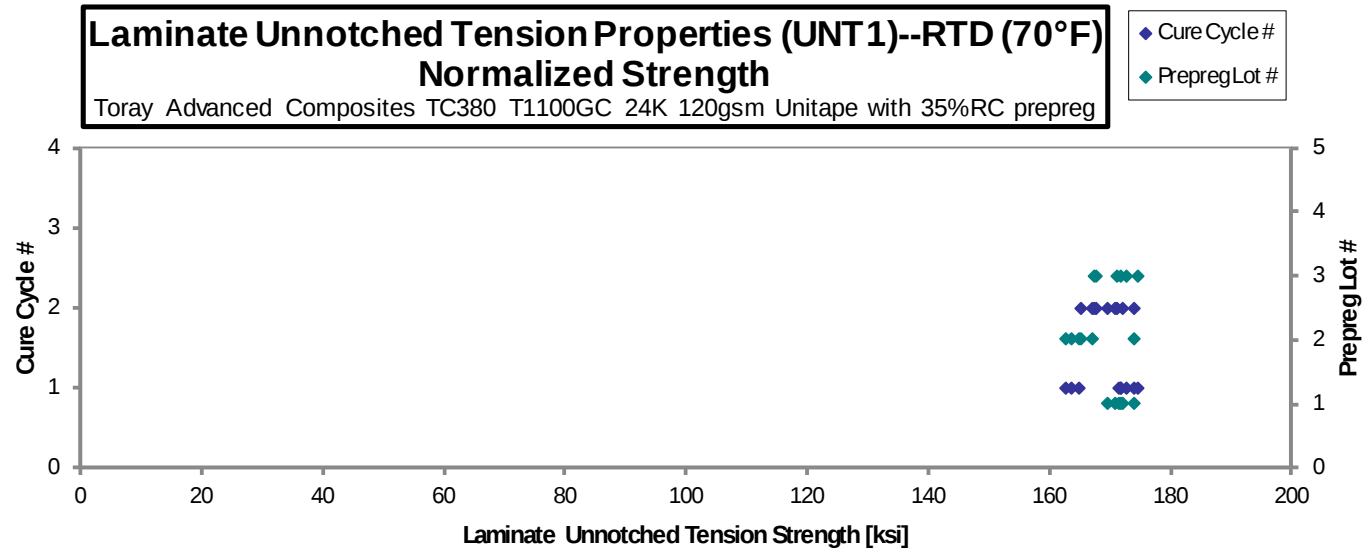
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCDA111A	A	C1	1	1	183.6	9.079	0.1091	24	M(A,D)GT	0.004547	173.9	8.599
TCDA112A	A	C1	1	1	177.2	8.727	0.1117	24	M(A,D)GM	0.004653	171.7	8.461
TCDA113A	A	C1	1	1	176.7	8.450	0.1119	24	M(A,D)GM	0.004663	171.6	8.208
TCDA211A	A	C2	1	2	177.5	8.602	0.1110	24	M(A,D)GB, M(A,D)WT	0.004626	171.0	8.290
TCDA212A	A	C2	1	2	175.7	8.436	0.1128	24	M(A,D)GB, M(A,D)WT	0.004700	172.0	8.260
TCDA213A	A	C2	1	2	171.0	8.381	0.1143	24	M(D,L)WB, M(A,D)GT	0.004763	169.6	8.316
TCDA111A	B	C1	2	1	160.0	8.016	0.1173	24	M(A,D,L)GB, M(A,D)WT	0.004886	162.9	8.160
TCDA112A	B	C1	2	1	167.4	8.409	0.1135	24	M(A,D)GB, M(A,D)AT	0.004728	164.9	8.284
TCDA113A	B	C1	2	1	163.4	7.922	0.1154	24	M(A,D)WB, M(A,D,L)WT	0.004809	163.7	7.937
TCDA211A	B	C2	2	2	170.4	8.024	0.1177	24	M(A,D)WB, M(A,D)WT	0.004904	174.1	8.198
TCDA212A	B	C2	2	2	166.9	8.440	0.1141	24	M(A,D)WB, M(A,D)WT	0.004754	165.3	8.360
TCDA213A	B	C2	2	2	164.6	7.855	0.1169	24	M(A,D)GB, M(D,L)WT	0.004871	167.0	7.971
TCDA111A	C	C1	3	1	174.4	8.458	0.1136	24	M(A,L)AT, AGB	0.004733	171.9	8.339
TCDA112A	C	C1	3	1	170.5	8.044	0.1168	24	AWB, LWT	0.004867	172.8	8.157
TCDA113A	C	C1	3	1	168.3	7.817	0.1196	24	LAB, AGT	0.004984	174.8	8.117
TCDA211A	C	C2	3	2	163.3	8.096	0.1181	24	LWT, M(A,L)GM	0.004922	167.5	8.302
TCDA212A	C	C2	3	2	160.4	8.093	0.1204	24	LWT, AGB	0.005018	167.7	8.461
TCDA213A	C	C2	3	2	162.4	7.723	0.1216	24	M(A,L)WT, AWB	0.005065	171.3	8.149

Average 169.6 8.254
Standard Dev. 6.742 0.3565
Coeff. of Var. [%] 3.974 4.319
Min. 160.0 7.723
Max. 183.6 9.079
Number of Spec. 18 18

Average_{norm} 0.004805 169.7 8.254
Standard Dev._{norm} 3.725 0.1655
Coeff. of Var. [%]_{norm} 2.196 2.005
Min. 0.004547 162.9 7.937
Max. 0.005065 174.8 8.599
Number of Spec. 18 18 18



**Laminate Unnotched Tension Properties (UNT1)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

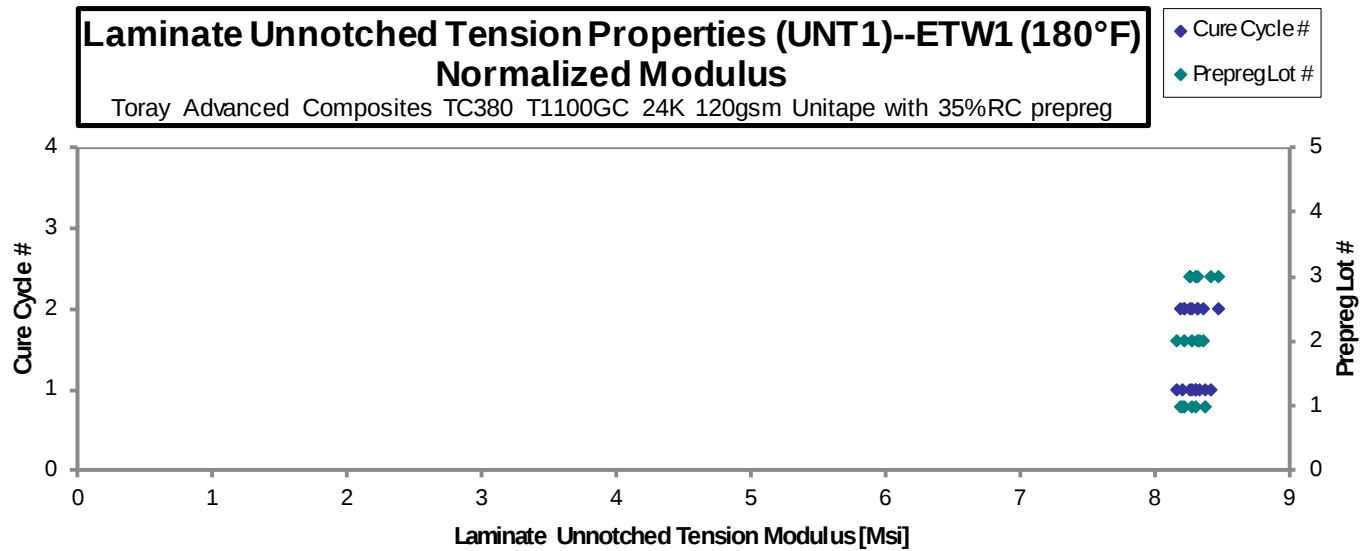
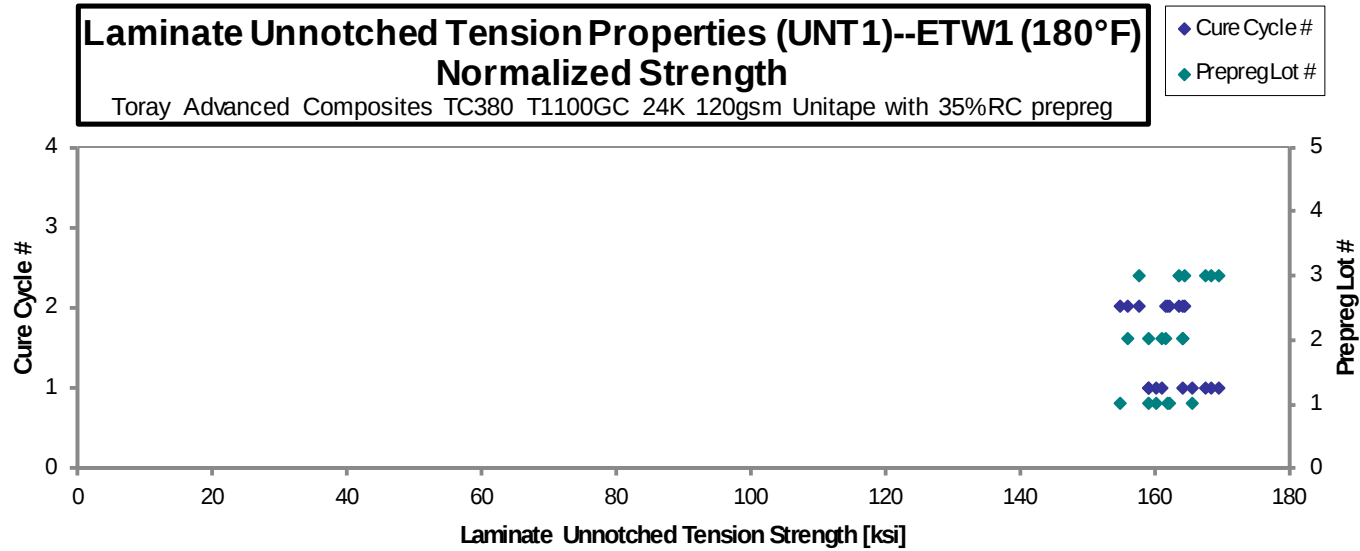
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDA111D	A	C1	1	1	161.6	8.445	0.1134	24	M(A,D)GT, AWT, LWB
TCDA112D	A	C1	1	1	173.9	8.806	0.1097	24	M(A,L)WB, LWT
TCDA113D	A	C1	1	1	163.6	8.390	0.1128	24	AWB, LGT, LWT
TCDA211D	A	C2	1	2	163.7	8.380	0.1139	24	M(A,L)GM, LWT, LWB
TCDA212D	A	C2	1	2	162.2	8.595	0.1099	24	M(A,L)GT, M(A,L)WB
TCDA213D	A	C2	1	2	165.2	8.362	0.1132	24	M(A,L)GT, M(A,L)WB
TCDA111D	B	C1	2	1	164.6	8.180	0.1150	24	AWB, LGT, AWT
TCDA112D	B	C1	2	1	164.2	8.545	0.1117	24	AGB, AWT, LWB
TCDA113D	B	C1	2	1	166.8	8.628	0.1113	24	AGT, LGB, LWB
TCDA211D	B	C2	2	2	161.2	8.296	0.1156	24	AGB, LWT, M(A,L)WB
TCDA212D	B	C2	2	2	161.3	8.646	0.1115	24	LWB, AWT
TCDA213D	B	C2	2	2	171.8	8.610	0.1100	24	LGB, AWT
TCDA111D	C	C1	3	1	166.5	8.217	0.1160	24	AGM, LWT, LAB
TCDA112D	C	C1	3	1	176.6	8.722	0.1098	24	AGB, AWB, LWT
TCDA113D	C	C1	3	1	162.4	8.071	0.1203	24	LWT, AWB
TCDA211D	C	C2	3	2	163.5	8.557	0.1112	24	M(A,L)WT, LWB
TCDA212D	C	C2	3	2	159.6	8.124	0.1180	24	M(A,L)WT, AWB
TCDA213D	C	C2	3	2	157.3	8.102	0.1205	24	AGB, LWT

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004724	159.0	8.310
0.004569	165.5	8.383
0.004698	160.1	8.211
0.004747	161.9	8.287
0.004581	154.8	8.202
0.004717	162.3	8.218
0.004790	164.3	8.162
0.004653	159.2	8.284
0.004638	161.2	8.337
0.004817	161.8	8.325
0.004644	156.1	8.365
0.004585	164.1	8.224
0.004831	167.6	8.270
0.004576	168.4	8.315
0.005012	169.6	8.428
0.004633	157.8	8.260
0.004916	163.5	8.321
0.005020	164.5	8.474

Average 164.8 8.426
Standard Dev. 4.927 0.2256
Coeff. of Var. [%] 2.990 2.677
Min. 157.3 8.071
Max. 176.6 8.806
Number of Spec. 18 18

Average_{norm} 0.004731 162.3 8.299
Standard Dev._{norm} 4.093 0.08121
Coeff. of Var. [%]_{norm} 2.522 0.9786
Min. 0.004569 154.8 8.162
Max. 0.005020 169.6 8.474
Number of Spec. 18 18



**Laminate Unnotched Tension Properties (UNT1)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

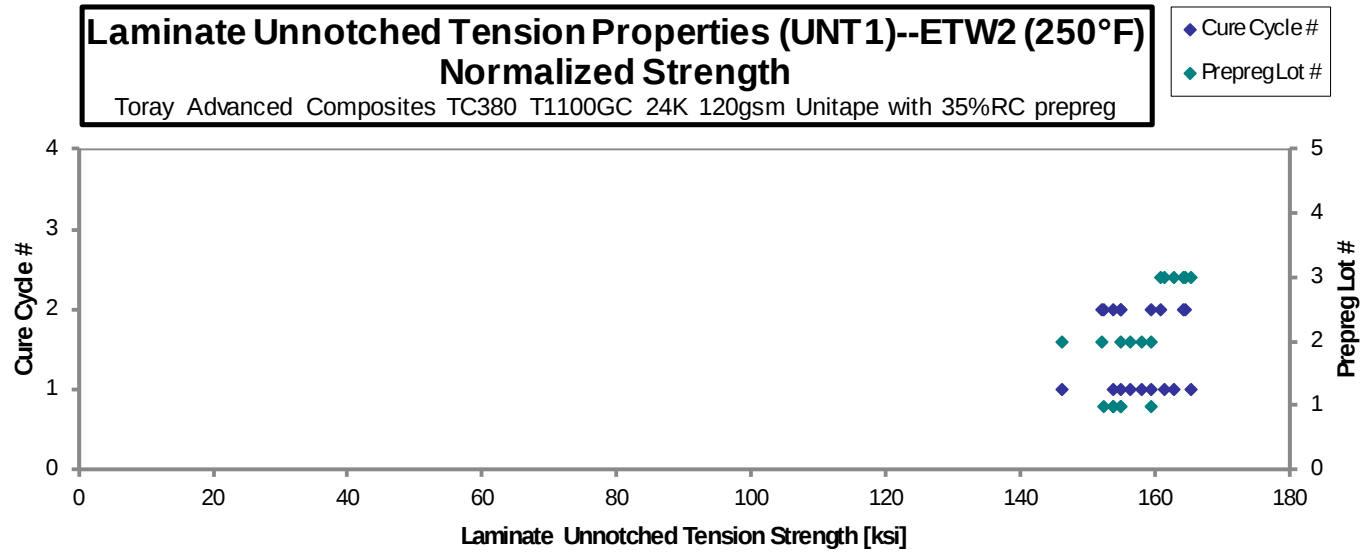
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0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCDA111E	A	C1	1	1	161.5	8.421	0.1137	24	M(A,D)WB, M(A,L)WT	0.004735	159.3	8.308
TCDA112E	A	C1	1	1	156.2	8.297	0.1133	24	M(A,D)WB, M(A,D)GM, M(A,D)WT	0.004719	153.5	8.158
TCDA113E	A	C1	1	1	156.9	8.173	0.1137	24	M(A,D)WT, M(A,D)GB	0.004736	154.8	8.064
TCDA211E	A	C2	1	2	154.0	8.355	0.1149	24	M(A,L)GB	0.004785	153.5	8.329
TCDA212E	A	C2	1	2	151.9	8.178	0.1155	24	M(A,D)GB, M(A,D)WT	0.004810	152.3	8.196
TCDA213E	A	C2	1	2	155.3	8.085	0.1149	24	M(A,D)GB, M(A,L)WT	0.004786	154.9	8.061
TCDAB111E	B	C1	2	1	150.5	7.664	0.1209	24	AGT, AWB	0.005037	158.0	8.042
TCDAB112E	B	C1	2	1	138.6	7.568	0.1213	24	AGT, AWB, LGB	0.005052	145.9	7.965
TCDAB113E	B	C1	2	1	147.8	7.531	0.1218	24	AGT, LWB	0.005073	156.2	7.960
TCDAB211E	B	C2	2	2	152.0	7.713	0.1208	24	AGB, LWT	0.005031	159.3	8.085
TCDAB212E	B	C2	2	2	146.2	7.518	0.1220	24	AGM, LWT	0.005081	154.7	7.959
TCDAB213E	B	C2	2	2	144.1	7.535	0.1215	24	AGM, LWT, LWB	0.005063	152.0	7.949
TCDAC111E	C	C1	3	1	155.9	7.776	0.1220	24	AGM, LWT, LWB	0.005083	165.1	8.235
TCDAC112E	C	C1	3	1	153.5	7.676	0.1211	24	AGM	0.005046	161.4	8.069
TCDAC113E	C	C1	3	1	157.4	7.978	0.1190	24	AGB, LWT	0.004960	162.6	8.243
TCDAC211E	C	C2	3	2	155.1	7.802	0.1221	24	AGB, LWT	0.005086	164.3	8.267
TCDAC212E	C	C2	3	2	153.1	7.867	0.1209	24	AWT, LWB	0.005038	160.7	8.258
TCDAC213E	C	C2	3	2	157.7	7.840	0.1198	24	AGT, LWB	0.004990	164.0	8.150

Average 152.6 7.888
 Standard Dev. 5.557 0.2991
 Coeff. of Var. [%] 3.640 3.792
 Min. 138.6 7.518
 Max. 161.5 8.421
 Number of Spec. 18 18

Average_{norm} 0.004951 157.4 8.128
 Standard Dev._{norm} 5.156 0.1276
 Coeff. of Var. [%]_{norm} 3.277 1.570
 Min. 0.004719 145.9 7.949
 Max. 0.005086 165.1 8.329
 Number of Spec. 18 18



4.9 “10/80/10” Unnotched Tension 2 Properties (UNT2)

Laminate Unnotched Tension Properties (UNT2)--CTD (-65°F)
Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

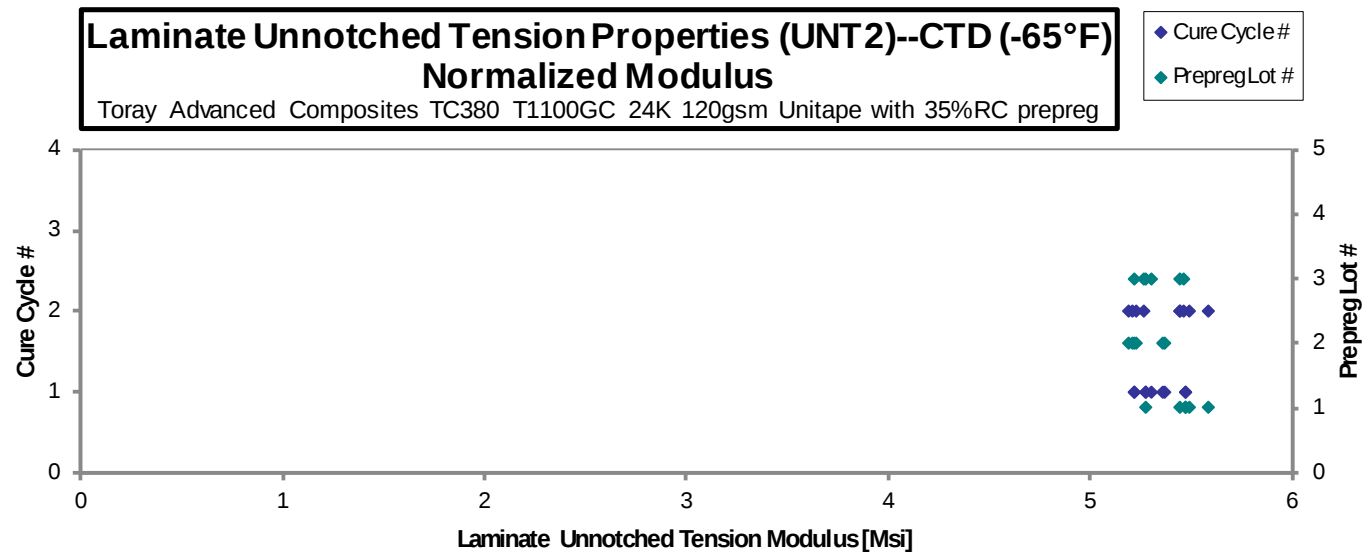
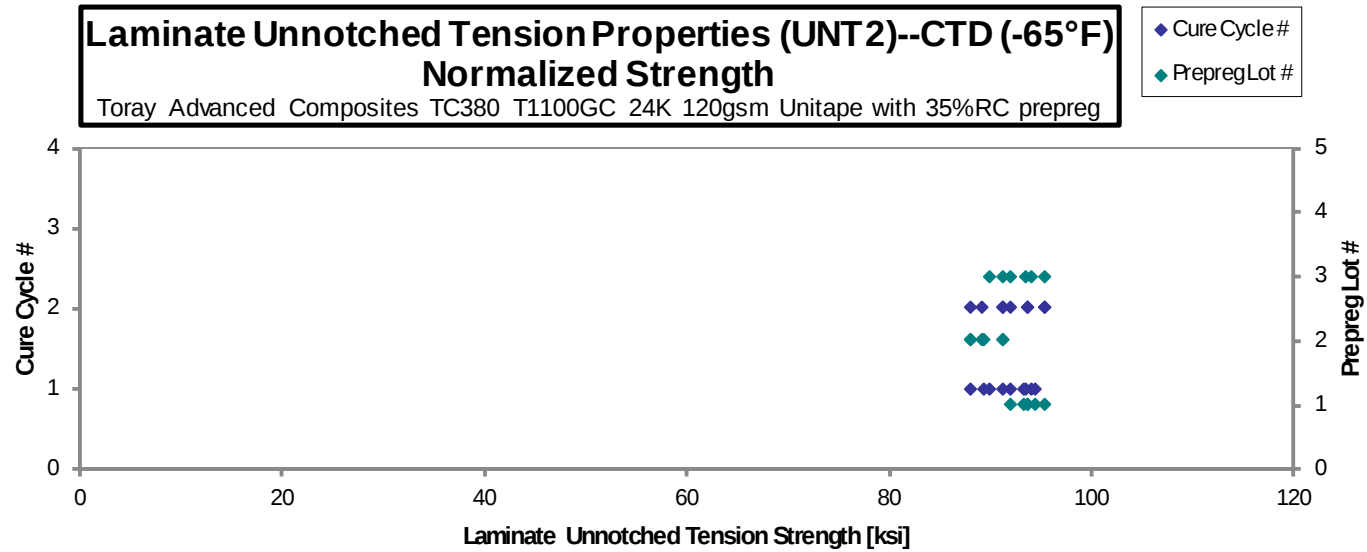
t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCDBA111B	A	C1	1	1	97.82	5.677	0.09262	20	M(A,D)WT	0.004631	94.37	5.477
TCDBA112B	A	C1	1	1	96.24	5.642	0.09310	20	M(A,D)GT	0.004655	93.33	5.472
TCDBA113B	A	C1	1	1	94.97	5.445	0.09297	20	M(A,D)GT	0.004648	91.97	5.273
TCDBA211B	A	C2	1	2	95.50	5.590	0.09427	20	M(A,D)GT	0.004713	93.78	5.490
TCDBA212B	A	C2	1	2	95.62	5.696	0.09407	20	M(A,D)GT, M(A,D)WT	0.004703	93.69	5.581
TCDBA213B	A	C2	1	2	96.95	5.540	0.09443	20	M(A,D)GT	0.004722	95.37	5.450
TCDBB111B	B	C1	2	1	89.94	5.294	0.09737	20	M(A,D)WT	0.004868	91.22	5.369
TCDBB112B	B	C1	2	1	86.93	5.283	0.09733	20	M(A,D)GB	0.004867	88.14	5.356
TCDBB113B	B	C1	2	1	87.90	5.131	0.09768	20	M(A,D)WT	0.004884	89.44	5.221
TCDBB211B	B	C2	2	2	88.06	5.122	0.09725	20	M(A,D)GM	0.004863	89.21	5.188
TCDBB212B	B	C2	2	2	90.45	5.182	0.09693	20	M(A,D)GT	0.004847	91.33	5.232
TCDBB213B	B	C2	2	2	86.72	5.132	0.09742	20	M(A,D)GT	0.004871	88.00	5.208
TCDBC111B	C	C1	3	1	92.83	5.175	0.09675	20	AWT	0.004838	93.55	5.216
TCDBC112B	C	C1	3	1	92.63	5.223	0.09743	20	AWT	0.004872	94.01	5.301
TCDBC113B	C	C1	3	1	89.50	5.246	0.09657	20	AGT	0.004828	90.03	5.277
TCDBC211B	C	C2	3	2	88.05	5.208	0.1003	20	AGB	0.005015	91.99	5.441
TCDBC212B	C	C2	3	2	86.98	5.025	0.1007	20	AGM	0.005033	91.21	5.269
TCDBC213B	C	C2	3	2	90.43	5.183	0.1013	20	AWT	0.005064	95.41	5.468

Average 91.53 5.322
Standard Dev. 3.833 0.2163
Coeff. of Var. [%] 4.187 4.064
Min. 86.72 5.025
Max. 97.82 5.696
Number of Spec. 18 18

Average_{norm} 0.004829 92.00 5.349
Standard Dev._{norm} 2.347 0.1216
Coeff. of Var. [%]_{norm} 2.551 2.274
Min. 0.004631 88.00 5.188
Max. 0.005064 95.41 5.581
Number of Spec. 18 18 18



**Laminate Unnotched Tension Properties (UNT2)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

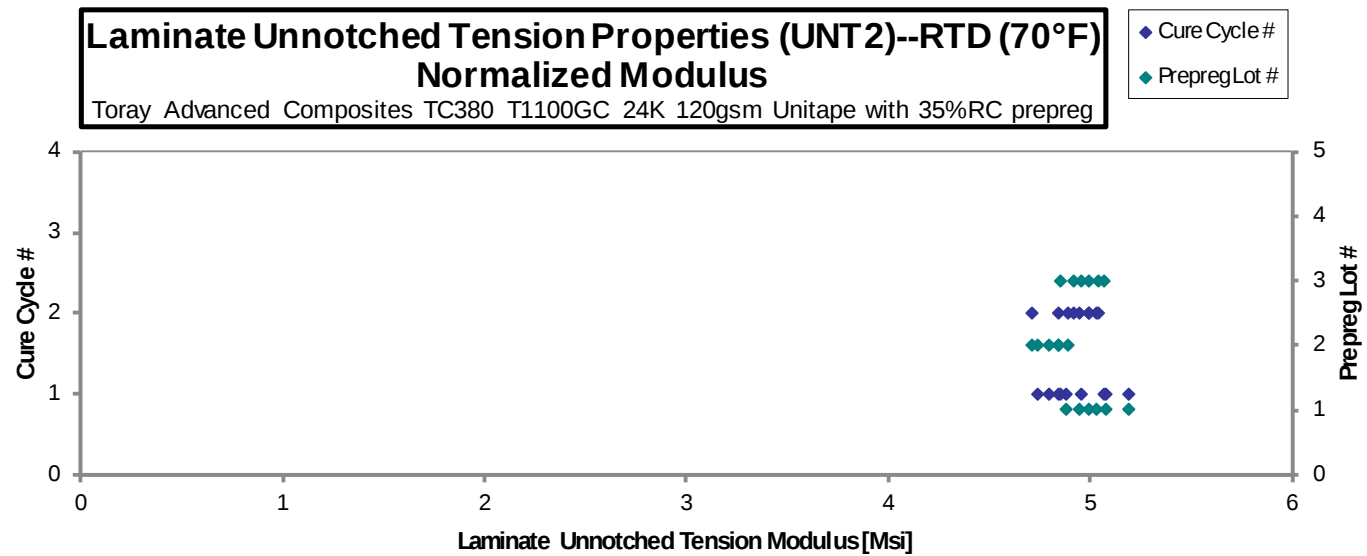
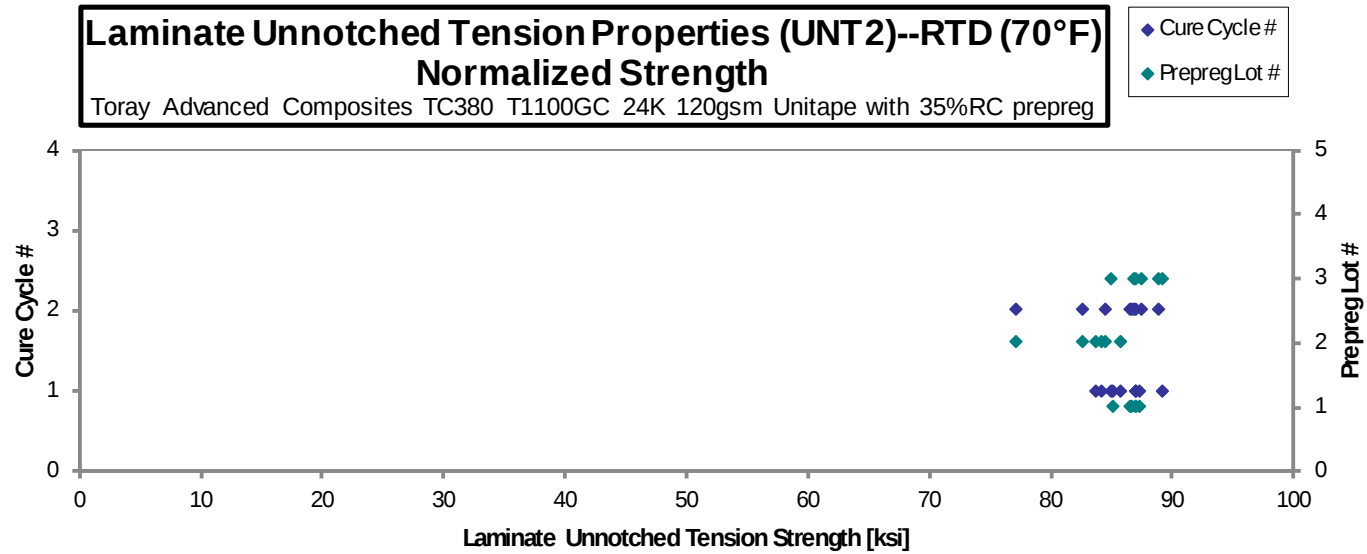
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDBA111A	A	C1	1	1	92.24	5.508	0.09050	20	M(A,D)GM
TCDBA112A	A	C1	1	1	90.86	5.289	0.09223	20	M(A,D)GM
TCDBA113A	A	C1	1	1	87.22	5.002	0.09370	20	M(A,D)WT
TCDBA211A	A	C2	1	2	90.34	5.245	0.09202	20	M(A,D)WT
TCDBA212A	A	C2	1	2	88.99	5.074	0.09358	20	M(A,D)GT
TCDBA213A	A	C2	1	2	88.04	5.054	0.09488	20	M(A,D)GM
TCDBB111A	B	C1	2	1	89.84	5.145	0.08948	20	M(A,D)GT
TCDBB112A	B	C1	2	1	87.28	4.930	0.09432	20	M(A,D)GB
TCDBB113A	B	C1	2	1	83.53	4.700	0.09677	20	M(A,D)GB
TCDBB211A	B	C2	2	2	82.40	5.222	0.08990	20	M(A,D)GT
TCDBB212A	B	C2	2	2	85.90	4.924	0.09440	20	M(A,D)WT
TCDBB213A	B	C2	2	2	81.96	4.667	0.09688	20	M(A,D)GM
TCDBC111A	C	C1	3	1	95.43	5.425	0.08973	20	AGM
TCDBC112A	C	C1	3	1	87.04	5.074	0.09380	20	AWB
TCDBC113A	C	C1	3	1	87.13	4.859	0.09588	20	AWB
TCDBC211A	C	C2	3	2	91.12	5.206	0.09213	20	AWB
TCDBC212A	C	C2	3	2	87.44	4.957	0.09532	20	AGM
TCDBC213A	C	C2	3	2	87.74	4.978	0.09727	20	AGT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004525	86.96	5.192
0.004612	87.30	5.081
0.004685	85.13	4.882
0.004601	86.59	5.027
0.004679	86.75	4.947
0.004744	87.02	4.995
0.004474	83.74	4.796
0.004716	85.75	4.844
0.004838	84.20	4.738
0.004495	77.16	4.890
0.004720	84.47	4.842
0.004844	82.72	4.710
0.004487	89.21	5.071
0.004690	85.04	4.957
0.004794	87.02	4.853
0.004607	87.45	4.996
0.004766	86.82	4.922
0.004863	88.90	5.043

Average 88.03 5.070
 Standard Dev. 3.400 0.2241
 Coeff. of Var. [%] 3.862 4.420
 Min. 81.96 4.667
 Max. 95.43 5.508
 Number of Spec. 18 18

Average_{norm} 0.004674 85.68 4.933
 Standard Dev._{norm} 2.728 0.1264
 Coeff. of Var. [%]_{norm} 3.184 2.562
 Min. 0.004474 77.16 4.710
 Max. 0.004863 89.21 5.192
 Number of Spec. 18 18 18



Laminate Unnotched Tension Properties (UNT2)--ETW1 (180°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

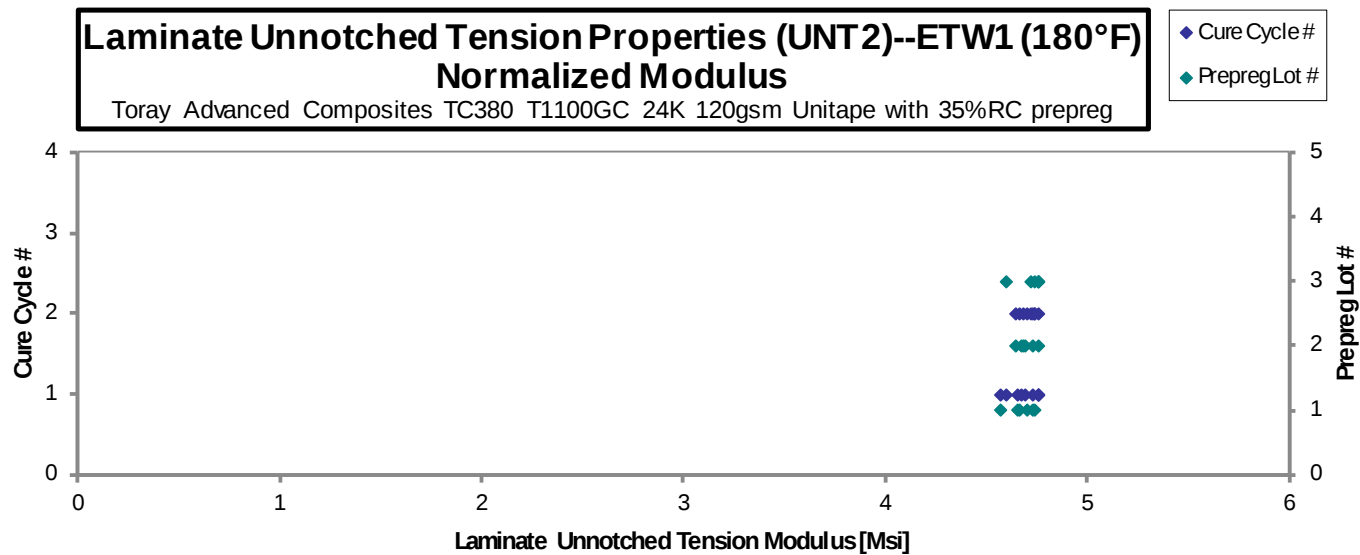
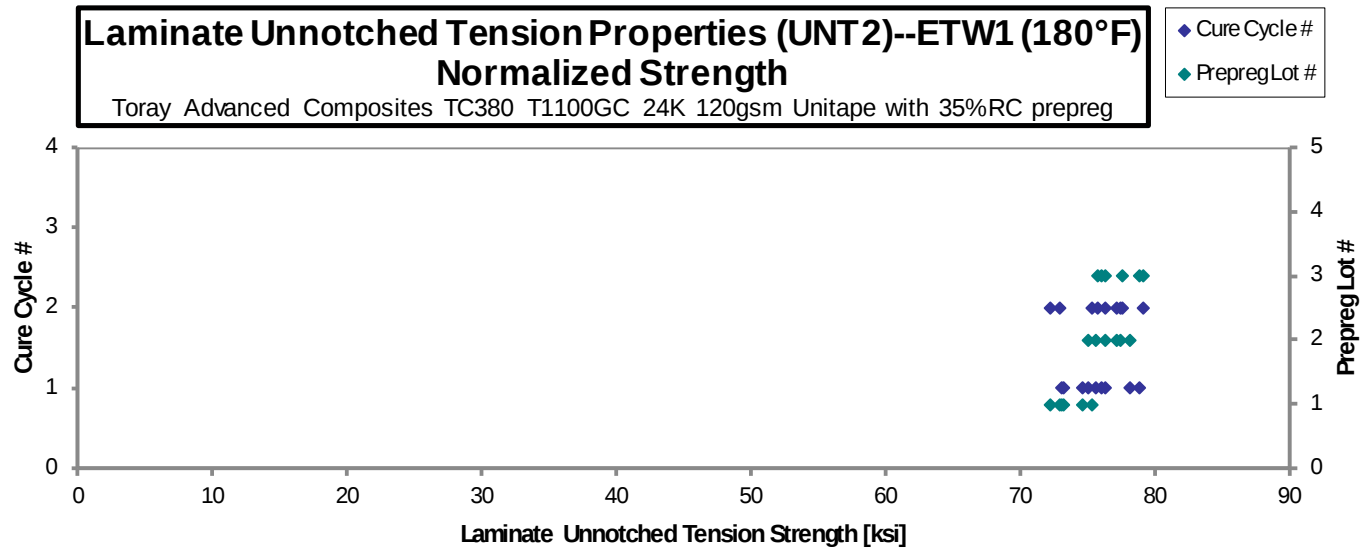
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDBA111D	A	C1	1	1	76.36	4.770	0.09370	20	M(A,D)GB
TCDBA112D	A	C1	1	1	76.81	4.966	0.09147	20	M(A,D)GB
TCDBA113D	A	C1	1	1	75.23	4.712	0.09313	20	M(A,D)GM
TCDBA211D	A	C2	1	2	74.38	4.764	0.09400	20	M(A,D)WB
TCDBA212D	A	C2	1	2	75.06	4.934	0.09227	20	M(A,D)WB
TCDBA213D	A	C2	1	2	76.33	4.769	0.09470	20	M(A,D)WB
TCDBB111D	B	C1	2	1	76.31	4.719	0.09513	20	AGT
TCDBB112D	B	C1	2	1	81.48	4.964	0.09198	20	AGB
TCDBB113D	B	C1	2	1	78.56	4.909	0.09172	20	M(A,D)GB
TCDBB211D	B	C2	2	2	77.48	4.662	0.09562	20	AGB
TCDBB212D	B	C2	2	2	80.43	4.869	0.09237	20	AGB
TCDBB213D	B	C2	2	2	79.71	4.945	0.09180	20	AGT
TCDBC111D	C	C1	3	1	76.18	4.616	0.09568	20	M(A,D)GM
TCDBC112D	C	C1	3	1	79.44	4.960	0.09217	20	AGB
TCDBC113D	C	C1	3	1	78.86	4.759	0.09597	20	AGT
TCDBC211D	C	C2	3	2	76.97	4.594	0.09862	20	AGB
TCDBC212D	C	C2	3	2	78.80	4.935	0.09218	20	AGT
TCDBC213D	C	C2	3	2	77.33	4.744	0.09618	20	AWB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004685	74.53	4.656
0.004573	73.18	4.731
0.004657	72.99	4.572
0.004700	72.83	4.664
0.004613	72.14	4.742
0.004735	75.30	4.705
0.004757	75.62	4.676
0.004599	78.07	4.756
0.004586	75.05	4.690
0.004781	77.17	4.644
0.004618	77.39	4.684
0.004590	76.22	4.728
0.004784	75.93	4.601
0.004608	76.27	4.762
0.004798	78.84	4.758
0.004931	79.07	4.719
0.004609	75.66	4.739
0.004809	77.48	4.754

Average 77.54 4.811
 Standard Dev. 1.958 0.1258
 Coeff. of Var. [%] 2.525 2.615
 Min. 74.38 4.594
 Max. 81.48 4.966
 Number of Spec. 18 18

Average_{norm} 0.004691 75.76 4.699
 Standard Dev._{norm} 2.060 0.05543
 Coeff. of Var. [%]_{norm} 2.719 1.180
 Min. 0.004573 72.14 4.572
 Max. 0.004931 79.07 4.762
 Number of Spec. 18 18 18



Laminate Unnotched Tension Properties (UNT2)--ETW2 (250°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

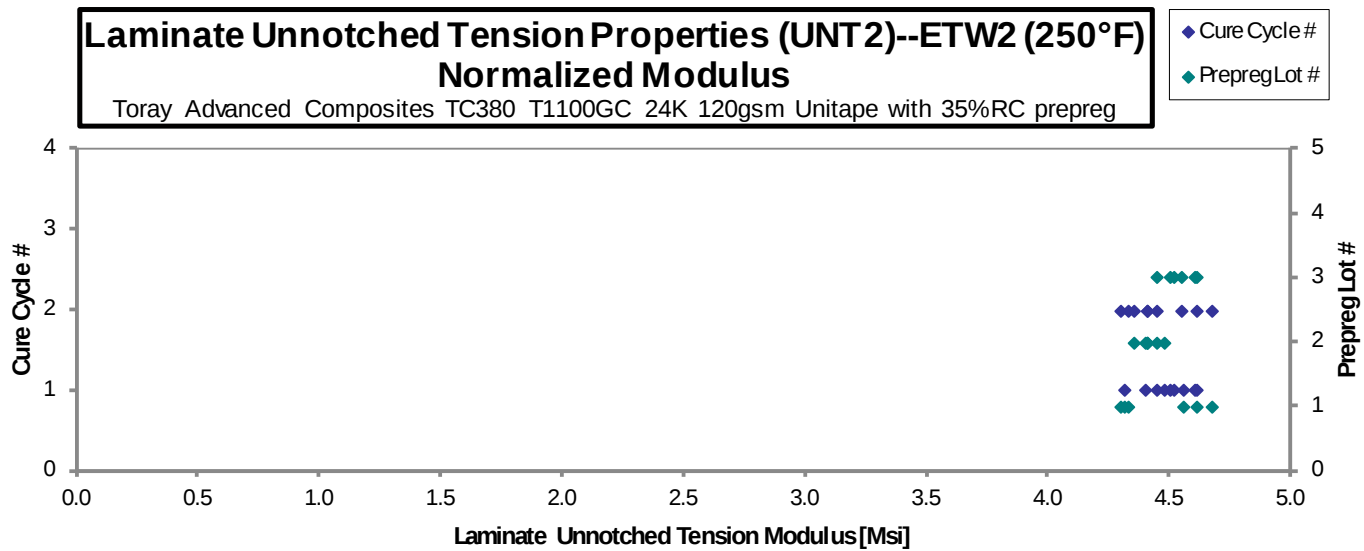
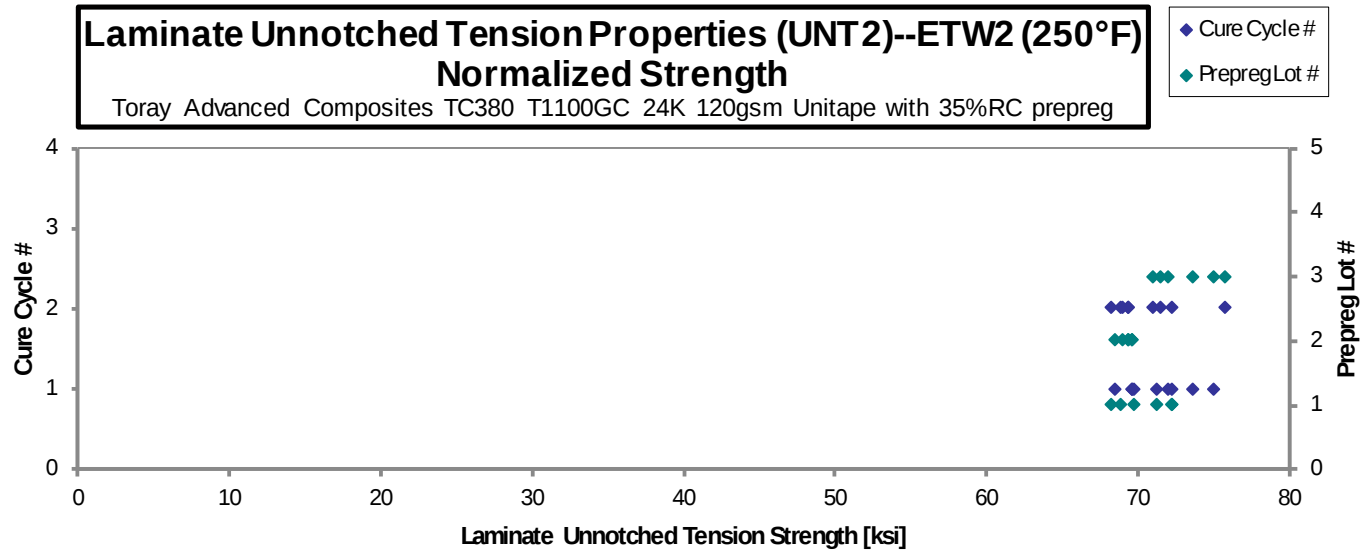
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDBA111E	A	C1	1	1	73.90	4.680	0.09372	20	DGM
TCDBA112E	A	C1	1	1	71.50	4.635	0.09560	20	M(A,D)GB
TCDBA113E	A	C1	1	1	71.10	4.417	0.09400	20	M(A,D)GB
TCDBA211E	A	C2	1	2	69.72	4.400	0.09470	20	M(A,D)WB
TCDBA212E	A	C2	1	2	72.98	4.734	0.09500	20	M(A,D)WB
TCDBA213E	A	C2	1	2	68.57	4.333	0.09540	20	M(A,D)WB
TCDBB111E	B	C1	2	1	65.83	4.237	0.09982	20	M(A,D)GM
TCDBB112E	B	C1	2	1	65.83	4.214	0.1014	20	M(A,D)GM
TCDBB113E	B	C1	2	1	66.84	4.310	0.09985	20	M(A,D)GM
TCDBB211E	B	C2	2	2	65.55	4.146	0.1010	20	M(A,D)GT
TCDBB212E	B	C2	2	2	66.10	4.212	0.1007	20	M(A,D)GB
TCDBB213E	B	C2	2	2	66.01	4.202	0.1008	20	M(A,D)GM
TCDBC111E	C	C1	3	1	70.59	4.329	0.1001	20	M(A,D)GM
TCDBC112E	C	C1	3	1	71.87	4.419	0.1001	20	M(A,D)GM
TCDBC113E	C	C1	3	1	69.16	4.349	0.09983	20	M(A,D)GT
TCDBC211E	C	C2	3	2	68.42	4.365	0.1002	20	M(A,D)GT
TCDBC212E	C	C2	3	2	67.74	4.252	0.1005	20	M(A,D)GB
TCDBC213E	C	C2	3	2	72.79	4.446	0.09980	20	M(A,D)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004686	72.14	4.569
0.004780	71.20	4.616
0.004700	69.62	4.325
0.004735	68.77	4.341
0.004750	72.21	4.685
0.004770	68.14	4.306
0.004991	68.44	4.405
0.005071	69.55	4.452
0.004993	69.52	4.482
0.005049	68.96	4.361
0.005036	69.34	4.418
0.005040	69.32	4.412
0.005004	73.59	4.513
0.005007	74.96	4.609
0.004992	71.92	4.523
0.005010	71.42	4.556
0.005025	70.92	4.451
0.004990	75.67	4.622

Average 69.14 4.371
 Standard Dev. 2.785 0.1675
 Coeff. of Var. [%] 4.028 3.832
 Min. 65.55 4.146
 Max. 73.90 4.734
 Number of Spec. 18 18

Average_{norm} 0.004924 70.87 4.480
 Standard Dev._{norm} 2.215 0.1131
 Coeff. of Var. [%]_{norm} 3.125 2.524
 Min. 0.004686 68.14 4.306
 Max. 0.005071 75.67 4.685
 Number of Spec. 18 18 18



4.10 “50/40/10” Unnotched Tension 3 Properties (UNT3)

Laminate Unnotched Tension Properties (UNT3)--CTD (-65°F)
Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

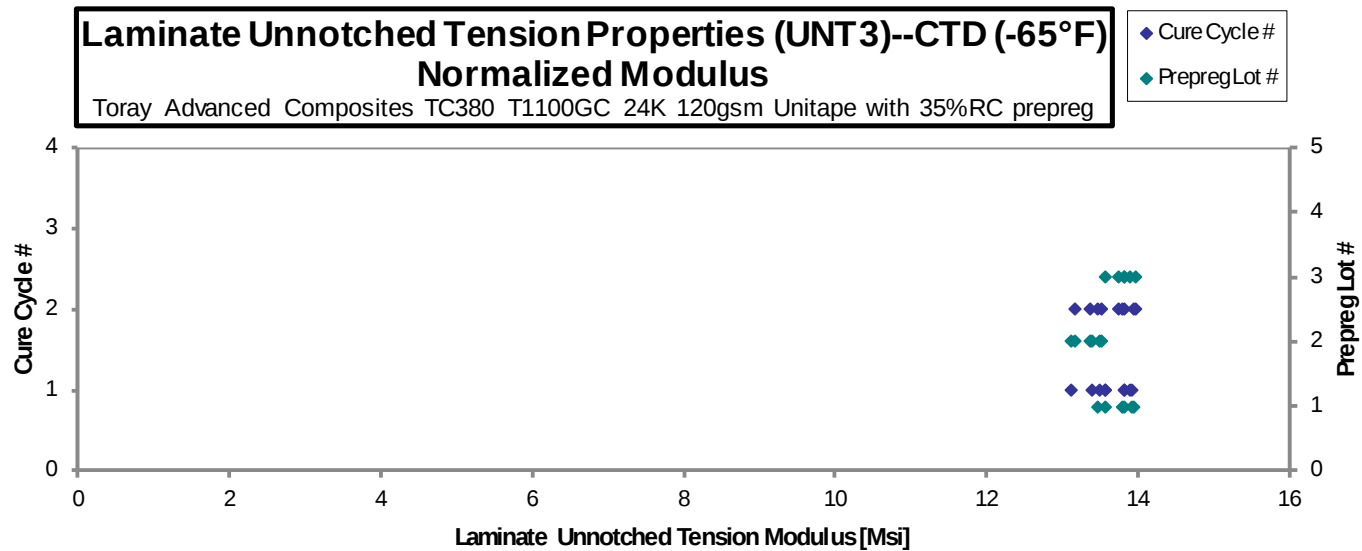
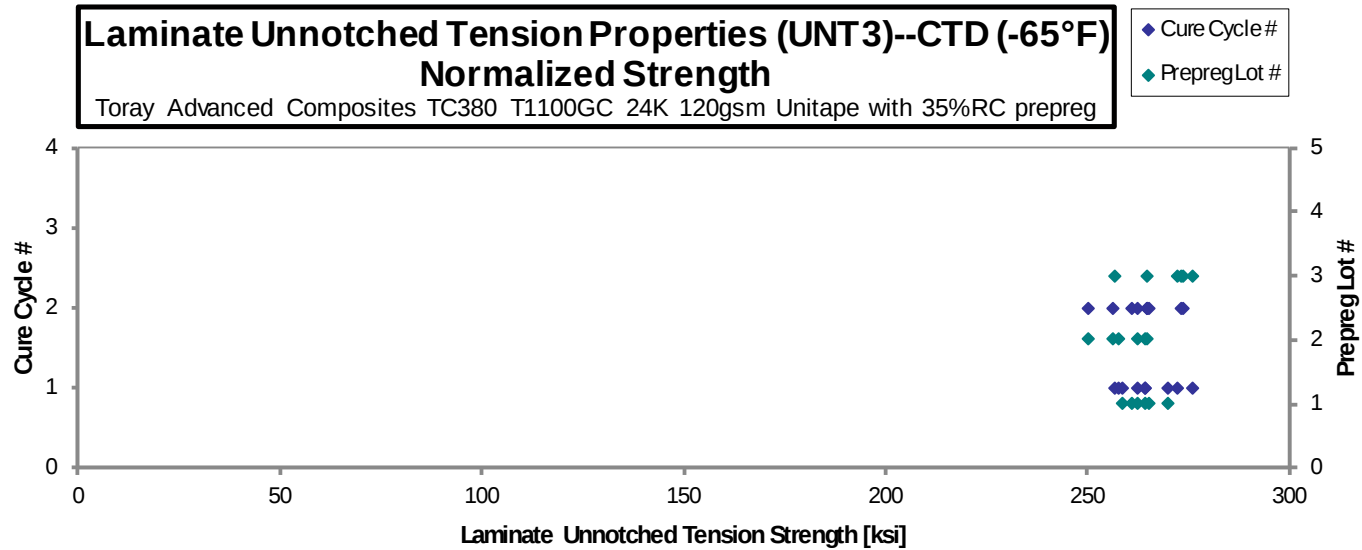
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCDCA111B	A	C1	1	1	271.1	13.92	0.09355	20	M(A,D)WT, M(A,D)WB	0.004678	264.2	13.56
TCDCA112B	A	C1	1	1	264.2	14.21	0.09398	20	M(A,D)WT, M(A,D)WB	0.004699	258.7	13.91
TCDCA113B	A	C1	1	1	273.8	14.01	0.09458	20	M(A,D)GT, M(A,D)WB	0.004729	269.8	13.80
TCDCA211B	A	C2	1	2	267.3	13.90	0.09525	20	M(A,D)WT, M(A,D)WB	0.004763	265.2	13.79
TCDCA212B	A	C2	1	2	263.0	13.97	0.09570	20	M(A,D)WT, M(A,D)WB	0.004785	262.2	13.93
TCDCA213B	A	C2	1	2	262.3	13.53	0.09547	20	M(A,D)WT, M(A,D)WB	0.004773	260.9	13.46
TDCDB111B	B	C1	2	1	261.6	13.35	0.09695	20	M(A,D)GT, M(A,D)WB	0.004848	264.1	13.49
TDCDB112B	B	C1	2	1	260.8	13.29	0.09658	20	M(A,D)GT, M(A,D)WB	0.004829	262.4	13.37
TDCDB113B	B	C1	2	1	254.3	12.93	0.09723	20	M(D,L)WB, M(A,D)WT	0.004862	257.6	13.10
TDCDB211B	B	C2	2	2	243.4	13.03	0.09855	20	M(A,D)GM	0.004928	249.9	13.37
TDCDB212B	B	C2	2	2	257.6	13.16	0.09862	20	M(A,D)GM, M(A,D)WB	0.004931	264.6	13.51
TDCDB213B	B	C2	2	2	252.1	12.95	0.09762	20	M(A,D)WT, M(A,D)WB	0.004881	256.3	13.17
TCDCC111B	C	C1	3	1	264.6	13.00	0.1001	20	AGM, LWT, M(A,L)WB	0.005004	275.9	13.55
TCDCC112B	C	C1	3	1	261.4	13.34	0.09990	20	AWT, AGM, M(A,L)WB	0.004995	272.1	13.89
TCDCC113B	C	C1	3	1	246.6	13.27	0.09997	20	AWT, LGB	0.004998	256.8	13.82
TCDCC211B	C	C2	3	2	269.6	13.63	0.09733	20	M(A,L)WB, M(A,L)GT	0.004867	273.3	13.82
TCDCC212B	C	C2	3	2	267.3	13.68	0.09798	20	M(A,L)WB, M(A,L)WT	0.004899	272.8	13.96
TCDCC213B	C	C2	3	2	260.1	13.51	0.09760	20	AWT, AGB	0.004880	264.4	13.73

Average 261.2 13.48
Standard Dev. 8.056 0.3997
Coeff. of Var. [%] 3.084 2.965
Min. 243.4 12.93
Max. 273.8 14.21
Number of Spec. 18 18

Average_{norm} 0.004853 264.0 13.62
Standard Dev._{norm} 6.872 0.2637
Coeff. of Var. [%]_{norm} 2.603 1.936
Min. 0.004678 249.9 13.10
Max. 0.005004 275.9 13.96
Number of Spec. 18 18 18



**Laminate Unnotched Tension Properties (UNT3)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

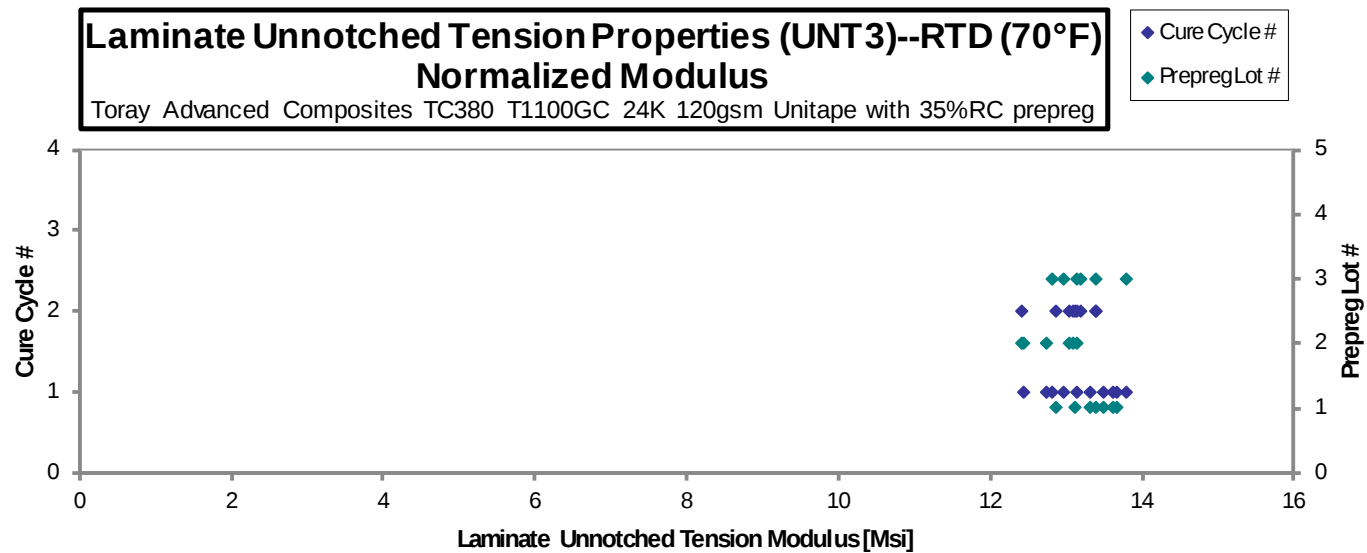
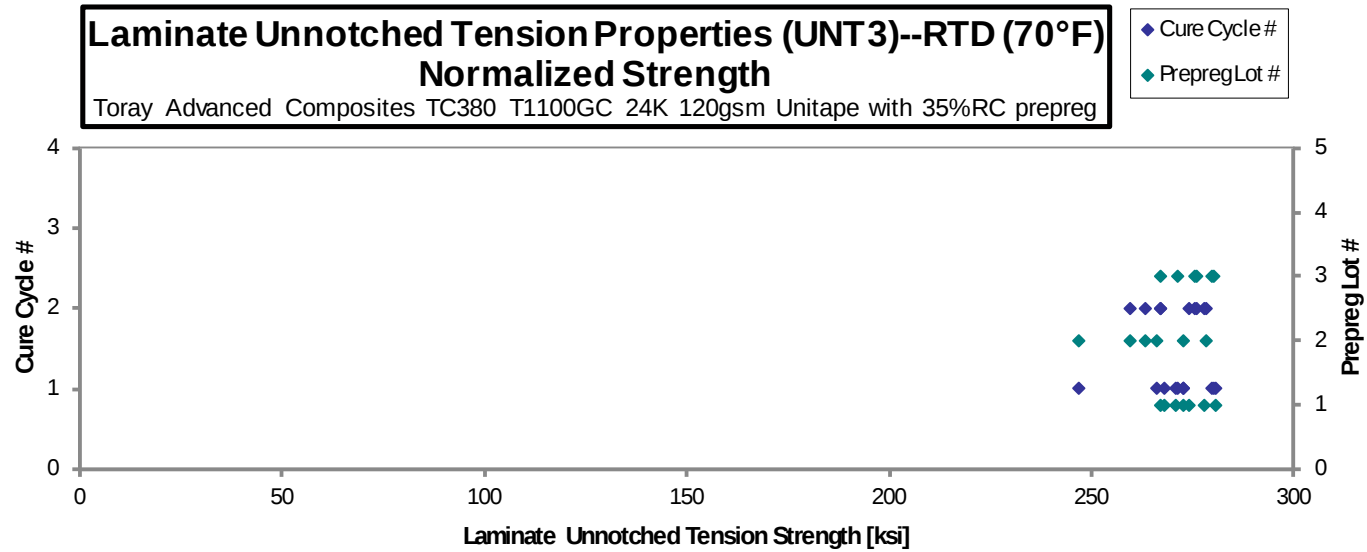
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDCA111A	A	C1	1	1	284.2	14.23	0.09220	20	M(A,D)WB, M(A,D)WT
TCDCA112A	A	C1	1	1	287.1	13.93	0.09383	20	M(A,D)GB, M(A,D)WT
TCDCA113A	A	C1	1	1	274.6	13.51	0.09472	20	M(A,D)WB, M(A,D)WT
TCDCA114A	A	C1	1	1	272.8	13.74	0.09428	20	M(A,D)WB, M(A,D)WT
TCDCA211A	A	C2	1	2	291.5	14.05	0.09160	20	M(A,D)GB, M(A,D)WT
TCDCA212A	A	C2	1	2	280.1	13.13	0.09403	20	M(A,D)WB, M(A,D)WT
TCDCA213A	A	C2	1	2	268.5	13.20	0.09553	20	M(A,D)WB, M(A,D)WT
TCDCB111A	B	C1	2	1	285.5	13.36	0.09167	20	M(A,D)WB, M(A,D)GT
TCDCB112A	B	C1	2	1	273.1	13.49	0.09362	20	M(A,D)GB, M(A,D)WT
TCDCB113A	B	C1	2	1	246.7	12.43	0.09613	20	M(D,L)AB, M(A,D)WT
TCDCB211A	B	C2	2	2	292.5	13.74	0.09143	20	M(A,D)WB, M(A,D)WT
TCDCB212A	B	C2	2	2	265.5	13.14	0.09528	20	M(A,D)GB, M(A,D)WT
TCDCB213A	B	C2	2	2	254.3	12.16	0.09795	20	M(A,D)WB, M(A,D)WT
TCDCC111A	C	C1	3	1	295.4	13.50	0.09110	20	AWB, AWT
TCDCC112A	C	C1	3	1	271.2	13.79	0.09602	20	AWB, LWT
TCDCC113A	C	C1	3	1	272.2	12.63	0.09868	20	LWB, AWT
TCDCC211A	C	C2	3	2	269.5	13.31	0.09525	20	AWB, M(A,L)GT
TCDCC212A	C	C2	3	2	270.8	13.17	0.09773	20	AWT, LWB
TCDCC213A	C	C2	3	2	271.1	12.90	0.09782	20	LWB, AGT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004610	272.9	13.66
0.004692	280.6	13.61
0.004736	270.9	13.33
0.004714	267.9	13.50
0.004580	278.2	13.41
0.004702	274.4	12.86
0.004777	267.2	13.13
0.004583	272.6	12.75
0.004681	266.3	13.16
0.004807	247.0	12.45
0.004572	278.6	13.09
0.004764	263.5	13.04
0.004898	259.5	12.41
0.004555	280.3	12.81
0.004801	271.3	13.79
0.004934	279.8	12.98
0.004763	267.4	13.20
0.004887	275.7	13.40
0.004891	276.2	13.14

Average 275.1 13.34
 Standard Dev. 12.51 0.5422
 Coeff. of Var. [%] 4.549 4.065
 Min. 246.7 12.16
 Max. 295.4 14.23
 Number of Spec. 19 19

Average_{norm} 0.004734 271.1 13.14
 Standard Dev._{norm} 8.348 0.3809
 Coeff. of Var. [%]_{norm} 3.079 2.898
 Min. 0.004555 247.0 12.41
 Max. 0.004934 280.6 13.79
 Number of Spec. 19 19



**Laminate Unnotched Tension Properties (UNT3)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

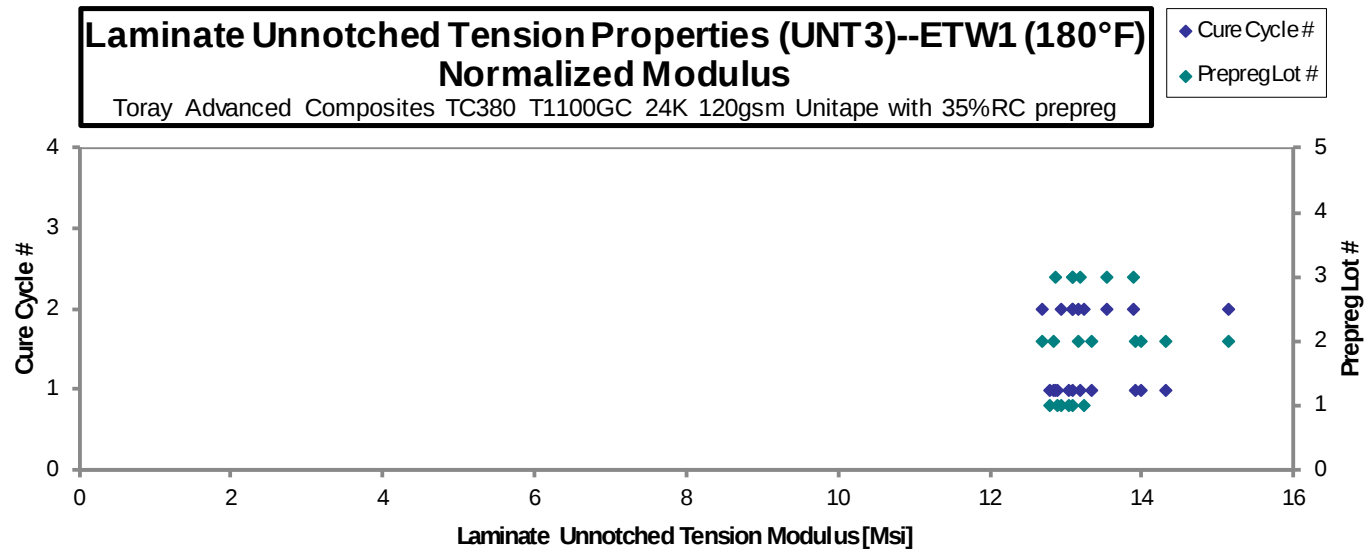
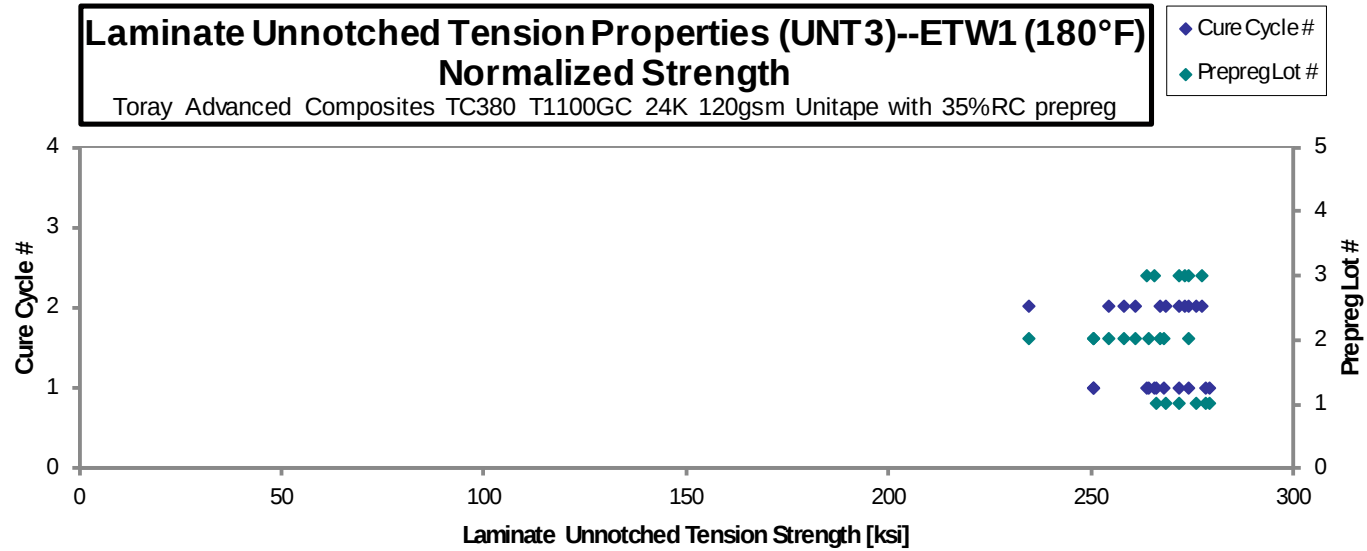
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCDC A111D	A	C1	1	1	283.7	13.25	0.09458	20	M(A,L)GM, LWT	0.004729	279.5	13.06
TCDC A112D	A	C1	1	1	292.5	13.56	0.09140	20	M(A,L)GM, AWT, AWB	0.004570	278.4	12.91
TCDC A113D	A	C1	1	1	271.0	13.04	0.09432	20	M(A,L)WT, M(A,L)WB, LGM	0.004716	266.2	12.81
TCDC A211D	A	C2	1	2	276.6	13.28	0.09580	20	AGM, M(A,L)WB, M(A,L)WT	0.004790	276.0	13.25
TCDC A212D	A	C2	1	2	275.8	13.46	0.09345	20	LWT, M(A,L)GB	0.004673	268.5	13.10
TCDC A213D	A	C2	1	2	269.3	12.82	0.09688	20	LWT, AGT, M(A,L)WT	0.004844	271.8	12.94
TCDC B111D	B	C1	2	1	247.8	14.13	0.09725	20	M(A,D)GT, LWB	0.004863	251.0	14.32
TCDC B112D	B	C1	2	1	281.3	14.35	0.09363	20	M(A,D)GM, LWT, LWB	0.004682	274.4	14.00
TCDC B113D	B	C1	2	1	272.9	14.36	0.09307	20	M(A,D)GM, M(A,D)WB	0.004653	264.5	13.92
TCDC B114D	B	C1	2	1	263.6	13.13	0.09770	20	M(A,D)GB, M(A,D)GT, M(A,D)WB	0.004885	268.3	13.36
TCDC B115D	B	C1	2	1	241.6	12.38	0.09962	20	M(A,D)WT, M(A,D,L)WB	0.004981	250.7	12.85
TCDC B211D*	B	C2	2	2	255.7		0.09702	20	M(A,D)WB, M(A,L)WT	0.004851	258.4	
TCDC B212D	B	C2	2	2	264.6	15.34	0.09480	20	M(A,D,L)WB, AWT	0.004740	261.3	15.14
TCDC B213D*	B	C2	2	2	276.6		0.09275	20	M(A,D)GT, M(A,D)WB	0.004638	267.2	
TCDC B214D	B	C2	2	2	250.2	12.94	0.09773	20	M(A,D)GT, M(A,D,L)WB	0.004887	254.7	13.18
TCDC B215D	B	C2	2	2	224.8	12.15	0.10030	20	M(A,D)WB, M(A,D)WT	0.005015	234.9	12.70
TCDC C111D	C	C1	3	1	267.7	12.89	0.09758	20	M(A,D)GM, AWT, AWB	0.004879	272.1	13.10
TCDC C112D	C	C1	3	1	278.8	13.50	0.09148	20	M(A,D)WB, M(A,D)WT	0.004574	265.7	12.87
TCDC C113D	C	C1	3	1	262.6	13.13	0.09650	20	M(A,L)WT, M(A,D)GM	0.004825	264.0	13.20
TCDC C211D	C	C2	3	2	286.2	13.71	0.09170	20	M(A,D)GM, AWB, AWT, SGT	0.004585	273.4	13.09
TCDC C212D	C	C2	3	2	268.6	13.28	0.09802	20	M(A,D)GM, AWB, AWT, SGT	0.004901	274.3	13.56
TCDC C213D	C	C2	3	2	267.4	13.39	0.09972	20	M(A,D)GM, AWT, LWB	0.004986	277.7	13.91

* Modulus is not reported due to erroneous strain data.

Average 267.2 13.40
Standard Dev. 15.73 0.7240
Coeff. of Var. [%] 5.887 5.401
Min. 224.8 12.15
Max. 292.5 15.34
Number of Spec. 22 20

Average_{norm} 0.004785 266.0 13.36
Standard Dev._{norm} 10.89 0.6136
Coeff. of Var. [%]_{norm} 4.094 4.592
Min. 0.004570 234.9 12.70
Max. 0.005015 279.5 15.14
Number of Spec. 22 22 20



**Laminate Unnotched Tension Properties (UNT3)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

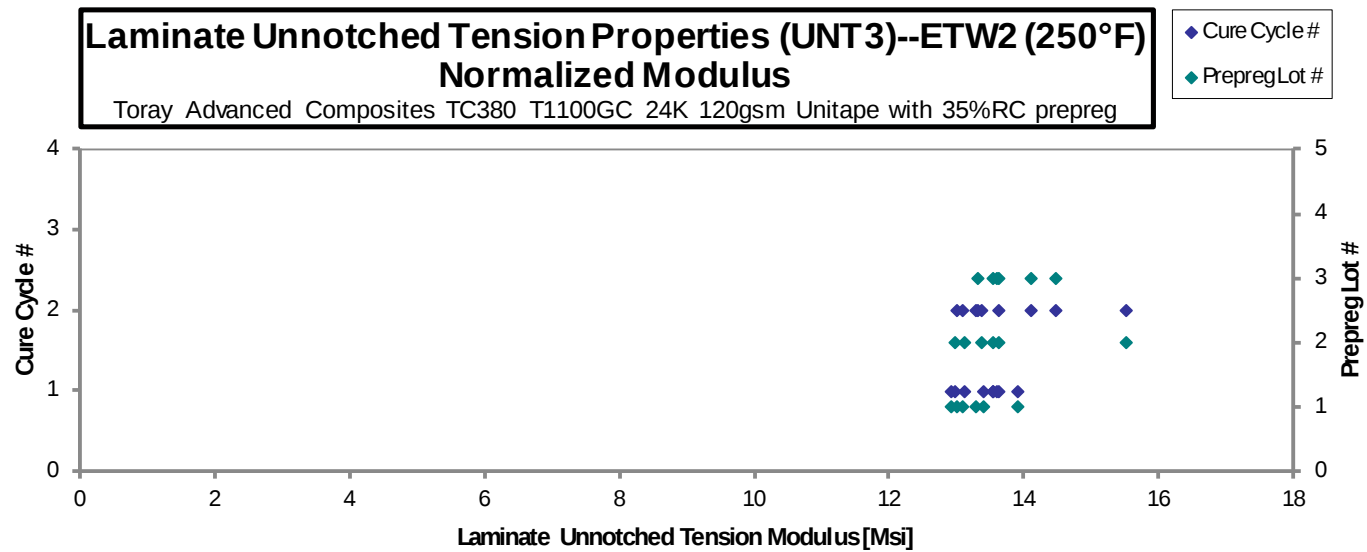
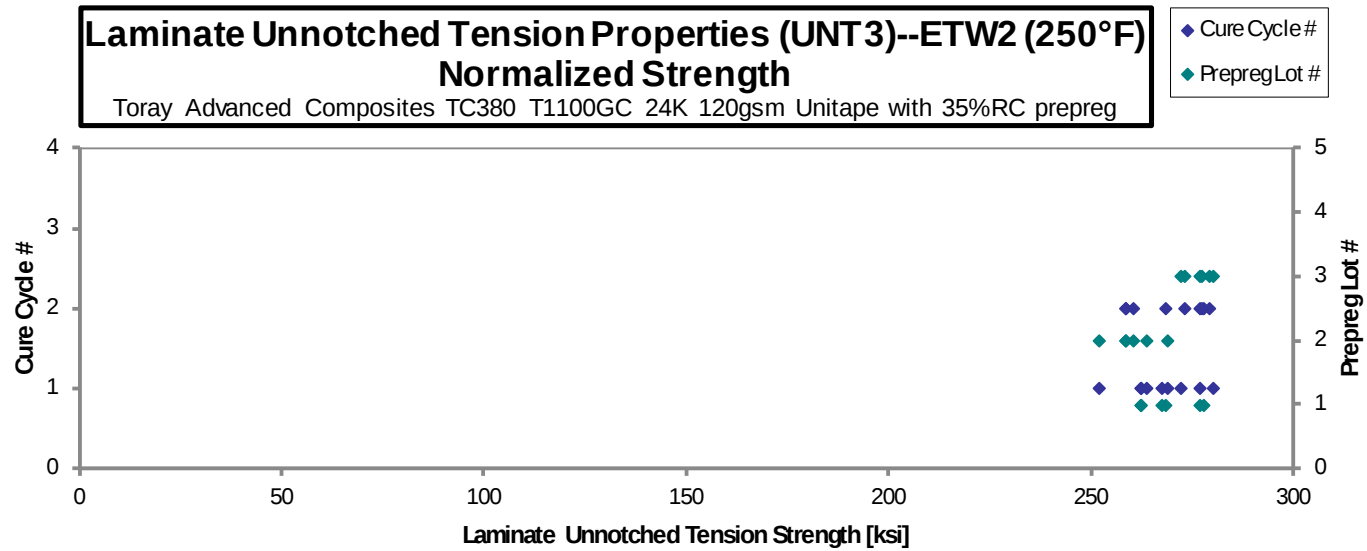
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0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCDCA111E	A	C1	1	1	264.2	13.01	0.09547	20	M(A,D)GM	0.004773	262.8	12.93
TCDCA112E	A	C1	1	1	269.6	14.01	0.09533	20	M(A,D)WB, M(A,D)WT	0.004767	267.7	13.91
TCDCA113E	A	C1	1	1	263.8	13.46	0.09562	20	M(A,D)WT, M(A,D)WB	0.004781	262.7	13.40
TCDCA211E	A	C2	1	2	274.0	13.10	0.09752	20	M(A,D)WB, M(A,D)WT	0.004876	278.3	13.31
TCDCA212E	A	C2	1	2	264.6	12.91	0.09748	20	M(A,D)WT, M(A,D)WB	0.004874	268.7	13.11
TCDCA213E	A	C2	1	2	272.5	12.80	0.09768	20	M(A,D)WT, M(A,D)WB	0.004884	277.3	13.03
TCDCB111E	B	C1	2	1	252.9	12.44	0.1003	20	M(A,D)GM, AWT, AWB	0.005016	264.2	12.99
TCDCB112E	B	C1	2	1	257.6	12.97	0.1004	20	M(A,D)WB, M(A,D)WT	0.005018	269.3	13.56
TCDCB113E	B	C1	2	1	241.2	12.54	0.1005	20	M(A,D)GT, M(A,D)WB	0.005024	252.5	13.12
TCDCB211E	B	C2	2	2	249.1	13.03	0.1004	20	M(A,D,S)GM, AWT	0.005020	260.6	13.62
TCDCB212E	B	C2	2	2	249.1	12.88	0.09978	20	LWB, M(A,D)WT	0.004989	259.0	13.39
TCDCB213E	B	C2	2	2	247.5	14.84	0.1003	20	M(A,D)GB, LWT	0.005017	258.7	15.51
TCDCC111E	C	C1	3	1	268.7	12.99	0.1002	20	M(A,D)GT, M(A,D)GB	0.005008	280.3	13.55
TCDCC112E	C	C1	3	1	267.0	13.10	0.09967	20	M(A,D)WB, M(A,D,L)WT	0.004983	277.2	13.60
TCDCC113E	C	C1	3	1	260.6	13.05	0.1004	20	M(A,D)GB, M(D,L)WT	0.005020	272.6	13.65
TCDCC211E	C	C2	3	2	266.1	13.44	0.1008	20	M(A,D)WB, M(D,L)WT	0.005042	279.5	14.12
TCDCC212E	C	C2	3	2	265.2	13.83	0.1005	20	M(A,D)WT, M(A,D)WB	0.005023	277.5	14.47
TCDCC213E	C	C2	3	2	262.8	12.81	0.09993	20	M(A,D)WT, LWB	0.004997	273.6	13.33

Average 260.9 13.18
Standard Dev. 9.330 0.5740
Coeff. of Var. [%] 3.576 4.356
Min. 241.2 12.44
Max. 274.0 14.84
Number of Spec. 18 18

Average_{norm} 0.004951 269.0 13.59
Standard Dev._{norm} 8.479 0.6255
Coeff. of Var. [%]_{norm} 3.152 4.603
Min. 0.004767 252.5 12.93
Max. 0.005042 280.3 15.51
Number of Spec. 18 18 18



4.11 “33/0/67” Unnotched Compression 0/90 Properties (UNC0)

Laminate Unnotched Compression 0/90 Properties (UNC0)--CTD (-65°F)
Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

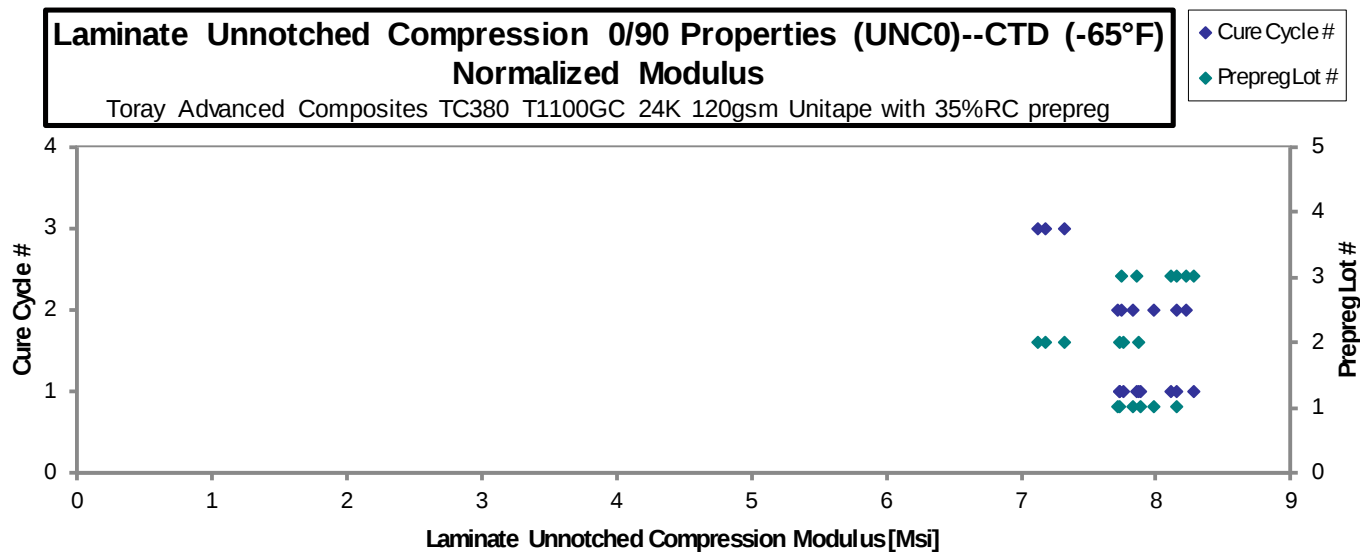
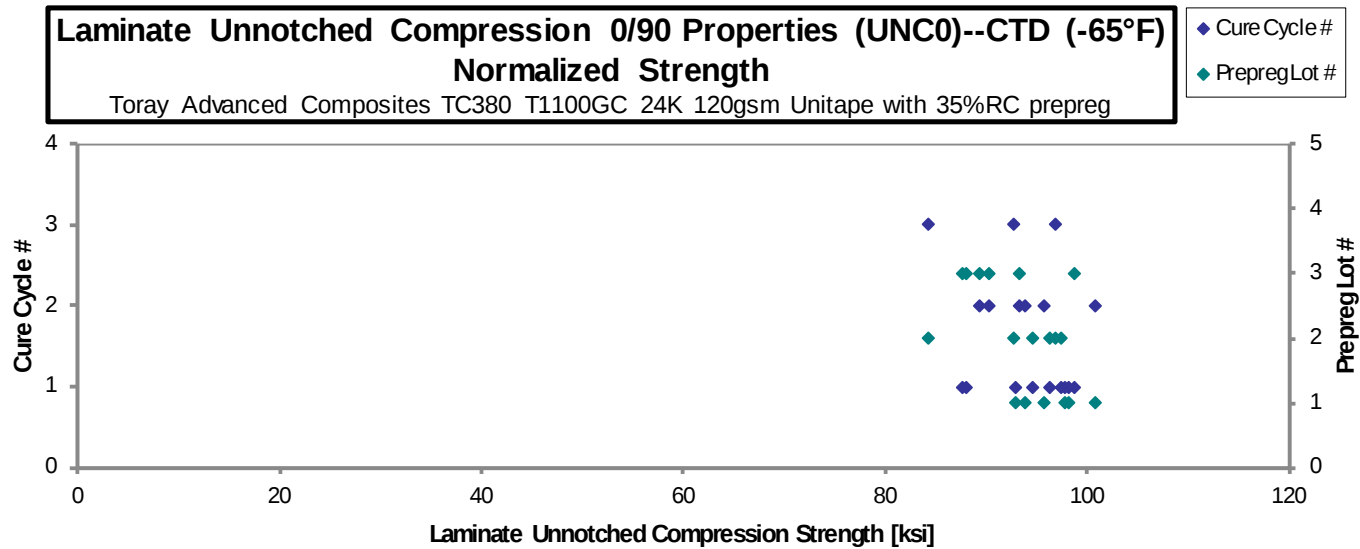
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDRA111B	A	C1	1	1	93.45	7.777	0.1003	21	BAT
TCDRA112B	A	C1	1	1	98.08	7.887	0.1008	21	BGM
TCDRA113B	A	C1	1	1	96.97	8.085	0.1017	21	BGM
TCDRA211B	A	C2	1	2	94.87	7.809	0.09968	21	BAB
TCDRA212B	A	C2	1	2	101.1	8.014	0.1005	21	HAB, BAT
TCDRA213B	A	C2	1	2	95.59	7.820	0.1010	21	BGM, HAB
TCDRB111B	B	C1	2	1	95.15	7.778	0.1021	21	BAT
TCDRB112B	B	C1	2	1	96.19	7.635	0.1022	21	BAT
TCDRB113B	B	C1	2	1	91.51	7.503	0.1042	21	BAT
TCDRB311B	B	C3	2	3	92.27	7.286	0.1014	21	BAT
TCDRB312B	B	C3	2	3	82.83	7.010	0.1025	21	BGM
TCDRB313B	B	C3	2	3	94.16	6.981	0.1038	21	BGM
TCDRC111B	C	C1	3	1	84.69	7.599	0.1043	21	BGM
TCDRC112B	C	C1	3	1	84.37	7.770	0.1053	21	BAT
TCDRC113B	C	C1	3	1	93.84	7.871	0.1061	21	BAT
TCDRC211B	C	C2	3	2	88.39	7.593	0.1029	21	BGM
TCDRC212B	C	C2	3	2	85.79	7.896	0.1049	21	BGM
TCDRC213B	C	C2	3	2	88.89	7.768	0.1058	21	BAB

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004776	92.99	7.738
0.004802	98.11	7.889
0.004841	97.80	8.155
0.004747	93.81	7.722
0.004783	100.7	7.986
0.004810	95.78	7.835
0.004861	96.36	7.878
0.004866	97.51	7.739
0.004963	94.63	7.759
0.004828	92.80	7.328
0.004883	84.26	7.131
0.004940	96.92	7.186
0.004967	87.64	7.864
0.005012	88.10	8.113
0.005052	98.76	8.283
0.004899	90.22	7.750
0.004997	89.30	8.220
0.005038	93.30	8.154

Average 92.12 7.671
 Standard Dev. 5.203 0.3078
 Coeff. of Var. [%] 5.648 4.013
 Min. 82.83 6.981
 Max. 101.1 8.085
 Number of Spec. 18 18

Average_{norm} 0.004893 93.84 7.818
 Standard Dev._{norm} 4.462 0.3319
 Coeff. of Var. [%]_{norm} 4.756 4.245
 Min. 0.004747 84.26 7.131
 Max. 0.005052 100.7 8.283
 Number of Spec. 18 18 18



Laminate Unnotched Compression 0/90 Properties (UNC0)--RTD (70°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

0.004800

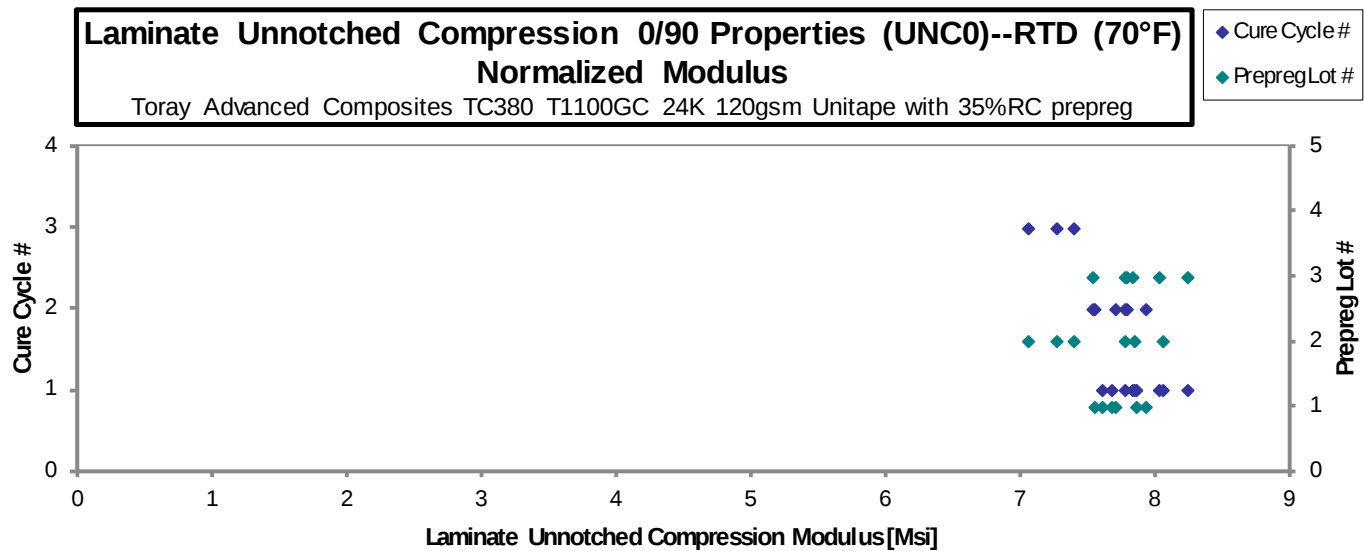
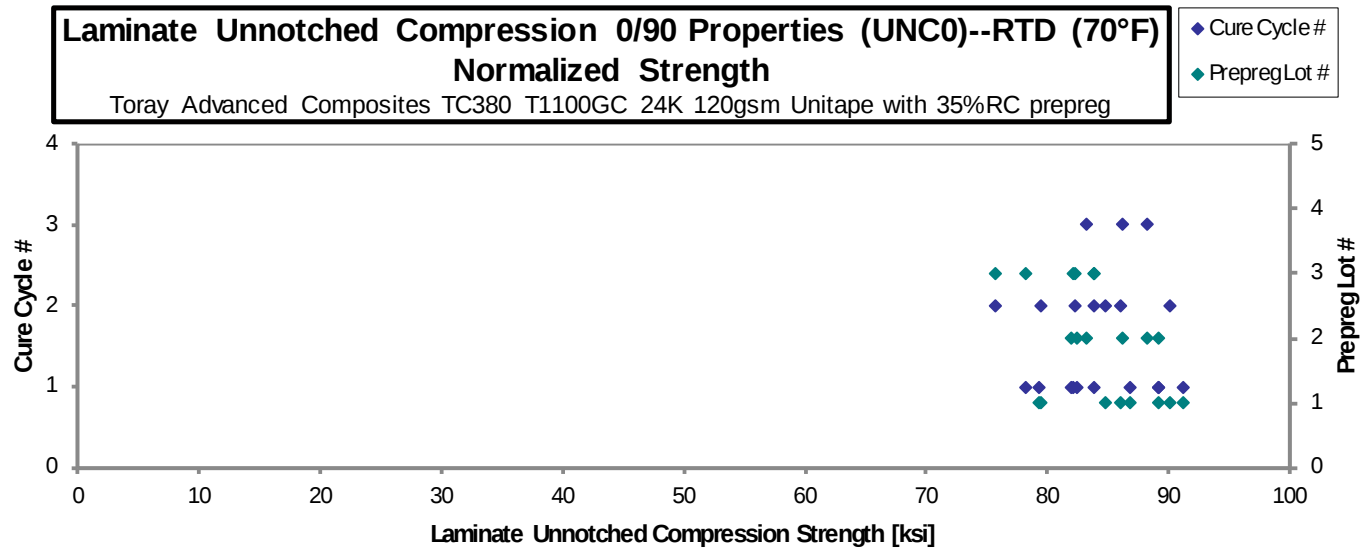
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCDRA111A*	A	C1	1	1	83.88	8.069	0.09520	21	BAB, HIB	0.004533	79.22	7.621
TCDRA112A*	A	C1	1	1	94.76	8.186	0.09697	21	BAB	0.004617	91.16	7.874
TCDRA113A	A	C1	1	1	88.63	7.858	0.09860	21	BAT, HIT	0.004695	86.69	7.686
TCDRA114A**	A	C1	1	1	89.54		0.1002	21	BAB	0.004773	89.04	
TCDRA211A	A	C2	1	2	84.54	8.051	0.09465	21	M(B,H)AB	0.004507	79.38	7.560
TCDRA212A	A	C2	1	2	88.68	8.069	0.09635	21	BAT	0.004588	84.76	7.713
TCDRA213A	A	C2	1	2	92.94	8.200	0.09765	21	BAT, HIT	0.004650	90.04	7.944
TCDRA214A**	A	C2	1	2	87.61		0.09892	21	HAT, HIT	0.004710	85.98	
TCDRB111A	B	C1	2	1	89.65	8.595	0.09212	21	BGM	0.004387	81.93	7.855
TCDRB112A	B	C1	2	1	88.67	8.368	0.09373	21	BGM	0.004463	82.45	7.782
TCDRB113A	B	C1	2	1	92.50	8.372	0.09717	21	BAT, HIT	0.004627	89.17	8.070
TCDRB311A	B	C3	2	3	93.21	8.019	0.09317	21	BAB	0.004437	86.16	7.412
TCDRB312A	B	C3	2	3	92.78	7.656	0.09582	21	BAT	0.004563	88.19	7.278
TCDRB313A	B	C3	2	3	85.82	7.293	0.09770	21	BAT	0.004652	83.18	7.069
TCDRC111A	C	C1	3	1	85.76	8.392	0.09653	21	BAB, HIB	0.004597	82.13	8.036
TCDRC112A	C	C1	3	1	79.57	7.983	0.09905	21	BAT	0.004717	78.18	7.845
TCDRC113A	C	C1	3	1	83.62	8.227	0.1011	21	BAB	0.004813	83.84	8.249
TCDRC211A	C	C2	3	2	88.17	8.097	0.09403	21	BAT	0.004478	82.25	7.554
TCDRC212A	C	C2	3	2	78.37	8.070	0.09720	21	BAT	0.004629	75.57	7.781
TCDRC213A	C	C2	3	2	85.01	7.914	0.09933	21	BGM	0.004730	83.78	7.799

* Modulus are averaged values of 2 strain gages.

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

Average	87.69	8.079
Standard Dev.	4.448	0.2939
Coeff. of Var. [%]	5.073	3.638
Min.	78.37	7.293
Max.	94.76	8.595
Number of Spec.	20	18

Average _{norm}	0.004608	84.16	7.729
Standard Dev. _{norm}		4.208	0.2871
Coeff. of Var. [%] _{norm}		5.000	3.715
Min.	0.004387	75.57	7.069
Max.	0.004813	91.16	8.249
Number of Spec.	20	20	18



Laminate Unnotched Compression 0/90 Properties (UNC0)--ETD1 (180°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

0.004800

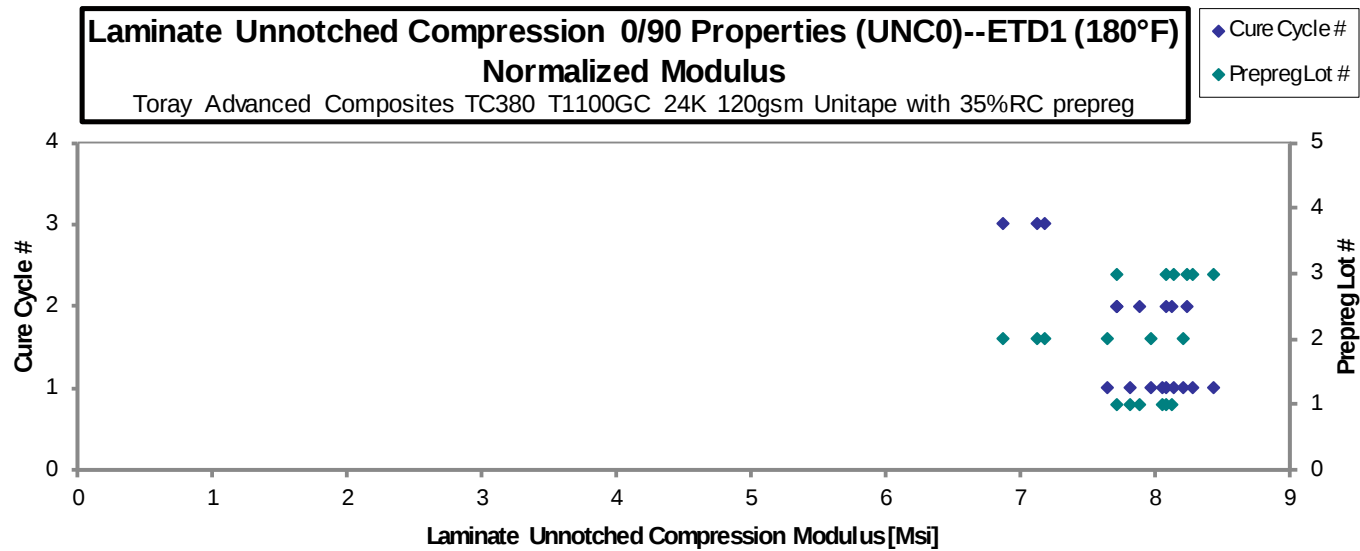
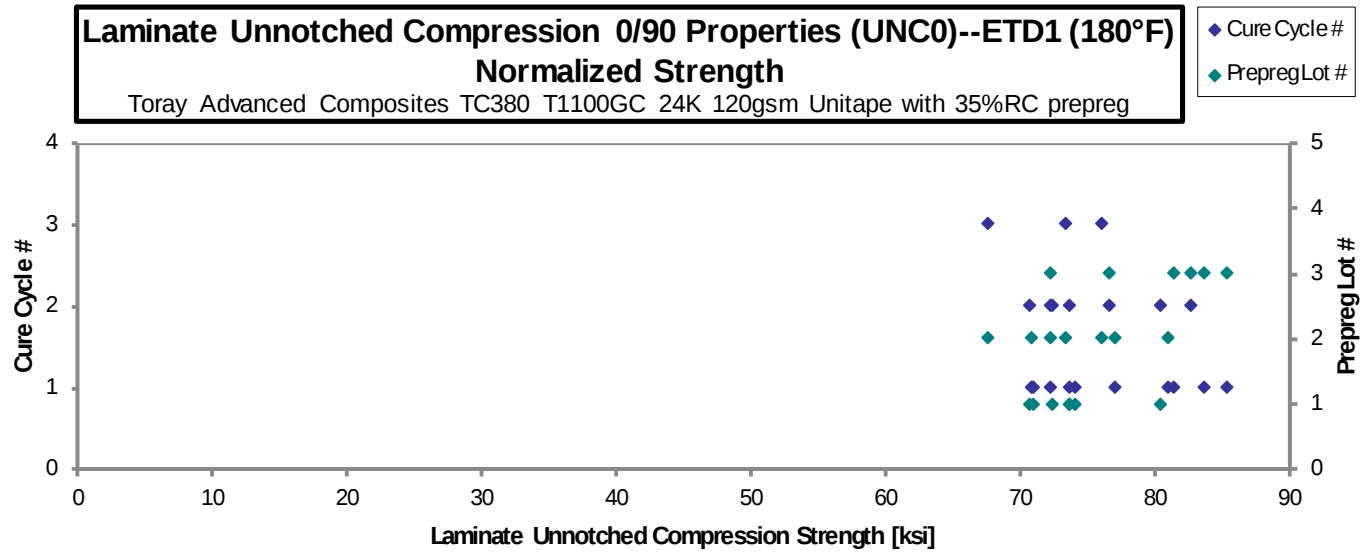
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDRA111C	A	C1	1	1	72.96	7.975	0.1017	21	BAB
TCDRA112C	A	C1	1	1	73.41	7.748	0.1016	21	BAB
TCDRA113C	A	C1	1	1	70.72	8.045	0.1011	21	BGM
TCDRA211C	A	C2	1	2	80.08	7.858	0.1011	21	HAT/HIT
TCDRA212C	A	C2	1	2	73.25	7.683	0.1012	21	BAB
TCDRA213C	A	C2	1	2	70.63	8.129	0.1007	21	BGM
TCDRA214C*	A	C2	1	2	72.72		0.1003	21	BGM
TCDRB111C	B	C1	2	1	69.56	7.361	0.1046	21	BAT
TCDRB112C	B	C1	2	1	78.06	7.908	0.1046	21	HAT/HIT
TCDRB113C	B	C1	2	1	68.84	7.738	0.1037	21	HAT
TCDRB114C*	B	C1	2	1	85.58		0.09062	21	HAT/HIT
TCDRB311C	B	C3	2	3	65.02	6.612	0.1047	21	BAT
TCDRB312C	B	C3	2	3	70.61	6.920	0.1045	21	BAT
TCDRB313C	B	C3	2	3	73.32	6.873	0.1045	21	BAB
TCDRC111C	C	C1	3	1	76.75	7.672	0.1068	21	BGM
TCDRC112C	C	C1	3	1	81.10	7.865	0.1060	21	BGM, HIT
TCDRC113C	C	C1	3	1	79.97	8.066	0.1054	21	BAT
TCDRC211C	C	C2	3	2	68.46	7.314	0.1063	21	BGM
TCDRC212C	C	C2	3	2	78.67	7.694	0.1058	21	BGM, HAT/HIT
TCDRC213C	C	C2	3	2	72.79	7.820	0.1061	21	M(B,H)AT

* Specimen was not gaged, only strength is tested.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004841	73.58	8.043
0.004840	74.02	7.812
0.004816	70.96	8.071
0.004814	80.32	7.881
0.004817	73.52	7.711
0.004797	70.58	8.124
0.004775	72.35	
0.004979	72.14	7.635
0.004979	80.96	8.202
0.004937	70.81	7.960
0.004315	76.93	
0.004985	67.52	6.867
0.004978	73.23	7.176
0.004974	75.98	7.122
0.005084	81.29	8.126
0.005046	85.26	8.268
0.005018	83.60	8.433
0.005062	72.19	7.713
0.005038	82.57	8.076
0.005051	76.59	8.228

Average 74.12 7.627
Standard Dev. 5.128 0.4386
Coeff. of Var. [%] 6.918 5.751
Min. 65.02 6.612
Max. 85.58 8.129
Number of Spec. 20 18

Average_{norm} 0.004907 75.72 7.858
Standard Dev._{norm} 5.014 0.4283
Coeff. of Var. [%]_{norm} 6.622 5.450
Min. 0.004315 67.52 6.867
Max. 0.005084 85.26 8.433
Number of Spec. 20 20 18



Laminate Unnotched Compression 0/90 Properties (UNC0)--ETW1 (180°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

0.004800

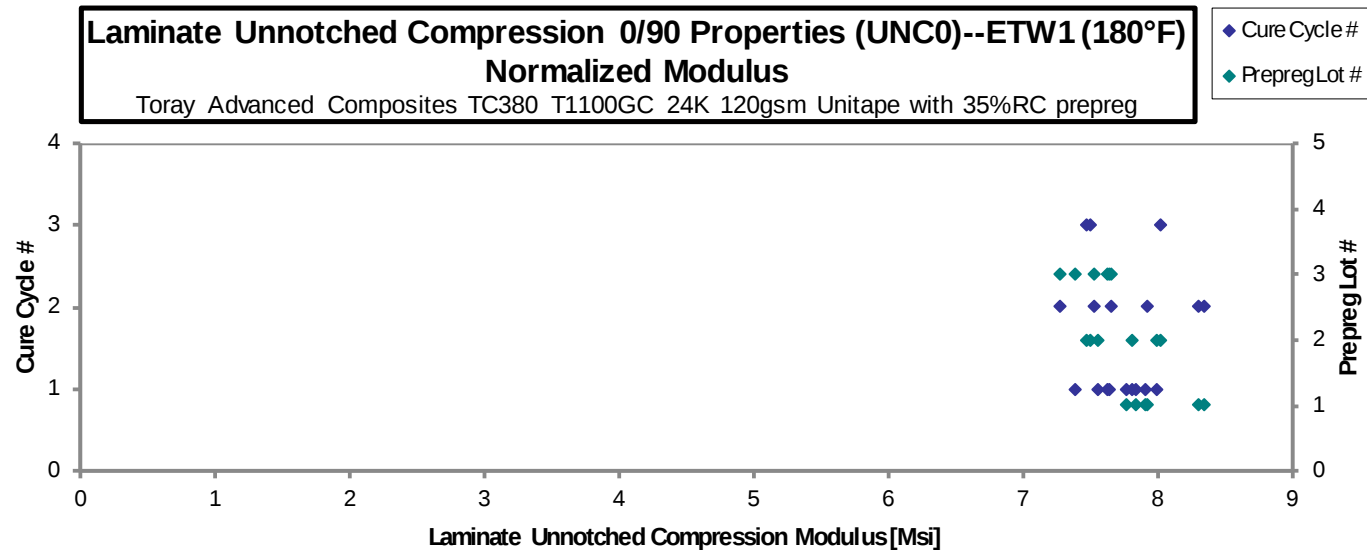
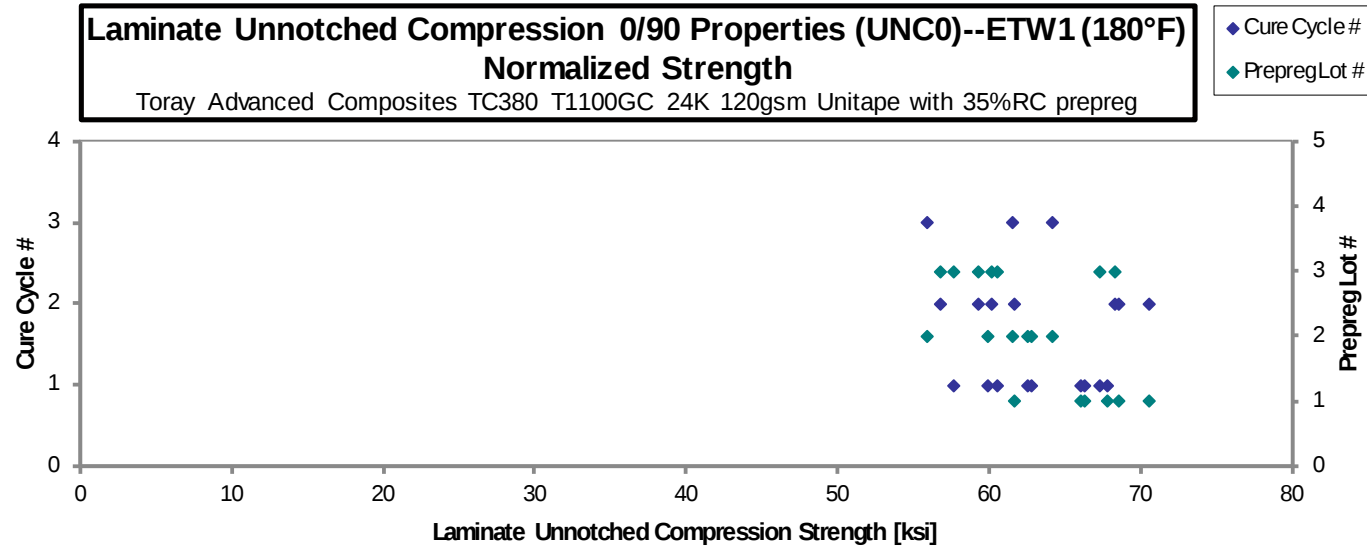
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDRA111D	A	C1	1	1	68.75	8.051	0.09733	21	M(B,H)GM
TCDRA112D	A	C1	1	1	67.57	8.016	0.09863	21	BAT
TCDRA113D	A	C1	1	1	68.38	7.973	0.1000	21	BAB
TCDRA211D	A	C2	1	2	69.15	7.986	0.1001	21	BGM
TCDRA212D	A	C2	1	2	62.41	8.408	0.09967	21	BAB, BAT
TCDRA213D	A	C2	1	2	71.68	8.473	0.09935	21	BAB, HIT
TCDRB111D	B	C1	2	1	67.23	8.087	0.09418	21	BAB, BAT
TCDRB112D	B	C1	2	1	61.82	8.061	0.09770	21	BAB, HIT
TCDRB113D	B	C1	2	1	63.07	8.059	0.1001	21	BGM
TCDRB311D	B	C3	2	3	55.44	7.430	0.1018	21	BAB
TCDRB312D	B	C3	2	3	64.11	7.466	0.1010	21	BAB
TCDRB313D	B	C3	2	3	62.30	8.128	0.09963	21	BAB
TCDRC111D	C	C1	3	1	59.00	7.208	0.1035	21	BAT
TCDRC112D	C	C1	3	1	57.59	7.631	0.1009	21	BGM
TCDRC113D	C	C1	3	1	68.54	7.782	0.09905	21	BAB, HIB
TCDRC211D	C	C2	3	2	66.25	7.304	0.1040	21	BAB
TCDRC212D	C	C2	3	2	58.70	7.571	0.1019	21	BAT
TCDRC213D	C	C2	3	2	56.80	7.283	0.1008	21	BAT
TCDRC214D*	C	C2	3	2	61.57		0.09857	21	M(B,H)AB, HIT

* Specimen was not gaged, only strength is tested.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004635	66.39	7.774
0.004697	66.11	7.844
0.004763	67.86	7.912
0.004764	68.64	7.926
0.004746	61.71	8.314
0.004731	70.65	8.351
0.004485	62.81	7.557
0.004652	59.92	7.813
0.004767	62.64	8.004
0.004846	55.98	7.501
0.004810	64.25	7.482
0.004744	61.57	8.034
0.004927	60.56	7.398
0.004806	57.66	7.640
0.004717	67.35	7.647
0.004953	68.37	7.537
0.004853	59.35	7.655
0.004802	56.82	7.286
0.004694	60.21	

Average 63.70 7.829
 Standard Dev. 4.775 0.3836
 Coeff. of Var. [%] 7.496 4.900
 Min. 55.44 7.208
 Max. 71.68 8.473
 Number of Spec. 19 18

Average_{norm} 0.004758 63.10 7.760
 Standard Dev._{norm} 4.350 0.2951
 Coeff. of Var. [%]_{norm} 6.894 3.803
 Min. 0.004485 55.98 7.286
 Max. 0.004953 70.65 8.351
 Number of Spec. 19 19 18



Laminate Unnotched Compression 0/90 Properties (UNC0)--ETW2 (250°F)

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

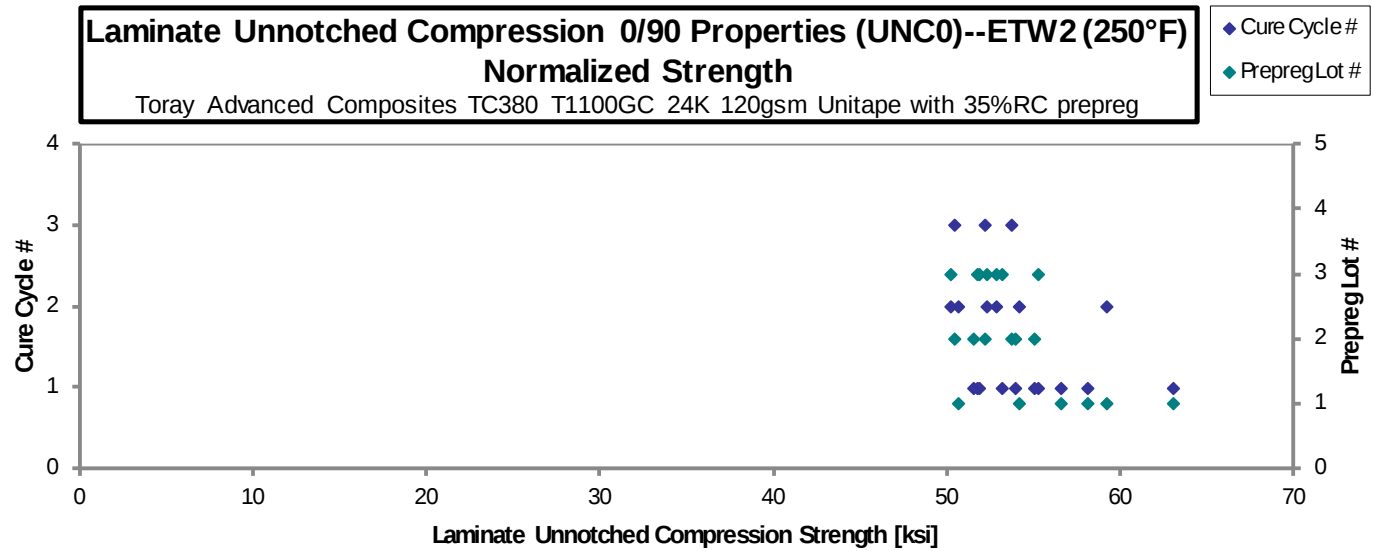
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCDRA111E	A	C1	1	1	55.75	7.934	0.1025	21	BAT	0.004881	56.69	8.068
TCDRA112E	A	C1	1	1	62.16	7.736	0.1024	21	BAT	0.004875	63.13	7.856
TCDRA113E	A	C1	1	1	57.16	7.565	0.1027	21	BAB	0.004889	58.22	7.706
TCDRA211E	A	C2	1	2	53.75	8.152	0.09507	21	BAT	0.004527	50.70	7.688
TCDRA212E	A	C2	1	2	56.62	8.295	0.09660	21	HAB/HIB	0.004600	54.26	7.950
TCDRA213E	A	C2	1	2	60.49	8.194	0.09875	21	BAT	0.004702	59.26	8.027
TCDRB111E	B	C1	2	1	50.59	7.072	0.1076	21	HAT/HIT	0.005125	54.01	7.550
TCDRB112E	B	C1	2	1	51.98	7.582	0.1070	21	HAT/HIT	0.005094	55.17	8.047
TCDRB113E	B	C1	2	1	48.43	6.777	0.1075	21	HAT/HIT	0.005121	51.67	7.230
TCDRB311E	B	C3	2	3	54.26	8.964	0.09388	21	BAB	0.004471	50.54	8.348
TCDRB312E	B	C3	2	3	54.82	8.320	0.09610	21	BAT	0.004576	52.26	7.932
TCDRB313E	B	C3	2	3	55.28	8.125	0.09802	21	BAT	0.004667	53.76	7.900
TCDRC111E	C	C1	3	1	52.48	7.311	0.1023	21	HAT/HIT	0.004869	53.23	7.417
TCDRC112E	C	C1	3	1	52.12	7.461	0.1004	21	HAB	0.004781	51.92	7.431
TCDRC113E	C	C1	3	1	57.01	7.685	0.09792	21	HAB	0.004663	55.38	7.465
TCDRC114E*	C	C1	3	1	54.91		0.09515	21	HAB	0.004531	51.83	
TCDRC211E	C	C2	3	2	54.18	7.669	0.09365	21	HAB/HIB	0.004460	50.34	7.125
TCDRC212E	C	C2	3	2	53.78	7.459	0.09810	21	HAB	0.004671	52.34	7.259
TCDRC213E	C	C2	3	2	53.18	7.406	0.1004	21	HAB	0.004783	52.98	7.379

* Specimen was not gaged, only strength is tested.

Average 54.68 7.762
 Standard Dev. 3.209 0.5192
 Coeff. of Var. [%] 5.869 6.689
 Min. 48.43 6.777
 Max. 62.16 8.964
 Number of Spec. 19 18

Average_{norm} 0.004752 54.09 7.688
 Standard Dev._{norm} 3.312 0.3465
 Coeff. of Var. [%]_{norm} 6.123 4.507
 Min. 0.004460 50.34 7.125
 Max. 0.005125 63.13 8.348
 Number of Spec. 19 19 18



4.12 “25/50/25” Unnotched Compression 1 Properties (UNC1)

Laminate Unnotched Compression Properties (UNC1)--CTD (-65°F)
Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

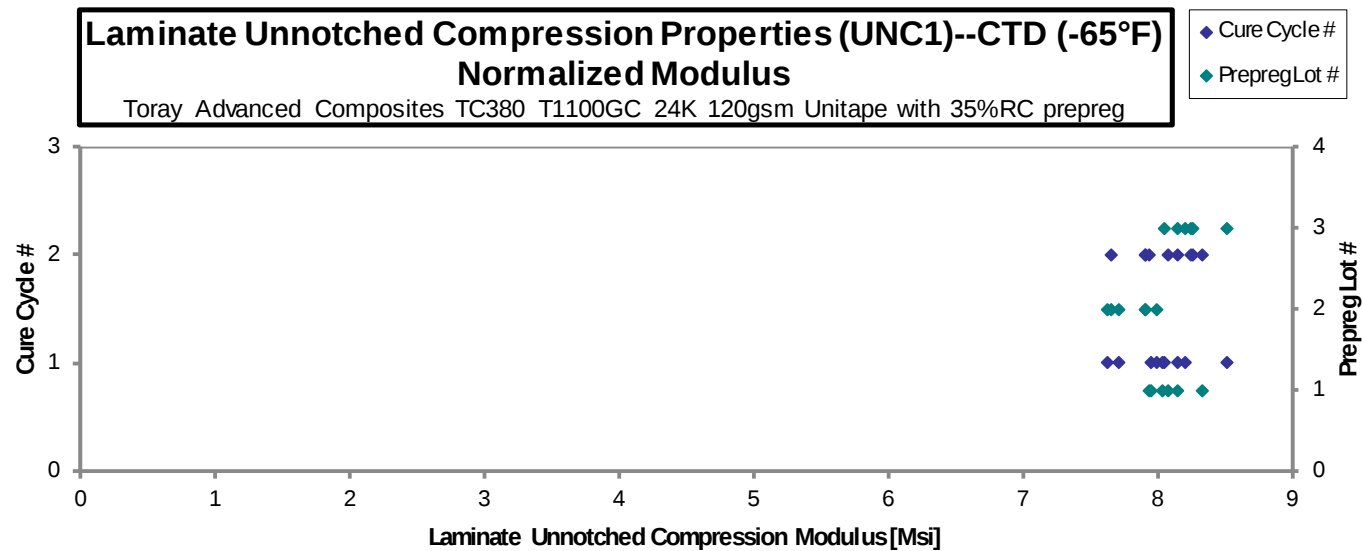
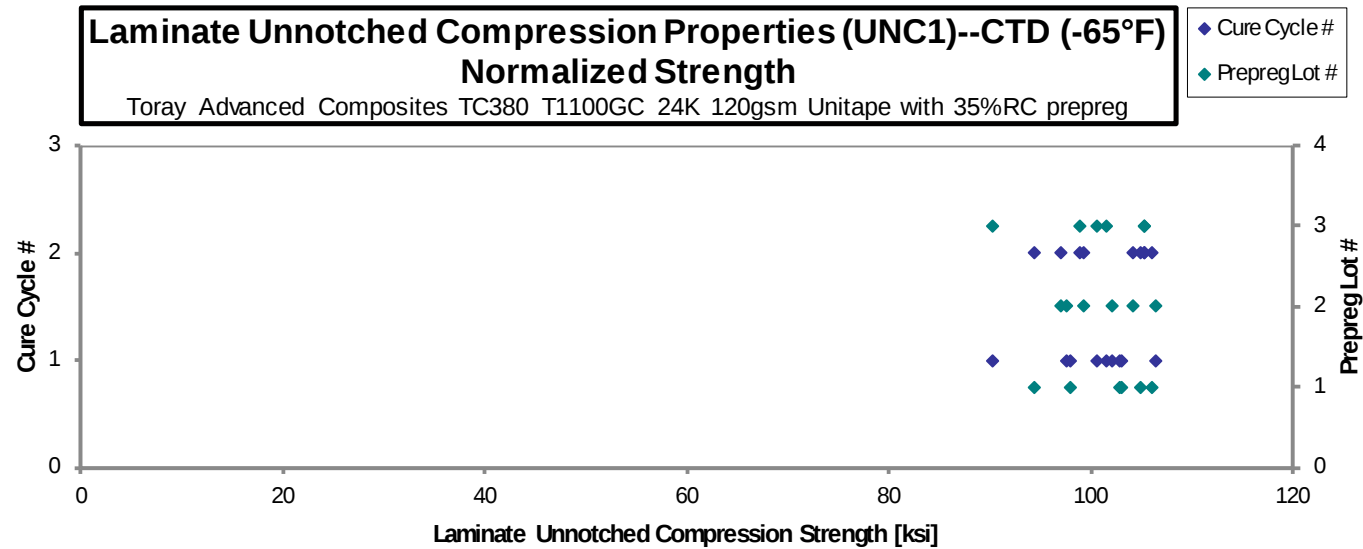
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDWA111B	A	C1	1	1	103.6	8.092	0.1146	24	M(B,H)AT
TCDWA112B	A	C1	1	1	98.20	7.983	0.1148	24	BGM
TCDWA113B	A	C1	1	1	102.9	8.165	0.1151	24	BGM
TCDWA211B	A	C2	1	2	106.5	8.474	0.1134	24	BGM
TCDWA212B	A	C2	1	2	95.60	8.046	0.1138	24	M(B,H)GM
TCDWA213B	A	C2	1	2	107.2	8.176	0.1139	24	BGM
TCDWB111B	B	C1	2	1	105.7	7.947	0.1161	24	BGM
TCDWB112B	B	C1	2	1	95.23	7.461	0.1179	24	BGM
TCDWB113B	B	C1	2	1	98.25	7.440	0.1196	24	BGM
TCDWB211B	B	C2	2	2	100.1	7.993	0.1141	24	BGM
TCDWB212B	B	C2	2	2	96.12	7.833	0.1163	24	BGM
TCDWB213B	B	C2	2	2	102.6	7.549	0.1170	24	BGM
TCDWC111B	C	C1	3	1	100.5	8.124	0.1163	24	BGM
TCDWC112B	C	C1	3	1	101.1	8.568	0.1145	24	BGM
TCDWC113B	C	C1	3	1	92.45	8.265	0.1124	24	BAT, BAB
TCDWC211B	C	C2	3	2	104.5	8.218	0.1159	24	BGM
TCDWC212B	C	C2	3	2	97.04	8.105	0.1173	24	BGM
TCDWC213B	C	C2	3	2	102.5	7.942	0.1183	24	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004774	103.1	8.047
0.004782	97.83	7.953
0.004796	102.8	8.158
0.004726	104.9	8.344
0.004742	94.44	7.948
0.004744	105.9	8.081
0.004835	106.5	8.006
0.004913	97.46	7.635
0.004983	102.0	7.724
0.004756	99.17	7.919
0.004847	97.05	7.909
0.004873	104.2	7.664
0.004847	101.5	8.204
0.004771	100.5	8.516
0.004682	90.18	8.062
0.004829	105.2	8.268
0.004888	98.81	8.253
0.004928	105.3	8.154

Average 100.6 8.021
 Standard Dev. 4.250 0.3063
 Coeff. of Var. [%] 4.226 3.818
 Min. 92.45 7.440
 Max. 107.2 8.568
 Number of Spec. 18 18

Average_{norm} 0.004818 100.9 8.047
 Standard Dev._{norm} 4.412 0.2333
 Coeff. of Var. [%]_{norm} 4.372 2.900
 Min. 0.004682 90.18 7.635
 Max. 0.004983 106.5 8.516
 Number of Spec. 18 18 18



Laminate Unnotched Compression Properties (UNC1)--RTD (70°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDWA111A*	A	C1	1	1	90.46	8.334	0.1088	24	M(B,H)GM
TCDWA112A*	A	C1	1	1	85.74	8.408	0.1110	24	BGM
TCDWA113A	A	C1	1	1	88.52	8.194	0.1126	24	HAT, HIT
TCDWA114A**	A	C1	1	1	90.56		0.1138	24	HAT, HIT
TCDWA211A	A	C2	1	2	94.19	8.369	0.1081	24	HAB
TCDWA212A	A	C2	1	2	92.91	8.370	0.1097	24	BGM
TCDWA213A	A	C2	1	2	88.06	8.272	0.1127	24	BGM
TCDWB111A	B	C1	2	1	89.21	8.429	0.1057	24	BAB, HIB
TCDWB112A	B	C1	2	1	98.90	8.547	0.1087	24	BAB
TCDWB113A	B	C1	2	1	89.51	8.038	0.1121	24	BAT, HIT
TCDWB114A**	B	C1	2	1	91.87		0.1140	24	BGM
TCDWB211A	B	C2	2	2	91.70	8.472	0.1034	24	BGM
TCDWB212A	B	C2	2	2	91.96	8.426	0.1080	24	BAB
TCDWB213A***	B	C2	2	2		8.207	0.1104	24	HIT
TCDWB214A**	B	C2	2	2	85.28		0.1127	24	BGM
TCDWC111A	C	C1	3	1	78.67	7.724	0.1197	24	BGM
TCDWC112A	C	C1	3	1	84.46	7.715	0.1184	24	BGM
TCDWC113A	C	C1	3	1	82.85	7.776	0.1173	24	BGM
TCDWC211A	C	C2	3	2	93.46	8.196	0.1081	24	HAB, HIB
TCDWC212A	C	C2	3	2	93.27	8.121	0.1103	24	BAT
TCDWC213A	C	C2	3	2	91.87	7.832	0.1128	24	BAT
TCDWC214A**	C	C2	3	2	90.17		0.1148	24	BAT

* Modulus are averaged values of 2 strain gages.

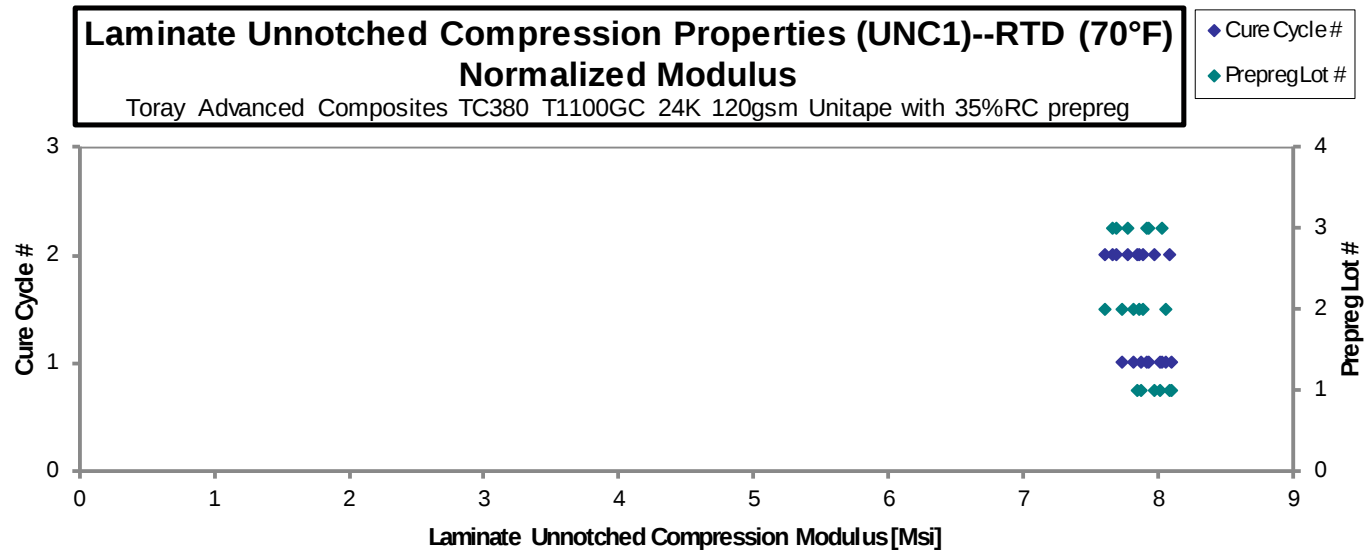
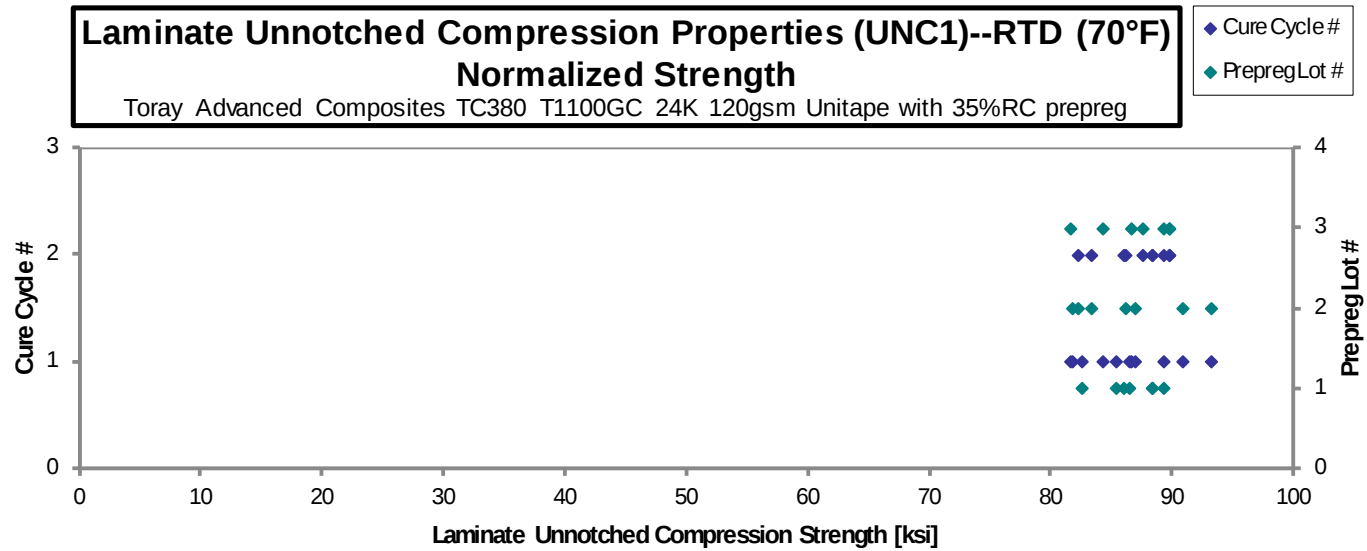
** Specimen was not gaged, only strength is tested.

*** Strength not reported due to unacceptable failure mode.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004533	85.43	7.871
0.004624	82.58	8.099
0.004693	86.55	8.012
0.004742	89.46	
0.004504	88.39	7.853
0.004571	88.47	7.971
0.004694	86.13	8.090
0.004405	81.87	7.735
0.004528	93.29	8.062
0.004669	87.06	7.819
0.004749	90.90	
0.004308	82.29	7.603
0.004499	86.19	7.897
0.004599		7.863
0.004694	83.40	
0.004989	81.77	8.028
0.004932	86.78	7.927
0.004885	84.32	7.915
0.004503	87.68	7.690
0.004597	89.33	7.778
0.004699	89.94	7.668
0.004783	89.85	

Average 89.70 8.191
Standard Dev. 4.458 0.2689
Coeff. of Var. [%] 4.970 3.283
Min. 78.67 7.715
Max. 98.90 8.547
Number of Spec. 21 18

Average_{norm} 0.004645 86.75 7.882
Standard Dev._{norm} 3.208 0.1476
Coeff. of Var. [%]_{norm} 3.698 1.873
Min. 0.004308 81.77 7.603
Max. 0.004989 93.29 8.099
Number of Spec. 22 21 18



**Laminate Unnotched Compression Properties (UNC1)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

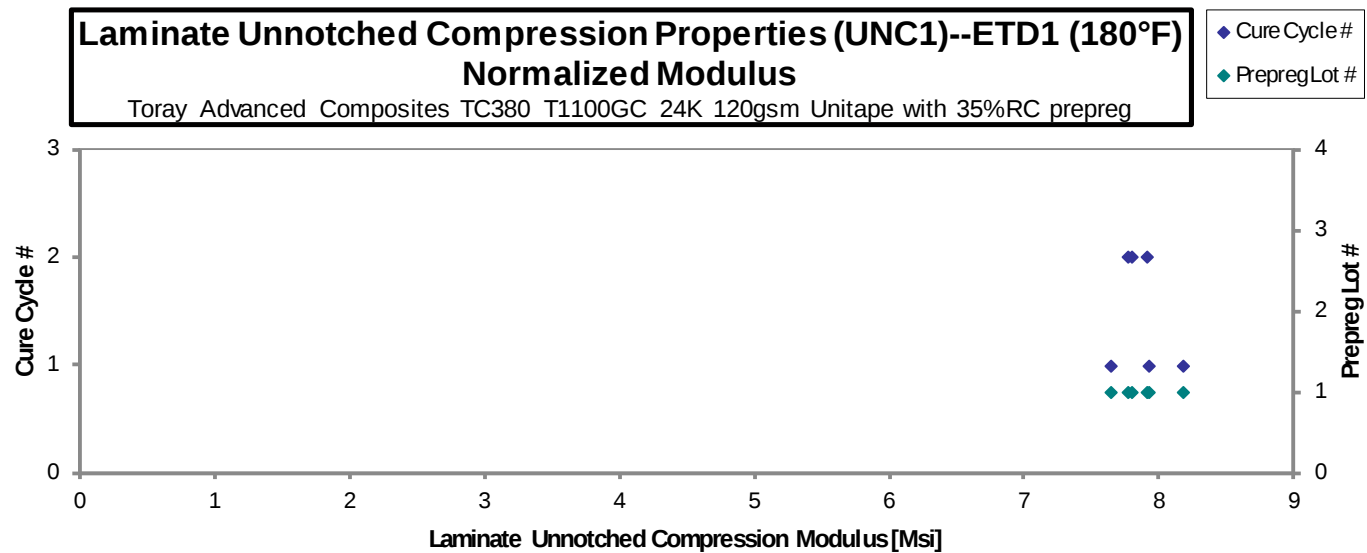
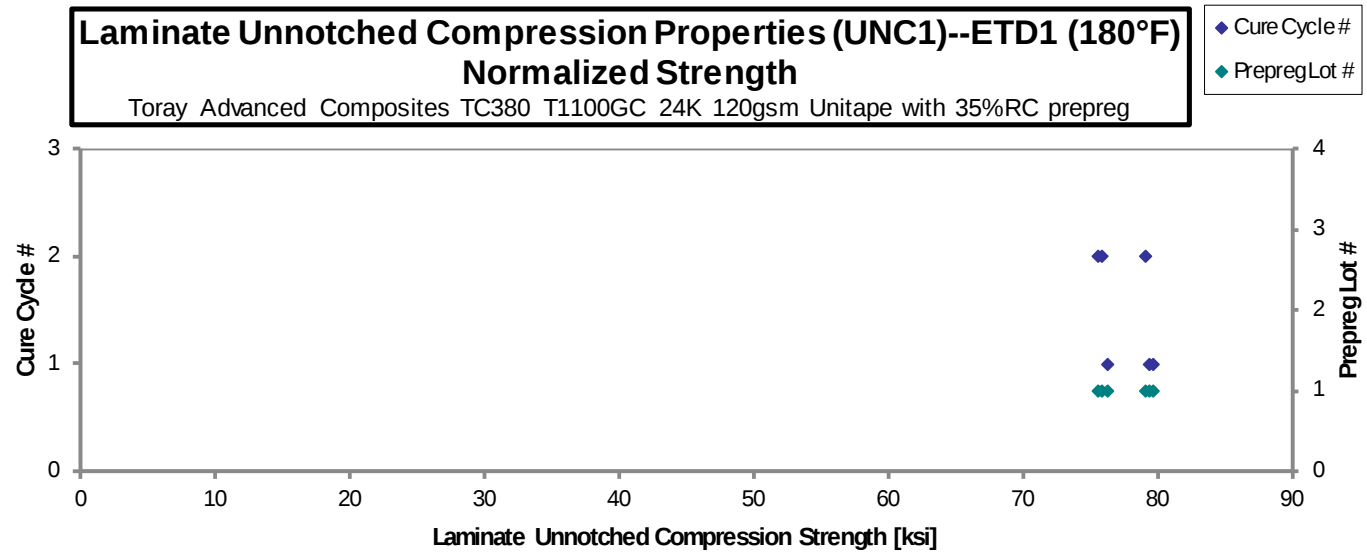
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDWA111C	A	C1	1	1	76.78	7.688	0.1146	24	BGM
TCDWA112C	A	C1	1	1	80.12	7.992	0.1142	24	BGM
TCDWA113C	A	C1	1	1	80.40	8.252	0.1143	24	BAT
TCDWA211C	A	C2	1	2	76.75	8.014	0.1139	24	BGM
TCDWA212C	A	C2	1	2	76.61	7.880	0.1138	24	BGM
TCDWA213C	A	C2	1	2	79.86	7.887	0.1141	24	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004774	76.36	7.645
0.004760	79.45	7.925
0.004761	79.75	8.185
0.004746	75.88	7.923
0.004740	75.66	7.782
0.004753	79.08	7.809

Average 78.42 7.952
Standard Dev. 1.878 0.1869
Coeff. of Var. [%] 2.395 2.351
Min. 76.61 7.688
Max. 80.40 8.252
Number of Spec. 6 6

Average_{norm} 0.004756 77.70 7.878
Standard Dev._{norm} 1.919 0.1826
Coeff. of Var. [%]_{norm} 2.470 2.318
Min. 0.004740 75.66 7.645
Max. 0.004774 79.75 8.185
Number of Spec. 6 6 6



Laminate Unnotched Compression Properties (UNC1)--ETW1 (180°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

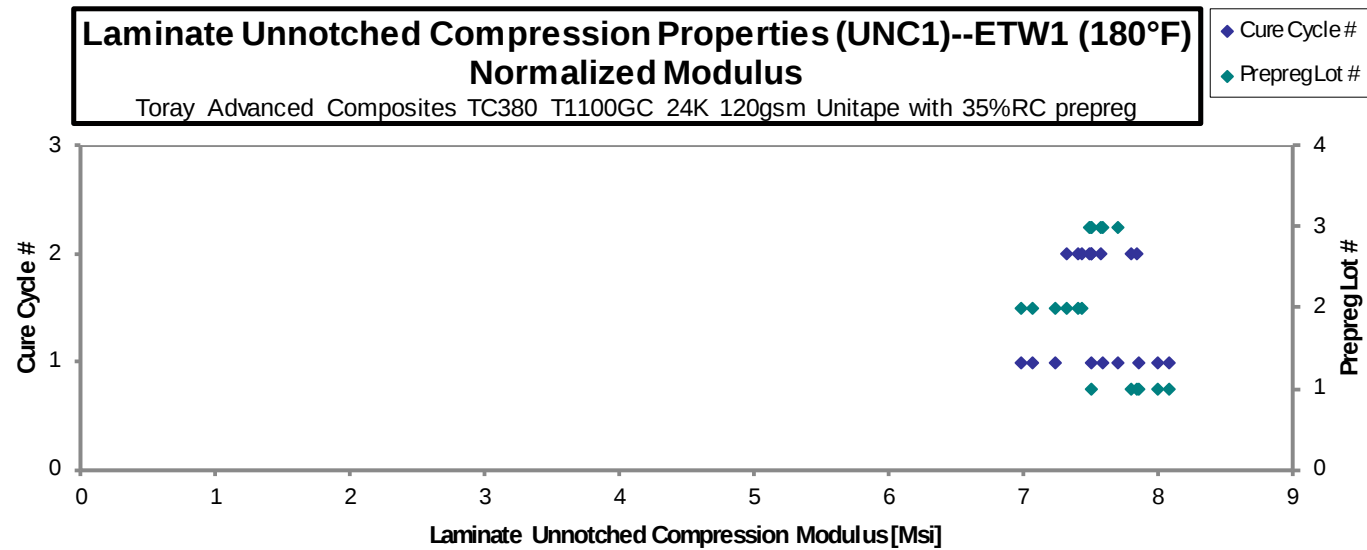
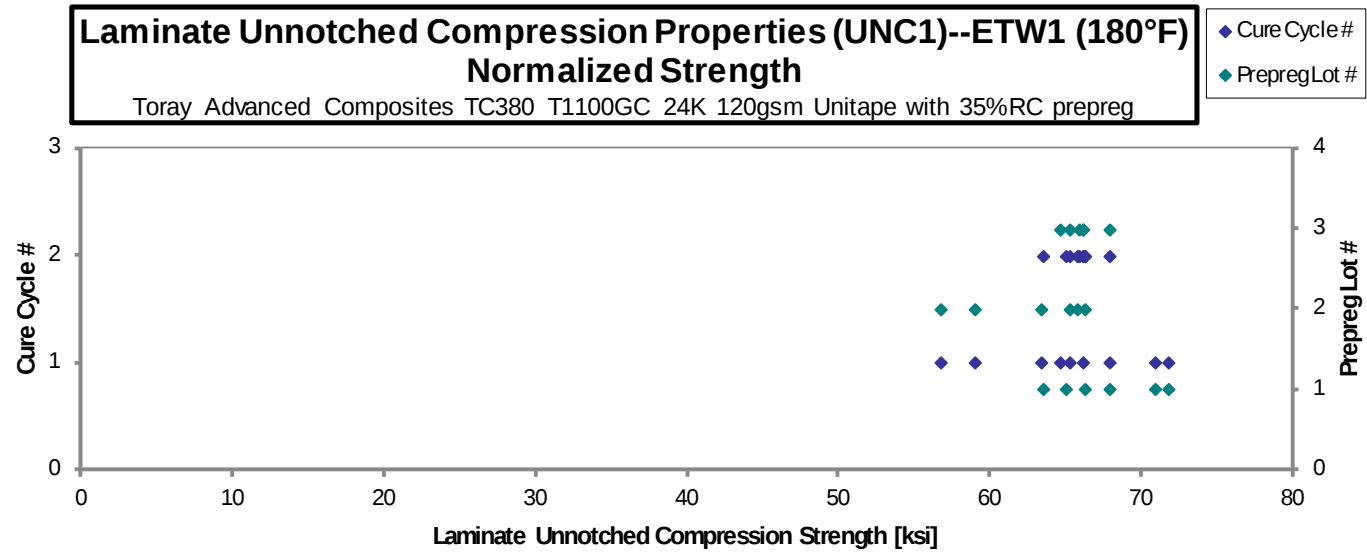
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDWA111D	A	C1	1	1	71.33	8.466	0.1098	24	BAT
TCDWA112D	A	C1	1	1	74.08	8.238	0.1118	24	BAT, HIT
TCDWA113D	A	C1	1	1	72.08	7.981	0.1134	24	BGM, BAT, HIT
TCDWA211D	A	C2	1	2	64.55	7.610	0.1135	24	M(B,H)AT
TCDWA212D	A	C2	1	2	66.24	7.948	0.1131	24	M(B,H)GM
TCDWA213D	A	C2	1	2	68.23	8.058	0.1120	24	HAT, HIT
TCDWB111D	B	C1	2	1	61.28	6.825	0.1192	24	BGM
TCDWB112D	B	C1	2	1	54.40	6.687	0.1202	24	BGM
TCDWB113D	B	C1	2	1	57.75	7.065	0.1179	24	BGM
TCDWB211D	B	C2	2	2	64.04	7.178	0.1193	24	BAT
TCDWB212D	B	C2	2	2	63.58	7.134	0.1183	24	BGM
TCDWB213D	B	C2	2	2	64.06	7.205	0.1184	24	M(B,H)GM
TCDWC111D	C	C1	3	1	70.26	8.282	0.1071	24	BAT
TCDWC112D	C	C1	3	1	61.49	7.123	0.1213	24	BGM
TCDWC113D	C	C1	3	1	62.90	7.202	0.1212	24	BAT
TCDWC211D	C	C2	3	2	63.71	7.220	0.1198	24	BGM
TCDWC212D	C	C2	3	2	63.67	7.306	0.1193	24	M(B,H)AT
TCDWC213D	C	C2	3	2	65.74	7.253	0.1190	24	BAT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004576	68.00	8.071
0.004657	71.87	7.992
0.004725	70.95	7.856
0.004729	63.60	7.498
0.004711	65.02	7.801
0.004668	66.35	7.837
0.004965	63.38	7.059
0.005006	56.74	6.974
0.004913	59.10	7.230
0.004972	66.33	7.435
0.004927	65.26	7.323
0.004931	65.82	7.402
0.004463	65.32	7.700
0.005053	64.73	7.499
0.005051	66.19	7.578
0.004990	66.23	7.505
0.004969	65.92	7.564
0.004958	67.90	7.491

Average 64.97 7.488
 Standard Dev. 4.944 0.5359
 Coeff. of Var. [%] 7.611 7.157
 Min. 54.40 6.687
 Max. 74.08 8.466
 Number of Spec. 18 18

Average_{norm} 0.004848 65.48 7.545
 Standard Dev._{norm} 3.529 0.2973
 Coeff. of Var. [%]_{norm} 5.389 3.940
 Min. 0.004463 56.74 6.974
 Max. 0.005053 71.87 8.071
 Number of Spec. 18 18 18



Laminate Unnotched Compression Properties (UNC1)--ETW2 (250°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

0.004800

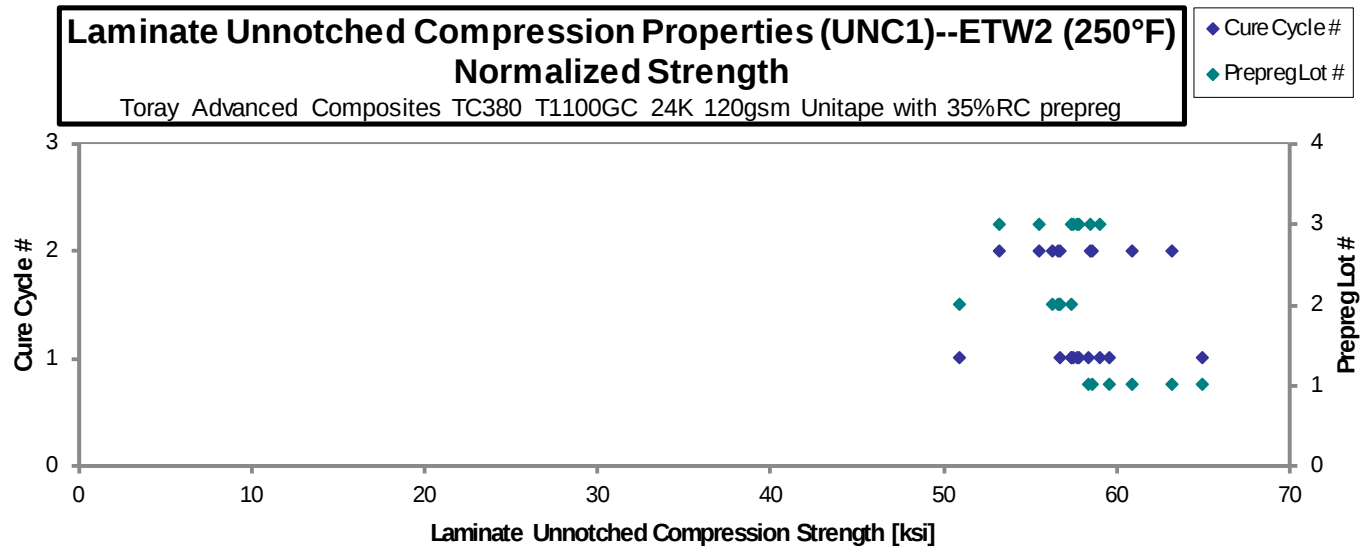
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDWA111E	A	C1	1	1	59.66	8.033	0.1150	24	BGM
TCDWA112E	A	C1	1	1	65.20	7.793	0.1147	24	BGM
TCDWA113E	A	C1	1	1	58.32	7.622	0.1153	24	BGM
TCDWA211E	A	C2	1	2	62.53	7.959	0.1079	24	M(B,H)AT
TCDWA212E	A	C2	1	2	65.94	8.124	0.1104	24	BGM
TCDWA213E	A	C2	1	2	62.67	7.976	0.1119	24	BAT
TCDWB111E	B	C1	2	1	57.46	7.427	0.1136	24	HAT, HIT
TCDWB112E	B	C1	2	1	59.18	7.602	0.1116	24	BGM
TCDWB113E	B	C1	2	1	53.58	7.311	0.1094	24	HAT
TCDWB211E	B	C2	2	2	56.53	7.631	0.1154	24	BGM
TCDWB212E	B	C2	2	2	58.01	7.480	0.1126	24	BAB
TCDWB213E	B	C2	2	2	59.58	7.384	0.1088	24	BAB
TCDWC111E	C	C1	3	1	55.72	7.094	0.1194	24	HAB, HIB
TCDWC112E	C	C1	3	1	56.75	7.338	0.1171	24	BAT
TCDWC113E	C	C1	3	1	57.64	7.374	0.1145	24	BAB, HIB
TCDWC114E*	C	C1	3	1	60.67		0.1121	24	HAB, HIB
TCDWC115E*	C	C1	3	1	61.00		0.1085	24	HAB, HIB
TCDWC211E	C	C2	3	2	55.30	7.361	0.1155	24	HAT
TCDWC212E	C	C2	3	2	59.20	7.638	0.1137	24	BGM
TCDWC213E	C	C2	3	2	54.94	7.279	0.1114	24	BAT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004790	59.53	8.017
0.004778	64.90	7.757
0.004804	58.37	7.629
0.004494	58.55	7.453
0.004599	63.17	7.784
0.004664	60.89	7.750
0.004731	56.64	7.321
0.004648	57.31	7.361
0.004558	50.88	6.942
0.004807	56.61	7.642
0.004693	56.72	7.313
0.004533	56.26	6.973
0.004974	57.74	7.350
0.004880	57.69	7.460
0.004770	57.28	7.328
0.004670	59.03	
0.004520	57.45	
0.004814	55.46	7.382
0.004736	58.41	7.536
0.004642	53.12	7.039

* Specimen was not gaged, only strength is tested.

Average 58.99 7.579
 Standard Dev. 3.303 0.2947
 Coeff. of Var. [%] 5.598 3.888
 Min. 53.58 7.094
 Max. 65.94 8.124
 Number of Spec. 20 18

Average_{norm} 0.004705 57.80 7.446
 Standard Dev._{norm} 3.050 0.2890
 Coeff. of Var. [%]_{norm} 5.277 3.882
 Min. 0.004494 50.88 6.942
 Max. 0.004974 64.90 8.017
 Number of Spec. 20 20 18



4.13 “10/80/10” Unnotched Compression 2 Properties (UNC2)

Laminate Unnotched Compression Properties (UNC2)--CTD (-65°F)
Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

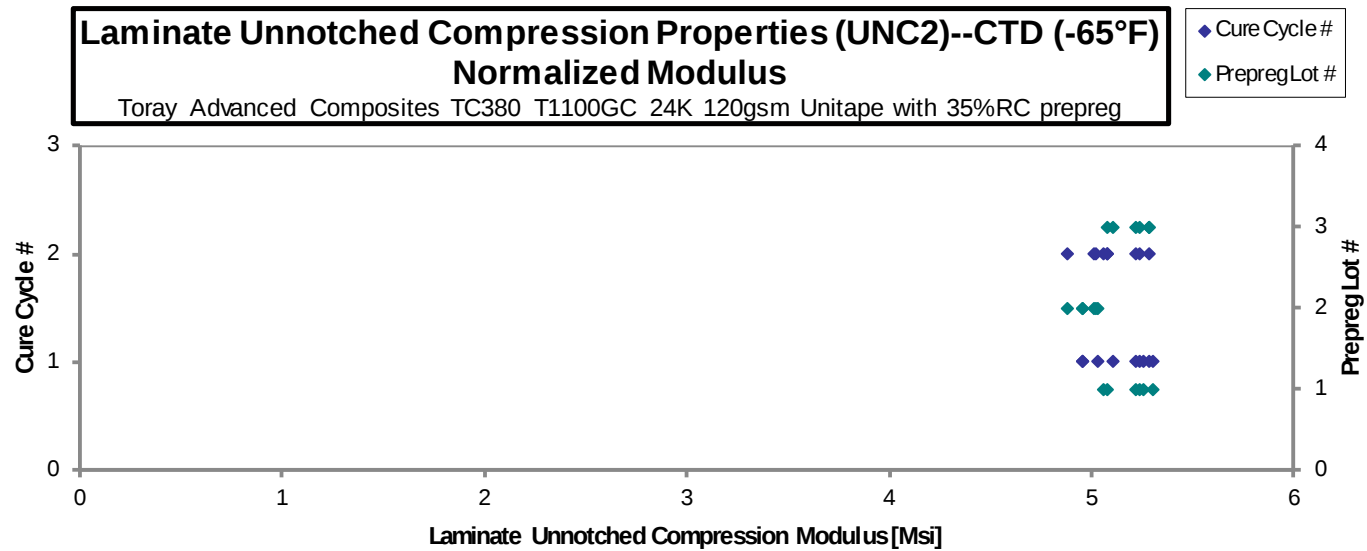
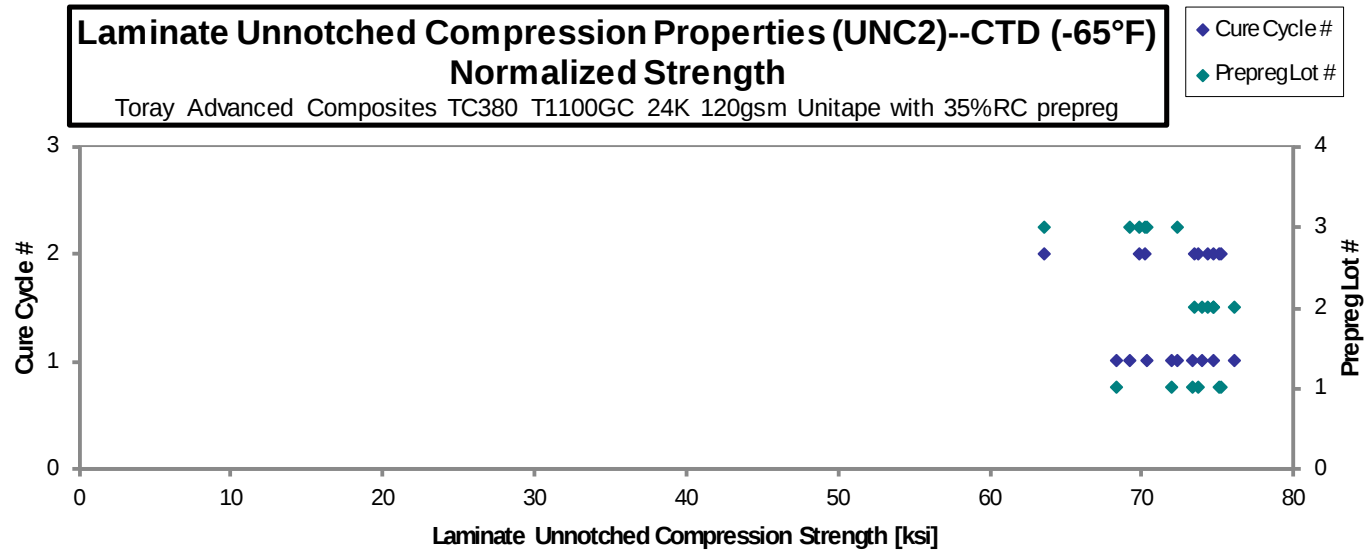
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDXA111B	A	C1	1	1	69.89	5.417	0.09402	20	BGM
TCDXA112B	A	C1	1	1	73.33	5.316	0.09435	20	BAB
TCDXA113B	A	C1	1	1	74.49	5.340	0.09453	20	BGM
TCDXA211B	A	C2	1	2	76.18	5.311	0.09468	20	BGM
TCDXA212B	A	C2	1	2	75.99	5.127	0.09518	20	BGM
TCDXA213B	A	C2	1	2	74.14	5.089	0.09550	20	BGM
TCDXB111B	B	C1	2	1	73.20	4.926	0.09805	20	BGM
TCDXB112B	B	C1	2	1	73.40	4.779	0.09963	20	BGM
TCDXB113B	B	C1	2	1	70.79	4.743	0.1004	20	BGM
TCDXB211B	B	C2	2	2	72.95	4.788	0.09787	20	BGM
TCDXB212B	B	C2	2	2	70.68	4.827	0.09988	20	BGM
TCDXB213B	B	C2	2	2	71.81	4.817	0.09992	20	BGM
TCDXC111B	C	C1	3	1	68.76	5.069	0.09667	20	BGM
TCDXC112B	C	C1	3	1	68.22	5.123	0.09900	20	BGM
TCDXC113B	C	C1	3	1	69.34	5.021	0.1002	20	BGM
TCDXC211B	C	C2	3	2	69.89	5.190	0.09653	20	BGM
TCDXC212B	C	C2	3	2	68.82	5.206	0.09747	20	BGM
TCDXC213B	C	C2	3	2	61.25	4.892	0.09970	20	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004701	68.45	5.305
0.004718	72.07	5.225
0.004727	73.35	5.259
0.004734	75.14	5.238
0.004759	75.34	5.083
0.004775	73.76	5.063
0.004903	74.76	5.032
0.004982	76.17	4.960
0.005022	74.06	4.962
0.004893	74.37	4.881
0.004994	73.54	5.023
0.004996	74.74	5.013
0.004833	69.24	5.104
0.004950	70.35	5.284
0.005008	72.35	5.239
0.004827	70.28	5.219
0.004873	69.87	5.286
0.004985	63.61	5.080

Average 71.28 5.055
Standard Dev. 3.520 0.2164
Coeff. of Var. [%] 4.938 4.282
Min. 61.25 4.743
Max. 76.18 5.417
Number of Spec. 18 18

Average_{norm} 0.004871 72.30 5.125
Standard Dev._{norm} 3.162 0.1326
Coeff. of Var. [%]_{norm} 4.373 2.588
Min. 0.004701 63.61 4.881
Max. 0.005022 76.17 5.305
Number of Spec. 18 18 18



**Laminate Unnotched Compression Properties (UNC2)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

0.004800

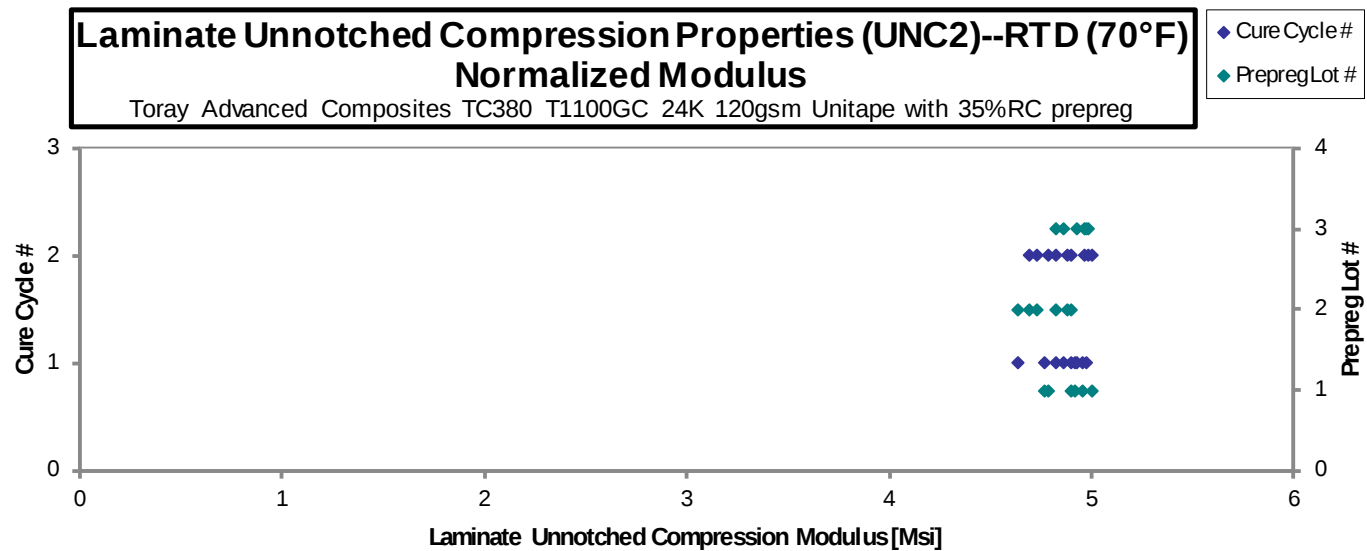
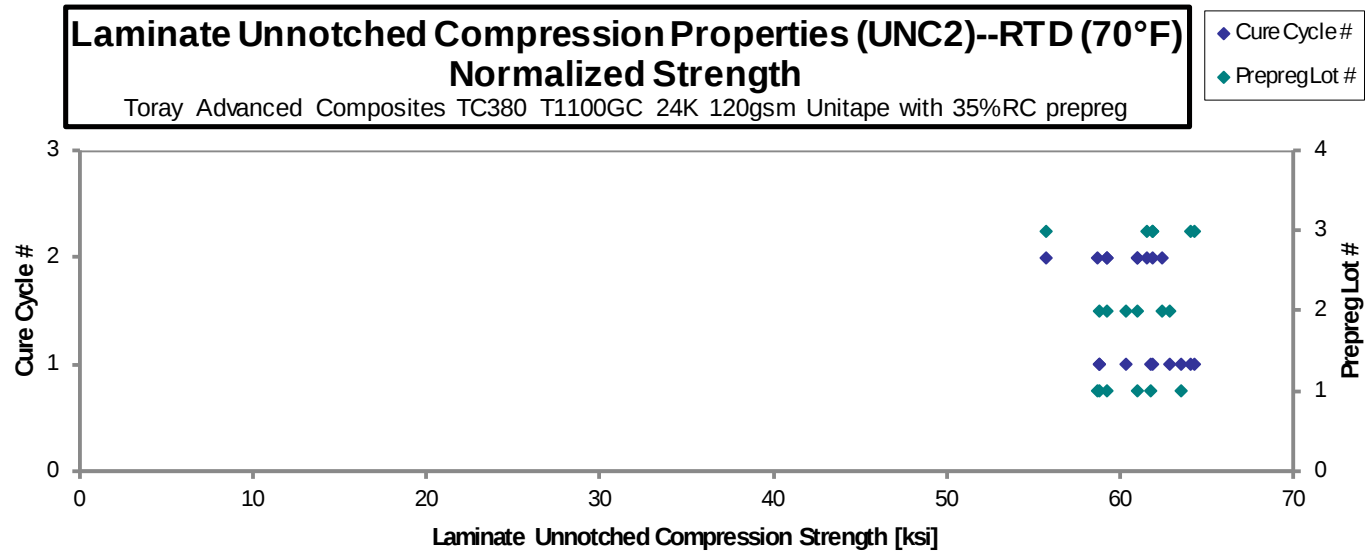
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDXA111A*	A	C1	1	1	62.12	5.043	0.09090	20	BGM
TCDXA112A*	A	C1	1	1	64.23	5.159	0.09232	20	BGM
TCDXA113A	A	C1	1	1	65.44	5.069	0.09318	20	BGM
TCDXA211A	A	C2	1	2	63.26	5.334	0.09007	20	BGM
TCDXA212A	A	C2	1	2	61.16	4.988	0.09222	20	BGM
TCDXA213A	A	C2	1	2	62.73	5.035	0.09350	20	BAB
TCDXB111A	B	C1	2	1	65.71	5.338	0.08815	20	BAB
TCDXB112A	B	C1	2	1	62.17	4.907	0.09082	20	BGM
TCDXB113A	B	C1	2	1	64.46	4.944	0.09375	20	BAB
TCDXB211A	B	C2	2	2	64.13	5.120	0.08870	20	BGM
TCDXB212A	B	C2	2	2	65.05	4.882	0.09225	20	BGM
TCDXB213A	B	C2	2	2	62.14	4.976	0.09425	20	BGM
TCDXC111A	C	C1	3	1	69.12	5.370	0.08900	20	BGM
TCDXC112A	C	C1	3	1	67.51	5.102	0.09145	20	BGM
TCDXC113A	C	C1	3	1	63.27	5.043	0.09390	20	BGM
TCDXC211A	C	C2	3	2	66.36	5.339	0.08963	20	M(B,H)AB
TCDXC212A	C	C2	3	2	58.46	5.203	0.09160	20	BGM
TCDXC213A	C	C2	3	2	63.40	4.964	0.09327	20	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004545	58.82	4.775
0.004616	61.76	4.961
0.004659	63.52	4.920
0.004503	59.35	5.004
0.004611	58.75	4.792
0.004675	61.10	4.904
0.004408	60.34	4.902
0.004541	58.82	4.642
0.004688	62.95	4.828
0.004435	59.25	4.730
0.004613	62.51	4.691
0.004713	61.00	4.885
0.004450	64.08	4.978
0.004573	64.31	4.860
0.004695	61.89	4.932
0.004482	61.96	4.985
0.004580	55.78	4.964
0.004663	61.60	4.823

* Modulus are averaged values of 2 strain gages.

Average	63.93	5.101
Standard Dev.	2.455	0.1576
Coeff. of Var. [%]	3.841	3.090
Min.	58.46	4.882
Max.	69.12	5.370
Number of Spec.	18	18

Average _{norm}	0.004580	60.99	4.865
Standard Dev. _{norm}		2.217	0.1060
Coeff. of Var. [%] _{norm}		3.635	2.179
Min.	0.004408	55.78	4.642
Max.	0.004713	64.31	5.004
Number of Spec.	18	18	18



**Laminate Unnotched Compression Properties (UNC2)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

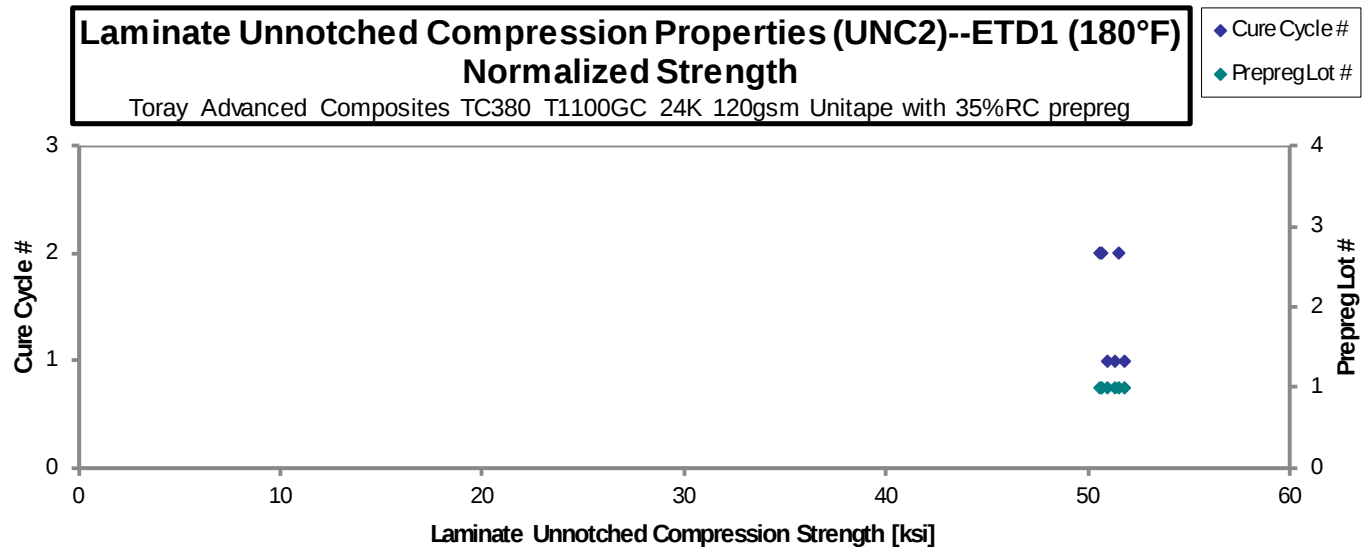
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDXA111C	A	C1	1	1	52.04	4.828	0.09463	20	M(B,H)GM
TCDXA112C	A	C1	1	1	51.87	4.714	0.09435	20	BGM
TCDXA113C	A	C1	1	1	52.33	4.733	0.09490	20	BGM
TCDXA211C	A	C2	1	2	51.12	4.771	0.09518	20	BGM
TCDXA212C	A	C2	1	2	51.00	4.600	0.09520	20	BGM
TCDXA213C	A	C2	1	2	52.09	4.792	0.09490	20	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004732	51.30	4.759
0.004718	50.98	4.633
0.004745	51.73	4.679
0.004759	50.69	4.730
0.004760	50.57	4.561
0.004745	51.49	4.737

Average 51.74 4.740
Standard Dev. 0.5514 0.07971
Coeff. of Var. [%] 1.066 1.682
Min. 51.00 4.600
Max. 52.33 4.828
Number of Spec. 6 6

Average_{norm} 0.004743 51.13 4.683
Standard Dev._{norm} 0.4603 0.07516
Coeff. of Var. [%]_{norm} 0.9003 1.605
Min. 0.004718 50.57 4.561
Max. 0.004760 51.73 4.759
Number of Spec. 6 6 6



Laminate Unnotched Compression Properties (UNC2)--ETW1 (180°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

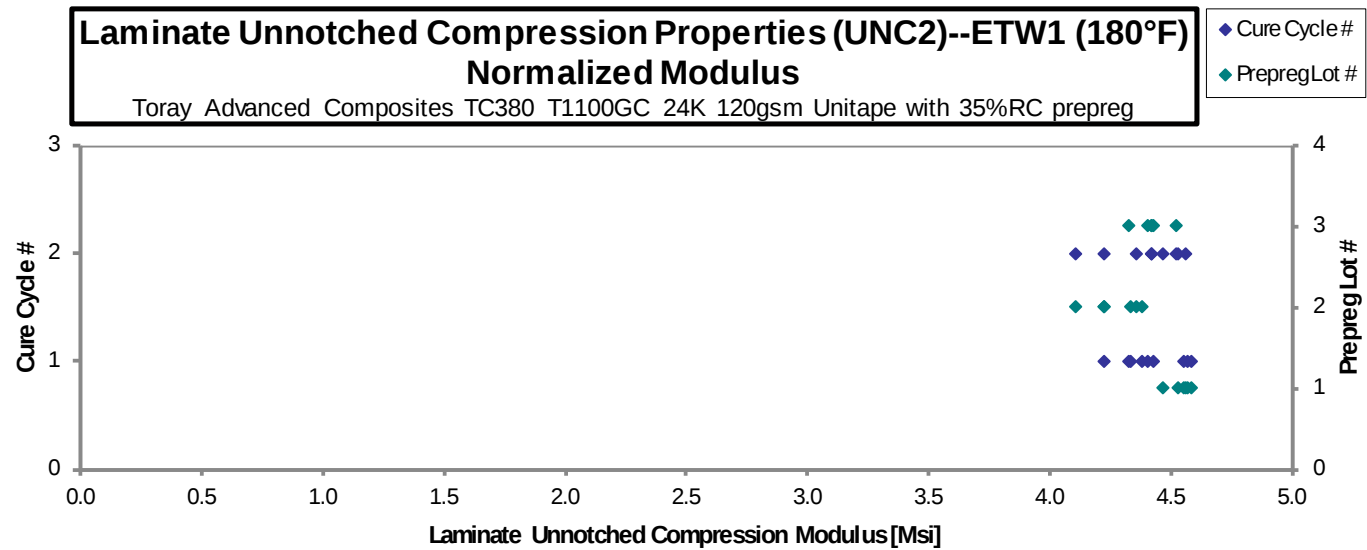
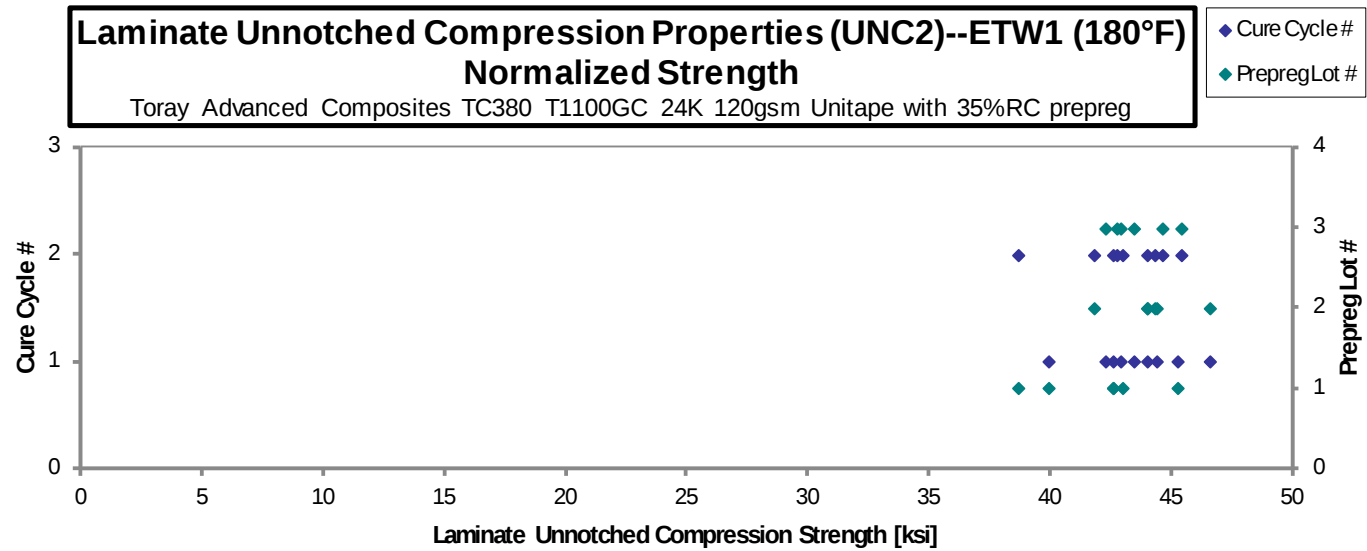
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDXA111D	A	C1	1	1	47.49	4.778	0.09150	20	BAB
TCDXA112D	A	C1	1	1	41.39	4.727	0.09272	20	BGM
TCDXA113D	A	C1	1	1	43.58	4.686	0.09383	20	BGM
TCDXA211D	A	C2	1	2	43.64	4.591	0.09468	20	BAT
TCDXA212D	A	C2	1	2	39.31	4.542	0.09445	20	BGM
TCDXA213D	A	C2	1	2	43.55	4.661	0.09393	20	BGM
TCDXB111D	B	C1	2	1	41.61	4.099	0.1015	20	BAB
TCDXB112D	B	C1	2	1	44.68	4.203	0.1001	20	BGM
TCDXB113D	B	C1	2	1	42.62	4.049	0.1002	20	M(B,H)GM
TCDXB211D	B	C2	2	2	42.30	3.916	0.1007	20	BGM
TCDXB212D	B	C2	2	2	42.51	4.209	0.09945	20	BAB
TCDXB213D	B	C2	2	2	40.38	4.070	0.09955	20	BAT
TCDXC111D	C	C1	3	1	41.59	4.263	0.09912	20	BGM
TCDXC112D	C	C1	3	1	45.51	4.654	0.08930	20	BGM
TCDXC113D	C	C1	3	1	45.30	4.607	0.09218	20	BAB
TCDXC211D	C	C2	3	2	41.01	4.240	0.1001	20	M(B,H)GM
TCDXC212D	C	C2	3	2	42.98	4.255	0.09977	20	BGM
TCDXC213D	C	C2	3	2	43.59	4.337	0.1001	20	BAB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004575	45.26	4.554
0.004636	39.98	4.566
0.004692	42.59	4.580
0.004734	43.05	4.528
0.004723	38.67	4.469
0.004697	42.61	4.561
0.005076	44.00	4.335
0.005006	46.60	4.383
0.005008	44.47	4.224
0.005033	44.36	4.106
0.004973	44.04	4.361
0.004978	41.87	4.220
0.004956	42.94	4.402
0.004465	42.34	4.329
0.004609	43.49	4.424
0.005006	42.76	4.422
0.004988	44.66	4.422
0.005004	45.45	4.521

Average 42.95 4.383
 Standard Dev. 1.996 0.2723
 Coeff. of Var. [%] 4.647 6.213
 Min. 39.31 3.916
 Max. 47.49 4.778
 Number of Spec. 18 18

Average_{norm} 0.004842 43.29 4.411
 Standard Dev._{norm} 1.903 0.1340
 Coeff. of Var. [%]_{norm} 4.397 3.038
 Min. 0.004465 38.67 4.106
 Max. 0.005076 46.60 4.580
 Number of Spec. 18 18 18



Laminate Unnotched Compression Properties (UNC2)--ETW2 (250°F)
Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

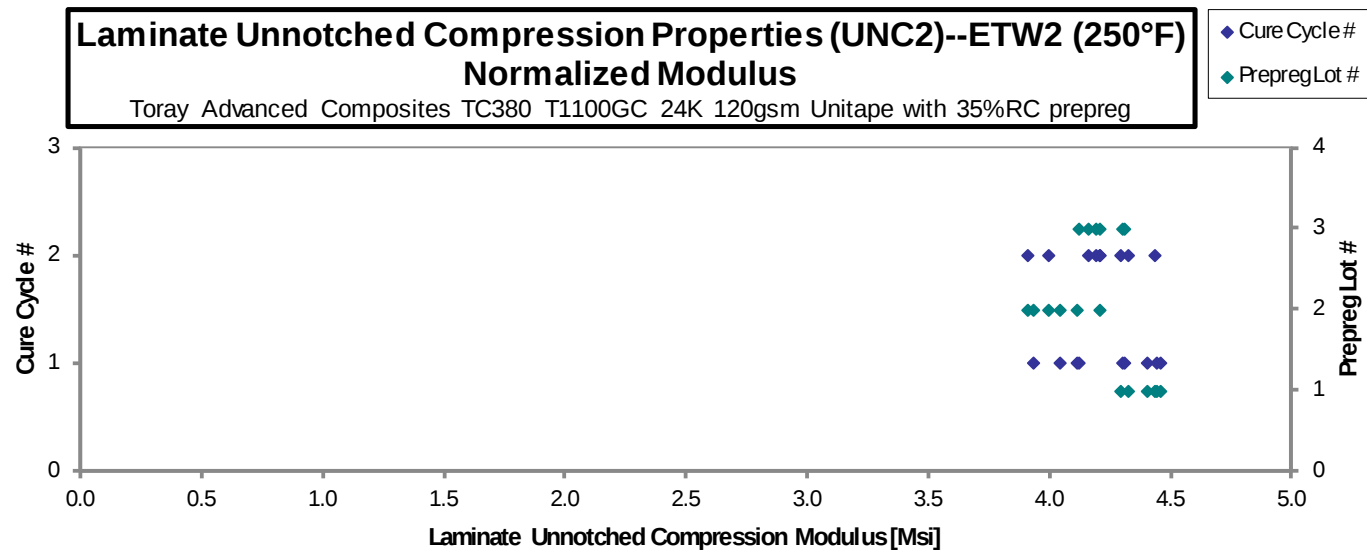
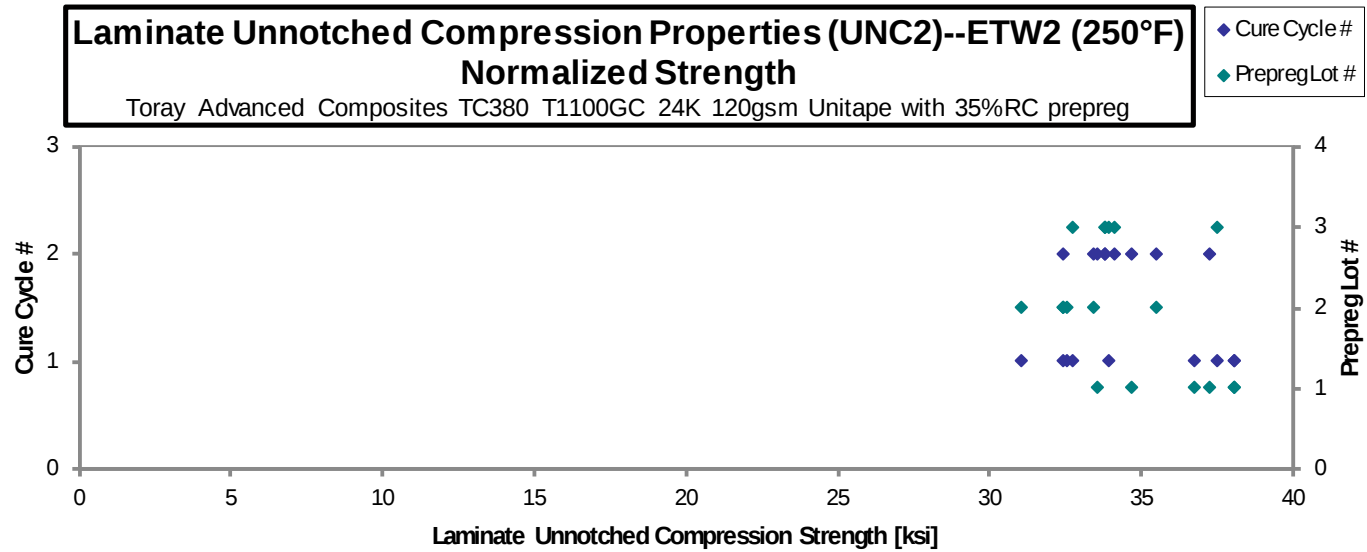
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDXA111E	A	C1	1	1	38.37	4.496	0.09523	20	BAT
TCDXA112E	A	C1	1	1	37.07	4.479	0.09523	20	BGM
TCDXA113E	A	C1	1	1	38.17	4.414	0.09573	20	BGM
TCDXA211E	A	C2	1	2	37.17	4.630	0.08965	20	BAT
TCDXA212E	A	C2	1	2	39.18	4.514	0.09138	20	BAB
TCDXA213E	A	C2	1	2	34.73	4.595	0.09275	20	BGM, BAT
TCDXB111E	B	C1	2	1	32.27	4.090	0.09660	20	BAB
TCDXB112E	B	C1	2	1	33.05	4.104	0.09463	20	BAB
TCDXB113E	B	C1	2	1	32.37	4.097	0.09213	20	BAB
TCDXB211E	B	C2	2	2	35.07	4.155	0.09730	20	BGM
TCDXB212E	B	C2	2	2	32.54	4.011	0.09572	20	BAB
TCDXB213E	B	C2	2	2	34.43	4.030	0.09322	20	BAB
TCDXC111E	C	C1	3	1	33.50	4.075	0.09722	20	BGM
TCDXC112E	C	C1	3	1	36.41	4.189	0.09887	20	BGM
TCDXC113E	C	C1	3	1	31.61	4.149	0.09950	20	BGM
TCDXC211E	C	C2	3	2	33.87	4.169	0.09583	20	BAT
TCDXC212E	C	C2	3	2	34.53	4.243	0.09482	20	BAT
TCDXC213E	C	C2	3	2	35.09	4.365	0.09257	20	BAT

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004762	38.06	4.460
0.004762	36.77	4.443
0.004787	38.06	4.402
0.004483	34.71	4.324
0.004569	37.30	4.297
0.004638	33.56	4.439
0.004830	32.47	4.115
0.004732	32.58	4.045
0.004607	31.07	3.932
0.004865	35.54	4.211
0.004786	32.44	3.999
0.004661	33.43	3.913
0.004861	33.92	4.126
0.004943	37.50	4.314
0.004975	32.76	4.300
0.004792	33.81	4.162
0.004741	34.11	4.191
0.004628	33.83	4.209

Average 34.97 4.267
Standard Dev. 2.296 0.2054
Coeff. of Var. [%] 6.567 4.815
Min. 31.61 4.011
Max. 39.18 4.630
Number of Spec. 18 18

Average_{norm} 0.004746 34.55 4.216
Standard Dev._{norm} 2.151 0.1716
Coeff. of Var. [%]_{norm} 6.226 4.071
Min. 0.004483 31.07 3.913
Max. 0.004975 38.06 4.460
Number of Spec. 18 18 18



4.14 “50/40/10” Unnotched Compression 3 Properties (UNC3)

Laminate Unnotched Compression Properties (UNC3)--CTD (-65°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

0.004800

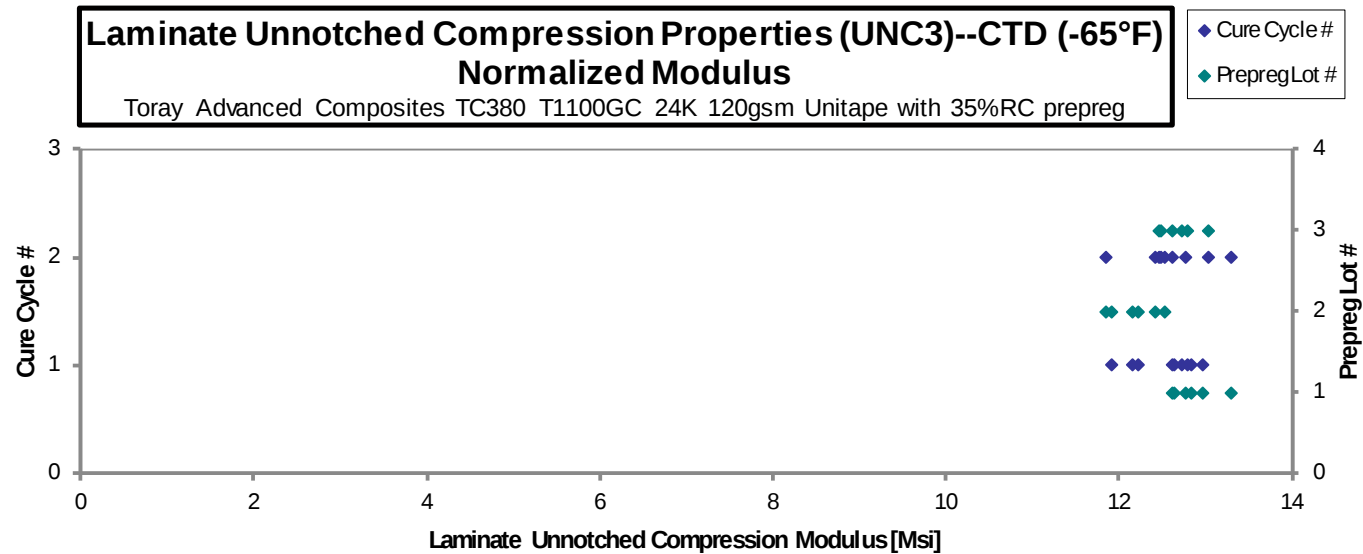
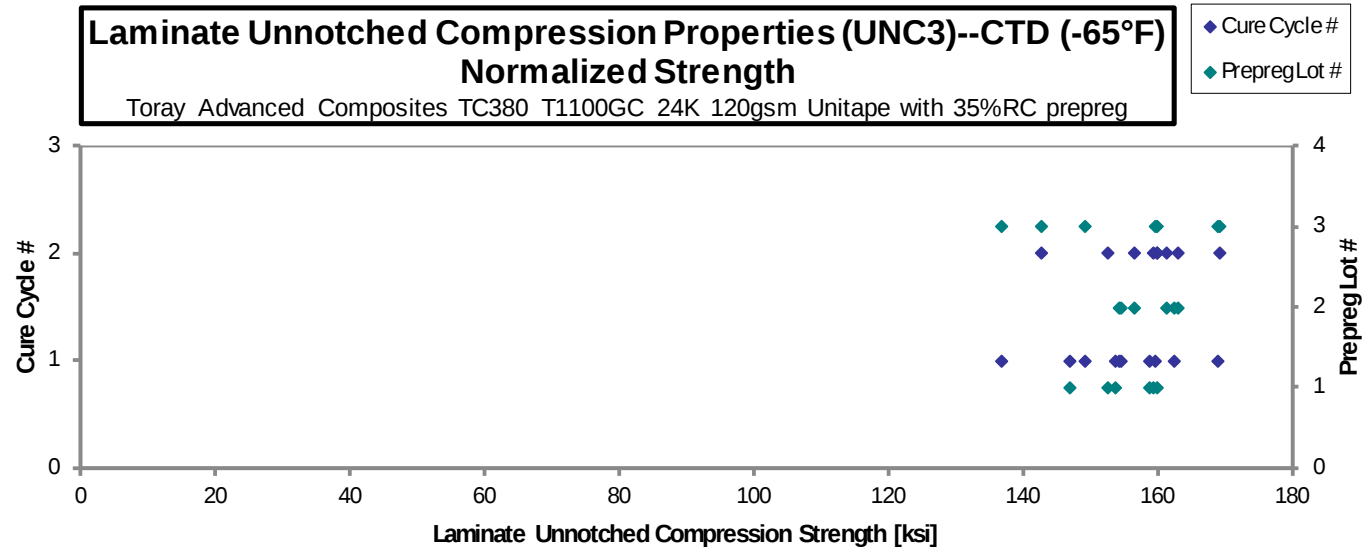
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDYA111B	A	C1	1	1	154.1	12.86	0.09575	20	BGM
TCDYA112B	A	C1	1	1	159.1	12.66	0.09577	20	BGM
TCDYA113B	A	C1	1	1	147.0	12.98	0.09592	20	BGM
TCDYA211B	A	C2	1	2	158.1	12.52	0.09680	20	BGM
TCDYA212B	A	C2	1	2	159.3	13.24	0.09645	20	BAT
TCDYA213B	A	C2	1	2	153.8	12.88	0.09518	20	BGM
TCDYB111B	B	C1	2	1	152.0	12.03	0.09752	20	BAB
TCDYB112B	B	C1	2	1	150.6	11.86	0.09848	20	BGM
TCDYB113B	B	C1	2	1	156.6	11.47	0.09968	20	BAB
TCDYB211B	B	C2	2	2	162.1	12.49	0.09555	20	BGM
TCDYB212B	B	C2	2	2	155.9	12.48	0.09643	20	BGM
TCDYB213B	B	C2	2	2	161.1	11.71	0.09713	20	BGM
TCDYC111B	C	C1	3	1	148.6	12.67	0.09638	20	TAB/TIB
TCDYC112B	C	C1	3	1	135.2	12.46	0.09723	20	M(B,H)AB
TCDYC113B	C	C1	3	1	165.4	12.52	0.09815	20	BAB, TAB/TIB
TCDYC114B*	C	C1	3	1	156.0		0.09827	20	BGM
TCDYC211B	C	C2	3	2	142.8	12.46	0.09590	20	BGM
TCDYC212B	C	C2	3	2	166.6	12.83	0.09748	20	BAB
TCDYC213B	C	C2	3	2	156.5	12.22	0.09805	20	BGM

* Specimen was not gaged, only strength is tested.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004788	153.7	12.83
0.004788	158.7	12.63
0.004796	146.8	12.97
0.004840	159.4	12.62
0.004823	160.0	13.30
0.004759	152.5	12.77
0.004876	154.4	12.22
0.004924	154.5	12.16
0.004984	162.6	11.91
0.004778	161.3	12.43
0.004822	156.6	12.54
0.004857	163.0	11.85
0.004819	149.2	12.72
0.004862	136.9	12.62
0.004908	169.1	12.80
0.004913	159.7	
0.004795	142.6	12.45
0.004874	169.2	13.02
0.004903	159.8	12.48

Average 154.8 12.46
Standard Dev. 7.669 0.4595
Coeff. of Var. [%] 4.955 3.687
Min. 135.2 11.47
Max. 166.6 13.24
Number of Spec. 19 18

Average_{norm} 0.004848 156.3 12.57
Standard Dev._{norm} 8.243 0.3739
Coeff. of Var. [%]_{norm} 5.273 2.974
Min. 0.004759 136.9 11.85
Max. 0.004984 169.2 13.30
Number of Spec. 19 19 18



**Laminate Unnotched Compression Properties (UNC3)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDYA111A**	A	C1	1	1		12.89	0.09058	20	CIT, CIB
TCDYA112A*	A	C1	1	1	140.0	12.91	0.09313	20	BGM
TCDYA113A	A	C1	1	1	144.7	13.37	0.09432	20	BAT
TCDYA114A***	A	C1	1	1	138.7		0.09548	20	BGM
TCDYA211A	A	C2	1	2	151.8	12.65	0.09087	20	M(B,H)AB
TCDYA212A	A	C2	1	2	147.3	12.62	0.09233	20	BGM
TCDYA213A	A	C2	1	2	154.4	12.96	0.09418	20	BAB
TCDYB111A	B	C1	2	1	138.6	13.08	0.08867	20	BGM
TCDYB112A**	B	C1	2	1		13.08	0.09175	20	CIB
TCDYB113A	B	C1	2	1	137.7	12.10	0.09407	20	HAT/HIT
TCDYB114A***	B	C1	2	1	139.2		0.09595	20	BGM
TCDYB211A**	B	C2	2	2		13.27	0.08780	20	CIB
TCDYB212A	B	C2	2	2	141.5	13.83	0.08973	20	BAB, HIB
TCDYB213A	B	C2	2	2	147.4	13.00	0.09293	20	BAB
TCDYB214A***	B	C2	2	2	146.3		0.09448	20	BGM
TCDYC111A**	C	C1	3	1		13.91	0.08748	20	CIT
TCDYC112A	C	C1	3	1	145.4	13.48	0.09010	20	BAT
TCDYC113A	C	C1	3	1	137.0	12.88	0.09288	20	BGM
TCDYC114A***	C	C1	3	1	137.9		0.09452	20	BAT
TCDYC211A	C	C2	3	2	129.5	12.93	0.09057	20	BGM
TCDYC212A**	C	C2	3	2		12.81	0.09212	20	CIT
TCDYC213A**	C	C2	3	2		12.81	0.09402	20	CIT
TCDYC214A***	C	C2	3	2	141.4		0.09510	20	BAT
TCDYC214B	C	C2	3	2	144.9	11.92	0.09858	20	BAB, HIB

* Modulus are averaged values of 2 strain gages.

** Strength not reported due to unacceptable failure mode.

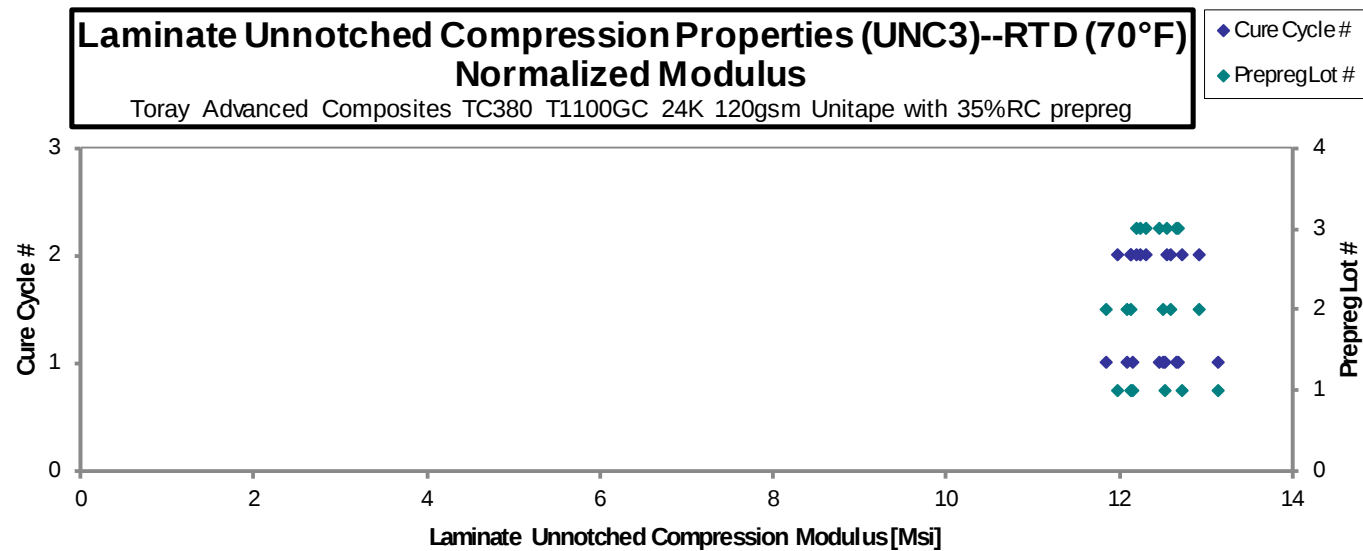
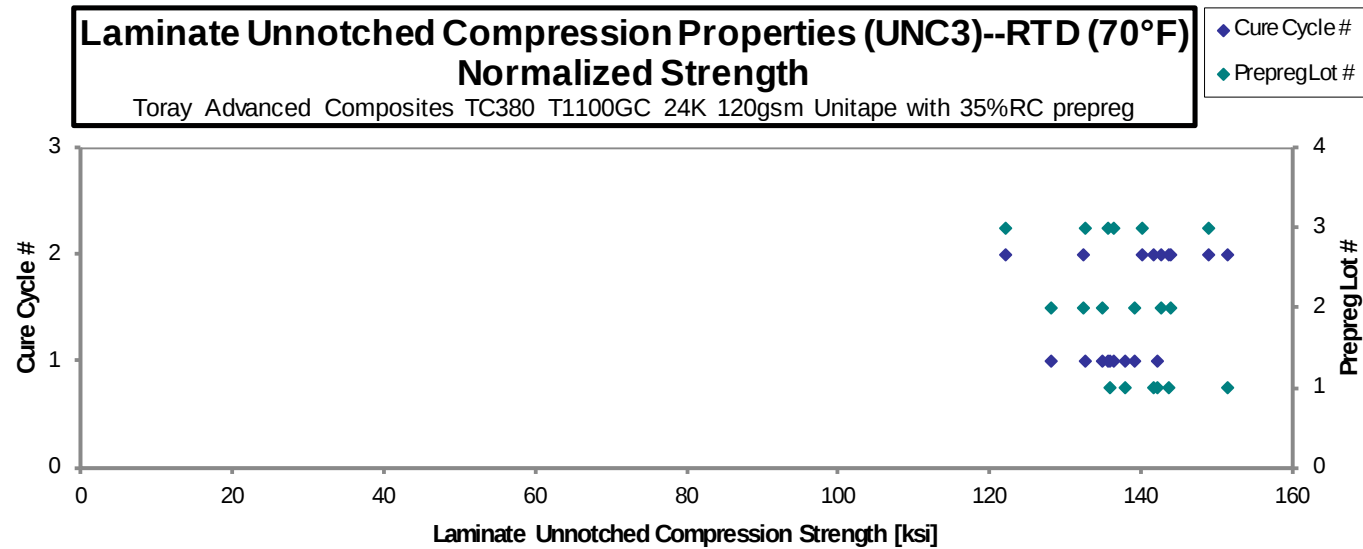
*** Specimen was not gaged, only strength is tested.

TCDYC214B: Specimen was taken from CTD and tested as RTD condition.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004529		12.16
0.004657	135.8	12.52
0.004716	142.2	13.13
0.004774	137.9	
0.004543	143.7	11.97
0.004617	141.6	12.13
0.004709	151.5	12.72
0.004433	128.1	12.08
0.004588		12.50
0.004703	134.9	11.85
0.004798	139.1	
0.004390		12.14
0.004487	132.3	12.93
0.004647	142.6	12.59
0.004724	144.0	
0.004374		12.67
0.004505	136.4	12.65
0.004644	132.6	12.46
0.004726	135.7	
0.004528	122.2	12.20
0.004606		12.30
0.004701		12.55
0.004755	140.0	
0.004929	148.8	12.25

Average 142.4 12.97
Standard Dev. 5.945 0.4891
Coeff. of Var. [%] 4.174 3.770
Min. 129.5 11.92
Max. 154.4 13.91
Number of Spec. 18 19

Average_{norm} 0.004628 138.3 12.41
Standard Dev._{norm} 7.100 0.3335
Coeff. of Var. [%]_{norm} 5.133 2.687
Min. 0.004374 122.2 11.85
Max. 0.004929 151.5 13.13
Number of Spec. 24 18 19



Laminate Unnotched Compression Properties (UNC3)--ETD1 (180°F) Strength & Modulus

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDYA111C	A	C1	1	1	122.0	12.28	0.09535	20	CIT
TCDYA112C	A	C1	1	1	118.7	12.24	0.09627	20	HAT, HIT
TCDYA113C	A	C1	1	1	119.8	12.63	0.09577	20	BAB, HIB
TCDYA114C*	A	C1	1	1	122.9		0.09598	20	BAB
TCDYA114B	A	C1	1	1	118.6	12.49	0.09662	20	BAT
TCDYA211C	A	C2	1	2	118.3	12.38	0.09508	20	HAT, HIT
TCDYA212C**	A	C2	1	2		12.24	0.09612	20	CIB
TCDYA213C	A	C2	1	2	123.3	12.66	0.09590	20	M(B,H)AT
TCDYA214C*	A	C2	1	2	129.3		0.09612	20	BAT, HIT
TCDYA214A	A	C2	1	2	105.8	12.52	0.09570	20	BAT, HIT
TCDYA214B	A	C2	1	2	115.4	13.03	0.09502	20	BGM, HIB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004768	121.1	12.19
0.004813	119.1	12.28
0.004788	119.5	12.60
0.004799	122.9	
0.004831	119.4	12.57
0.004754	117.1	12.26
0.004806		12.25
0.004795	123.2	12.64
0.004806	129.5	
0.004785	105.4	12.48
0.004751	114.2	12.90

* Specimen was not gaged, only strength is tested.

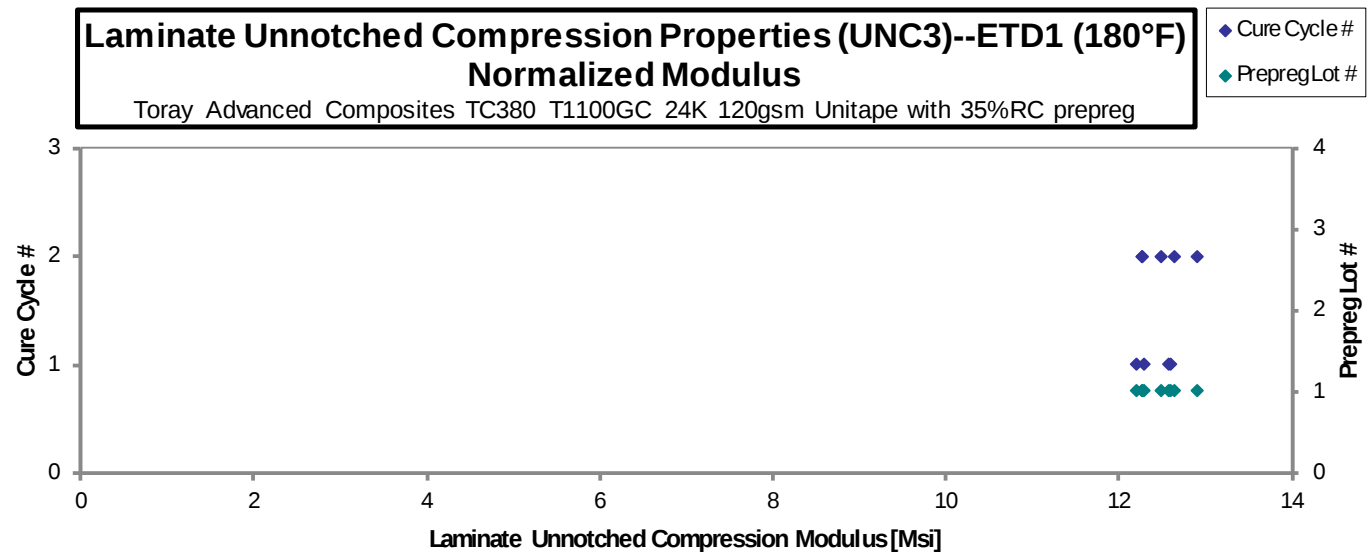
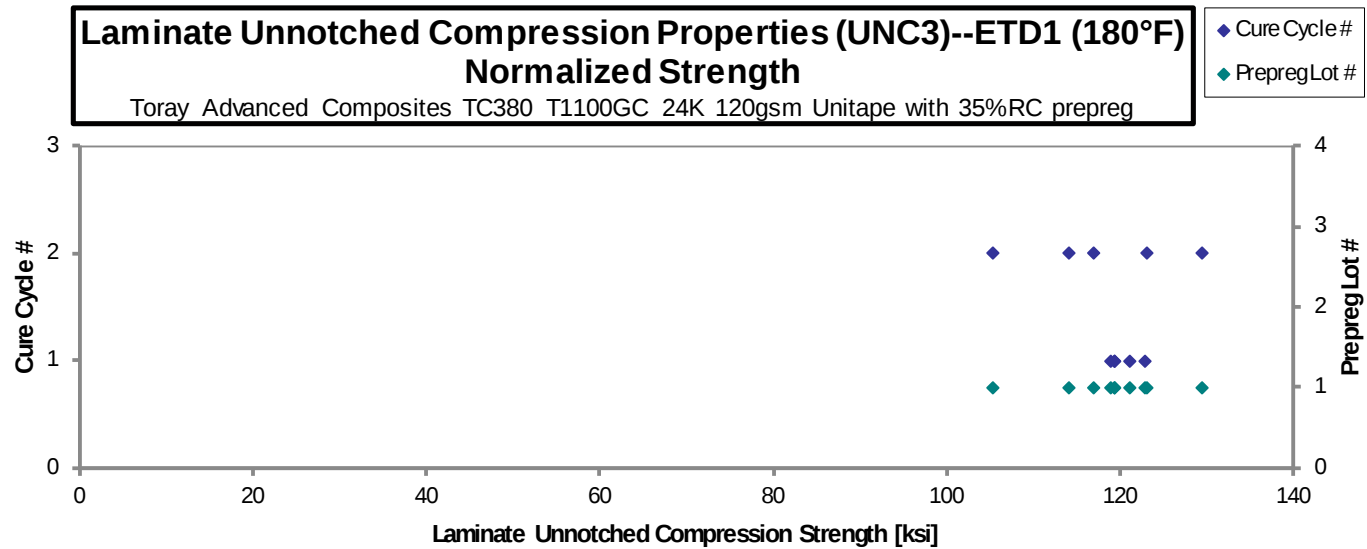
** Strength not reported due to unacceptable failure mode.

TCDYA214A: Specimen was taken from RTD and tested as ETD1 condition.

TCDYA114B and TCDYA214B: Specimen was taken from CTD and tested as ETD1 condition.

Average	119.4	12.50
Standard Dev.	6.119	0.2553
Coeff. of Var. [%]	5.124	2.043
Min.	105.8	12.24
Max.	129.3	13.03
Number of Spec.	10	9

Average _{norm}	0.004791	119.1	12.46
Standard Dev. _{norm}		6.302	0.2350
Coeff. of Var. [%] _{norm}		5.289	1.885
Min.	0.004751	105.4	12.19
Max.	0.004831	129.5	12.90
Number of Spec.	11	10	9



**Laminate Unnotched Compression Properties (UNC3)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDYA111D	A	C1	1	1	100.2	12.15	0.09617	20	BGM
TCDYA112D	A	C1	1	1	82.44	12.87	0.09582	20	HAB, HIB
TCDYA113D	A	C1	1	1	88.02	12.78	0.09475	20	HAB, HIB
TCDYA114D*	A	C1	1	1	89.02		0.09363	20	HAB, HIB
TCDYA115D*	A	C1	1	1	101.5		0.09125	20	BAT
TCDYA211D	A	C2	1	2	111.1	12.93	0.09555	20	HAT, HIT
TCDYA212D	A	C2	1	2	112.4	12.40	0.09512	20	BAB
TCDYA213D	A	C2	1	2	113.4	13.21	0.09422	20	BAB, HIB
TCDYB111D	B	C1	2	1	85.64	10.47	0.09960	20	BAB
TCDYB112D	B	C1	2	1	98.63	11.38	0.09990	20	BAT
TCDYB113D**	B	C1	2	1		11.43	0.09933	20	HIB
TCDYB114D*	B	C1	2	1	93.35		0.09908	20	HAT, HIT
TCDYB211D**	B	C2	2	2		11.17	0.09737	20	HIT
TCDYB212D**	B	C2	2	2		11.29	0.09767	20	HIT
TCDYB213D**	B	C2	2	2		11.62	0.09708	20	HIB
TCDYB214D	B	C2	2	2	100.0	11.33	0.09755	20	BAB
TCDYB215D	B	C2	2	2	80.21	11.10	0.09600	20	BAB
TCDYC111D	C	C1	3	1	87.97	11.52	0.09853	20	BAT
TCDYC112D	C	C1	3	1	97.36	11.53	0.09827	20	BAB
TCDYC113D	C	C1	3	1	109.4	13.09	0.08823	20	M(B,H)AT
TCDYC211D	C	C2	3	2	111.3	11.89	0.09817	20	BAB, HIB
TCDYC212D	C	C2	3	2	90.34	11.76	0.09843	20	HAT, HIT
TCDYC213D	C	C2	3	2	98.87	12.08	0.09820	20	BAT, HIT
TCDYC214D*	C	C2	3	2	98.04		0.09822	20	HAT, HIT

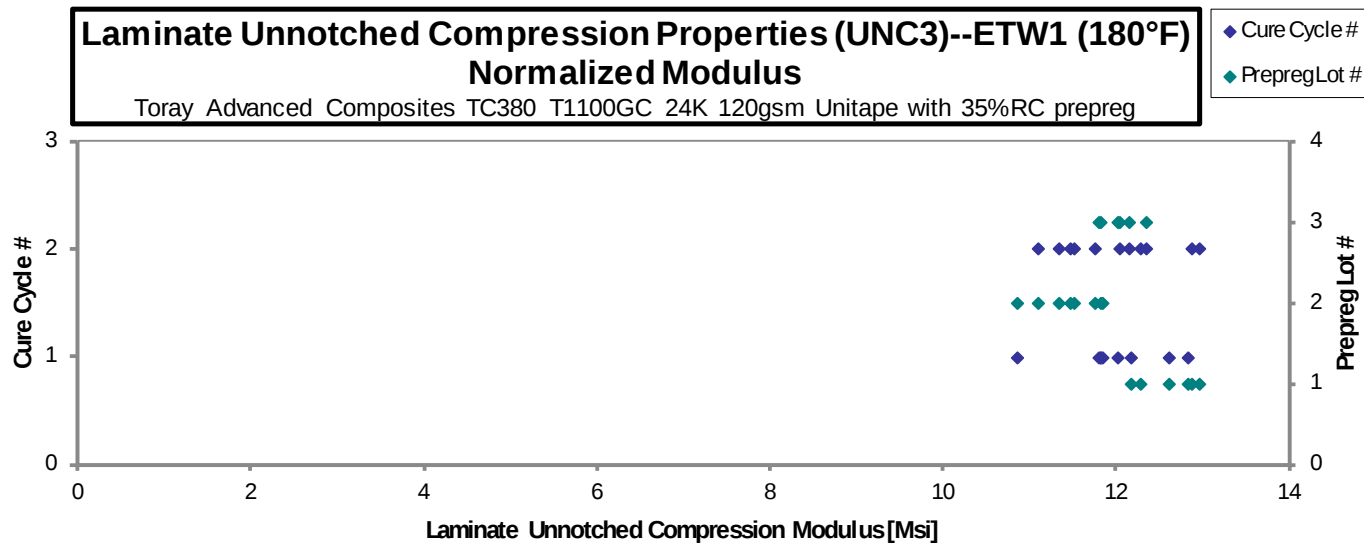
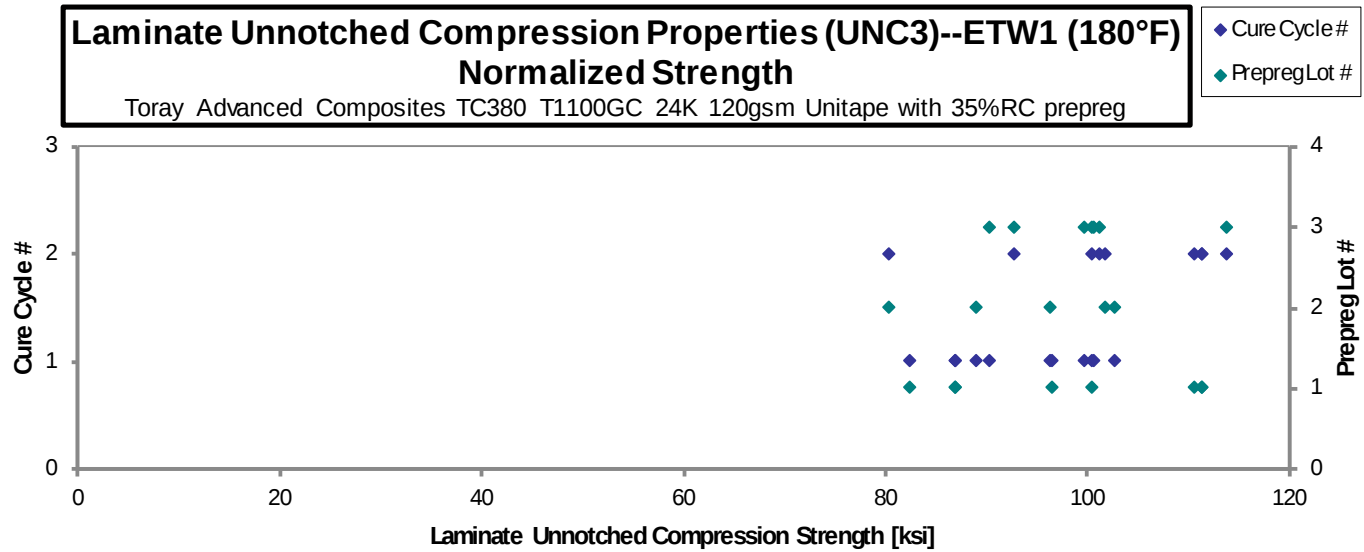
* Specimen was not gaged, only strength is tested.

** Strength not reported due to unacceptable failure mode.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004808	100.4	12.17
0.004791	82.28	12.84
0.004738	86.88	12.61
0.004682	86.83	
0.004563	96.46	
0.004778	110.6	12.87
0.004756	111.4	12.29
0.004711	111.3	12.96
0.004980	88.85	10.86
0.004995	102.6	11.84
0.004967		11.82
0.004954	96.35	
0.004868		11.33
0.004883		11.48
0.004854		11.75
0.004878	101.6	11.51
0.004800	80.21	11.10
0.004927	90.29	11.82
0.004913	99.66	11.80
0.004412	100.6	12.03
0.004908	113.8	12.16
0.004922	92.63	12.05
0.004910	101.1	12.36
0.004911	100.3	

Average 97.46 11.90
Standard Dev. 10.29 0.7624
Coeff. of Var. [%] 10.56 6.407
Min. 80.21 10.47
Max. 113.4 13.21
Number of Spec. 20 20

Average_{norm} 0.004829 97.71 11.98
Standard Dev._{norm} 9.773 0.5753
Coeff. of Var. [%]_{norm} 10.00 4.801
Min. 0.004412 80.21 10.86
Max. 0.004995 113.8 12.96
Number of Spec. 24 20 20



**Laminate Unnotched Compression Properties (UNC3)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDYA111E	A	C1	1	1	87.32	12.96	0.09082	20	BAT, HIT
TCDYA112E	A	C1	1	1	81.83	12.93	0.09225	20	HAT, HIT
TCDYA113E*	A	C1	1	1		13.04	0.09458	20	HIT
TCDYA114E*	A	C1	1	1	84.36		0.09573	20	BAT, HIT
TCDYA115E**	A	C1	1	1	83.59		0.09637	20	HAB, HIB
TCDYA211E*	A	C2	1	2		12.65	0.09082	20	HIT
TCDYA212E	A	C2	1	2	87.30	13.35	0.09258	20	HAT, HIT
TCDYA213E	A	C2	1	2	85.64	13.04	0.09237	20	BAT
TCDYA214E**	A	C2	1	2	79.03		0.09525	20	HAT, HIT
TCDYB111E	B	C1	2	1	76.80	12.48	0.09483	20	BAB
TCDYB112E	B	C1	2	1	70.54	12.04	0.09645	20	HAB/HIB
TCDYB113E	B	C1	2	1	69.77	12.30	0.09260	20	HAB, HIB
TCDYB114E**	B	C1	2	1	68.23		0.08970	20	HAB, HIB
TCDYB115E**	B	C1	2	1	69.32		0.08747	20	HAB, HIB
TCDYB211E	B	C2	2	2	72.17	11.67	0.09533	20	HGM
TCDYB212E	B	C2	2	2	74.19	12.18	0.09323	20	HAT
TCDYB213E	B	C2	2	2	68.64	12.08	0.09137	20	HAB
TCDYC111E	C	C1	3	1	67.23	11.58	0.09932	20	HAB/HIB
TCDYC112E*	C	C1	3	1		11.56	0.1006	20	HIB
TCDYC113E	C	C1	3	1	65.94	11.59	0.1012	20	HAB/HIB
TCDYC114E**	C	C1	3	1	78.61		0.1017	20	BAB, BIB
TCDYC211E	C	C2	3	2	71.38	11.54	0.09520	20	M(B,H)AT
TCDYC212E	C	C2	3	2	67.17	11.85	0.09442	20	HAT
TCDYC213E*	C	C2	3	2		11.97	0.09238	20	HIB
TCDYC214E**	C	C2	3	2	71.83		0.09070	20	HAB, HIB

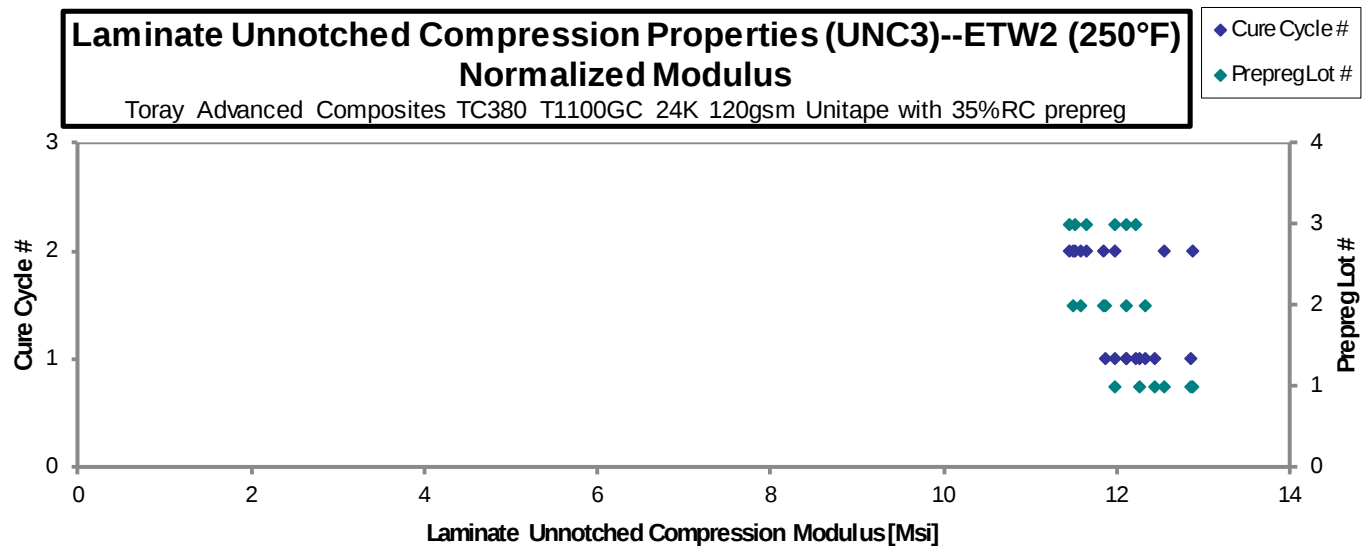
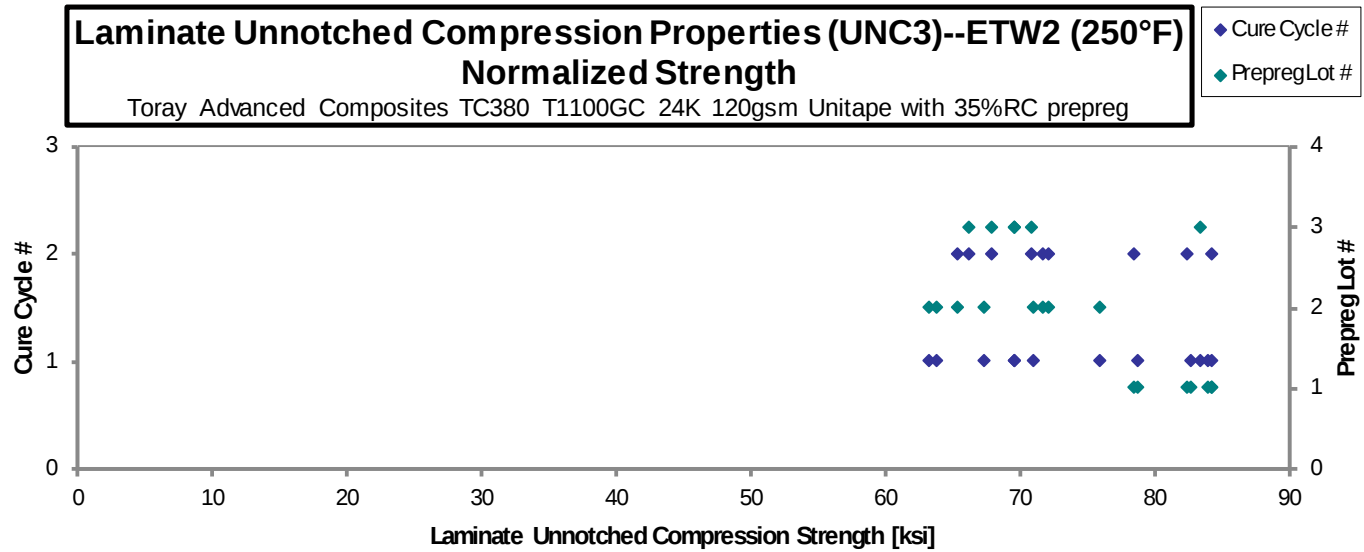
* Strength not reported due to unacceptable failure mode.

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

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.004541	82.60	12.26
0.004613	78.63	12.43
0.004729		12.85
0.004787	84.13	
0.004818	83.91	
0.004541		11.97
0.004629	84.20	12.88
0.004618	82.40	12.55
0.004763	78.41	
0.004742	75.86	12.33
0.004823	70.87	12.10
0.004630	67.30	11.87
0.004485	63.75	
0.004373	63.16	
0.004767	71.67	11.59
0.004662	72.06	11.83
0.004568	65.32	11.49
0.004966	69.56	11.98
0.005028		12.11
0.005061	69.53	12.22
0.005083	83.25	
0.004760	70.78	11.44
0.004721	66.06	11.65
0.004619		11.52
0.004535	67.86	

Average 75.28 12.27
Standard Dev. 7.269 0.6036
Coeff. of Var. [%] 9.656 4.920
Min. 65.94 11.54
Max. 87.32 13.35
Number of Spec. 21 18

Average_{norm} 0.004714 73.87 12.06
Standard Dev._{norm} 7.388 0.4411
Coeff. of Var. [%]_{norm} 10.00 3.658
Min. 0.004373 63.16 11.44
Max. 0.005083 84.20 12.88
Number of Spec. 25 21 18



4.15 “25/50/25” Open-Hole Tension 1 Properties (OHT1)

**Laminate Open-Hole Tension Properties (OHT1)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

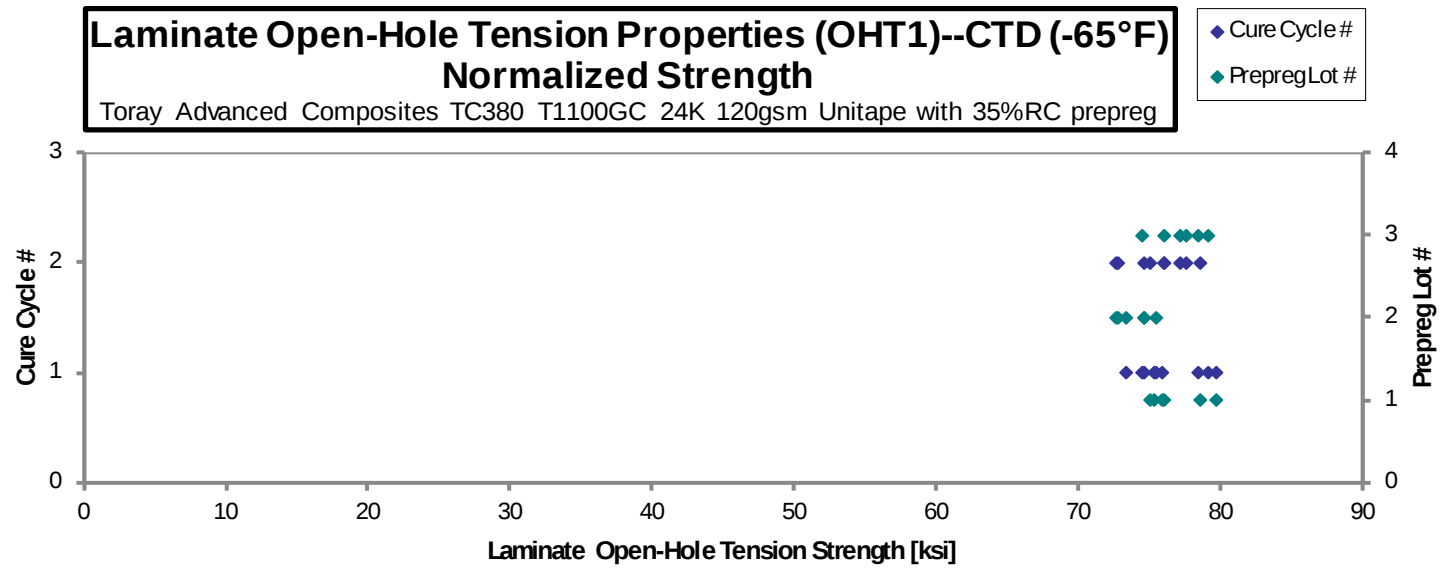
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDDA111B	A	C1	1	1	75.40	0.1159	24	M(A,L)GM	0.004830	75.87
TCDDA112B	A	C1	1	1	74.65	0.1161	24	M(A,L)GM	0.004839	75.25
TCDDA113B	A	C1	1	1	78.45	0.1169	24	M(A,L)GM	0.004872	79.62
TCDDA211B	A	C2	1	2	76.07	0.1151	24	AGM	0.004794	75.98
TCDDA212B	A	C2	1	2	75.15	0.1150	24	AGM	0.004790	74.99
TCDDA213B	A	C2	1	2	78.76	0.1148	24	M(A,L)GM	0.004782	78.46
TCDDB111B	B	C1	2	1	68.30	0.1236	24	LGM	0.005149	73.26
TCDDB112B	B	C1	2	1	69.94	0.1228	24	AGM	0.005117	74.57
TCDDB113B	B	C1	2	1	71.07	0.1222	24	M(A,L)GM	0.005092	75.39
TCDDB211B	B	C2	2	2	68.88	0.1214	24	LGM	0.005057	72.57
TCDDB212B	B	C2	2	2	71.09	0.1208	24	M(A,L)GM	0.005035	74.57
TCDDB213B	B	C2	2	2	68.53	0.1223	24	M(A,L)GM	0.005097	72.78
TCDDC111B	C	C1	3	1	76.89	0.1185	24	M(A,L)GM	0.004939	79.11
TCDDC112B	C	C1	3	1	72.71	0.1180	24	M(A,L)GM	0.004915	74.45
TCDDC113B	C	C1	3	1	76.01	0.1188	24	M(A,L)GM	0.004950	78.38
TCDDC211B	C	C2	3	2	73.32	0.1211	24	M(A,L)GM	0.005044	77.05
TCDDC212B	C	C2	3	2	73.07	0.1199	24	M(A,L)GM	0.004994	76.03
TCDDC213B	C	C2	3	2	73.98	0.1208	24	M(A,L)GM	0.005033	77.58

Average 73.46
Standard Dev. 3.278
Coeff. of Var. [%] 4.462
Min. 68.30
Max. 78.76
Number of Spec. 18

Average_{norm} 0.004963 75.88
Standard Dev._{norm} 2.114
Coeff. of Var. [%]_{norm} 2.786
Min. 0.004782 72.57
Max. 0.005149 79.62
Number of Spec. 18 18



Laminate Open-Hole Tension Properties (OHT1)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

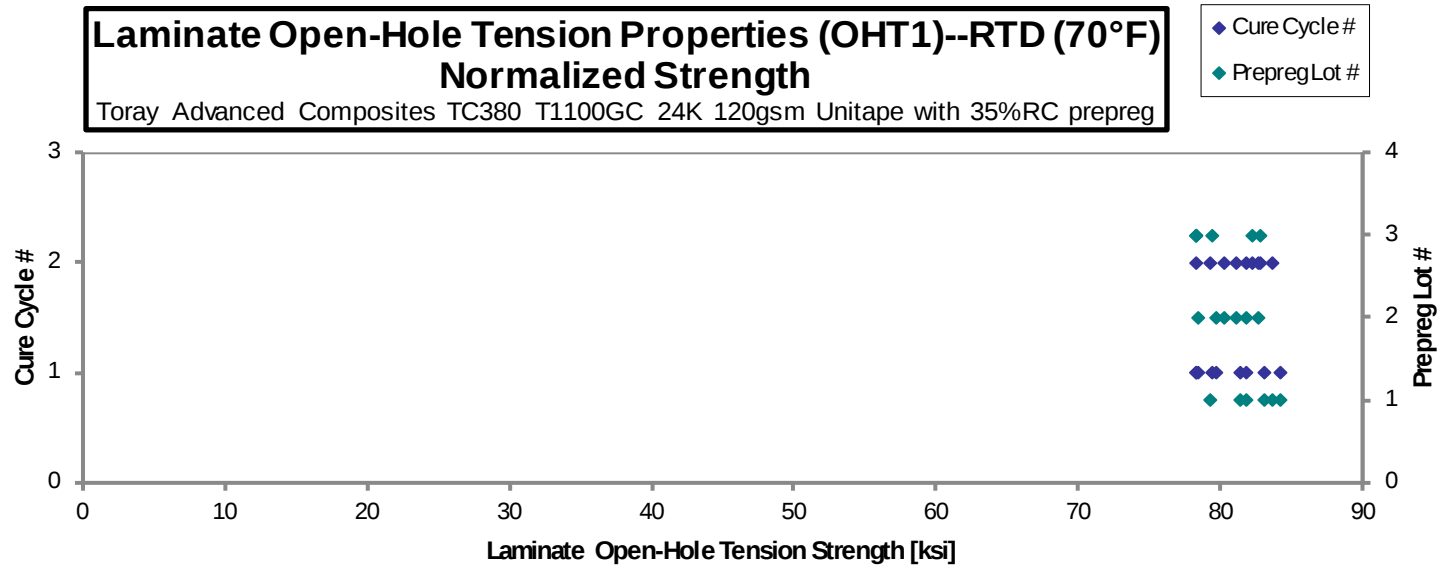
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDDA111A	A	C1	1	1	86.41	0.1124	24	AGM	0.004681	84.27
TCDDA112A	A	C1	1	1	79.73	0.1177	24	AGM	0.004904	81.46
TCDDA113A	A	C1	1	1	80.59	0.1189	24	AGM	0.004952	83.14
TCDDA211A	A	C2	1	2	81.54	0.1121	24	AGM	0.004671	79.34
TCDDA212A	A	C2	1	2	82.42	0.1170	24	AGM	0.004876	83.72
TCDDA213A	A	C2	1	2	80.68	0.1169	24	AGM	0.004870	81.85
TCDDDB111A	B	C1	2	1	84.74	0.1112	24	AGM	0.004634	81.81
TCDDDB112A	B	C1	2	1	76.39	0.1202	24	AGM	0.005010	79.73
TCDDDB113A	B	C1	2	1	72.58	0.1246	24	AGM	0.005193	78.52
TCDDDB211A	B	C2	2	2	81.77	0.1132	24	AGM	0.004715	80.33
TCDDDB212A	B	C2	2	2	76.89	0.1216	24	AGM	0.005066	81.15
TCDDDB213A	B	C2	2	2	76.64	0.1244	24	AGM	0.005182	82.73
TCDDDC111A	C	C1	3	1	82.00	0.1117	24	AGM	0.004656	79.53
TCDDDC112A	C	C1	3	1	76.53	0.1179	24	M(A,L)GM	0.004911	78.30
TCDDDC113A	C	C1	3	1	74.71	0.1207	24	M(A,L)GM	0.005028	78.26
TCDDDC211A	C	C2	3	2	83.90	0.1129	24	M(A,L)GM	0.004705	82.23
TCDDDC212A	C	C2	3	2	80.27	0.1188	24	M(A,L)GM	0.004951	82.79
TCDDDC213A	C	C2	3	2	74.38	0.1212	24	AGM	0.005051	78.28

Average 79.56
Standard Dev. 3.853
Coeff. of Var. [%] 4.843
Min. 72.58
Max. 86.41
Number of Spec. 18

Average_{norm} 0.004892 80.97
Standard Dev._{norm} 1.990
Coeff. of Var. [%]_{norm} 2.458
Min. 0.004634 78.26
Max. 0.005193 84.27
Number of Spec. 18 18



Laminate Open-Hole Tension Properties (OHT1)--ETD1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

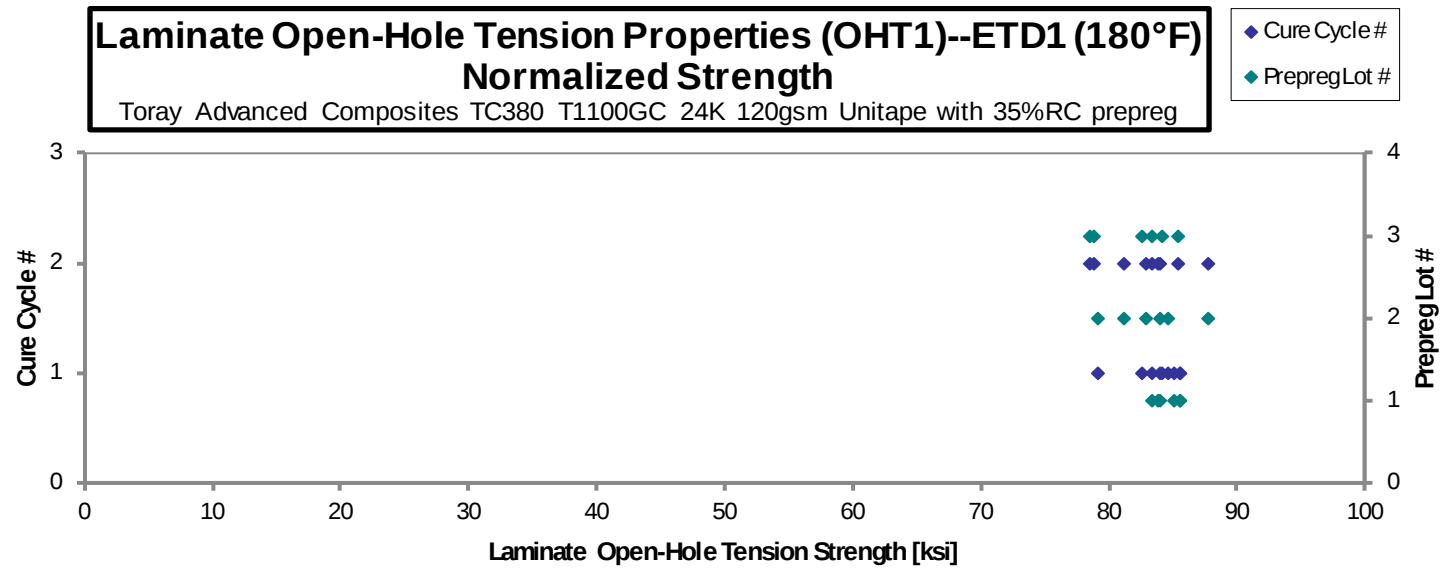
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDDA111C	A	C1	1	1	83.19	0.1179	24	M(A,D)GM	0.004910	85.10
TCDDA112C	A	C1	1	1	84.29	0.1171	24	M(A,D)GM	0.004878	85.66
TCDDA113C	A	C1	1	1	87.71	0.1125	24	M(A,D)GM	0.004689	85.68
TCDDA211C	A	C2	1	2	82.42	0.1172	24	M(A,D)GM	0.004883	83.84
TCDDA212C	A	C2	1	2	82.93	0.1168	24	M(A,D)GM	0.004865	84.05
TCDDA213C	A	C2	1	2	86.57	0.1110	24	M(A,D)GM	0.004623	83.37
TCDDB111C	B	C1	2	1	73.28	0.1246	24	M(A,D)GM	0.005193	79.29
TCDDB112C	B	C1	2	1	79.10	0.1225	24	M(A,D)GM	0.005103	84.10
TCDDB113C	B	C1	2	1	83.81	0.1164	24	M(A,D)GM	0.004850	84.69
TCDDB211C	B	C2	2	2	80.91	0.1250	24	M(A,D)GM	0.005210	87.82
TCDDB212C	B	C2	2	2	78.79	0.1213	24	M(A,D)GM	0.005056	82.99
TCDDB213C	B	C2	2	2	82.28	0.1137	24	M(A,D)GM	0.004739	81.23
TCDDC111C	C	C1	3	1	79.14	0.1202	24	M(A,L)GM	0.005009	82.59
TCDDC112C	C	C1	3	1	81.40	0.1180	24	M(A,L)GM	0.004917	83.39
TCDDC113C	C	C1	3	1	87.68	0.1107	24	M(A,L)GM	0.004613	84.26
TCDDC211C	C	C2	3	2	74.17	0.1221	24	M(A,L)GM	0.005087	78.60
TCDDC212C	C	C2	3	2	81.77	0.1203	24	AGM	0.005013	85.41
TCDDC213C	C	C2	3	2	79.53	0.1143	24	M(A,L)GM	0.004763	78.92

Average 81.61
 Standard Dev. 3.956
 Coeff. of Var. [%] 4.847
 Min. 73.28
 Max. 87.71
 Number of Spec. 18

Average_{norm} 0.004911 83.39
 Standard Dev._{norm} 2.496
 Coeff. of Var. [%]_{norm} 2.993
 Min. 0.004613 78.60
 Max. 0.005210 87.82
 Number of Spec. 18



Laminate Open-Hole Tension Properties (OHT1)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

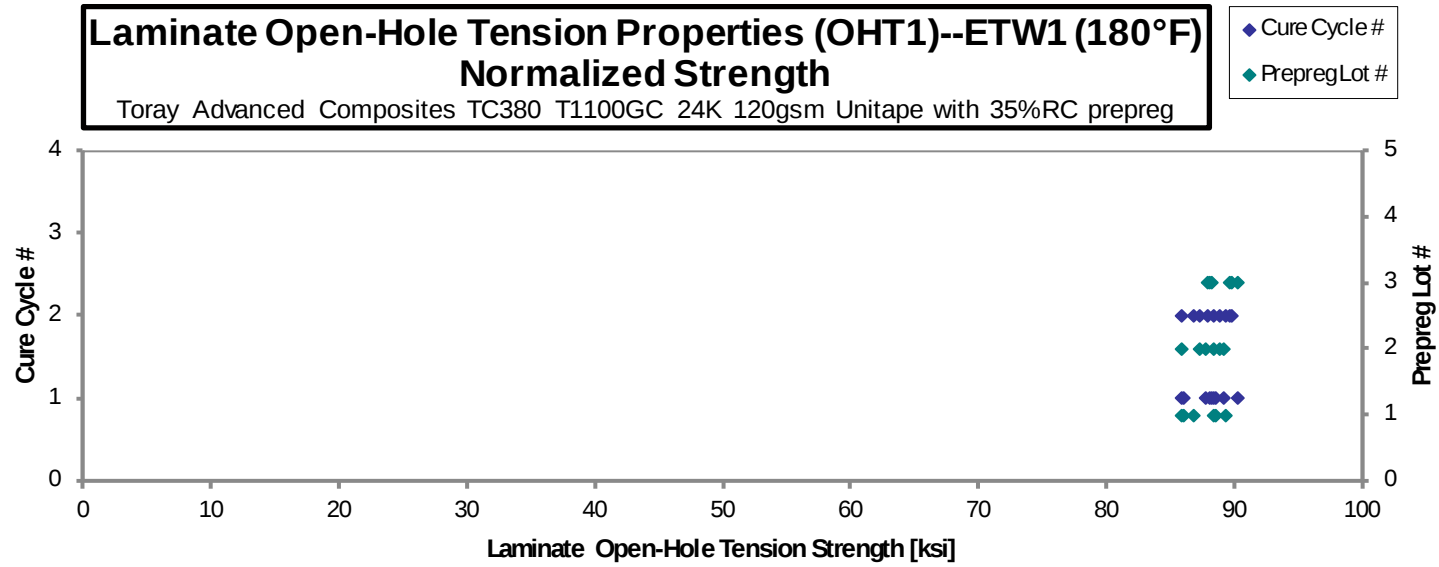
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDDA111D	A	C1	1	1	87.53	0.1165	24	AGM	0.004855	88.53
TCDDA112D	A	C1	1	1	86.68	0.1175	24	AGM	0.004897	88.43
TCDDA113D	A	C1	1	1	85.01	0.1166	24	AGM	0.004859	86.06
TCDDA211D	A	C2	1	2	88.71	0.1160	24	AGM	0.004833	89.31
TCDDA212D	A	C2	1	2	85.78	0.1166	24	AGM	0.004859	86.84
TCDDA213D	A	C2	1	2	85.55	0.1157	24	AGM	0.004821	85.92
TCDDB111D	B	C1	2	1	85.68	0.1180	24	AGM	0.004915	87.73
TCDDB112D	B	C1	2	1	81.14	0.1220	24	AGM	0.005084	85.94
TCDDB113D	B	C1	2	1	84.04	0.1223	24	AGM	0.005094	89.19
TCDDB211D	B	C2	2	2	83.21	0.1209	24	AGM	0.005038	87.33
TCDDB212D	B	C2	2	2	82.81	0.1237	24	AGM	0.005153	88.91
TCDDB213D	B	C2	2	2	82.96	0.1227	24	AGM	0.005114	88.38
TCDDC111D	C	C1	3	1	85.40	0.1189	24	AGM	0.004953	88.13
TCDDC112D	C	C1	3	1	86.47	0.1202	24	AGM	0.005007	90.20
TCDDC113D	C	C1	3	1	85.29	0.1192	24	AGM	0.004967	88.26
TCDDC211D	C	C2	3	2	87.63	0.1179	24	AGM	0.004912	89.67
TCDDC212D	C	C2	3	2	84.51	0.1199	24	AGM	0.004995	87.95
TCDDC213D	C	C2	3	2	86.32	0.1199	24	AGM	0.004996	89.85

Average 85.26
 Standard Dev. 1.916
 Coeff. of Var. [%] 2.247
 Min. 81.14
 Max. 88.71
 Number of Spec. 18

Average_{norm} 0.004964 88.15
 Standard Dev._{norm} 1.317
 Coeff. of Var. [%]_{norm} 1.494
 Min. 0.004821 85.92
 Max. 0.005153 90.20
 Number of Spec. 18



Laminate Open-Hole Tension Properties (OHT1)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

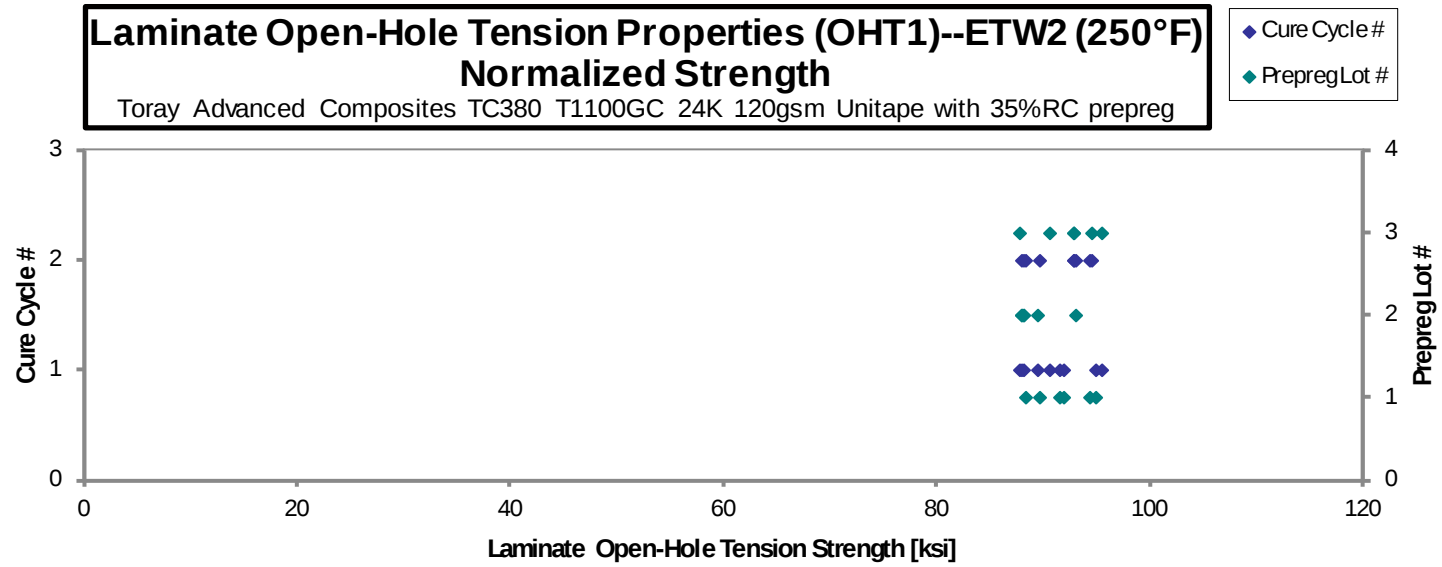
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDDA111E	A	C1	1	1	91.08	0.1158	24	M(A,D)GM	0.004826	91.58
TCDDA112E	A	C1	1	1	93.71	0.1167	24	M(A,D)GM	0.004864	94.96
TCDDA113E	A	C1	1	1	89.99	0.1176	24	M(A,D)GM	0.004900	91.86
TCDDA211E	A	C2	1	2	88.51	0.1149	24	AGM	0.004789	88.30
TCDDA212E	A	C2	1	2	89.71	0.1151	24	AGM	0.004797	89.65
TCDDA213E	A	C2	1	2	93.25	0.1165	24	AGM	0.004855	94.31
TCDDB111E	B	C1	2	1	84.20	0.1203	24	M(A,D,L)GM	0.005010	87.89
TCDDB112E	B	C1	2	1	83.01	0.1224	24	M(A,D,L)GM	0.005101	88.21
TCDDB113E	B	C1	2	1	84.40	0.1222	24	M(A,D,L)GM	0.005092	89.53
TCDDB211E	B	C2	2	2	83.95	0.1209	24	M(A,D)GM	0.005038	88.11
TCDDB212E	B	C2	2	2	82.43	0.1229	24	M(A,D)GM	0.005119	87.91
TCDDB213E	B	C2	2	2	86.76	0.1236	24	M(A,D)GM	0.005151	93.10
TCDDC111E	C	C1	3	1	93.21	0.1179	24	M(A,D)GM	0.004913	95.41
TCDDC112E	C	C1	3	1	84.74	0.1192	24	M(A,D)GM	0.004966	87.67
TCDDC113E	C	C1	3	1	86.81	0.1202	24	M(A,D)GM	0.005006	90.54
TCDDC211E	C	C2	3	2	90.26	0.1186	24	M(A,D)GM	0.004941	92.91
TCDDC212E	C	C2	3	2	91.18	0.1193	24	M(A,D,L)GM	0.004972	94.44
TCDDC213E	C	C2	3	2	89.15	0.1199	24	M(A,D)GM	0.004996	92.79

Average 88.13
 Standard Dev. 3.706
 Coeff. of Var. [%] 4.206
 Min. 82.43
 Max. 93.71
 Number of Spec. 18

Average_{norm} 0.004963
 Standard Dev._{norm} 0.004789
 Coeff. of Var. [%]_{norm} 0.005151
 Min. 87.67
 Max. 95.41
 Number of Spec. 18



4.16 “10/80/10” Open-Hole Tension 2 Properties (OHT2)

**Laminate Open-Hole Tension Properties (OHT2)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

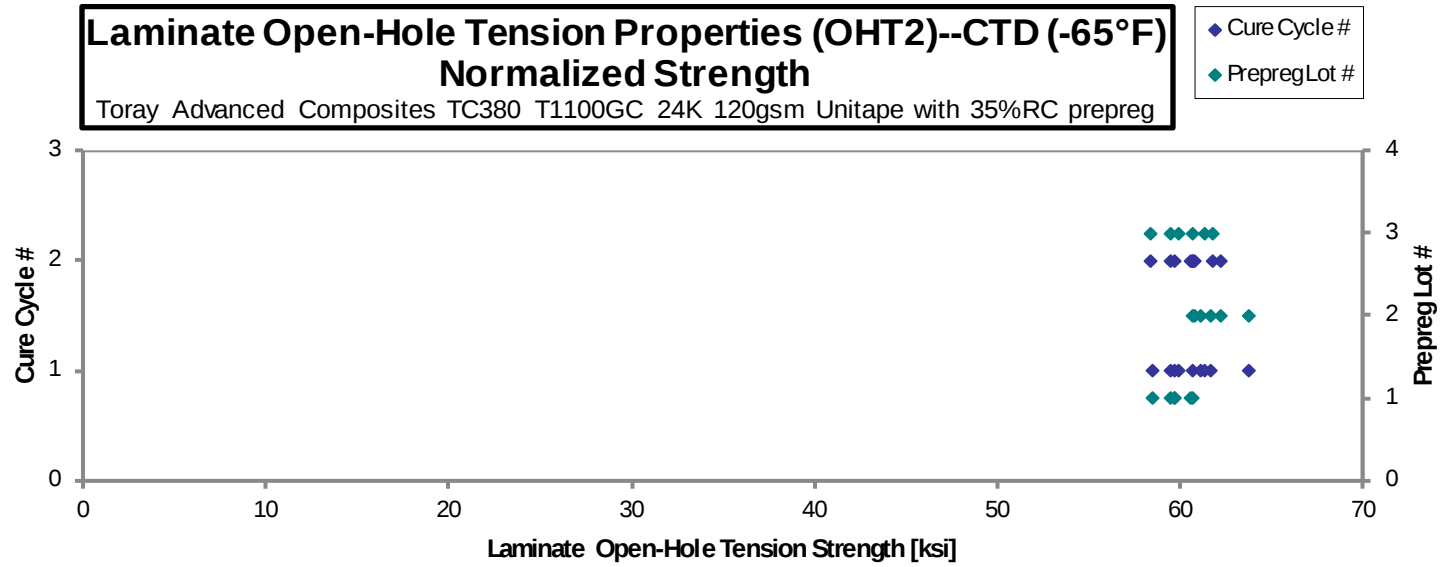
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDEA111B	A	C1	1	1	58.13	0.09667	20	AGM	0.004833	58.53
TCDEA112B	A	C1	1	1	59.66	0.09602	20	AGM	0.004801	59.67
TCDEA113B	A	C1	1	1	59.27	0.09627	20	AGM	0.004813	59.43
TCDEA211B	A	C2	1	2	60.17	0.09525	20	M(A,D)GM	0.004763	59.70
TCDEA212B	A	C2	1	2	61.45	0.09468	20	M(A,D)GM	0.004734	60.61
TCDEA213B	A	C2	1	2	60.97	0.09557	20	M(A,D)GM	0.004778	60.70
TCDEB111B	B	C1	2	1	60.89	0.1005	20	M(A,D)GM	0.005025	63.74
TCDEB112B	B	C1	2	1	59.36	0.09975	20	M(A,D)GM	0.004988	61.68
TCDEB113B	B	C1	2	1	58.34	0.1006	20	M(A,D)GM	0.005029	61.12
TCDEB211B	B	C2	2	2	59.61	0.1001	20	M(A,D)GM	0.005007	62.17
TCDEB212B	B	C2	2	2	58.11	0.1002	20	M(A,D)GM	0.005009	60.64
TCDEB213B	B	C2	2	2	57.89	0.1008	20	M(A,D)GM	0.005042	60.80
TCDEC111B	C	C1	3	1	58.12	0.1002	20	AGM	0.005012	60.69
TCDEC112B	C	C1	3	1	57.45	0.1002	20	AGM	0.005008	59.94
TCDEC113B	C	C1	3	1	58.87	0.1001	20	AGM	0.005003	61.37
TCDEC211B	C	C2	3	2	58.96	0.1005	20	AGM	0.005026	61.74
TCDEC212B	C	C2	3	2	56.66	0.09897	20	AGM	0.004948	58.41
TCDEC213B	C	C2	3	2	57.99	0.09855	20	AGM	0.004928	59.53

Average 58.99
Standard Dev. 1.301
Coeff. of Var. [%] 2.205
Min. 56.66
Max. 61.45
Number of Spec. 18

Average_{norm} 0.004930 60.58
Standard Dev._{norm} 1.315
Coeff. of Var. [%]_{norm} 2.171
Min. 0.004734 58.41
Max. 0.005042 63.74
Number of Spec. 18 18



Laminate Open-Hole Tension Properties (OHT2)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

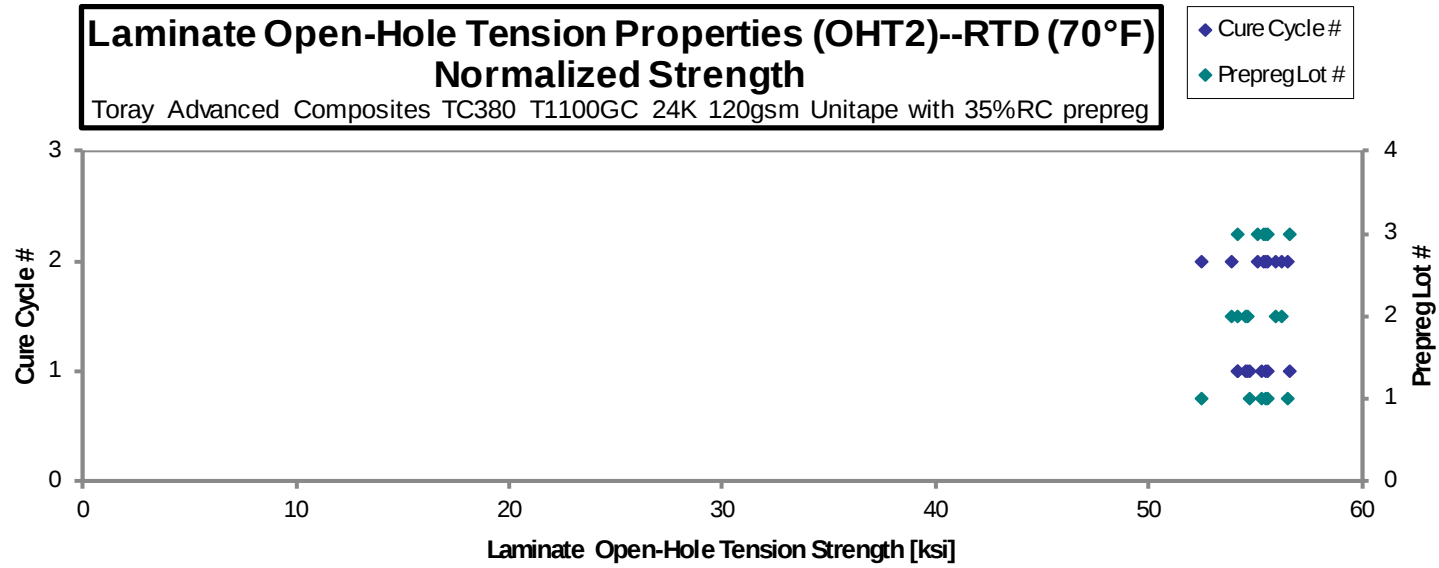
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDEA111A	A	C1	1	1	55.62	0.09437	20	AGM	0.004718	54.68
TCDEA112A	A	C1	1	1	54.21	0.09788	20	AGM	0.004894	55.27
TCDEA113A	A	C1	1	1	53.88	0.09897	20	AGM	0.004948	55.55
TCDEA212A	A	C2	1	2	55.86	0.09708	20	AGM	0.004854	56.49
TCDEA213A	A	C2	1	2	54.90	0.09708	20	AGM	0.004854	55.52
TCDEA214A	A	C2	1	2	52.44	0.09613	20	AGM	0.004807	52.51
TCDEB111A	B	C1	2	1	55.85	0.09395	20	AGM	0.004698	54.65
TCDEB112A	B	C1	2	1	51.52	0.1009	20	AGM	0.005045	54.15
TCDEB113A	B	C1	2	1	50.66	0.1033	20	AGM	0.005166	54.52
TCDEB211A	B	C2	2	2	54.71	0.09445	20	AGM	0.004723	53.83
TCDEB212A	B	C2	2	2	53.44	0.1005	20	AGM	0.005025	55.94
TCDEB213A	B	C2	2	2	52.56	0.1027	20	AGM	0.005133	56.20
TCDEC111A	C	C1	3	1	55.07	0.09447	20	AGM	0.004723	54.19
TCDEC112A	C	C1	3	1	54.33	0.1001	20	AGM	0.005003	56.62
TCDEC113A	C	C1	3	1	52.18	0.1020	20	AGM	0.005102	55.46
TCDEC211A	C	C2	3	2	56.61	0.09425	20	AGM	0.004713	55.58
TCDEC212A	C	C2	3	2	52.94	0.09988	20	AGM	0.004994	55.09
TCDEC213A	C	C2	3	2	52.72	0.1009	20	AGM	0.005046	55.41

Average 53.86
Standard Dev. 1.659
Coeff. of Var. [%] 3.081
Min. 50.66
Max. 56.61
Number of Spec. 18

Average_{norm} 0.004914 55.09
Standard Dev._{norm} 1.023
Coeff. of Var. [%]_{norm} 1.857
Min. 0.004698 52.51
Max. 0.005166 56.62
Number of Spec. 18 18



Laminate Open-Hole Tension Properties (OHT2)--ETD1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

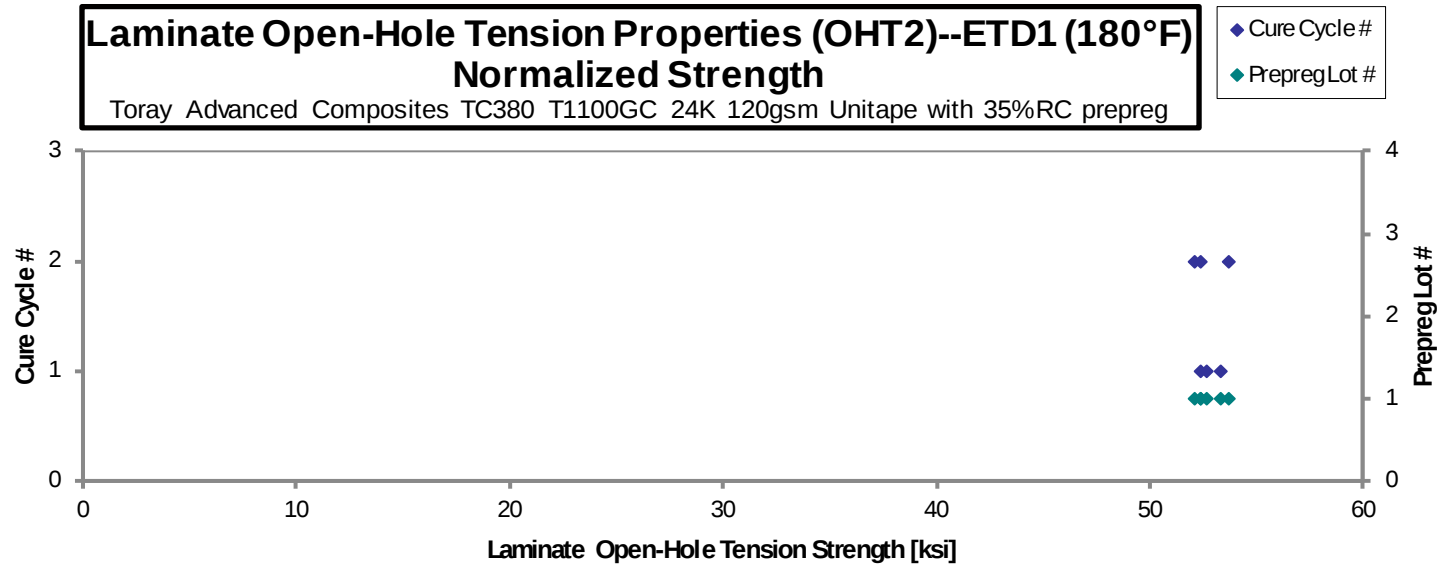
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDEA111C	A	C1	1	1	51.75	0.09892	20	M(A,D)GM
TCDEA112C	A	C1	1	1	51.02	0.09860	20	M(A,D)GM
TCDEA113C	A	C1	1	1	53.45	0.09465	20	M(A,D)GM
TCDEA211C	A	C2	1	2	51.86	0.09692	20	M(A,D)GM
TCDEA212C	A	C2	1	2	53.46	0.09648	20	M(A,D)GM
TCDEA213C	A	C2	1	2	54.11	0.09253	20	M(A,D)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.004946	53.32
0.004930	52.40
0.004733	52.70
0.004846	52.35
0.004824	53.72
0.004627	52.16

Average 52.61
 Standard Dev. 1.225
 Coeff. of Var. [%] 2.329
 Min. 51.02
 Max. 54.11
 Number of Spec. 6

Average_{norm} 0.004818
 Standard Dev._{norm} 0.6183
 Coeff. of Var. [%]_{norm} 1.172
 Min. 0.004627
 Max. 0.004946
 Number of Spec. 6



Laminate Open-Hole Tension Properties (OHT2)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

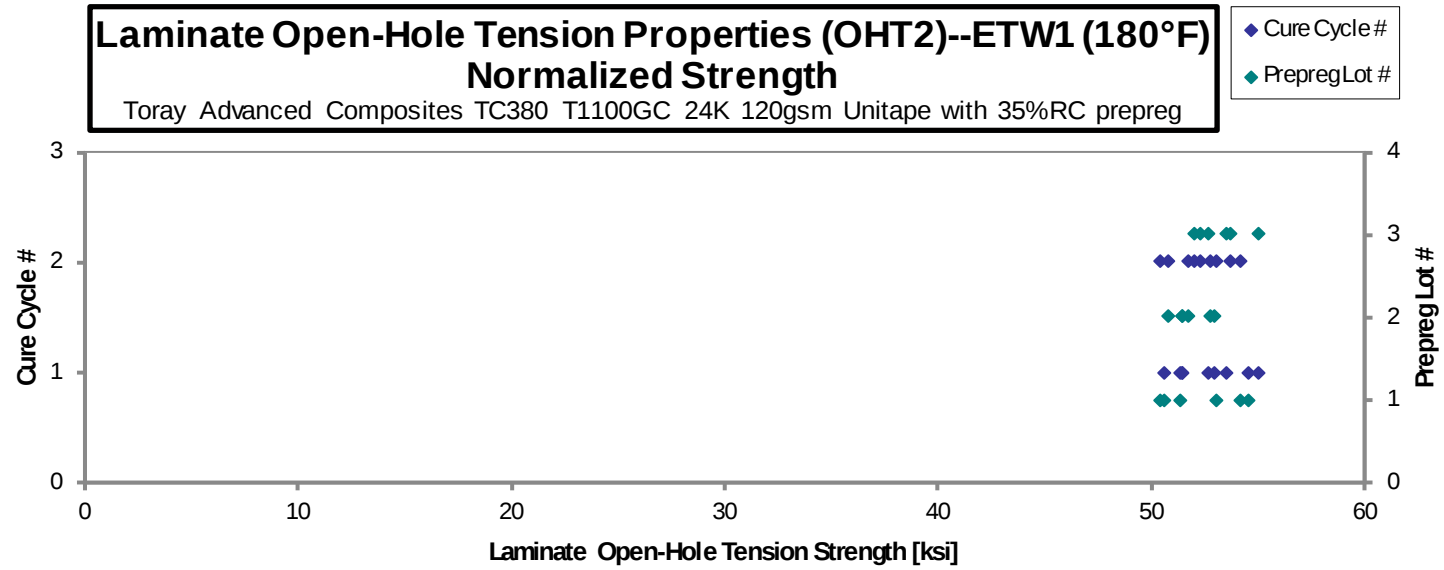
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDEA111D	A	C1	1	1	50.57	0.09748	20	AGM	0.004874	51.35
TCDEA112D	A	C1	1	1	53.51	0.09798	20	AGM	0.004899	54.62
TCDEA113D	A	C1	1	1	49.81	0.09760	20	AGM	0.004880	50.64
TCDEA211D	A	C2	1	2	53.74	0.09675	20	AGM	0.004838	54.16
TCDEA212D	A	C2	1	2	52.55	0.09693	20	AGM	0.004847	53.06
TCDEA213D	A	C2	1	2	50.23	0.09632	20	AGM	0.004816	50.40
TCDEB111D	B	C1	2	1	49.68	0.1024	20	AGM	0.005121	53.00
TCDEB112D	B	C1	2	1	53.60	0.09213	20	AGM	0.004607	51.44
TCDEB113D	B	C1	2	1	49.89	0.09912	20	AGM	0.004956	51.51
TCDEB211D	B	C2	2	2	47.55	0.1027	20	AGM	0.005134	50.86
TCDEB212D	B	C2	2	2	52.72	0.09427	20	AGM	0.004713	51.77
TCDEB214D	B	C2	2	2	49.72	0.1020	20	M(A,L)GM	0.005101	52.83
TCDEC111D	C	C1	3	1	51.63	0.1023	20	AGM	0.005117	55.03
TCDEC112D	C	C1	3	1	55.35	0.09282	20	AGM	0.004641	53.52
TCDEC113D	C	C1	3	1	51.57	0.09813	20	AGM	0.004907	52.72
TCDEC211D	C	C2	3	2	50.01	0.1004	20	AGM	0.005022	52.31
TCDEC212D	C	C2	3	2	53.50	0.09333	20	AGM	0.004667	52.01
TCDEC213D	C	C2	3	2	52.19	0.09878	20	AGM	0.004939	53.70

Average 51.54
 Standard Dev. 1.995
 Coeff. of Var. [%] 3.871
 Min. 47.55
 Max. 55.35
 Number of Spec. 18

Average_{norm} 0.004893
 Standard Dev._{norm} 1.365
 Coeff. of Var. [%]_{norm} 2.600
 Min. 0.004607
 Max. 0.005134
 Number of Spec. 18



Laminate Open-Hole Tension Properties (OHT2)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

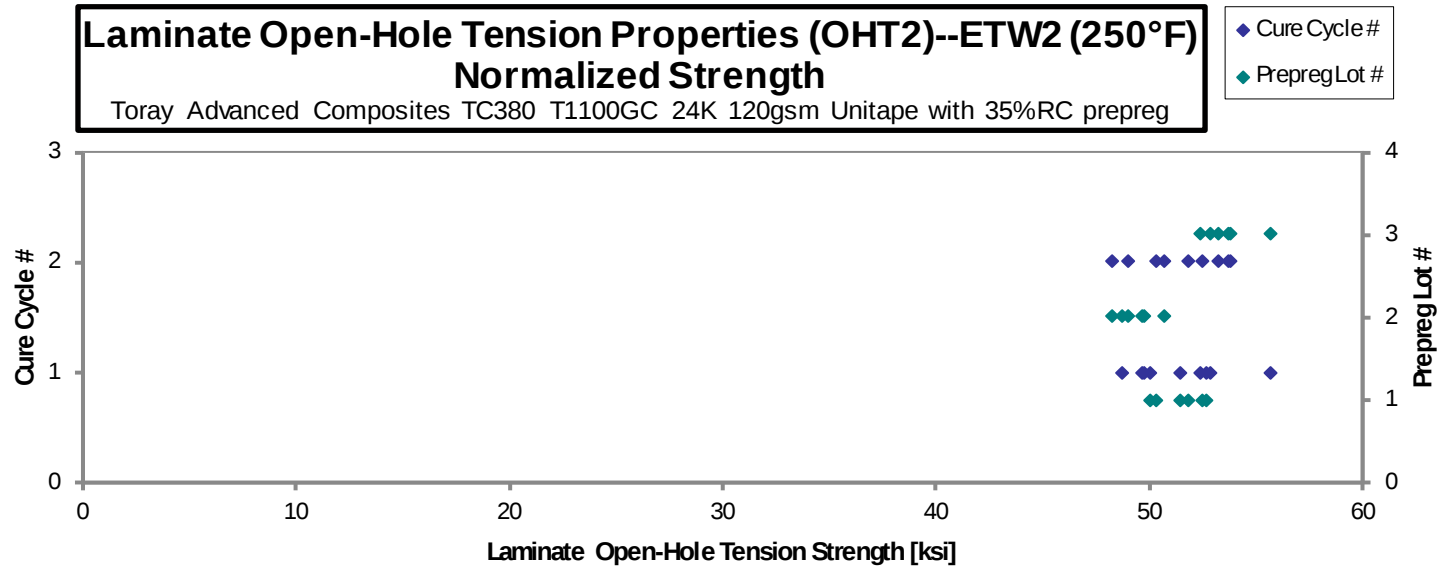
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDEA111E	A	C1	1	1	52.32	0.09662	20	AGM	0.004831	52.66
TCDEA112E	A	C1	1	1	49.53	0.09705	20	AGM	0.004853	50.07
TCDEA113E	A	C1	1	1	50.37	0.09803	20	AGM	0.004902	51.44
TCDEA211E	A	C2	1	2	52.71	0.09567	20	AGM	0.004783	52.52
TCDEA212E	A	C2	1	2	50.16	0.09640	20	AGM	0.004820	50.37
TCDEA213E	A	C2	1	2	51.18	0.09732	20	AGM	0.004866	51.89
TCDEB111E	B	C1	2	1	47.93	0.09958	20	AGM	0.004979	49.72
TCDEB112E	B	C1	2	1	47.46	0.09868	20	AGM	0.004934	48.79
TCDEB113E	B	C1	2	1	48.16	0.09930	20	AGM	0.004965	49.82
TCDEB211E	B	C2	2	2	47.37	0.09938	20	AGM	0.004969	49.04
TCDEB212E	B	C2	2	2	46.98	0.09860	20	AGM	0.004930	48.25
TCDEB213E	B	C2	2	2	48.93	0.09955	20	AGM	0.004978	50.74
TCDEC111E	C	C1	3	1	52.29	0.09717	20	AGM	0.004858	52.93
TCDEC112E	C	C1	3	1	51.81	0.09720	20	AGM	0.004860	52.46
TCDEC113E	C	C1	3	1	54.68	0.09775	20	AGM	0.004888	55.68
TCDEC211E	C	C2	3	2	52.55	0.09832	20	AGM	0.004916	53.82
TCDEC212E	C	C2	3	2	51.87	0.09850	20	AGM	0.004925	53.22
TCDEC213E	C	C2	3	2	51.83	0.09950	20	AGM	0.004975	53.72

Average 50.45
 Standard Dev. 2.249
 Coeff. of Var. [%] 4.457
 Min. 46.98
 Max. 54.68
 Number of Spec. 18

Average_{norm} 0.004902 51.51
 Standard Dev._{norm} 2.031
 Coeff. of Var. [%]_{norm} 3.943
 Min. 0.004783 48.25
 Max. 0.004979 55.68
 Number of Spec. 18 18



4.17 “50/40/10” Open-Hole Tension 3 Properties (OHT3)

**Laminate Open-Hole Tension Properties (OHT3)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

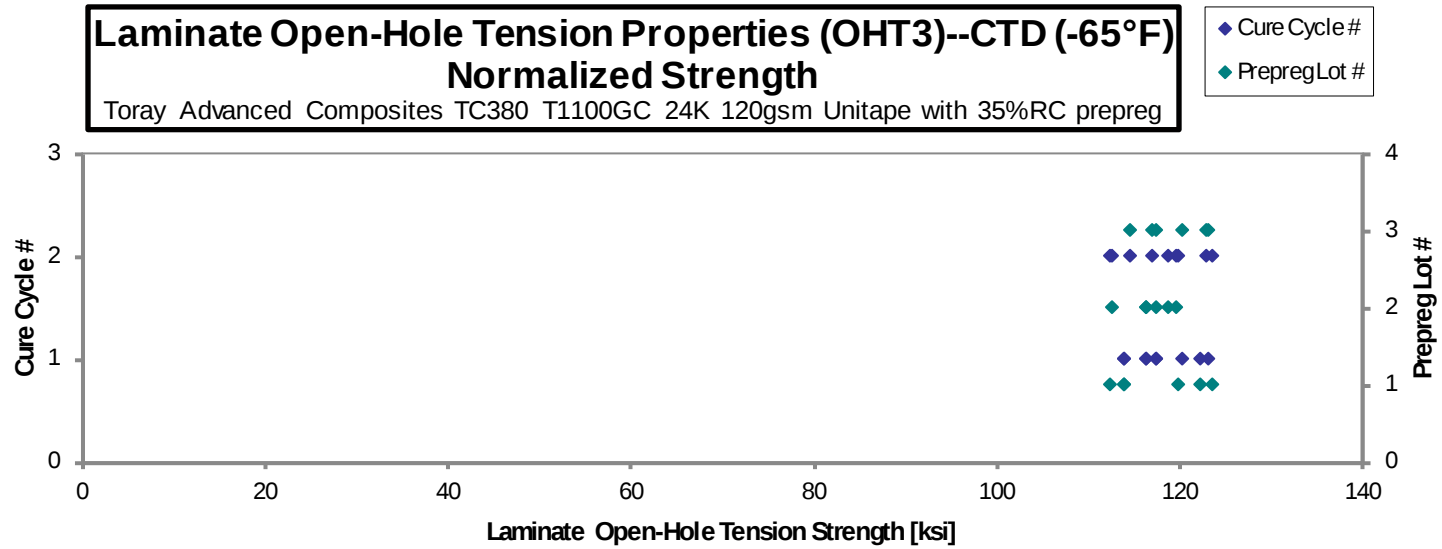
 t_{ply} [in]

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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TC DFA111B	A	C1	1	1	112.4	0.09743	20	M(A,L)GM	0.004872	114.0
TC DFA112B	A	C1	1	1	120.5	0.09740	20	M(A,L)GM	0.004870	122.3
TC DFA113B	A	C1	1	1	113.0	0.09687	20	M(A,L)GM	0.004843	114.1
TC DFA211B	A	C2	1	2	112.5	0.09590	20	M(A,L)GM	0.004795	112.3
TC DFA212B	A	C2	1	2	123.5	0.09603	20	M(A,L)GM	0.004802	123.6
TC DFA213B	A	C2	1	2	119.9	0.09598	20	M(A,L)GM	0.004799	119.8
TC DFB111B	B	C1	2	1	112.0	0.1007	20	M(A,L)GM	0.005033	117.4
TC DFB112B	B	C1	2	1	111.1	0.1006	20	M(A,L)GM	0.005029	116.4
TC DFB113B	B	C1	2	1	110.5	0.1010	20	M(A,L)GM	0.005052	116.3
TC DFB211B	B	C2	2	2	112.9	0.1011	20	M(A,L)GM	0.005053	118.8
TC DFB212B	B	C2	2	2	113.9	0.1008	20	M(A,L)GM	0.005041	119.6
TC DFB213B	B	C2	2	2	106.5	0.1016	20	M(A,L)GM	0.005078	112.7
TC DFC111B	C	C1	3	1	119.1	0.09922	20	M(A,L)GM	0.004961	123.1
TC DFC112B	C	C1	3	1	114.6	0.09842	20	M(A,L)GM	0.004921	117.5
TC DFC113B	C	C1	3	1	117.3	0.09847	20	M(A,L)GM	0.004923	120.3
TC DFC211B	C	C2	3	2	109.5	0.1004	20	LGM	0.005021	114.6
TC DFC212B	C	C2	3	2	112.3	0.1001	20	LGM	0.005003	117.0
TC DFC213B	C	C2	3	2	116.9	0.1010	20	LGM	0.005052	123.0

Average 114.3
Standard Dev. 4.357
Coeff. of Var. [%] 3.810
Min. 106.5
Max. 123.5
Number of Spec. 18

Average_{norm} 0.004953 117.9
Standard Dev._{norm} 3.623
Coeff. of Var. [%]_{norm} 3.072
Min. 0.004795 112.3
Max. 0.005078 123.6
Number of Spec. 18 18



Laminate Open-Hole Tension Properties (OHT3)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

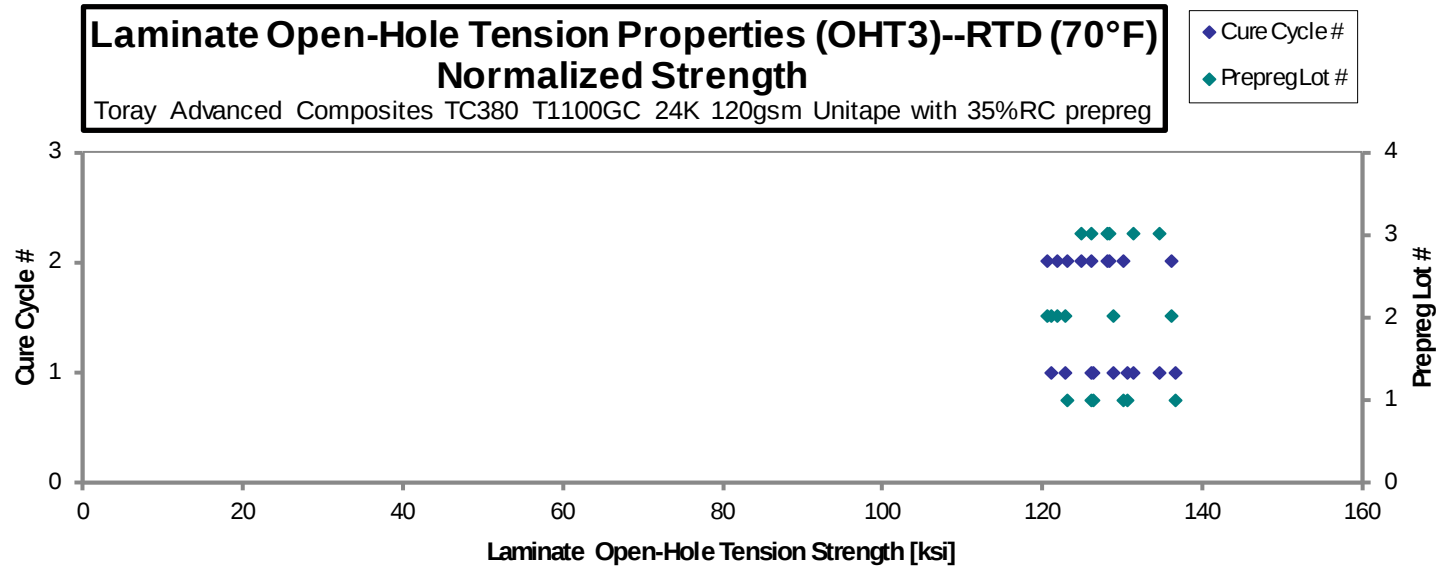
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TC DFA111A	A	C1	1	1	128.7	0.09437	20	M(A,L)GM	0.004718	126.5
TC DFA112A	A	C1	1	1	133.6	0.09822	20	M(A,L)GM	0.004911	136.7
TC DFA113A	A	C1	1	1	127.7	0.09822	20	M(A,L)GM	0.004911	130.7
TC DFA211A	A	C2	1	2	133.6	0.09355	20	M(A,L)GM	0.004678	130.2
TC DFA212A	A	C2	1	2	124.7	0.09700	20	M(A,L)GM	0.004850	126.0
TC DFA213A	A	C2	1	2	120.9	0.09772	20	M(A,L)GM	0.004886	123.1
TC DFB111A	B	C1	2	1	128.9	0.09595	20	M(A,L)GM	0.004798	128.8
TC DFB112A	B	C1	2	1	113.7	0.1022	20	M(A,L)GM	0.005108	121.0
TC DFB113A	B	C1	2	1	114.6	0.1030	20	M(A,L)GM	0.005152	123.0
TC DFB211A	B	C2	2	2	121.5	0.09623	20	M(A,L)GM	0.004812	121.8
TC DFB212A	B	C2	2	2	114.0	0.1016	20	M(A,L)GM	0.005080	120.6
TC DFB213A	B	C2	2	2	126.4	0.1033	20	M(A,L)GM	0.005165	136.0
TC DFC111A	C	C1	3	1	134.2	0.09403	20	M(A,L)GM	0.004702	131.4
TC DFC112A	C	C1	3	1	129.9	0.09950	20	M(A,L)GM	0.004975	134.7
TC DFC113A	C	C1	3	1	120.4	0.1006	20	M(A,L)GM	0.005028	126.1
TC DFC211A	C	C2	3	2	130.1	0.09463	20	M(A,L)GM	0.004732	128.3
TC DFC212A	C	C2	3	2	122.3	0.1006	20	M(A,L)GM	0.005031	128.2
TC DFC213A	C	C2	3	2	117.5	0.1020	20	M(A,L)GM	0.005098	124.8

Average 124.6
Standard Dev. 6.805
Coeff. of Var. [%] 5.462
Min. 113.7
Max. 134.2
Number of Spec. 18

Average_{norm} 0.004924 127.7
Standard Dev._{norm} 4.956
Coeff. of Var. [%]_{norm} 3.882
Min. 0.004678 120.6
Max. 0.005165 136.7
Number of Spec. 18 18



Laminate Open-Hole Tension Properties (OHT3)--ETD1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

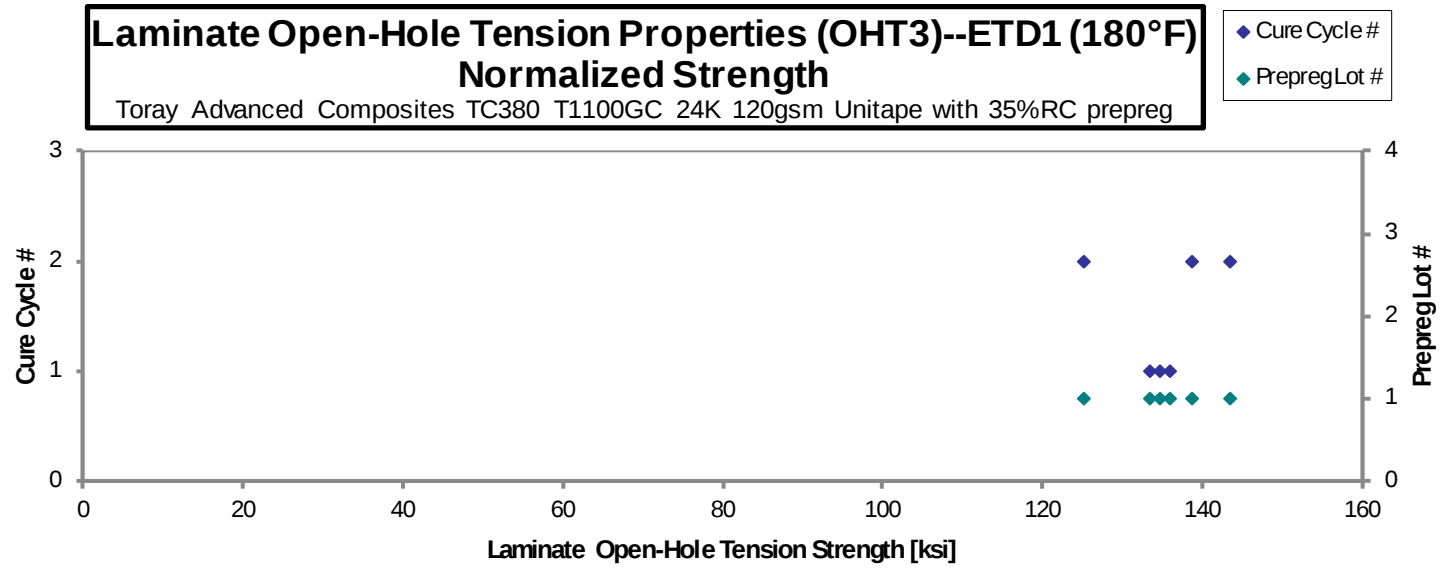
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDFA111C	A	C1	1	1	131.3	0.09843	20	M(A,D)GM
TCDFA112C	A	C1	1	1	130.3	0.09822	20	M(A,D)GM
TCDFA113C	A	C1	1	1	137.7	0.09480	20	M(A,D)GM
TCDFA211C	A	C2	1	2	123.3	0.09743	20	M(A,D,L)GM
TCDFA212C	A	C2	1	2	136.6	0.09742	20	M(A,D,L)GM
TCDFA213C	A	C2	1	2	147.6	0.09328	20	M(A,D,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.004922	134.6
0.004911	133.3
0.004740	136.0
0.004872	125.2
0.004871	138.6
0.004664	143.4

Average 134.5
 Standard Dev. 8.243
 Coeff. of Var. [%] 6.130
 Min. 123.3
 Max. 147.6
 Number of Spec. 6

Average_{norm} 0.004830
 Standard Dev._{norm} 6.084
 Coeff. of Var. [%]_{norm} 4.501
 Min. 0.004664
 Max. 0.004922
 Number of Spec. 6



Laminate Open-Hole Tension Properties (OHT3)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

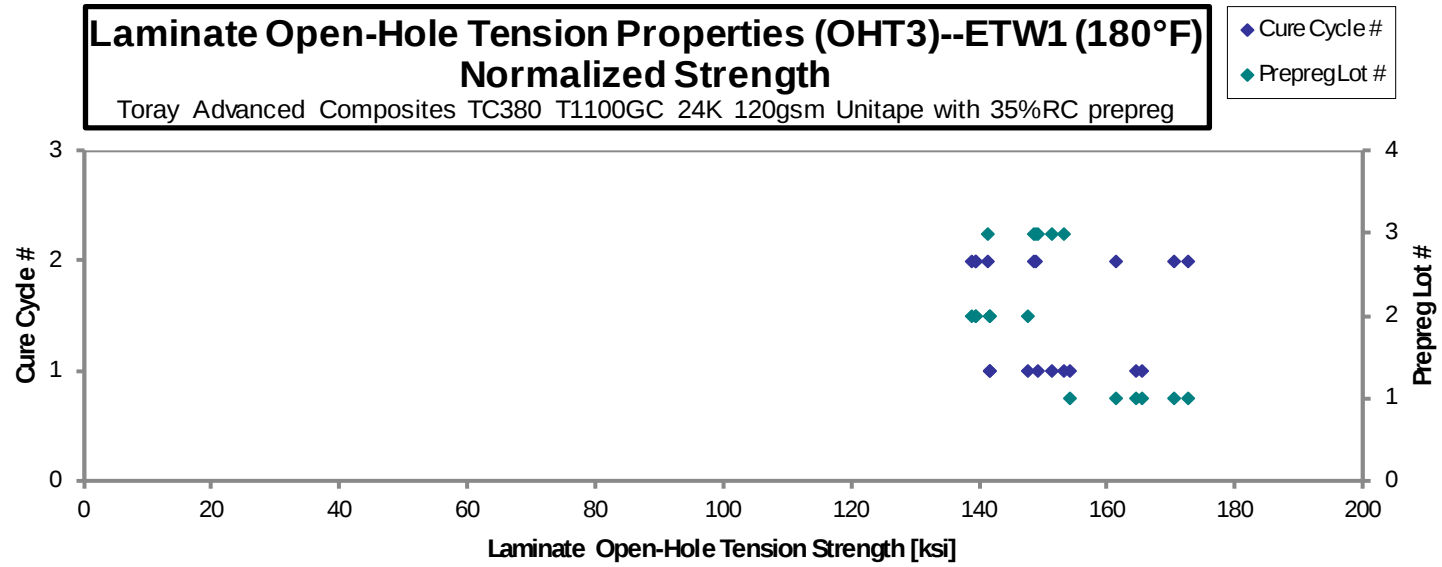
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TC DFA111D	A	C1	1	1	161.0	0.09803	20	M(A,L)GM	0.004902	164.4
TC DFA112D	A	C1	1	1	161.9	0.09815	20	M(A,L)GM	0.004908	165.5
TC DFA113D	A	C1	1	1	152.8	0.09673	20	M(A,L)GM	0.004837	153.9
TC DFA211D	A	C2	1	2	160.5	0.09657	20	M(A,L)GM	0.004828	161.4
TC DFA212D	A	C2	1	2	170.5	0.09598	20	M(A,L)GM	0.004799	170.5
TC DFA213D	A	C2	1	2	174.6	0.09480	20	M(A,L)GM	0.004740	172.4
TC DFB111D	B	C1	2	1	137.0	0.1034	20	AGM, LWB	0.005169	147.5
TC DFB112D	B	C1	2	1	143.7	0.09452	20	AGM	0.004726	141.5
TC DFB113D	B	C1	2	1	134.2	0.1013	20	M(A,L)GM	0.005064	141.6
TC DFB211D	B	C2	2	2	129.6	0.1033	20	M(A,L)GM	0.005164	139.5
TC DFB212D	B	C2	2	2	141.8	0.09428	20	M(A,L)GM	0.004714	139.3
TC DFB213D	B	C2	2	2	131.5	0.1013	20	M(A,L)GM	0.005065	138.8
TC DFC111D	C	C1	3	1	145.7	0.09967	20	AGM	0.004983	151.3
TC DFC112D	C	C1	3	1	151.8	0.09420	20	AGM	0.004710	149.0
TC DFC113D	C	C1	3	1	149.6	0.09822	20	AGM	0.004911	153.0
TC DFC211D	C	C2	3	2	133.3	0.1017	20	M(A,L)GM	0.005086	141.2
TC DFC212D	C	C2	3	2	151.4	0.09428	20	M(A,L)GM	0.004714	148.7
TC DFC213D	C	C2	3	2	143.8	0.09902	20	M(A,L)GM	0.004951	148.3

Average 148.6
 Standard Dev. 13.27
 Coeff. of Var. [%] 8.933
 Min. 129.6
 Max. 174.6
 Number of Spec. 18

Average_{norm} 0.004904 151.5
 Standard Dev._{norm} 11.03
 Coeff. of Var. [%]_{norm} 7.279
 Min. 0.004710 138.8
 Max. 0.005169 172.4
 Number of Spec. 18



Laminate Open-Hole Tension Properties (OHT3)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

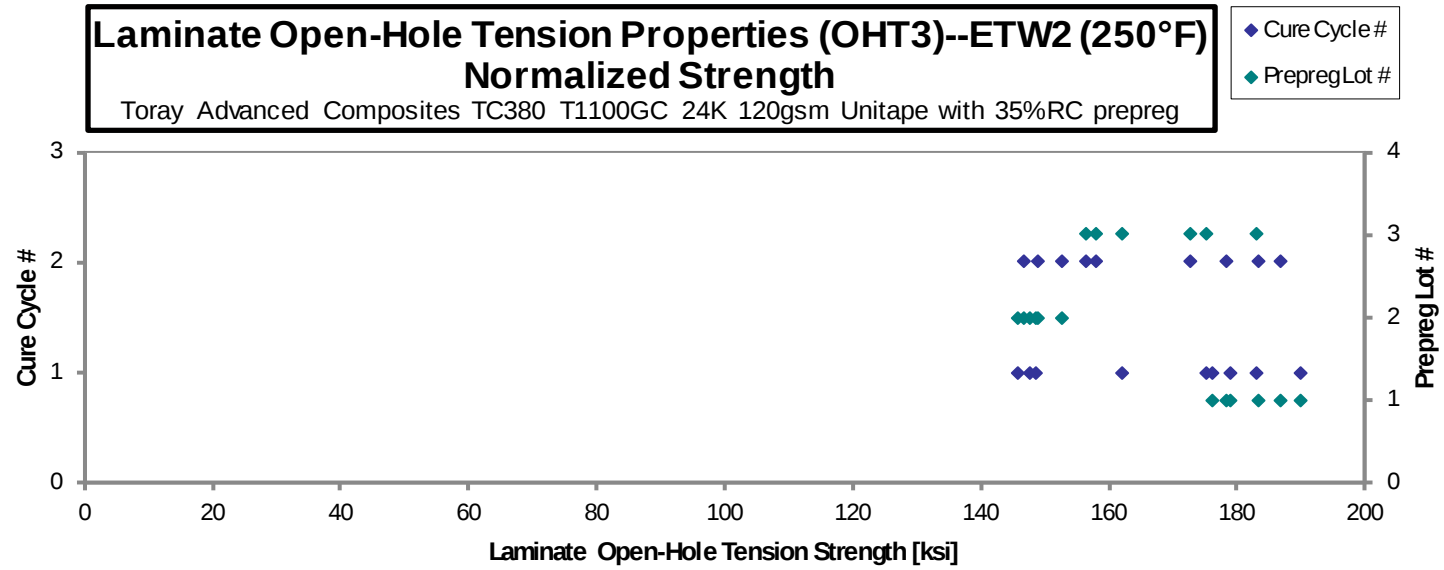
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TC DFA111E	A	C1	1	1	176.2	0.09610	20	M(A,D,L)GM, M(A,L)GB	0.004805	176.4
TC DFA112E	A	C1	1	1	177.4	0.09685	20	M(A,D)GM	0.004843	179.0
TC DFA113E	A	C1	1	1	186.8	0.09763	20	M(A,D)GM, M(A,L)GB	0.004882	190.0
TC DFA211E	A	C2	1	2	186.9	0.09602	20	M(A,D,L)GM, M(A,L)GB, M(A,L)GT	0.004801	186.9
TC DFA212E	A	C2	1	2	178.0	0.09635	20	M(A,D,L)GM, M(A,L)GB, M(A,L)GT	0.004818	178.6
TC DFA213E	A	C2	1	2	181.9	0.09678	20	M(A,D,L)GM, M(A,L)GB, M(A,L)GT	0.004839	183.4
TC DFB111E	B	C1	2	1	140.4	0.1011	20	M(A,D,L)GM	0.005056	147.9
TC DFB112E	B	C1	2	1	143.8	0.09935	20	M(A,D,L)GM	0.004968	148.8
TC DFB113E	B	C1	2	1	140.3	0.09973	20	M(A,D,L)GM	0.004987	145.8
TC DFB211E	B	C2	2	2	141.9	0.1008	20	M(A,D)GM	0.005041	149.0
TC DFB212E	B	C2	2	2	140.8	0.1002	20	M(A,D)GM	0.005010	146.9
TC DFB213E	B	C2	2	2	146.7	0.09993	20	M(A,D)GM	0.004997	152.7
TC DFC111E	C	C1	3	1	178.6	0.09847	20	M(A,D)GM	0.004923	183.2
TC DFC112E	C	C1	3	1	159.5	0.09757	20	M(A,D)GM	0.004878	162.1
TC DFC113E	C	C1	3	1	172.2	0.09777	20	M(A,D)GM	0.004888	175.4
TC DFC211E	C	C2	3	2	154.1	0.09843	20	M(A,D)GM, LWB	0.004922	158.0
TC DFC212E	C	C2	3	2	153.1	0.09818	20	M(A,D)GM, M(A,L)AB	0.004909	156.6
TC DFC213E	C	C2	3	2	167.6	0.09905	20	M(A,D)GM, M(A,L)AB	0.004953	172.9

Average 162.6
 Standard Dev. 17.56
 Coeff. of Var. [%] 10.80
 Min. 140.3
 Max. 186.9
 Number of Spec. 18

Average_{norm} 0.004918 166.3
 Standard Dev._{norm} 15.74
 Coeff. of Var. [%]_{norm} 9.467
 Min. 0.004801 145.8
 Max. 0.005056 190.0
 Number of Spec. 18 18



4.18 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)

**Laminate Filled-Hole Tension Properties (FHT1)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

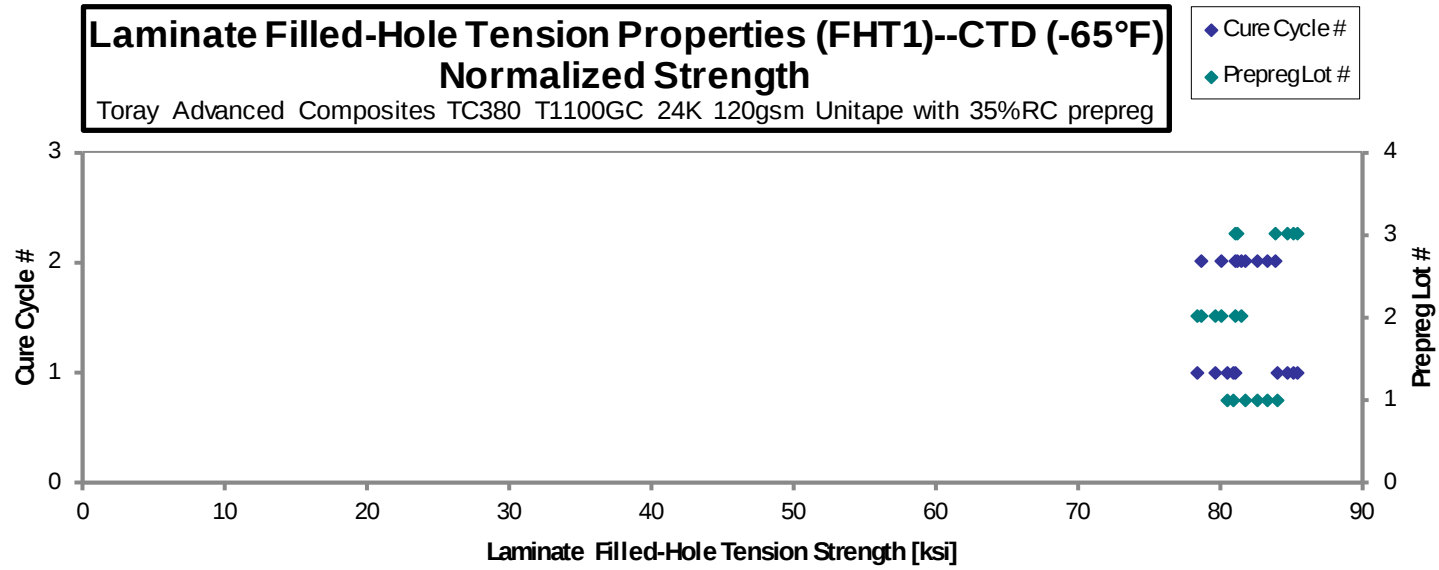
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD4A111B	A	C1	1	1	84.75	0.1143	24	M(A,L)GM	0.004764	84.12
TCD4A112B	A	C1	1	1	81.00	0.1145	24	M(A,L)GM	0.004771	80.51
TCD4A113B	A	C1	1	1	81.35	0.1147	24	M(A,L)GM	0.004777	80.96
TCD4A211B	A	C2	1	2	82.58	0.1153	24	M(A,L)GM	0.004803	82.63
TCD4A212B	A	C2	1	2	82.19	0.1147	24	LGM	0.004778	81.82
TCD4A213B	A	C2	1	2	83.78	0.1145	24	LGM	0.004772	83.30
TCD4B111B	B	C1	2	1	76.83	0.1216	24	LGM	0.005067	81.10
TCD4B112B	B	C1	2	1	75.75	0.1212	24	M(A,L)GM	0.005051	79.71
TCD4B113B	B	C1	2	1	73.56	0.1229	24	AGM	0.005120	78.46
TCD4B211B	B	C2	2	2	76.92	0.1220	24	M(A,L)GM	0.005083	81.46
TCD4B212B	B	C2	2	2	76.48	0.1207	24	AGM	0.005028	80.11
TCD4B213B	B	C2	2	2	74.59	0.1215	24	M(A,L)GM	0.005062	78.66
TCD4C111B	C	C1	3	1	81.85	0.1192	24	LGM	0.004967	84.70
TCD4C112B	C	C1	3	1	82.21	0.1194	24	M(A,L)GM	0.004973	85.17
TCD4C113B	C	C1	3	1	83.02	0.1186	24	M(A,L)GM	0.004941	85.46
TCD4C211B	C	C2	3	2	78.14	0.1195	24	M(A,L)GM	0.004978	81.04
TCD4C212B	C	C2	3	2	81.50	0.1186	24	M(A,L)GM	0.004942	83.91
TCD4C213B	C	C2	3	2	78.41	0.1194	24	M(A,L)GM	0.004973	81.24

Average 79.72
 Standard Dev. 3.396
 Coeff. of Var. [%] 4.260
 Min. 73.56
 Max. 84.75
 Number of Spec. 18

Average_{norm} 0.004936 81.91
 Standard Dev._{norm} 2.139
 Coeff. of Var. [%]_{norm} 2.611
 Min. 0.004764 78.46
 Max. 0.005120 85.46
 Number of Spec. 18 18



Laminate Filled-Hole Tension Properties (FHT1)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

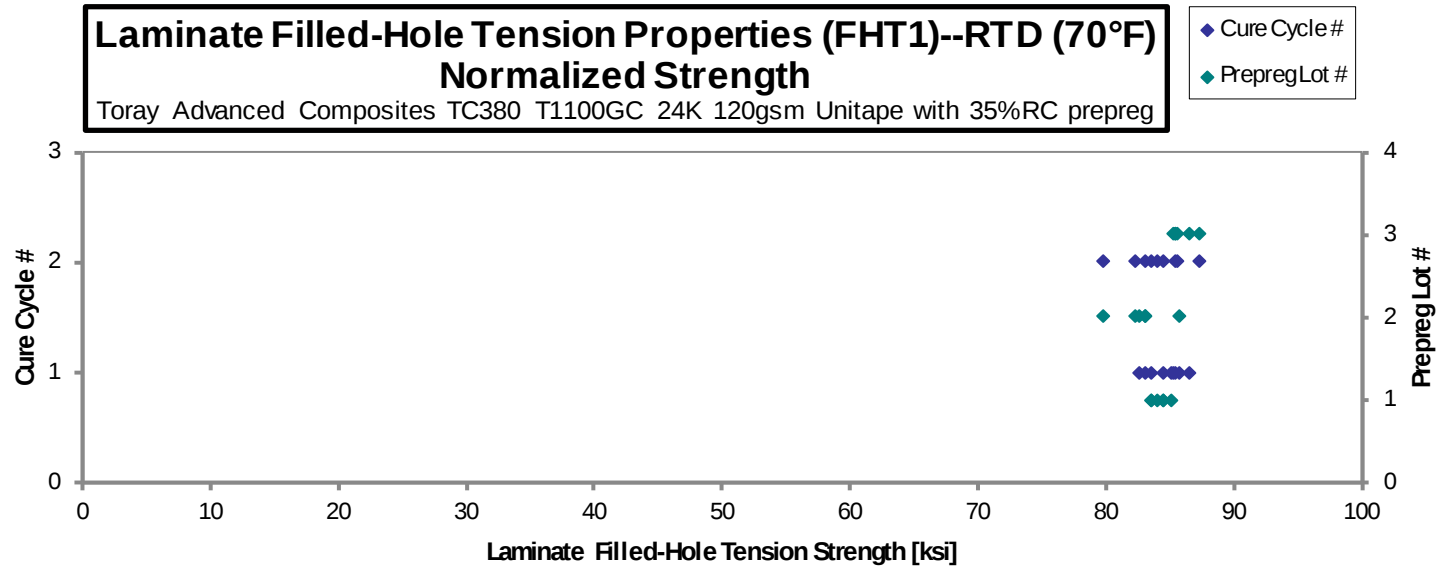
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD4A111A	A	C1	1	1	87.82	0.1116	24	M(A,D)GM	0.004648	85.04
TCD4A112A	A	C1	1	1	83.69	0.1163	24	M(A,D)GM	0.004847	84.51
TCD4A113A	A	C1	1	1	82.55	0.1165	24	M(A,D)GM	0.004856	83.51
TCD4A211A	A	C2	1	2	87.59	0.1112	24	M(A,D)GM	0.004633	84.54
TCD4A212A	A	C2	1	2	83.51	0.1160	24	M(A,D)GM	0.004831	84.05
TCD4A213A	A	C2	1	2	82.53	0.1167	24	M(A,D)GM	0.004863	83.62
TCD4B111A	B	C1	2	1	84.45	0.1127	24	M(A,D)GM	0.004694	82.58
TCD4B112A	B	C1	2	1	81.37	0.1213	24	M(A,D)GM	0.005056	85.70
TCD4B113A	B	C1	2	1	77.14	0.1241	24	M(A,D)GM	0.005170	83.09
TCD4B211A	B	C2	2	2	80.87	0.1136	24	M(A,D)GM	0.004733	79.74
TCD4B212A	B	C2	2	2	79.20	0.1208	24	M(A,D)GM	0.005033	83.05
TCD4B213A	B	C2	2	2	76.27	0.1244	24	M(A,D)GM	0.005181	82.32
TCD4C111A	C	C1	3	1	86.07	0.1144	24	AGM	0.004765	85.43
TCD4C112A	C	C1	3	1	83.33	0.1197	24	AGM	0.004988	86.60
TCD4C113A	C	C1	3	1	80.34	0.1222	24	AGM	0.005090	85.19
TCD4C211A	C	C2	3	2	88.16	0.1118	24	AGM	0.004658	85.56
TCD4C212A	C	C2	3	2	84.23	0.1194	24	M(A,L)GM	0.004973	87.27
TCD4C213A	C	C2	3	2	80.85	0.1217	24	AGM	0.005069	85.39

Average 82.78
Standard Dev. 3.407
Coeff. of Var. [%] 4.116
Min. 76.27
Max. 88.16
Number of Spec. 18

Average_{norm} 0.004894 84.29
Standard Dev._{norm} 1.772
Coeff. of Var. [%]_{norm} 2.102
Min. 0.004633 79.74
Max. 0.005181 87.27
Number of Spec. 18 18



**Laminate Filled-Hole Tension Properties (FHT1)--ETW1 (180°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

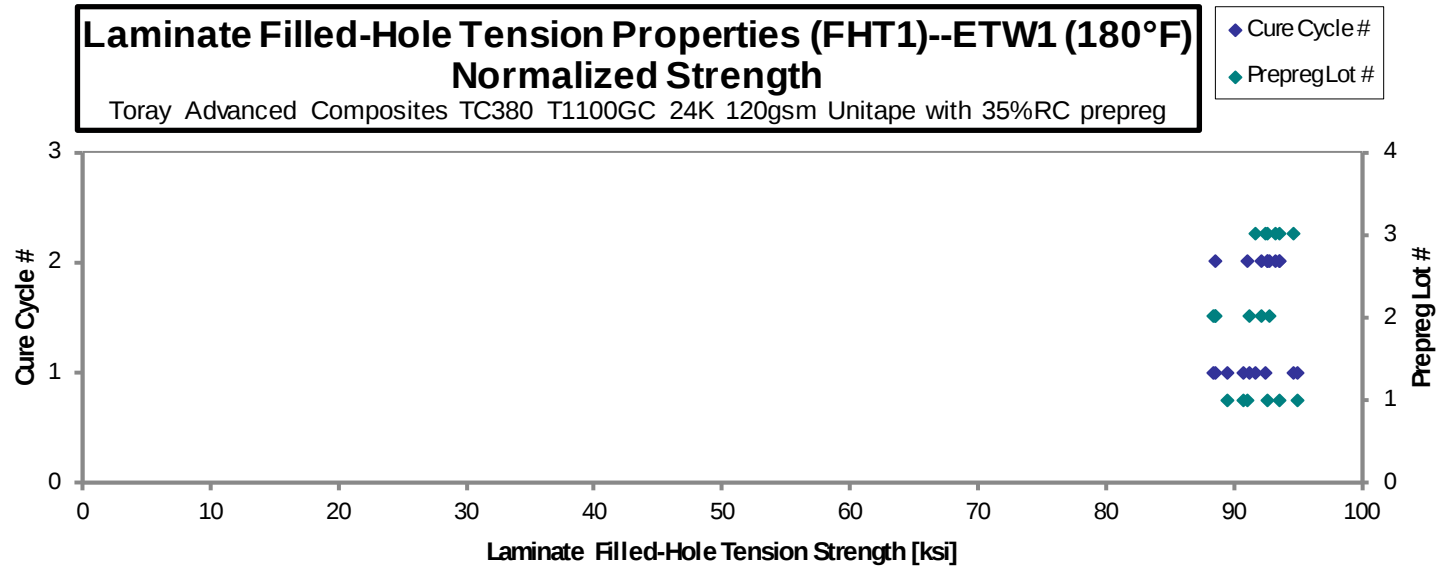
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD4A111D	A	C1	1	1	87.32	0.1180	24	M(A,L)GM	0.004917	89.46
TCD4A112D	A	C1	1	1	93.76	0.1114	24	M(A,L)GM	0.004643	90.70
TCD4A113D	A	C1	1	1	94.42	0.1160	24	M(A,L)GM	0.004832	95.05
TCD4A211D	A	C2	1	2	92.40	0.1166	24	M(A,L)GM	0.004859	93.54
TCD4A212D	A	C2	1	2	95.78	0.1115	24	M(A,L)GM	0.004645	92.69
TCD4A213D	A	C2	1	2	90.19	0.1164	24	M(A,L)GM	0.004849	91.12
TCD4B111D	B	C1	2	1	82.59	0.1235	24	M(A,L)GM	0.005144	88.50
TCD4B112D	B	C1	2	1	92.53	0.1135	24	M(A,L)GM	0.004729	91.16
TCD4B113D	B	C1	2	1	84.17	0.1211	24	AGM	0.005046	88.48
TCD4B211D	B	C2	2	2	86.22	0.1239	24	M(A,D,L)GM	0.005162	92.72
TCD4B212D	B	C2	2	2	94.35	0.1124	24	M(A,D)GM	0.004685	92.09
TCD4B213D	B	C2	2	2	84.53	0.1206	24	M(A,D)GM	0.005024	88.48
TCD4C111D	C	C1	3	1	88.40	0.1206	24	M(A,D)GM	0.005024	92.52
TCD4C112D	C	C1	3	1	95.91	0.1101	24	M(A,D)GM	0.004588	91.66
TCD4C113D	C	C1	3	1	93.64	0.1164	24	M(A,D)GM	0.004851	94.64
TCD4C211D	C	C2	3	2	88.67	0.1215	24	M(A,D,L)GM	0.005064	93.55
TCD4C212D	C	C2	3	2	96.08	0.1111	24	M(A,D)GM	0.004628	92.64
TCD4C213D	C	C2	3	2	90.29	0.1189	24	M(A,D)GM	0.004953	93.18

Average 90.63
Standard Dev. 4.345
Coeff. of Var. [%] 4.795
Min. 82.59
Max. 96.08
Number of Spec. 18

Average_{norm} 0.004869 91.79
Standard Dev._{norm} 2.030
Coeff. of Var. [%]_{norm} 2.212
Min. 0.004588 88.48
Max. 0.005162 95.05
Number of Spec. 18 18



Laminate Filled-Hole Tension Properties (FHT1)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

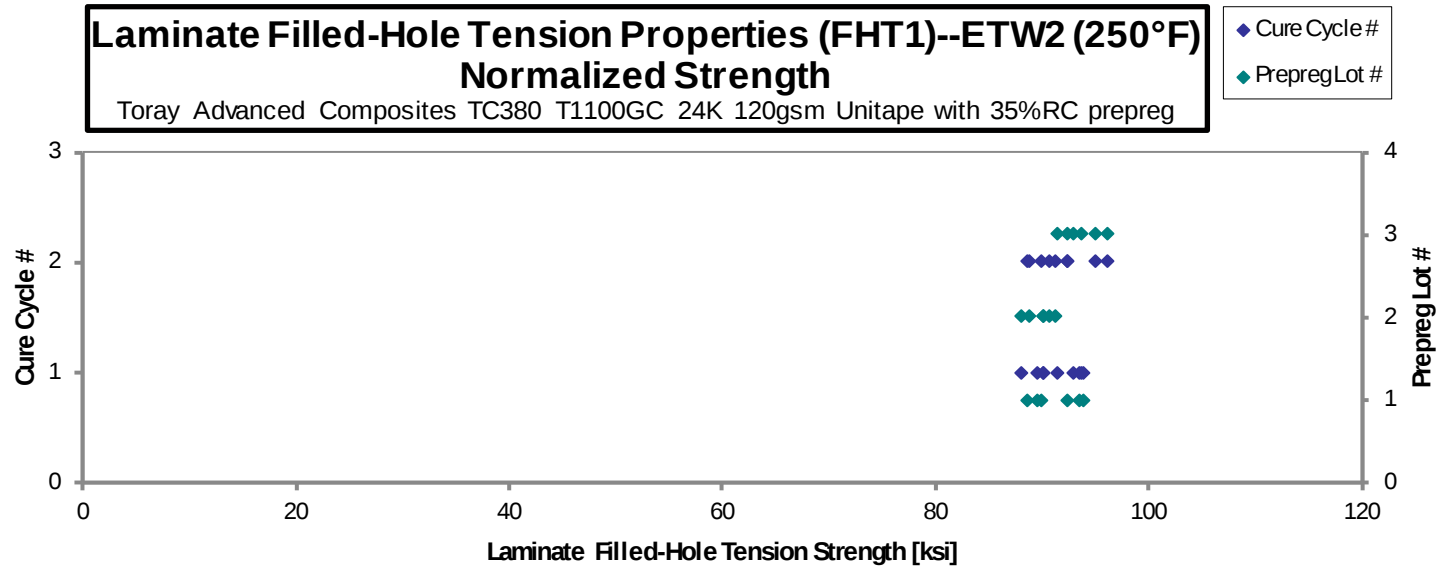
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD4A111E	A	C1	1	1	94.04	0.1146	24	M(A,L)GM	0.004774	93.54
TCD4A112E	A	C1	1	1	94.73	0.1140	24	M(A,L)GM	0.004751	93.77
TCD4A113E	A	C1	1	1	90.30	0.1141	24	M(A,L)GM	0.004754	89.44
TCD4A211E	A	C2	1	2	90.24	0.1147	24	M(A,L)GM	0.004780	89.86
TCD4A212E	A	C2	1	2	88.68	0.1152	24	M(A,L)GM	0.004798	88.65
TCD4A213E	A	C2	1	2	92.38	0.1152	24	M(A,L)GM	0.004801	92.39
TCD4B111E	B	C1	2	1	86.05	0.1207	24	AGM	0.005028	90.15
TCD4B112E	B	C1	2	1	84.75	0.1197	24	M(A,L)GM	0.004989	88.09
TCD4B113E	B	C1	2	1	86.12	0.1204	24	M(A,L)GM	0.005017	90.01
TCD4B211E	B	C2	2	2	84.68	0.1207	24	M(A,L)GM	0.005031	88.75
TCD4B212E	B	C2	2	2	87.84	0.1197	24	M(A,L)GM	0.004988	91.28
TCD4B213E	B	C2	2	2	86.50	0.1208	24	M(A,L)GM	0.005034	90.72
TCD4C111E	C	C1	3	1	90.52	0.1183	24	M(A,L)GM	0.004928	92.95
TCD4C112E	C	C1	3	1	89.34	0.1178	24	M(A,L)GM	0.004906	91.32
TCD4C113E	C	C1	3	1	91.05	0.1185	24	M(A,L)GM	0.004939	93.69
TCD4C211E	C	C2	3	2	89.15	0.1193	24	M(A,L)GM	0.004969	92.30
TCD4C212E	C	C2	3	2	93.33	0.1186	24	M(A,L)GM	0.004941	96.07
TCD4C213E	C	C2	3	2	91.69	0.1194	24	M(A,L)GM	0.004976	95.05

Average 89.52
 Standard Dev. 3.086
 Coeff. of Var. [%] 3.448
 Min. 84.68
 Max. 94.73
 Number of Spec. 18

Average_{norm} 0.004911 91.56
 Standard Dev._{norm} 2.302
 Coeff. of Var. [%]_{norm} 2.514
 Min. 0.004751 88.09
 Max. 0.005034 96.07
 Number of Spec. 18



4.19 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)

**Laminate Filled-Hole Tension Properties (FHT2)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

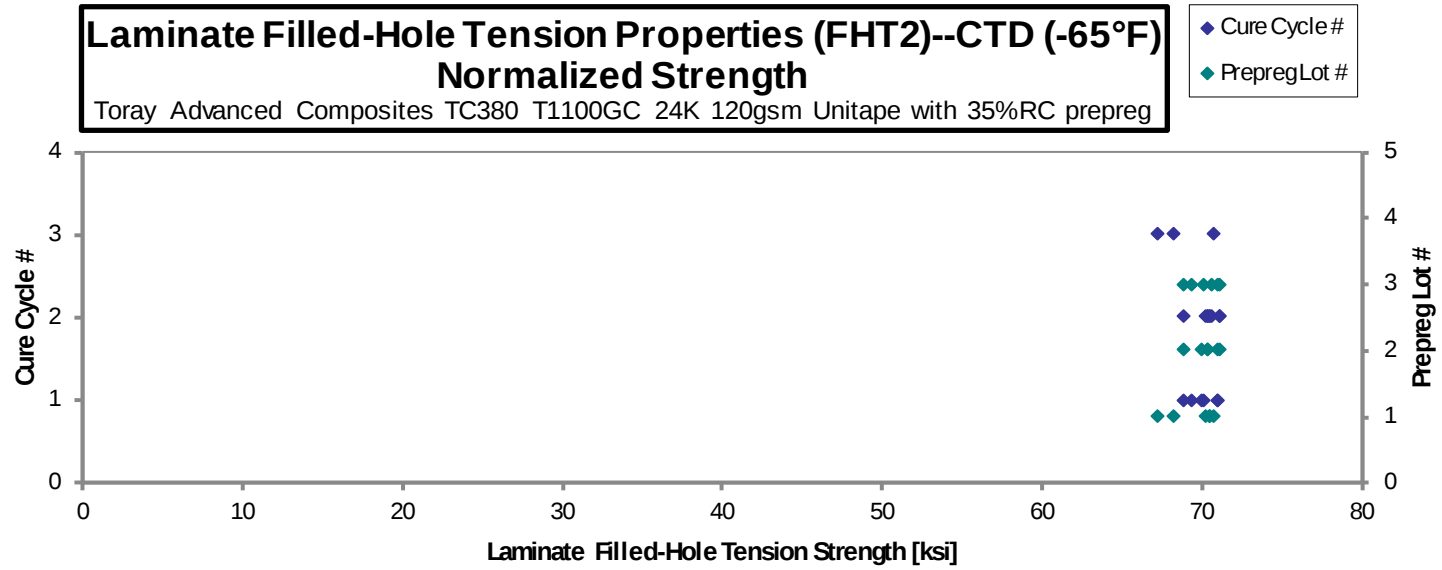
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD5A211B	A	C2	1	2	70.14	0.09637	20	AGM	0.004818	70.40
TCD5A212B	A	C2	1	2	70.38	0.09603	20	AGM	0.004802	70.41
TCD5A213B	A	C2	1	2	70.06	0.09623	20	AGF	0.004812	70.23
TCD5A311B	A	C3	1	3	69.96	0.09353	20	AGM	0.004677	68.16
TCD5A312B	A	C3	1	3	69.03	0.09350	20	AGM	0.004675	67.24
TCD5A313B	A	C3	1	3	73.03	0.09293	20	AGM	0.004647	70.69
TCD5B111B	B	C1	2	1	65.98	0.1001	20	AGM	0.005003	68.77
TCD5B112B	B	C1	2	1	67.57	0.09937	20	AGM	0.004968	69.94
TCD5B113B	B	C1	2	1	68.48	0.09953	20	AGM	0.004977	71.00
TCD5B211B	B	C2	2	2	68.41	0.09980	20	AGM	0.004990	71.12
TCD5B212B	B	C2	2	2	67.91	0.09950	20	AGM	0.004975	70.39
TCD5B213B	B	C2	2	2	67.49	0.1001	20	AGM	0.005003	70.35
TCD5C111B	C	C1	3	1	66.35	0.1002	20	M(A,L)GM	0.005012	69.28
TCD5C112B	C	C1	3	1	68.18	0.09998	20	M(A,L)GM	0.004999	71.01
TCD5C113B	C	C1	3	1	66.96	0.1004	20	M(A,L)GM	0.005022	70.05
TCD5C211B	C	C2	3	2	66.06	0.09997	20	AGM	0.004998	68.79
TCD5C212B	C	C2	3	2	68.67	0.09940	20	AGM	0.004970	71.11
TCD5C213B	C	C2	3	2	68.27	0.09918	20	AGM	0.004959	70.54

Average 68.50
Standard Dev. 1.771
Coeff. of Var. [%] 2.586
Min. 65.98
Max. 73.03
Number of Spec. 18

Average_{norm} 0.004906 69.97
Standard Dev._{norm} 1.097
Coeff. of Var. [%]_{norm} 1.567
Min. 0.004647 67.24
Max. 0.005022 71.12
Number of Spec. 18 18



Laminate Filled-Hole Tension Properties (FHT2)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

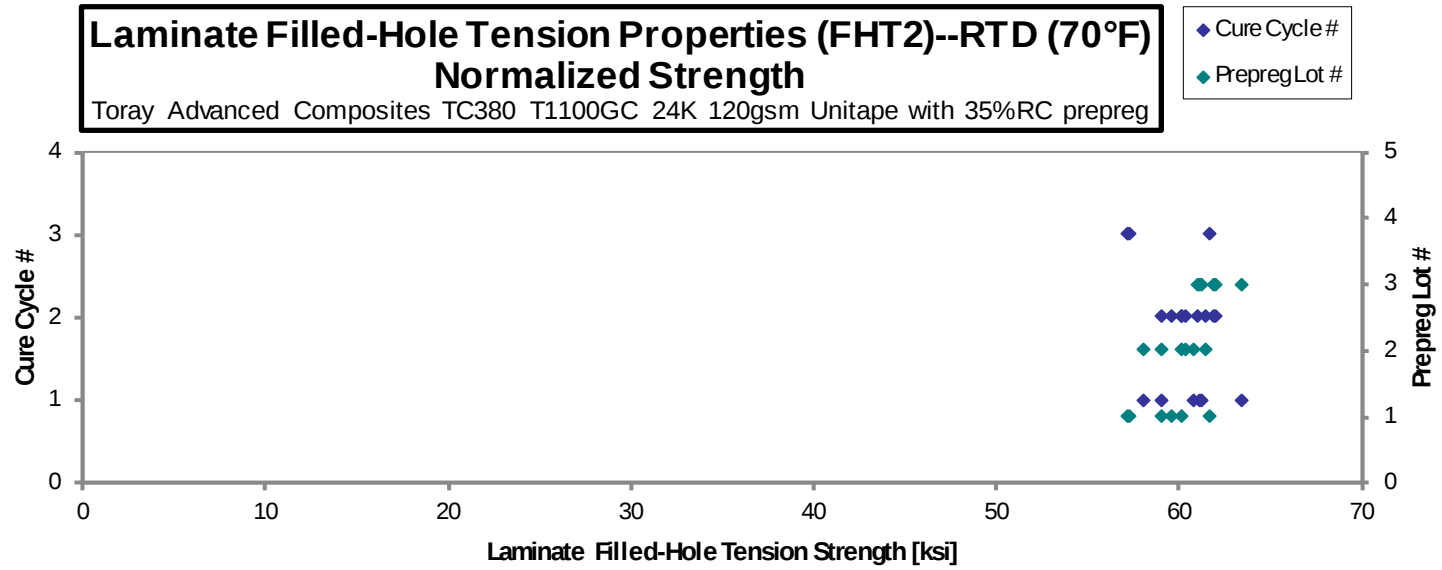
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD5A211A	A	C2	1	2	61.33	0.09330	20	M(A,D)GM	0.004665	59.60
TCD5A212A	A	C2	1	2	58.14	0.09737	20	M(A,D)GM	0.004868	58.96
TCD5A213A	A	C2	1	2	59.11	0.09767	20	M(A,D)GM	0.004883	60.14
TCD5A311A	A	C3	1	3	59.31	0.09268	20	M(A,D)GM	0.004634	57.26
TCD5A312A	A	C3	1	3	62.58	0.09457	20	M(A,D)GM	0.004728	61.64
TCD5A313A	A	C3	1	3	58.36	0.09408	20	M(A,D)GM	0.004704	57.19
TCD5B111A	B	C1	2	1	59.59	0.09357	20	M(A,D)GM	0.004678	58.08
TCD5B112A	B	C1	2	1	58.69	0.09940	20	M(A,D)GM	0.004970	60.76
TCD5B113A	B	C1	2	1	55.69	0.1017	20	M(A,D)GM	0.005083	58.98
TCD5B211A	B	C2	2	2	61.68	0.09353	20	M(A,D)GM	0.004677	60.10
TCD5B212A	B	C2	2	2	57.97	0.09987	20	M(A,D)GM	0.004993	60.31
TCD5B213A	B	C2	2	2	57.66	0.1022	20	M(A,D)GM	0.005110	61.38
TCD5C111A	C	C1	3	1	61.19	0.09590	20	AGM	0.004795	61.13
TCD5C112A	C	C1	3	1	60.74	0.1003	20	AGM	0.005013	63.44
TCD5C113A	C	C1	3	1	57.68	0.1018	20	AGM	0.005089	61.15
TCD5C211A	C	C2	3	2	62.21	0.09405	20	AGM	0.004703	60.95
TCD5C212A	C	C2	3	2	59.85	0.09930	20	AGM	0.004965	61.91
TCD5C213A	C	C2	3	2	58.33	0.1020	20	AGM	0.005102	61.99

Average 59.45
 Standard Dev. 1.853
 Coeff. of Var. [%] 3.116
 Min. 55.69
 Max. 62.58
 Number of Spec. 18

Average_{norm} 0.004870 60.28
 Standard Dev._{norm} 1.685
 Coeff. of Var. [%]_{norm} 2.795
 Min. 0.004634 57.19
 Max. 0.005110 63.44
 Number of Spec. 18



Laminate Filled-Hole Tension Properties (FHT2)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

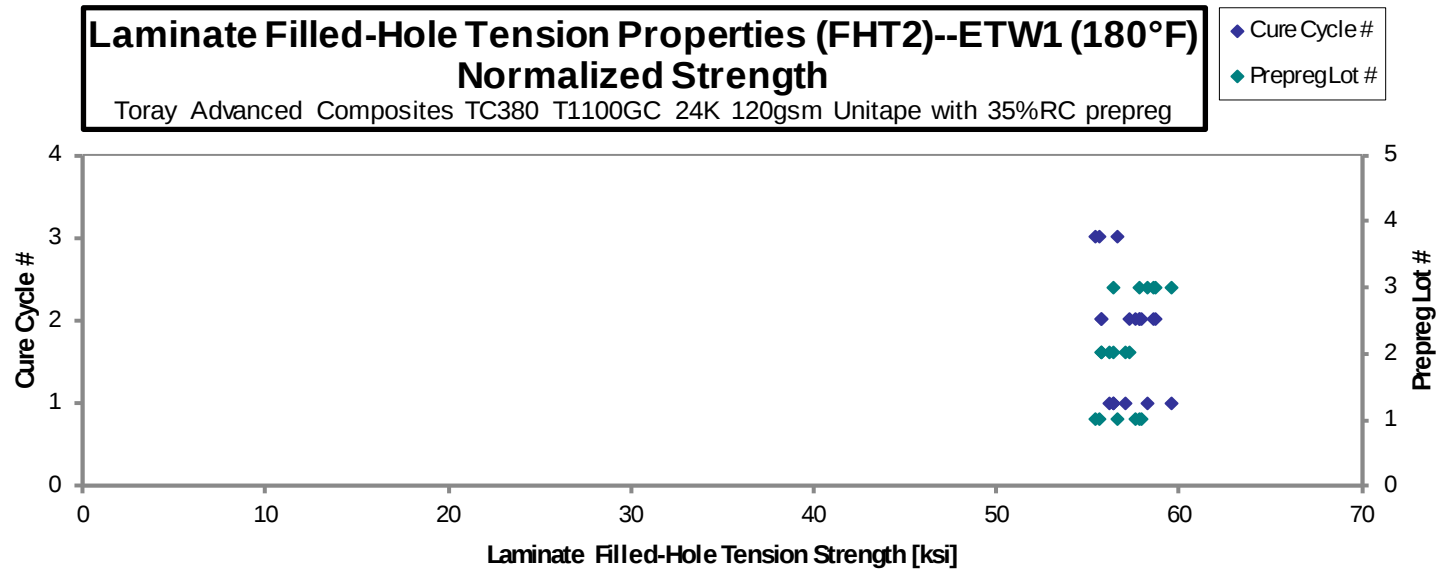
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD5A211D	A	C2	1	2	56.47	0.09790	20	AGM	0.004895	57.59
TCD5A212D	A	C2	1	2	59.33	0.09350	20	AGM	0.004675	57.78
TCD5A213D	A	C2	1	2	57.29	0.09700	20	AGM	0.004850	57.89
TCD5A311D	A	C3	1	3	56.53	0.09408	20	AGM	0.004704	55.41
TCD5A312D	A	C3	1	3	59.49	0.09135	20	AGM	0.004568	56.61
TCD5A313D	A	C3	1	3	56.66	0.09425	20	AGM	0.004713	55.62
TCD5B111D	B	C1	2	1	53.70	0.1020	20	M(A,D)GM	0.005098	57.04
TCD5B112D	B	C1	2	1	58.31	0.09247	20	M(A,D)GM	0.004623	56.16
TCD5B113D	B	C1	2	1	54.91	0.09867	20	M(A,D)GM	0.004933	56.44
TCD5B211D	B	C2	2	2	53.97	0.1018	20	M(A,D)GM	0.005092	57.25
TCD5B212D	B	C2	2	2	57.79	0.09257	20	M(A,D)GM	0.004628	55.72
TCD5B213D	B	C2	2	2	54.18	0.09870	20	M(A,D)GM	0.004935	55.70
TCD5C111D	C	C1	3	1	55.23	0.1012	20	M(A,D)GM	0.005062	58.24
TCD5C112D	C	C1	3	1	57.18	0.09475	20	M(A,D)GM	0.004738	56.43
TCD5C113D	C	C1	3	1	57.08	0.1002	20	M(A,D)GM	0.005008	59.55
TCD5C211D	C	C2	3	2	55.84	0.1008	20	M(A,D)GM	0.005042	58.66
TCD5C212D	C	C2	3	2	59.65	0.09305	20	M(A,D)GM	0.004653	57.81
TCD5C213D	C	C2	3	2	57.37	0.09802	20	M(A,D)GM	0.004901	58.57

Average 56.72
 Standard Dev. 1.836
 Coeff. of Var. [%] 3.237
 Min. 53.70
 Max. 59.65
 Number of Spec. 18

Average_{norm} 0.004840 57.14
 Standard Dev._{norm} 1.204
 Coeff. of Var. [%]_{norm} 2.107
 Min. 0.004568 55.41
 Max. 0.005098 59.55
 Number of Spec. 18



Laminate Filled-Hole Tension Properties (FHT2)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

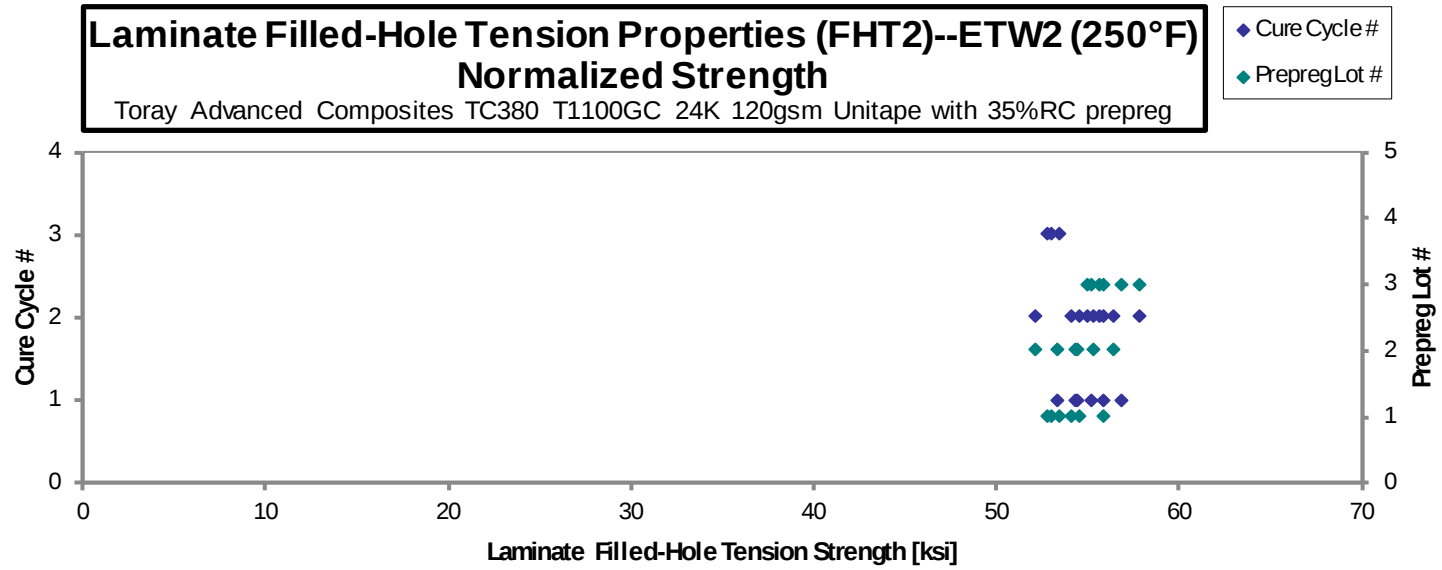
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD5A211E	A	C2	1	2	56.65	0.09453	20	AGM	0.004727	55.78
TCD5A212E	A	C2	1	2	55.40	0.09443	20	AGM	0.004722	54.50
TCD5A213E	A	C2	1	2	54.85	0.09470	20	AGM	0.004735	54.11
TCD5A311E	A	C3	1	3	54.82	0.09277	20	AGM	0.004638	52.97
TCD5A312E	A	C3	1	3	55.12	0.09192	20	AGM	0.004596	52.78
TCD5A313E	A	C3	1	3	54.79	0.09365	20	AGM	0.004683	53.45
TCD5B111E	B	C1	2	1	52.49	0.09930	20	M(A,D)GM	0.004965	54.30
TCD5B112E	B	C1	2	1	51.44	0.09947	20	M(A,D)GM	0.004973	53.30
TCD5B113E	B	C1	2	1	52.49	0.09950	20	M(A,D)GM	0.004975	54.40
TCD5B211E	B	C2	2	2	53.44	0.09923	20	M(A,D)GM	0.004962	55.24
TCD5B212E	B	C2	2	2	50.64	0.09873	20	M(A,D)GM	0.004937	52.08
TCD5B213E	B	C2	2	2	54.45	0.09937	20	M(A,D)GM	0.004968	56.36
TCD5C111E	C	C1	3	1	54.14	0.09902	20	AGM	0.004951	55.84
TCD5C112E	C	C1	3	1	53.84	0.09842	20	AGM	0.004921	55.19
TCD5C113E	C	C1	3	1	54.72	0.09975	20	AGM	0.004988	56.86
TCD5C211E	C	C2	3	2	54.17	0.09857	20	AGM	0.004928	55.62
TCD5C212E	C	C2	3	2	56.43	0.09832	20	AGM	0.004916	57.79
TCD5C213E	C	C2	3	2	53.38	0.09880	20	AGM	0.004940	54.94

Average 54.07
Standard Dev. 1.570
Coeff. of Var. [%] 2.904
Min. 50.64
Max. 56.65
Number of Spec. 18

Average_{norm} 0.004862 54.75
Standard Dev._{norm} 1.505
Coeff. of Var. [%]_{norm} 2.749
Min. 0.004596 52.08
Max. 0.004988 57.79
Number of Spec. 18



4.20 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)

**Laminate Filled-Hole Tension Properties (FHT3)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

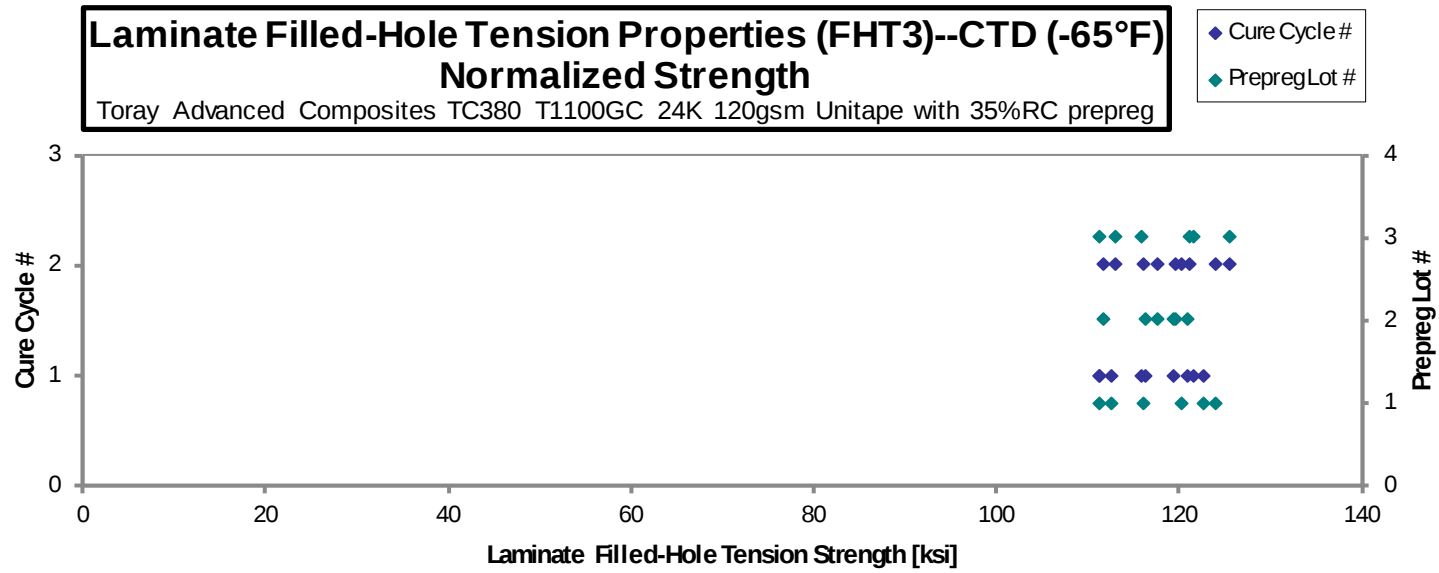
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD6A111B	A	C1	1	1	109.8	0.09723	20	M(A,L)GM	0.004862	111.2
TCD6A112B	A	C1	1	1	111.1	0.09718	20	M(A,L)GM	0.004859	112.4
TCD6A113B	A	C1	1	1	121.4	0.09697	20	M(A,L)GM	0.004848	122.6
TCD6A211B	A	C2	1	2	118.5	0.09735	20	M(A,L)GM	0.004868	120.2
TCD6A212B	A	C2	1	2	115.6	0.09650	20	M(A,L)GM	0.004825	116.2
TCD6A213B	A	C2	1	2	122.8	0.09688	20	M(A,L)GM	0.004844	124.0
TCD6B111B	B	C1	2	1	115.7	0.1002	20	AGM	0.005012	120.8
TCD6B112B	B	C1	2	1	111.9	0.09978	20	AGM	0.004989	116.3
TCD6B113B	B	C1	2	1	114.4	0.1001	20	M(A,L)GM	0.005003	119.2
TCD6B211B	B	C2	2	2	113.9	0.09923	20	M(A,L)GM	0.004962	117.7
TCD6B212B	B	C2	2	2	108.1	0.09925	20	M(A,L)GM	0.004963	111.7
TCD6B213B	B	C2	2	2	115.5	0.09942	20	M(A,L)GM	0.004971	119.6
TCD6C111B	C	C1	3	1	106.9	0.09992	20	LGM	0.004996	111.3
TCD6C112B	C	C1	3	1	111.1	0.1001	20	LGM	0.005005	115.8
TCD6C113B	C	C1	3	1	115.5	0.1011	20	LGM	0.005055	121.6
TCD6C211B	C	C2	3	2	116.9	0.09945	20	LGM	0.004973	121.1
TCD6C212B	C	C2	3	2	122.3	0.09857	20	LGM	0.004928	125.6
TCD6C213B	C	C2	3	2	109.9	0.09875	20	LGM	0.004938	113.0

Average 114.5
Standard Dev. 4.716
Coeff. of Var. [%] 4.119
Min. 106.9
Max. 122.8
Number of Spec. 18

Average_{norm} 0.004939 117.8
Standard Dev._{norm} 4.546
Coeff. of Var. [%]_{norm} 3.860
Min. 0.004825 111.2
Max. 0.005055 125.6
Number of Spec. 18 18



Laminate Filled-Hole Tension Properties (FHT3)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

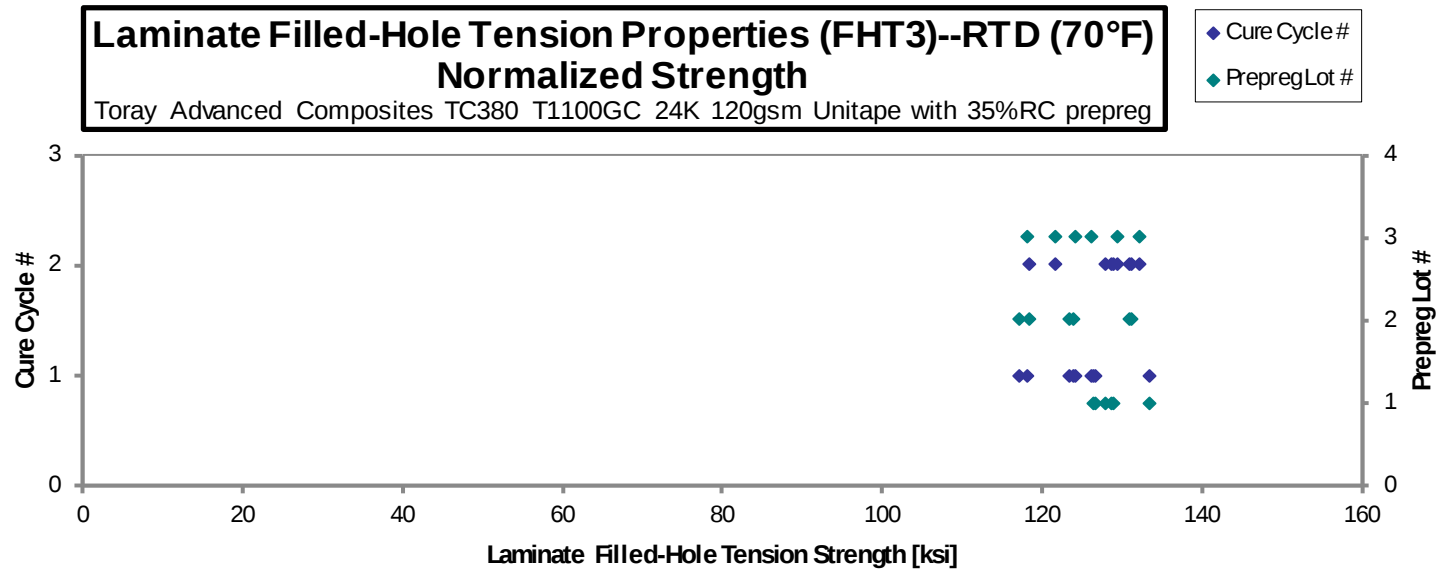
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD6A111A	A	C1	1	1	128.0	0.09492	20	M(A,D,L)GM	0.004746	126.5
TCD6A112A	A	C1	1	1	123.0	0.09873	20	M(A,D,L)GM	0.004937	126.5
TCD6A113A	A	C1	1	1	129.7	0.09873	20	M(A,D,L)GM	0.004937	133.4
TCD6A211A	A	C2	1	2	130.9	0.09422	20	M(A,D,L)GM	0.004711	128.5
TCD6A212A	A	C2	1	2	125.6	0.09782	20	M(A,D,L)GM	0.004891	127.9
TCD6A213A	A	C2	1	2	126.1	0.09820	20	M(A,D,L)GM	0.004910	129.0
TCD6B111A	B	C1	2	1	126.1	0.09402	20	M(A,D,L)GM	0.004701	123.5
TCD6B112A	B	C1	2	1	118.8	0.1001	20	M(A,D,L)GM	0.005004	123.8
TCD6B113A	B	C1	2	1	109.8	0.1023	20	M(A,D,L)GM	0.005117	117.0
TCD6B211A	B	C2	2	2	124.9	0.1006	20	M(A,D,L)GM	0.005031	130.9
TCD6B212A	B	C2	2	2	112.3	0.1012	20	M(A,D,L)GM	0.005059	118.4
TCD6B213A	B	C2	2	2	127.6	0.09878	20	M(A,D,L)GM	0.004939	131.3
TCD6C111A	C	C1	3	1	118.4	0.09582	20	LGM	0.004791	118.2
TCD6C112A	C	C1	3	1	118.0	0.1009	20	LGM	0.005043	124.0
TCD6C113A	C	C1	3	1	118.8	0.1019	20	LGM	0.005095	126.1
TCD6C211A	C	C2	3	2	133.0	0.09343	20	M(A,L)GM	0.004672	129.4
TCD6C212A	C	C2	3	2	128.5	0.09863	20	M(A,L)GM	0.004932	132.0
TCD6C213A	C	C2	3	2	116.9	0.09983	20	M(A,L)GM	0.004992	121.6

Average 123.1
Standard Dev. 6.503
Coeff. of Var. [%] 5.281
Min. 109.8
Max. 133.0
Number of Spec. 18

Average_{norm} 0.004917 126.0
Standard Dev._{norm} 4.895
Coeff. of Var. [%]_{norm} 3.885
Min. 0.004672 117.0
Max. 0.005117 133.4
Number of Spec. 18 18



Laminate Filled-Hole Tension Properties (FHT3)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

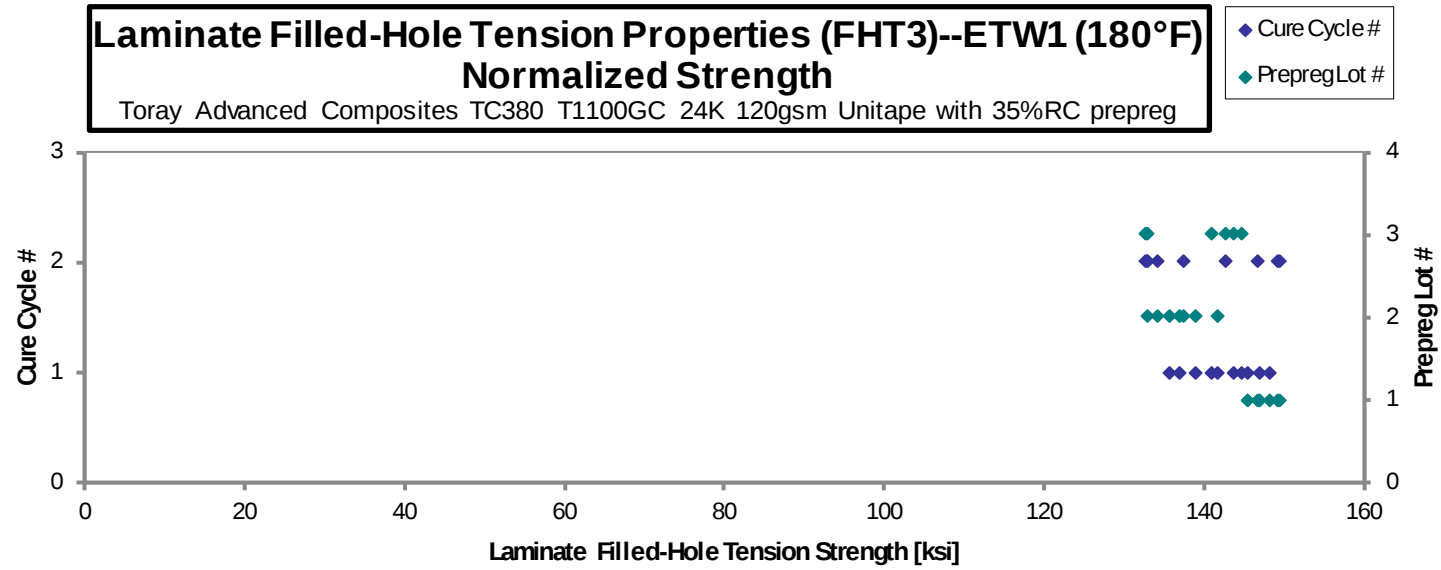
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD6A111D	A	C1	1	1	144.0	0.09877	20	M(A,L)GM	0.004938	148.2
TCD6A112D	A	C1	1	1	147.2	0.09485	20	M(A,L)GM	0.004743	145.5
TCD6A113D	A	C1	1	1	142.9	0.09863	20	M(A,L)GM	0.004932	146.9
TCD6A211D	A	C2	1	2	145.6	0.09860	20	M(A,L)GM	0.004930	149.5
TCD6A212D	A	C2	1	2	149.5	0.09422	20	M(A,L)GM	0.004711	146.7
TCD6A213D	A	C2	1	2	145.8	0.09825	20	M(A,L)GM	0.004913	149.2
TCD6B111D	B	C1	2	1	128.4	0.1015	20	LGM	0.005073	135.7
TCD6B112D	B	C1	2	1	138.7	0.09472	20	LGM	0.004736	136.8
TCD6B113D	B	C1	2	1	136.5	0.09970	20	LGM	0.004985	141.7
TCD6B114D	B	C1	2	1	131.5	0.1014	20	LGM	0.005071	138.9
TCD6B211D	B	C2	2	2	129.1	0.1021	20	LGM	0.005104	137.3
TCD6B212D	B	C2	2	2	136.9	0.09325	20	LGM	0.004663	133.0
TCD6B213D	B	C2	2	2	130.6	0.09857	20	LGM	0.004928	134.1
TCD6C111D	C	C1	3	1	132.2	0.1024	20	M(A,D,L)GM	0.005118	141.0
TCD6C112D	C	C1	3	1	146.6	0.09407	20	M(A,D,L)GM	0.004703	143.7
TCD6C113D	C	C1	3	1	139.0	0.09997	20	M(A,D,L)GM	0.004998	144.8
TCD6C211D	C	C2	3	2	126.1	0.1012	20	M(A,D,L)GM	0.005058	132.9
TCD6C212D	C	C2	3	2	146.0	0.09372	20	M(A,D,L)GM	0.004686	142.6
TCD6C213D	C	C2	3	2	130.2	0.09785	20	M(A,D,L)GM	0.004893	132.7

Average 138.3
 Standard Dev. 7.613
 Coeff. of Var. [%] 5.506
 Min. 126.1
 Max. 149.5
 Number of Spec. 19

Average_{norm} 0.004904 141.1
 Standard Dev._{norm} 5.838
 Coeff. of Var. [%]_{norm} 4.137
 Min. 0.004663 132.7
 Max. 0.005118 149.5
 Number of Spec. 19 19



**Laminate Filled-Hole Tension Properties (FHT3)--ETW2 (250°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

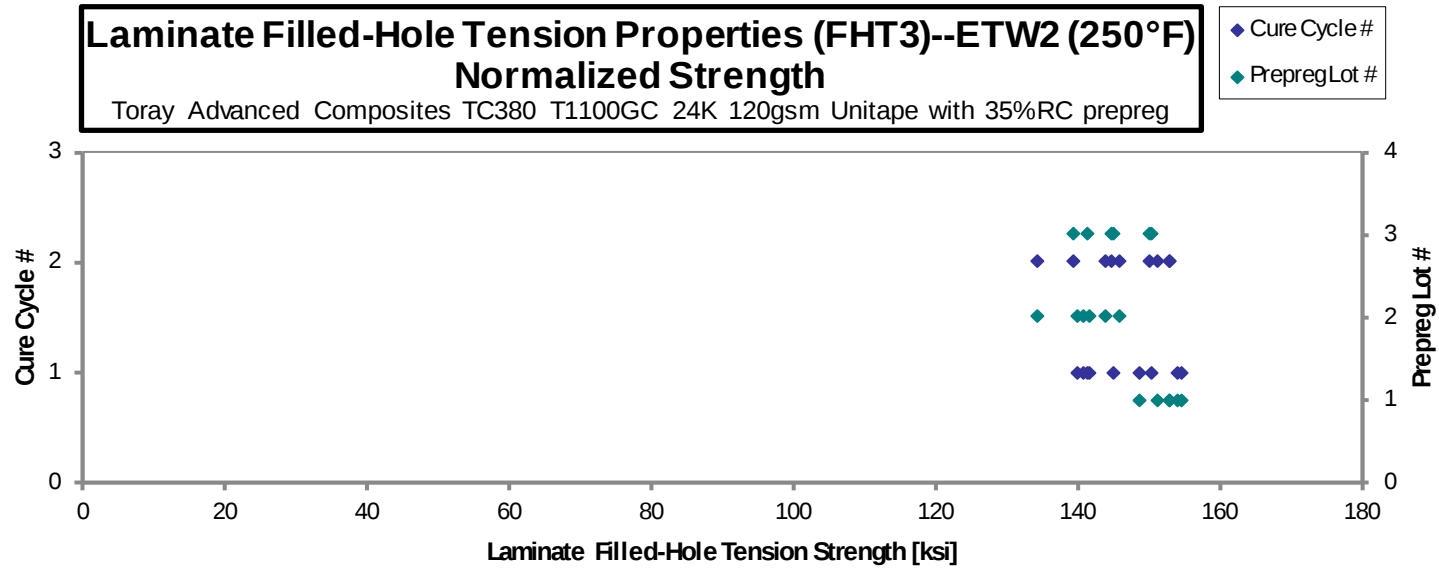
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD6A111E	A	C1	1	1	151.9	0.09725	20	M(A,L)GM	0.004863	153.9
TCD6A112E	A	C1	1	1	146.8	0.09717	20	M(A,L)GM	0.004858	148.6
TCD6A113E	A	C1	1	1	152.8	0.09705	20	M(A,L)GM	0.004853	154.4
TCD6A211E	A	C2	1	2	149.8	0.09700	20	M(A,L)GM, M(A,L)WT	0.004850	151.3
TCD6A212E	A	C2	1	2	151.3	0.09697	20	M(A,L)GM, M(A,L)WB	0.004848	152.8
TCD6A213E	A	C2	1	2	151.0	0.09710	20	M(A,L)GM, M(A,L)WB	0.004855	152.8
TCD6B111E	B	C1	2	1	136.1	0.09927	20	LGM	0.004963	140.8
TCD6B112E	B	C1	2	1	137.8	0.09873	20	M(A,L)GM	0.004937	141.7
TCD6B113E	B	C1	2	1	135.4	0.09923	20	LGM	0.004962	140.0
TCD6B211E	B	C2	2	2	139.5	0.09897	20	M(A,L)GM	0.004948	143.8
TCD6B212E	B	C2	2	2	131.5	0.09807	20	LGM	0.004903	134.3
TCD6B213E	B	C2	2	2	141.0	0.09937	20	LGM	0.004968	145.9
TCD6C111E	C	C1	3	1	141.5	0.09845	20	LGM	0.004923	145.1
TCD6C112E	C	C1	3	1	147.1	0.09805	20	LGM	0.004903	150.3
TCD6C113E	C	C1	3	1	136.9	0.09903	20	LGM	0.004952	141.2
TCD6C211E	C	C2	3	2	145.4	0.09907	20	M(A,L)GM	0.004953	150.0
TCD6C212E	C	C2	3	2	142.8	0.09737	20	LGM	0.004868	144.8
TCD6C213E	C	C2	3	2	135.6	0.09857	20	LGM	0.004928	139.2

Average 143.0
Standard Dev. 6.721
Coeff. of Var. [%] 4.700
Min. 131.5
Max. 152.8
Number of Spec. 18

Average_{norm} 0.004908 146.2
Standard Dev._{norm} 5.893
Coeff. of Var. [%]_{norm} 4.032
Min. 0.004848 134.3
Max. 0.004968 154.4
Number of Spec. 18 18



4.21 “25/50/25” Open-Hole Compression 1 Properties (OHC1)

**Laminate Open-Hole Compression Properties (OHC1)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

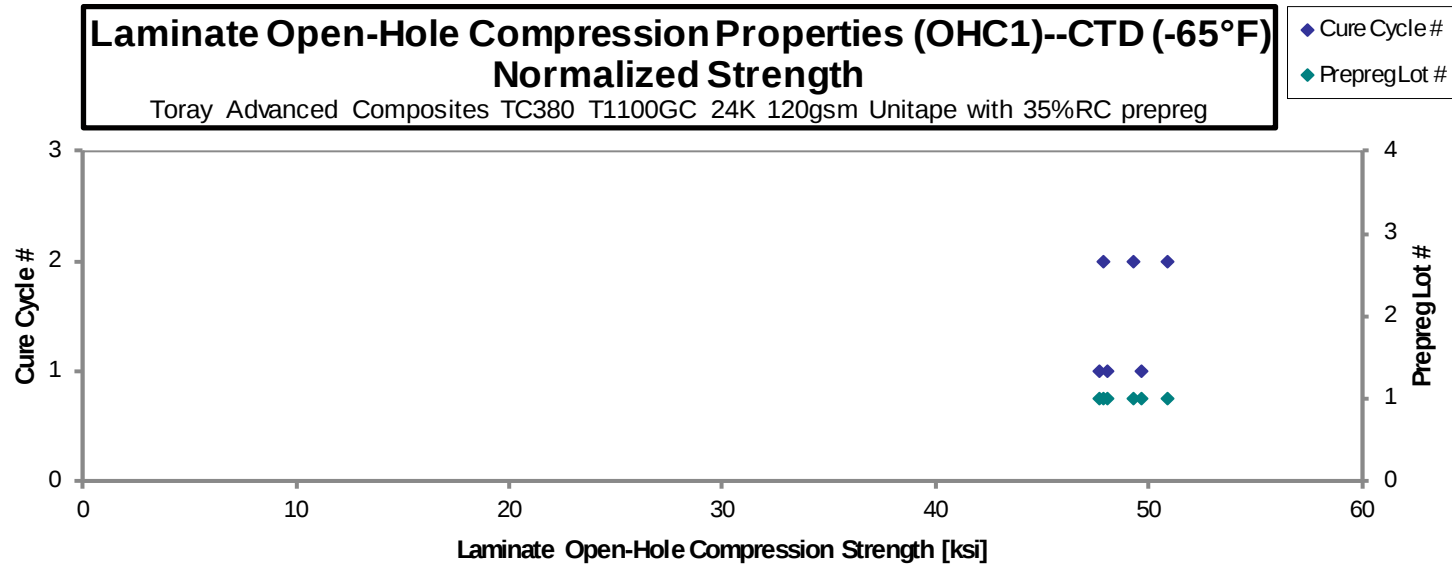
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDGA111B	A	C1	1	1	47.92	0.1155	24	M(A,L)GM
TCDGA112B	A	C1	1	1	49.66	0.1153	24	M(A,L)GM
TCDGA113B	A	C1	1	1	47.68	0.1153	24	M(A,L)GM
TCDGA211B	A	C2	1	2	50.99	0.1150	24	LGM
TCDGA212B	A	C2	1	2	47.89	0.1151	24	M(A,L)GM
TCDGA213B	A	C2	1	2	49.24	0.1152	24	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.004812	48.04
0.004802	49.68
0.004802	47.70
0.004790	50.89
0.004794	47.83
0.004799	49.22

Average 48.90
Standard Dev. 1.306
Coeff. of Var. [%] 2.672
Min. 47.68
Max. 50.99
Number of Spec. 6

Average_{norm} 0.004800 48.89
Standard Dev._{norm} 1.265
Coeff. of Var. [%]_{norm} 2.586
Min. 0.004790 47.70
Max. 0.004812 50.89
Number of Spec. 6 6



Laminate Open-Hole Compression Properties (OHC1)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

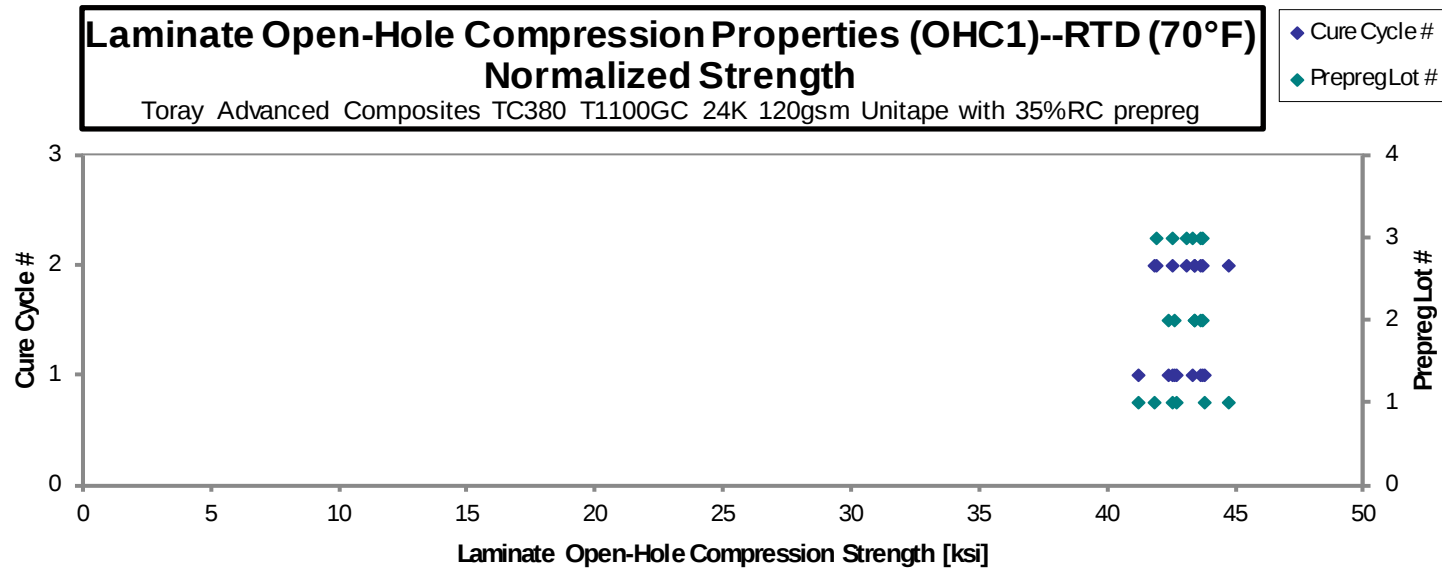
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDGA111A	A	C1	1	1	42.17	0.1127	24	LGM	0.004695	41.25
TCDGA112A	A	C1	1	1	42.15	0.1168	24	LGM	0.004865	42.72
TCDGA113A	A	C1	1	1	43.01	0.1174	24	LGM	0.004890	43.82
TCDGA211A	A	C2	1	2	43.00	0.1122	24	LGM	0.004674	41.88
TCDGA212A	A	C2	1	2	42.15	0.1164	24	LGM	0.004849	42.58
TCDGA213A	A	C2	1	2	44.19	0.1167	24	LGM	0.004863	44.77
TCDGB111A	B	C1	2	1	43.40	0.1125	24	LGM	0.004688	42.38
TCDGB112A	B	C1	2	1	41.42	0.1187	24	LGM	0.004944	42.67
TCDGB113A	B	C1	2	1	41.43	0.1216	24	LGM	0.005066	43.72
TCDGB211A	B	C2	2	2	44.09	0.1134	24	LGM	0.004724	43.39
TCDGB212A	B	C2	2	2	41.56	0.1205	24	LGM	0.005019	43.46
TCDGB213A	B	C2	2	2	40.85	0.1231	24	LGM	0.005128	43.65
TCDGC111A	C	C1	3	1	43.27	0.1134	24	M(A,L)GM	0.004725	42.59
TCDGC112A	C	C1	3	1	41.91	0.1200	24	M(A,L)GM	0.004999	43.65
TCDGC113A	C	C1	3	1	41.02	0.1218	24	M(A,L)GM	0.005073	43.35
TCDGC211A	C	C2	3	2	42.61	0.1134	24	M(A,L)GM	0.004726	41.95
TCDGC212A	C	C2	3	2	41.65	0.1193	24	M(A,L)GM	0.004972	43.15
TCDGC213A	C	C2	3	2	41.38	0.1218	24	M(A,L)GM	0.005073	43.73

Average 42.29
 Standard Dev. 1.010
 Coeff. of Var. [%] 2.387
 Min. 40.85
 Max. 44.19
 Number of Spec. 18

Average_{norm} 0.004888 43.04
 Standard Dev._{norm} 0.8586
 Coeff. of Var. [%]_{norm} 1.995
 Min. 0.004674 41.25
 Max. 0.005128 44.77
 Number of Spec. 18



Laminate Open-Hole Compression Properties (OHC1)--ETD1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

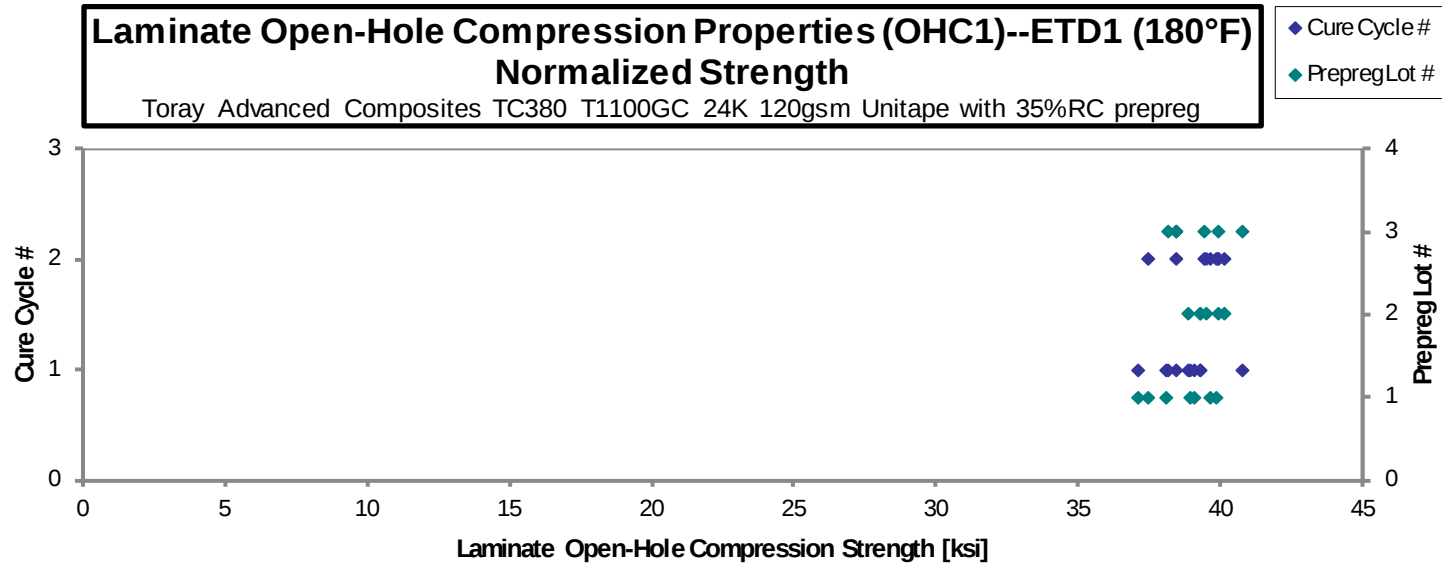
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDGA111C	A	C1	1	1	38.21	0.1174	24	LGM	0.004890	38.93
TCDGA112C	A	C1	1	1	38.69	0.1164	24	LGM	0.004851	39.10
TCDGA113C	A	C1	1	1	39.28	0.1119	24	M(A,L)GM	0.004662	38.15
TCDGA114C	A	C1	1	1	37.95	0.1127	24	LGM	0.004695	37.12
TCDGA211C	A	C2	1	2	39.00	0.1179	24	M(A,L)GM	0.004910	39.89
TCDGA212C	A	C2	1	2	39.30	0.1164	24	M(A,L)GM	0.004848	39.69
TCDGA213C	A	C2	1	2	38.59	0.1120	24	M(A,L)GM	0.004665	37.50
TCDGB111C	B	C1	2	1	37.87	0.1196	24	M(A,L)GM	0.004984	39.32
TCDGB112C	B	C1	2	1	37.70	0.1188	24	M(A,L)GM	0.004948	38.86
TCDGB113C	B	C1	2	1	37.71	0.1201	24	M(A,L)GM	0.005002	39.30
TCDGB211C	B	C2	2	2	37.99	0.1218	24	M(A,L)GM	0.005075	40.16
TCDGB212C	B	C2	2	2	38.23	0.1204	24	M(A,L)GM	0.005015	39.94
TCDGB213C	B	C2	2	2	37.58	0.1211	24	M(A,L)GM	0.005045	39.50
TCDGC111C	C	C1	3	1	36.55	0.1203	24	LGM	0.005014	38.18
TCDGC112C	C	C1	3	1	37.01	0.1198	24	LGM	0.004990	38.47
TCDGC113C	C	C1	3	1	39.00	0.1204	24	LGM	0.005017	40.76
TCDGC211C	C	C2	3	2	36.90	0.1200	24	M(A,L)GM	0.005001	38.44
TCDGC212C	C	C2	3	2	38.00	0.1195	24	M(A,L)GM	0.004979	39.42
TCDGC213C	C	C2	3	2	38.30	0.1202	24	M(A,L)GM	0.005008	39.96

Average 38.10
 Standard Dev. 0.7749
 Coeff. of Var. [%] 2.034
 Min. 36.55
 Max. 39.30
 Number of Spec. 19

Average_{norm} 0.004926 39.09
 Standard Dev._{norm} 0.9375
 Coeff. of Var. [%]_{norm} 2.398
 Min. 0.004662 37.12
 Max. 0.005075 40.76
 Number of Spec. 19 19



Laminate Open-Hole Compression Properties (OHC1)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

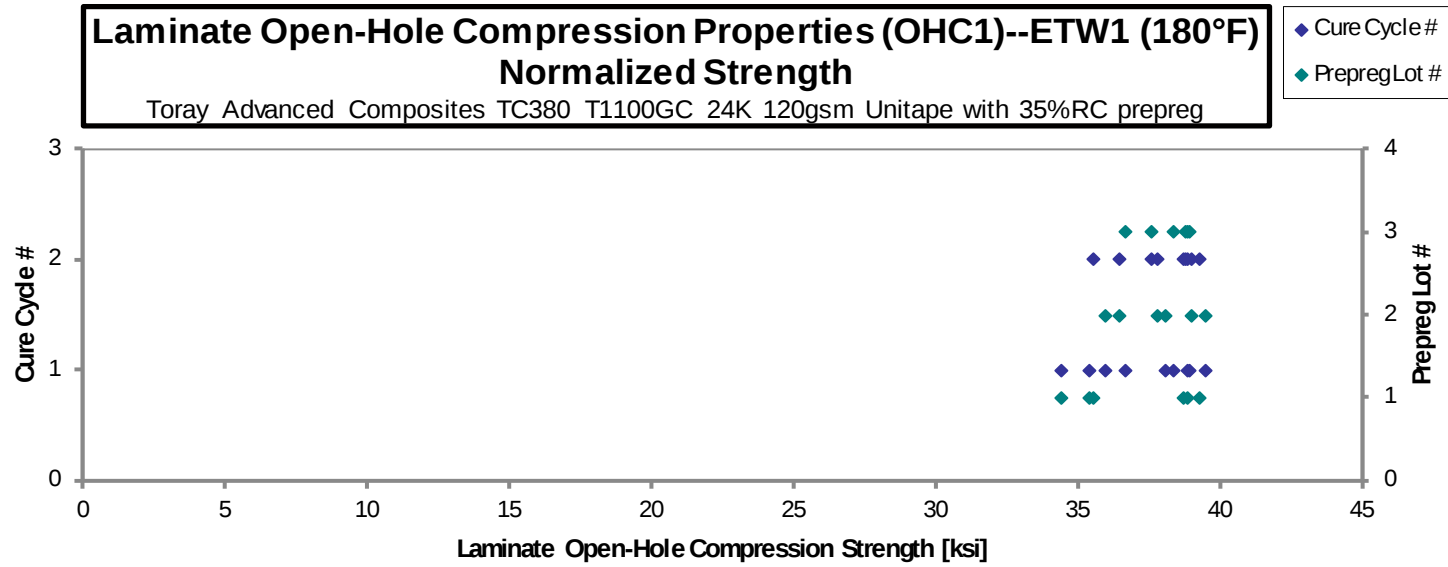
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDGA111D	A	C1	1	1	38.56	0.1160	24	M(A,L)GM	0.004834	38.83
TCDGA112D	A	C1	1	1	34.07	0.1165	24	M(A,L)GM	0.004852	34.44
TCDGA113D	A	C1	1	1	35.12	0.1161	24	M(A,L)GM	0.004838	35.39
TCDGA211D	A	C2	1	2	39.08	0.1158	24	LGM	0.004824	39.28
TCDGA212D	A	C2	1	2	38.35	0.1163	24	LGM	0.004845	38.71
TCDGA213D	A	C2	1	2	35.62	0.1149	24	LGM	0.004787	35.53
TCDGB111D	B	C1	2	1	36.25	0.1210	24	AGM	0.005042	38.08
TCDGB112D	B	C1	2	1	36.92	0.1123	24	AGM	0.004678	35.98
TCDGB113D	B	C1	2	1	38.19	0.1191	24	AGM	0.004961	39.48
TCDGB211D	B	C2	2	2	35.29	0.1233	24	AGM	0.005139	37.78
TCDGB212D	B	C2	2	2	39.72	0.1131	24	AGM	0.004713	38.99
TCDGB213D	B	C2	2	2	34.86	0.1204	24	AGM	0.005016	36.43
TCDGC111D	C	C1	3	1	34.71	0.1218	24	AGM	0.005074	36.69
TCDGC112D	C	C1	3	1	40.02	0.1120	24	AGM	0.004665	38.89
TCDGC113D	C	C1	3	1	37.32	0.1184	24	AGM	0.004935	38.37
TCDGC211D	C	C2	3	2	36.88	0.1212	24	M(A,L)GM	0.005049	38.79
TCDGC212D	C	C2	3	2	38.26	0.1132	24	M(A,L)GM	0.004718	37.61
TCDGC213D	C	C2	3	2	37.58	0.1191	24	AGM	0.004962	38.84

Average 37.04
 Standard Dev. 1.812
 Coeff. of Var. [%] 4.892
 Min. 34.07
 Max. 40.02
 Number of Spec. 18

Average_{norm} 0.004885 37.67
 Standard Dev._{norm} 1.541
 Coeff. of Var. [%]_{norm} 4.090
 Min. 0.004665 34.44
 Max. 0.005139 39.48
 Number of Spec. 18 18



Laminate Open-Hole Compression Properties (OHC1)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

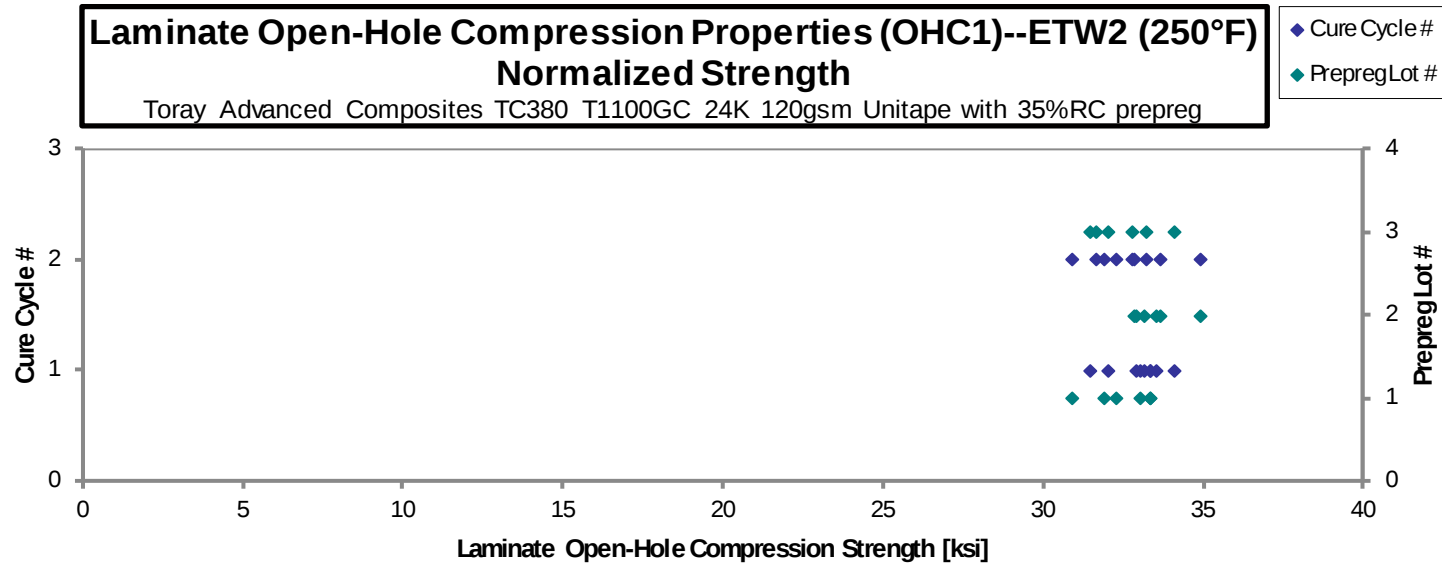
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDGA111E	A	C1	1	1	33.34	0.1152	24	M(A,L)GM	0.004801	33.35
TCDGA112E	A	C1	1	1	33.27	0.1156	24	M(A,L)GM	0.004818	33.39
TCDGA113E	A	C1	1	1	32.55	0.1170	24	M(A,L)GM	0.004876	33.06
TCDGA211E	A	C2	1	2	32.35	0.1137	24	LGM	0.004736	31.92
TCDGA212E	A	C2	1	2	32.55	0.1144	24	M(A,L)GM	0.004765	32.32
TCDGA213E	A	C2	1	2	30.67	0.1163	24	M(A,L)GM	0.004844	30.95
TCDGB111E	B	C1	2	1	32.09	0.1182	24	AGM	0.004925	32.93
TCDGB112E	B	C1	2	1	32.74	0.1180	24	AGM	0.004918	33.55
TCDGB113E	B	C1	2	1	32.23	0.1186	24	AGM	0.004941	33.18
TCDGB211E	B	C2	2	2	33.26	0.1209	24	AGM	0.005039	34.92
TCDGB212E	B	C2	2	2	31.65	0.1197	24	AGM	0.004989	32.90
TCDGB213E	B	C2	2	2	32.16	0.1207	24	AGM	0.005029	33.69
TCDGC111E	C	C1	3	1	30.64	0.1185	24	AGM	0.004935	31.51
TCDGC112E	C	C1	3	1	33.36	0.1179	24	AGM	0.004914	34.15
TCDGC113E	C	C1	3	1	31.06	0.1189	24	AGM	0.004955	32.07
TCDGC211E	C	C2	3	2	31.47	0.1201	24	AGM	0.005004	32.81
TCDGC212E	C	C2	3	2	32.16	0.1190	24	AGM	0.004959	33.23
TCDGC213E	C	C2	3	2	30.22	0.1208	24	AGM	0.005033	31.68

Average 32.10
 Standard Dev. 0.9729
 Coeff. of Var. [%] 3.031
 Min. 30.22
 Max. 33.36
 Number of Spec. 18

Average_{norm} 0.004916 32.87
 Standard Dev._{norm} 0.9854
 Coeff. of Var. [%]_{norm} 2.998
 Min. 0.004736 30.95
 Max. 0.005039 34.92
 Number of Spec. 18



4.22 “10/80/10” Open-Hole Compression 2 Properties (OHC2)

**Laminate Open-Hole Compression Properties (OHC2)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

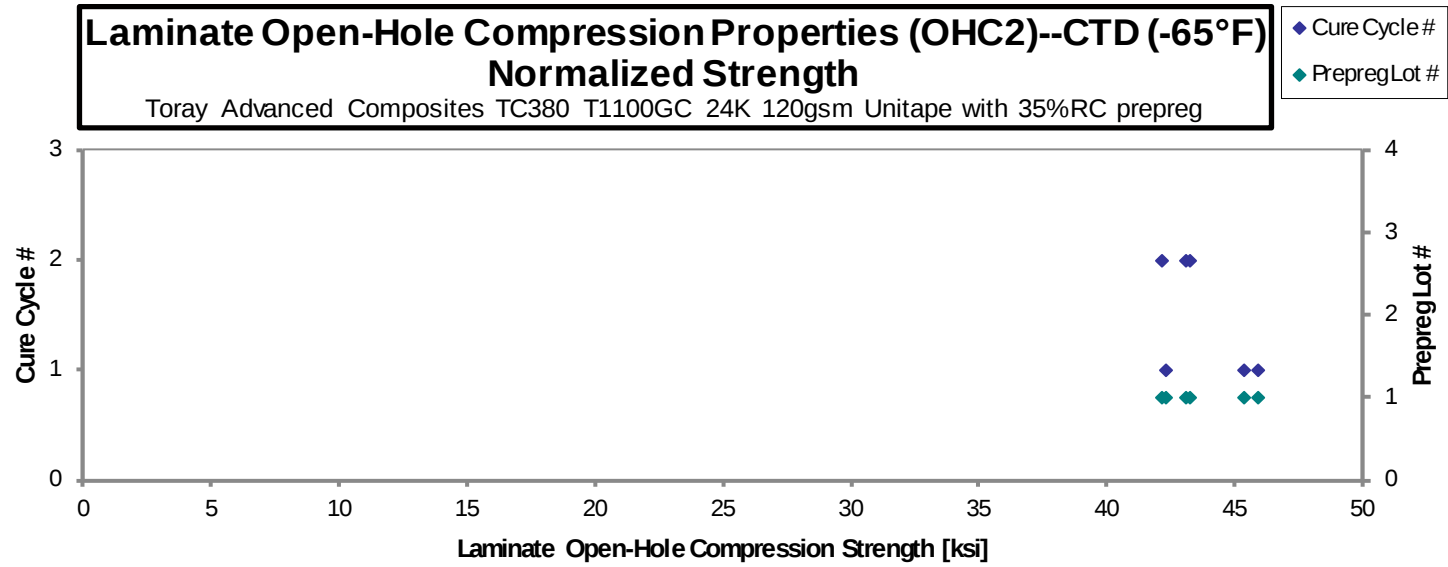
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDHA111B	A	C1	1	1	42.53	0.09555	20	M(A,L)GM
TCDHA112B	A	C1	1	1	46.24	0.09530	20	M(A,L)GM
TCDHA113B	A	C1	1	1	45.67	0.09538	20	M(A,L)GM
TCDHA211B	A	C2	1	2	43.34	0.09548	20	M(A,L)GM
TCDHA212B	A	C2	1	2	43.62	0.09523	20	M(A,L)GM
TCDHA213B	A	C2	1	2	42.24	0.09573	20	M(A,L)GM

Avg. t _{ply} [in]	Strength _{norm} [ksi]
0.004778	42.33
0.004765	45.90
0.004769	45.38
0.004774	43.11
0.004762	43.27
0.004787	42.12

Average 43.94
Standard Dev. 1.652
Coeff. of Var. [%] 3.759
Min. 42.24
Max. 46.24
Number of Spec. 6

Average_{norm} 0.004772 43.69
Standard Dev._{norm} 1.586
Coeff. of Var. [%]_{norm} 3.631
Min. 0.004762 42.12
Max. 0.004787 45.90
Number of Spec. 6



Laminate Open-Hole Compression Properties (OHC2)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

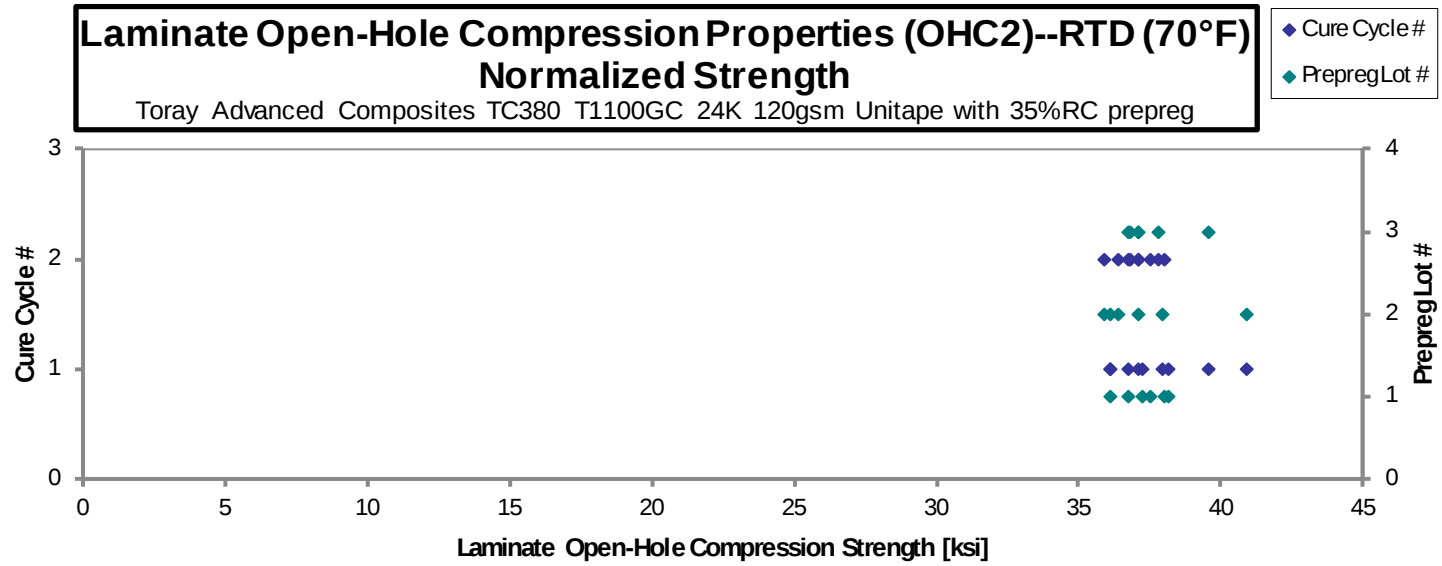
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDHA111A	A	C1	1	1	37.62	0.09503	20	M(A,L)GM	0.004752	37.24
TCDHA112A	A	C1	1	1	35.76	0.09707	20	M(A,L)GM	0.004853	36.16
TCDHA113A	A	C1	1	1	37.79	0.09693	20	M(A,L)GM	0.004847	38.16
TCDHA211A	A	C2	1	2	37.01	0.09533	20	M(A,L)GM	0.004767	36.75
TCDHA212A	A	C2	1	2	36.41	0.09893	20	M(A,L)GM	0.004947	37.52
TCDHA213A	A	C2	1	2	37.23	0.09802	20	M(A,L)GM	0.004901	38.01
TCDHB111A	B	C1	2	1	37.43	0.09268	20	M(A,L)GM	0.004634	36.14
TCDHB112A	B	C1	2	1	36.60	0.09953	20	M(A,L)GM	0.004977	37.95
TCDHB113A	B	C1	2	1	39.19	0.1002	20	M(A,L)GM	0.005010	40.90
TCDHB211A	B	C2	2	2	37.47	0.09197	20	M(A,L)GM	0.004598	35.90
TCDHB212A	B	C2	2	2	35.66	0.09803	20	M(A,L)GM	0.004902	36.42
TCDHB213A	B	C2	2	2	35.64	0.1000	20	M(A,L)GM	0.005002	37.14
TCDHC111A	C	C1	3	1	37.80	0.09338	20	AGM	0.004669	36.77
TCDHC112A	C	C1	3	1	38.93	0.09768	20	M(A,L)GM	0.004884	39.62
TCDHC113A	C	C1	3	1	35.81	0.09948	20	M(A,L)GM	0.004974	37.11
TCDHC211A	C	C2	3	2	37.02	0.09552	20	AGM	0.004776	36.84
TCDHC212A	C	C2	3	2	35.58	0.1001	20	AGM	0.005003	37.09
TCDHC213A	C	C2	3	2	35.83	0.1014	20	AGM	0.005068	37.82

Average 36.93
 Standard Dev. 1.113
 Coeff. of Var. [%] 3.015
 Min. 35.58
 Max. 39.19
 Number of Spec. 18

Average_{norm} 0.004865 37.42
 Standard Dev._{norm} 1.246
 Coeff. of Var. [%]_{norm} 3.331
 Min. 0.004598 35.90
 Max. 0.005068 40.90
 Number of Spec. 18 18



Laminate Open-Hole Compression Properties (OHC2)--ETD1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

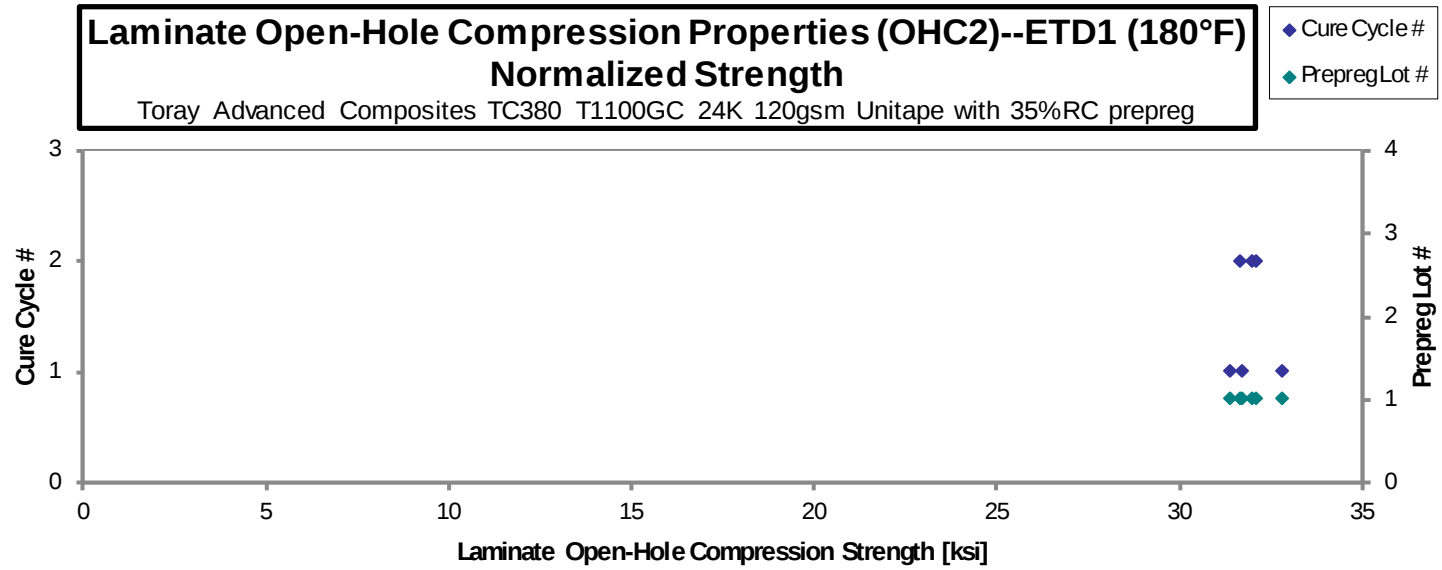
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDHA111C	A	C1	1	1	32.00	0.09835	20	M(A,L)GM
TCDHA112C	A	C1	1	1	30.92	0.09740	20	M(A,L)GM
TCDHA113C	A	C1	1	1	32.56	0.09347	20	M(A,L)GM
TCDHA211C	A	C2	1	2	31.44	0.09758	20	M(A,L)GM
TCDHA212C	A	C2	1	2	31.54	0.09757	20	M(A,L)GM
TCDHA213C	A	C2	1	2	32.15	0.09453	20	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.004918	32.78
0.004870	31.37
0.004673	31.71
0.004879	31.96
0.004878	32.05
0.004727	31.66

Average 31.77
 Standard Dev. 0.5865
 Coeff. of Var. [%] 1.846
 Min. 30.92
 Max. 32.56
 Number of Spec. 6

Average_{norm} 0.004824
 Standard Dev._{norm} 0.4864
 Coeff. of Var. [%]_{norm} 1.524
 Min. 0.004673
 Max. 0.004918
 Number of Spec. 6



Laminate Open-Hole Compression Properties (OHC2)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

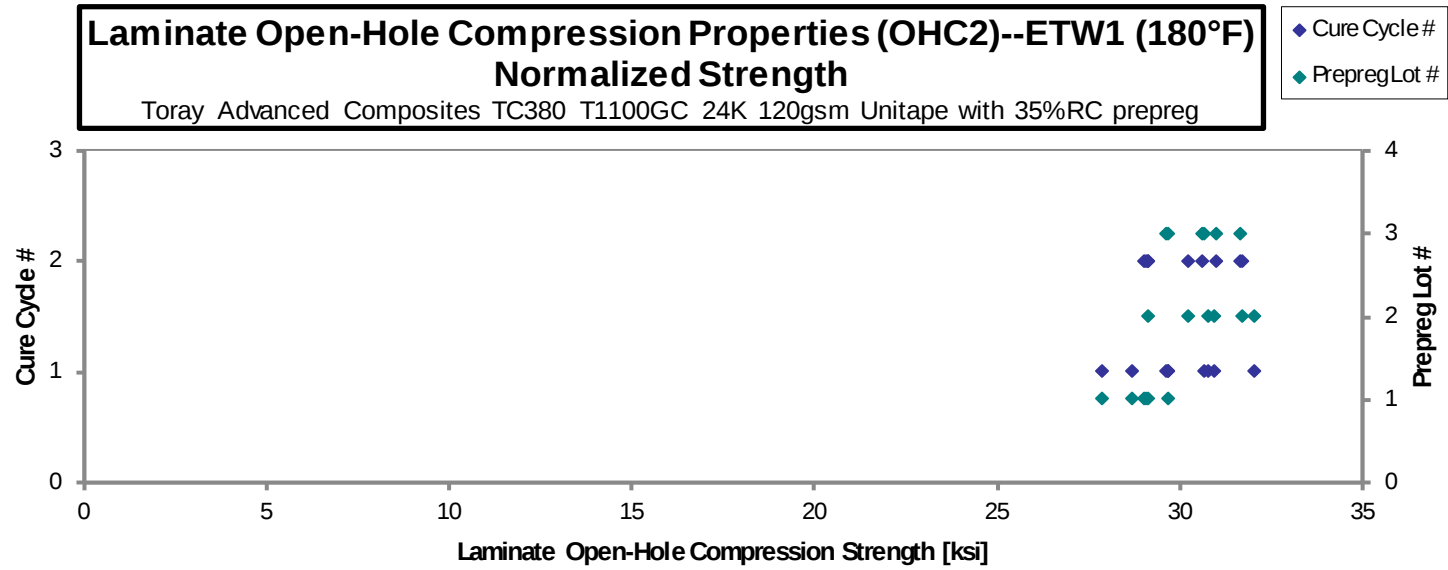
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDHA111D	A	C1	1	1	27.82	0.09603	20	AGM	0.004802	27.83
TCDHA112D	A	C1	1	1	29.36	0.09697	20	M(A,L)GM	0.004848	29.65
TCDHA113D	A	C1	1	1	28.47	0.09662	20	M(A,L)GM	0.004831	28.65
TCDHA211D	A	C2	1	2	28.58	0.09740	20	M(A,L)GM	0.004870	28.99
TCDHA212D	A	C2	1	2	28.49	0.09805	20	M(A,L)GM	0.004903	29.10
TCDHA213D	A	C2	1	2	28.74	0.09695	20	M(A,L)GM	0.004848	29.03
TCDHB111D	B	C1	2	1	29.47	0.1008	20	AGM	0.005040	30.94
TCDHB112D	B	C1	2	1	31.06	0.09893	20	AGM	0.004947	32.00
TCDHB113D	B	C1	2	1	31.20	0.09457	20	AGM	0.004728	30.73
TCDHB211D	B	C2	2	2	30.10	0.1011	20	AGM	0.005053	31.69
TCDHB212D	B	C2	2	2	29.29	0.09897	20	AGM	0.004948	30.20
TCDHB213D	B	C2	2	2	29.89	0.09357	20	AGM	0.004678	29.13
TCDHC111D	C	C1	3	1	28.56	0.09973	20	AGM	0.004987	29.67
TCDHC112D	C	C1	3	1	28.61	0.09927	20	AGM	0.004963	29.58
TCDHC113D	C	C1	3	1	30.73	0.09573	20	AGM	0.004787	30.64
TCDHC211D	C	C2	3	2	29.37	0.1012	20	AGM	0.005058	30.95
TCDHC212D	C	C2	3	2	30.50	0.09953	20	AGM	0.004977	31.62
TCDHC213D	C	C2	3	2	30.91	0.09493	20	AGM	0.004747	30.56

Average 29.51
 Standard Dev. 1.040
 Coeff. of Var. [%] 3.525
 Min. 27.82
 Max. 31.20
 Number of Spec. 18

Average_{norm} 0.004890 30.05
 Standard Dev._{norm} 1.163
 Coeff. of Var. [%]_{norm} 3.869
 Min. 0.004678 27.83
 Max. 0.005058 32.00
 Number of Spec. 18 18



Laminate Open-Hole Compression Properties (OHC2)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

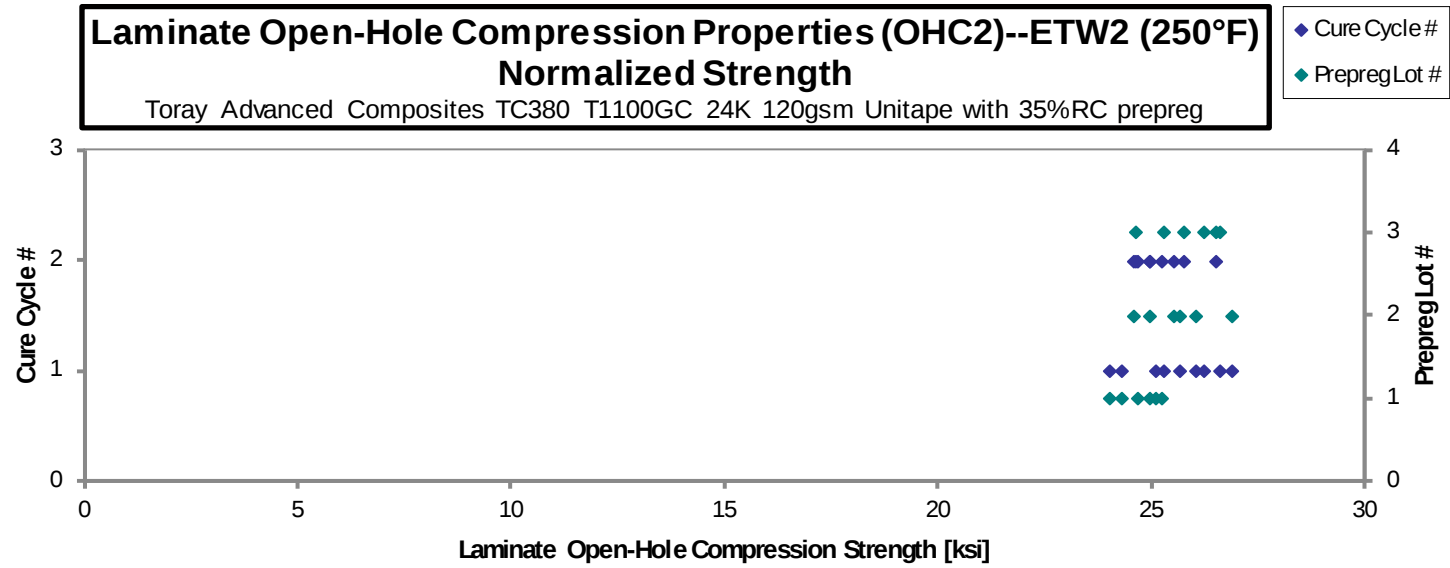
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDHA111E	A	C1	1	1	25.18	0.09587	20	M(A,L)GM	0.004793	25.15
TCDHA112E	A	C1	1	1	24.31	0.09605	20	M(A,L)GM	0.004803	24.32
TCDHA113E	A	C1	1	1	23.88	0.09675	20	M(A,L)GM	0.004838	24.07
TCDHA211E	A	C2	1	2	24.48	0.09687	20	M(A,L)GM	0.004843	24.70
TCDHA212E	A	C2	1	2	24.62	0.09742	20	M(A,L)GM	0.004871	24.99
TCDHA213E	A	C2	1	2	24.68	0.09832	20	M(A,L)GM	0.004916	25.27
TCDHB111E	B	C1	2	1	26.27	0.09843	20	AGM	0.004922	26.94
TCDHB112E	B	C1	2	1	24.99	0.09863	20	AGM	0.004932	25.68
TCDHB113E	B	C1	2	1	25.39	0.09855	20	AGM	0.004928	26.07
TCDHB211E	B	C2	2	2	23.96	0.09872	20	AGM	0.004936	24.64
TCDHB212E	B	C2	2	2	24.50	0.1001	20	AGM	0.005003	25.54
TCDHB213E	B	C2	2	2	24.07	0.09972	20	AGM	0.004986	25.00
TCDHC111E	C	C1	3	1	25.30	0.09962	20	AGM	0.004981	26.25
TCDHC112E	C	C1	3	1	24.17	0.1005	20	AGM	0.005025	25.30
TCDHC113E	C	C1	3	1	25.66	0.09973	20	AGM	0.004987	26.66
TCDHC211E	C	C2	3	2	23.91	0.09895	20	AGM	0.004948	24.65
TCDHC212E	C	C2	3	2	24.66	0.1003	20	AGM	0.005017	25.78
TCDHC213E	C	C2	3	2	25.51	0.09985	20	AGM	0.004993	26.53

Average 24.75
 Standard Dev. 0.6830
 Coeff. of Var. [%] 2.759
 Min. 23.88
 Max. 26.27
 Number of Spec. 18

Average_{norm} 0.004929 25.42
 Standard Dev._{norm} 0.8271
 Coeff. of Var. [%]_{norm} 3.254
 Min. 0.004793 24.07
 Max. 0.005025 26.94
 Number of Spec. 18 18



4.23 “50/40/10” Open-Hole Compression 3 Properties (OHC3)

**Laminate Open-Hole Compression Properties (OHC3)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

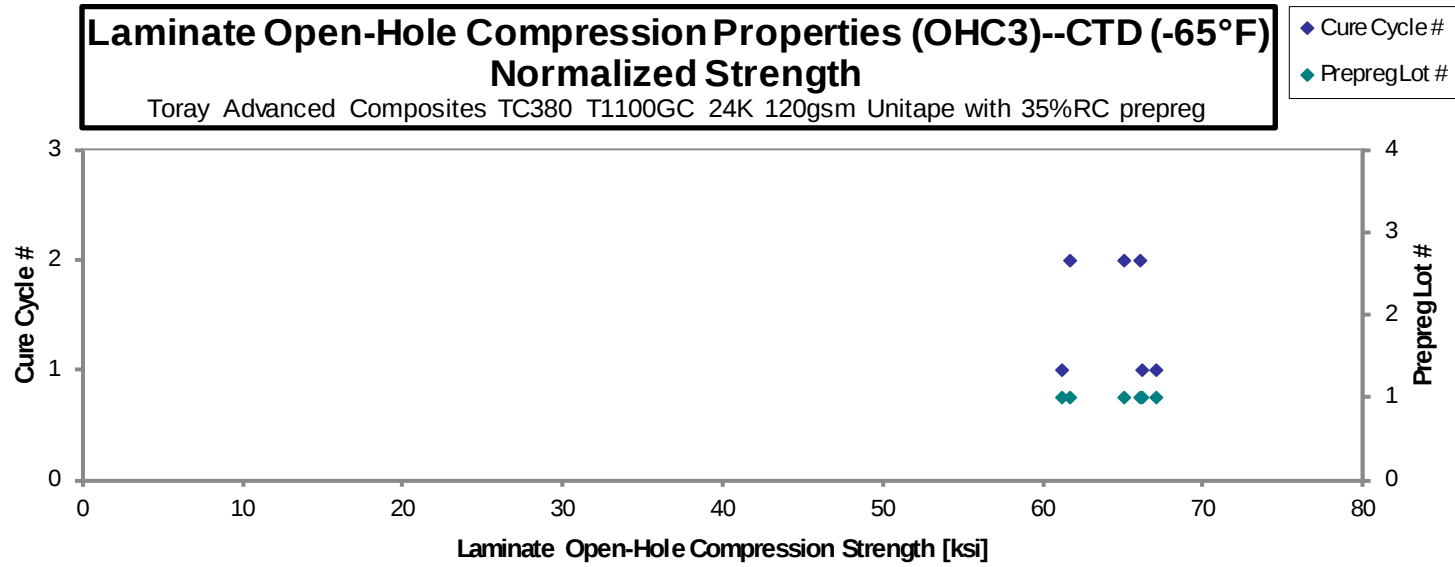
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDIA111B	A	C1	1	1	65.81	0.09658	20	M(A,L)GM
TCDIA112B	A	C1	1	1	66.75	0.09652	20	M(A,L)GM
TCDIA113B	A	C1	1	1	60.74	0.09678	20	LGM
TCDIA211B	A	C2	1	2	64.91	0.09775	20	M(A,L)GM
TCDIA212B	A	C2	1	2	64.19	0.09732	20	M(A,L)GM
TCDIA213B	A	C2	1	2	60.91	0.09728	20	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.004829	66.21
0.004826	67.11
0.004839	61.23
0.004888	66.09
0.004866	65.07
0.004864	61.73

Average 63.89
Standard Dev. 2.524
Coeff. of Var. [%] 3.951
Min. 60.74
Max. 66.75
Number of Spec. 6

Average_{norm} 0.004852 64.57
Standard Dev._{norm} 2.489
Coeff. of Var. [%]_{norm} 3.855
Min. 0.004826 61.23
Max. 0.004888 67.11
Number of Spec. 6 6



Laminate Open-Hole Compression Properties (OHC3)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

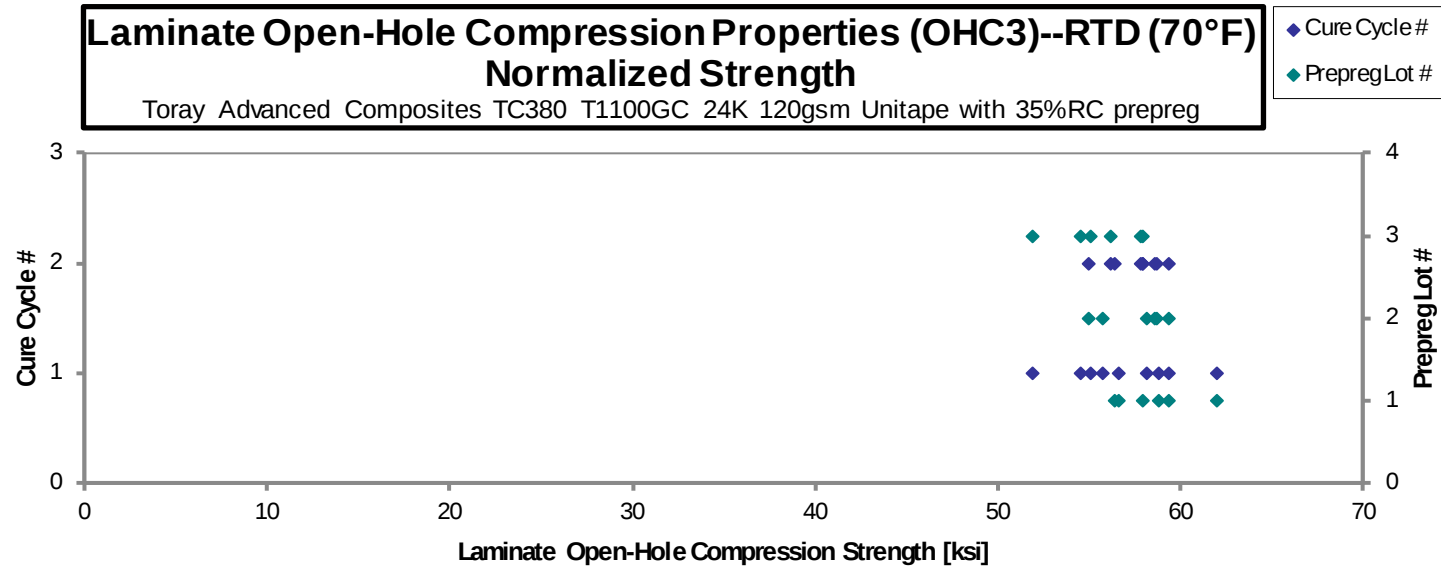
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDIA111A	A	C1	1	1	58.08	0.09362	20	LGM	0.004681	56.64
TCDIA112A	A	C1	1	1	60.89	0.09777	20	LGM	0.004888	62.01
TCDIA113A	A	C1	1	1	57.85	0.09755	20	LGM	0.004878	58.78
TCDIA211A	A	C2	1	2	59.05	0.09413	20	LGM	0.004707	57.90
TCDIA212A	A	C2	1	2	57.67	0.09882	20	LGM	0.004941	59.37
TCDIA213A	A	C2	1	2	54.62	0.09912	20	LGM	0.004956	56.39
TCDIB111A	B	C1	2	1	60.99	0.09338	20	LGM	0.004669	59.33
TCDIB112A	B	C1	2	1	53.88	0.09928	20	LGM	0.004964	55.73
TCDIB113A	B	C1	2	1	55.76	0.1002	20	LGM	0.005009	58.19
TCDIB211A	B	C2	2	2	56.08	0.09408	20	LGM	0.004704	54.96
TCDIB212A	B	C2	2	2	56.88	0.09887	20	LGM	0.004943	58.58
TCDIB213A	B	C2	2	2	56.46	0.09985	20	LGM	0.004993	58.73
TCDIC111A	C	C1	3	1	53.33	0.09340	20	LGM	0.004670	51.89
TCDIC112A	C	C1	3	1	53.76	0.09840	20	LGM	0.004920	55.11
TCDIC113A	C	C1	3	1	52.11	0.1004	20	LGM	0.005022	54.52
TCDIC211A	C	C2	3	2	57.86	0.09595	20	M(A,L)GM	0.004798	57.83
TCDIC212A	C	C2	3	2	55.04	0.1011	20	M(A,L)GM	0.005056	57.97
TCDIC213A	C	C2	3	2	52.84	0.1021	20	M(A,L)GM	0.005103	56.18

Average 56.29
 Standard Dev. 2.615
 Coeff. of Var. [%] 4.646
 Min. 52.11
 Max. 60.99
 Number of Spec. 18

Average_{norm} 0.004883 57.23
 Standard Dev._{norm} 2.308
 Coeff. of Var. [%]_{norm} 4.033
 Min. 0.004669 51.89
 Max. 0.005103 62.01
 Number of Spec. 18



Laminate Open-Hole Compression Properties (OHC3)--ETD1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

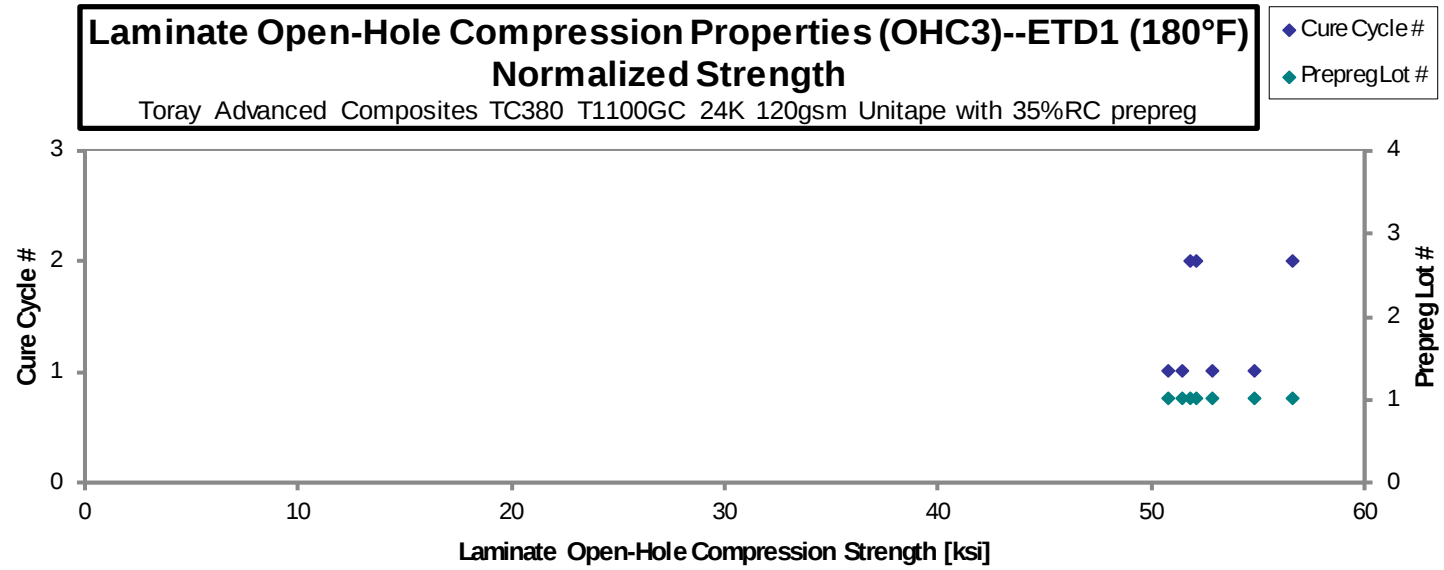
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCDIA111C	A	C1	1	1	50.78	0.09728	20	LGM
TCDIA112C	A	C1	1	1	54.06	0.09745	20	LGM
TCDIA113C	A	C1	1	1	53.72	0.09448	20	LGM
TCDIA114C	A	C1	1	1	52.45	0.09303	20	LGM
TCDIA211C	A	C2	1	2	50.74	0.09858	20	LGM
TCDIA212C	A	C2	1	2	55.01	0.09885	20	LGM
TCDIA213C	A	C2	1	2	52.35	0.09512	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.004864	51.46
0.004873	54.88
0.004724	52.87
0.004652	50.83
0.004929	52.10
0.004943	56.64
0.004756	51.87

Average 52.73
 Standard Dev. 1.631
 Coeff. of Var. [%] 3.092
 Min. 50.74
 Max. 55.01
 Number of Spec. 7

Average_{norm} 0.004820 52.95
 Standard Dev._{norm} 2.081
 Coeff. of Var. [%]_{norm} 3.930
 Min. 0.004652 50.83
 Max. 0.004943 56.64
 Number of Spec. 7 7



Laminate Open-Hole Compression Properties (OHC3)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

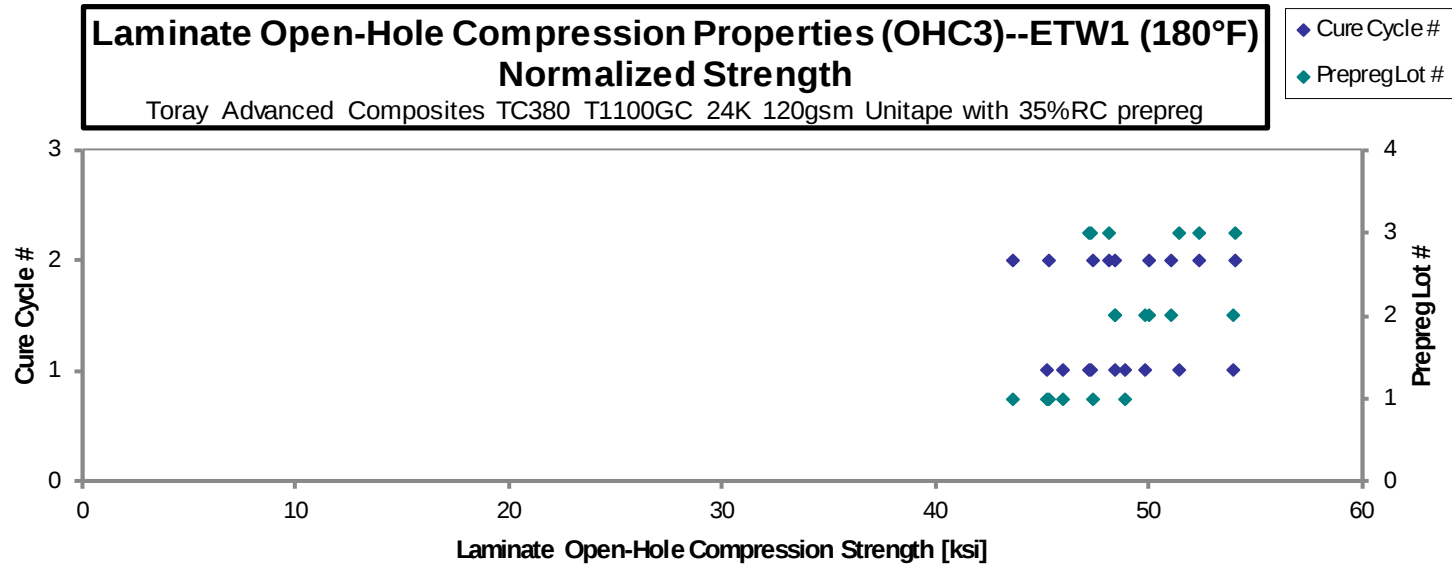
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDIA111D	A	C1	1	1	44.74	0.09708	20	M(A,L)GM	0.004854	45.24
TCDIA112D	A	C1	1	1	48.42	0.09702	20	M(A,L)GM	0.004851	48.93
TCDIA113D	A	C1	1	1	45.69	0.09658	20	M(A,L)GM	0.004829	45.97
TCDIA211D	A	C2	1	2	42.34	0.09898	20	LGM	0.004949	43.65
TCDIA212D	A	C2	1	2	46.02	0.09885	20	M(A,L)GM	0.004943	47.39
TCDIA213D	A	C2	1	2	44.84	0.09708	20	LGM	0.004854	45.34
TCDIB111D	B	C1	2	1	47.71	0.1003	20	LGM	0.005013	49.83
TCDIB112D	B	C1	2	1	52.15	0.09938	20	LGM	0.004969	53.99
TCDIB113D	B	C1	2	1	48.57	0.09567	20	M(A,L)GM	0.004783	48.40
TCDIB211D	B	C2	2	2	47.93	0.1002	20	AGM	0.005008	50.01
TCDIB212D	B	C2	2	2	46.67	0.09963	20	AGM	0.004982	48.44
TCDIB213D	B	C2	2	2	51.02	0.09613	20	M(A,L)GM	0.004807	51.09
TCDIC111D	C	C1	3	1	45.03	0.1007	20	M(A,L)GM	0.005035	47.23
TCDIC112D	C	C1	3	1	49.31	0.1002	20	M(A,L)GM	0.005010	51.46
TCDIC113D	C	C1	3	1	47.03	0.09657	20	M(A,L)GM	0.004828	47.31
TCDIC211D	C	C2	3	2	49.15	0.1024	20	M(A,L)GM	0.005120	52.43
TCDIC212D	C	C2	3	2	45.68	0.1011	20	AGM	0.005057	48.13
TCDIC213D	C	C2	3	2	53.93	0.09622	20	M(A,L)GM	0.004811	54.05

Average 47.57
 Standard Dev. 2.876
 Coeff. of Var. [%] 6.046
 Min. 42.34
 Max. 53.93
 Number of Spec. 18

Average_{norm} 0.004928 48.83
 Standard Dev._{norm} 2.961
 Coeff. of Var. [%]_{norm} 6.065
 Min. 0.004783 43.65
 Max. 0.005120 54.05
 Number of Spec. 18



Laminate Open-Hole Compression Properties (OHC3)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

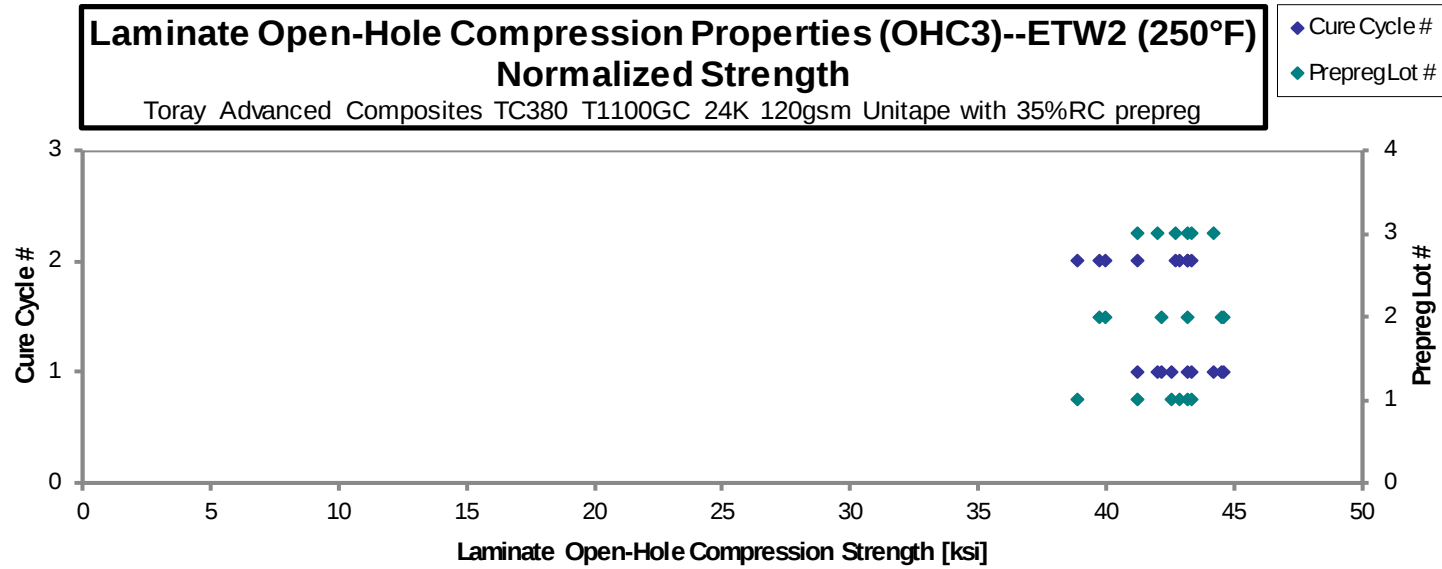
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDIA111E	A	C1	1	1	43.13	0.09602	20	LGM	0.004801	43.13
TCDIA112E	A	C1	1	1	42.90	0.09692	20	M(A,L)GM	0.004846	43.31
TCDIA113E	A	C1	1	1	41.78	0.09783	20	LGM	0.004892	42.58
TCDIA211E	A	C2	1	2	42.63	0.09660	20	LGM	0.004830	42.90
TCDIA212E	A	C2	1	2	38.32	0.09740	20	LGM	0.004870	38.88
TCDIA213E	A	C2	1	2	39.95	0.09912	20	LGM	0.004956	41.25
TCDIB111E	B	C1	2	1	42.48	0.1008	20	LGM	0.005039	44.59
TCDIB112E	B	C1	2	1	40.06	0.1010	20	LGM	0.005048	42.13
TCDIB113E	B	C1	2	1	42.42	0.1007	20	LGM	0.005035	44.50
TCDIB211E	B	C2	2	2	41.73	0.09923	20	LGM	0.004962	43.14
TCDIB212E	B	C2	2	2	38.84	0.09887	20	LGM	0.004943	40.00
TCDIB213E	B	C2	2	2	38.67	0.09858	20	LGM	0.004929	39.71
TCDIC111E	C	C1	3	1	39.93	0.1009	20	LGM	0.005047	41.98
TCDIC112E	C	C1	3	1	39.29	0.1006	20	AGM	0.005030	41.18
TCDIC113E	C	C1	3	1	42.18	0.1006	20	LGM	0.005032	44.21
TCDIC211E	C	C2	3	2	40.95	0.1011	20	LGM	0.005057	43.14
TCDIC212E	C	C2	3	2	41.18	0.1011	20	LGM	0.005053	43.34
TCDIC213E	C	C2	3	2	40.15	0.1020	20	LGM	0.005102	42.67

Average 40.92
 Standard Dev. 1.562
 Coeff. of Var. [%] 3.817
 Min. 38.32
 Max. 43.13
 Number of Spec. 18

Average_{norm} 0.004971 42.37
 Standard Dev._{norm} 1.620
 Coeff. of Var. [%]_{norm} 3.824
 Min. 0.004801 38.88
 Max. 0.005102 44.59
 Number of Spec. 18 18



4.24 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)

**Laminate Filled-Hole Compression Properties (FHC1)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

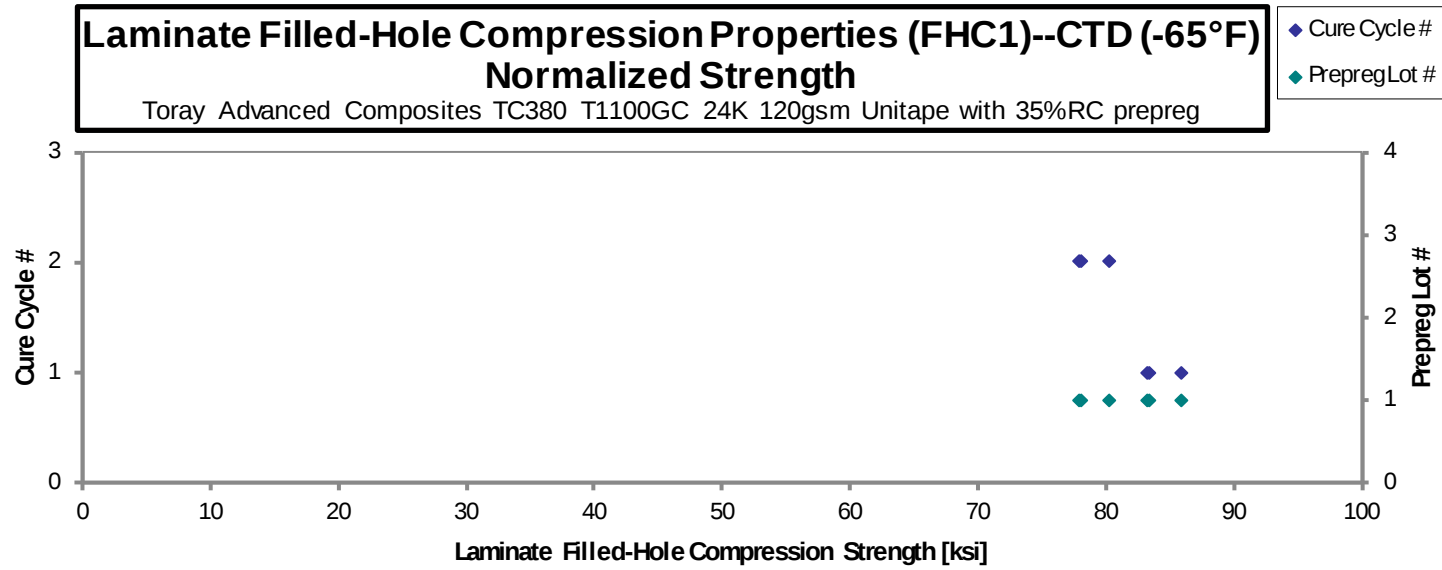
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD7A111B	A	C1	1	1	83.22	0.1152	24	M(A,L)GF
TCD7A112B	A	C1	1	1	86.29	0.1147	24	M(A,L)GF
TCD7A113B	A	C1	1	1	83.64	0.1148	24	M(A,L)GF
TCD7A211B	A	C2	1	2	81.03	0.1141	24	M(A,L)GF
TCD7A212B	A	C2	1	2	78.73	0.1139	24	M(A,L)GF
TCD7A213B	A	C2	1	2	78.62	0.1143	24	M(A,L)GF

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.004799	83.21
0.004778	85.89
0.004782	83.33
0.004753	80.24
0.004747	77.86
0.004762	77.99

Average 81.92
Standard Dev. 3.020
Coeff. of Var. [%] 3.686
Min. 78.62
Max. 86.29
Number of Spec. 6

Average_{norm} 0.004770 81.42
Standard Dev._{norm} 3.243
Coeff. of Var. [%]_{norm} 3.983
Min. 0.004747 77.86
Max. 0.004799 85.89
Number of Spec. 6 6



Laminate Filled-Hole Compression Properties (FHC1)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

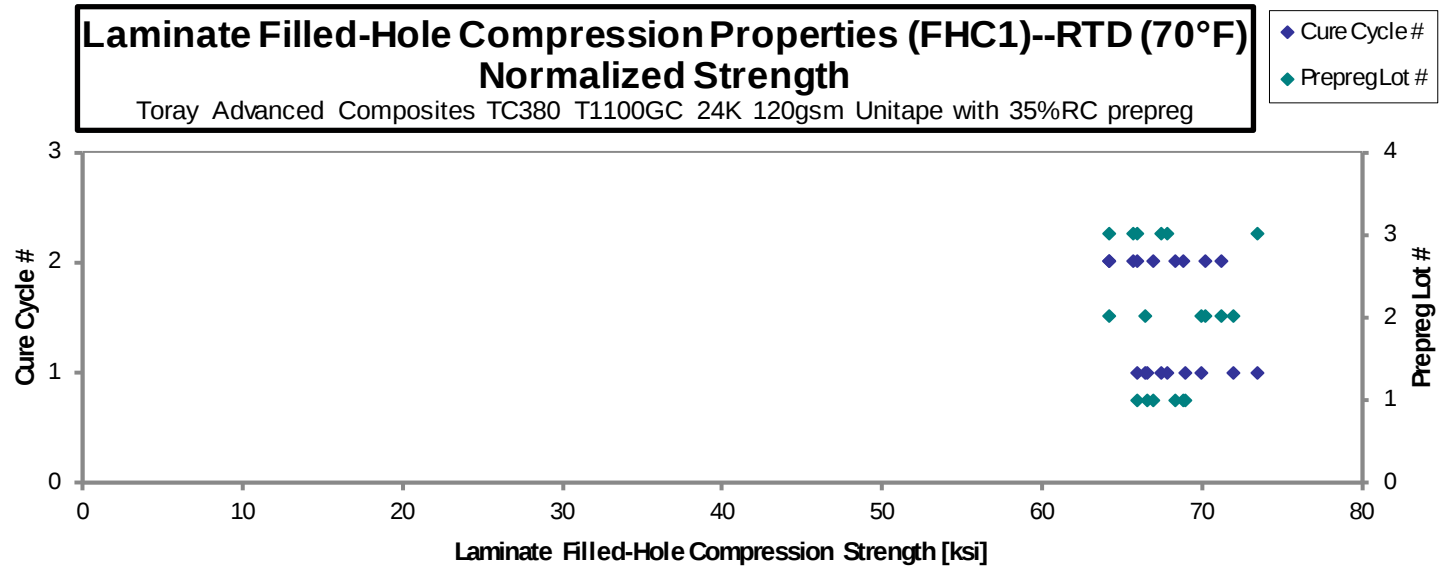
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD7A111A	A	C1	1	1	68.04	0.1127	24	M(A,L)GF	0.004695	66.56
TCD7A112A	A	C1	1	1	64.79	0.1173	24	M(A,L)GF	0.004887	65.96
TCD7A113A	A	C1	1	1	67.77	0.1173	24	M(A,L)GF	0.004889	69.03
TCD7A211A	A	C2	1	2	70.11	0.1122	24	M(A,L)GF	0.004676	68.31
TCD7A212A	A	C2	1	2	66.37	0.1163	24	M(A,L)GF	0.004846	67.00
TCD7A213A	A	C2	1	2	68.22	0.1163	24	LGF, LGB	0.004844	68.85
TCD7B111A	B	C1	2	1	68.94	0.1111	24	M(A,L)GF	0.004628	66.47
TCD7B112A	B	C1	2	1	68.07	0.1183	24	M(A,L)GF	0.004931	69.92
TCD7B113A	B	C1	2	1	68.46	0.1211	24	M(A,L)GF	0.005045	71.95
TCD7B211A	B	C2	2	2	66.14	0.1119	24	M(A,L)GF	0.004664	64.26
TCD7B212A	B	C2	2	2	67.55	0.1198	24	M(A,L)GF	0.004990	70.23
TCD7B213A	B	C2	2	2	67.20	0.1222	24	M(A,L)GF	0.005090	71.26
TCD7C111A	C	C1	3	1	69.33	0.1128	24	M(A,L)GF, AGT	0.004699	67.87
TCD7C112A	C	C1	3	1	65.32	0.1190	24	M(A,L)GF, AGB	0.004958	67.47
TCD7C113A	C	C1	3	1	70.25	0.1205	24	M(A,L)GF, AGT	0.005019	73.45
TCD7C211A	C	C2	3	2	62.89	0.1177	24	M(A,L)GF	0.004905	64.27
TCD7C212A	C	C2	3	2	62.76	0.1207	24	M(A,L)GF	0.005030	65.76
TCD7C213A	C	C2	3	2	62.19	0.1221	24	M(A,L)GF	0.005088	65.92

Average 66.91
 Standard Dev. 2.461
 Coeff. of Var. [%] 3.678
 Min. 62.19
 Max. 70.25
 Number of Spec. 18

Average_{norm} 0.004882 68.03
 Standard Dev._{norm} 2.586
 Coeff. of Var. [%]_{norm} 3.801
 Min. 0.004628 64.26
 Max. 0.005090 73.45
 Number of Spec. 18 18



Laminate Filled-Hole Compression Properties (FHC1)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

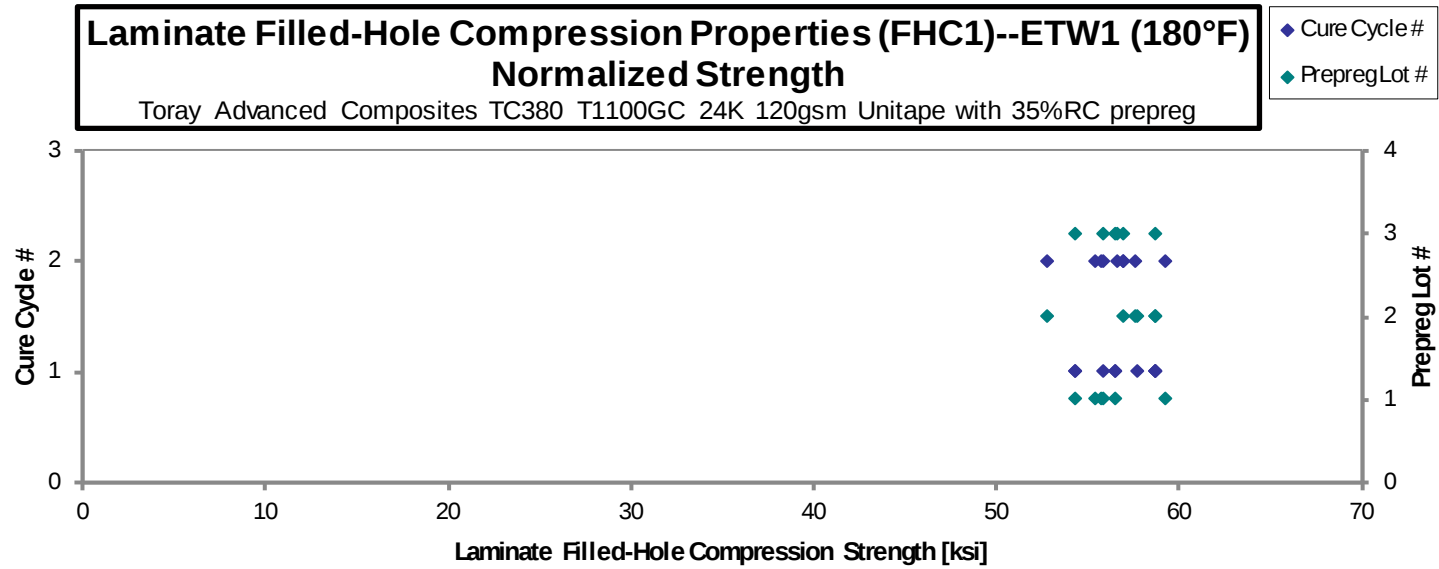
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD7A111D	A	C1	1	1	54.77	0.1174	24	LGF, LGO	0.004890	55.80
TCD7A112D	A	C1	1	1	56.29	0.1112	24	M(A,L)GF	0.004634	54.35
TCD7A113D	A	C1	1	1	56.07	0.1161	24	M(A,L)GF	0.004838	56.51
TCD7A211D	A	C2	1	2	54.88	0.1164	24	M(A,L)GF	0.004849	55.43
TCD7A212D	A	C2	1	2	57.11	0.1123	24	M(A,L)GF	0.004681	55.69
TCD7A213D	A	C2	1	2	59.19	0.1153	24	M(A,L)GF	0.004803	59.23
TCD7B111D	B	C1	2	1	56.07	0.1207	24	M(A,L)GF	0.005028	58.73
TCD7B112D	B	C1	2	1	57.19	0.1183	24	AGF	0.004929	58.73
TCD7B113D	B	C1	2	1	58.33	0.1141	24	AGF	0.004752	57.74
TCD7B211D	B	C2	2	2	50.00	0.1216	24	M(A,L)GF	0.005068	52.79
TCD7B212D	B	C2	2	2	55.05	0.1191	24	M(A,L)GF	0.004963	56.92
TCD7B213D	B	C2	2	2	58.15	0.1142	24	M(A,L)GF	0.004758	57.65
TCD7C111D	C	C1	3	1	53.38	0.1220	24	M(A,L)GF	0.005084	56.53
TCD7C112D	C	C1	3	1	55.04	0.1230	24	M(A,L)GF	0.005123	58.74
TCD7C113D	C	C1	3	1	54.48	0.1148	24	M(A,L)GF	0.004785	54.31
TCD7C211D	C	C2	3	2	53.70	0.1214	24	M(A,L)GF	0.005056	56.57
TCD7C212D	C	C2	3	2	54.07	0.1190	24	M(A,L)GF	0.004958	55.84
TCD7C213D	C	C2	3	2	57.98	0.1131	24	M(A,L)GF	0.004711	56.90

Average 55.65
 Standard Dev. 2.217
 Coeff. of Var. [%] 3.983
 Min. 50.00
 Max. 59.19
 Number of Spec. 18

Average_{norm} 0.004884
 Standard Dev._{norm} 1.740
 Coeff. of Var. [%]_{norm} 3.075
 Min. 0.004634
 Max. 0.005123
 Number of Spec. 18



Laminate Filled-Hole Compression Properties (FHC1)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

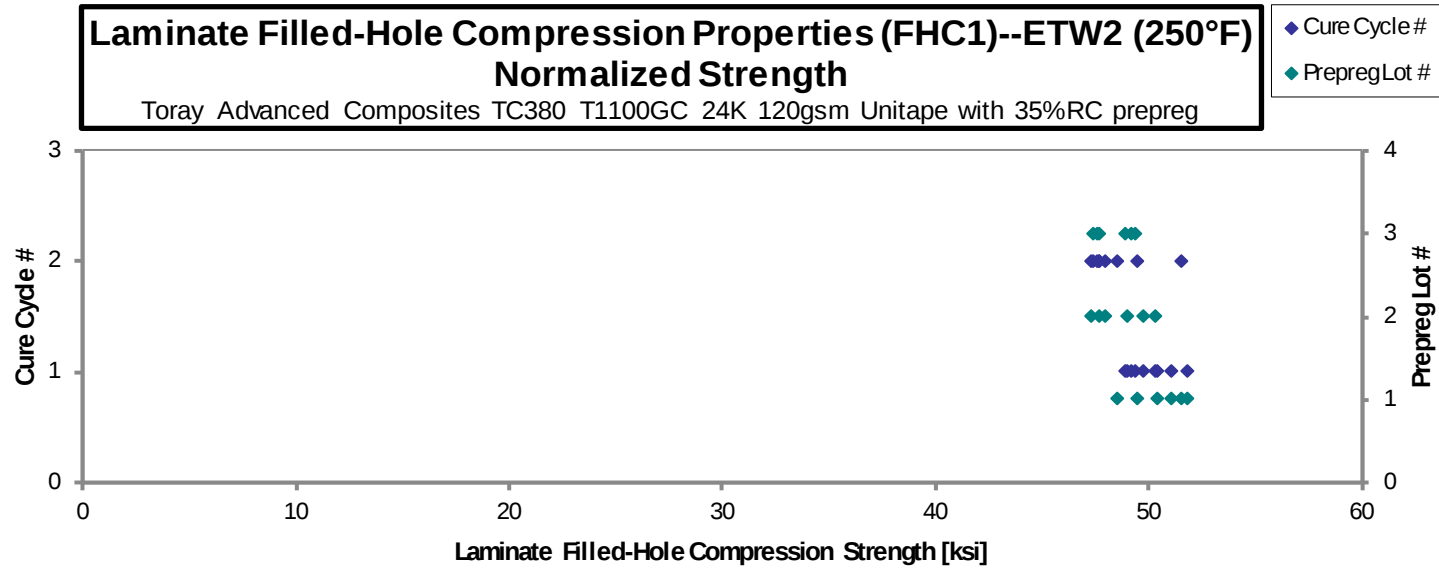
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD7A111E	A	C1	1	1	51.14	0.1151	24	M(A,L)GF	0.004797	51.11
TCD7A112E	A	C1	1	1	51.91	0.1150	24	M(A,L)GF	0.004793	51.83
TCD7A113E	A	C1	1	1	50.46	0.1152	24	M(A,L)GF	0.004800	50.46
TCD7A211E	A	C2	1	2	51.43	0.1154	24	M(A,L)GF	0.004810	51.53
TCD7A212E	A	C2	1	2	49.49	0.1152	24	M(A,L)GF	0.004801	49.50
TCD7A213E	A	C2	1	2	48.30	0.1159	24	M(A,L)GF	0.004827	48.57
TCD7B111E	B	C1	2	1	48.00	0.1207	24	AGF	0.005028	50.29
TCD7B112E	B	C1	2	1	46.89	0.1222	24	AGF	0.005090	49.72
TCD7B113E	B	C1	2	1	46.89	0.1203	24	AGF	0.005013	48.97
TCD7B211E	B	C2	2	2	45.01	0.1210	24	M(A,L)GF	0.005040	47.26
TCD7B212E	B	C2	2	2	44.84	0.1224	24	AGF	0.005101	47.65
TCD7B213E	B	C2	2	2	45.35	0.1218	24	M(A,L)GF	0.005074	47.94
TCD7C111E	C	C1	3	1	46.58	0.1221	24	M(A,L)GF	0.005088	49.37
TCD7C112E	C	C1	3	1	46.66	0.1214	24	M(A,L)GF	0.005058	49.17
TCD7C113E	C	C1	3	1	46.56	0.1209	24	M(A,L)GF	0.005039	48.87
TCD7C211E	C	C2	3	2	45.40	0.1207	24	M(A,L)GF	0.005029	47.57
TCD7C212E	C	C2	3	2	45.17	0.1209	24	M(A,L)GF	0.005038	47.41
TCD7C213E	C	C2	3	2	45.63	0.1204	24	M(A,L)GF	0.005015	47.67

Average 47.54
 Standard Dev. 2.378
 Coeff. of Var. [%] 5.001
 Min. 44.84
 Max. 51.91
 Number of Spec. 18

Average_{norm} 0.004969 49.16
 Standard Dev._{norm} 1.447
 Coeff. of Var. [%]_{norm} 2.944
 Min. 0.004793 47.26
 Max. 0.005101 51.83
 Number of Spec. 18



4.25 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

In some cases of FHC2>UNC2, UNC2 data is recommended for design. The FHC2 data is for informational purposes only and is not appropriate to be used for design. Shaded values indicated FHC2>UNC2.

Laminate Filled-Hole Compression Properties (FHC2)--CTD (-65°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

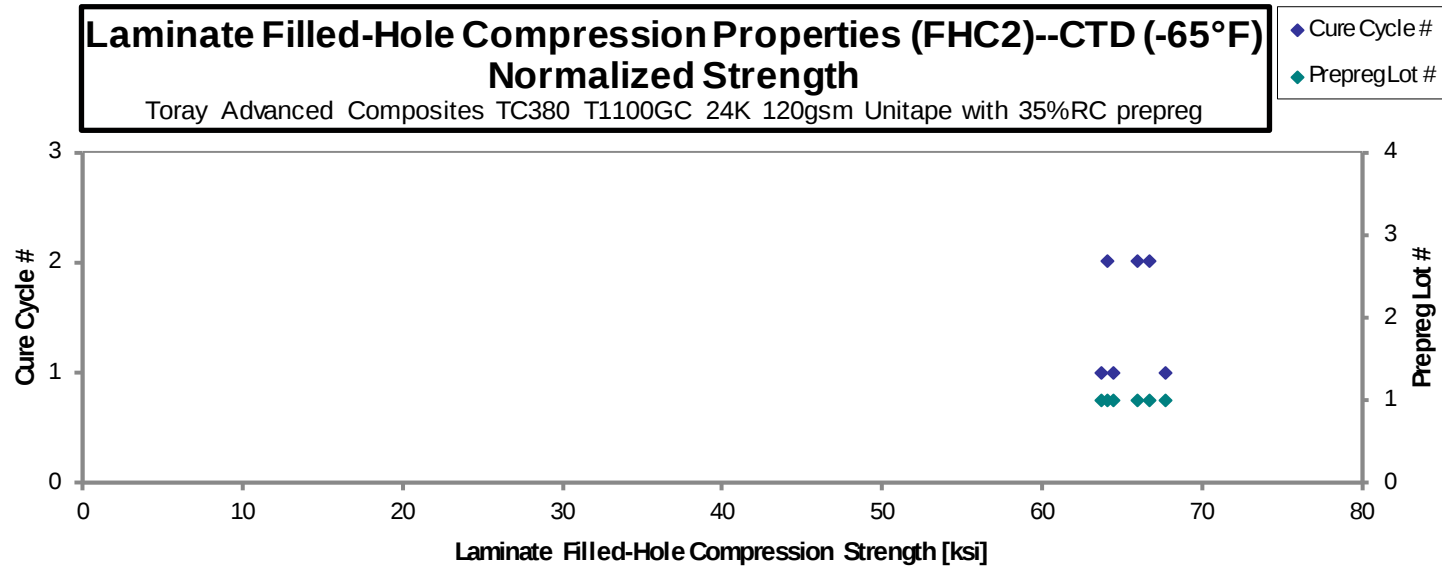
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD8A111B	A	C1	1	1	64.56	0.09582	20	M(A,L)GF
TCD8A112B	A	C1	1	1	63.62	0.09602	20	M(A,L)GF
TCD8A113B	A	C1	1	1	67.35	0.09648	20	M(A,L)GF
TCD8A211B	A	C2	1	2	67.82	0.09438	20	M(A,L)GF
TCD8A212B	A	C2	1	2	67.18	0.09430	20	M(A,L)GF
TCD8A213B	A	C2	1	2	65.10	0.09442	20	M(A,L)GF

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.004791	64.44
0.004801	63.63
0.004824	67.69
0.004719	66.67
0.004715	65.99
0.004721	64.03

Average 65.94
Standard Dev. 1.733
Coeff. of Var. [%] 2.628
Min. 63.62
Max. 67.82
Number of Spec. 6

Average_{norm} 0.004762 65.41
Standard Dev._{norm} 1.621
Coeff. of Var. [%]_{norm} 2.478
Min. 0.004715 63.63
Max. 0.004824 67.69
Number of Spec. 6 6



Laminate Filled-Hole Compression Properties (FHC2)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

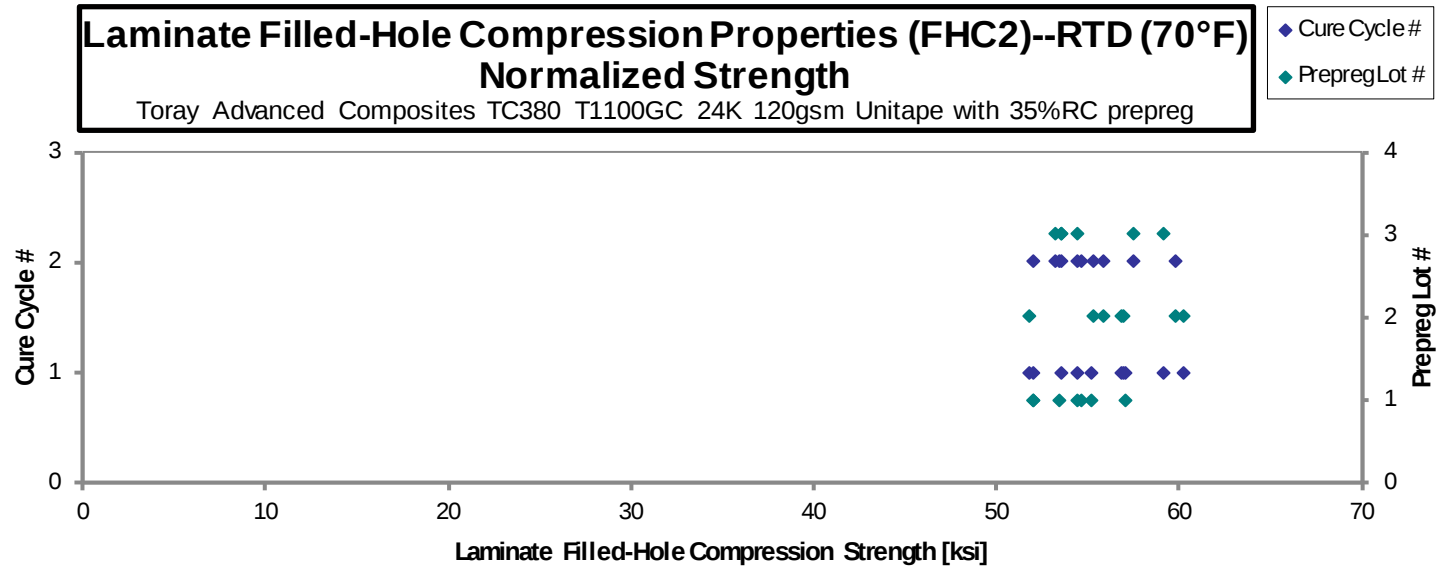
 t_{ply} [in]

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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD8A111A	A	C1	1	1	53.12	0.09407	20	M(A,L)GF	0.004703	52.05
TCD8A112A	A	C1	1	1	55.81	0.09810	20	M(A,L)GF	0.004905	57.03
TCD8A113A	A	C1	1	1	53.75	0.09855	20	M(A,L)GF	0.004928	55.18
TCD8A211A	A	C2	1	2	56.26	0.09327	20	M(A,L)GF	0.004663	54.65
TCD8A212A	A	C2	1	2	51.59	0.09680	20	M(A,L)GF	0.004840	52.02
TCD8A213A	A	C2	1	2	53.26	0.09632	20	M(A,L)GF	0.004816	53.44
TCD8A214A	A	C2	1	2	54.81	0.09533	20	M(A,L)GF	0.004767	54.43
TCD8B111A	B	C1	2	1	52.77	0.09420	20	M(A,L)WT	0.004710	51.78
TCD8B112A	B	C1	2	1	55.18	0.09900	20	M(A,L)GF	0.004950	56.91
TCD8B113A	B	C1	2	1	53.98	0.1010	20	M(A,L)GF	0.005051	56.80
TCD8B114A	B	C1	2	1	56.98	0.1015	20	AGF	0.005073	60.21
TCD8B211A	B	C2	2	2	56.60	0.09377	20	M(A,L)GF	0.004688	55.28
TCD8B212A	B	C2	2	2	52.99	0.1011	20	M(A,L)GF	0.005056	55.82
TCD8B213A	B	C2	2	2	57.21	0.1003	20	M(A,L)GF	0.005013	59.75
TCD8C111A	C	C1	3	1	54.57	0.09413	20	M(A,L)GF	0.004707	53.51
TCD8C112A	C	C1	3	1	53.18	0.09827	20	M(A,L)GF	0.004913	54.43
TCD8C113A	C	C1	3	1	56.98	0.09970	20	M(A,L)GF, AGT	0.004985	59.17
TCD8C211A	C	C2	3	2	54.83	0.09322	20	M(A,L)GF	0.004661	53.24
TCD8C212A	C	C2	3	2	52.67	0.09767	20	M(A,L)GF	0.004883	53.58
TCD8C213A	C	C2	3	2	55.69	0.09913	20	M(A,L)GF	0.004957	57.51

Average **54.61**
 Standard Dev. **1.681**
 Coeff. of Var. [%] **3.079**
 Min. **51.59**
 Max. **57.21**
 Number of Spec. **20**

Average_{norm} **0.004863** **55.34**
 Standard Dev._{norm} **2.527**
 Coeff. of Var. [%]_{norm} **4.567**
 Min. **0.004661** **51.78**
 Max. **0.005073** **60.21**
 Number of Spec. **20** **20**



Laminate Filled-Hole Compression Properties (FHC2)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

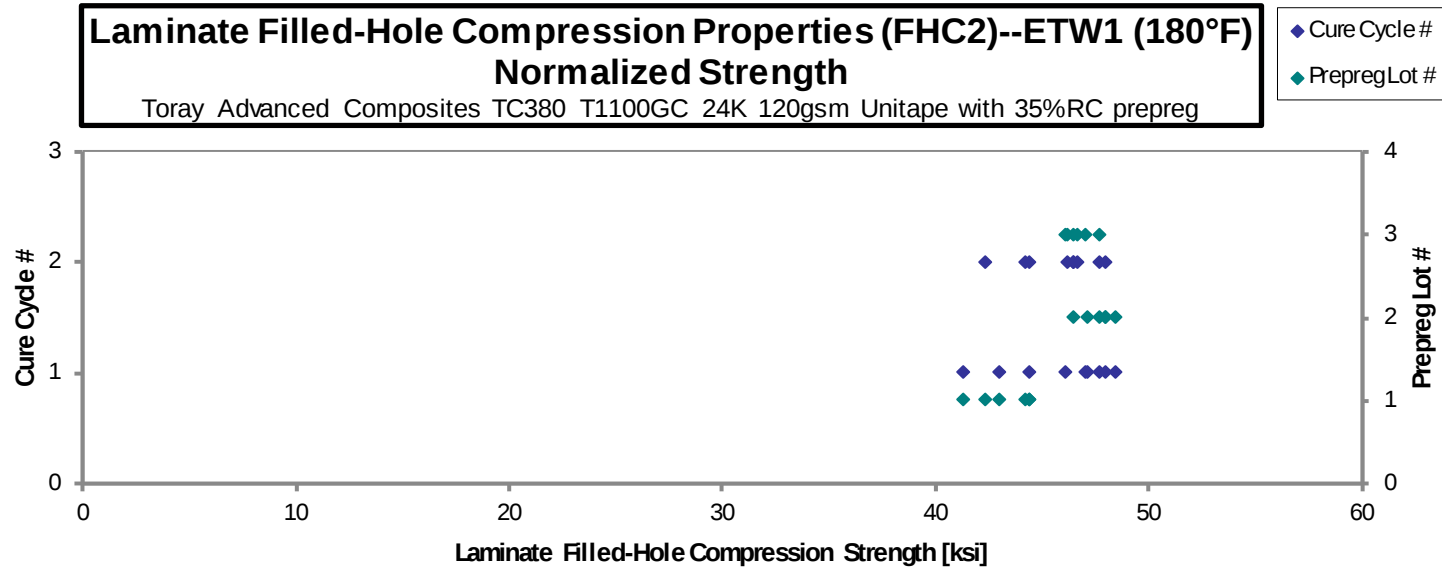
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0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD8A111D	A	C1	1	1	42.00	0.09815	20	M(A,L)GF	0.004908	42.94
TCD8A112D	A	C1	1	1	42.38	0.09362	20	M(A,L)GF	0.004681	41.32
TCD8A113D	A	C1	1	1	43.81	0.09728	20	M(A,L)GF	0.004864	44.40
TCD8A211D	A	C2	1	2	44.12	0.09657	20	M(A,L)GF	0.004828	44.38
TCD8A212D	A	C2	1	2	44.05	0.09232	20	M(A,L)GF	0.004616	42.36
TCD8A213D	A	C2	1	2	44.38	0.09563	20	M(A,L)GF	0.004782	44.21
TCD8B111D	B	C1	2	1	46.00	0.1011	20	AGF	0.005057	48.46
TCD8B112D	B	C1	2	1	46.16	0.09973	20	AGF	0.004987	47.95
TCD8B113D	B	C1	2	1	47.31	0.09553	20	M(A,L)GF	0.004777	47.08
TCD8B211D	B	C2	2	2	45.45	0.1007	20	AGF	0.005033	47.66
TCD8B212D	B	C2	2	2	45.01	0.09917	20	AGF	0.004958	46.49
TCD8B213D	B	C2	2	2	48.85	0.09415	20	AGF	0.004708	47.91
TCD8C111D	C	C1	3	1	45.50	0.1006	20	AGF	0.005030	47.68
TCD8C112D	C	C1	3	1	44.65	0.09910	20	AGF	0.004955	46.10
TCD8C113D	C	C1	3	1	47.08	0.09578	20	AGF	0.004789	46.97
TCD8C211D	C	C2	3	2	45.43	0.09855	20	AGF	0.004928	46.63
TCD8C212D	C	C2	3	2	45.35	0.09828	20	AGF	0.004914	46.42
TCD8C213D	C	C2	3	2	46.59	0.09505	20	AGF	0.004753	46.13

Average **45.23**
 Standard Dev. **1.692**
 Coeff. of Var. [%] **3.740**
 Min. **42.00**
 Max. **48.85**
 Number of Spec. **18**

Average_{norm} **0.004865** **45.84**
 Standard Dev._{norm} **2.093**
 Coeff. of Var. [%]_{norm} **4.566**
 Min. **0.004616** **41.32**
 Max. **0.005057** **48.46**
 Number of Spec. **18**



Laminate Filled-Hole Compression Properties (FHC2)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

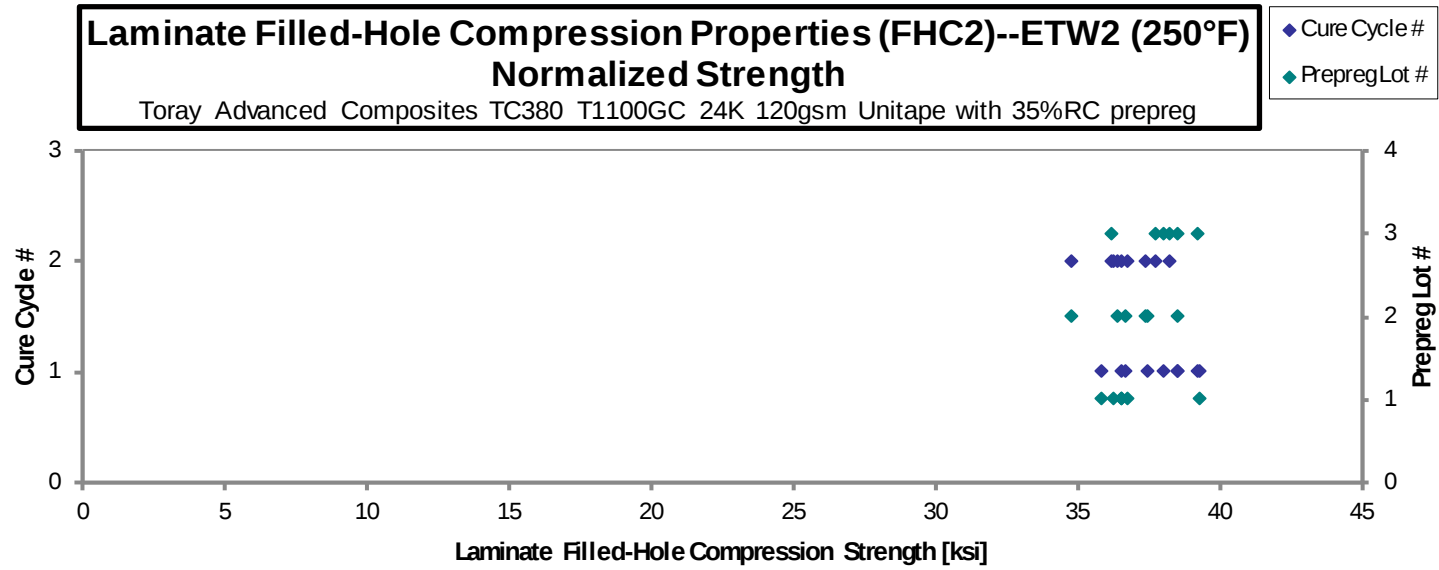
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD8A111E	A	C1	1	1	39.36	0.09573	20	M(A,L)GF	0.004787	39.25
TCD8A112E	A	C1	1	1	36.20	0.09502	20	M(A,L)GF	0.004751	35.83
TCD8A113E	A	C1	1	1	36.88	0.09513	20	M(A,L)GF	0.004757	36.55
TCD8A211E	A	C2	1	2	37.27	0.09405	20	M(A,L)GF	0.004703	36.51
TCD8A212E	A	C2	1	2	36.88	0.09440	20	M(A,L)GF	0.004720	36.27
TCD8A213E	A	C2	1	2	37.36	0.09438	20	M(A,L)GF	0.004719	36.73
TCD8B111E	B	C1	2	1	35.00	0.1028	20	AGF	0.005140	37.48
TCD8B112E	B	C1	2	1	34.81	0.1011	20	AGF	0.005056	36.66
TCD8B113E	B	C1	2	1	36.59	0.1010	20	AGF	0.005049	38.49
TCD8B211E	B	C2	2	2	35.81	0.1003	20	AGF	0.005013	37.40
TCD8B212E	B	C2	2	2	32.88	0.1015	20	AGF	0.005076	34.77
TCD8B213E	B	C2	2	2	34.31	0.1019	20	AGF	0.005093	36.40
TCD8C111E	C	C1	3	1	37.13	0.09820	20	AGF	0.004910	37.98
TCD8C112E	C	C1	3	1	38.29	0.09838	20	AGF	0.004919	39.24
TCD8C113E	C	C1	3	1	37.17	0.09948	20	AGF	0.004974	38.52
TCD8C211E	C	C2	3	2	36.58	0.09903	20	AGF	0.004952	37.73
TCD8C212E	C	C2	3	2	35.07	0.09907	20	AGF	0.004953	36.19
TCD8C213E	C	C2	3	2	37.02	0.09912	20	AGF	0.004956	38.22

Average **36.37**
 Standard Dev. **1.523**
 Coeff. of Var. [%] **4.187**
 Min. **32.88**
 Max. **39.36**
 Number of Spec. **18**

Average_{norm} **0.004918** **37.23**
 Standard Dev._{norm} **1.225**
 Coeff. of Var. [%]_{norm} **3.290**
 Min. **0.004703** **34.77**
 Max. **0.005140** **39.25**
 Number of Spec. **18**



4.26 “50/40/10” Filled-Hole Compression 3 Properties (FHC3)

**Laminate Filled-Hole Compression Properties (FHC3)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

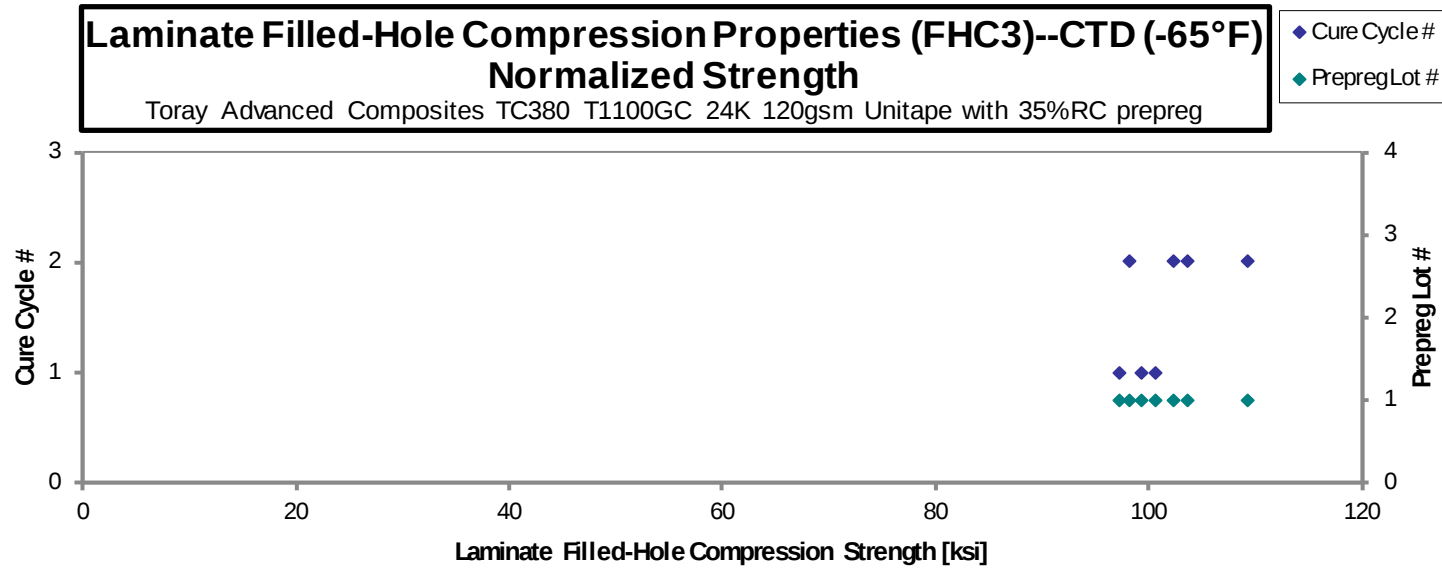
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD9A111B	A	C1	1	1	98.26	0.09692	20	M(A,L)GM, M(A,L)GF	0.004846	99.20
TCD9A112B	A	C1	1	1	96.78	0.09650	20	M(A,L)GO, M(A,L)GF	0.004825	97.29
TCD9A113B	A	C1	1	1	99.75	0.09683	20	M(A,L)GF	0.004842	100.6
TCD9A211B	A	C2	1	2	101.6	0.09663	20	M(A,L)GO	0.004832	102.2
TCD9A212B	A	C2	1	2	103.2	0.09628	20	M(A,L)GO	0.004814	103.6
TCD9A213B	A	C2	1	2	97.59	0.09655	20	M(A,L)GO	0.004828	98.15
TCD9A214B	A	C2	1	2	108.6	0.09657	20	M(A,L)GO	0.004828	109.2

Average 100.8
Standard Dev. 4.107
Coeff. of Var. [%] 4.073
Min. 96.78
Max. 108.6
Number of Spec. 7

Average_{norm} 0.004831 101.5
Standard Dev._{norm} 4.072
Coeff. of Var. [%]_{norm} 4.014
Min. 0.004814 97.29
Max. 0.004846 109.2
Number of Spec. 7 7



Laminate Filled-Hole Compression Properties (FHC3)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

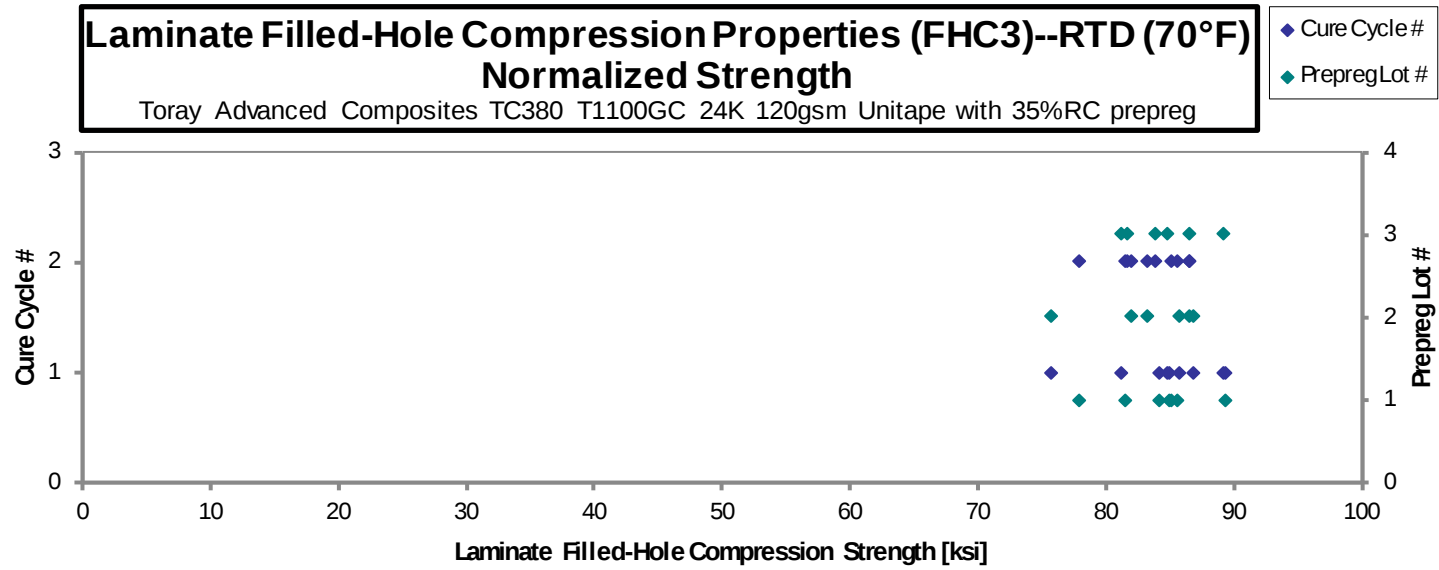
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD9A111A	A	C1	1	1	86.27	0.09368	20	M(A,L)GF	0.004684	84.18
TCD9A112A	A	C1	1	1	83.10	0.09813	20	M(A,L)GF	0.004907	84.94
TCD9A113A	A	C1	1	1	87.43	0.09802	20	LGF	0.004901	89.26
TCD9A211A	A	C2	1	2	76.47	0.09790	20	LAT	0.004895	77.98
TCD9A212A	A	C2	1	2	86.48	0.09448	20	M(A,L)GF	0.004724	85.11
TCD9A213A	A	C2	1	2	83.51	0.09837	20	M(A,L)GF	0.004918	85.56
TCD9A214A	A	C2	1	2	79.87	0.09795	20	M(A,L)GF	0.004898	81.49
TCD9B111A	B	C1	2	1	88.66	0.09402	20	M(A,L)GF	0.004701	86.83
TCD9B112A	B	C1	2	1	73.39	0.09905	20	LGF	0.004953	75.72
TCD9B113A	B	C1	2	1	81.97	0.1004	20	M(A,L)GF	0.005019	85.71
TCD9B211A	B	C2	2	2	88.33	0.09410	20	M(A,L)GF	0.004705	86.59
TCD9B212A	B	C2	2	2	80.60	0.09918	20	M(A,L)GF	0.004959	83.27
TCD9B213A	B	C2	2	2	78.20	0.1006	20	M(A,L)GF	0.005028	81.92
TCD9C111A	C	C1	3	1	88.10	0.09235	20	M(A,L)GF, LGM	0.004618	84.75
TCD9C112A	C	C1	3	1	87.68	0.09760	20	M(A,L)GF, LGO	0.004880	89.14
TCD9C113A	C	C1	3	1	79.00	0.09872	20	M(A,L)GO	0.004936	81.24
TCD9C211A	C	C2	3	2	84.80	0.09492	20	M(A,L)GF, LGO	0.004746	83.84
TCD9C212A	C	C2	3	2	78.43	0.09993	20	M(A,L)GF	0.004997	81.65
TCD9C213A	C	C2	3	2	81.59	0.1018	20	M(A,L)GO	0.005088	86.48

Average 82.84
 Standard Dev. 4.517
 Coeff. of Var. [%] 5.453
 Min. 73.39
 Max. 88.66
 Number of Spec. 19

Average_{norm} 0.004871 83.98
 Standard Dev._{norm} 3.433
 Coeff. of Var. [%]_{norm} 4.088
 Min. 0.004618 75.72
 Max. 0.005088 89.26
 Number of Spec. 19 19



Laminate Filled-Hole Compression Properties (FHC3)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

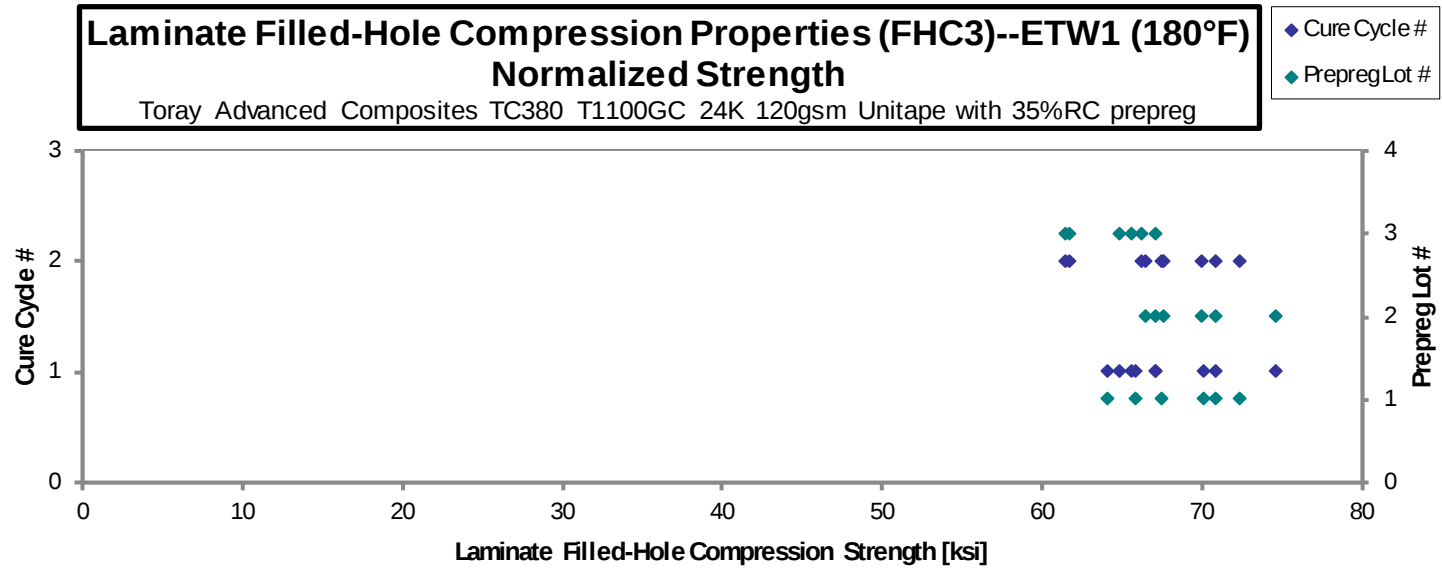
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD9A111D	A	C1	1	1	64.20	0.09850	20	LGF	0.004925	65.87
TCD9A112D	A	C1	1	1	65.20	0.09432	20	M(A,L)GF	0.004716	64.05
TCD9A113D	A	C1	1	1	68.82	0.09775	20	LGF	0.004888	70.07
TCD9A211D	A	C2	1	2	66.64	0.09712	20	LGM	0.004856	67.41
TCD9A212D	A	C2	1	2	70.81	0.09805	20	M(A,L)GF	0.004903	72.33
TCD9A213D	A	C2	1	2	72.62	0.09363	20	M(A,L)GF	0.004682	70.83
TCD9B111D	B	C1	2	1	67.63	0.1006	20	M(A,L)GF	0.005028	70.84
TCD9B112D	B	C1	2	1	64.80	0.09940	20	M(A,L)GF	0.004970	67.10
TCD9B113D	B	C1	2	1	74.41	0.09623	20	M(A,L)GF	0.004812	74.60
TCD9B211D	B	C2	2	2	67.20	0.09988	20	M(A,L)GF	0.004994	69.92
TCD9B212D	B	C2	2	2	64.22	0.09937	20	AGF	0.004968	66.47
TCD9B213D	B	C2	2	2	67.26	0.09638	20	AGF	0.004819	67.53
TCD9C111D	C	C1	3	1	64.72	0.09955	20	M(A,L)GF	0.004978	67.11
TCD9C112D	C	C1	3	1	62.66	0.09923	20	M(A,L)GF	0.004962	64.77
TCD9C113D	C	C1	3	1	65.75	0.09582	20	M(A,L)GF	0.004791	65.62
TCD9C211D	C	C2	3	2	58.76	0.1009	20	M(A,L)GF	0.005043	61.73
TCD9C212D	C	C2	3	2	58.92	0.1001	20	M(A,L)GF	0.005006	61.44
TCD9C213D	C	C2	3	2	66.01	0.09622	20	M(A,L)GF	0.004811	66.16

Average 66.15
 Standard Dev. 4.025
 Coeff. of Var. [%] 6.086
 Min. 58.76
 Max. 74.41
 Number of Spec. 18

Average_{norm} 0.004897 67.44
 Standard Dev._{norm} 3.489
 Coeff. of Var. [%]_{norm} 5.174
 Min. 0.004682 61.44
 Max. 0.005043 74.60
 Number of Spec. 18



Laminate Filled-Hole Compression Properties (FHC3)--ETW2 (250°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

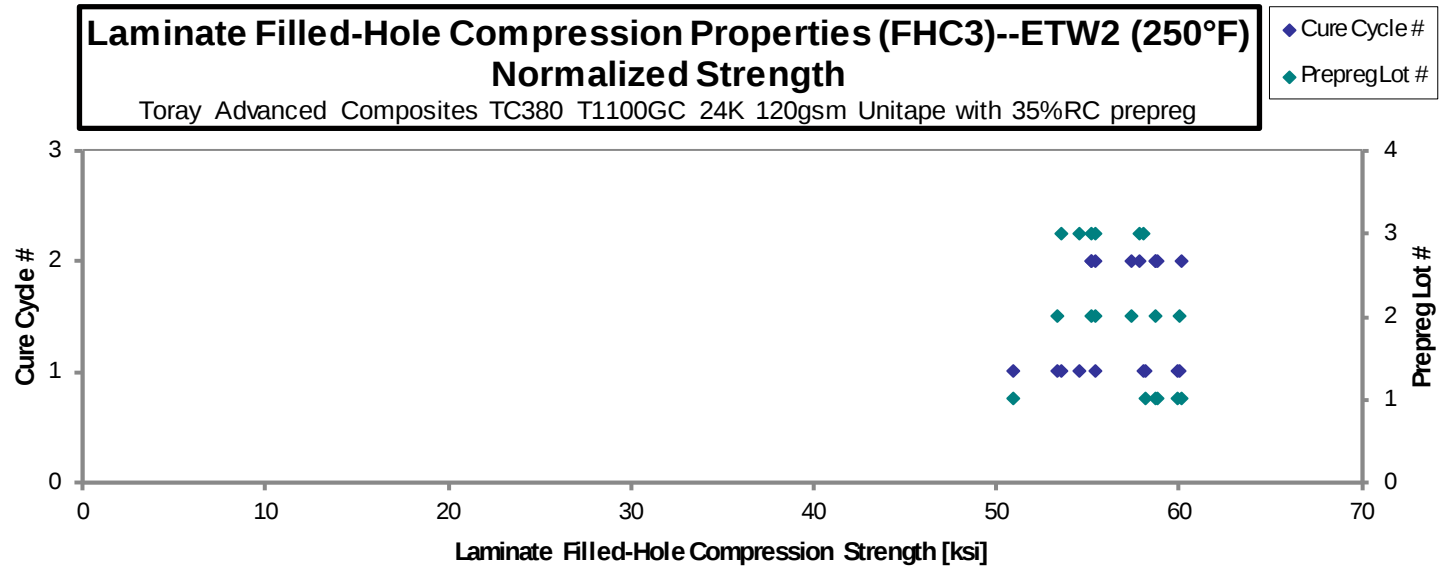
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCD9A111E	A	C1	1	1	57.69	0.09675	20	LGF	0.004838	58.14
TCD9A112E	A	C1	1	1	59.23	0.09705	20	LGF	0.004853	59.87
TCD9A113E	A	C1	1	1	50.69	0.09650	20	LGF	0.004825	50.95
TCD9A211E	A	C2	1	2	58.64	0.09628	20	M(A,L)GF	0.004814	58.81
TCD9A212E	A	C2	1	2	59.84	0.09638	20	M(A,L)GF	0.004819	60.08
TCD9A213E	A	C2	1	2	58.35	0.09652	20	M(A,L)GF	0.004826	58.67
TCD9B111E	B	C1	2	1	57.31	0.1005	20	M(A,L)GF	0.005027	60.02
TCD9B112E	B	C1	2	1	49.96	0.1025	20	LGF	0.005123	53.32
TCD9B113E	B	C1	2	1	52.66	0.1010	20	AGF	0.005048	55.38
TCD9B211E	B	C2	2	2	56.98	0.09893	20	AGF	0.004947	58.72
TCD9B212E	B	C2	2	2	55.21	0.09967	20	AGF	0.004983	57.32
TCD9B213E	B	C2	2	2	53.26	0.09938	20	AGF	0.004969	55.14
TCD9C111E	C	C1	3	1	56.12	0.09932	20	M(A,L)GF	0.004966	58.06
TCD9C112E	C	C1	3	1	51.78	0.09935	20	M(A,L)GF	0.004968	53.59
TCD9C113E	C	C1	3	1	52.47	0.09967	20	M(A,L)GF	0.004983	54.48
TCD9C211E	C	C2	3	2	52.71	0.1005	20	M(A,L)GF	0.005024	55.18
TCD9C212E	C	C2	3	2	53.05	0.1002	20	M(A,L)GF	0.005011	55.38
TCD9C213E	C	C2	3	2	55.51	0.09997	20	M(A,L)GF	0.004998	57.81

Average 55.08
 Standard Dev. 3.087
 Coeff. of Var. [%] 5.605
 Min. 49.96
 Max. 59.84
 Number of Spec. 18

Average_{norm} 0.004946
 Standard Dev._{norm} 2.634
 Coeff. of Var. [%]_{norm} 4.643
 Min. 0.004814
 Max. 0.005123
 Number of Spec. 18



4.27 “25/50/25” Single-Shear Bearing 1 Properties (SSB1, Proc. C)

Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--RTD (70°F)
Strength & Chord Stiffness

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

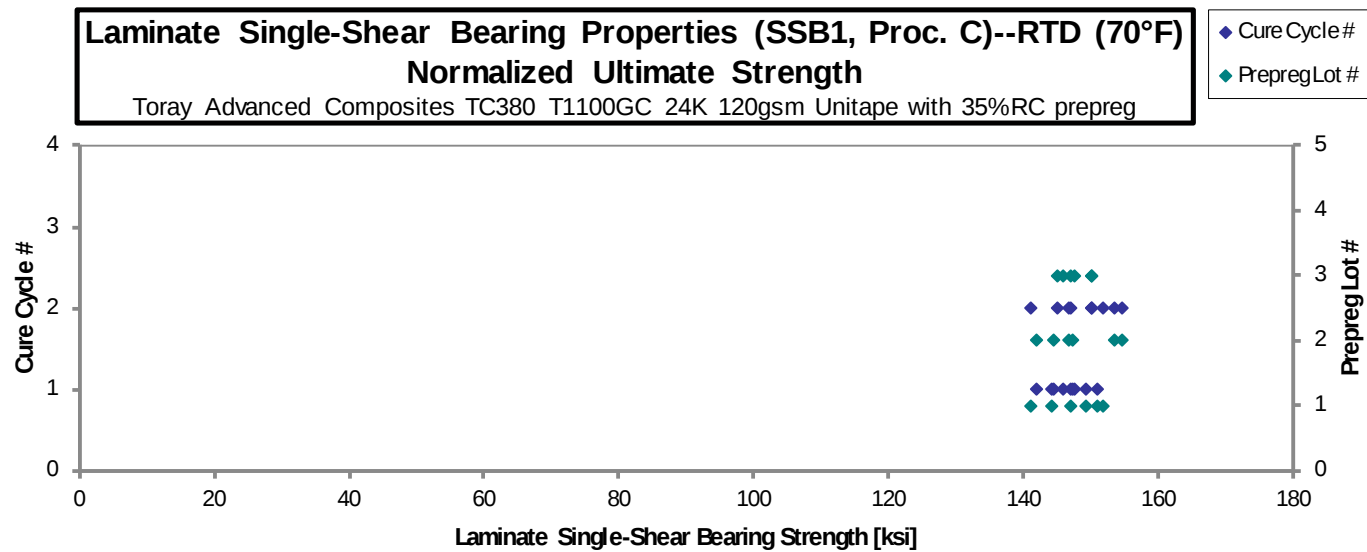
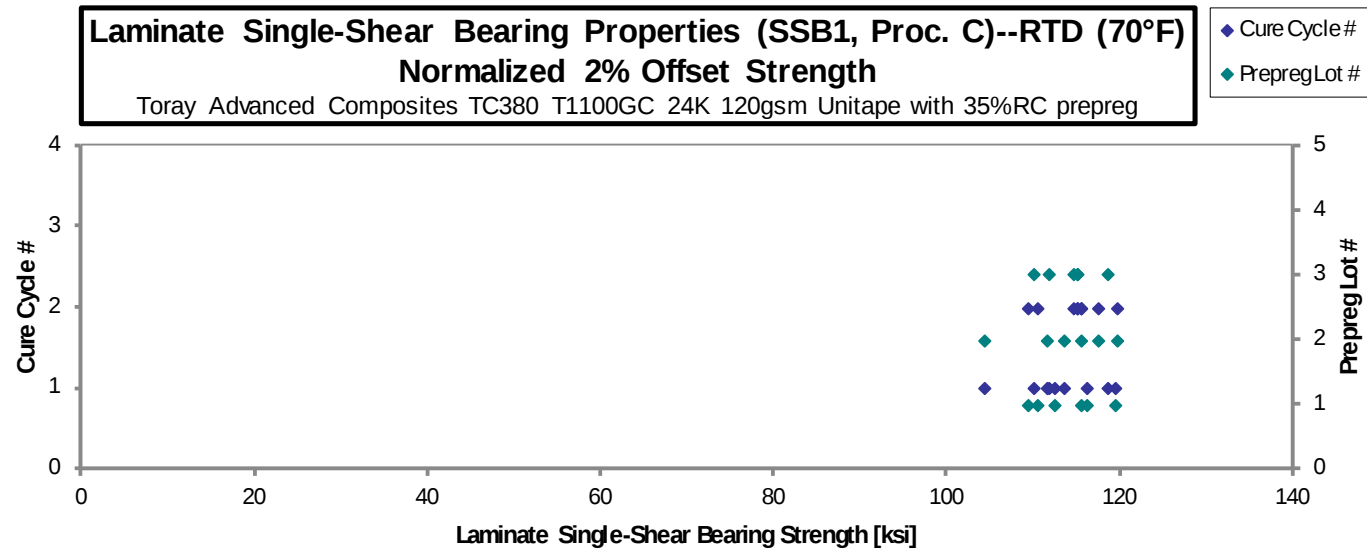
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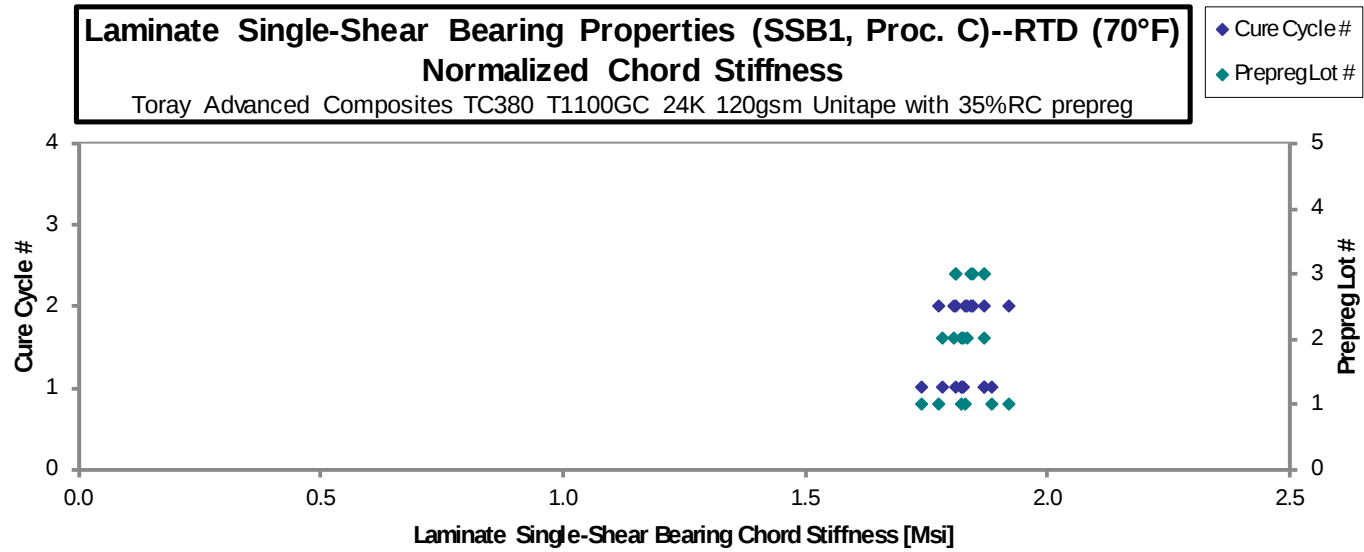
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD1A111A	A	C1	1	1	117.8	156.6	1.821	0.1099	24	B1I
TCD1A112A	A	C1	1	1	123.1	148.4	1.939	0.1119	24	B1I
TCD1A113A	A	C1	1	1	118.8	154.3	1.858	0.1128	24	B1I
TCD1A211A	A	C2	1	2	116.7	150.7	1.891	0.1080	24	B1I
TCD1A212A	A	C2	1	2	115.9	159.3	1.918	0.1099	24	B1I
TCD1A213A	A	C2	1	2	120.5	153.4	2.001	0.1105	24	B1I
TCD1B111A	B	C1	2	1	123.3	156.7	1.973	0.1062	24	B1I
TCD1B112A	B	C1	2	1	117.0	154.5	1.915	0.1098	24	B1I
TCD1B113A	B	C1	2	1	108.5	147.7	1.851	0.1108	24	B1I
TCD1B211A	B	C2	2	2	125.8	159.9	2.032	0.1058	24	B1I
TCD1B212A	B	C2	2	2	121.1	158.1	1.885	0.1119	24	B1I
TCD1B213A	B	C2	2	2	123.6	159.6	1.862	0.1116	24	B1I
TCD1C111A	C	C1	3	1	115.7	153.6	1.962	0.1096	24	B1I
TCD1C112A	C	C1	3	1	121.3	150.4	1.909	0.1127	24	B1I
TCD1C113A	C	C1	3	1	113.3	149.8	1.831	0.1137	24	B1I
TCD1C211A	C	C2	3	2	123.1	160.5	1.965	0.1078	24	B1I
TCD1C212A	C	C2	3	2	116.8	147.8	1.877	0.1131	24	B1I
TCD1C213A	C	C2	3	2	117.0	152.6	1.840	0.1134	24	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.004581	112.4	149.5	1.738
0.004664	119.6	144.2	1.884
0.004699	116.3	151.0	1.819
0.004500	109.4	141.3	1.773
0.004578	110.5	151.9	1.830
0.004602	115.5	147.1	1.919
0.004425	113.7	144.5	1.819
0.004576	111.6	147.3	1.825
0.004617	104.4	142.0	1.781
0.004408	115.5	146.8	1.865
0.004660	117.6	153.5	1.830
0.004651	119.7	154.6	1.804
0.004566	110.1	146.1	1.867
0.004697	118.7	147.2	1.868
0.004736	111.8	147.8	1.807
0.004491	115.1	150.1	1.838
0.004713	114.7	145.1	1.843
0.004723	115.1	150.2	1.810

Average 118.8 154.1 1.907
 Standard Dev. 4.293 4.342 0.06095
 Coeff. of Var. [%] 3.612 2.818 3.196
 Min. 108.5 147.7 1.821
 Max. 125.8 160.5 2.032
 Number of Spec. 18 18 18

Average_{norm} 0.004605 114.0 147.8 1.829
 Standard Dev._{norm} 3.965 3.693 0.04276
 Coeff. of Var. [%]_{norm} 3.479 2.499 2.338
 Min. 0.004408 104.4 141.3 1.738
 Max. 0.004736 119.7 154.6 1.919
 Number of Spec. 18 18 18 18





Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW1 (180°F)
Strength & Chord Stiffness

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

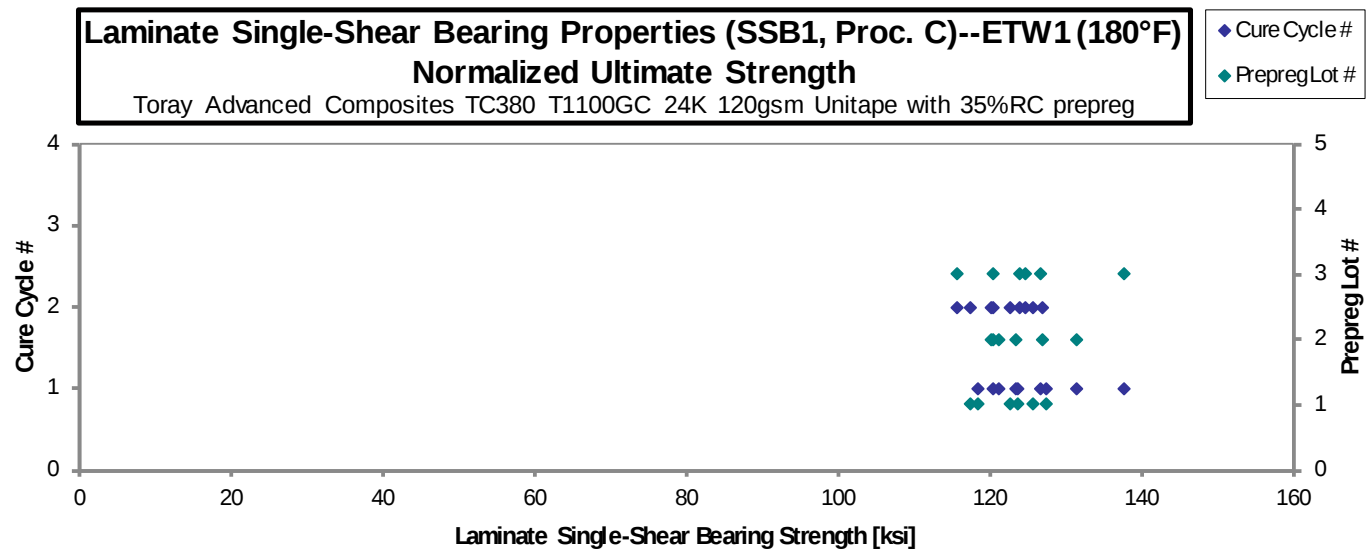
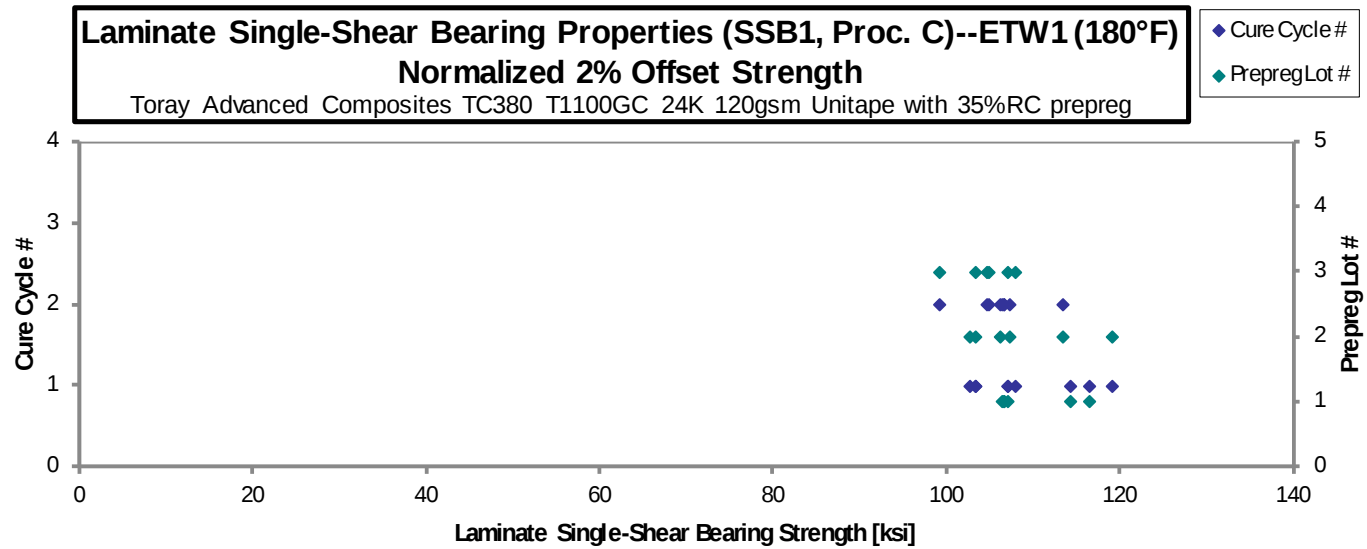
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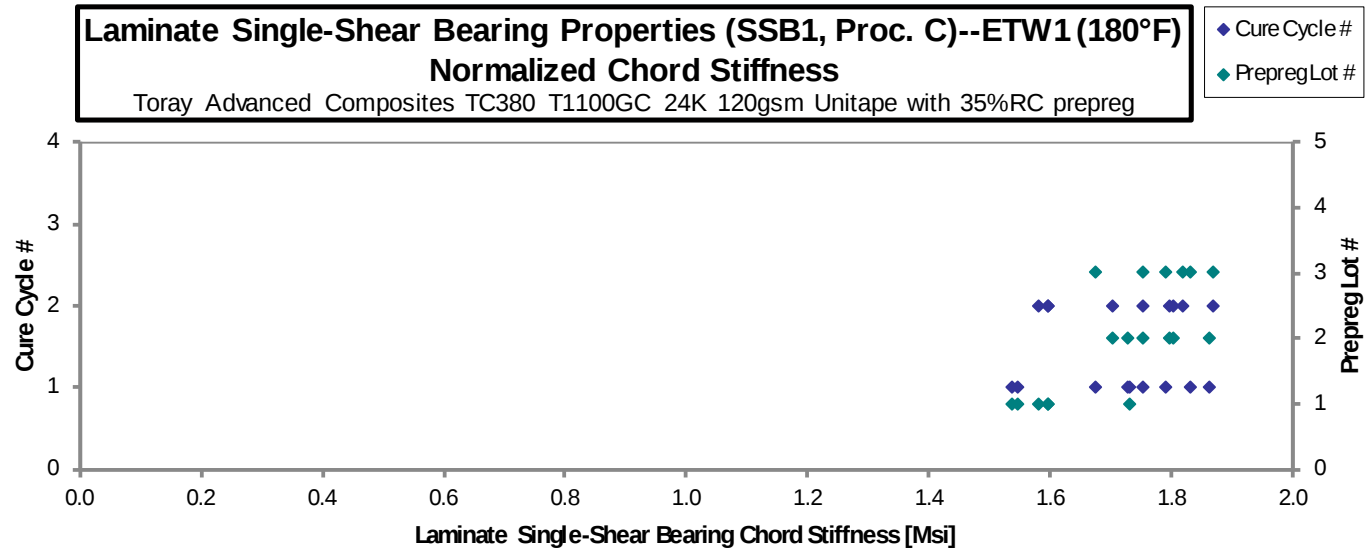
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD1A111D	A	C1	1	1	119.7	127.0	1.780	0.1121	24	B1I
TCD1A112D	A	C1	1	1	110.4	131.4	1.594	0.1118	24	B1I
TCD1A113D	A	C1	1	1	119.5	123.5	1.606	0.1103	24	B1I
TCD1A211D	A	C2	1	2	110.8	127.6	1.663	0.1107	24	B1I
TCD1A212D	A	C2	1	2	110.8	121.9	1.643	0.1110	24	B1I
TCD1A213D	A	C2	1	2	113.0	133.0	1.692	0.1087	24	B1I
TCD1B111D	B	C1	2	1	105.9	127.4	1.784	0.1117	24	B1I
TCD1B112D	B	C1	2	1	124.1	136.9	1.940	0.1106	24	B1I
TCD1B113D	B	C1	2	1	109.3	128.0	1.851	0.1091	24	B1I
TCD1B211D	B	C2	2	2	111.6	125.1	1.768	0.1109	24	B1I
TCD1B212D	B	C2	2	2	118.0	132.1	1.869	0.1107	24	B1I
TCD1B213D	B	C2	2	2	113.9	128.6	1.930	0.1076	24	B1I
TCD1C111D	C	C1	3	1	109.6	139.7	1.700	0.1136	24	B1I
TCD1C112D	C	C1	3	1	111.3	131.7	1.906	0.1108	24	B1I
TCD1C113D	C	C1	3	1	111.3	129.6	1.926	0.1071	24	B1I
TCD1C211D	C	C2	3	2	105.4	124.7	1.881	0.1144	24	B1I
TCD1C212D	C	C2	3	2	100.5	126.2	1.841	0.1139	24	B1I
TCD1C213D	C	C2	3	2	109.7	120.9	1.833	0.1102	24	B1I

Avg. t _{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.004672	116.5	123.6	1.733
0.004657	107.1	127.5	1.547
0.004597	114.4	118.3	1.538
0.004613	106.5	122.6	1.598
0.004623	106.7	117.4	1.583
0.004531	106.7	125.6	1.597
0.004655	102.7	123.5	1.730
0.004606	119.1	131.4	1.862
0.004544	103.5	121.2	1.753
0.004621	107.4	120.4	1.702
0.004614	113.4	127.0	1.797
0.004481	106.3	120.1	1.802
0.004732	108.1	137.7	1.676
0.004617	107.1	126.7	1.833
0.004461	103.5	120.5	1.790
0.004768	104.7	123.8	1.868
0.004744	99.33	124.8	1.819
0.004590	105.0	115.6	1.753

Average	111.9	128.6	1.789
Standard Dev.	5.632	4.917	0.1151
Coeff. of Var. [%]	5.031	3.823	6.432
Min.	100.5	120.9	1.594
Max.	124.1	139.7	1.940
Number of Spec.	18	18	18

Average _{norm}	0.004618	107.7	123.8	1.721
Standard Dev. _{norm}		5.079	5.255	0.1082
Coeff. of Var. [%] _{norm}		4.717	4.247	6.288
Min.	0.004461	99.33	115.6	1.538
Max.	0.004768	119.1	137.7	1.868
Number of Spec.	18	18	18	18





Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW2 (250°F)
Strength & Chord Stiffness

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 $t_{ply} [in]$

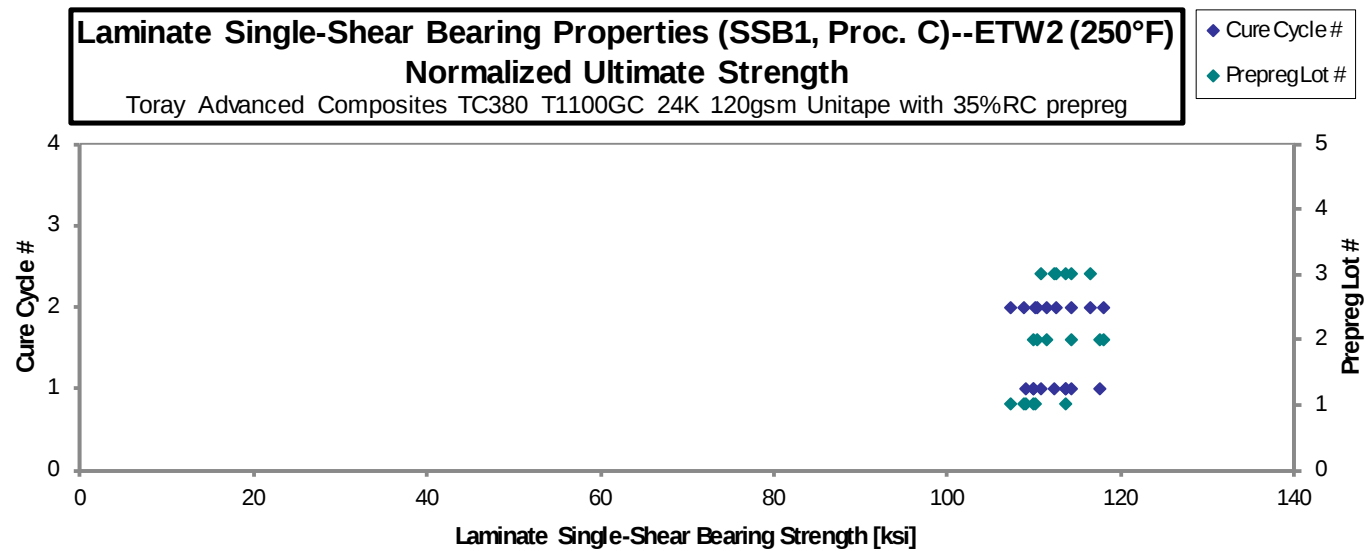
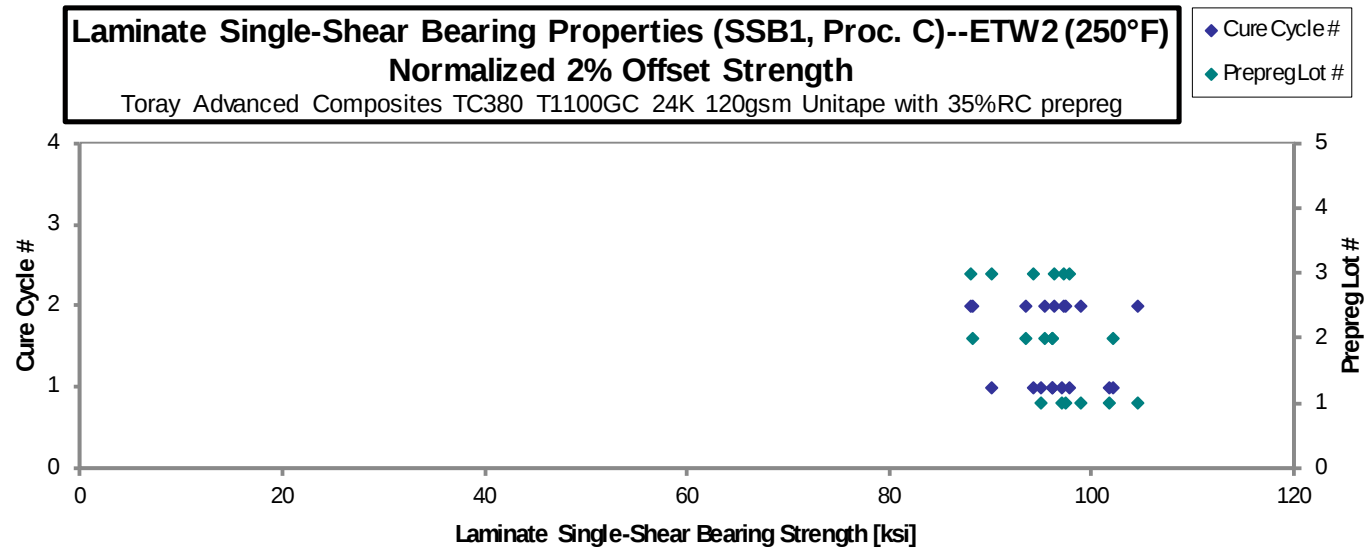
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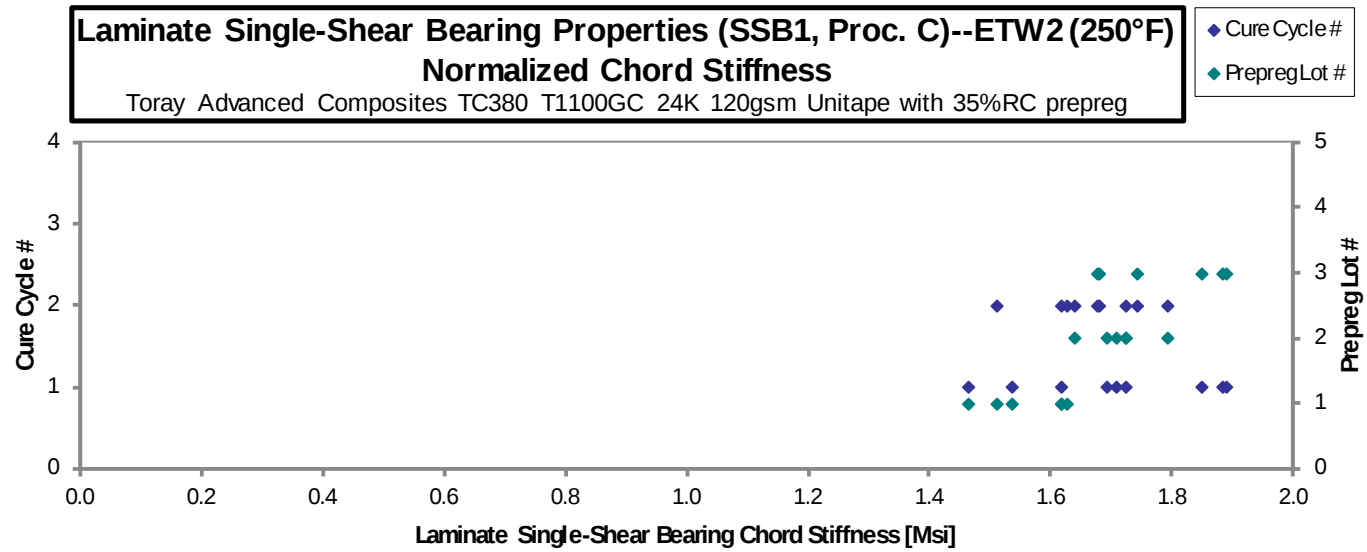
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD1A111E	A	C1	1	1	101.6	113.4	1.463	0.1154	24	B1I
TCD1A112E	A	C1	1	1	94.87	109.9	1.535	0.1153	24	B1I
TCD1A113E	A	C1	1	1	96.65	108.7	1.613	0.1156	24	B1I
TCD1A211E	A	C2	1	2	99.28	112.4	1.651	0.1130	24	B1I
TCD1A212E	A	C2	1	2	100.6	110.8	1.657	0.1131	24	B1I
TCD1A213E	A	C2	1	2	106.2	108.9	1.537	0.1134	24	B1I
TCD1B111E	B	C1	2	1	91.81	112.3	1.648	0.1206	24	B1I
TCD1B112E	B	C1	2	1	97.00	108.7	1.626	0.1212	24	B1I
TCD1B113E	B	C1	2	1	91.44	104.8	1.613	0.1209	24	B1I
TCD1B211E	B	C2	2	2	84.30	106.4	1.568	0.1206	24	B1I
TCD1B212E	B	C2	2	2	90.75	112.2	1.642	0.1211	24	B1I
TCD1B213E	B	C2	2	2	89.20	105.4	1.713	0.1206	24	B1I
TCD1C111E	C	C1	3	1	94.28	109.5	1.786	0.1194	24	B1I
TCD1C112E	C	C1	3	1	85.91	105.6	1.795	0.1209	24	B1I
TCD1C113E	C	C1	3	1	90.57	107.9	1.817	0.1199	24	B1I
TCD1C211E	C	C2	3	2	92.67	112.1	1.678	0.1197	24	B1I
TCD1C212E	C	C2	3	2	83.51	106.8	1.593	0.1215	24	B1I
TCD1C213E	C	C2	3	2	91.86	108.1	1.589	0.1219	24	B1I

Avg. $t_{ply} [in]$	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.004807	101.7	113.5	1.465
0.004804	94.95	110.0	1.536
0.004818	97.01	109.1	1.619
0.004706	97.34	110.2	1.619
0.004714	98.80	108.8	1.627
0.004724	104.5	107.2	1.513
0.005024	96.10	117.6	1.725
0.005051	102.1	114.3	1.711
0.005038	95.98	110.0	1.693
0.005023	88.21	111.4	1.640
0.005045	95.39	117.9	1.726
0.005024	93.36	110.3	1.793
0.004976	97.73	113.5	1.851
0.005037	90.15	110.9	1.884
0.004997	94.28	112.3	1.892
0.004986	96.26	116.4	1.743
0.005060	88.04	112.6	1.680
0.005077	97.16	114.4	1.681

Average 93.47 109.1 1.640
 Standard Dev. 6.053 2.671 0.09349
 Coeff. of Var. [%] 6.475 2.448 5.700
 Min. 83.51 104.8 1.463
 Max. 106.2 113.4 1.817
 Number of Spec. 18 18 18

Average_{norm} 0.004940 96.06 112.2 1.689
 Standard Dev._{norm} 4.390 3.054 0.1195
 Coeff. of Var. [%]_{norm} 4.569 2.721 7.075
 Min. 0.004706 88.04 107.2 1.465
 Max. 0.005077 104.5 117.9 1.892
 Number of Spec. 18 18 18 18





4.28 “10/80/10” Single-Shear Bearing 2 Properties (SSB2, Proc. C)

Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--RTD (70°F)
Strength & Chord Stiffness

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

$$\frac{t_{ply} [in]}{0.004800}$$

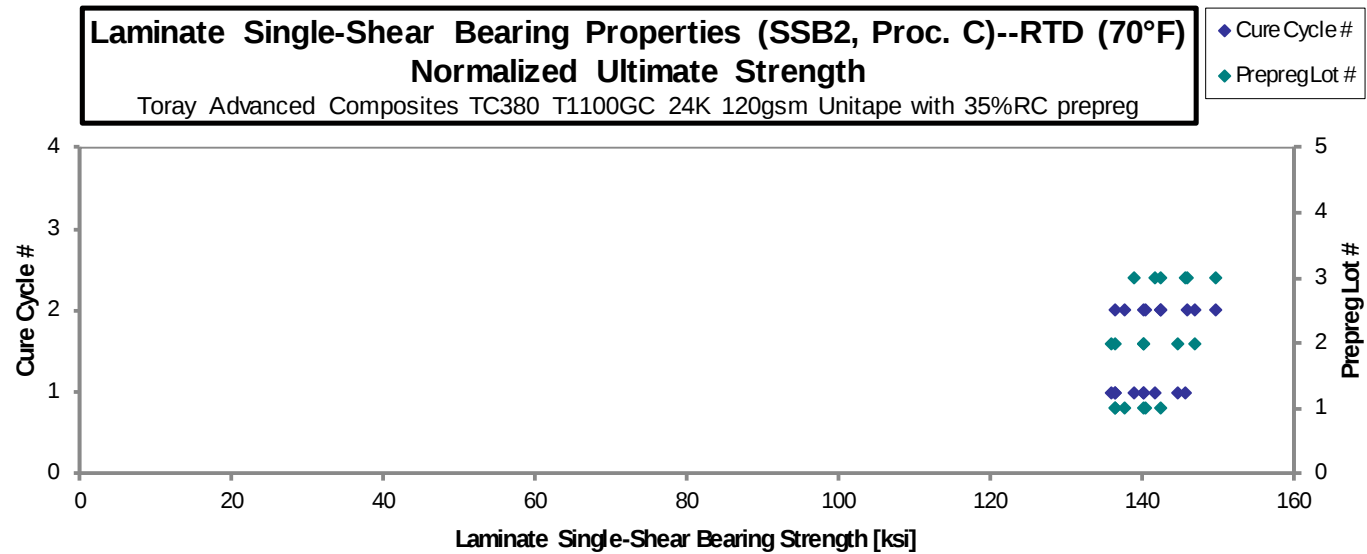
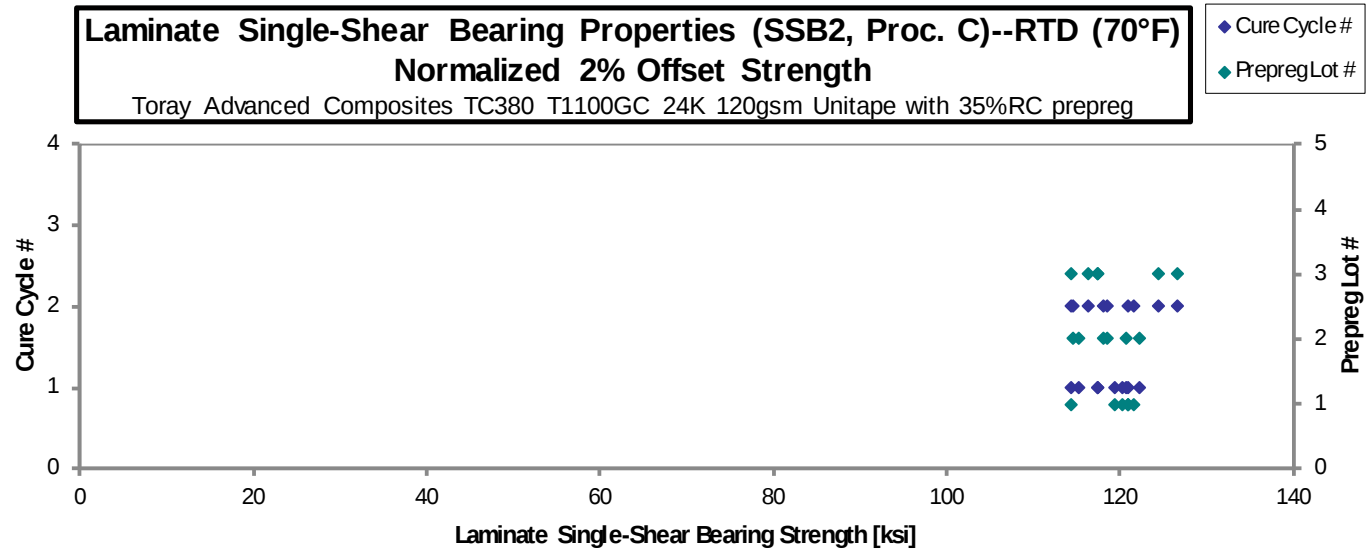
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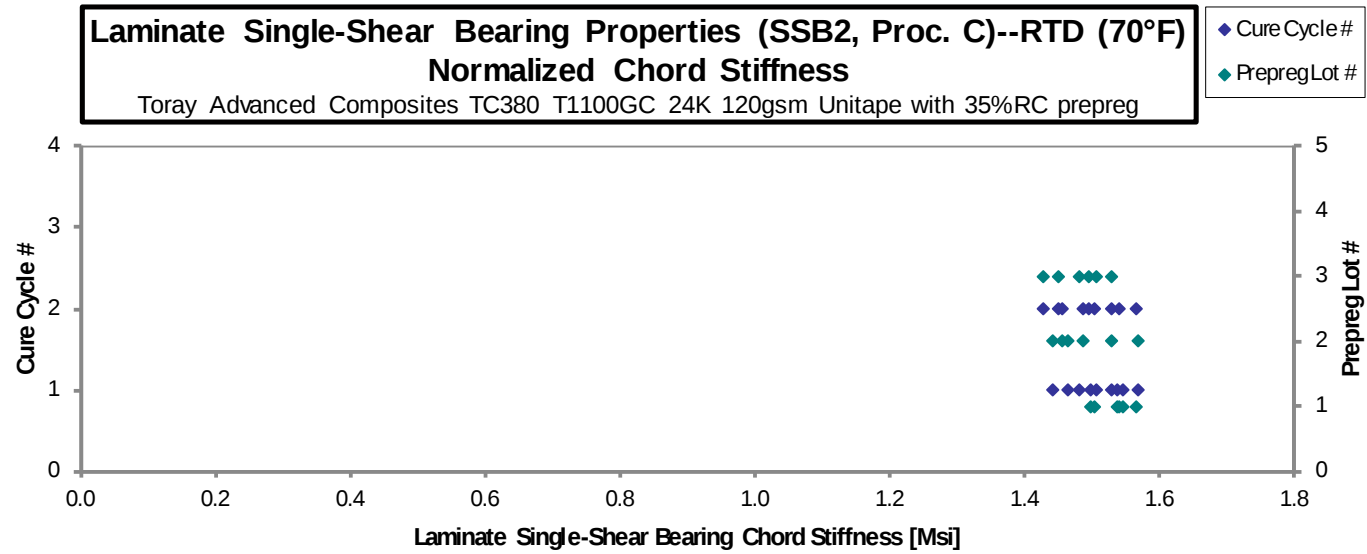
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TCD2A111A	A	C1	1	1	127.9	145.2	1.643	0.09023	20	B1I
TCD2A112A	A	C1	1	1	126.5	146.7	1.607	0.09173	20	B1I
TCD2A113A	A	C1	1	1	125.1	143.1	1.569	0.09157	20	B1I
TCD2A211A	A	C2	1	2	128.1	150.8	1.594	0.09055	20	B1I
TCD2A212A	A	C2	1	2	119.5	144.1	1.636	0.09177	20	B1I
TCD2A213A	A	C2	1	2	126.3	145.8	1.598	0.09238	20	B1I
TCD2B111A	B	C1	2	1	123.4	147.9	1.603	0.09385	20	B1I
TCD2B112A	B	C1	2	1	127.2	145.9	1.524	0.09215	20	B1I
TCD2B113A	B	C1	2	1	118.8	140.0	1.486	0.09307	20	B1I
TCD2B211A	B	C2	2	2	127.3	158.0	1.596	0.08932	20	B1I
TCD2B212A	B	C2	2	2	122.4	141.5	1.508	0.09255	20	B1I
TCD2B213A	B	C2	2	2	118.7	145.2	1.582	0.09263	20	B1I
TCD2C111A	C	C1	3	1	126.3	152.6	1.645	0.08912	20	B1I
TCD2C112A	C	C1	3	1	118.5	143.9	1.559	0.09262	20	B1I
TCD2C113A	C	C1	3	1	120.2	149.3	1.515	0.09373	20	B1I
TCD2C211A	C	C2	3	2	123.0	150.8	1.509	0.09072	20	B1I
TCD2C212A	C	C2	3	2	121.6	143.8	1.392	0.09990	20	B1I
TCD2C213A	C	C2	3	2	125.5	147.2	1.507	0.09517	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.004512	120.3	136.5	1.544
0.004587	120.9	140.2	1.535
0.004578	119.3	136.5	1.496
0.004528	120.9	142.2	1.504
0.004588	114.3	137.7	1.563
0.004619	121.6	140.3	1.538
0.004693	120.6	144.6	1.567
0.004608	122.1	140.1	1.463
0.004653	115.2	135.8	1.441
0.004466	118.4	147.0	1.485
0.004628	118.0	136.4	1.454
0.004632	114.5	140.1	1.527
0.004456	117.3	141.6	1.527
0.004631	114.3	138.9	1.504
0.004687	117.3	145.7	1.479
0.004536	116.2	142.5	1.426
0.004995	126.5	149.7	1.448
0.004758	124.4	145.9	1.494

Average 123.7 146.8 1.560
 Standard Dev. 3.451 4.318 0.06571
 Coeff. of Var. [%] 2.790 2.942 4.213
 Min. 118.5 140.0 1.392
 Max. 128.1 158.0 1.645
 Number of Spec. 18 18 18

Average_{norm} 0.004620 119.0 141.2 1.500
 Standard Dev._{norm} 3.495 4.073 0.04235
 Coeff. of Var. [%]_{norm} 2.937 2.884 2.824
 Min. 0.004456 114.3 135.8 1.426
 Max. 0.004995 126.5 149.7 1.567
 Number of Spec. 18 18 18 18





Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW1 (180°F)
Strength & Chord Stiffness

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

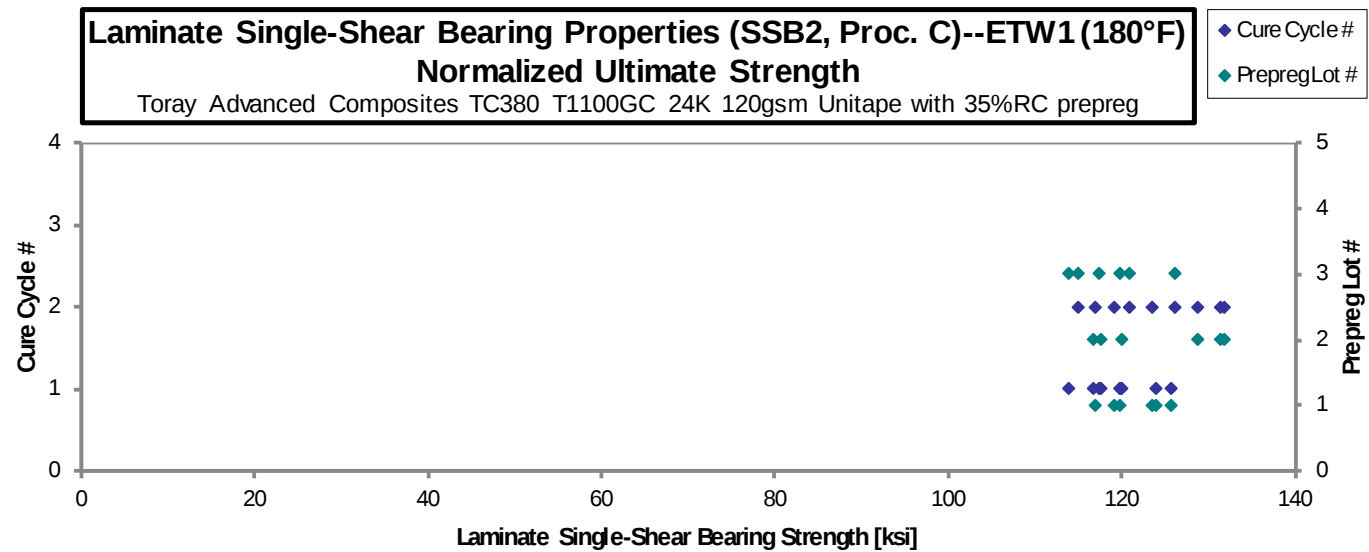
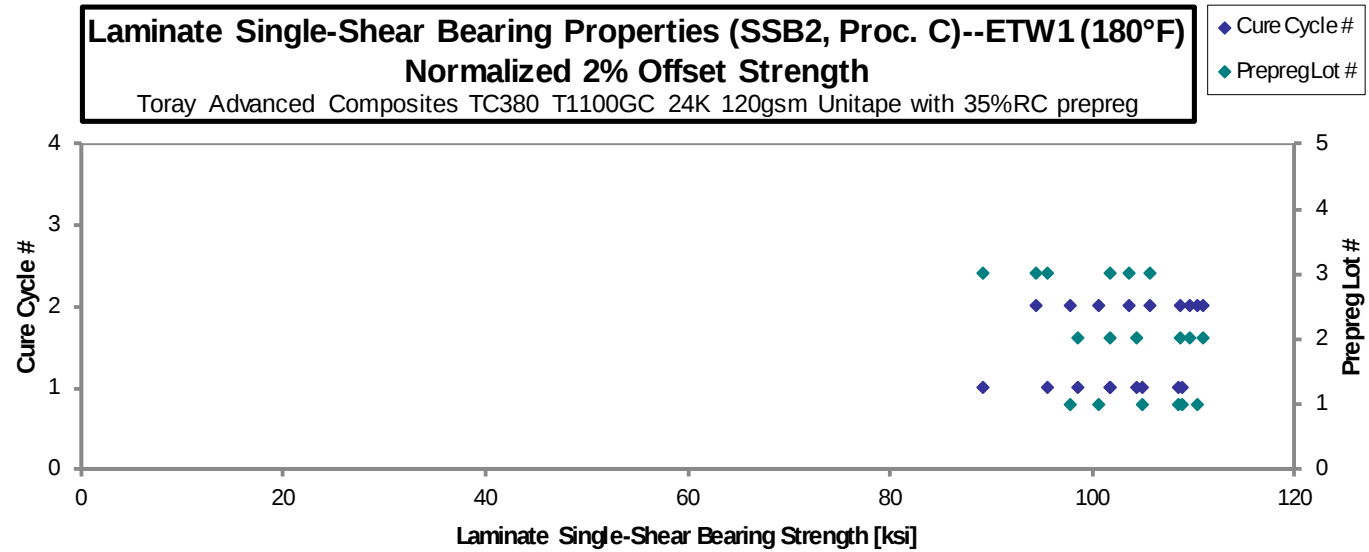
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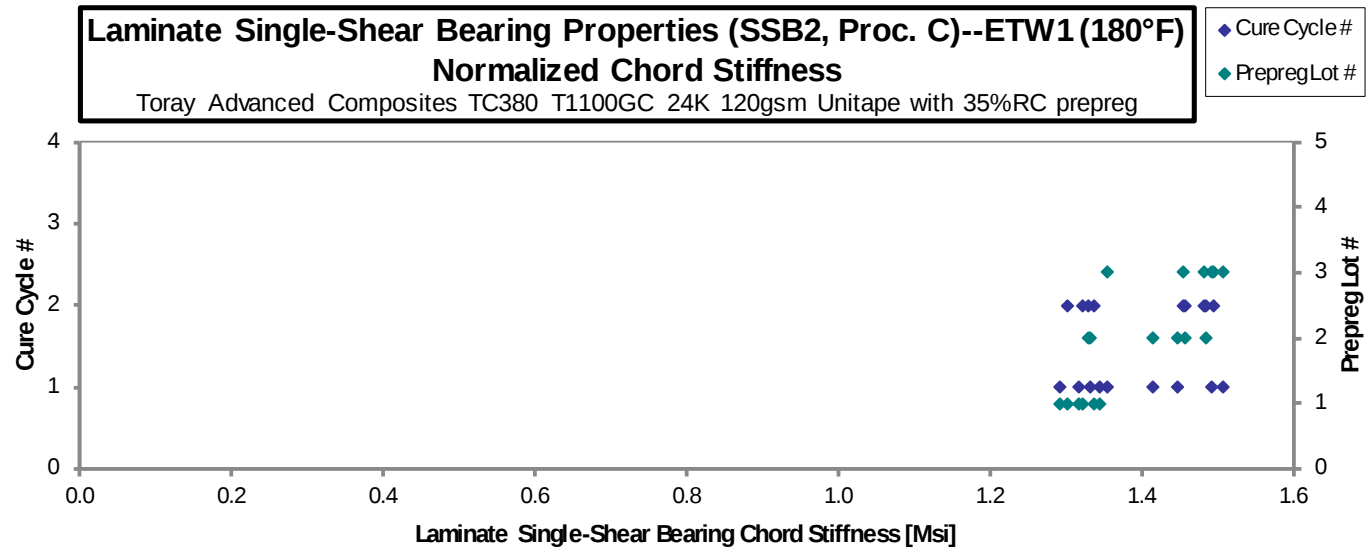
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD2A111D	A	C1	1	1	109.9	129.8	1.407	0.09177	20	B1I
TCD2A112D	A	C1	1	1	113.5	131.0	1.369	0.09223	20	B1I
TCD2A113D	A	C1	1	1	114.9	126.8	1.368	0.09067	20	B1I
TCD2A211D	A	C2	1	2	105.0	124.2	1.392	0.09210	20	B1I
TCD2A212D	A	C2	1	2	101.8	121.7	1.352	0.09237	20	B1I
TCD2A213D	A	C2	1	2	116.3	130.0	1.392	0.09122	20	B1I
TCD2B111D	B	C1	2	1	104.5	120.7	1.364	0.09362	20	B1I
TCD2B112D	B	C1	2	1	106.6	122.6	1.478	0.09402	20	B1I
TCD2B113D	B	C1	2	1	104.0	123.2	1.490	0.09107	20	B1I
TCD2B211D	B	C2	2	2	113.4	136.5	1.376	0.09278	20	B1I
TCD2B212D	B	C2	2	2	112.4	135.9	1.535	0.09283	20	B1I
TCD2B213D	B	C2	2	2	118.4	137.3	1.553	0.09003	20	B1I
TCD2C111D	C	C1	3	1	97.84	120.0	1.541	0.09388	20	B1I
TCD2C112D	C	C1	3	1	105.5	124.3	1.403	0.09262	20	B1I
TCD2C113D	C	C1	3	1	95.53	122.1	1.596	0.08967	20	B1I
TCD2C211D	C	C2	3	2	107.5	123.0	1.505	0.09445	20	B1I
TCD2C212D	C	C2	3	2	107.1	130.3	1.544	0.09292	20	B1I
TCD2C213D	C	C2	3	2	98.15	119.5	1.509	0.09243	20	B1I

Avg. t _{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.004588	105.0	124.1	1.345
0.004612	109.0	125.8	1.315
0.004533	108.5	119.8	1.292
0.004605	100.7	119.2	1.335
0.004618	97.91	117.1	1.301
0.004561	110.5	123.5	1.322
0.004681	101.9	117.8	1.330
0.004701	104.4	120.1	1.447
0.004553	98.64	116.8	1.413
0.004639	109.6	131.9	1.330
0.004642	108.7	131.4	1.484
0.004502	111.0	128.8	1.456
0.004694	95.69	117.4	1.507
0.004631	101.8	119.9	1.353
0.004483	89.23	114.0	1.491
0.004723	105.8	121.0	1.480
0.004646	103.6	126.1	1.494
0.004622	94.50	115.1	1.453

Average 107.3 126.6 1.454
 Standard Dev. 6.596 5.827 0.08089
 Coeff. of Var. [%] 6.145 4.602 5.563
 Min. 95.53 119.5 1.352
 Max. 118.4 137.3 1.596
 Number of Spec. 18 18 18

Average_{norm} 0.004613 103.1 121.7 1.397
 Standard Dev._{norm} 6.161 5.382 0.07826
 Coeff. of Var. [%]_{norm} 5.973 4.424 5.601
 Min. 0.004483 89.23 114.0 1.292
 Max. 0.004723 111.0 131.9 1.507
 Number of Spec. 18 18 18 18





Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW2 (250°F)
Strength & Chord Stiffness

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

 t_{ply} [in]

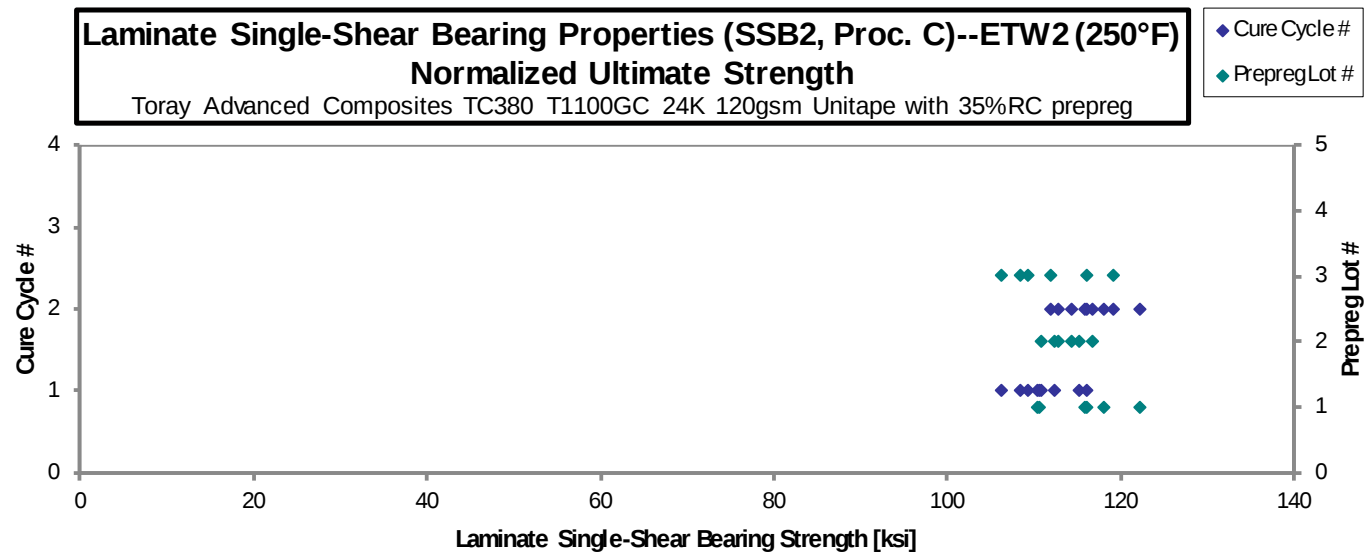
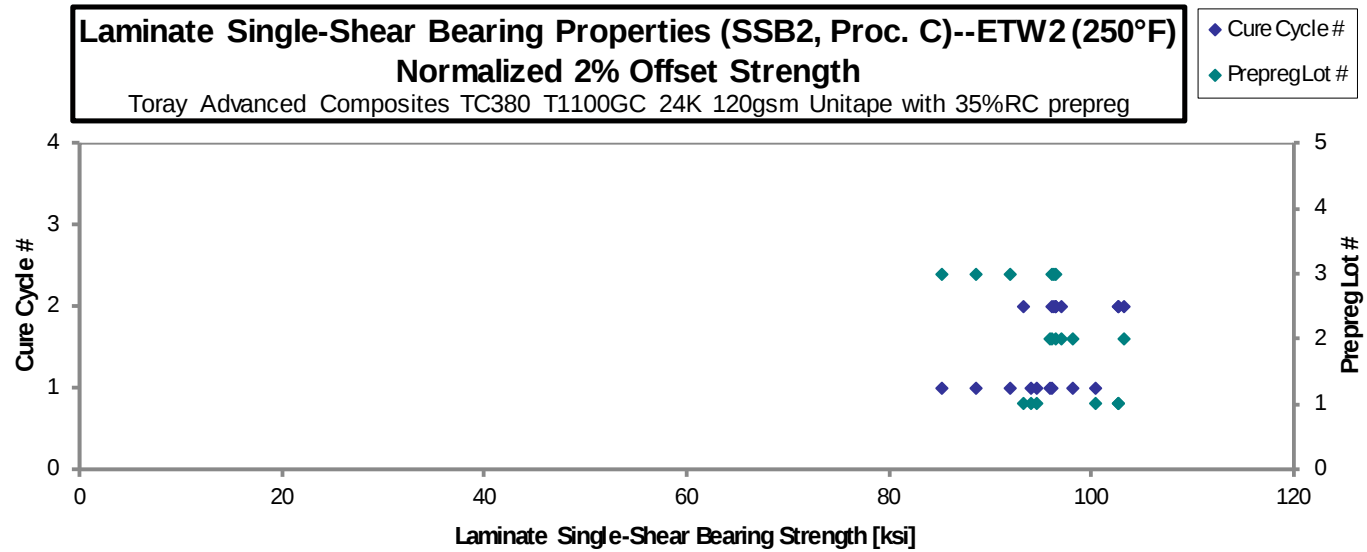
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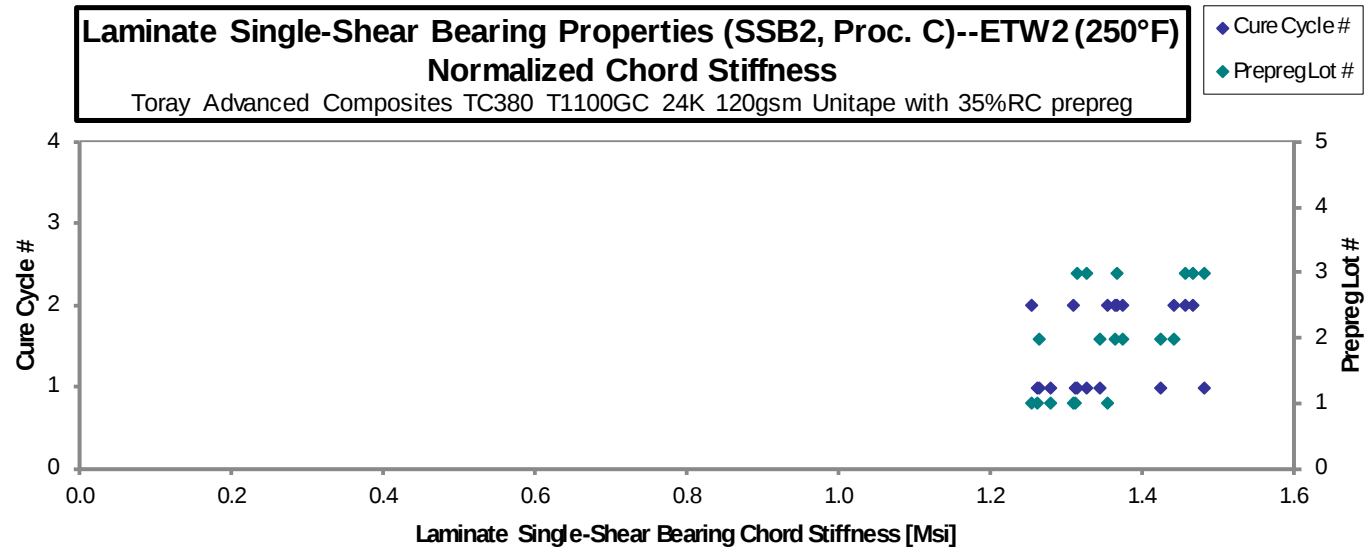
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD2A111E	A	C1	1	1	103.1	119.0	1.344	0.09357	20	B1I
TCD2A112E	A	C1	1	1	96.79	112.7	1.290	0.09393	20	B1I
TCD2A113E	A	C1	1	1	96.83	113.7	1.316	0.09333	20	B1I
TCD2A211E	A	C2	1	2	93.47	115.9	1.254	0.09588	20	B1I
TCD2A212E	A	C2	1	2	103.1	118.6	1.358	0.09557	20	B1I
TCD2A213E	A	C2	1	2	102.5	121.9	1.305	0.09617	20	B1I
TCD2B111E	B	C1	2	1	91.35	105.4	1.204	0.1008	20	B1I
TCD2B112E	B	C1	2	1	93.34	109.4	1.353	0.1010	20	B1I
TCD2B113E	B	C1	2	1	91.48	106.8	1.279	0.1009	20	B1I
TCD2B211E	B	C2	2	2	92.25	107.1	1.296	0.1010	20	B1I
TCD2B212E	B	C2	2	2	97.71	108.2	1.301	0.1014	20	B1I
TCD2B213E	B	C2	2	2	91.52	110.7	1.368	0.1012	20	B1I
TCD2C111E	C	C1	3	1	85.78	102.8	1.283	0.09915	20	B1I
TCD2C112E	C	C1	3	1	88.86	105.7	1.270	0.09930	20	B1I
TCD2C113E	C	C1	3	1	82.06	104.1	1.423	0.09982	20	B1I
TCD2C211E	C	C2	3	2	91.80	106.5	1.386	0.1008	20	B1I
TCD2C212E	C	C2	3	2	92.11	113.7	1.400	0.1006	20	B1I
TCD2C213E	C	C2	3	2	91.50	110.4	1.300	0.1009	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.004678	100.5	116.0	1.310
0.004697	94.71	110.3	1.262
0.004667	94.14	110.6	1.279
0.004794	93.36	115.7	1.253
0.004778	102.7	118.1	1.352
0.004808	102.7	122.1	1.307
0.005042	95.95	110.7	1.264
0.005048	98.17	115.1	1.423
0.005045	96.15	112.2	1.344
0.005049	97.04	112.6	1.363
0.005068	103.2	114.2	1.374
0.005058	96.43	116.7	1.442
0.004958	88.60	106.2	1.325
0.004965	91.91	109.3	1.314
0.004991	85.32	108.3	1.480
0.005038	96.36	111.8	1.455
0.005029	96.50	119.1	1.467
0.005046	96.19	116.1	1.366

Average	93.64	110.7	1.318
Standard Dev.	5.636	5.522	0.05566
Coeff. of Var. [%]	6.018	4.988	4.222
Min.	82.06	102.8	1.204
Max.	103.1	121.9	1.423
Number of Spec.	18	18	18

Average _{norm}	0.004931	96.10	113.6	1.354
Standard Dev. _{norm}		4.630	4.104	0.07305
Coeff. of Var. [%] _{norm}		4.818	3.612	5.393
Min.	0.004667	85.32	106.2	1.253
Max.	0.005068	103.2	122.1	1.480
Number of Spec.	18	18	18	18





4.29 “50/40/10” Single-Shear Bearing 3 Properties (SSB3, Proc. C)

Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--RTD (70°F)
Strength & Chord Stiffness

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

$$\frac{t_{ply} [in]}{0.004800}$$

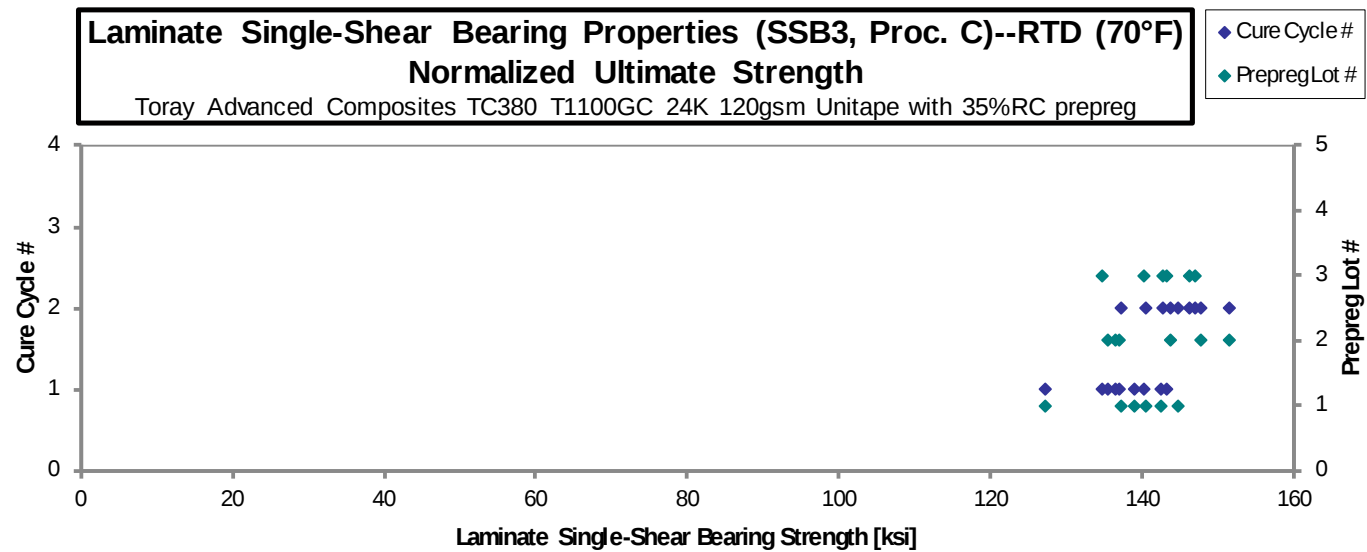
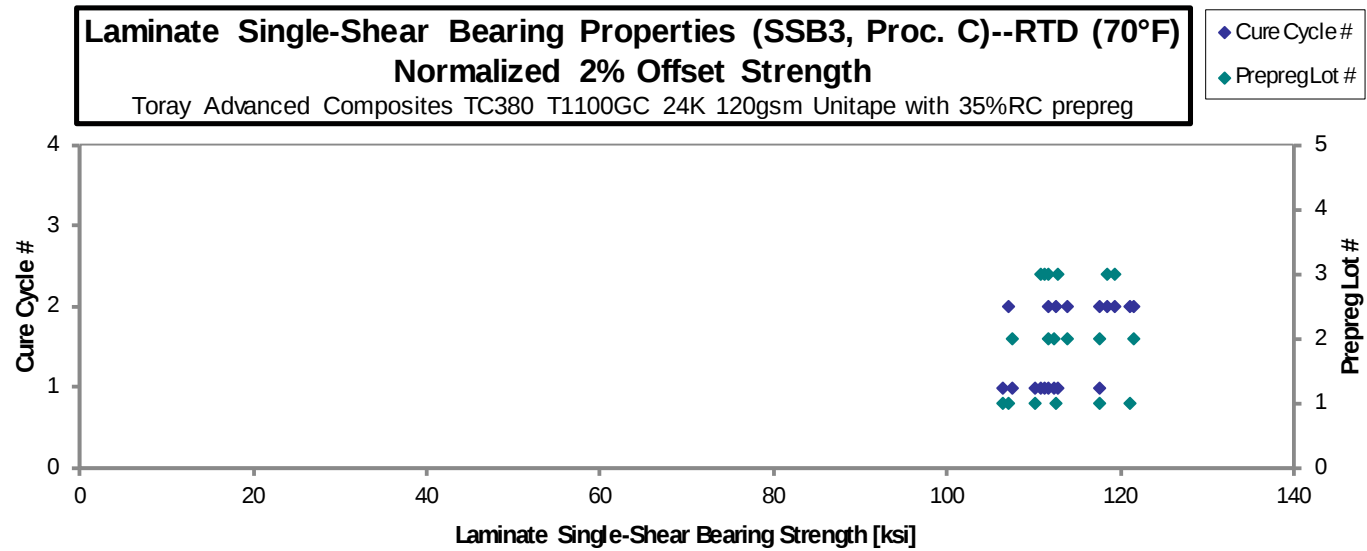
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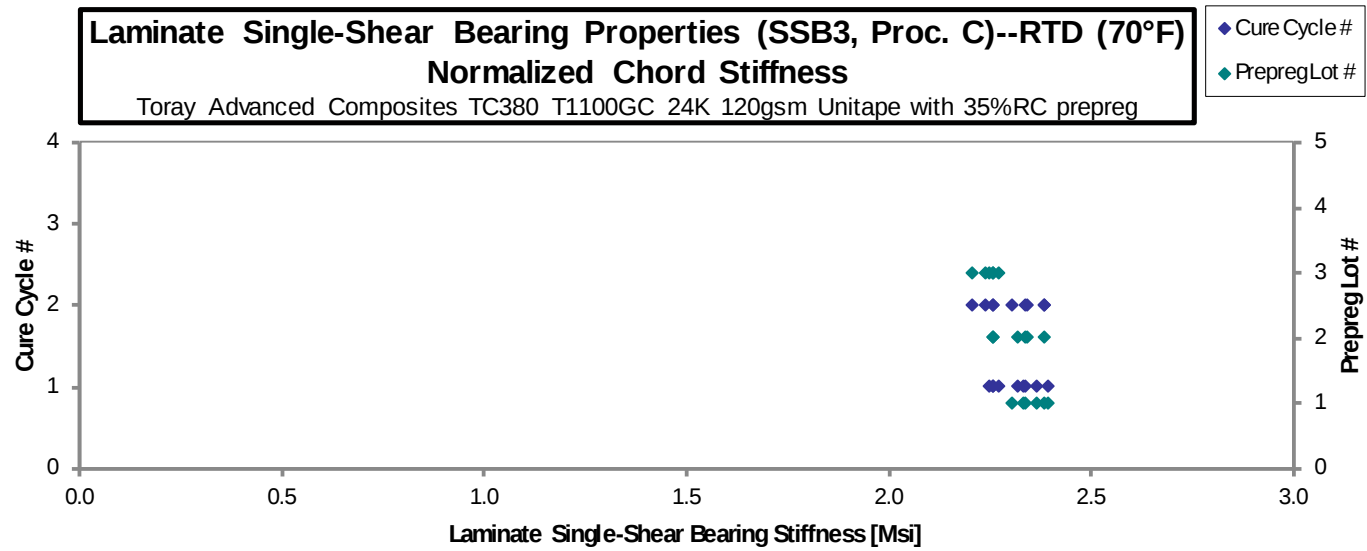
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD3A111A	A	C1	1	1	116.9	147.2	2.536	0.09055	20	B1I
TCD3A112A	A	C1	1	1	110.8	132.2	2.432	0.09217	20	B1I
TCD3A113A	A	C1	1	1	121.8	147.2	2.447	0.09275	20	B1I
TCD3A211A	A	C2	1	2	115.9	144.3	2.453	0.09327	20	B1I
TCD3A212A	A	C2	1	2	124.8	141.3	2.408	0.09313	20	B1I
TCD3A213A	A	C2	1	2	110.3	148.7	2.375	0.09323	20	B1I
TCD3B111A	B	C1	2	1	121.0	146.6	2.532	0.08860	20	B1I
TCD3B112A	B	C1	2	1	118.5	144.4	2.447	0.09092	20	B1I
TCD3B113A	B	C1	2	1	111.1	140.8	2.333	0.09285	20	B1I
TCD3B211A	B	C2	2	2	123.7	155.9	2.451	0.08838	20	B1I
TCD3B212A	B	C2	2	2	128.3	159.6	2.471	0.09093	20	B1I
TCD3B213A	B	C2	2	2	122.9	154.4	2.495	0.09178	20	B1I
TCD3C111A	C	C1	3	1	120.0	145.8	2.434	0.08863	20	B1I
TCD3C112A	C	C1	3	1	116.7	146.8	2.382	0.09160	20	B1I
TCD3C113A	C	C1	3	1	116.8	148.2	2.337	0.09267	20	B1I
TCD3C211A	C	C2	3	2	121.0	158.2	2.390	0.08860	20	B1I
TCD3C212A	C	C2	3	2	125.0	153.5	2.342	0.09175	20	B1I
TCD3C213A	C	C2	3	2	121.7	146.7	2.321	0.09333	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.004528	110.2	138.8	2.392
0.004608	106.4	126.9	2.335
0.004638	117.7	142.2	2.365
0.004663	112.6	140.2	2.383
0.004657	121.1	137.0	2.336
0.004662	107.1	144.4	2.306
0.004430	111.7	135.3	2.336
0.004546	112.2	136.7	2.318
0.004643	107.4	136.2	2.256
0.004419	113.9	143.5	2.256
0.004547	121.6	151.2	2.341
0.004589	117.5	147.6	2.386
0.004432	110.8	134.6	2.248
0.004580	111.3	140.1	2.273
0.004633	112.7	143.1	2.256
0.004430	111.7	146.0	2.206
0.004588	119.4	146.7	2.238
0.004667	118.4	142.6	2.256

Average 119.3 147.9 2.421
 Standard Dev. 5.126 6.676 0.06550
 Coeff. of Var. [%] 4.297 4.515 2.705
 Min. 110.3 132.2 2.321
 Max. 128.3 159.6 2.536
 Number of Spec. 18 18 18

Average_{norm} 0.004570 113.5 140.7 2.305
 Standard Dev._{norm} 4.697 5.770 0.05743
 Coeff. of Var. [%]_{norm} 4.137 4.100 2.492
 Min. 0.004419 106.4 126.9 2.206
 Max. 0.004667 121.6 151.2 2.392
 Number of Spec. 18 18 18 18





Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW1 (180°F)
Strength & Chord Stiffness

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

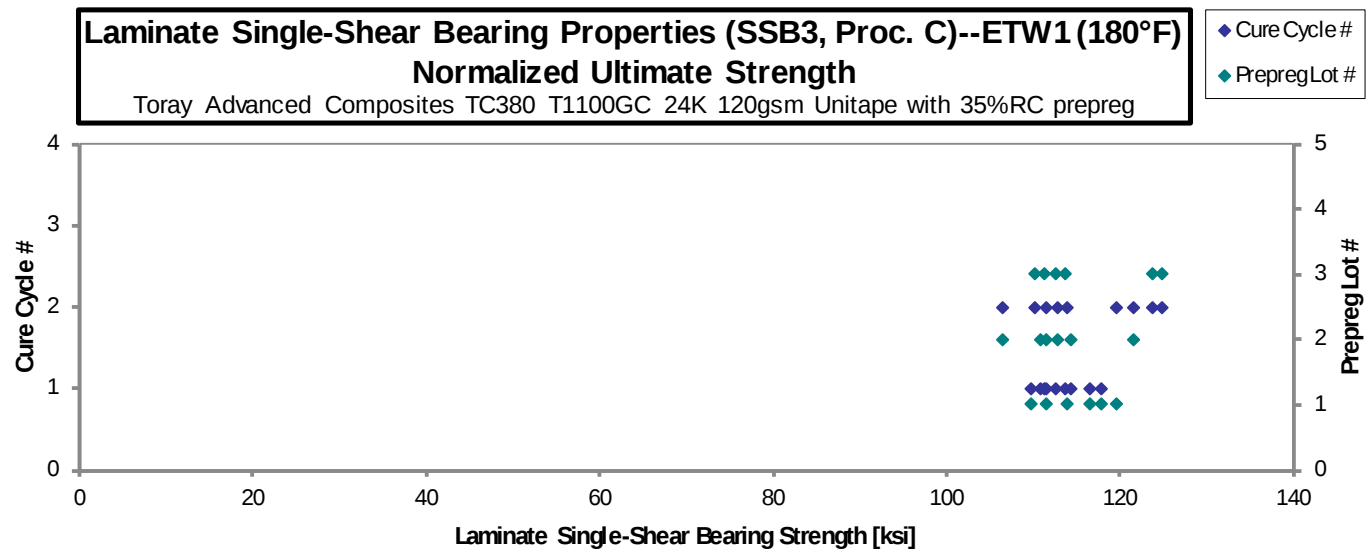
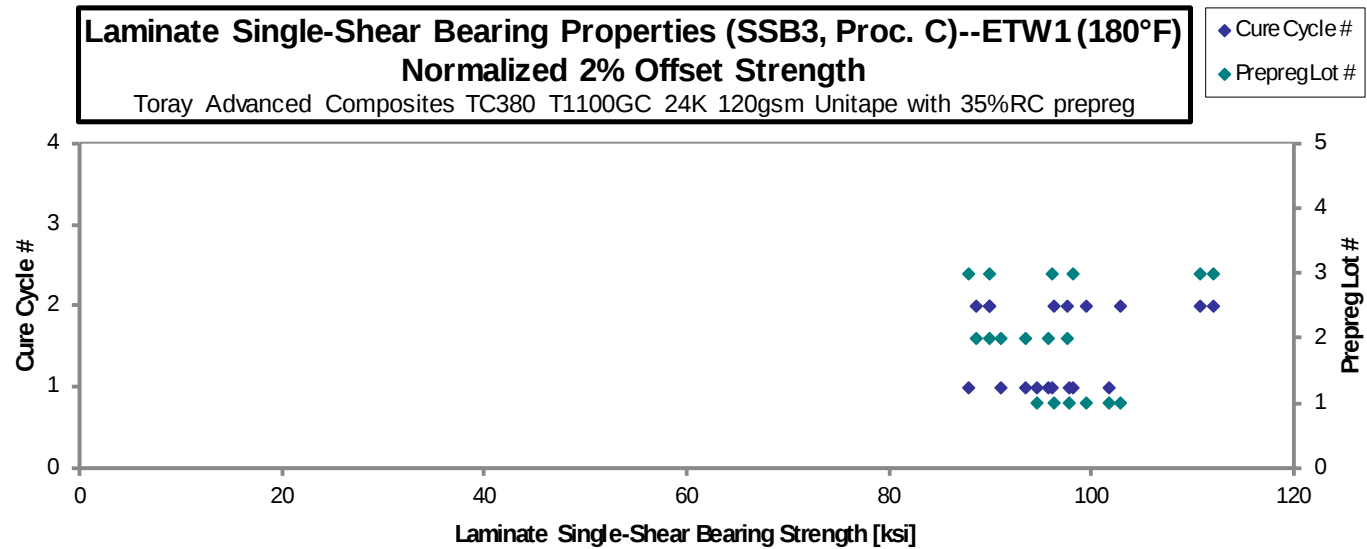
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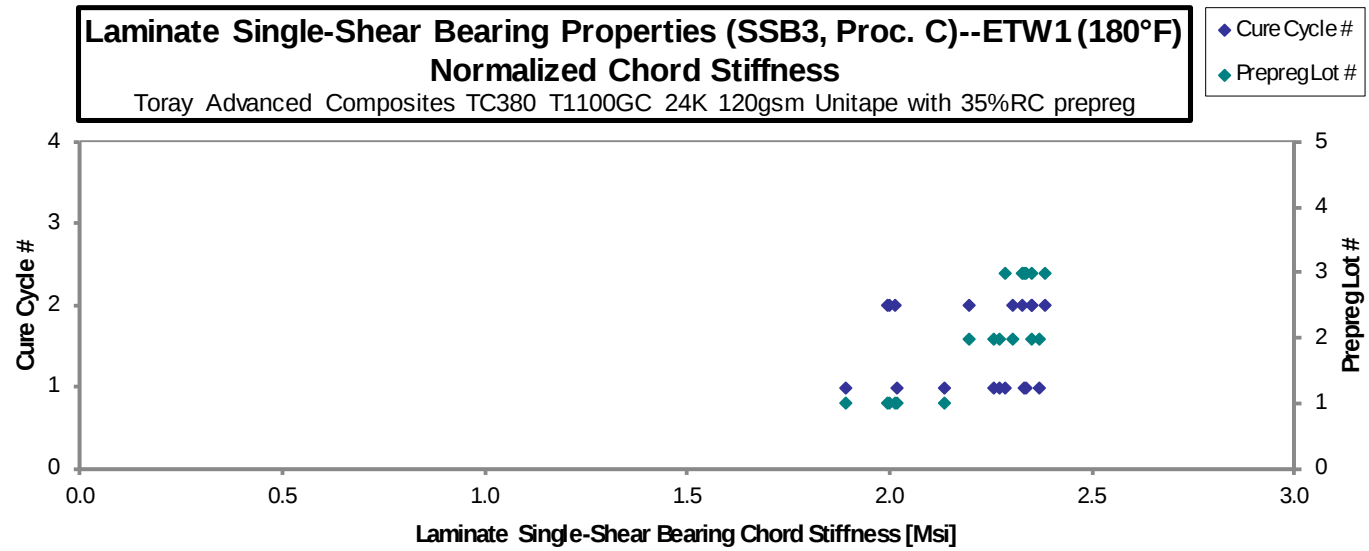
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD3A111D	A	C1	1	1	106.1	122.9	2.225	0.09208	20	B1I
TCD3A112D	A	C1	1	1	98.68	114.5	1.972	0.09198	20	B1I
TCD3A113D	A	C1	1	1	103.1	122.9	2.126	0.09098	20	B1I
TCD3A211D	A	C2	1	2	102.6	117.6	2.076	0.09300	20	B1I
TCD3A212D	A	C2	1	2	99.75	123.8	2.070	0.09277	20	B1I
TCD3A213D	A	C2	1	2	106.7	115.6	2.067	0.09250	20	B1I
TCD3B111D	B	C1	2	1	94.64	115.3	2.364	0.09227	20	B1I
TCD3B112D	B	C1	2	1	97.38	119.3	2.349	0.09208	20	B1I
TCD3B113D	B	C1	2	1	101.9	118.6	2.522	0.09023	20	B1I
TCD3B211D	B	C2	2	2	92.12	110.7	2.286	0.09225	20	B1I
TCD3B212D	B	C2	2	2	101.4	126.3	2.444	0.09233	20	B1I
TCD3B213D	B	C2	2	2	95.53	119.7	2.444	0.09037	20	B1I
TCD3C111D	C	C1	3	1	91.47	115.8	2.424	0.09227	20	B1I
TCD3C113D	C	C1	3	1	104.6	122.4	2.485	0.08825	20	B1I
TCD3C114D	C	C1	3	1	100.0	115.8	2.379	0.09423	20	B1I
TCD3C211D	C	C2	3	2	107.1	118.4	2.278	0.1004	20	B1I
TCD3C212D	C	C2	3	2	115.3	130.1	2.424	0.09213	20	B1I
TCD3C213D	C	C2	3	2	91.89	112.7	2.399	0.09393	20	B1I

Avg. t _{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.004604	101.8	117.9	2.134
0.004599	94.56	109.7	1.890
0.004549	97.73	116.5	2.015
0.004650	99.40	113.9	2.011
0.004638	96.39	119.7	2.000
0.004625	102.9	111.4	1.992
0.004613	90.96	110.8	2.272
0.004604	93.41	114.4	2.254
0.004512	95.75	111.5	2.370
0.004613	88.52	106.4	2.197
0.004617	97.54	121.5	2.351
0.004518	89.92	112.7	2.301
0.004613	87.91	111.3	2.329
0.004413	96.17	112.5	2.284
0.004712	98.20	113.7	2.335
0.005022	112.1	123.8	2.383
0.004607	110.7	124.9	2.326
0.004697	89.92	110.2	2.348

Average	100.6	119.0	2.296
Standard Dev.	6.248	4.973	0.1679
Coeff. of Var. [%]	6.212	4.178	7.310
Min.	91.47	110.7	1.972
Max.	115.3	130.1	2.522
Number of Spec.	18	18	18

Average _{norm}	0.004623	96.88	114.6	2.211
Standard Dev _{norm}		6.827	5.106	0.1599
Coeff. of Var. [%] _{norm}		7.047	4.455	7.235
Min.	0.004413	87.91	106.4	1.890
Max.	0.005022	112.1	124.9	2.383
Number of Spec.	18	18	18	18





Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW2 (250°F)
Strength & Chord Stiffness

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

t_{ply} [in]

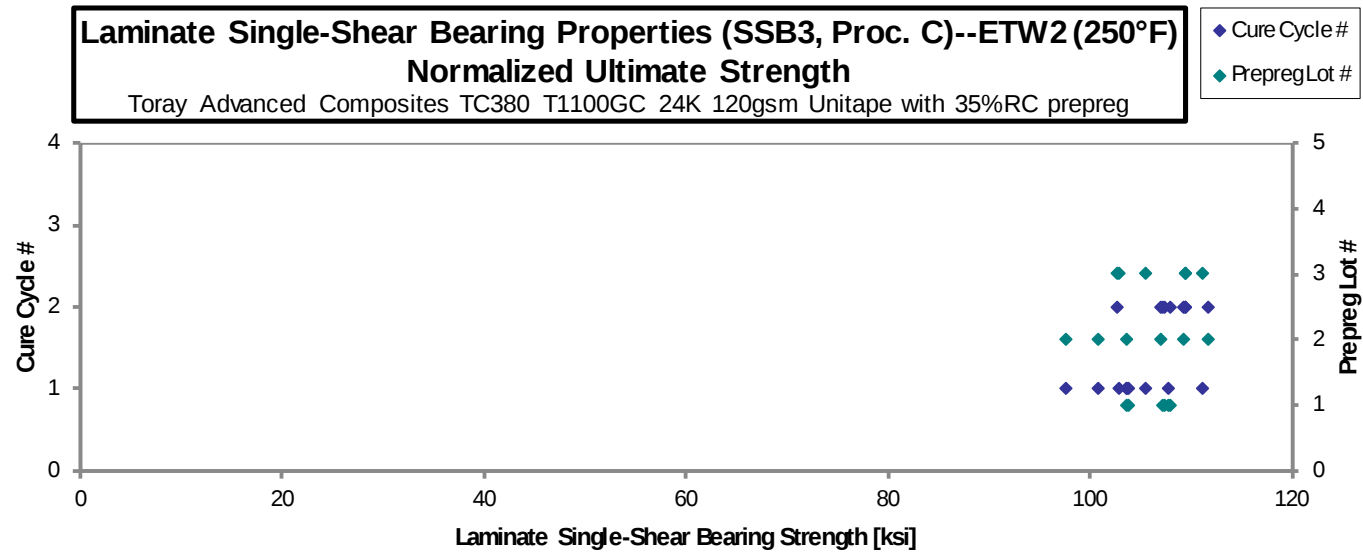
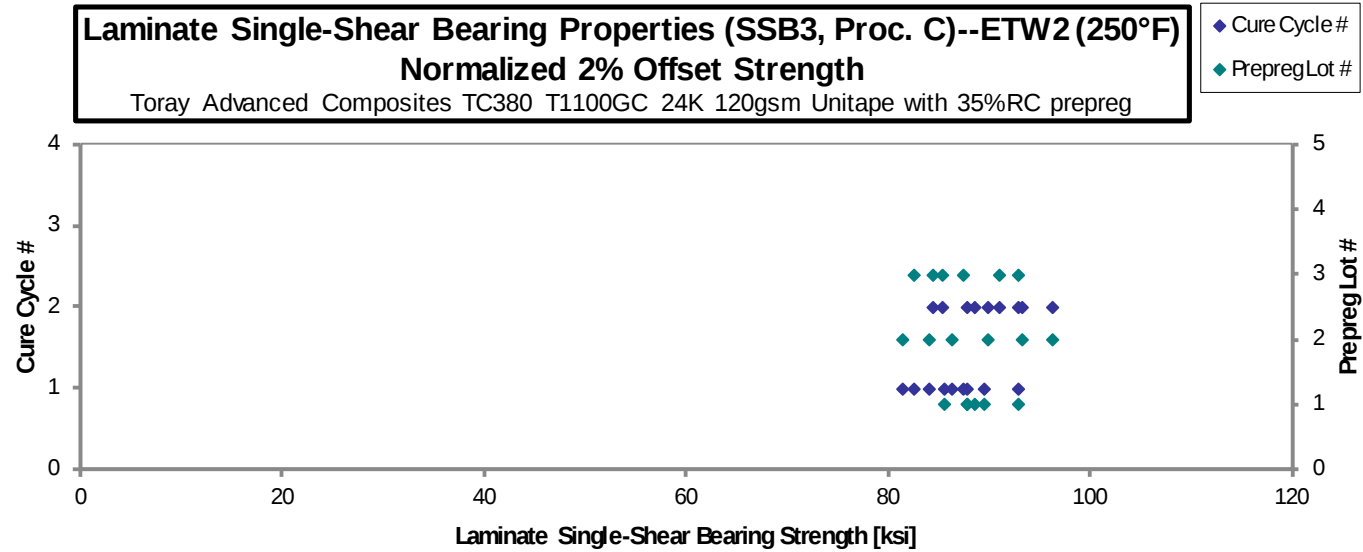
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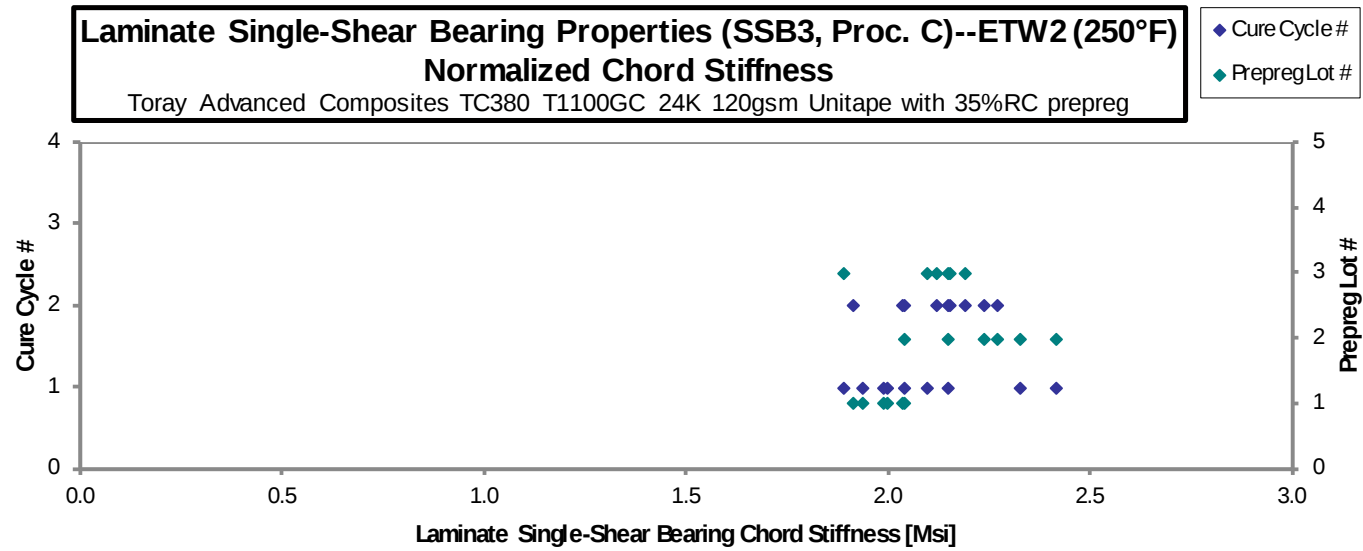
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCD3A111E	A	C1	1	1	85.27	103.4	1.980	0.09637	20	B1I
TCD3A112E	A	C1	1	1	88.49	108.8	1.952	0.09522	20	B1I
TCD3A113E	A	C1	1	1	89.63	103.8	1.999	0.09595	20	B1I
TCD3A211E	A	C2	1	2	88.50	107.1	1.914	0.09610	20	B1I
TCD3A212E	A	C2	1	2	87.40	106.8	2.028	0.09643	20	B1I
TCD3A213E	A	C2	1	2	92.67	107.7	2.039	0.09620	20	B1I
TCD3B111E	B	C1	2	1	77.92	96.43	2.312	0.1004	20	B1I
TCD3B112E	B	C1	2	1	82.68	99.25	2.232	0.1002	20	B1I
TCD3B113E	B	C1	2	1	80.37	93.26	1.951	0.1005	20	B1I
TCD3B211E	B	C2	2	2	86.32	102.6	2.177	0.1001	20	B1I
TCD3B212E	B	C2	2	2	92.04	104.5	2.143	0.1004	20	B1I
TCD3B213E	B	C2	2	2	89.90	107.7	2.072	0.09962	20	B1I
TCD3C111E	C	C1	3	1	84.66	102.0	2.027	0.09928	20	B1I
TCD3C112E	C	C1	3	1	79.85	99.37	2.076	0.09932	20	B1I
TCD3C113E	C	C1	3	1	90.29	107.9	1.836	0.09885	20	B1I
TCD3C211E	C	C2	3	2	82.67	106.0	2.121	0.09912	20	B1I
TCD3C212E	C	C2	3	2	82.04	99.62	2.089	0.09890	20	B1I
TCD3C213E	C	C2	3	2	88.11	105.9	2.052	0.09927	20	B1I

Avg. t _{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.004818	85.59	103.8	1.988
0.004761	87.77	107.9	1.936
0.004798	89.58	103.7	1.998
0.004805	88.59	107.2	1.916
0.004822	87.80	107.3	2.038
0.004810	92.86	108.0	2.043
0.005021	81.50	100.9	2.418
0.005008	86.27	103.6	2.328
0.005024	84.13	97.62	2.042
0.005004	89.99	107.0	2.269
0.005018	96.23	109.3	2.240
0.004981	93.29	111.7	2.150
0.004964	87.56	105.5	2.096
0.004966	82.61	102.8	2.148
0.004943	92.98	111.1	1.890
0.004956	85.35	109.5	2.189
0.004945	84.52	102.6	2.152
0.004963	91.11	109.5	2.122

Average 86.05 103.5 2.055
Standard Dev. 4.351 4.390 0.1152
Coeff. of Var. [%] 5.056 4.243 5.603
Min. 77.92 93.26 1.836
Max. 92.67 108.8 2.312
Number of Spec. 18 18 18

Average_{norm} 0.004923 88.21 106.0 2.109
Standard Dev._{norm} 4.017 3.754 0.1443
Coeff. of Var. [%]_{norm} 4.555 3.540 6.844
Min. 0.004761 81.50 97.62 1.890
Max. 0.005024 96.23 111.7 2.418
Number of Spec. 18 18 18 18





4.30 “25/50/25” Compression After Impact 1 Properties (CAI1)

**Laminate Compression After Impact 1 Properties (CAI1)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

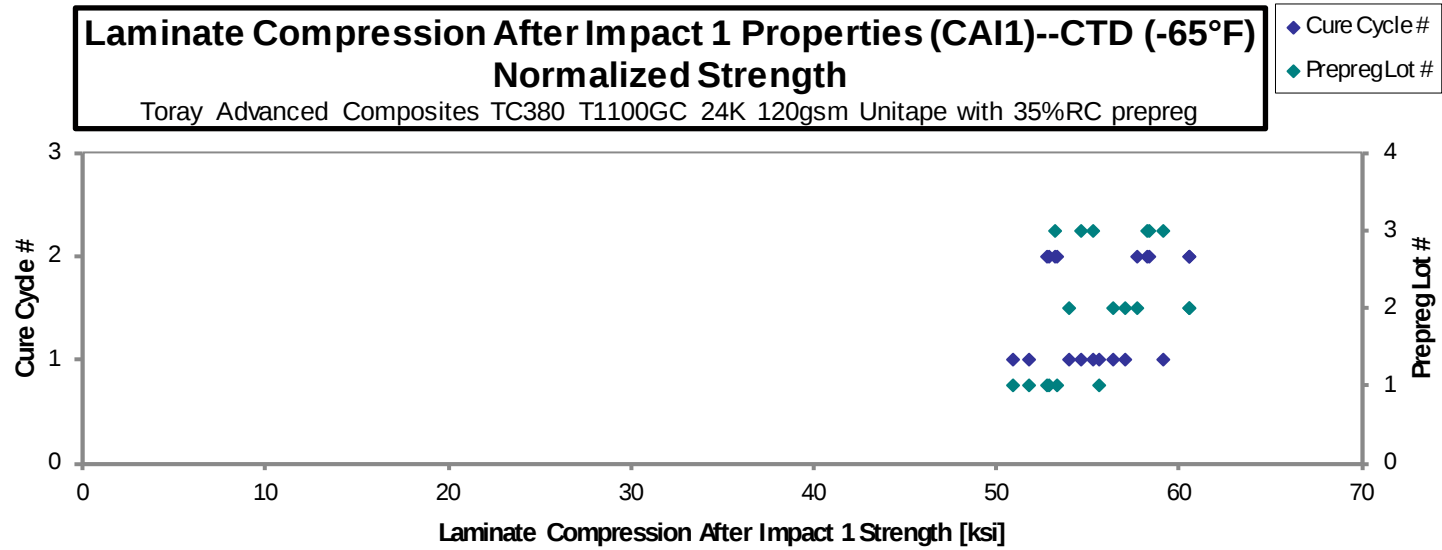
 t_{ply} [in]

0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDKA111B	A	C1	1	1	51.75	284.4	0.1890	40	LDM	0.004725	50.94
TCDKA112B	A	C1	1	1	55.78	284.5	0.1914	40	LDM	0.004784	55.59
TCDKA113B	A	C1	1	1	51.98	286.5	0.1913	40	M(A,L)DM	0.004783	51.80
TCDKA211B	A	C2	1	2	54.17	279.5	0.1874	40	M(A,L)DM	0.004684	52.86
TCDKA212B	A	C2	1	2	52.27	288.6	0.1937	40	M(A,L)DM	0.004843	52.75
TCDKA213B	A	C2	1	2	55.16	279.9	0.1858	40	M(A,L)DM	0.004645	53.38
TCDKB111B	B	C1	2	1	53.26	293.3	0.1946	40	M(A,L)DM	0.004864	53.96
TCDKB112B	B	C1	2	1	53.55	303.9	0.2022	40	M(A,L)DM	0.005055	56.39
TCDKB113B	B	C1	2	1	56.80	290.2	0.1930	40	M(A,L)DM	0.004825	57.10
TCDKB211B	B	C2	2	2	56.82	291.9	0.1951	40	M(A,L)DM	0.004878	57.74
TCDKB212B	B	C2	2	2	57.22	304.3	0.2033	40	M(A,L)DM	0.005083	60.60
TCDKB213B	B	C2	2	2	60.27	289.1	0.1930	40	M(A,L)DM	0.004825	60.58
TCDKC111B	C	C1	3	1	55.12	288.7	0.1926	40	LDM	0.004815	55.29
TCDKC112B	C	C1	3	1	56.73	302.7	0.2003	40	LDM	0.005008	59.19
TCDKC113B	C	C1	3	1	54.94	287.7	0.1909	40	LDM	0.004771	54.61
TCDKC211B	C	C2	3	2	56.51	295.7	0.1985	40	LDM	0.004962	58.42
TCDKC212B	C	C2	3	2	55.68	302.9	0.2010	40	LDM	0.005025	58.29
TCDKC213B	C	C2	3	2	50.94	301.1	0.2007	40	LDM	0.005018	53.26

Average 54.94
 Standard Dev. 2.364
 Coeff. of Var. [%] 4.302
 Min. 50.94
 Max. 60.27
 Number of Spec. 18

Average_{norm} 0.004866 55.71
 Standard Dev._{norm} 2.981
 Coeff. of Var. [%]_{norm} 5.350
 Min. 0.004645 50.94
 Max. 0.005083 60.60
 Number of Spec. 18 18



Laminate Compression After Impact 1 Properties (CAI1)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

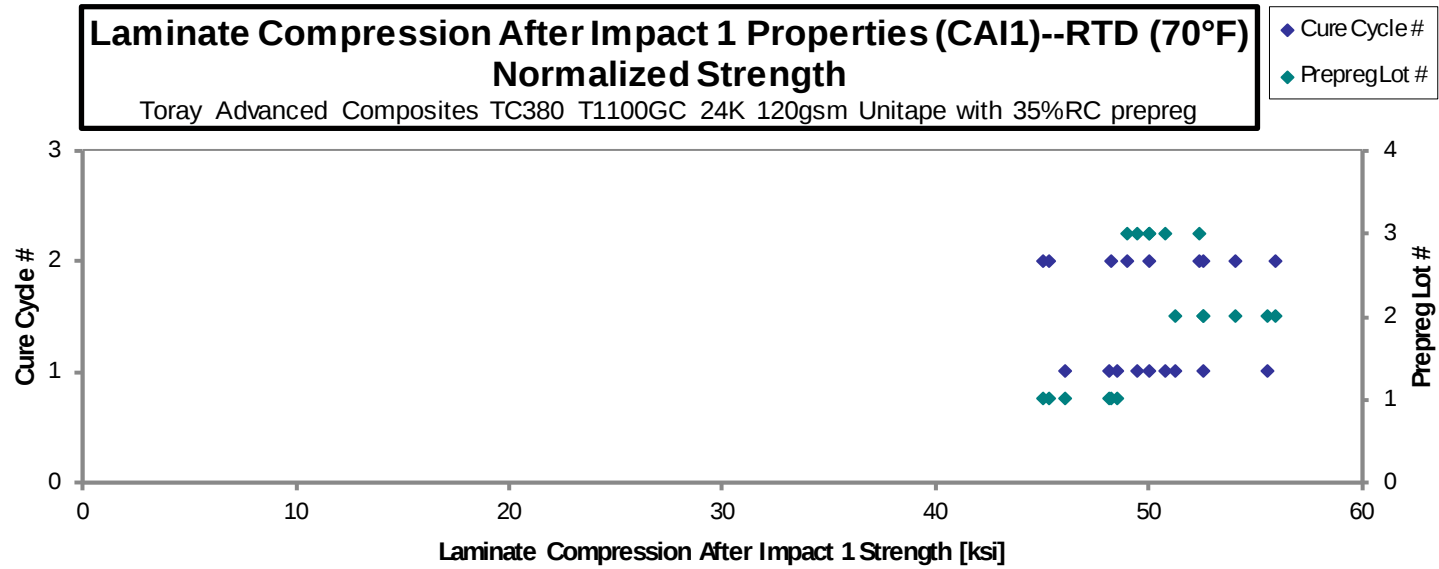
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDKA111A	A	C1	1	1	47.47	282.4	0.1866	40	M(A,L)DM	0.004664	46.13
TCDKA112A	A	C1	1	1	49.22	282.2	0.1879	40	M(A,L)DM	0.004698	48.17
TCDKA113A	A	C1	1	1	49.30	282.6	0.1890	40	M(A,L)DM	0.004724	48.52
TCDKA211A	A	C2	1	2	46.98	275.0	0.1843	40	M(A,L)DM	0.004608	45.10
TCDKA212A	A	C2	1	2	45.78	283.2	0.1902	40	M(A,L)DM	0.004754	45.34
TCDKA213A	A	C2	1	2	49.13	285.4	0.1886	40	M(A,L)DM	0.004714	48.25
TCDKB111A	B	C1	2	1	55.69	288.6	0.1917	40	M(A,L)DM	0.004793	55.61
TCDKB112A	B	C1	2	1	51.00	297.1	0.1980	40	M(A,L)DM	0.004949	52.59
TCDKB113A	B	C1	2	1	50.40	288.2	0.1953	40	M(A,L)DM	0.004882	51.26
TCDKB211A	B	C2	2	2	54.40	287.4	0.1910	40	M(A,L)DM	0.004774	54.11
TCDKB212A	B	C2	2	2	55.16	293.0	0.1947	40	M(A,L)DM	0.004868	55.93
TCDKB213A	B	C2	2	2	51.77	291.9	0.1948	40	M(A,L)DM	0.004871	52.54
TCDKC111A	C	C1	3	1	49.85	286.1	0.1904	40	LDM	0.004760	49.44
TCDKC112A	C	C1	3	1	48.76	297.7	0.1971	40	LDM	0.004926	50.04
TCDKC113A	C	C1	3	1	50.25	290.1	0.1941	40	LDM	0.004851	50.79
TCDKC211A	C	C2	3	2	48.71	291.5	0.1930	40	LDM	0.004825	48.97
TCDKC212A	C	C2	3	2	49.24	291.7	0.1950	40	LDM	0.004876	50.02
TCDKC213A	C	C2	3	2	51.88	291.0	0.1939	40	LDM	0.004848	52.40

Average 50.28
 Standard Dev. 2.699
 Coeff. of Var. [%] 5.369
 Min. 45.78
 Max. 55.69
 Number of Spec. 18

Average_{norm} 0.004799 50.29
 Standard Dev._{norm} 3.198
 Coeff. of Var. [%]_{norm} 6.358
 Min. 0.004608 45.10
 Max. 0.004949 55.93
 Number of Spec. 18 18



4.31 “10/80/10” Compression After Impact 2 Properties (CAI2)

**Laminate Compression After Impact 2 Properties (CAI2)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

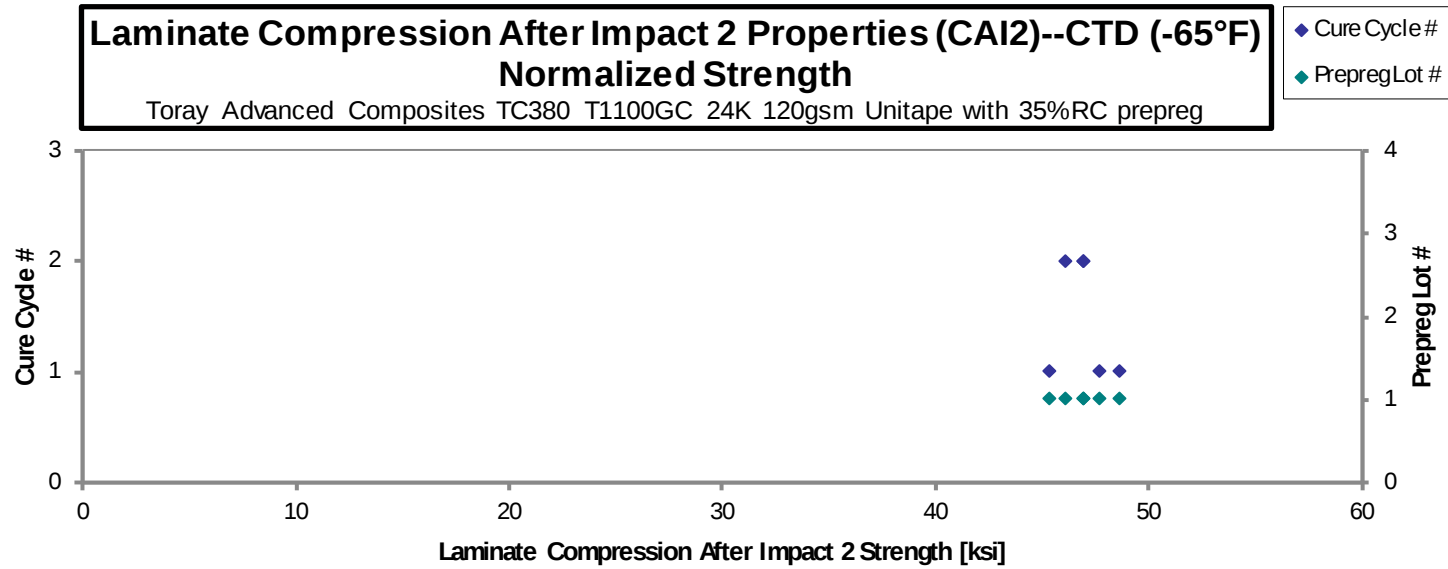
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDOA111B	A	C1	1	1	46.29	278.8	0.1879	40	M(A,L)DM	0.004697	45.30
TCDOA112B	A	C1	1	1	49.05	284.6	0.1901	40	M(A,L)DM	0.004753	48.57
TCDOA113B	A	C1	1	1	47.98	284.3	0.1906	40	M(A,L)DM	0.004766	47.64
TCDOA211B	A	C2	1	2	47.76	285.7	0.1887	40	M(A,L)DM	0.004718	46.95
TCDOA212B	A	C2	1	2	46.08	288.8	0.1919	40	M(A,L)DM	0.004797	46.05
TCDOA213B	A	C2	1	2	47.99	282.7	0.1878	40	M(A,L)DM	0.004694	46.94

Average 47.53
 Standard Dev. 1.132
 Coeff. of Var. [%] 2.382
 Min. 46.08
 Max. 49.05
 Number of Spec. 6

Average_{norm} 0.004737 46.91
 Standard Dev._{norm} 1.148
 Coeff. of Var. [%]_{norm} 2.448
 Min. 0.004694 45.30
 Max. 0.004797 48.57
 Number of Spec. 6 6



Laminate Compression After Impact 2 Properties (CAI2)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

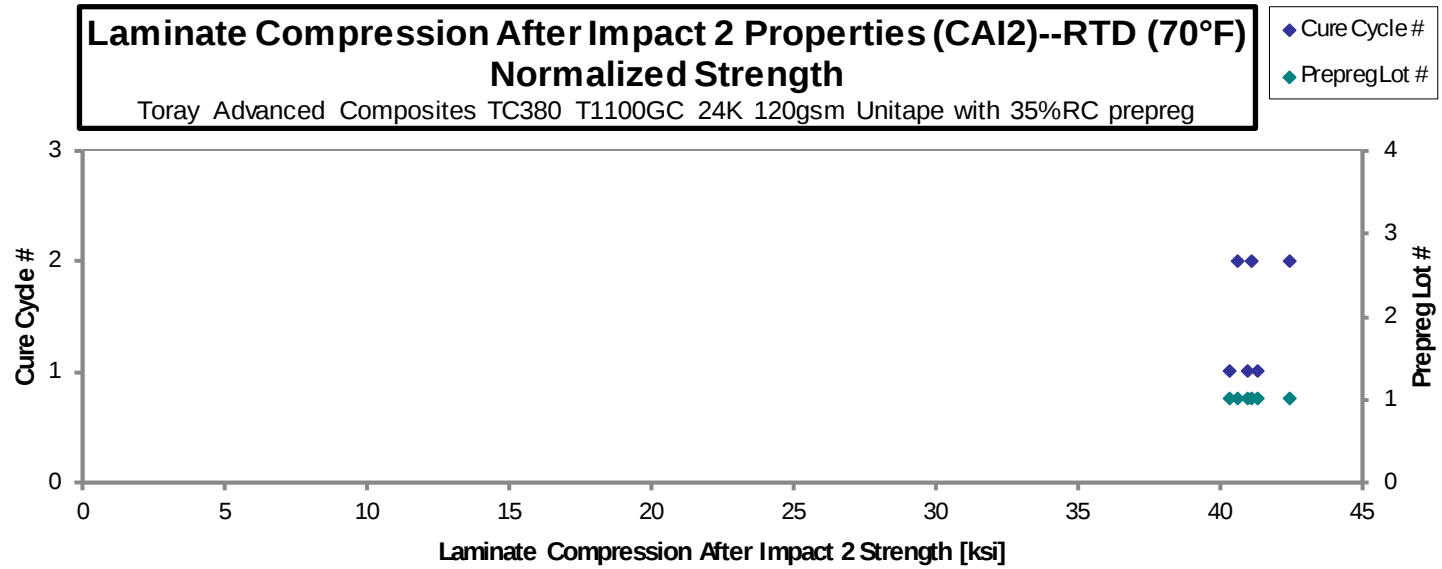
t_{ply} [in]

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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDOA111A	A	C1	1	1	41.56	280.1	0.1863	40	M(A,L)DM	0.004656	40.31
TCDOA112A	A	C1	1	1	42.39	280.1	0.1871	40	M(A,L)DM	0.004678	41.31
TCDOA113A	A	C1	1	1	41.83	280.6	0.1880	40	M(A,L)DM	0.004700	40.96
TCDOA211A	A	C2	1	2	42.12	281.8	0.1875	40	M(A,L)DM	0.004688	41.13
TCDOA212A	A	C2	1	2	42.98	286.2	0.1897	40	M(A,L)DM	0.004742	42.46
TCDOA213A	A	C2	1	2	41.05	286.7	0.1900	40	M(A,L)DM	0.004749	40.61

Average 41.99
 Standard Dev. 0.6724
 Coeff. of Var. [%] 1.601
 Min. 41.05
 Max. 42.98
 Number of Spec. 6

Average_{norm} 0.004702 41.13
 Standard Dev._{norm} 0.7449
 Coeff. of Var. [%]_{norm} 1.811
 Min. 0.004656 40.31
 Max. 0.004749 42.46
 Number of Spec. 6 6



4.32 “50/40/10” Compression After Impact 3 Properties (CAI3)

**Laminate Compression After Impact 3 Properties (CAI3)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

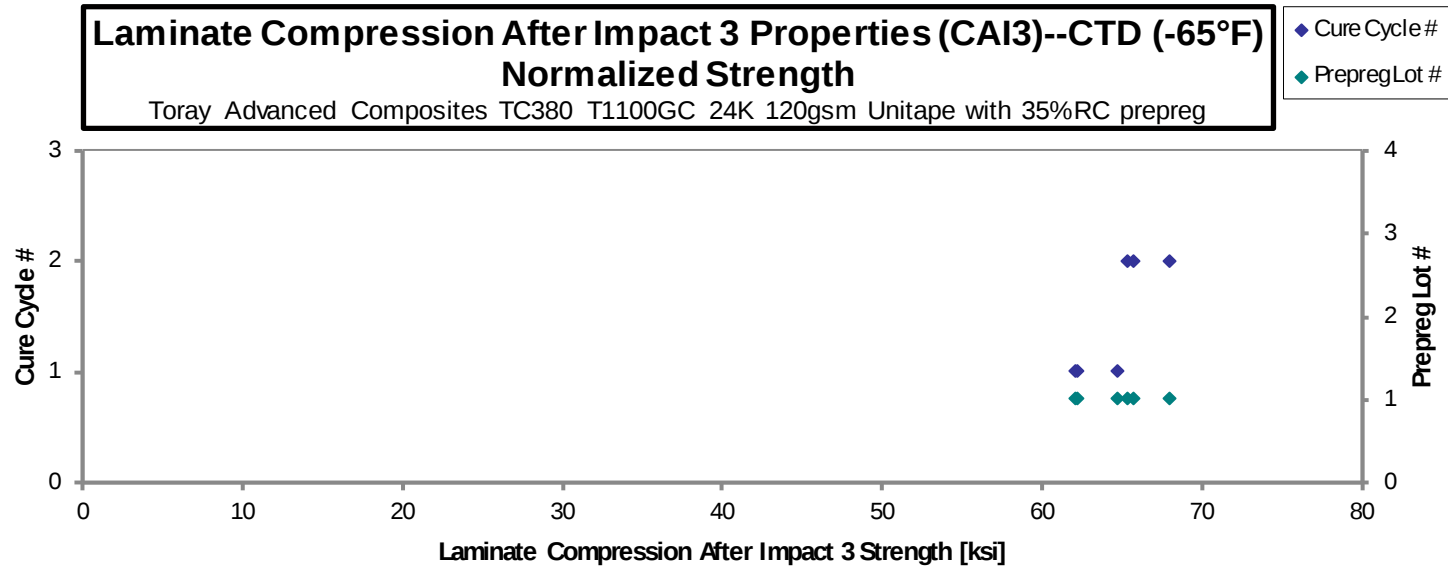
 t_{ply} [in]

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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCDPA111B	A	C1	1	1	63.70	294.3	0.1950	40	M(A,L)DM	0.004874	64.69
TCDPA112B	A	C1	1	1	60.50	294.1	0.1974	40	M(A,L)DM	0.004934	62.19
TCDPA113B	A	C1	1	1	60.16	292.7	0.1980	40	M(A,L)DM	0.004949	62.03
TCDPA211B	A	C2	1	2	65.04	289.1	0.1939	40	M(A,L)DM	0.004848	65.69
TCDPA212B	A	C2	1	2	66.51	294.0	0.1963	40	M(A,L)DM	0.004908	68.01
TCDPA213B	A	C2	1	2	64.99	289.1	0.1930	40	M(A,L)DM	0.004825	65.33

Average 63.48
 Standard Dev. 2.602
 Coeff. of Var. [%] 4.098
 Min. 60.16
 Max. 66.51
 Number of Spec. 6

Average_{norm} 0.004890 64.65
 Standard Dev._{norm} 2.268
 Coeff. of Var. [%]_{norm} 3.508
 Min. 0.004825 62.03
 Max. 0.004949 68.01
 Number of Spec. 6 6



Laminate Compression After Impact 3 Properties (CAI3)--RTD (70°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing

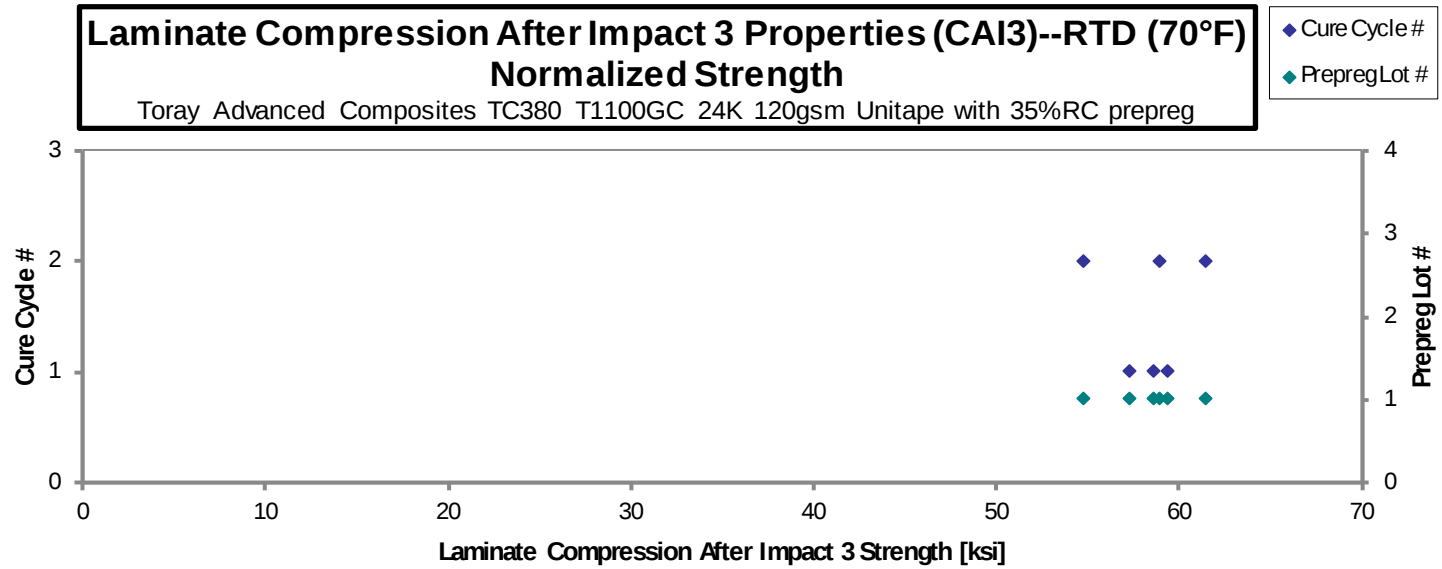
t_{ply} [in]

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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t _{ply} [in]	Strength _{norm} [ksi]
TCDPA111A	A	C1	1	1	57.60	286.9	0.1907	40	LDM	0.004768	57.23
TCDPA112A	A	C1	1	1	58.96	289.0	0.1931	40	M(A,L)DM	0.004828	59.30
TCDPA113A	A	C1	1	1	58.11	288.2	0.1936	40	M(A,L)DM	0.004840	58.59
TCDPA211A	A	C2	1	2	59.38	286.7	0.1906	40	M(A,L)DM	0.004764	58.93
TCDPA212A	A	C2	1	2	54.73	287.1	0.1921	40	LDM	0.004801	54.74
TCDPA213A	A	C2	1	2	61.07	287.2	0.1933	40	LDM	0.004831	61.47

Average 58.31
 Standard Dev. 2.123
 Coeff. of Var. [%] 3.641
 Min. 54.73
 Max. 61.07
 Number of Spec. 6

Average_{norm} 0.004805 58.38
 Standard Dev._{norm} 2.248
 Coeff. of Var. [%]_{norm} 3.851
 Min. 0.004764 54.74
 Max. 0.004840 61.47
 Number of Spec. 6 6



4.33 Interlaminar Tension Properties (ILT)

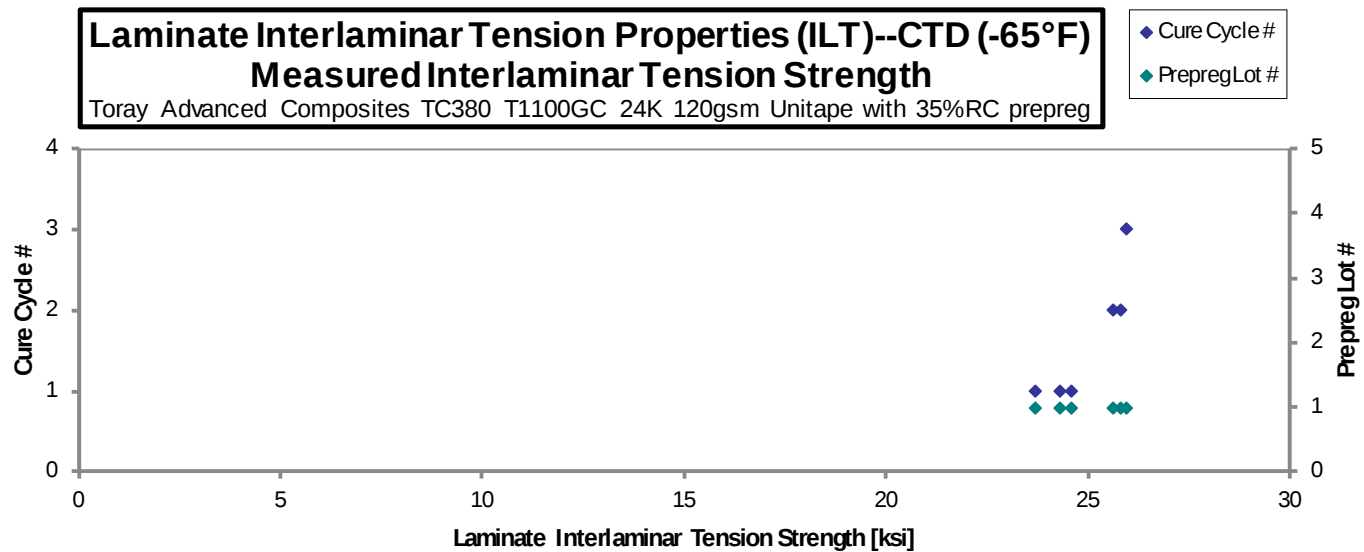
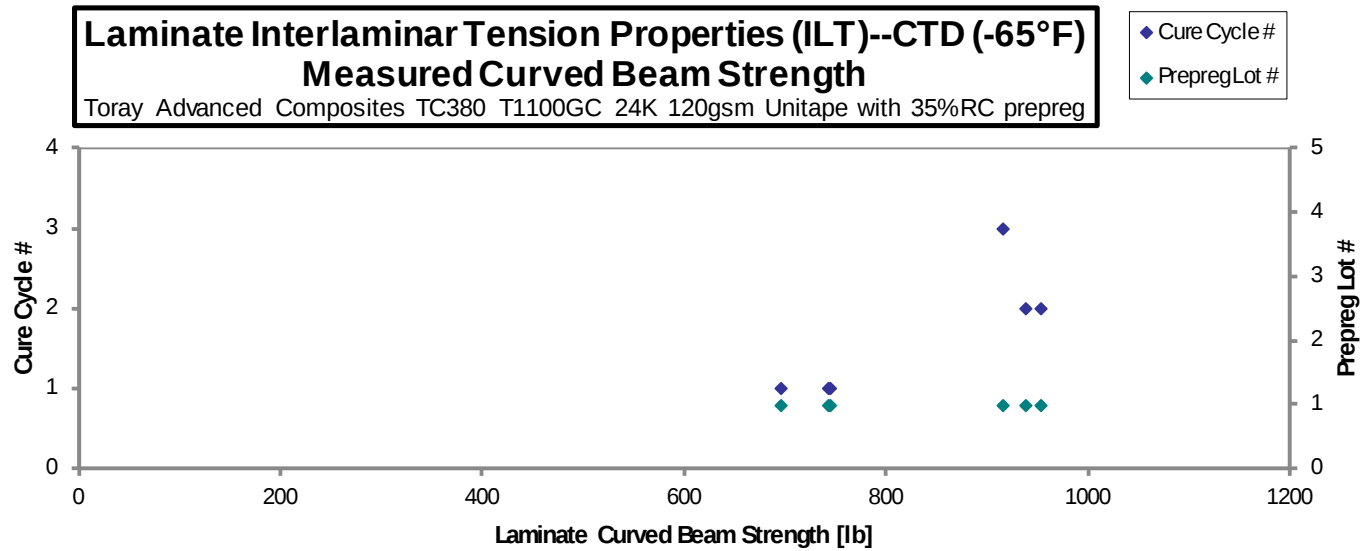
Laminate Interlaminar Tension Properties (ILT)--CTD (-65°F) Strength

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDMA111B*	A	C1	1	1	695.0	23.69	0.1408	32	0.004399	INTERLAMINAR TENSILE FAILURE
TCDMA112B*	A	C1	1	1	741.9	24.30	0.1456	32	0.004551	INTERLAMINAR TENSILE FAILURE
TCDMA113B*	A	C1	1	1	743.6	24.57	0.1446	32	0.004517	INTERLAMINAR TENSILE FAILURE
TCDMA211B*	A	C2	1	2	938.0	25.61	0.1696	32	0.005301	INTERLAMINAR TENSILE FAILURE, OUTER PLYS FAILURE AT LEGS
TCDMA213B*	A	C2	1	2	953.8	25.82	0.1709	32	0.005339	INTERLAMINAR TENSILE FAILURE, OUTER PLYS FAILURE AT LEGS
TCDMA311B*	A	C3	1	3	914.5	25.92	0.1644	32	0.005138	INTERLAMINAR TENSILE FAILURE, OUTER PLYS FAILURE AT CURVE AND LEGS

* Cross head displacement exceeds 0.2in.

Average	831.1	24.98	0.004874
Standard Dev.	116.3	0.9241	
Coeff. of Var. [%]	13.99	3.699	
Min.	695.0	23.69	0.004399
Max.	953.8	25.92	0.005339
Number of Spec.	6	6	6



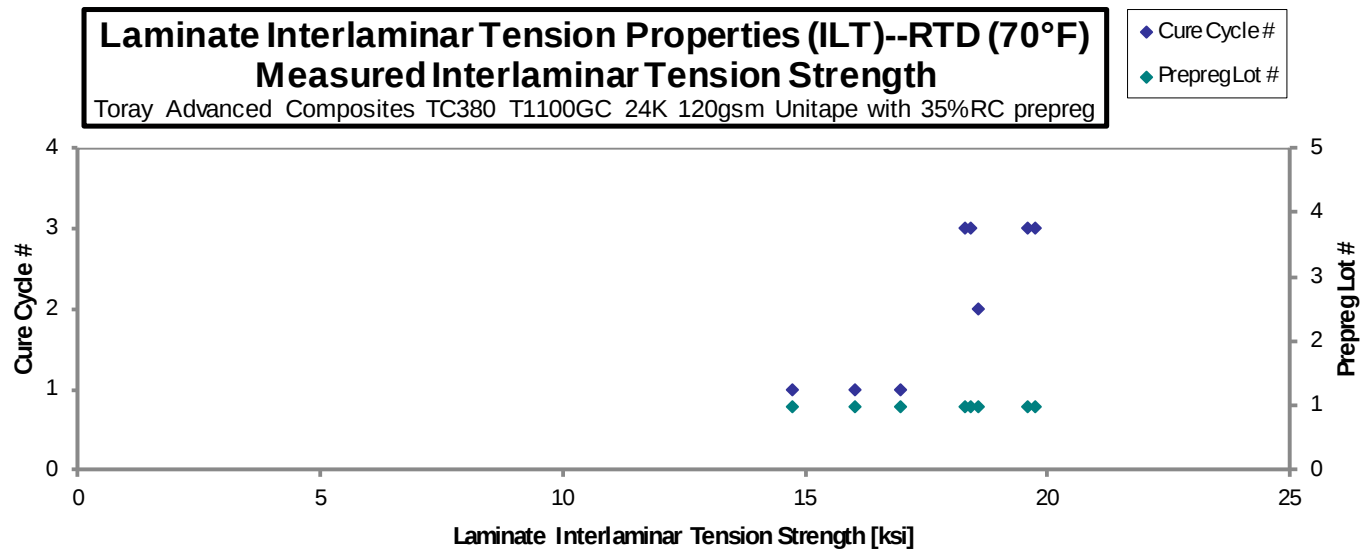
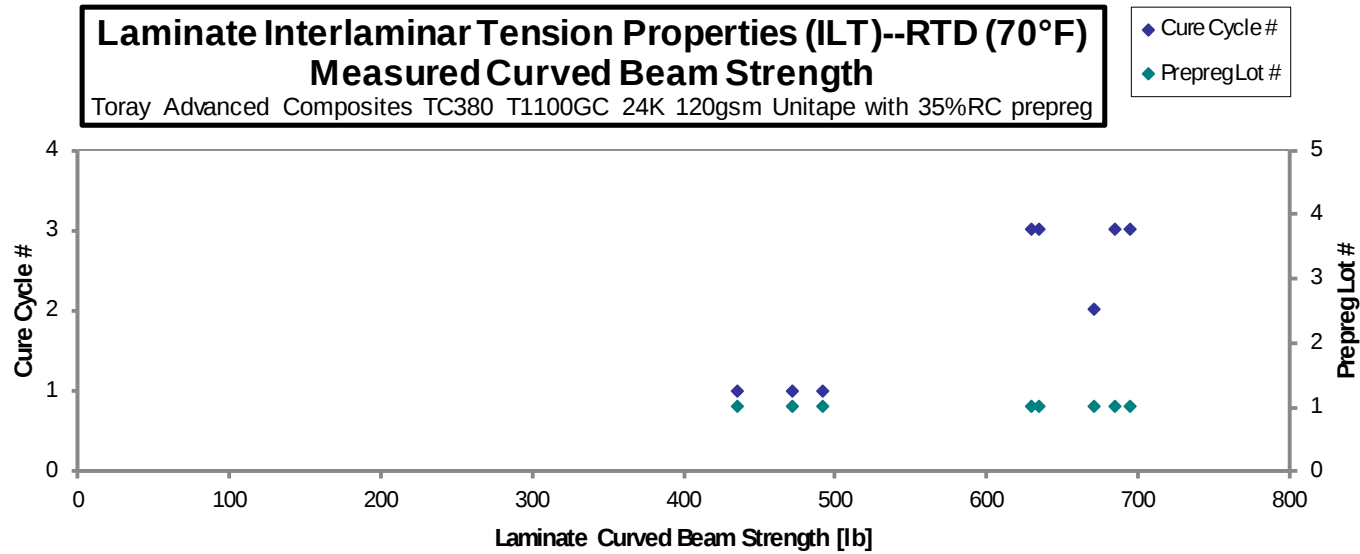
**Laminate Interlaminar Tension Properties (ILT)--RTD (70°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDMA111A*	A	C1	1	1	491.7	16.95	0.1395	32	0.004358	INTERLAMINAR TENSILE FAILURE
TCDMA112A*	A	C1	1	1	434.5	14.73	0.1415	32	0.004421	INTERLAMINAR TENSILE FAILURE
TCDMA113A*	A	C1	1	1	471.5	16.02	0.1412	32	0.004412	INTERLAMINAR TENSILE FAILURE
TCDMA211A*	A	C2	1	2	670.5	18.56	0.1677	32	0.005239	INTERLAMINAR TENSILE FAILURE, COMPRESSION FAILURE AT OUTER LEG
TCDMA311A*	A	C3	1	3	634.5	18.41	0.1612	32	0.005038	INTERLAMINAR TENSILE FAILURE
TCDMA312A*	A	C3	1	3	629.1	18.30	0.1609	32	0.005028	INTERLAMINAR TENSILE FAILURE
TCDMA313A*	A	C3	1	3	683.7	19.57	0.1631	32	0.005097	INTERLAMINAR TENSILE FAILURE
TCDMA314A*	A	C3	1	3	693.8	19.74	0.1639	32	0.005121	INTERLAMINAR TENSILE FAILURE

* Cross head displacement exceeds 0.2in.

Average	588.7	17.78	0.004839
Standard Dev.	105.2	1.750	
Coeff. of Var. [%]	17.86	9.839	
Min.	434.5	14.73	0.004358
Max.	693.8	19.74	0.005239
Number of Spec.	8	8	8

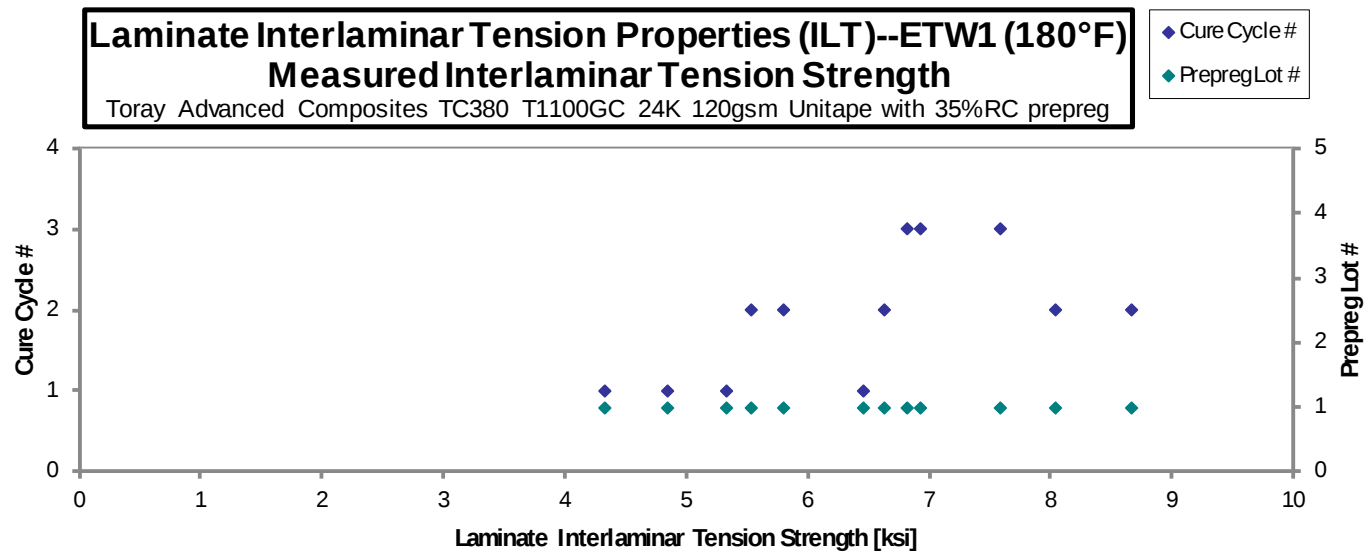
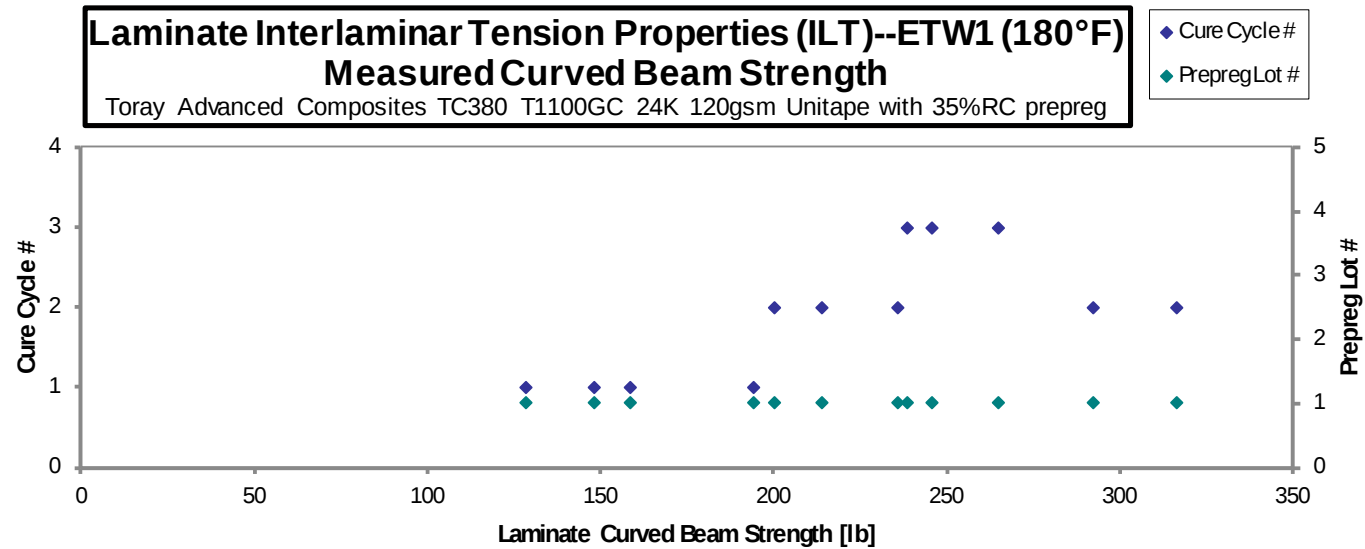


**Laminate Interlaminar Tension Properties (ILT)--ETW1 (180°F)
Strength**

Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDMA111D	A	C1	1	1	158.4	5.334	0.1423	32	0.004445	INTERLAMINAR TENSILE FAILURE
TCDMA112D	A	C1	1	1	194.0	6.467	0.1435	32	0.004483	INTERLAMINAR TENSILE FAILURE
TCDMA113D	A	C1	1	1	128.2	4.340	0.1417	32	0.004427	INTERLAMINAR TENSILE FAILURE
TCDMA114D	A	C1	1	1	147.9	4.856	0.1453	32	0.004541	INTERLAMINAR TENSILE FAILURE
TCDMA211D	A	C2	1	2	214.0	5.802	0.1707	32	0.005333	INTERLAMINAR TENSILE FAILURE
TCDMA212D	A	C2	1	2	316.4	8.681	0.1690	32	0.005280	INTERLAMINAR TENSILE FAILURE
TCDMA213D	A	C2	1	2	235.7	6.632	0.1654	32	0.005170	INTERLAMINAR TENSILE FAILURE
TCDMA214D	A	C2	1	2	292.4	8.048	0.1685	32	0.005266	INTERLAMINAR TENSILE FAILURE
TCDMA215D	A	C2	1	2	200.4	5.537	0.1679	32	0.005248	INTERLAMINAR TENSILE FAILURE
TCDMA311D	A	C3	1	3	245.5	6.937	0.1648	32	0.005151	INTERLAMINAR TENSILE FAILURE
TCDMA312D	A	C3	1	3	238.6	6.824	0.1632	32	0.005100	INTERLAMINAR TENSILE FAILURE
TCDMA313D	A	C3	1	3	265.0	7.601	0.1628	32	0.005088	INTERLAMINAR TENSILE FAILURE

Average	219.7	6.422	0.004961
Standard Dev.	57.47	1.305	
Coeff. of Var. [%]	26.15	20.33	
Min.	128.2	4.340	0.004427
Max.	316.4	8.681	0.005333
Number of Spec.	12	12	12



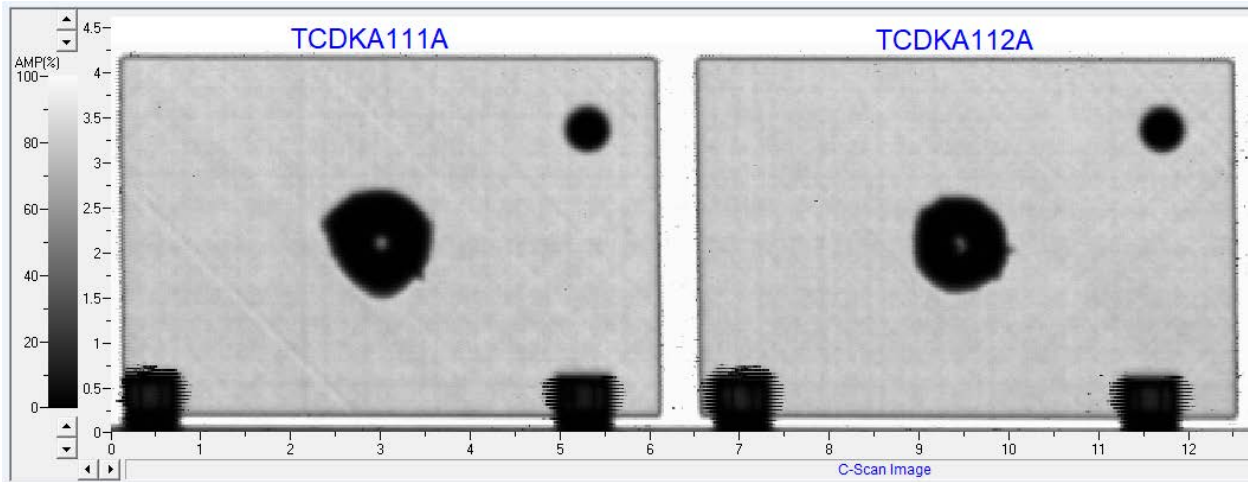
5. Additional Compression After Impact Data

5.1 “25/50/25” Compression After Impact 1 Properties (CAI1)

Target Impact Energy Level: 1500 in-lb/in

Impactor Diameter: 0.625”

Representative of Damage Area:



Damage Area and Dent Depth Summary:

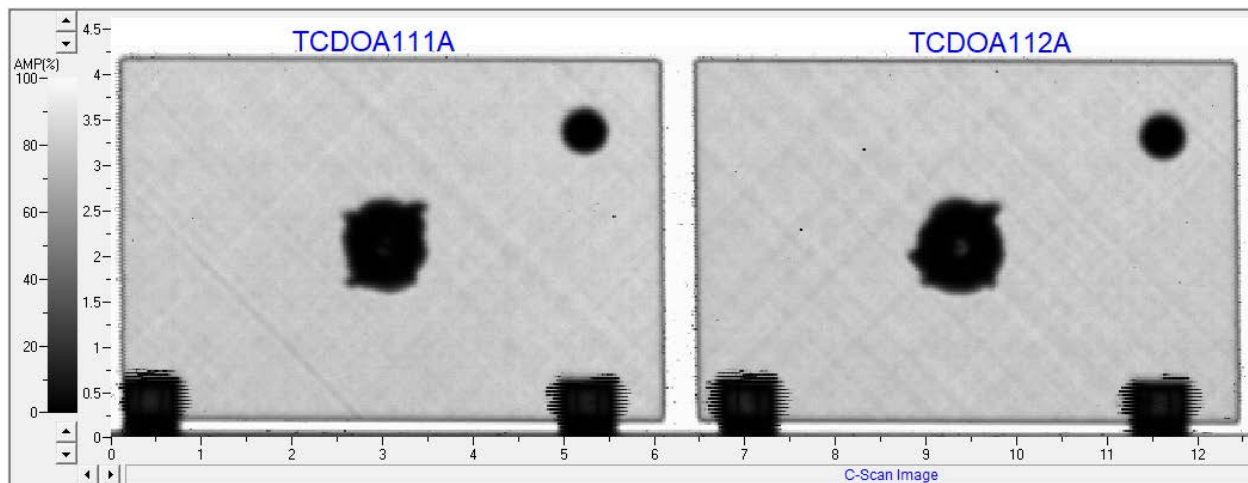
Specimen ID	Damage Area (inch²)	Dent Depth (inch)
TCDKA111B	1.0448	0.0110
TCDKA112B	0.8796	0.0125
TCDKA113B	0.9136	0.0130
TCDKA211B	1.0712	0.0105
TCDKA212B	1.1556	0.0115
TCDKA213B	1.1544	0.0100
TCDKB111B	0.7420	0.0130
TCDKB112B	0.6588	0.0135
TCDKB113B	0.7448	0.0125
TCDKB211B	0.7560	0.0085
TCDKB212B	0.6596	0.0130
TCDKB213B	0.6424	0.0090
TCDKA111A	1.0660	0.0115
TCDKA112A	0.8876	0.0120
TCDKA113A	0.9800	0.0120
TCDKA211A	1.2528	0.0095
TCDKA212A	1.2520	0.0110
TCDKA213A	1.2084	0.0095
TCDKB111A	0.7072	0.0125
TCDKB112A	0.6744	0.0130
TCDKB113A	0.7004	0.0110
TCDKB211A	0.6768	0.0115
TCDKB212A	0.7852	0.0065
TCDKB213A	0.7792	0.0130

5.2 “10/80/10” Compression After Impact 2 Properties (CAI2)

Target Impact Energy Level: 1500 in-lb/in

Impactor Diameter: 0.625”

Representative of Damage Area:



Damage Area and Dent Depth Summary:

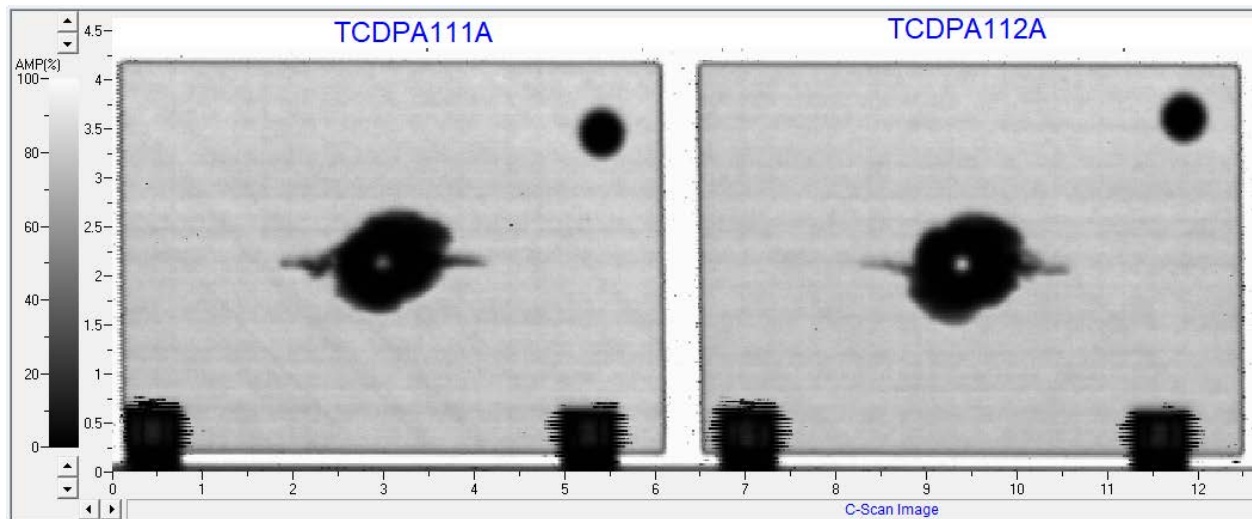
Specimen ID	Damage Area (inch ²)	Dent Depth (inch)
TCDOA111B	0.7844	0.0110
TCDOA112B	0.8660	0.0115
TCDOA113B	0.7708	0.0115
TCDOA211B	0.8628	0.0120
TCDOA212B	0.8048	0.0125
TCDOA213B	0.9120	0.0115
TCDOA111A	0.7920	0.0115
TCDOA112A	0.8260	0.0120
TCDOA113A	0.8720	0.0115
TCDOA211A	0.8224	0.0115
TCDOA212A	0.8312	0.0115
TCDOA213A	0.8320	0.0120

5.3 “50/40/10” Compression After Impact 3 Properties (CAI3)

Target Impact Energy Level: 1500 in-lb/in

Impactor Diameter: 0.625”

Representative of Damage Area:

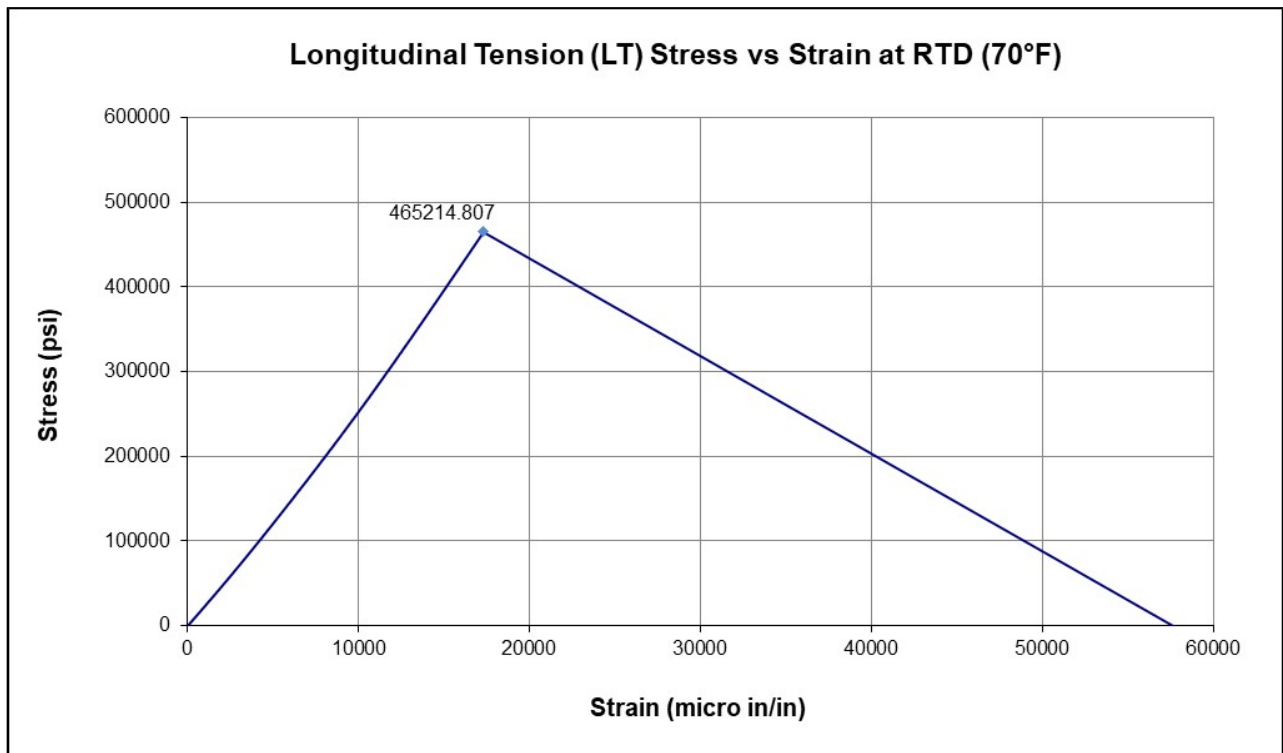
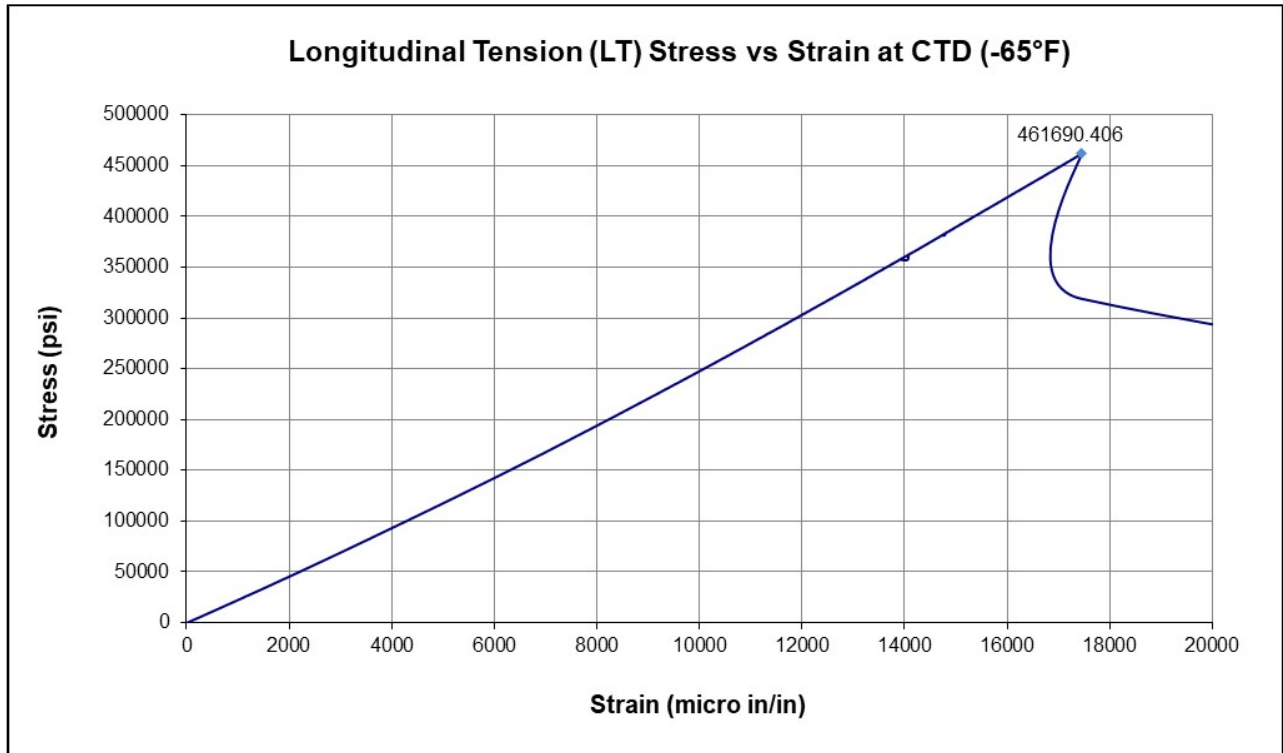


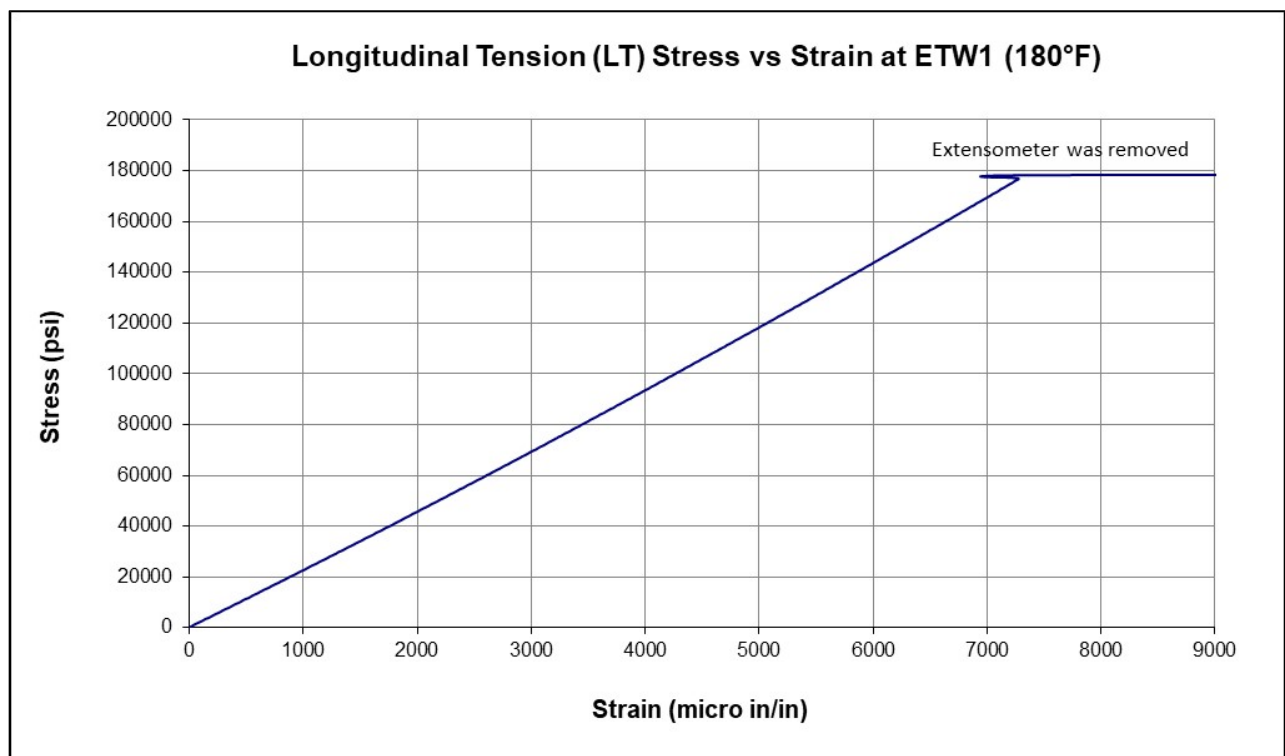
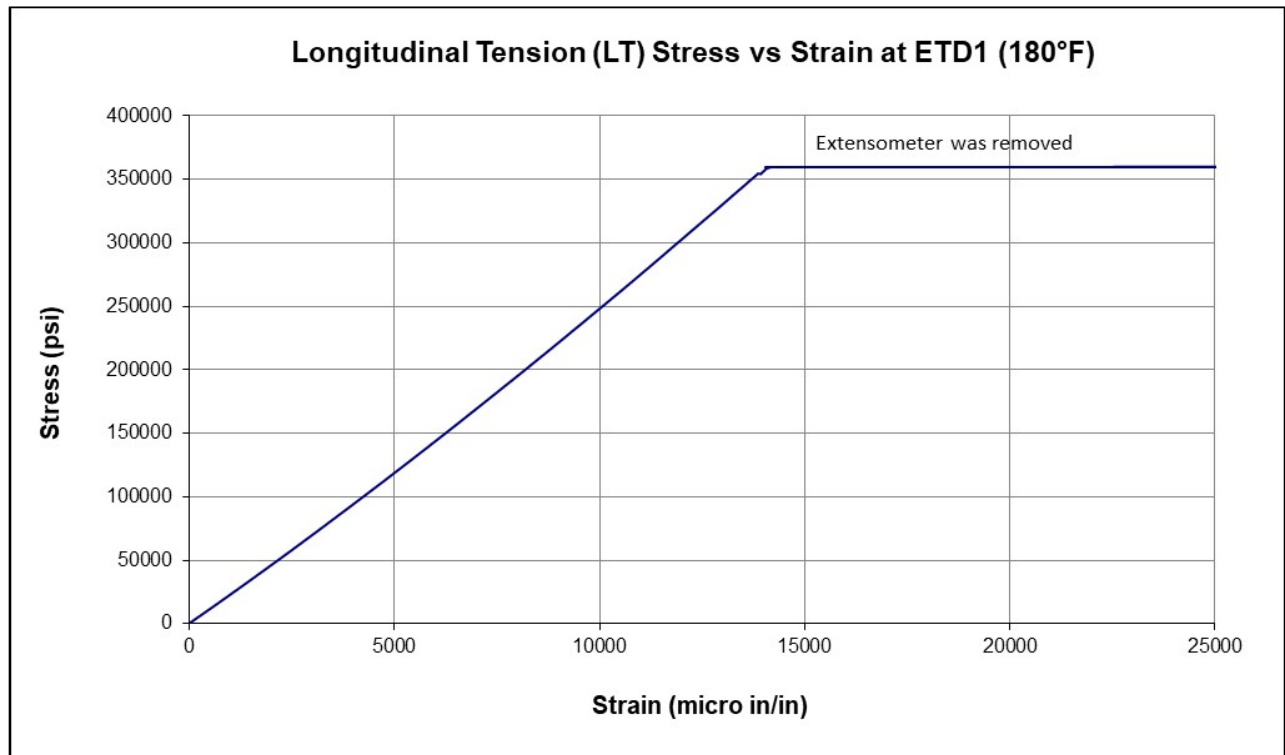
Damage Area and Dent Depth Summary:

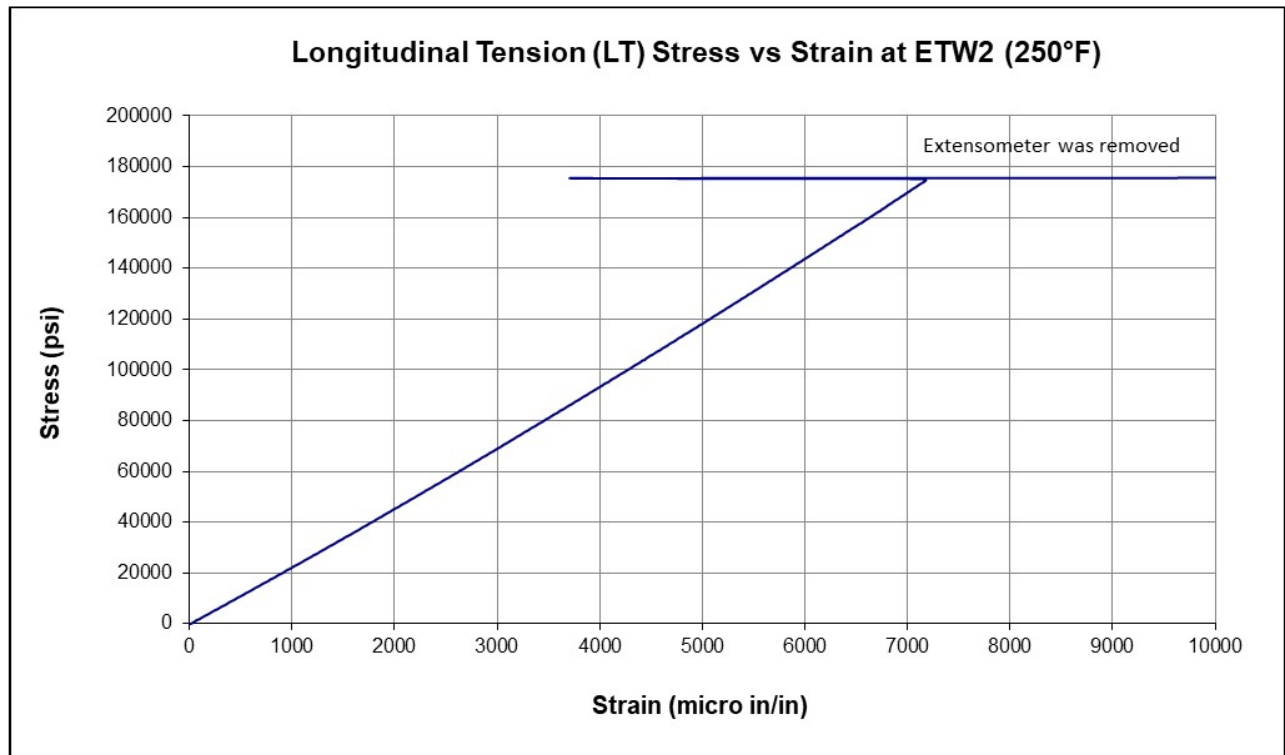
Specimen ID	Damage Area (inch ²)	Dent Depth (inch)
TCDPA111B	0.9836	0.0120
TCDPA112B	1.1072	0.0135
TCDPA113B	1.0256	0.0135
TCDPA211B	1.1628	0.0125
TCDPA212B	1.0388	0.0130
TCDPA213B	1.2008	0.0125
TCDPA111A	1.0996	0.0125
TCDPA112A	1.1044	0.0120
TCDPA113A	1.0260	0.0120
TCDPA211A	1.1764	0.0120
TCDPA212A	1.2404	0.0120
TCDPA213A	1.3116	0.0125

6. Full Stress vs. Strain Curve

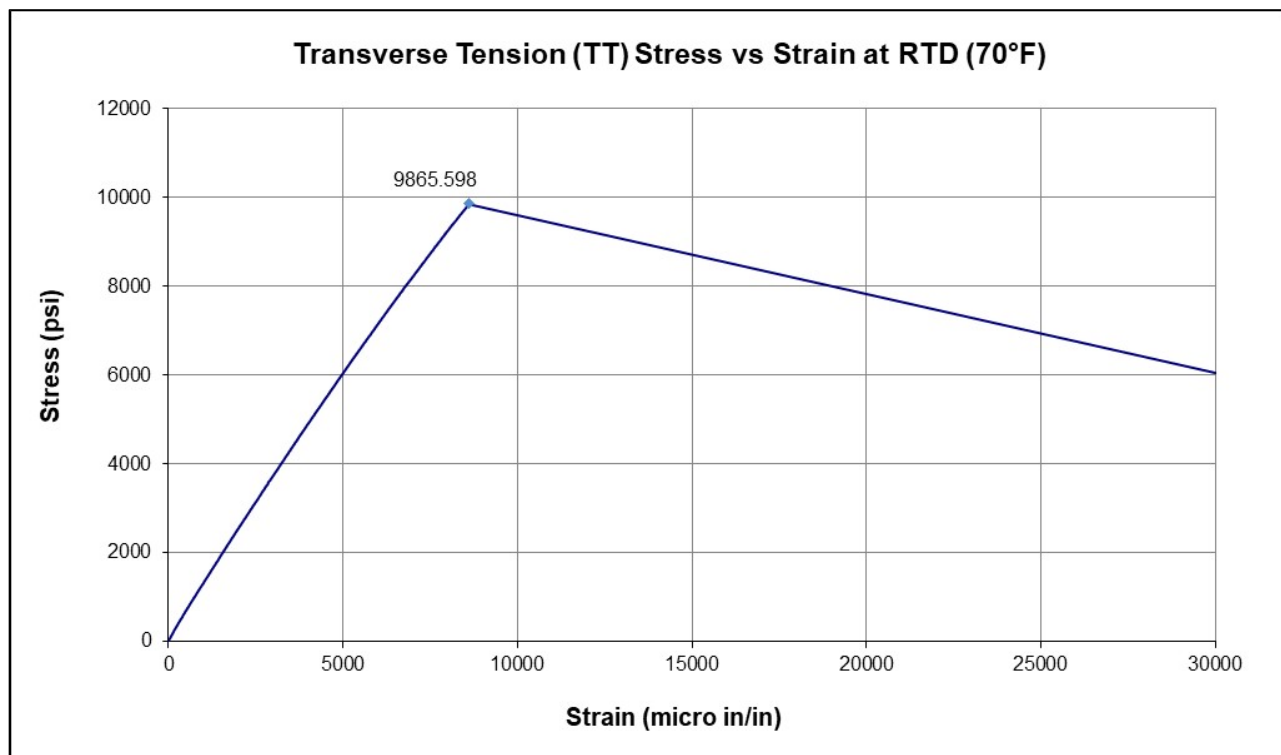
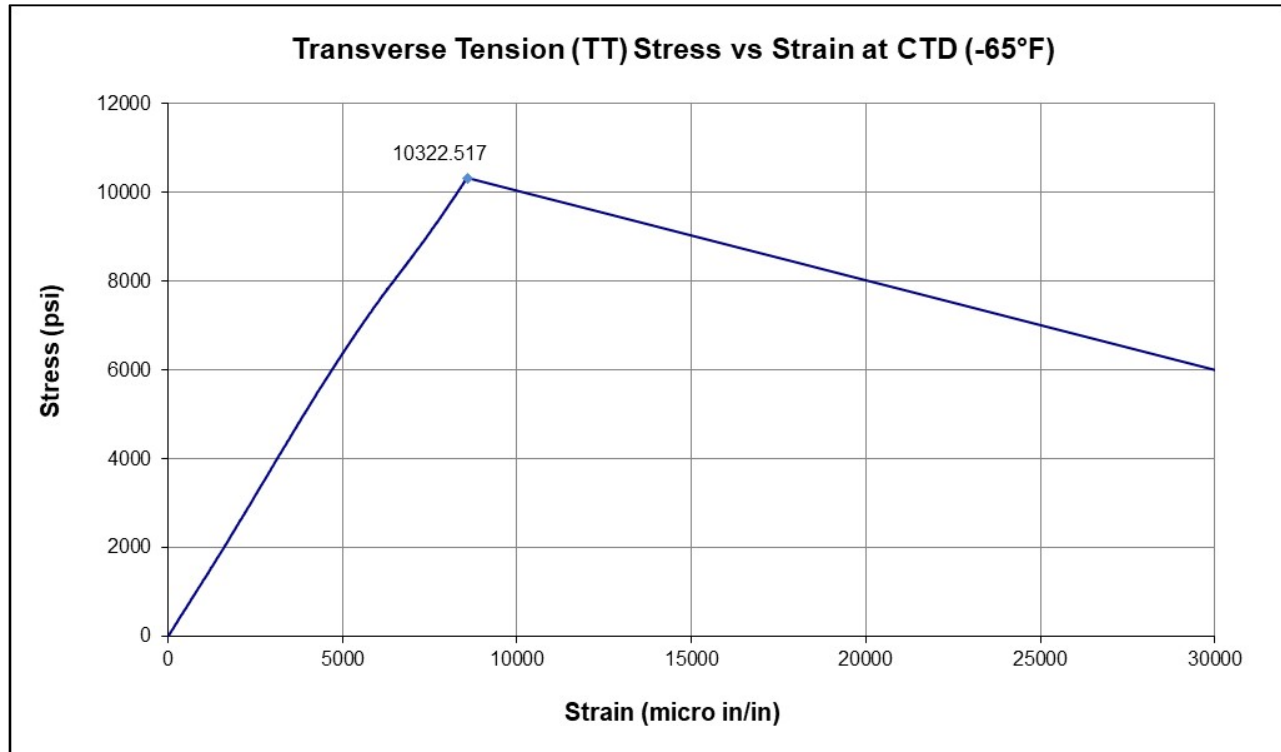
6.1 Longitudinal Tension (LT)

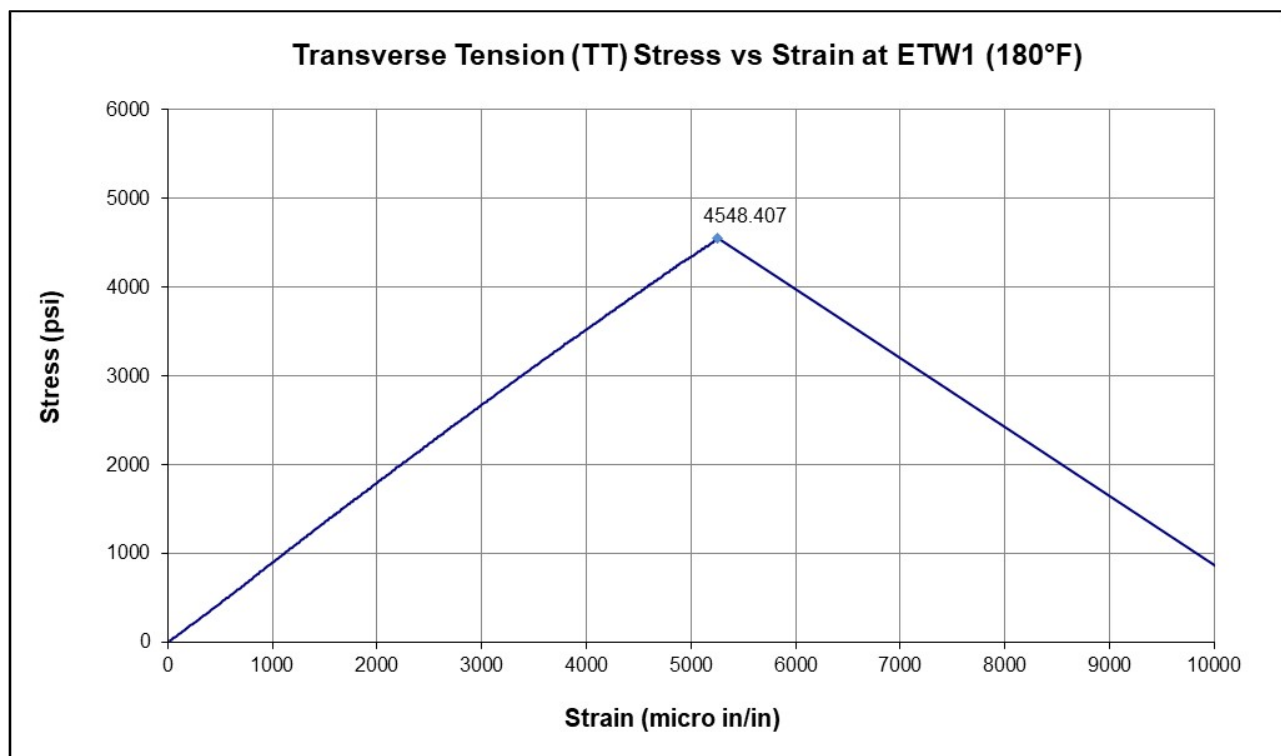
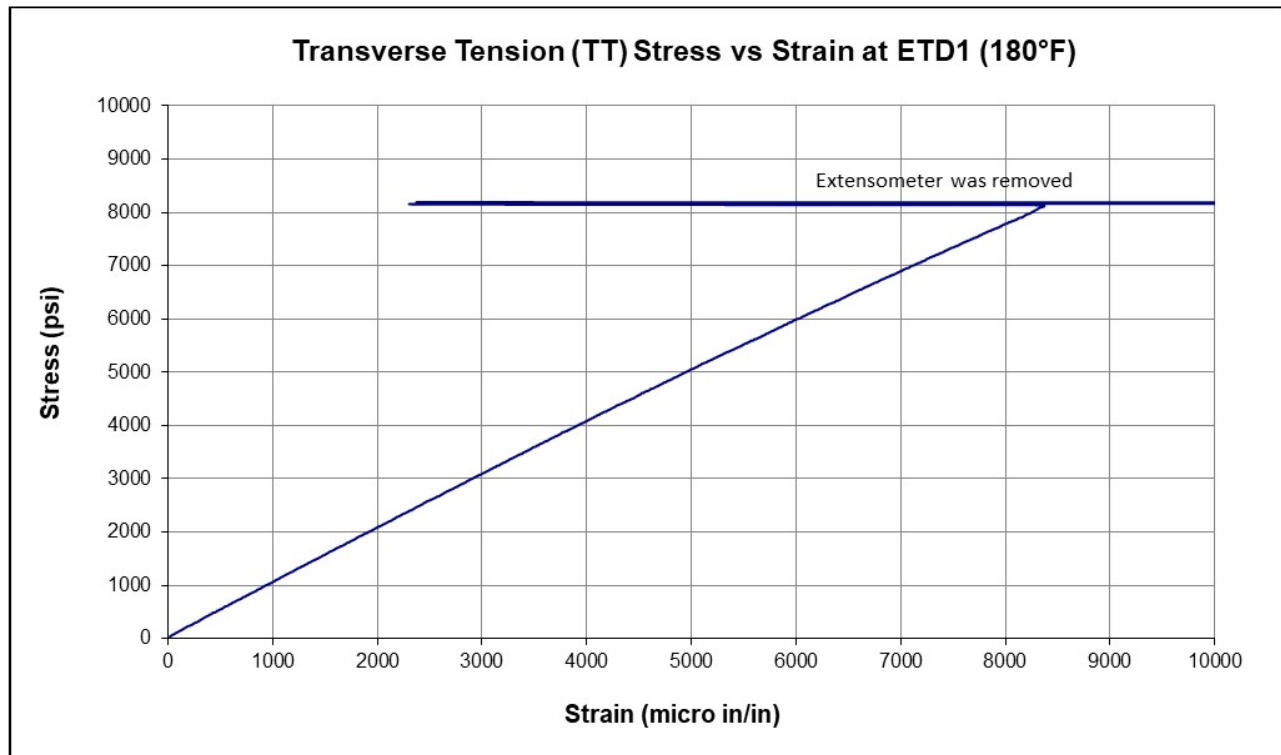


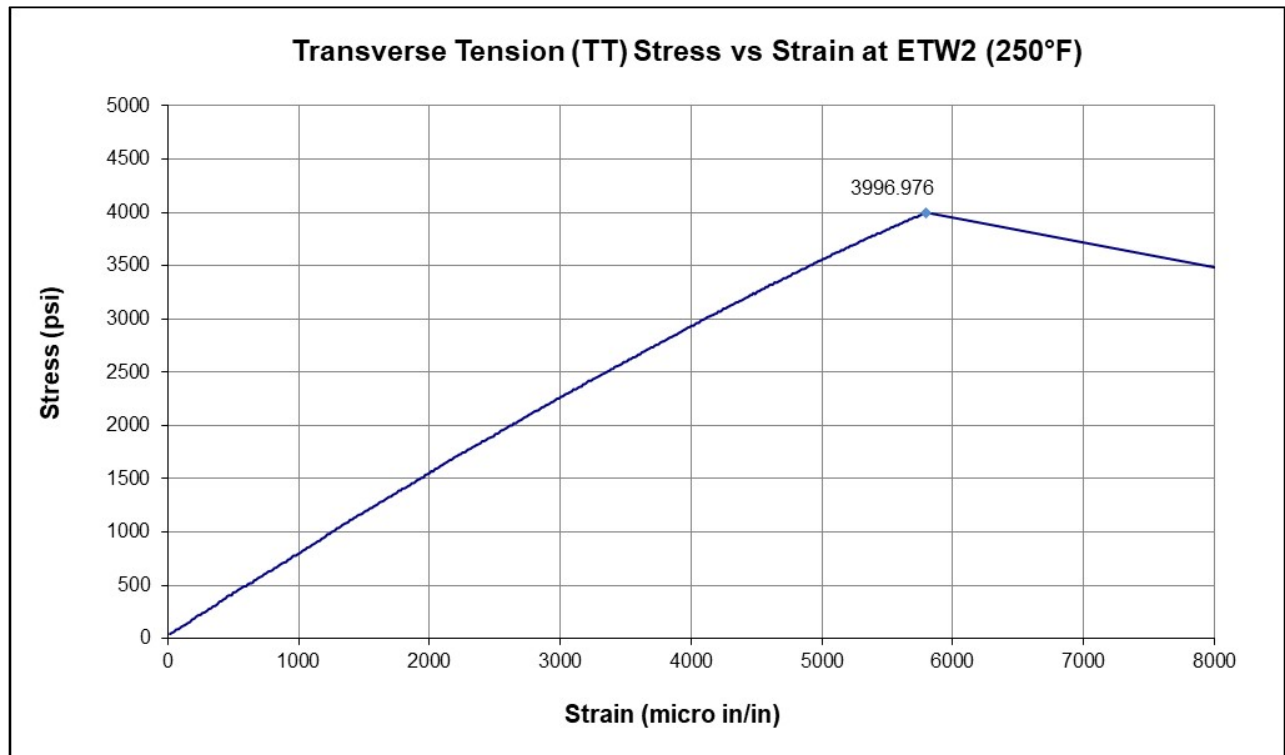




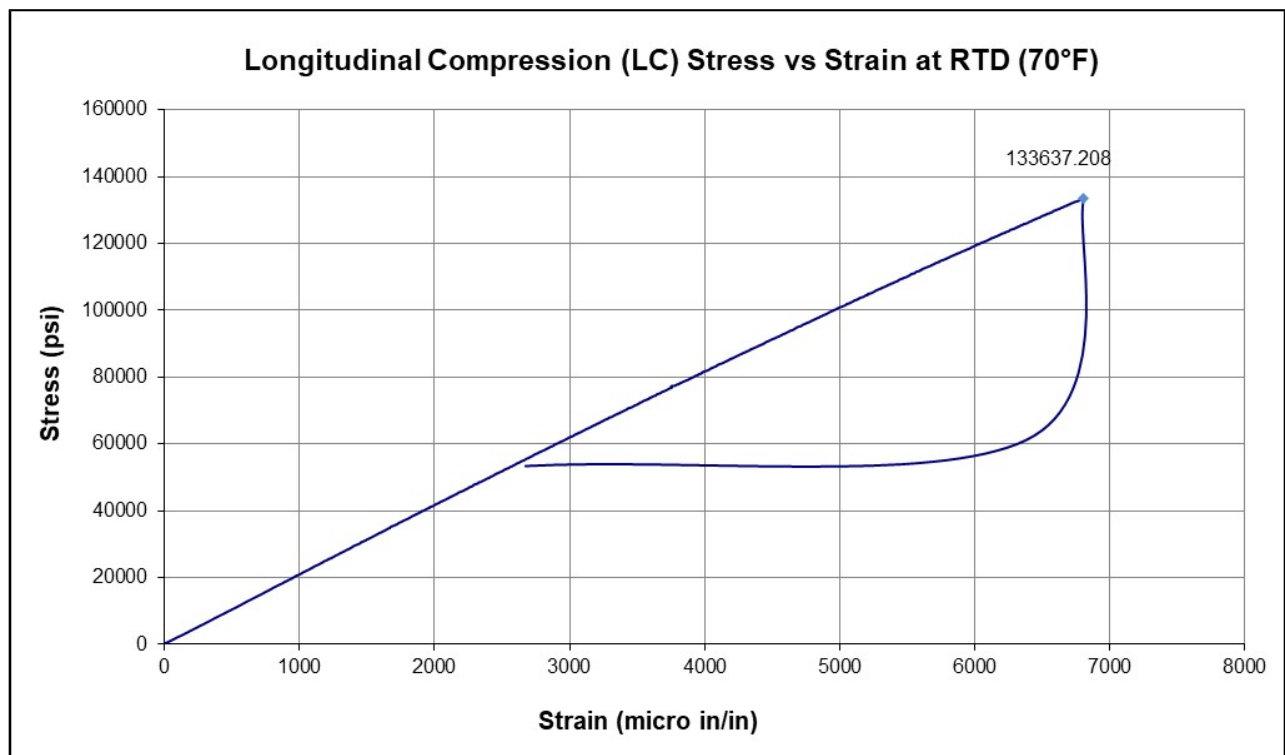
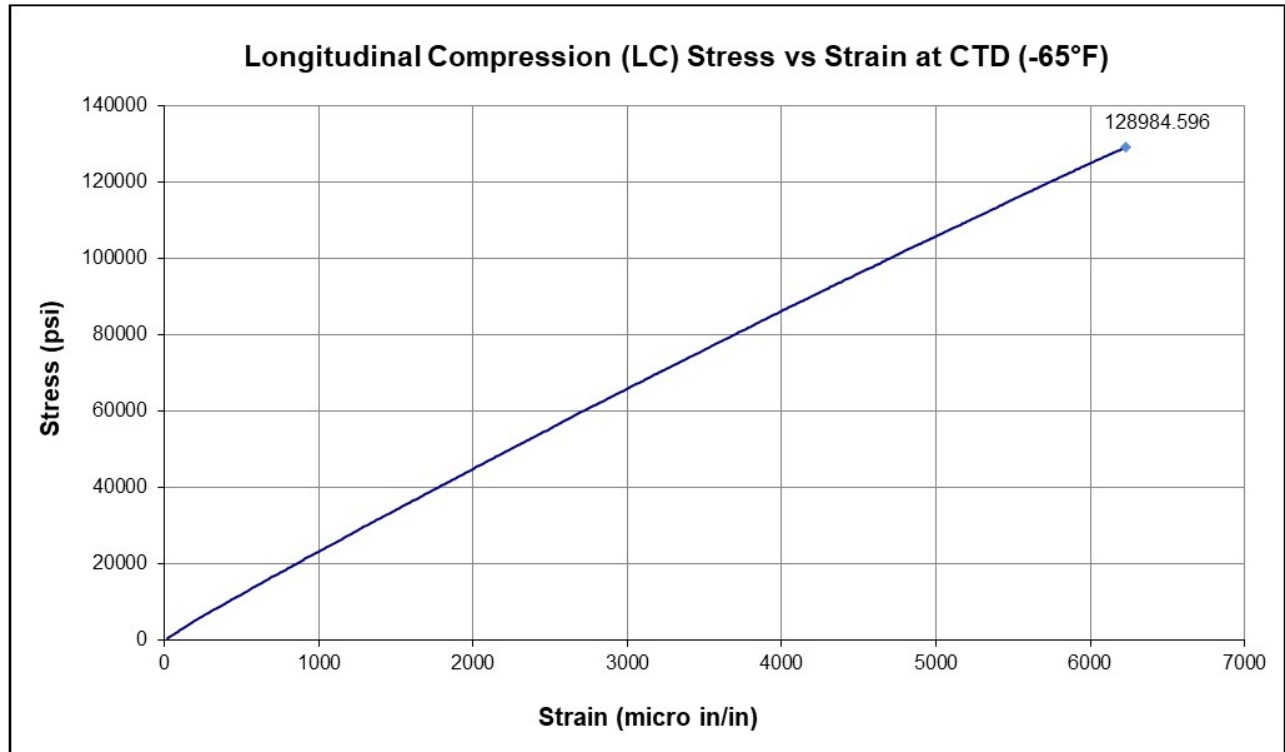
6.2 Transverse Tension (TT)

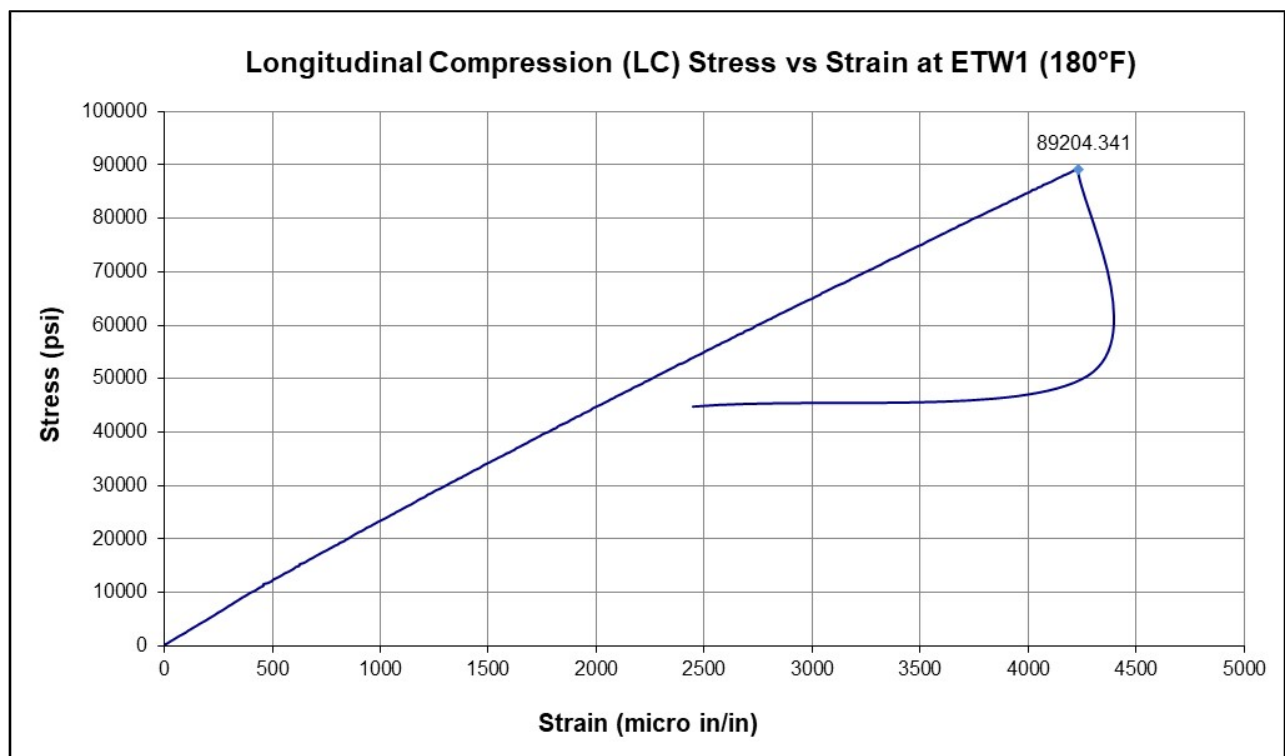
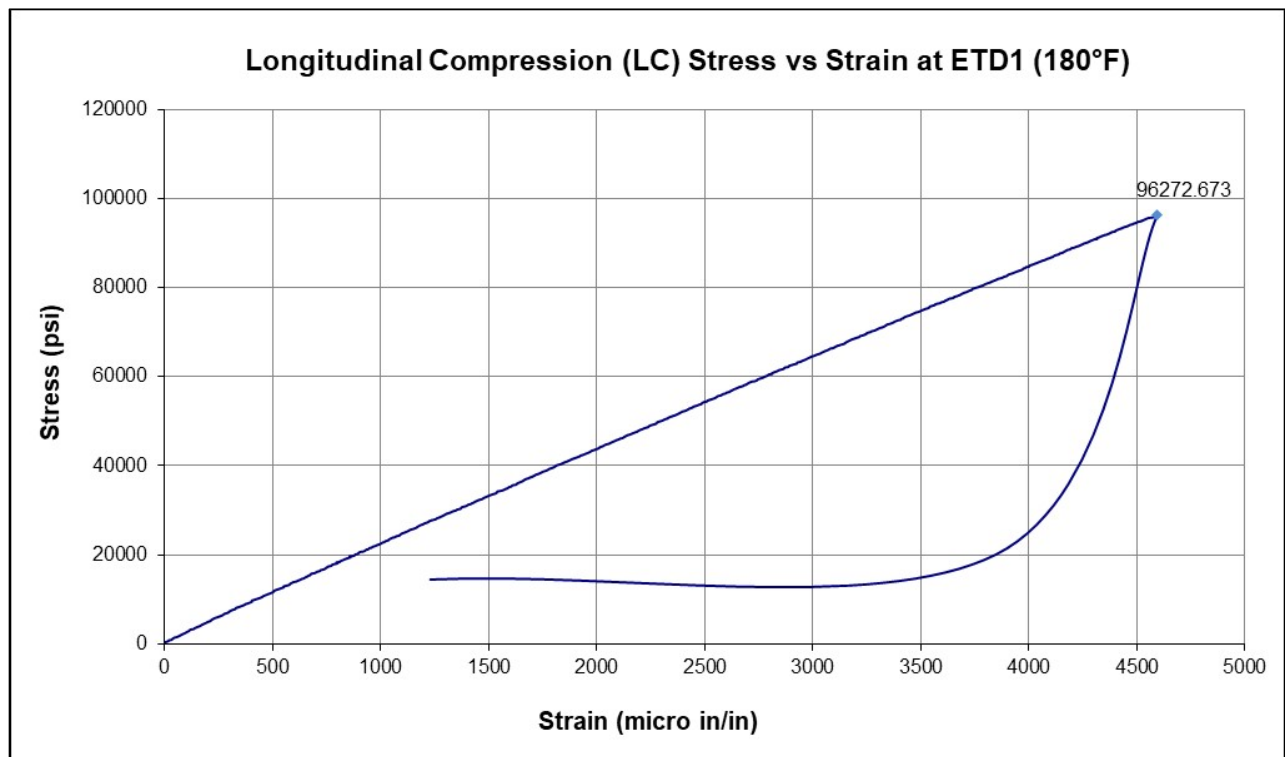


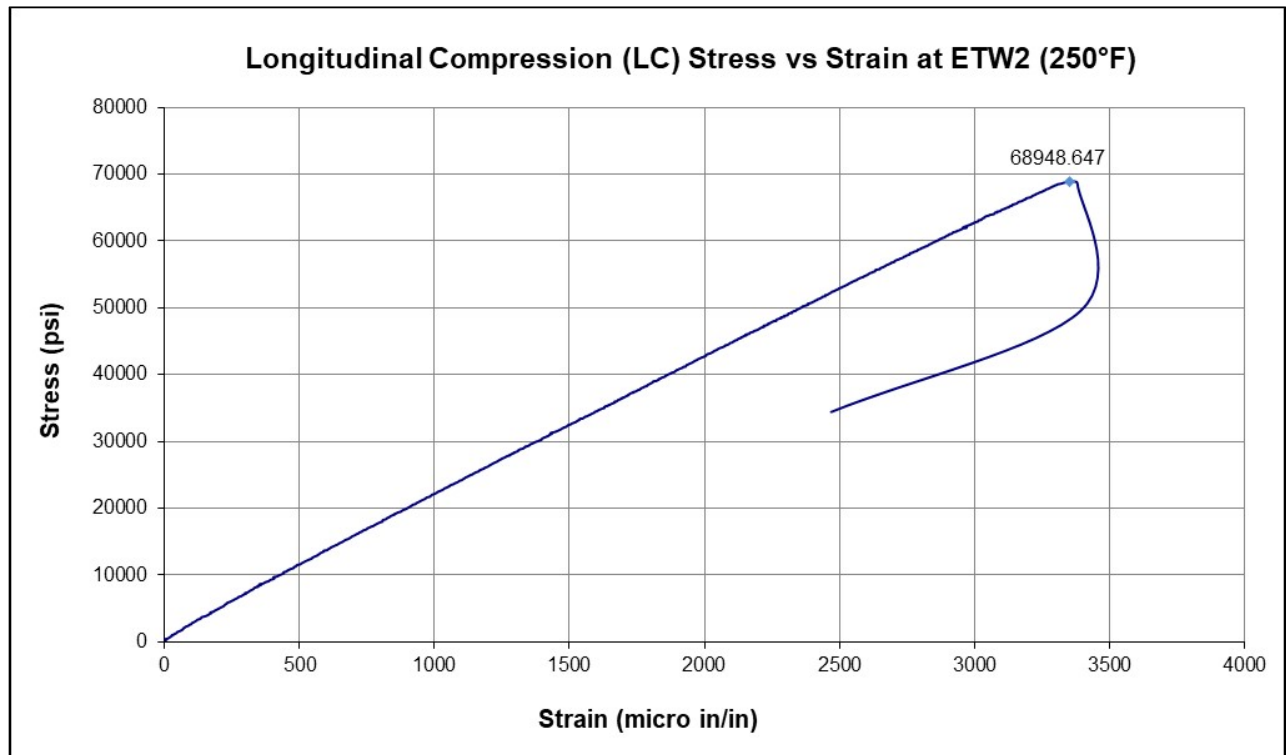




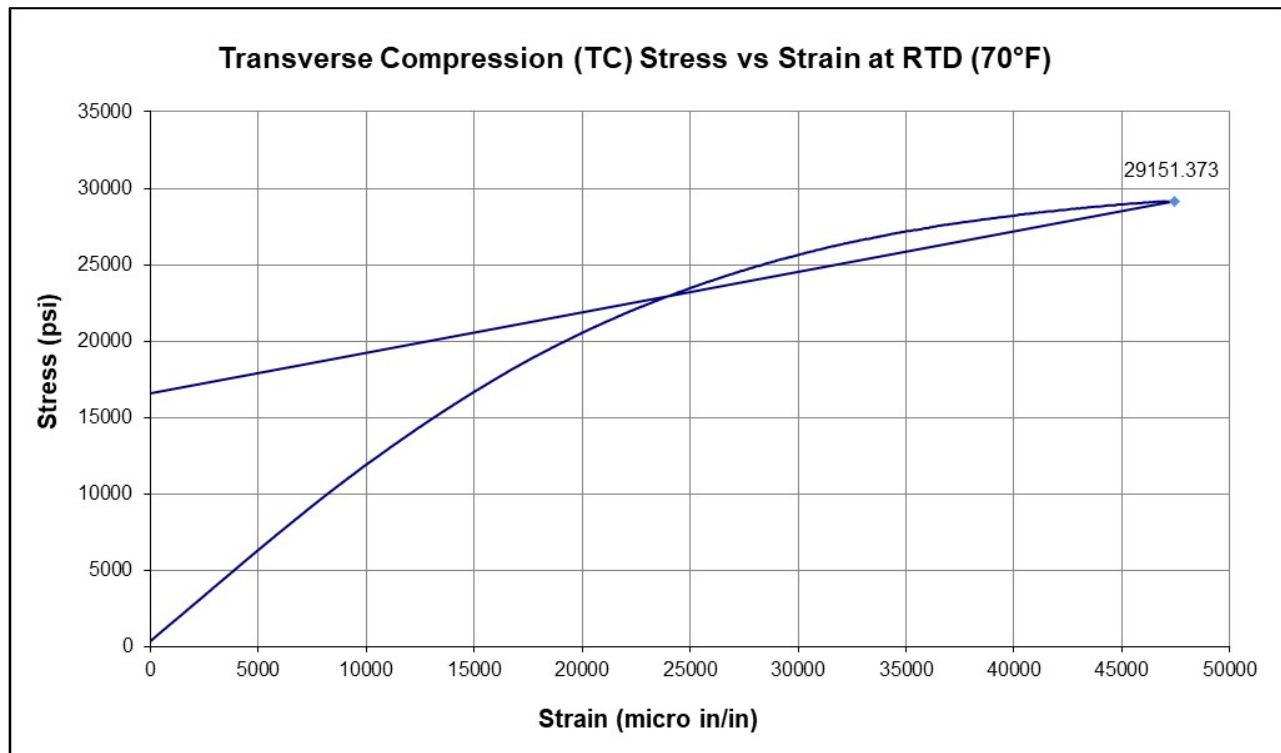
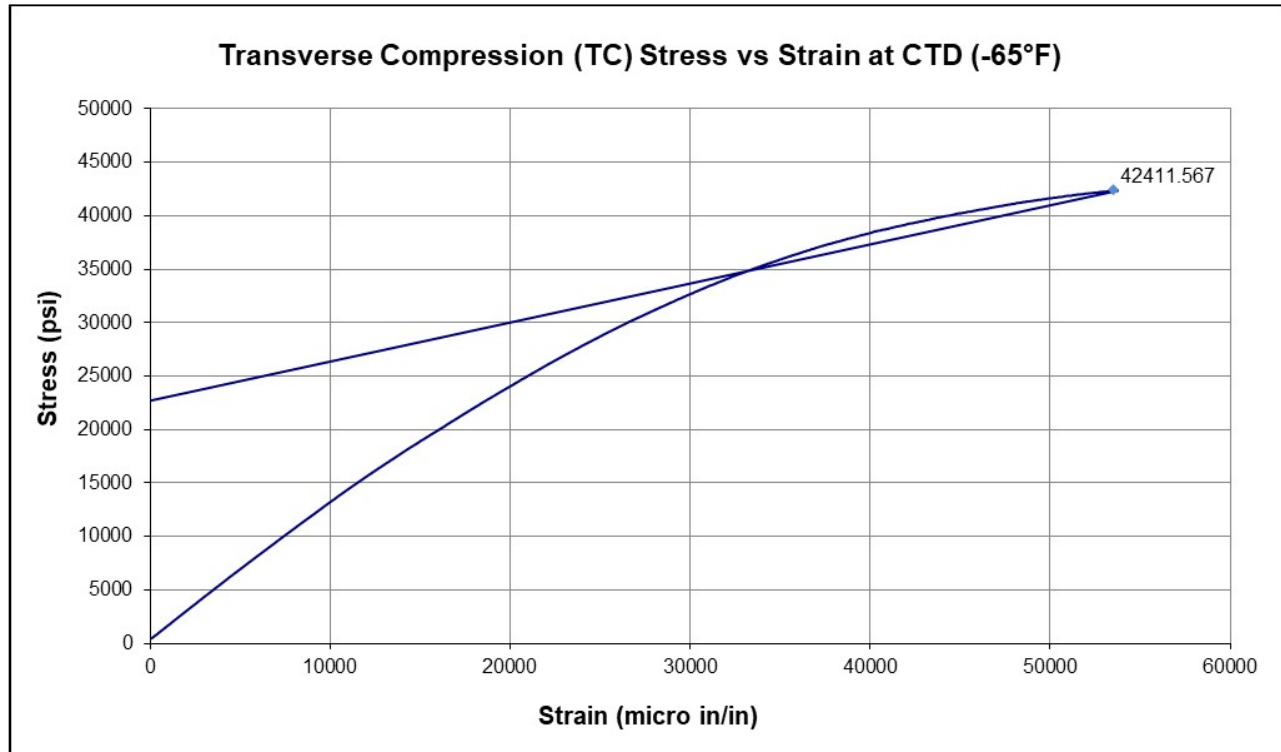
6.3 Longitudinal Compression (LC)

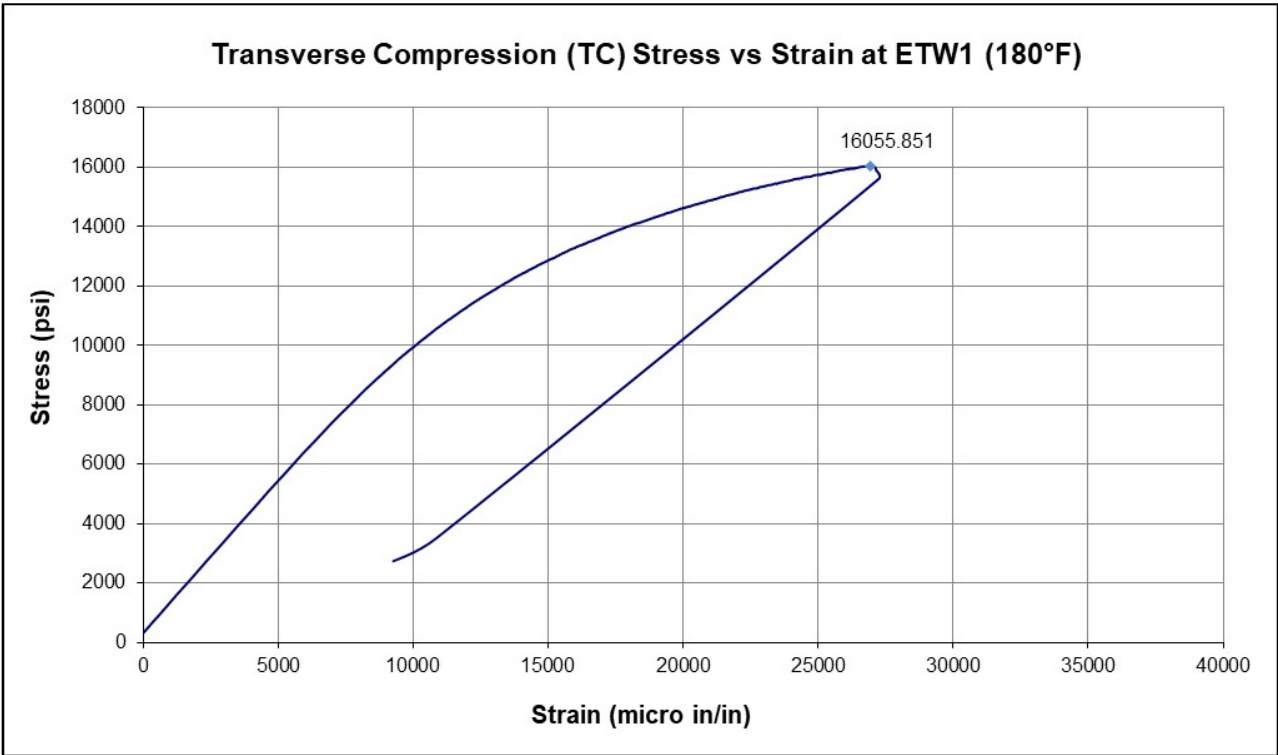
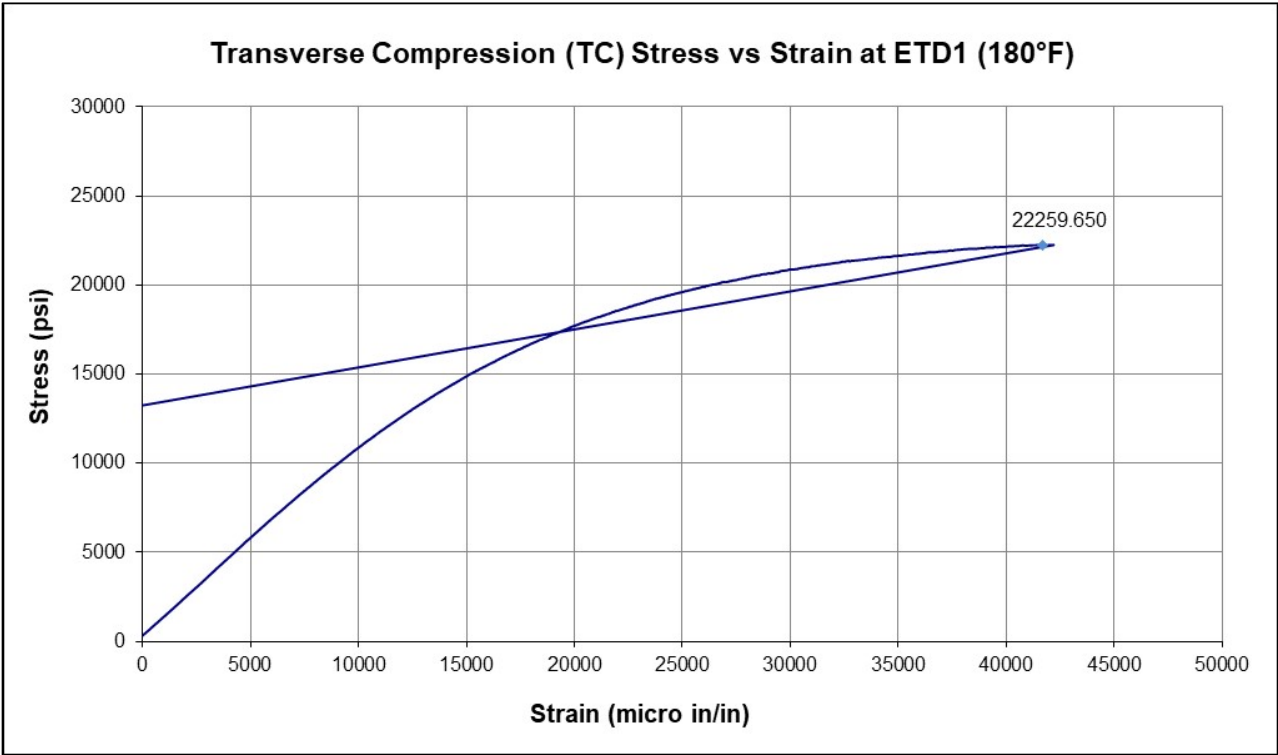


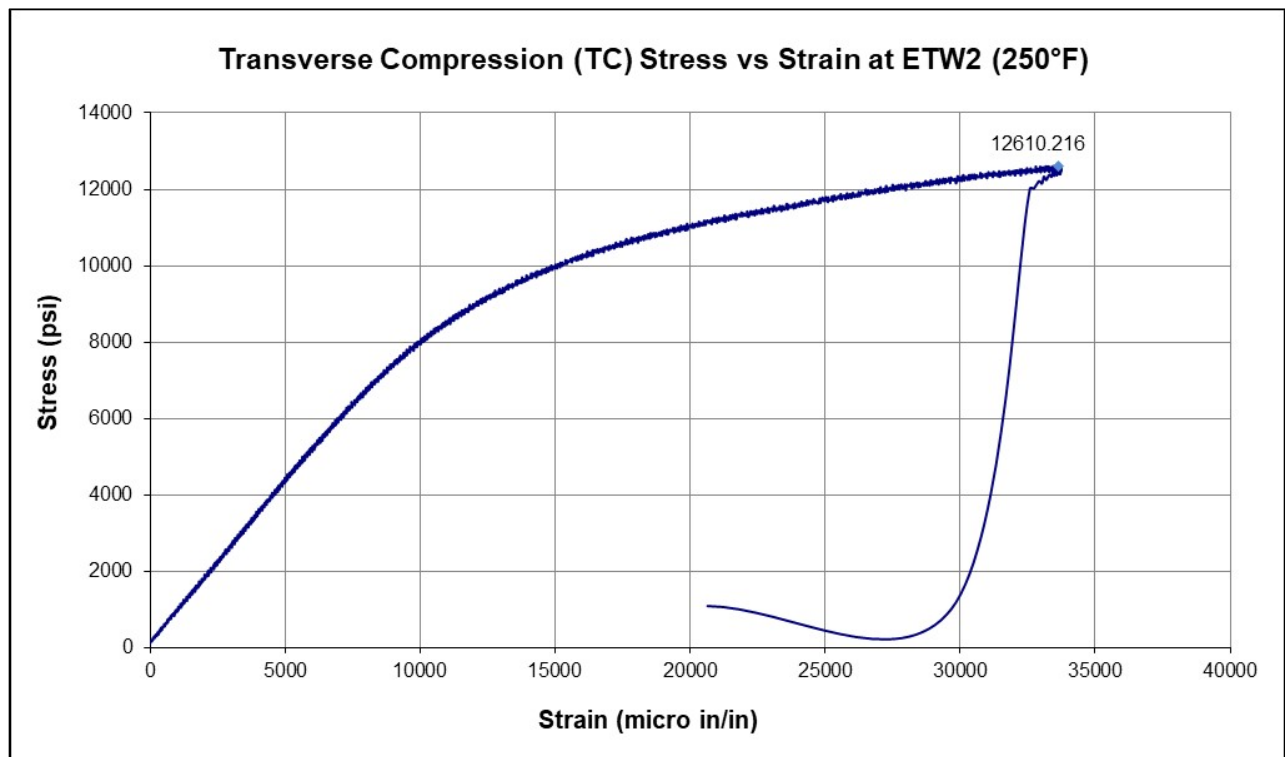




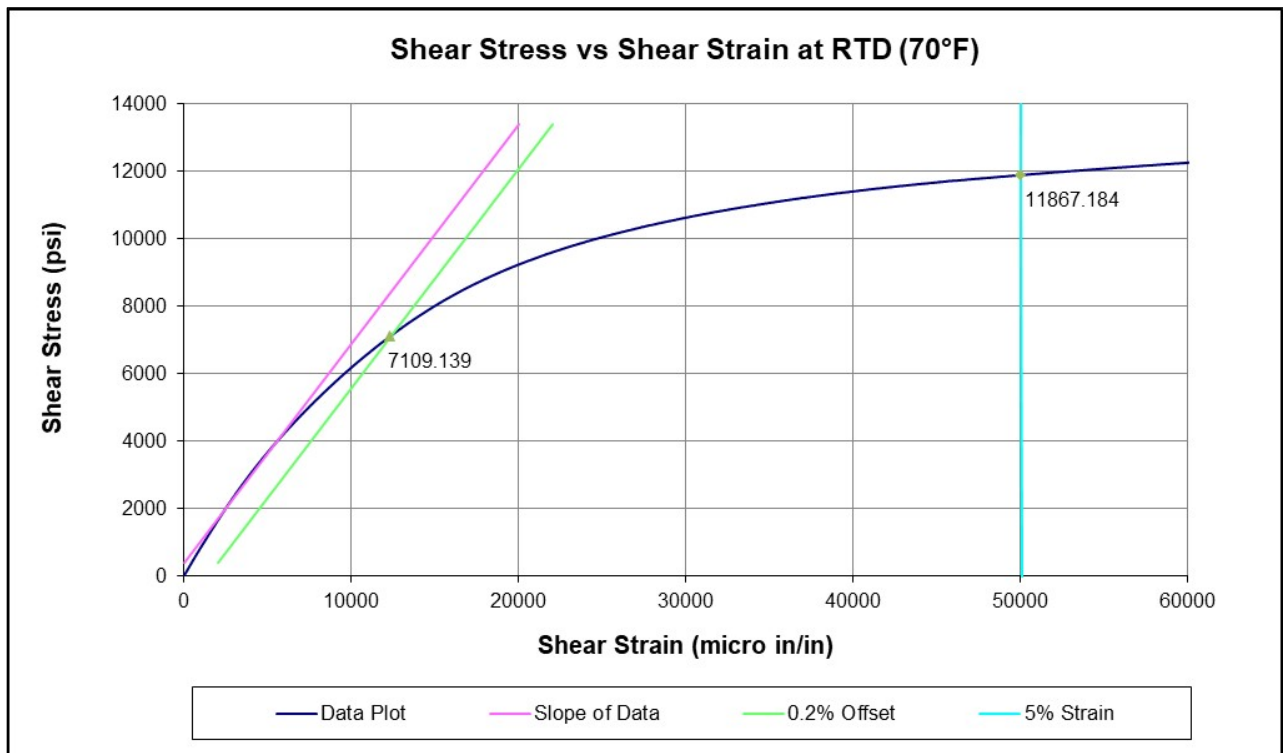
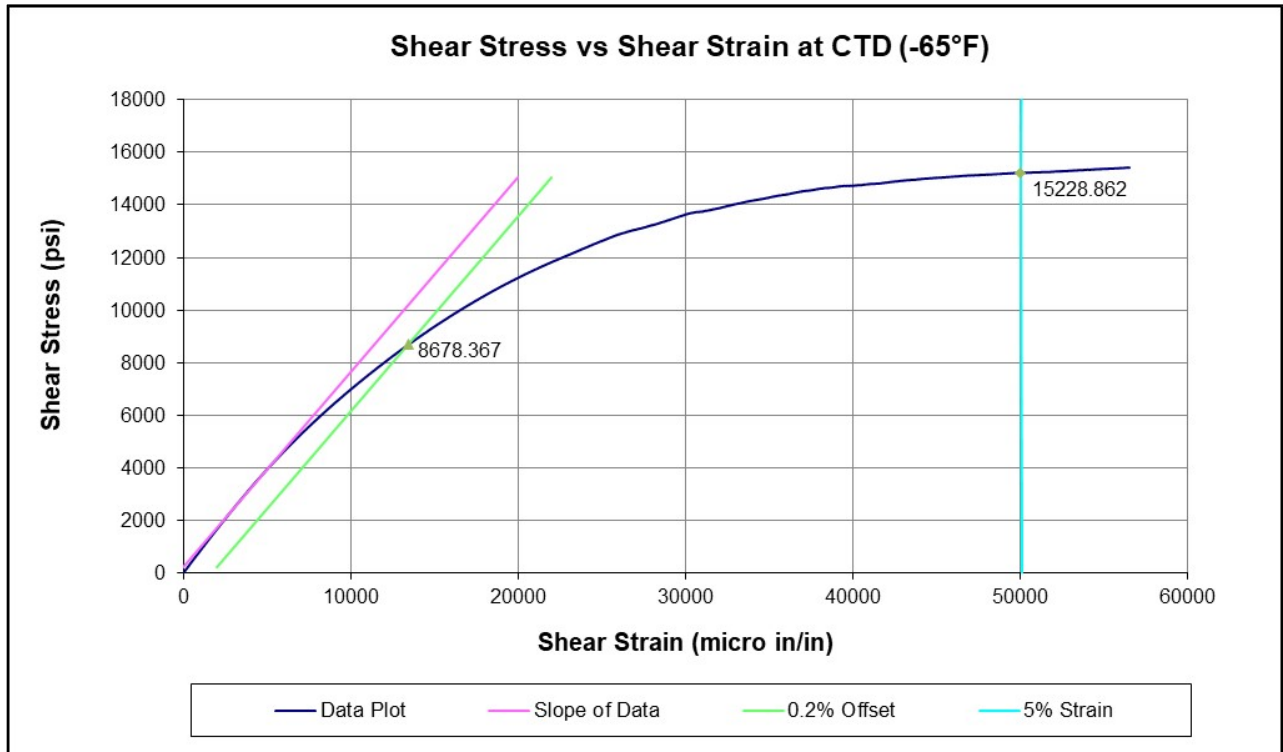
6.4 Transverse Compression (TC)

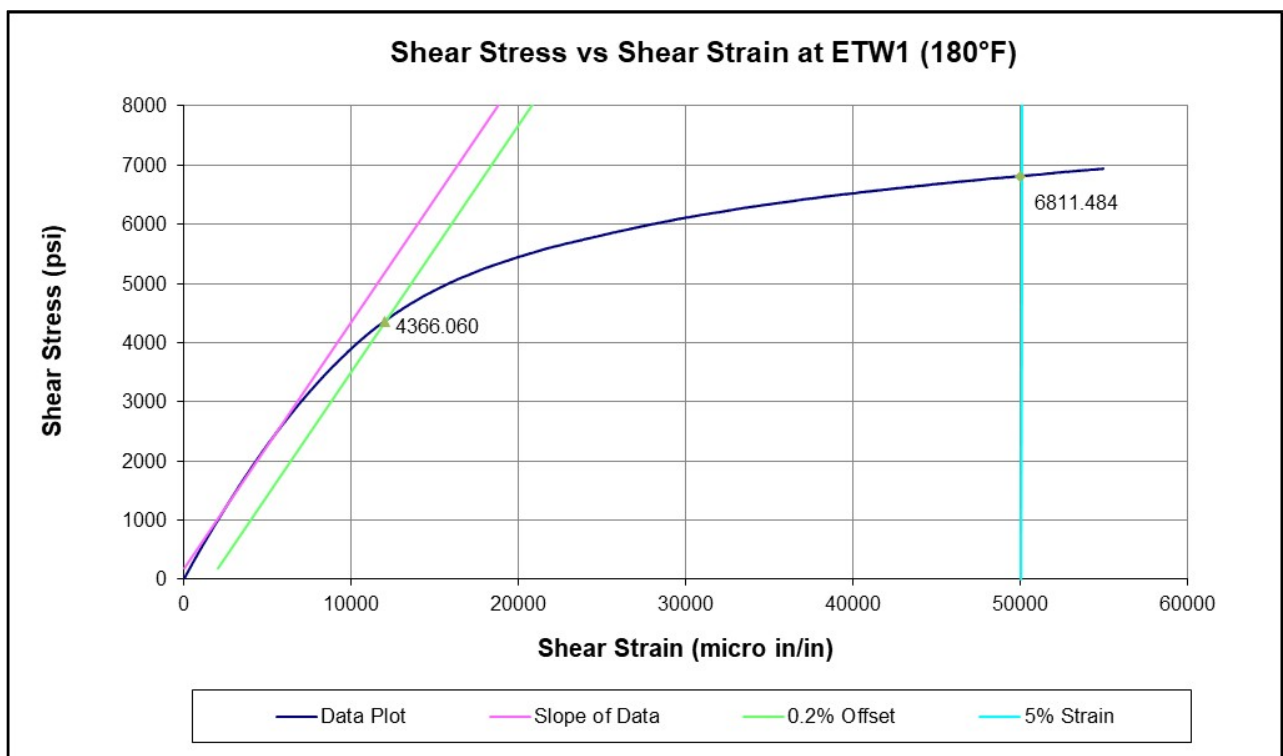
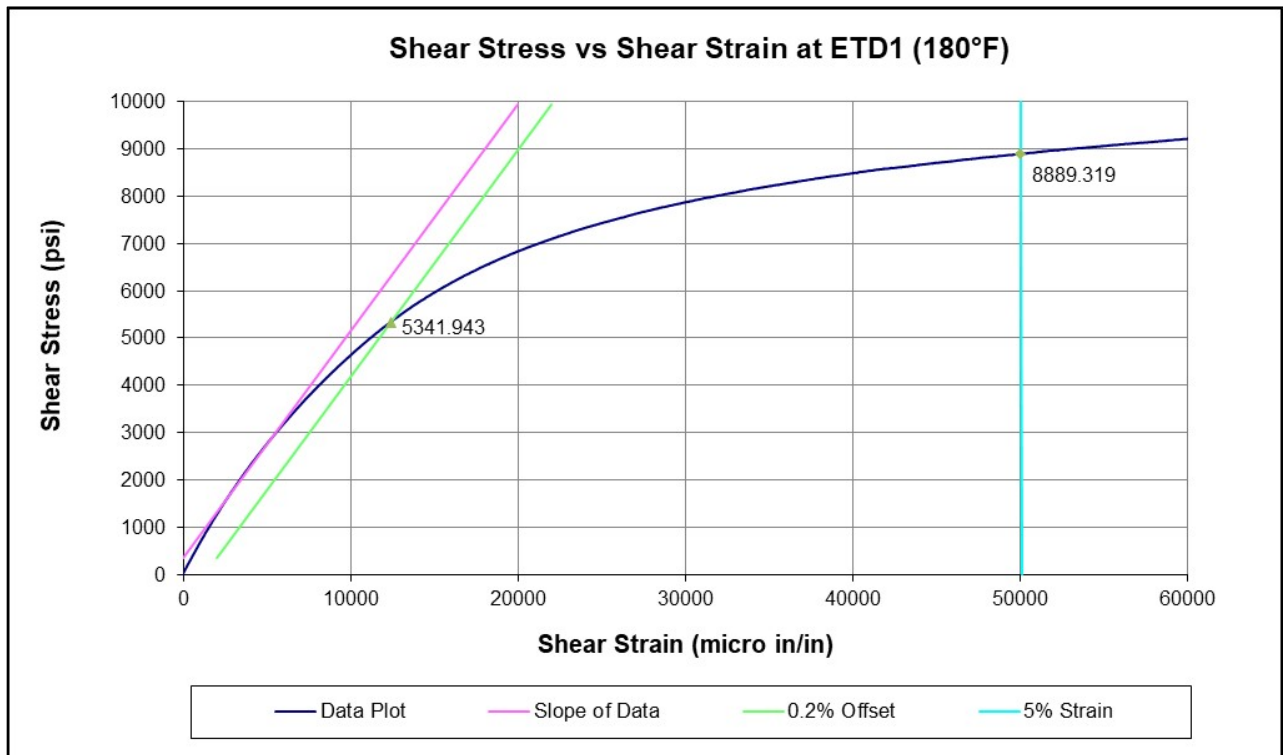


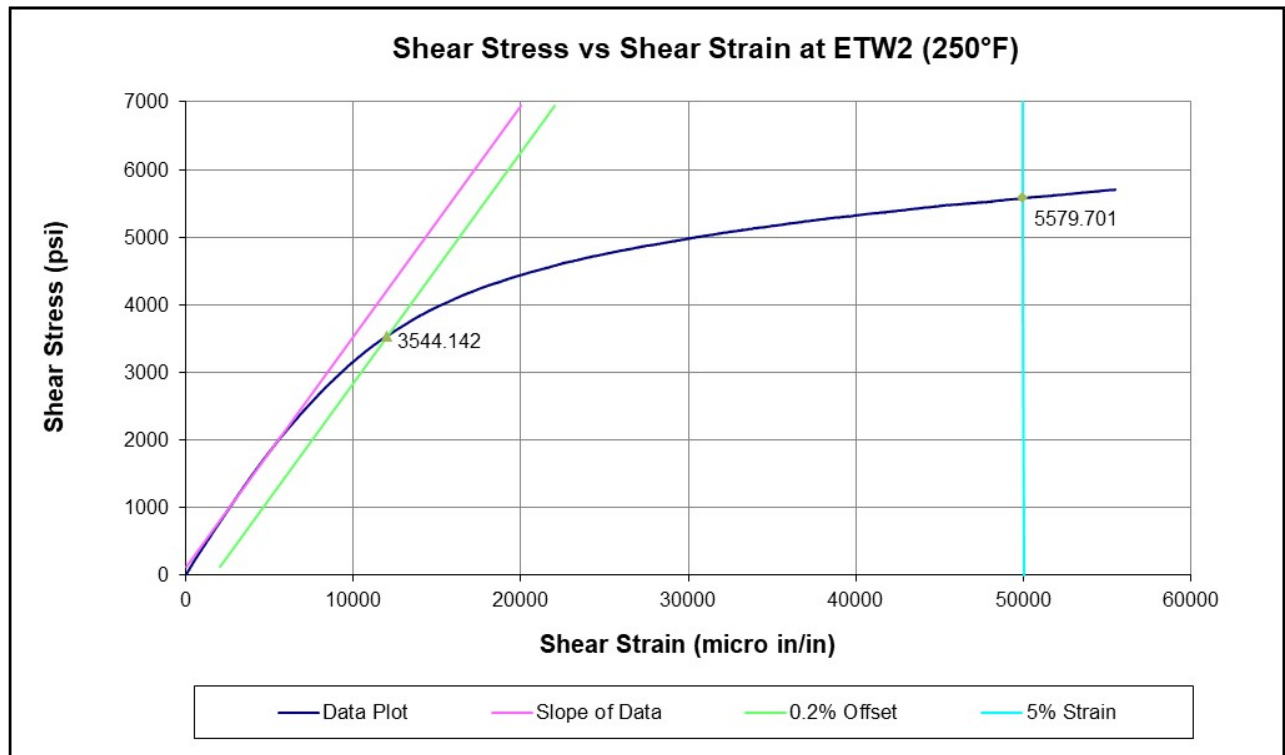




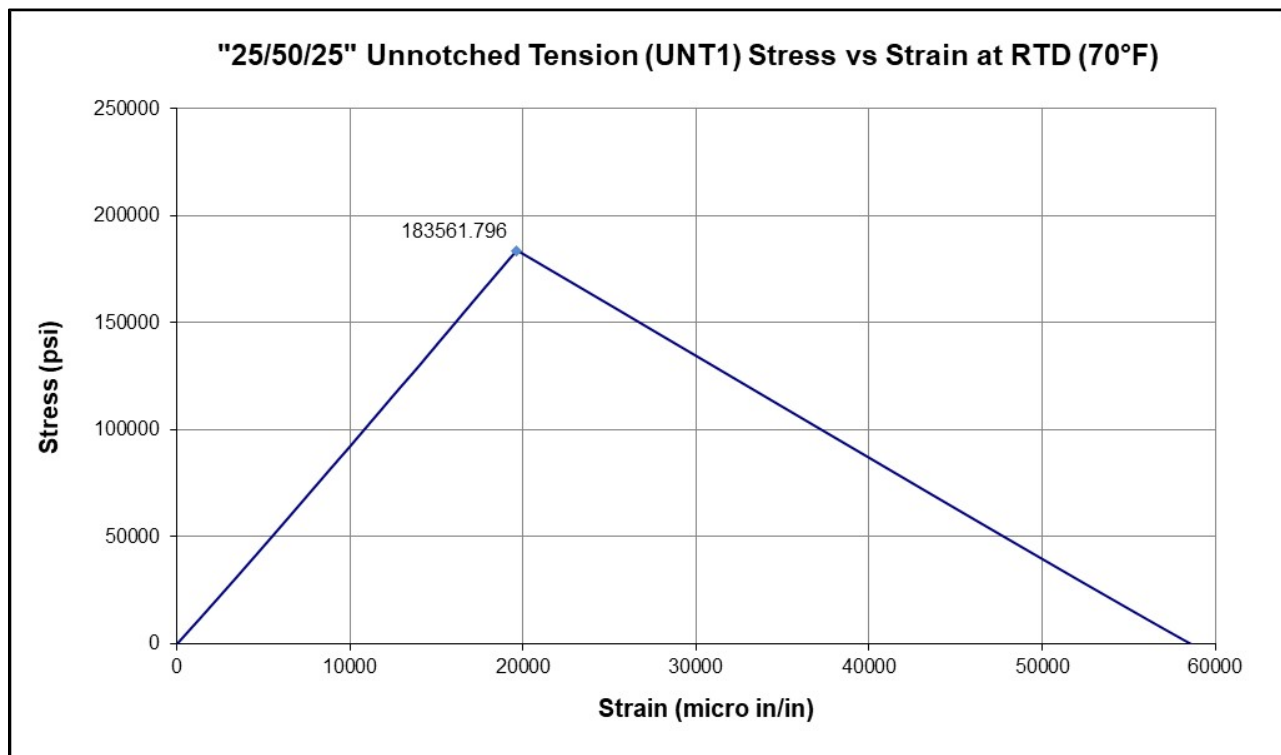
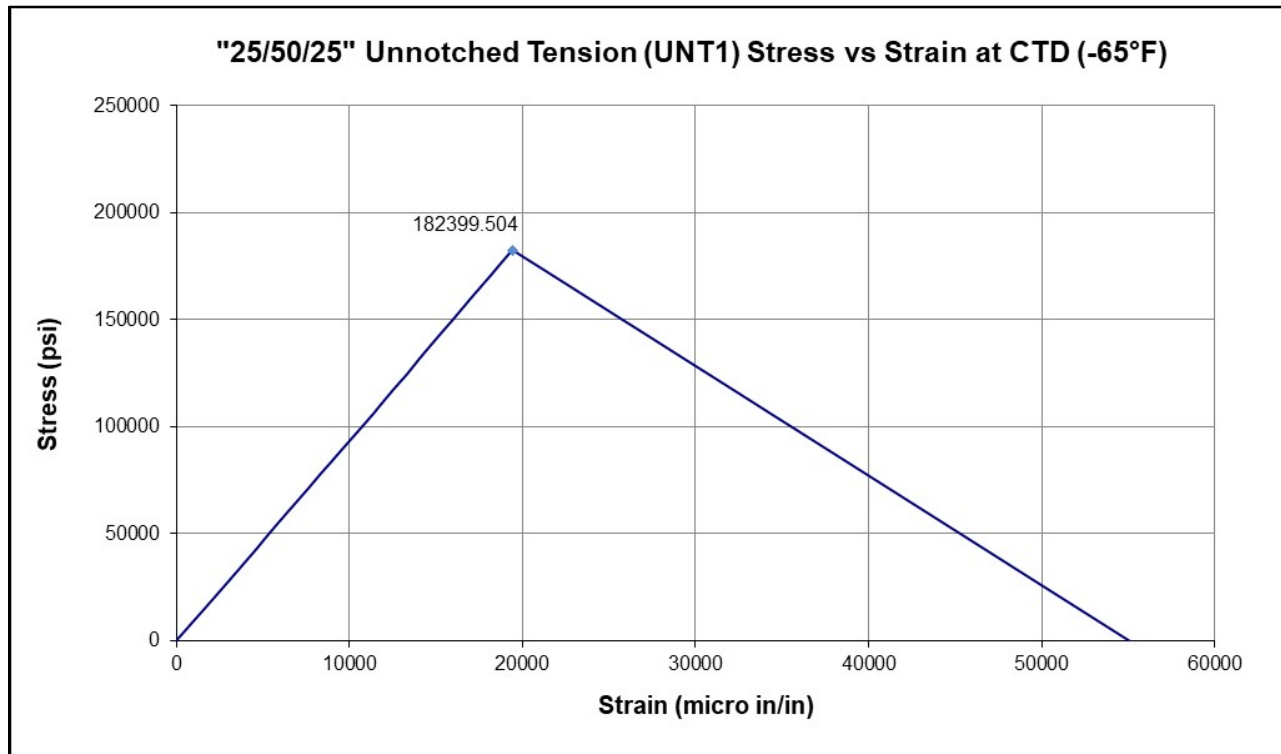
6.5 In-Plane Shear (IPS)

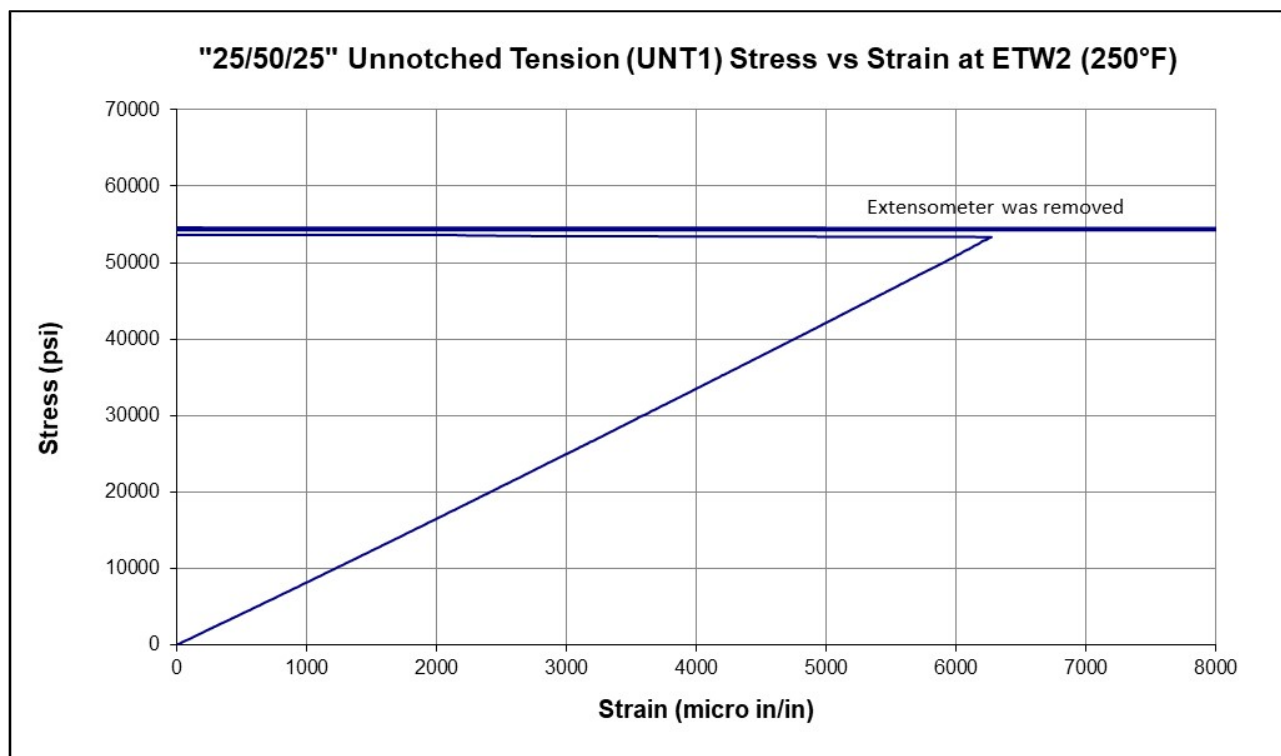
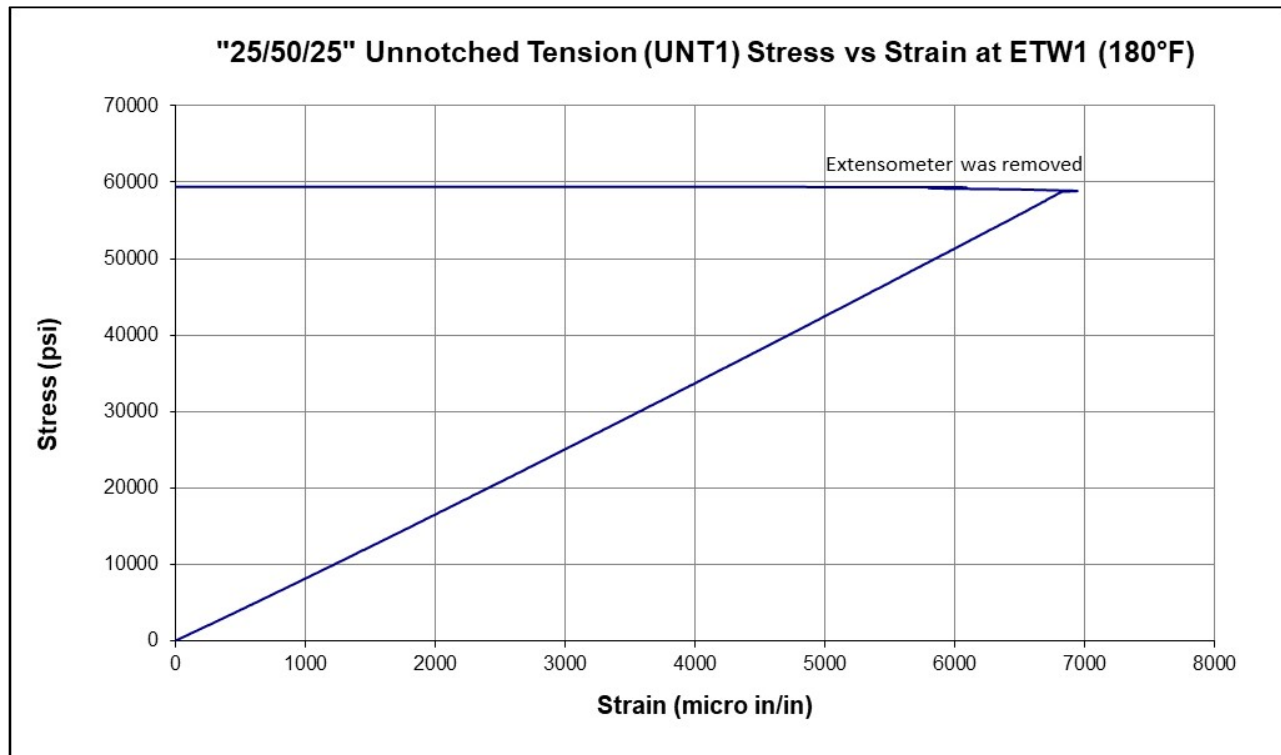




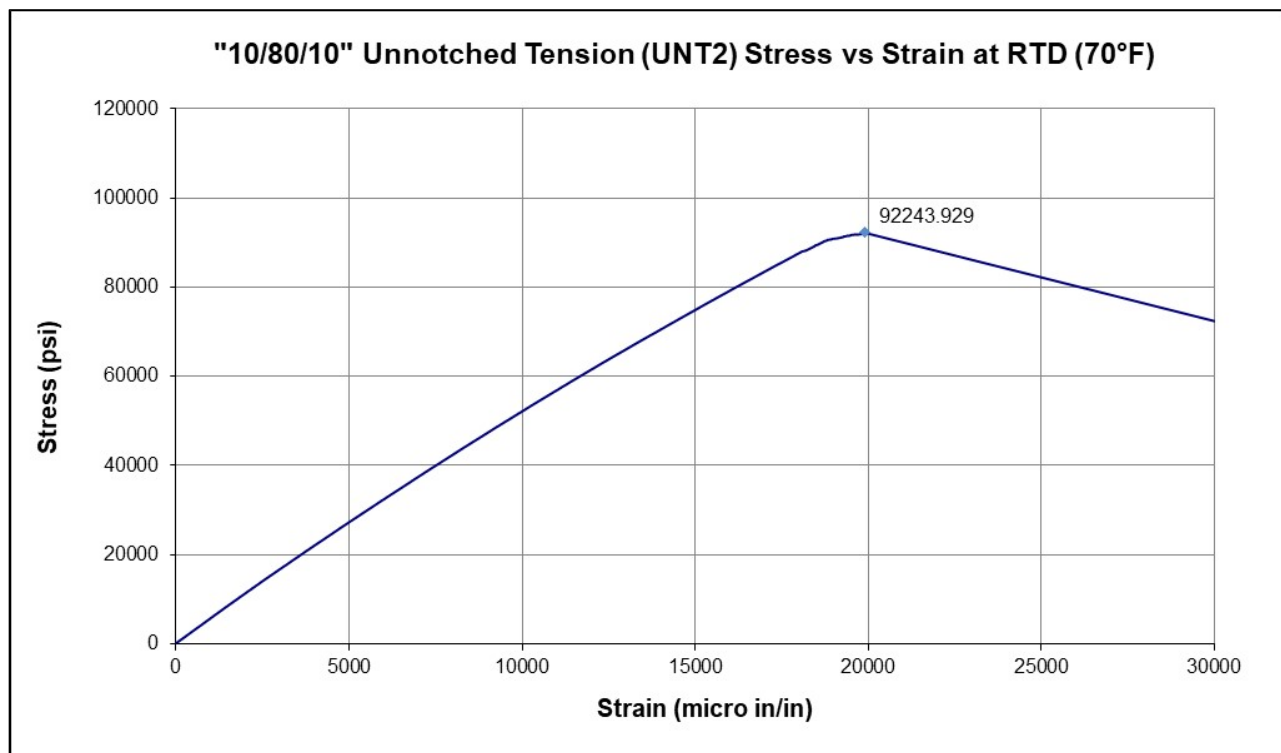
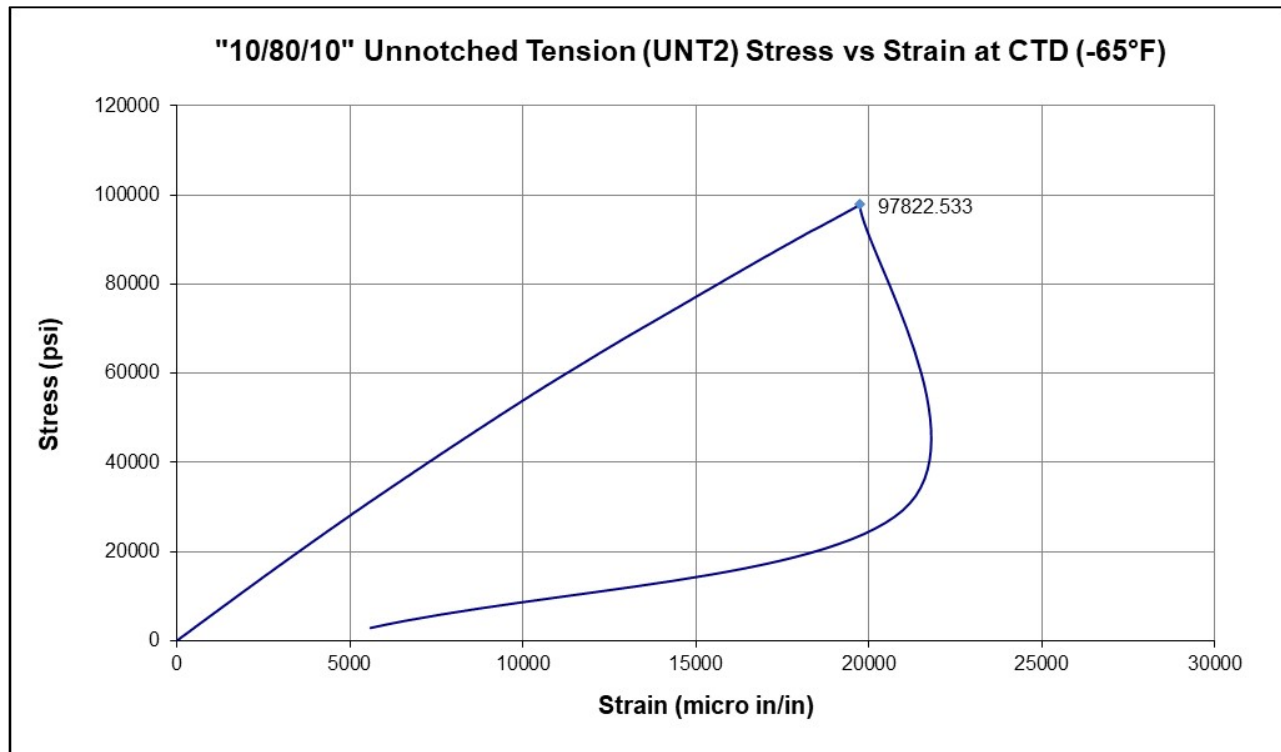


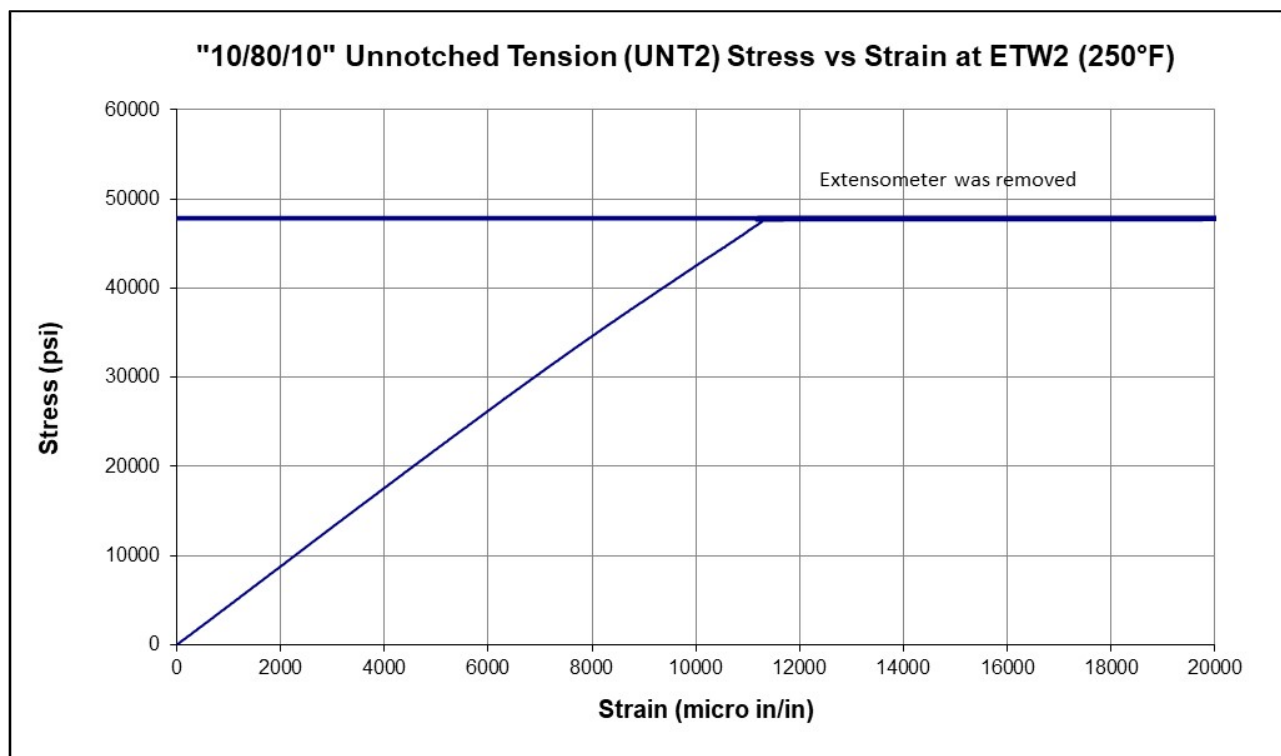
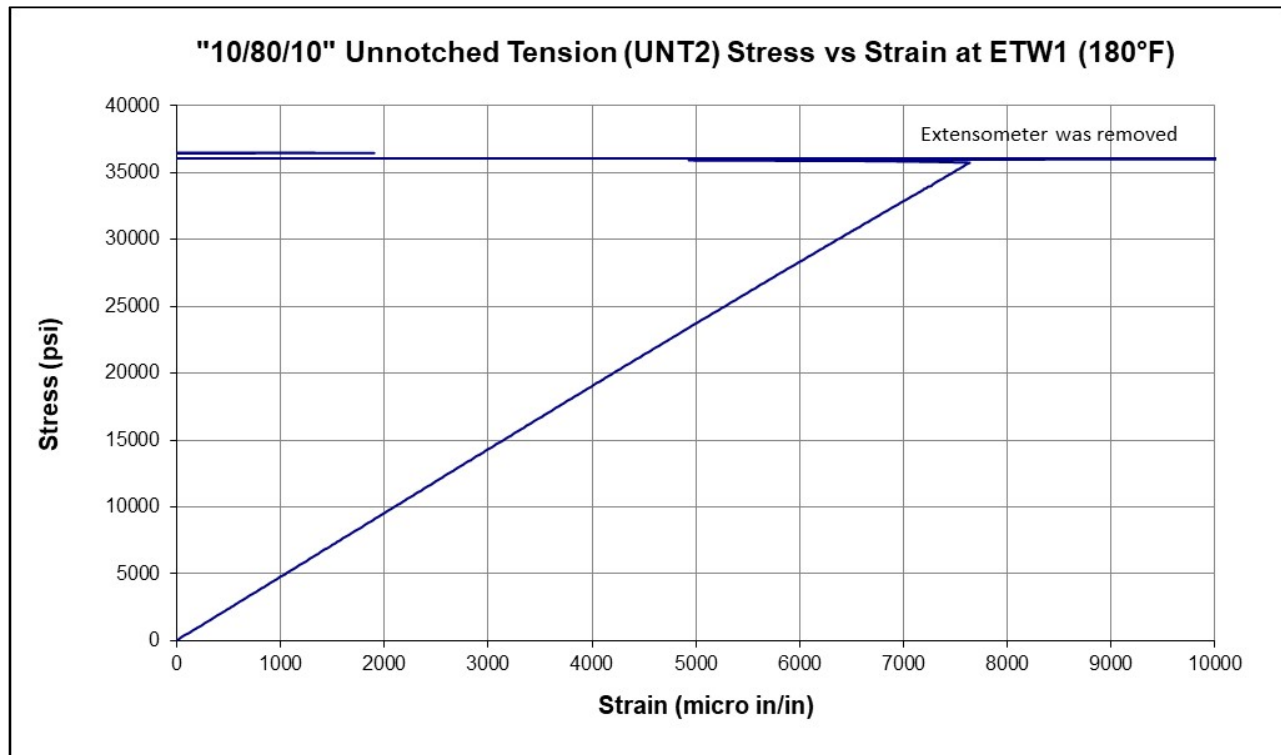
6.6 "25/50/25" Unnotched Tension 1 (UNT1)



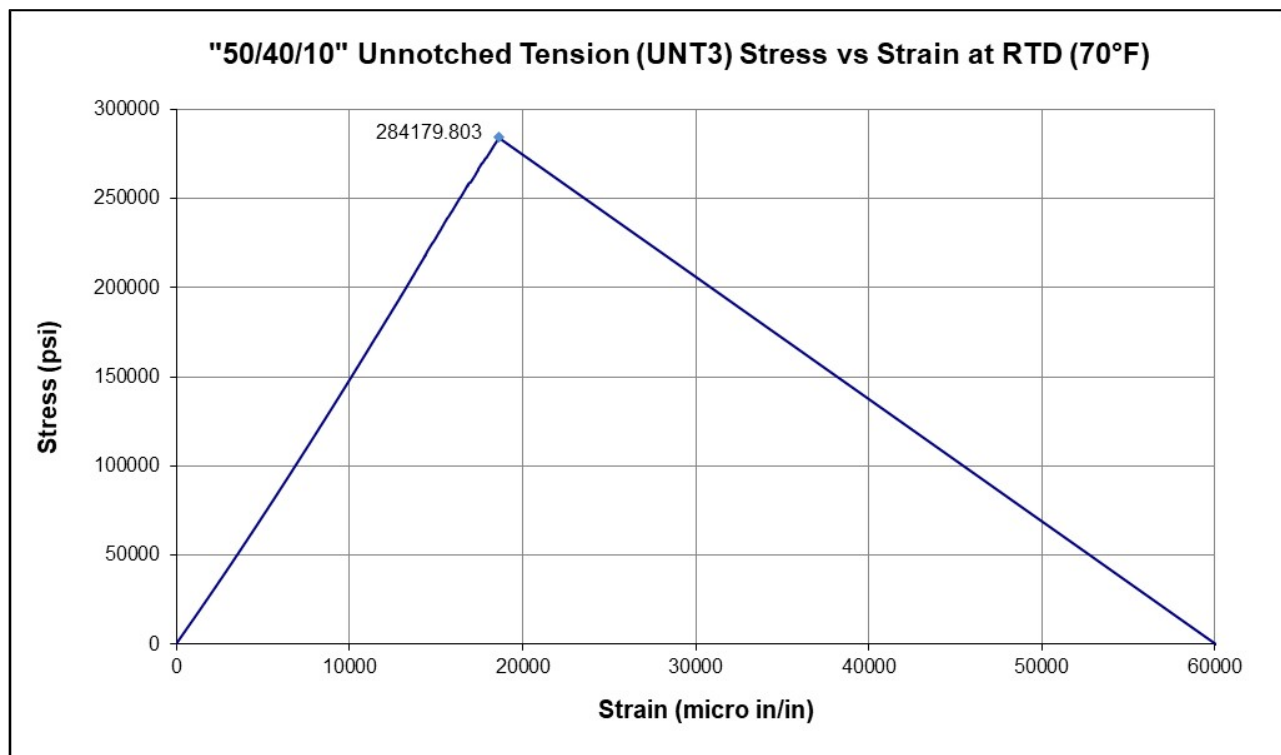
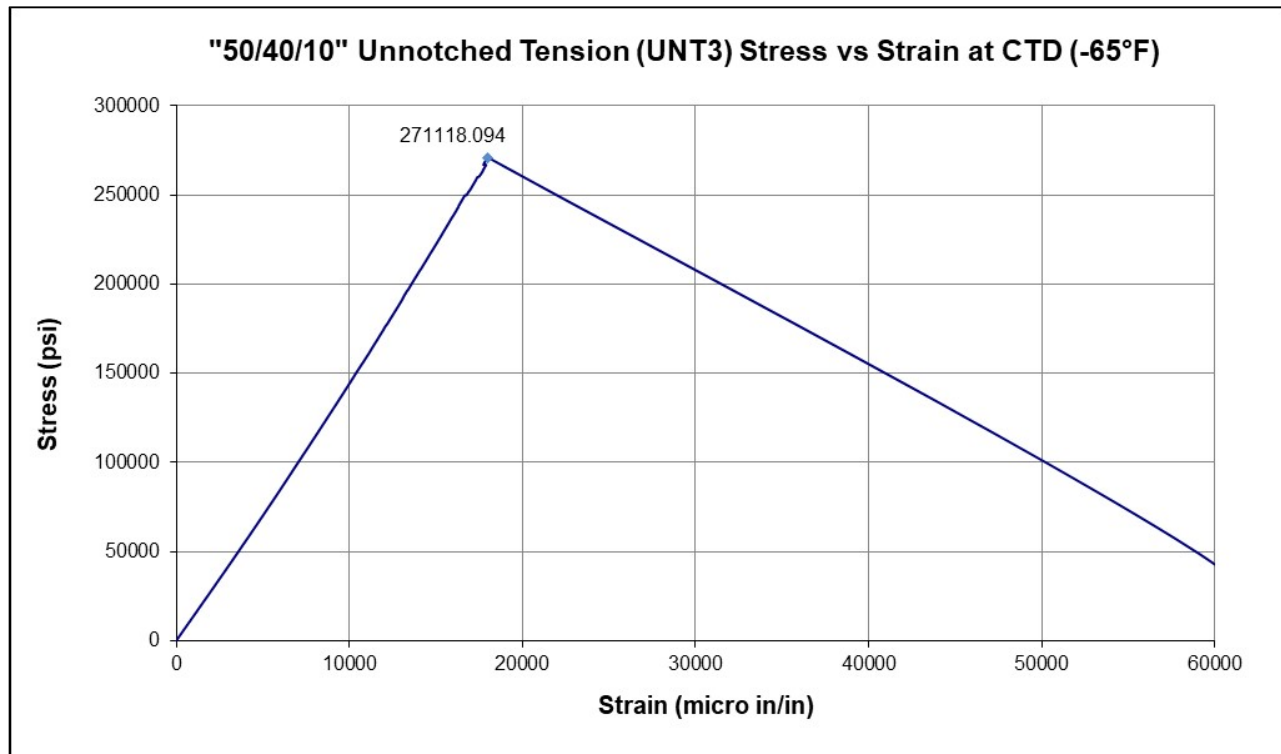


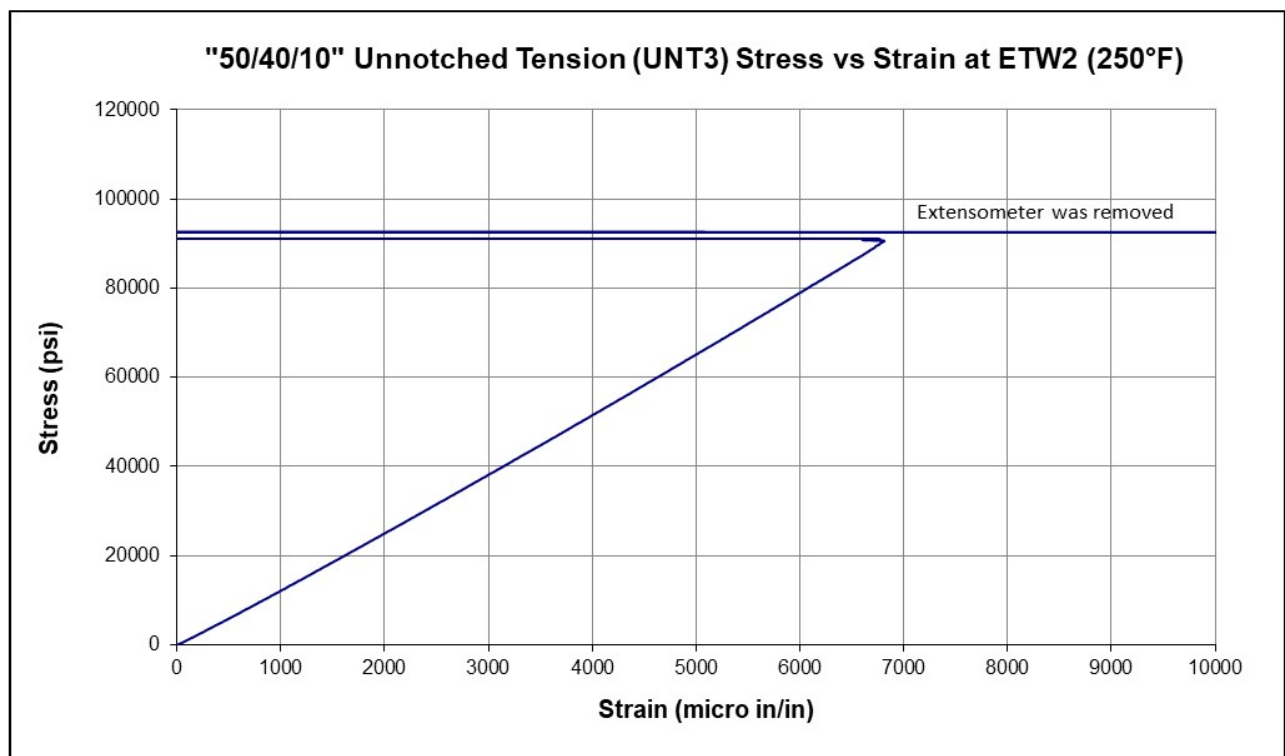
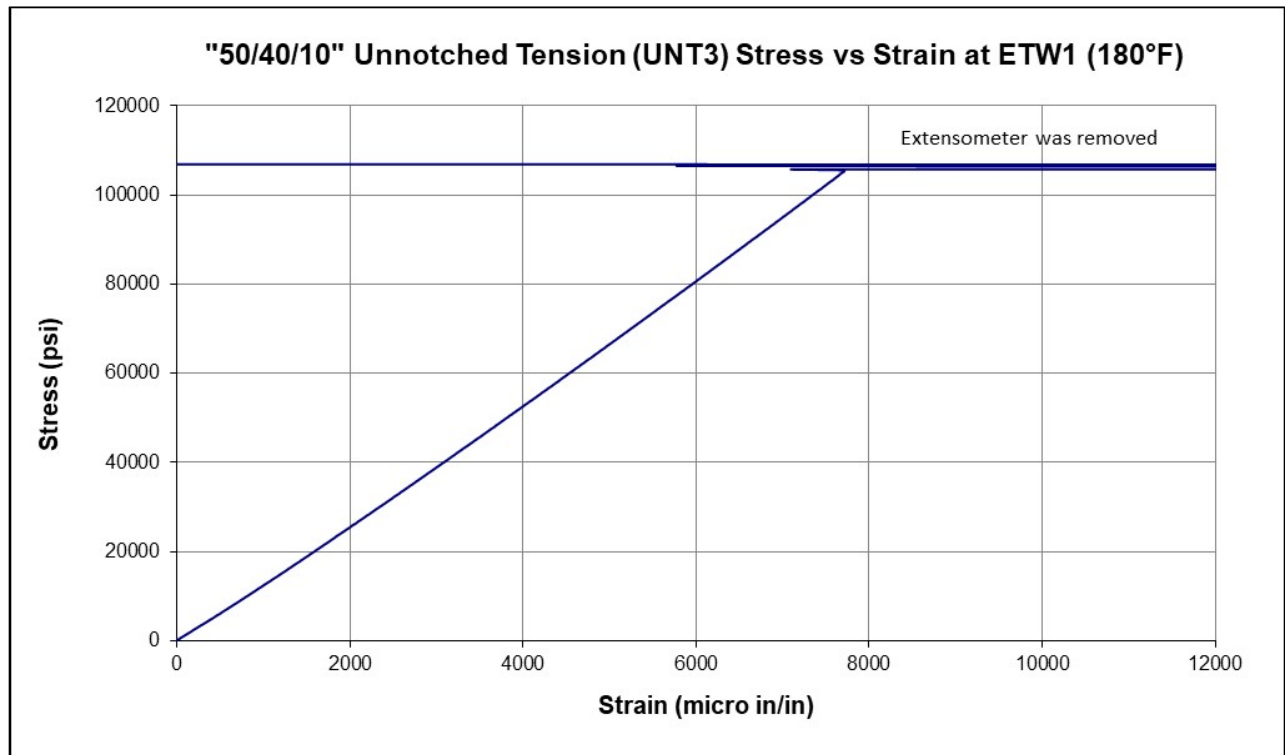
6.7 "10/80/10" Unnotched Tension 2 (UNT2)



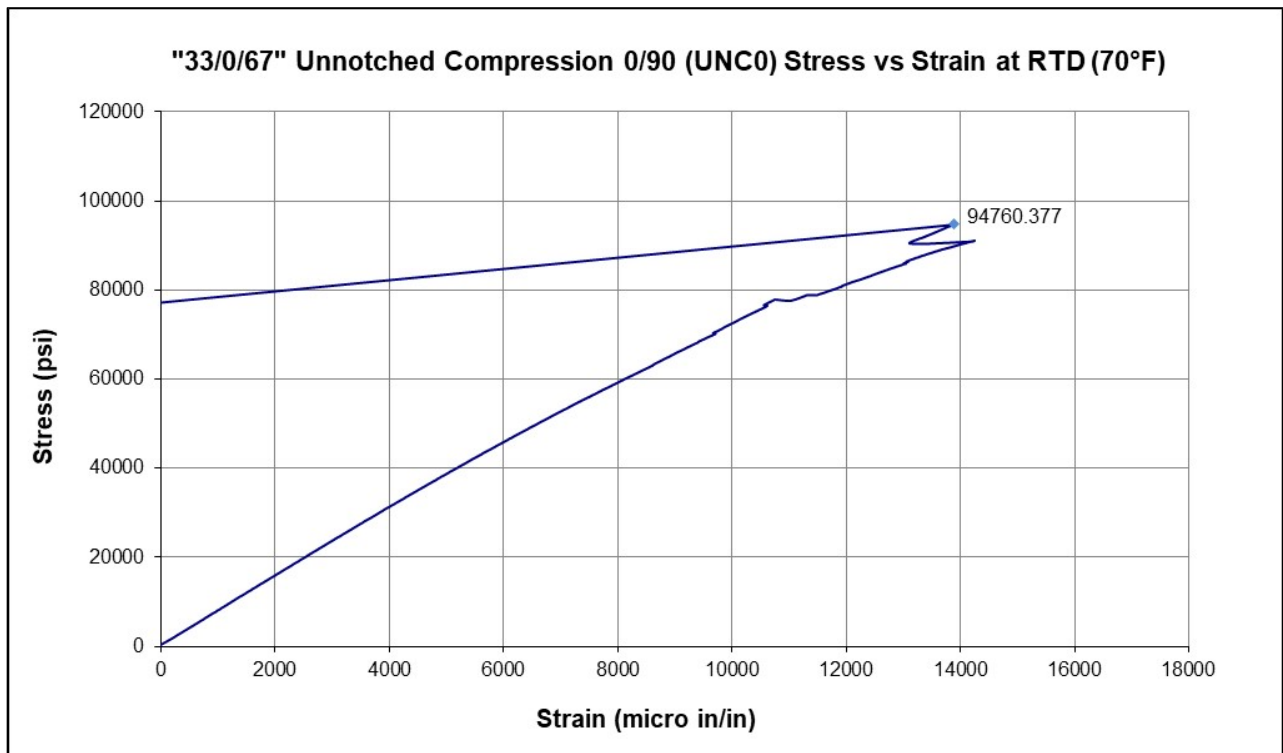
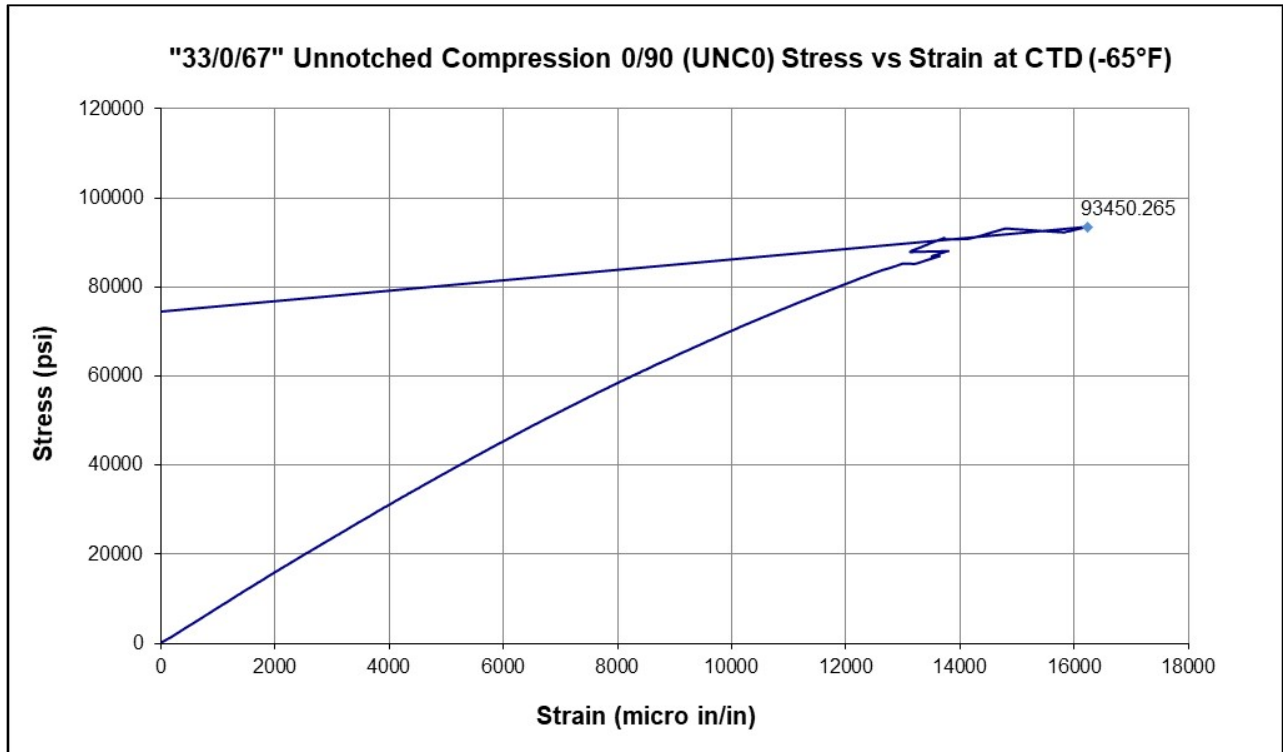


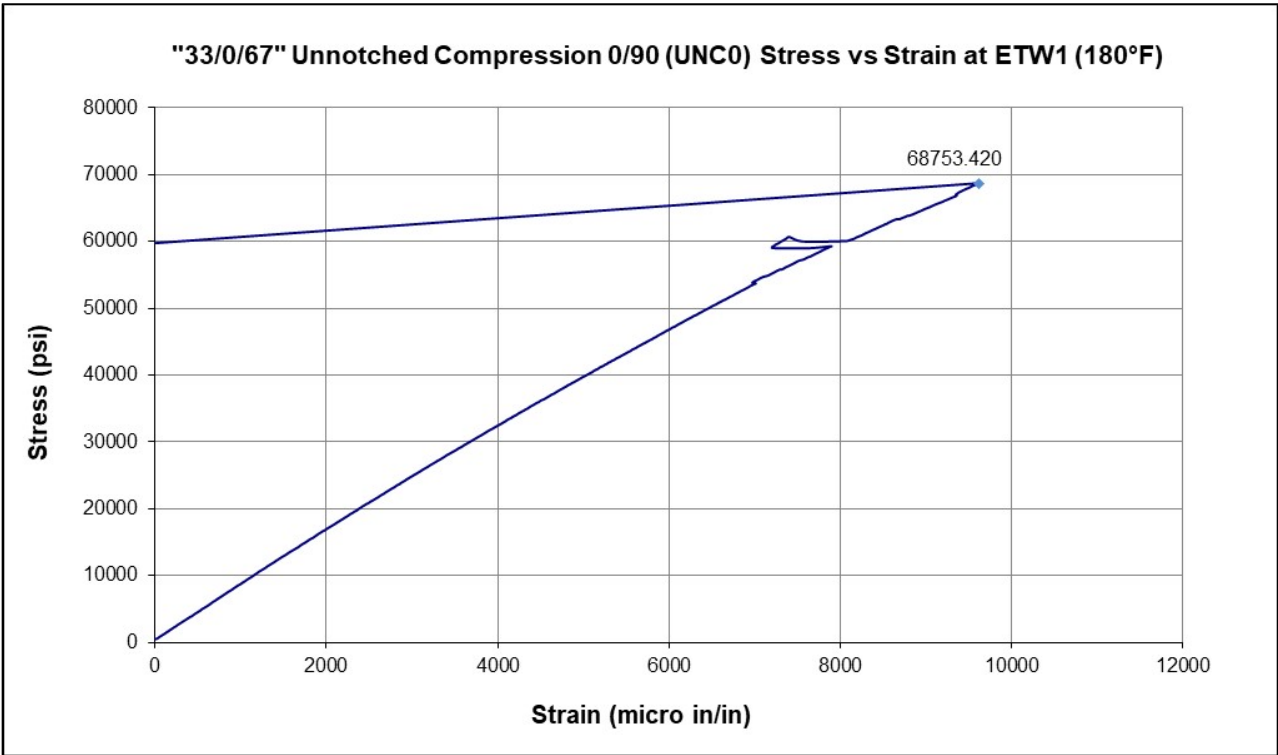
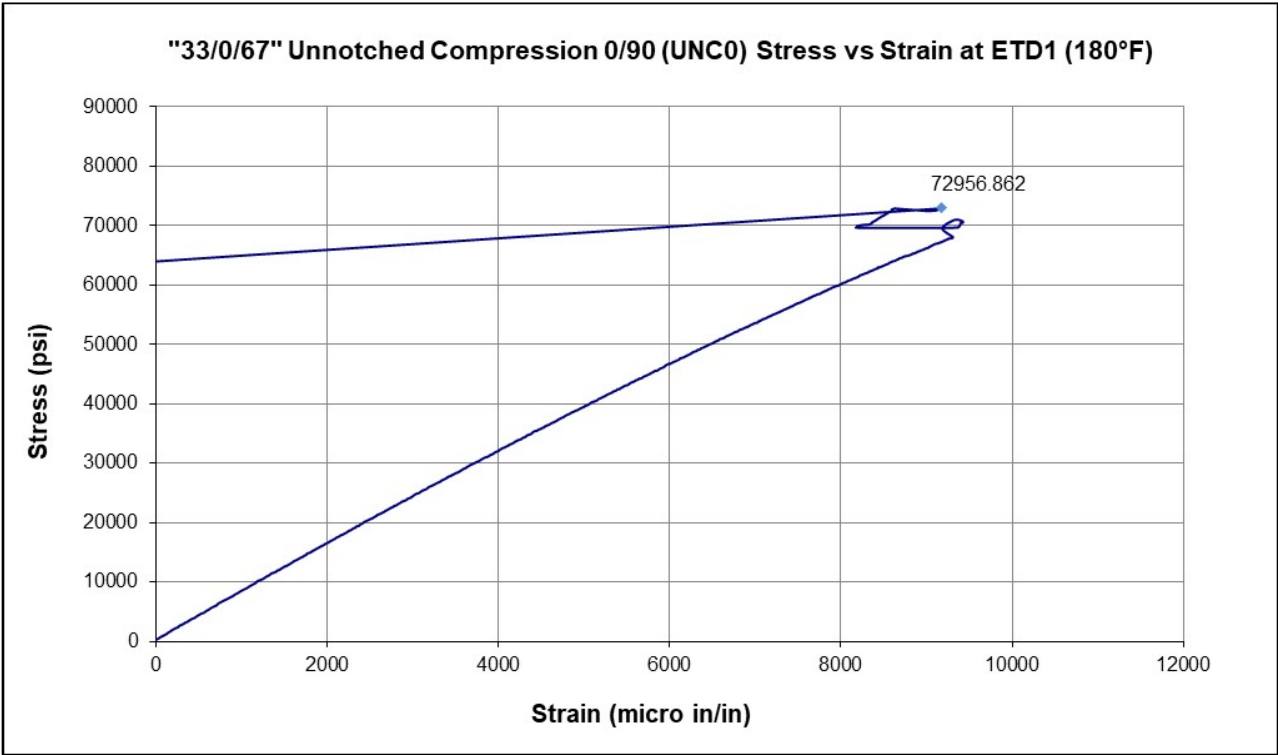
6.8 “50/40/10” Unnotched Tension 3 (UNT3)

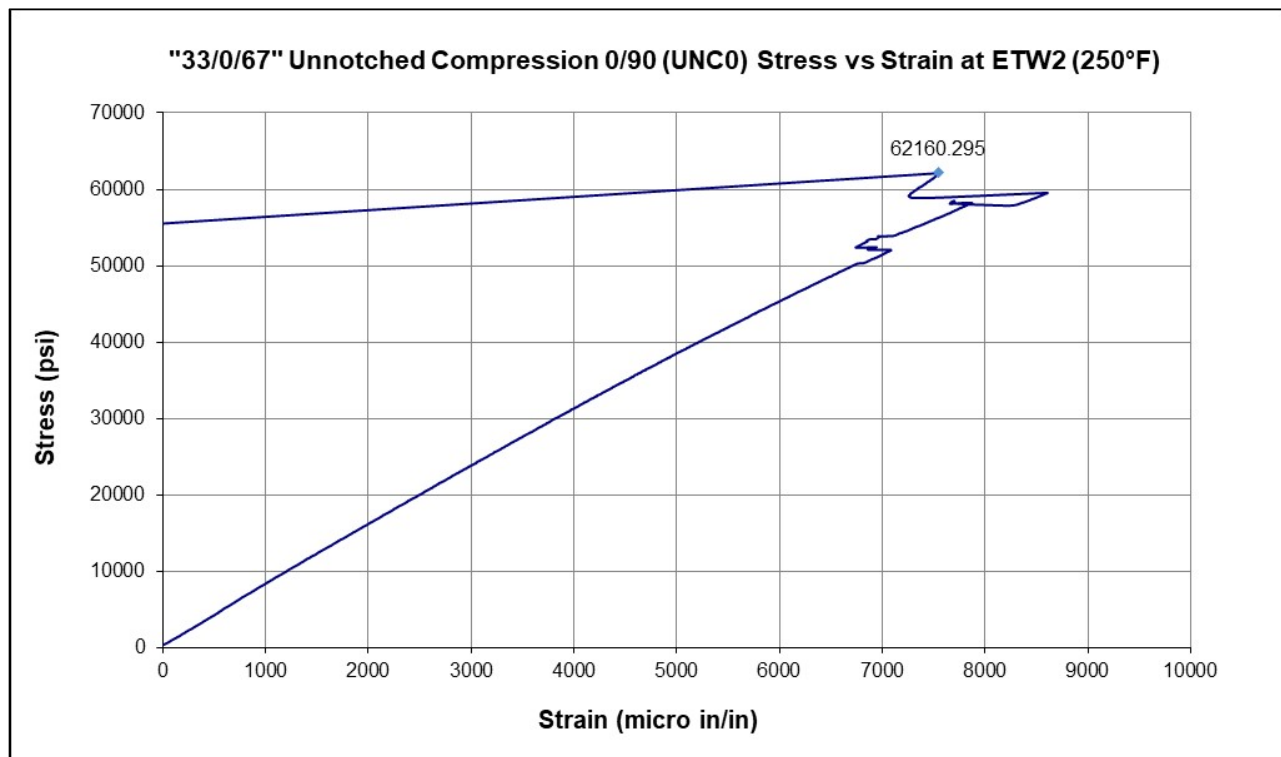


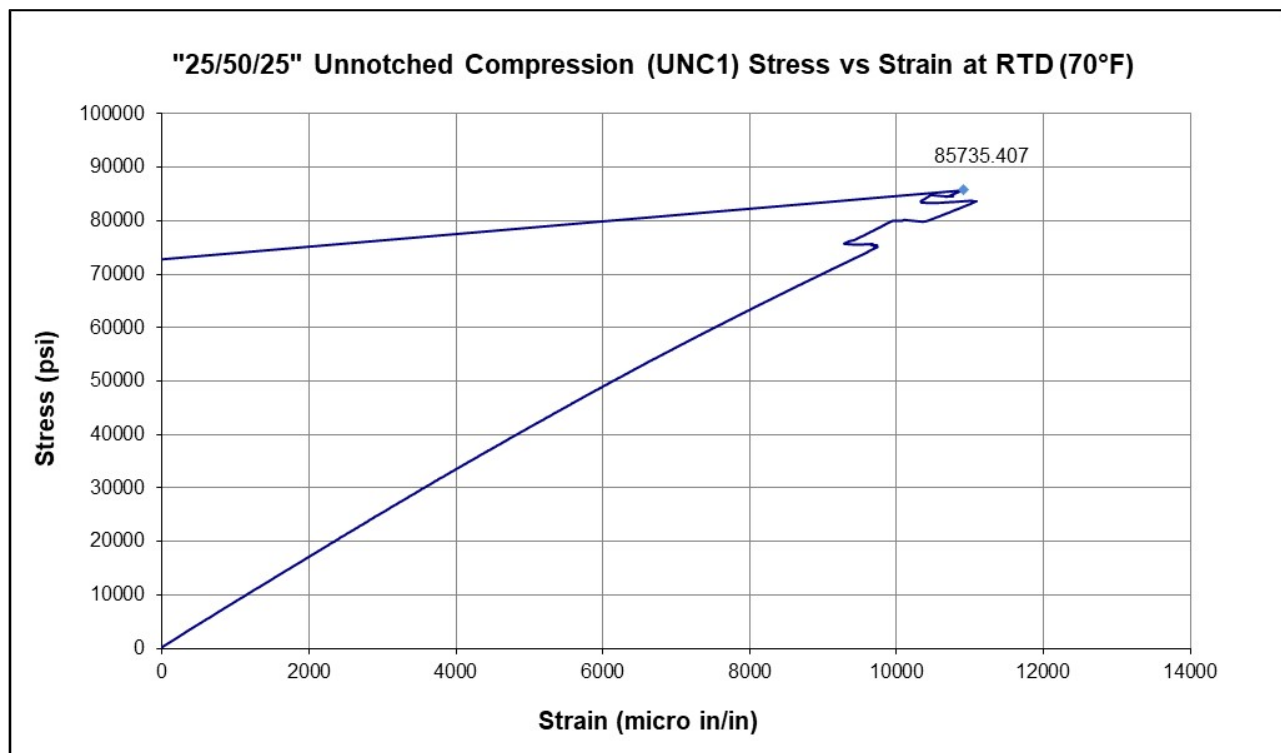
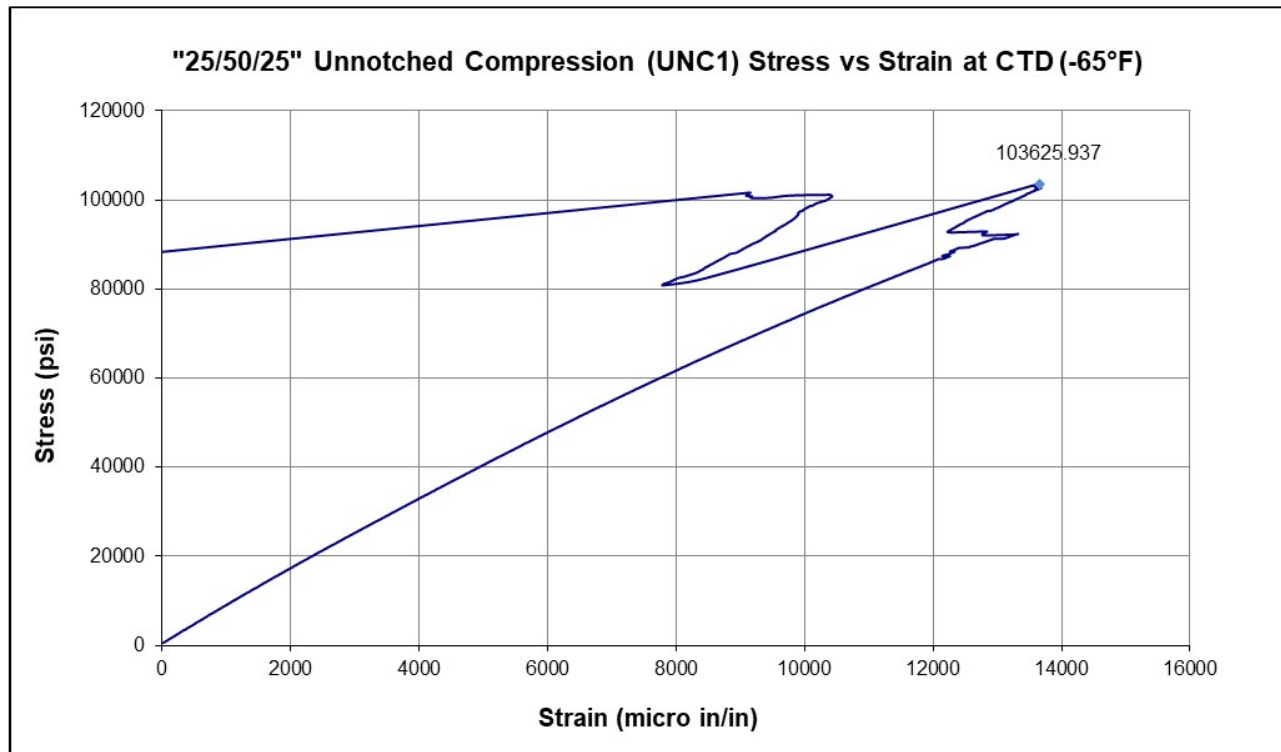


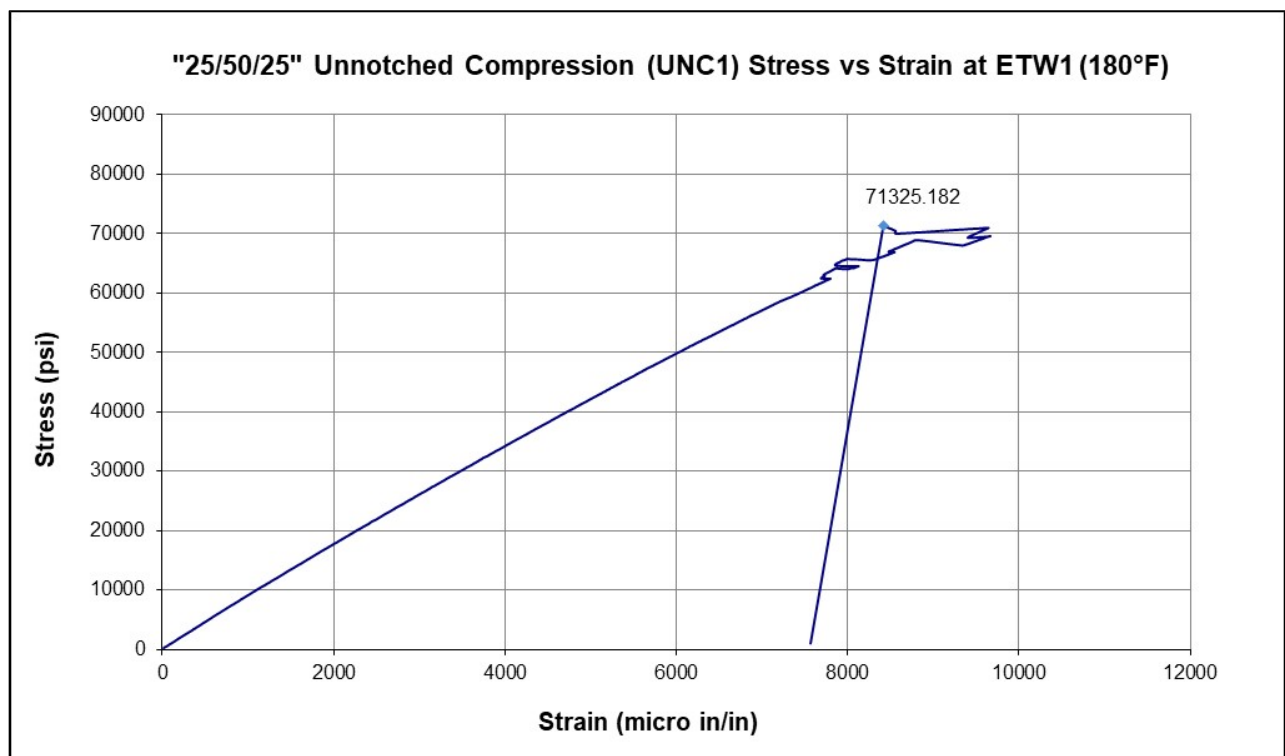
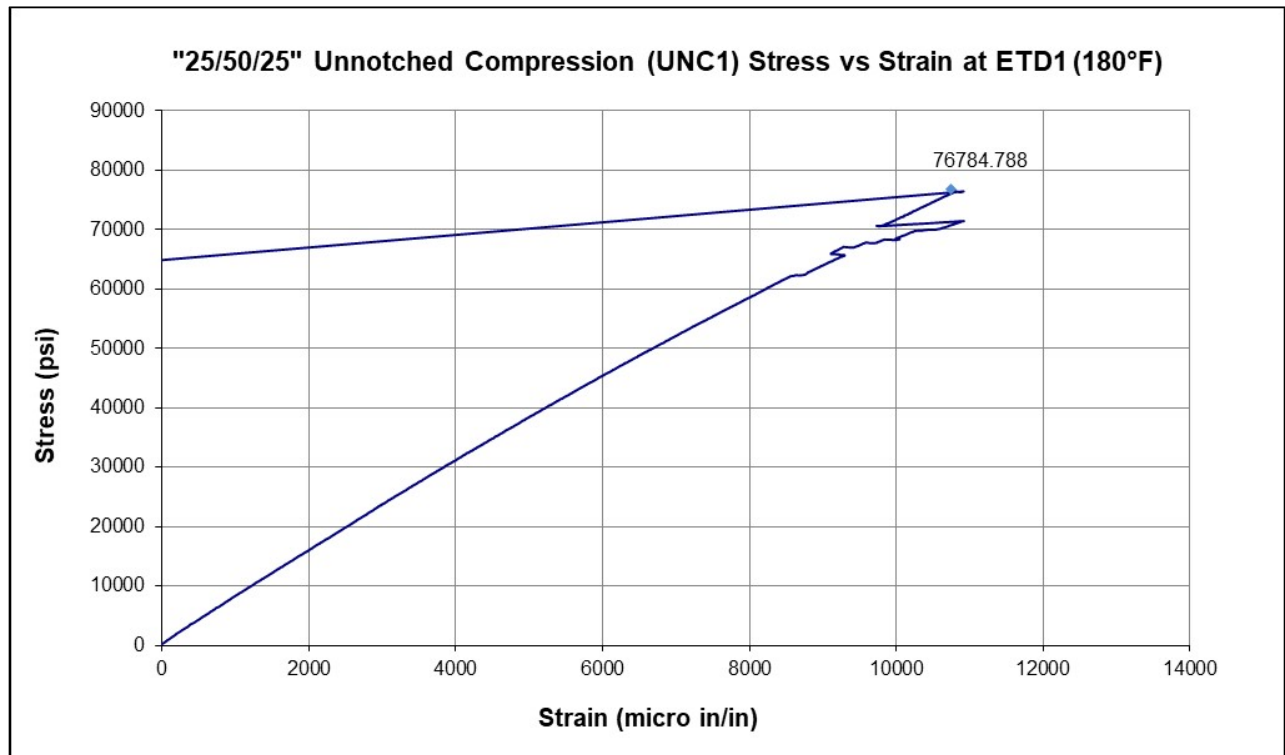
6.9 "33/0/67" Unnotched Compression 0/90 (UNC0)

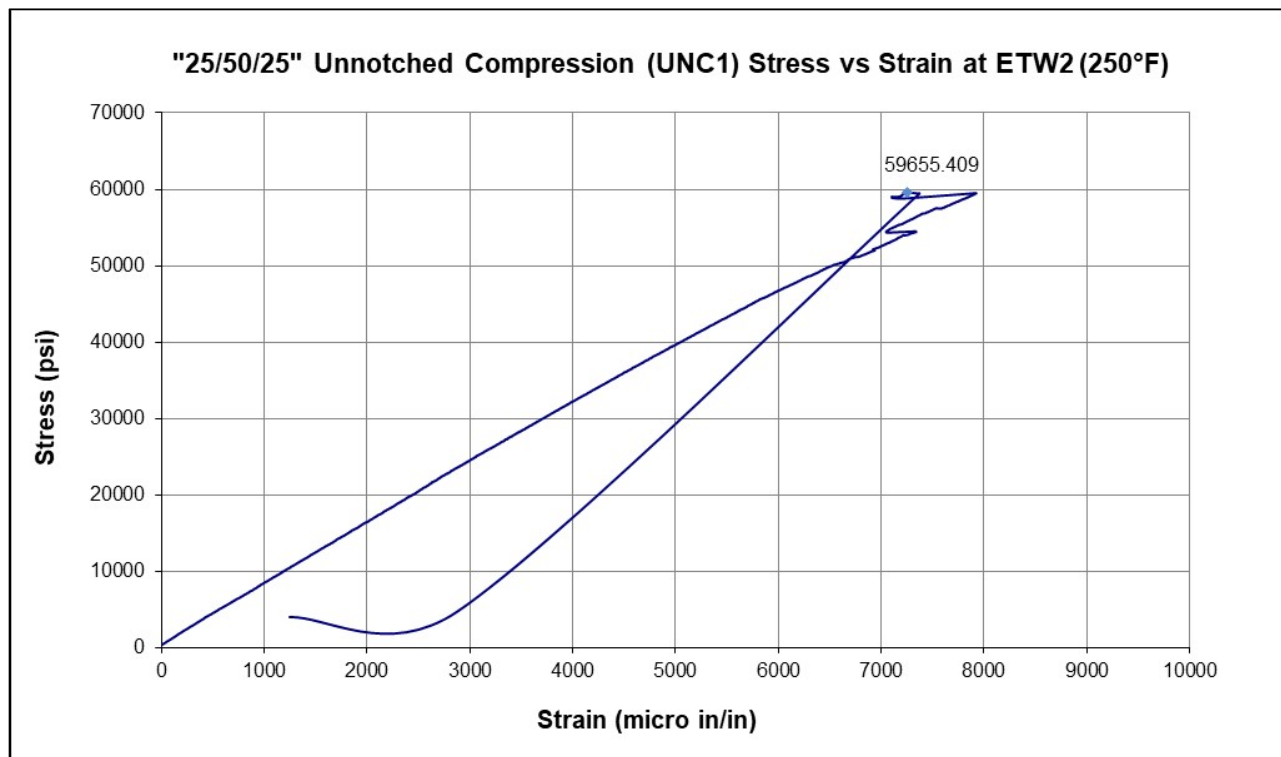


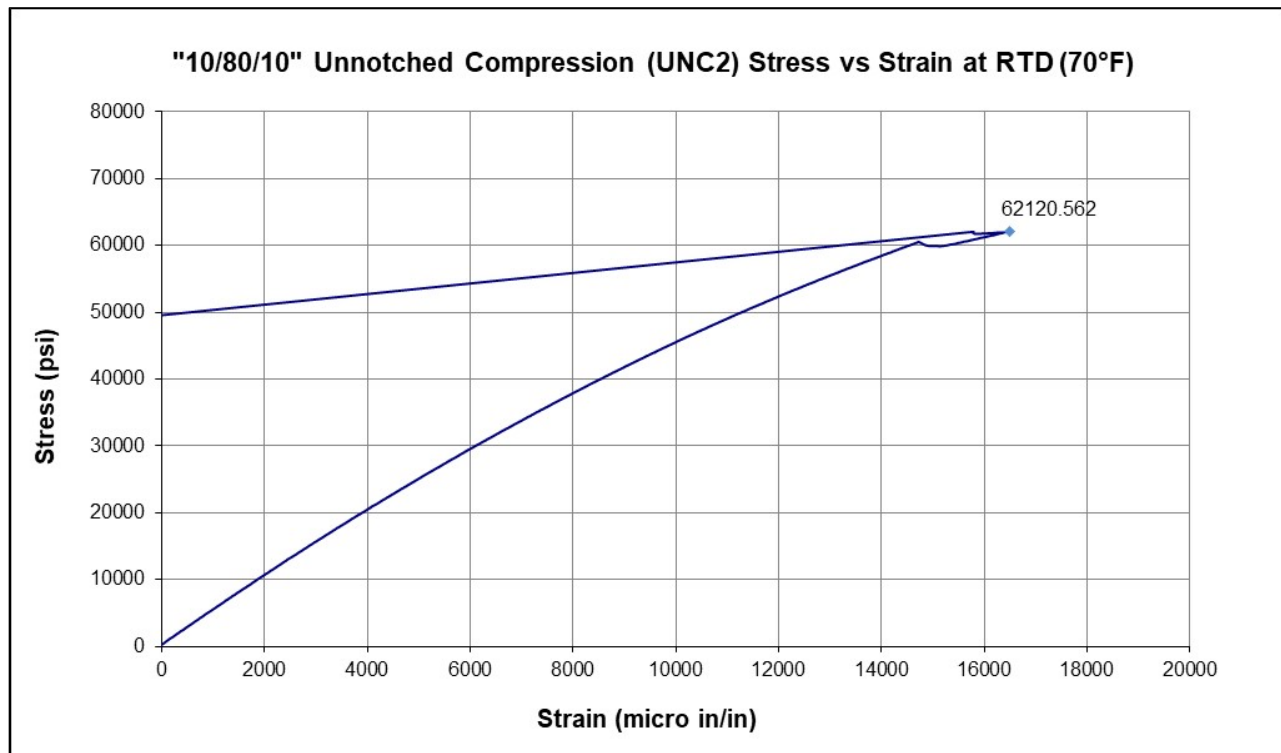
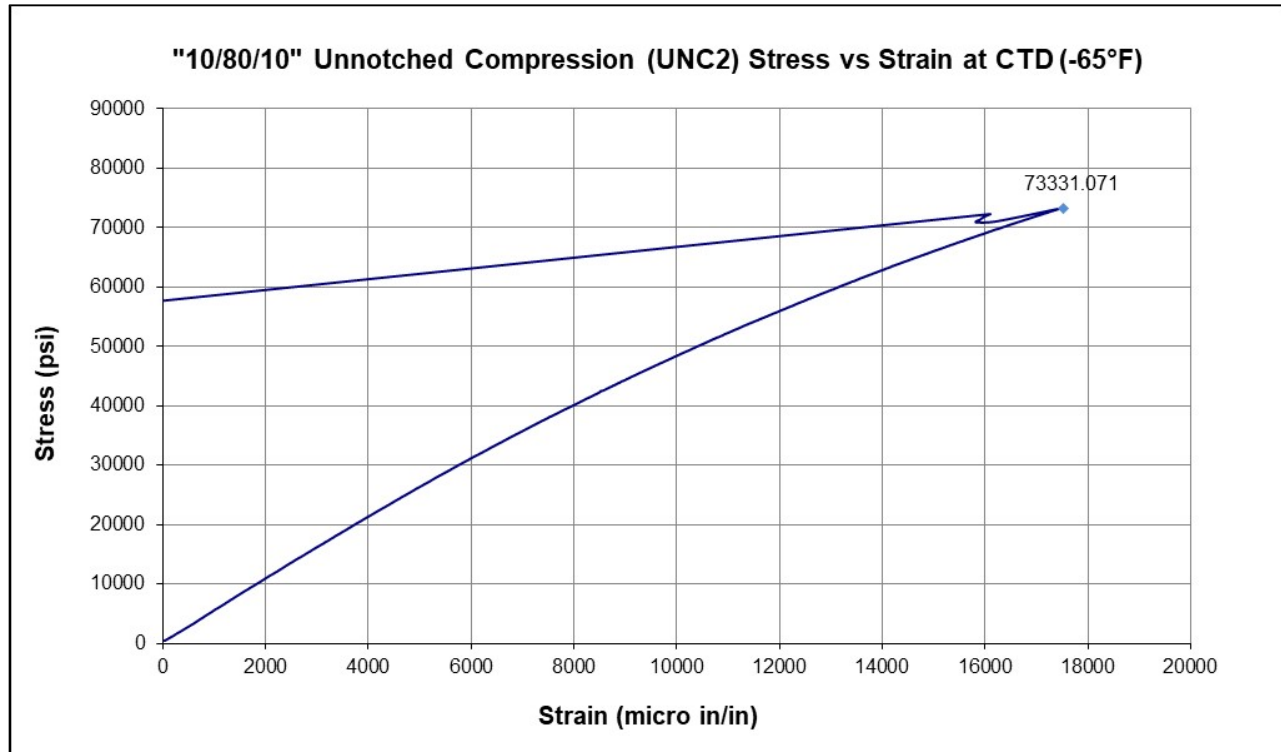


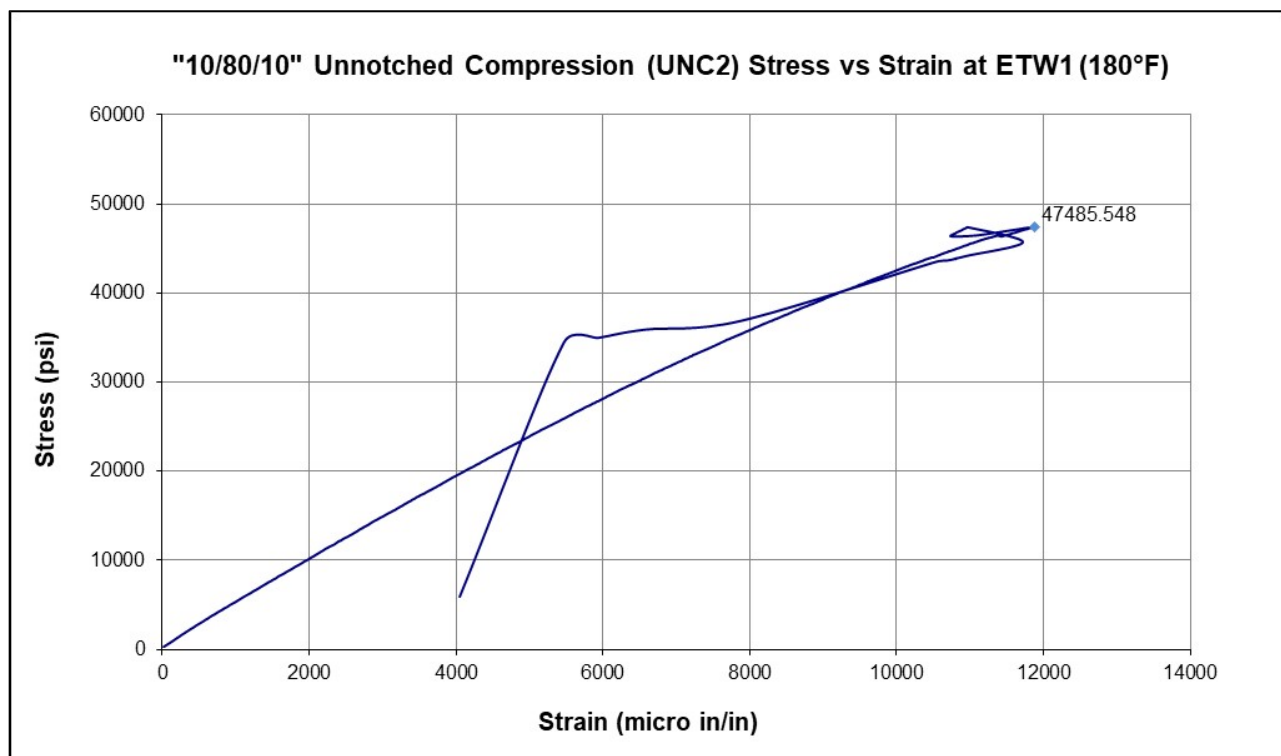
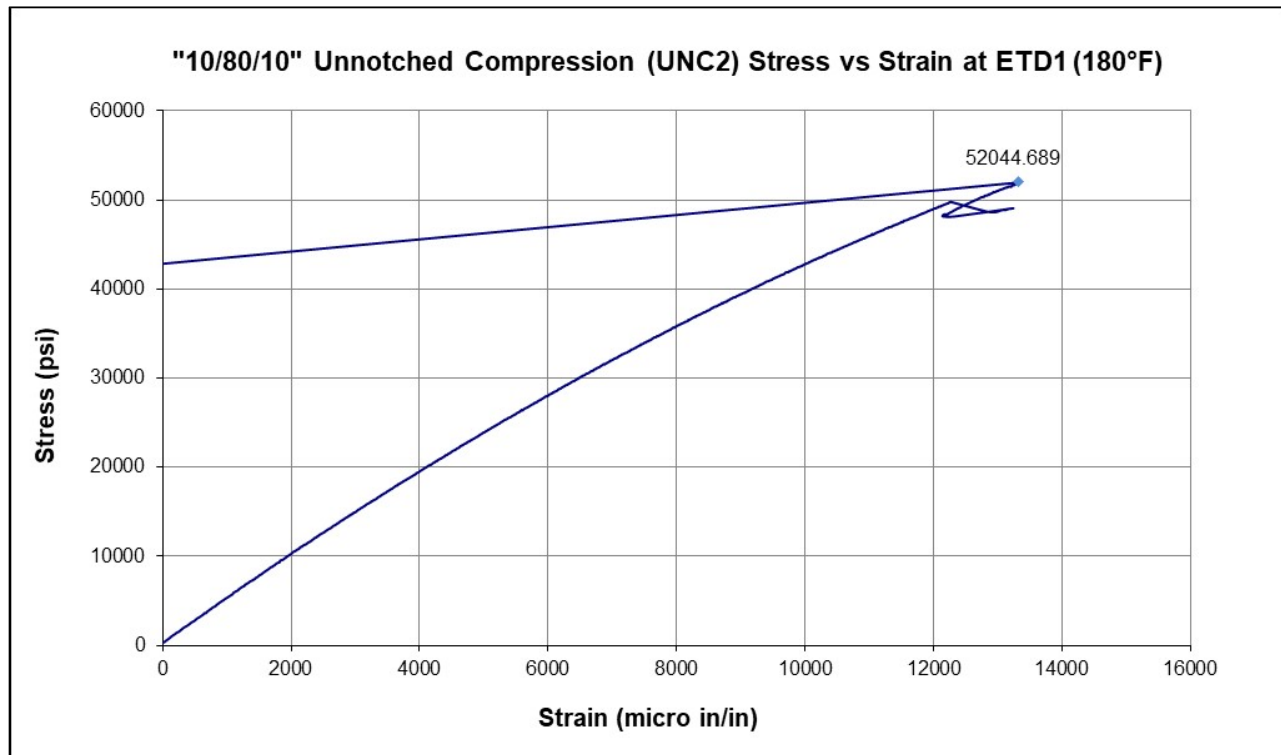


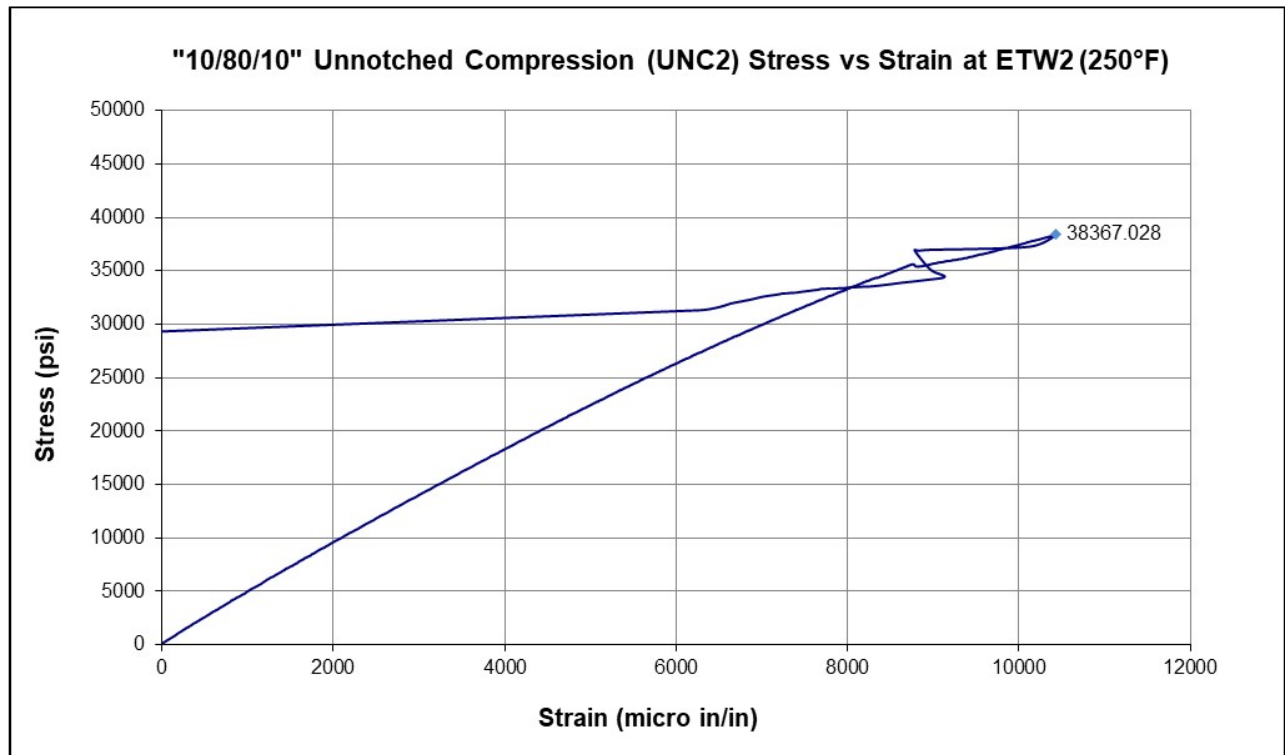
6.10 “25/50/25” Unnotched Compression 1 (UNC1)



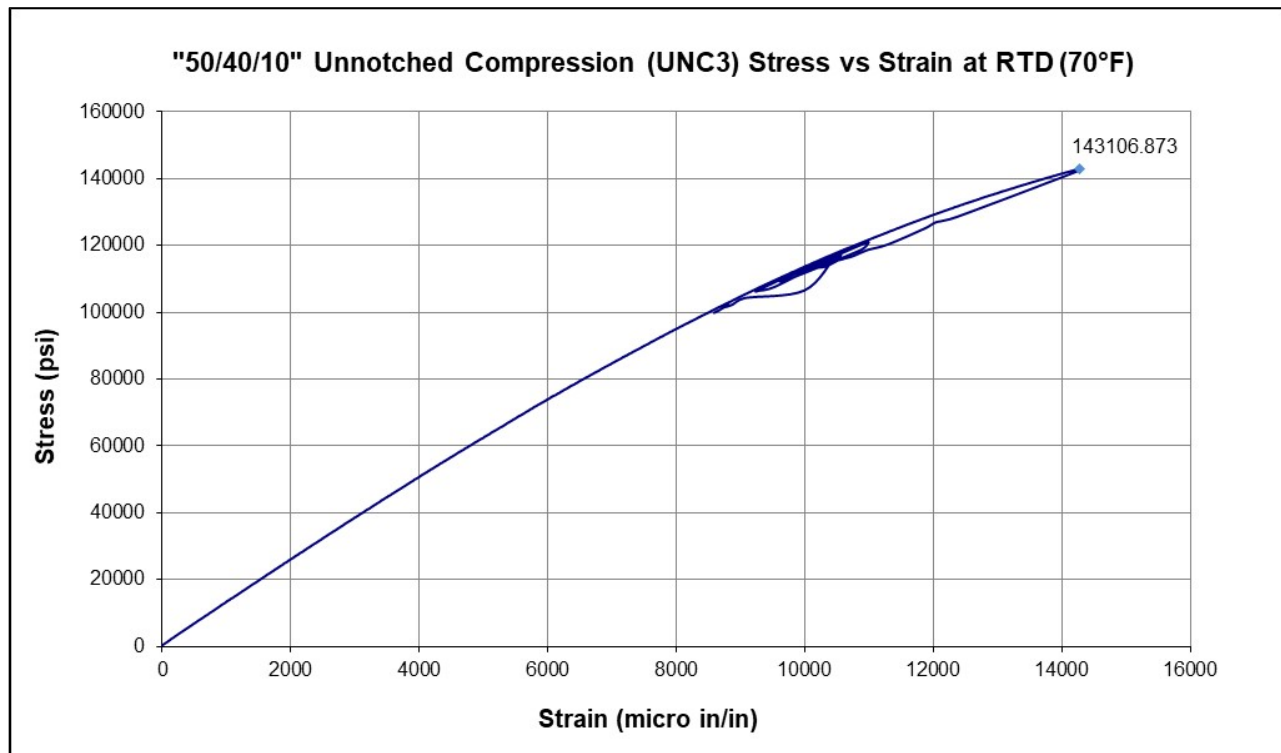
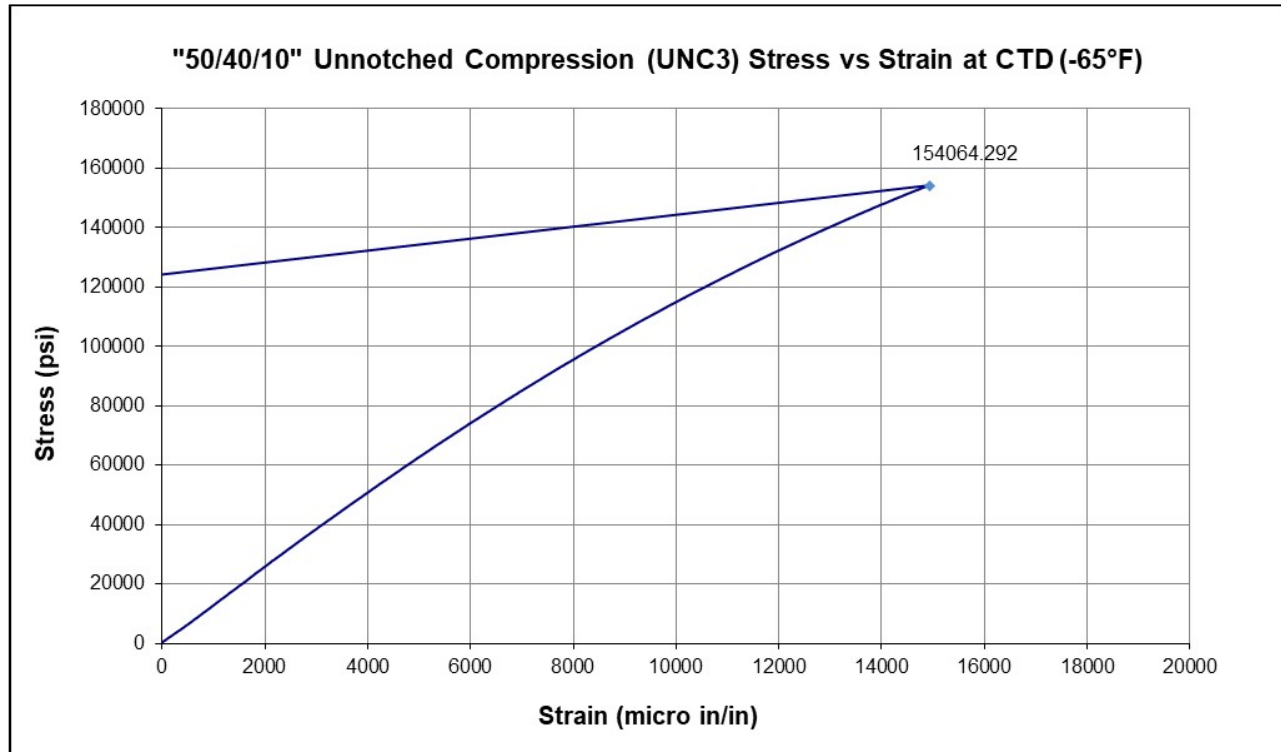


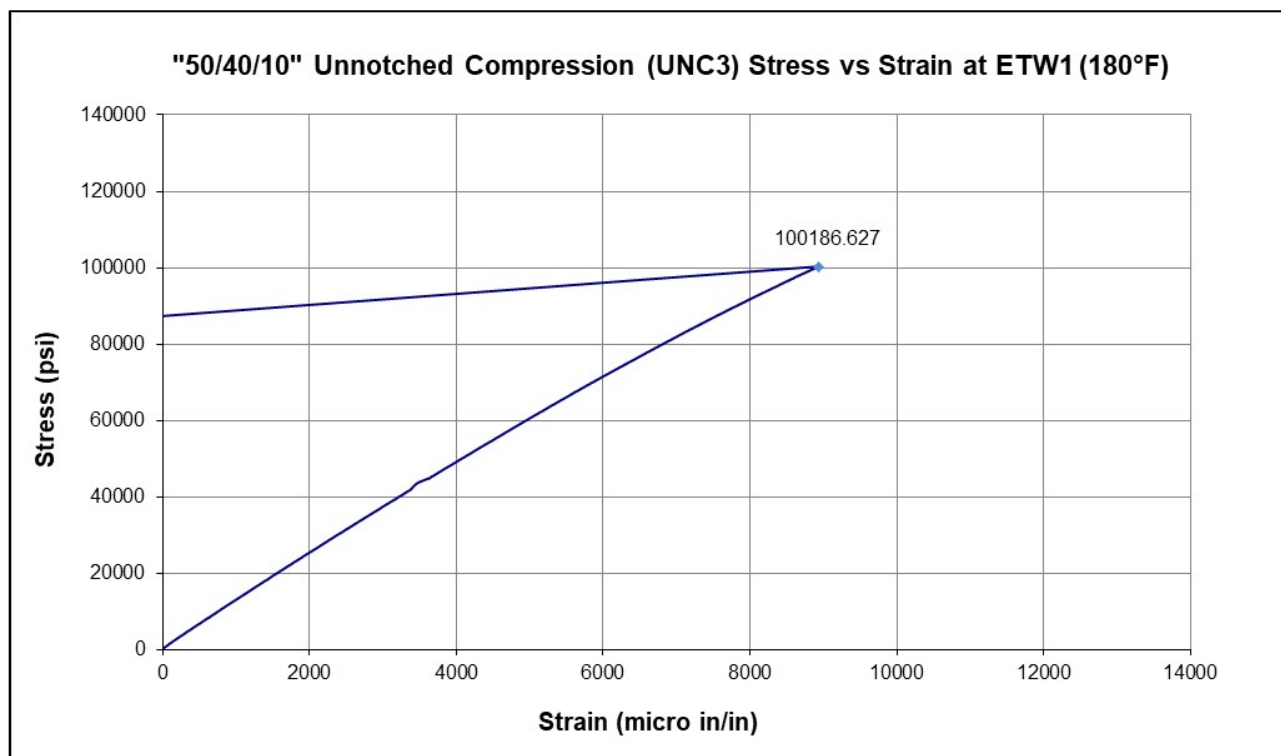
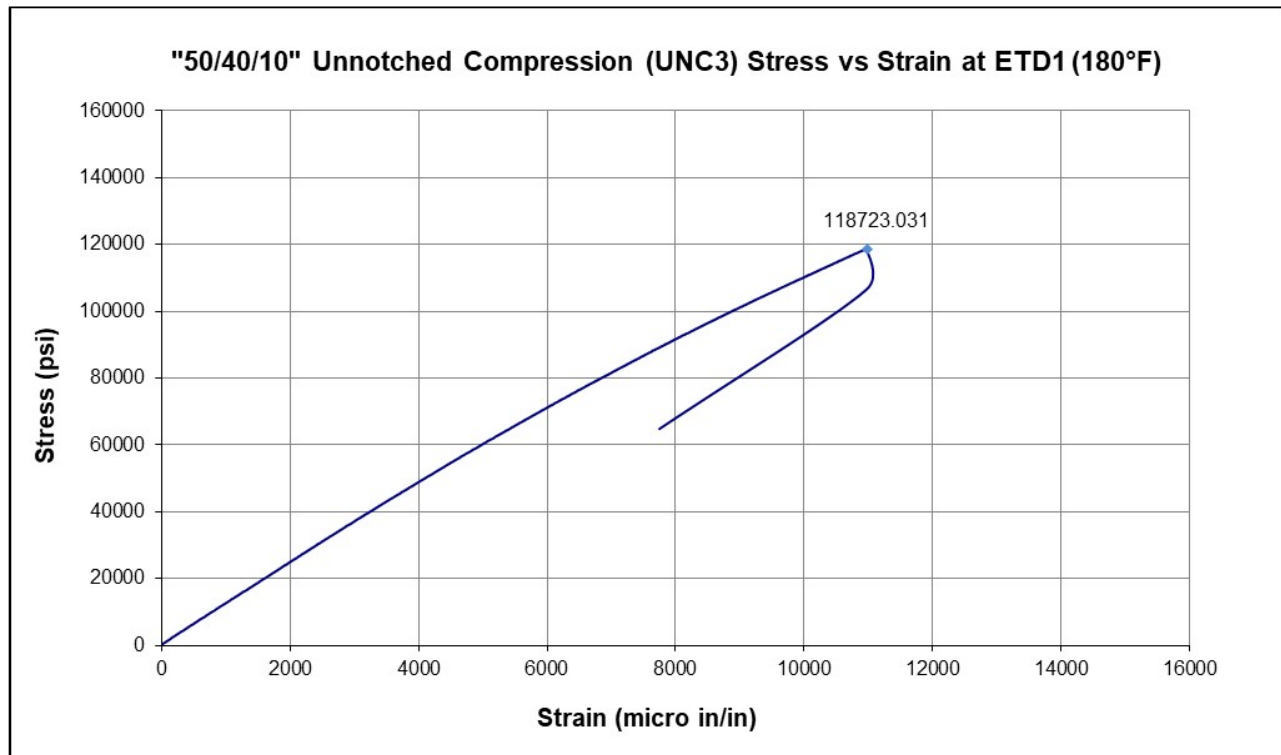
6.11 “10/80/10” Unnotched Compression 2 (UNC2)

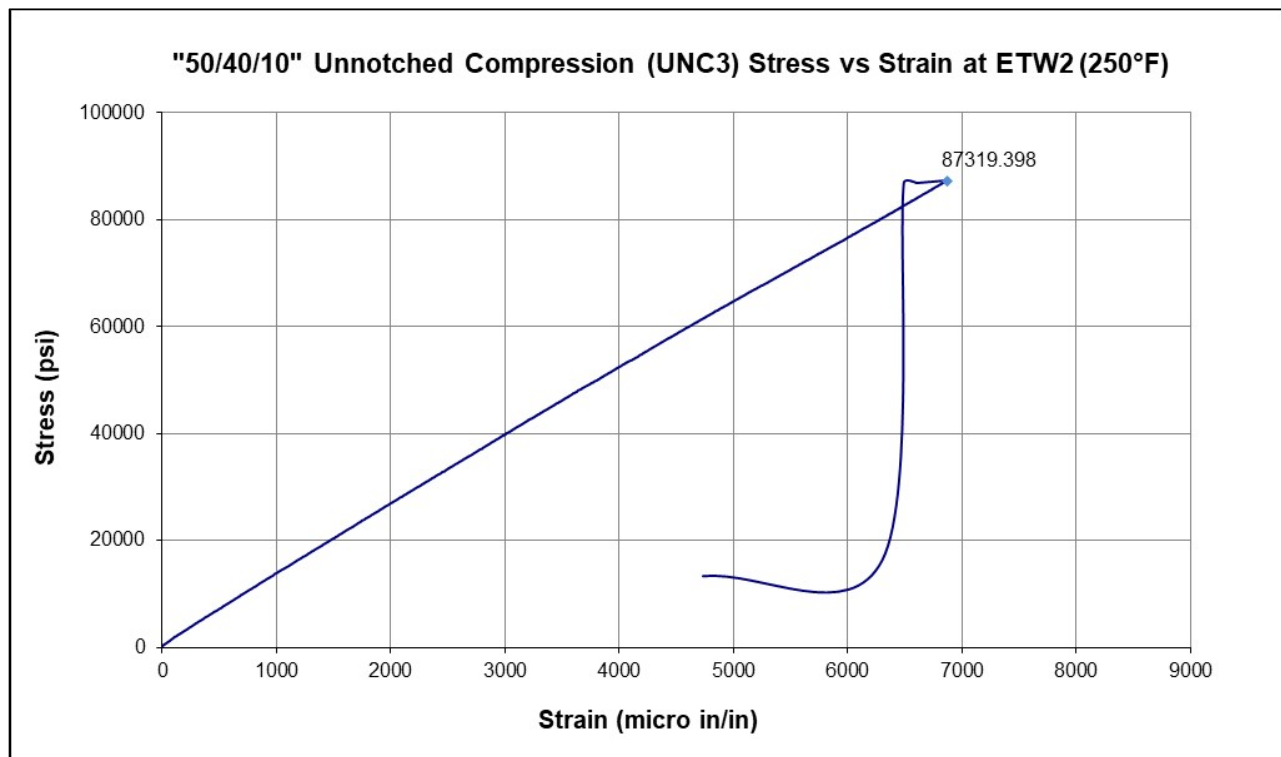




6.12 "50/40/10" Unnotched Compression 3 (UNC3)





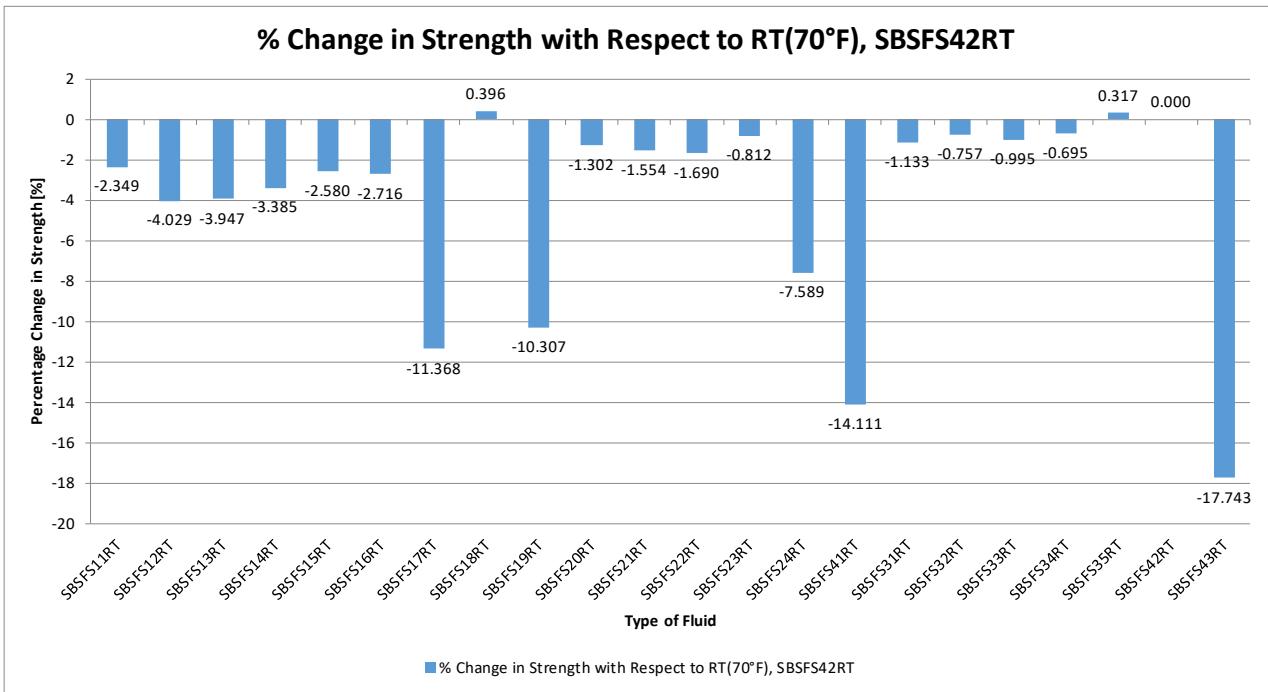
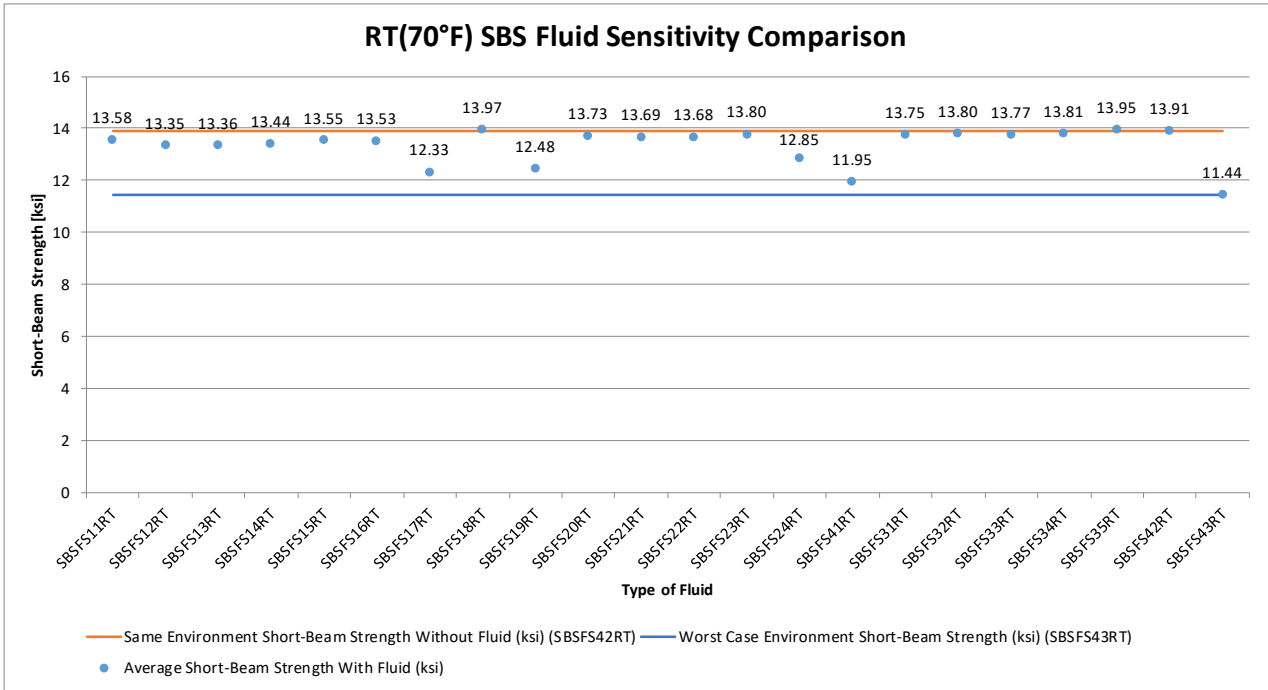


7. Fluid Sensitivity Comparison

7.1 Short Beam Strength Fluid Sensitivity (SBSFS)

7.1.1 SBSFS Room Temperature Test Data

Code	Type of Fluid	Exposure
SBSFS11RT	100 Low Lead Fuel	90 days min @ 70°F±10°F
SBSFS12RT	Jet A Fuel	
SBSFS13RT	MIL-PRF-5606 Hydraulic Oil	
SBSFS14RT	MIL-PRF-83282 Hydraulic Oil	
SBSFS15RT	MIL-PRF-7808 Engine Oil	
SBSFS16RT	MIL-PRF-23699 Engine Oil	
SBSFS17RT	Sea Water	
SBSFS18RT	Skydrol LD-4	
SBSFS19RT	50% Water with 50% Skydrol LD-4	
SBSFS20RT	MIL-PRF-87252 PAO Cooling Fluid	
SBSFS21RT	E85 Fuel (Alternate aircraft fuel)	
SBSFS22RT	SAE AMS 2629 Jet Reference Fluid	
SBSFS23RT	MIL-PRF-87257B Hydraulic Oil	
SBSFS24RT	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
SBSFS41RT	Distilled Water	
SBSFS31RT	MEK washing fluid	90 mins @ 70°F±10°F
SBSFS32RT	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
SBSFS33RT	De-icing Fluid SAE AMS 1428 (Type II)	
SBSFS34RT	De-icing Fluid SAE AMS 1428 (Type IV)	
SBSFS35RT	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
SBSFS42RT	Dry	Per section 6.1 Test Plan NTP 3800Q1
SBSFS43RT	85% Relative Humidity	Per section 6.1 Test Plan NTP 3800Q1



Fluid Sensitivity Screening
Short Beam Strength Properties (SBSFS)--RT(70°F) Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

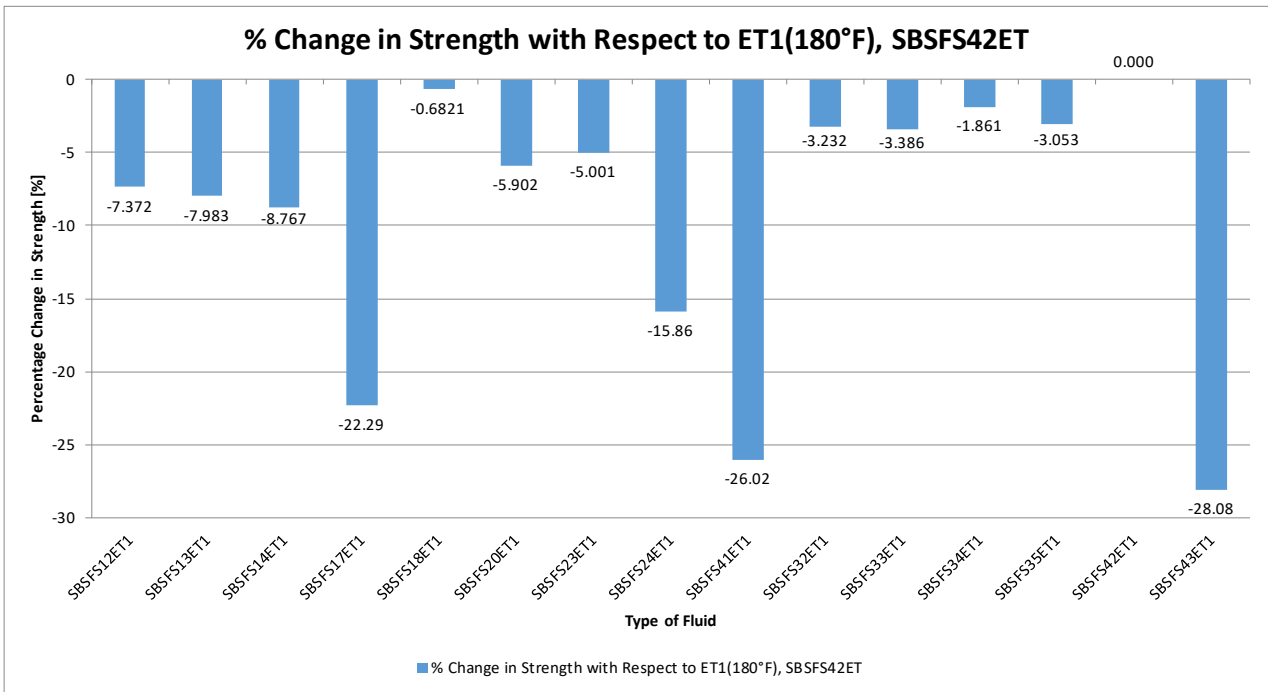
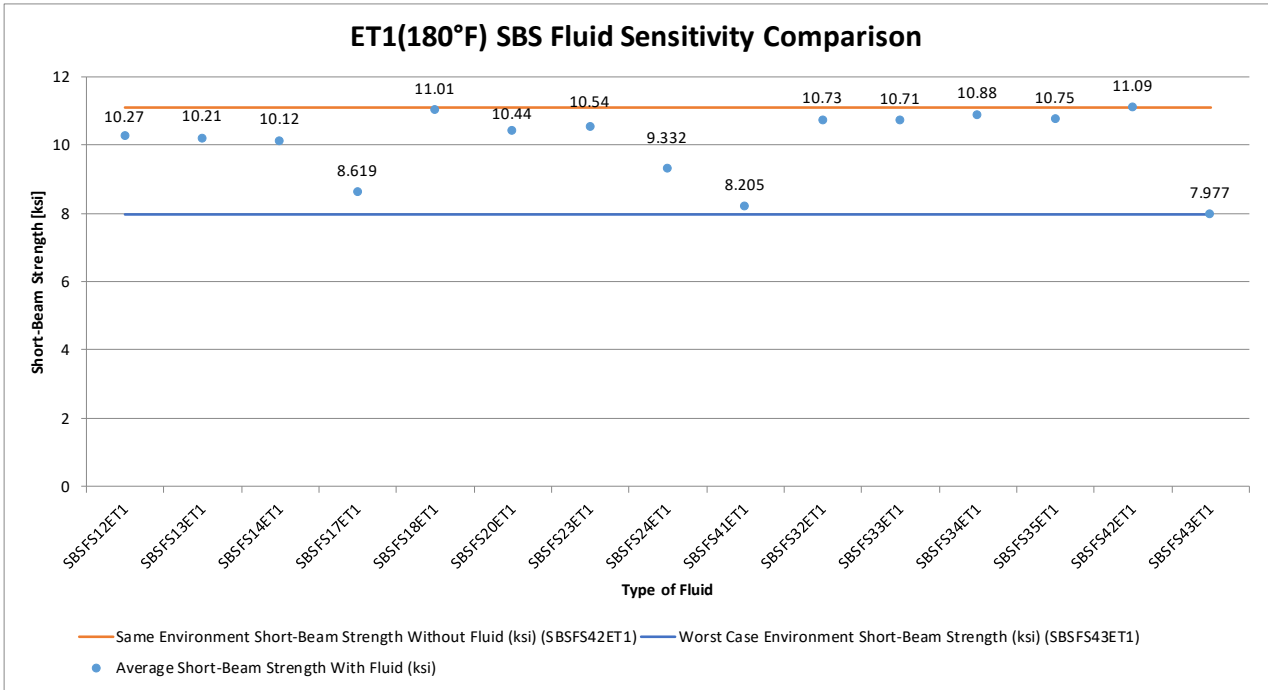
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Average Strength [ksi]	Failure Mode
SBSFS11RT	TCDQA111FS11RT	A	C1	1	1	13.52	0.1525	32	0.004765	13.58	ILS, INELASTIC DEFORMATION
	TCDQA112FS11RT	A	C1	1	1	13.67	0.1525	32	0.004766		ILS, INELASTIC DEFORMATION
	TCDQA113FS11RT	A	C1	1	1	13.62	0.1537	32	0.004802		ILS, INELASTIC DEFORMATION
	TCDQA114FS11RT	A	C1	1	1	13.49	0.1540	32	0.004814		ILS, INELASTIC DEFORMATION
	TCDQA115FS11RT	A	C1	1	1	13.63	0.1536	32	0.004800		ILS, INELASTIC DEFORMATION
SBSFS12RT	TCDQA112FS12RT	A	C1	1	1	13.76	0.1494	32	0.004670	13.35	ILS, INELASTIC DEFORMATION
	TCDQA113FS12RT	A	C1	1	1	13.16	0.1532	32	0.004786		ILS, INELASTIC DEFORMATION
	TCDQA114FS12RT	A	C1	1	1	13.25	0.1539	32	0.004809		ILS, INELASTIC DEFORMATION
	TCDQA115FS12RT	A	C1	1	1	13.40	0.1519	32	0.004746		ILS, INELASTIC DEFORMATION
	TCDQA116FS12RT	A	C1	1	1	13.19	0.1530	32	0.004782		ILS, INELASTIC DEFORMATION
SBSFS13RT	TCDQA111FS13RT	A	C1	1	1	13.36	0.1542	32	0.004819	13.36	ILS, INELASTIC DEFORMATION
	TCDQA112FS13RT	A	C1	1	1	13.36	0.1523	32	0.004758		ILS, INELASTIC DEFORMATION
	TCDQA113FS13RT	A	C1	1	1	13.32	0.1541	32	0.004815		ILS, INELASTIC DEFORMATION
	TCDQA114FS13RT	A	C1	1	1	13.31	0.1543	32	0.004823		ILS, INELASTIC DEFORMATION
	TCDQA115FS13RT	A	C1	1	1	13.45	0.1549	32	0.004841		ILS, INELASTIC DEFORMATION
SBSFS14RT	TCDQA111FS14RT	A	C1	1	1	13.73	0.1584	32	0.004948	13.44	ILS, INELASTIC DEFORMATION
	TCDQA113FS14RT	A	C1	1	1	13.31	0.1546	32	0.004831		ILS, INELASTIC DEFORMATION
	TCDQA114FS14RT	A	C1	1	1	13.13	0.1550	32	0.004844		ILS, INELASTIC DEFORMATION
	TCDQA115FS14RT	A	C1	1	1	13.36	0.1547	32	0.004834		ILS, INELASTIC DEFORMATION
	TCDQA116FS14RT	A	C1	1	1	13.65	0.1572	32	0.004914		ILS, INELASTIC DEFORMATION
SBSFS15RT	TCDQA111FS15RT	A	C1	1	1	13.68	0.1562	32	0.004882	13.55	ILS, INELASTIC DEFORMATION
	TCDQA112FS15RT	A	C1	1	1	13.56	0.1590	32	0.004968		ILS, INELASTIC DEFORMATION
	TCDQA113FS15RT	A	C1	1	1	13.34	0.1584	32	0.004950		ILS, INELASTIC DEFORMATION
	TCDQA114FS15RT	A	C1	1	1	13.49	0.1566	32	0.004894		ILS, INELASTIC DEFORMATION
	TCDQA115FS15RT	A	C1	1	1	13.69	0.1574	32	0.004919		ILS, INELASTIC DEFORMATION
SBSFS16RT	TCDQA111FS16RT	A	C1	1	1	13.68	0.1580	32	0.004936	13.53	ILS, INELASTIC DEFORMATION
	TCDQA112FS16RT	A	C1	1	1	13.54	0.1566	32	0.004895		ILS, INELASTIC DEFORMATION
	TCDQA113FS16RT	A	C1	1	1	13.53	0.1572	32	0.004911		ILS, INELASTIC DEFORMATION
	TCDQA114FS16RT	A	C1	1	1	13.40	0.1610	32	0.005032		ILS, INELASTIC DEFORMATION
	TCDQA115FS16RT	A	C1	1	1	13.51	0.1580	32	0.004939		ILS, INELASTIC DEFORMATION
SBSFS17RT	TCDQA111FS17RT	A	C1	1	1	12.33	0.1602	32	0.005005	12.33	ILS, INELASTIC DEFORMATION
	TCDQA112FS17RT	A	C1	1	1	12.36	0.1584	32	0.004950		ILS, INELASTIC DEFORMATION
	TCDQA113FS17RT	A	C1	1	1	12.29	0.1589	32	0.004965		ILS, INELASTIC DEFORMATION
	TCDQA114FS17RT	A	C1	1	1	12.35	0.1585	32	0.004953		ILS, INELASTIC DEFORMATION
	TCDQA115FS17RT	A	C1	1	1	12.32	0.1583	32	0.004946		ILS, INELASTIC DEFORMATION
SBSFS18RT	TCDQA111FS18RT	A	C1	1	1	14.05	0.1603	32	0.005009	13.97	ILS, INELASTIC DEFORMATION
	TCDQA112FS18RT	A	C1	1	1	14.16	0.1582	32	0.004945		ILS, INELASTIC DEFORMATION
	TCDQA113FS18RT	A	C1	1	1	13.88	0.1582	32	0.004944		ILS, INELASTIC DEFORMATION
	TCDQA114FS18RT	A	C1	1	1	13.92	0.1580	32	0.004938		ILS, INELASTIC DEFORMATION
	TCDQA115FS18RT	A	C1	1	1	13.82	0.1579	32	0.004934		ILS, INELASTIC DEFORMATION
SBSFS19RT	TCDQA111FS19RT	A	C1	1	1	12.46	0.1584	32	0.004948	12.48	ILS, INELASTIC DEFORMATION
	TCDQA112FS19RT	A	C1	1	1	12.52	0.1581	32	0.004941		ILS, INELASTIC DEFORMATION
	TCDQA113FS19RT	A	C1	1	1	12.49	0.1566	32	0.004893		ILS, INELASTIC DEFORMATION
	TCDQA114FS19RT	A	C1	1	1	12.41	0.1585	32	0.004952		ILS, INELASTIC DEFORMATION
	TCDQA115FS19RT	A	C1	1	1	12.50	0.1577	32	0.004929		ILS, INELASTIC DEFORMATION
SBSFS20RT	TCDQA111FS20RT	A	C1	1	1	13.69	0.1606	32	0.005020	13.73	ILS, INELASTIC DEFORMATION
	TCDQA112FS20RT	A	C1	1	1	13.74	0.1597	32	0.004992		ILS, INELASTIC DEFORMATION
	TCDQA113FS20RT	A	C1	1	1	13.81	0.1607	32	0.005022		ILS, INELASTIC DEFORMATION
	TCDQA115FS20RT	A	C1	1	1	13.63	0.1595	32	0.004985		ILS, INELASTIC DEFORMATION
	TCDQA116FS20RT	A	C1	1	1	13.78	0.1576	32	0.004926		ILS, INELASTIC DEFORMATION
SBSFS21RT	TCDQA111FS21RT	A	C1	1	1	13.82	0.1603	32	0.005009	13.69	ILS, INELASTIC DEFORMATION
	TCDQA112FS21RT	A	C1	1	1	13.61	0.1593	32	0.004977		ILS, INELASTIC DEFORMATION
	TCDQA113FS21RT	A	C1	1	1	13.69	0.1608	32	0.005026		ILS, INELASTIC DEFORMATION
	TCDQA114FS21RT	A	C1	1	1	13.70	0.1594	32	0.004980		ILS, INELASTIC DEFORMATION
	TCDQA115FS21RT	A	C1	1	1	13.65	0.1604	32	0.005014		ILS, INELASTIC DEFORMATION
SBSFS22RT	TCDQA111FS22RT	A	C1	1	1	13.78	0.1595	32	0.004984	13.68	ILS, INELASTIC DEFORMATION
	TCDQA112FS22RT	A	C1	1	1	13.83	0.1592	32	0.004975		ILS, INELASTIC DEFORMATION
	TCDQA113FS22RT	A	C1	1	1	13.82	0.1593	32	0.004979		ILS, INELASTIC DEFORMATION
	TCDQA114FS22RT	A	C1	1	1	13.52	0.1615	32	0.005046		ILS, INELASTIC DEFORMATION
	TCDQA115FS22RT	A	C1	1	1	13.43	0.1599	32	0.004997		ILS, INELASTIC DEFORMATION
SBSFS23RT	TCDQA111FS23RT	A	C1	1	1	13.77	0.1474	32	0.004605	13.80	ILS, INELASTIC DEFORMATION
	TCDQA112FS23RT	A	C1	1	1	13.87	0.1520	32	0.004750		ILS, INELASTIC DEFORMATION
	TCDQA113FS23RT	A	C1	1	1	13.69	0.1473	32	0.004604		ILS, INELASTIC DEFORMATION
	TCDQA114FS23RT	A	C1	1	1	13.86	0.1475	32	0.004609		ILS, INELASTIC DEFORMATION
	TCDQA115FS23RT	A	C1	1	1	13.79	0.1583	32	0.004946		ILS, INELASTIC DEFORMATION
SBSFS24RT	TCDQA111FS24RT	A	C1	1	1	12.87	0.1579	32	0.004933	12.85	ILS, INELASTIC DEFORMATION
	TCDQA112FS24RT	A	C1	1	1	12.80	0.1563	32	0.004883		ILS, INELASTIC DEFORMATION
	TCDQA113FS24RT	A	C1	1	1	12.71	0.1581	32	0.004942		ILS, INELASTIC DEFORMATION
	TCDQA114FS24RT	A	C1	1	1	13.01	0.1580	32	0.004936		ILS, INELASTIC DEFORMATION
	TCDQA115FS24RT	A	C1	1	1	12.89	0.1578	32	0.004931		ILS, INELASTIC DEFORMATION

SBSFS41RT	TCDQA111FS41RT	A	C1	1	1	11.89	0.1521	32	0.004754	11.95	ILS, INELASTIC DEFORMATION
	TCDQA112FS41RT	A	C1	1	1	11.98	0.1534	32	0.004793		ILS, INELASTIC DEFORMATION
	TCDQA113FS41RT	A	C1	1	1	11.88	0.1534	32	0.004794		ILS, INELASTIC DEFORMATION
	TCDQA114FS41RT	A	C1	1	1	12.05	0.1529	32	0.004778		ILS, INELASTIC DEFORMATION
	TCDQA117FS41RT	A	C1	1	1	11.94	0.1524	32	0.004764		ILS, INELASTIC DEFORMATION
SBSFS31RT	TCDQA111FS31RT	A	C1	1	1	13.64	0.1598	32	0.004994	13.75	ILS, INELASTIC DEFORMATION
	TCDQA112FS31RT	A	C1	1	1	13.93	0.1596	32	0.004986		ILS, INELASTIC DEFORMATION
	TCDQA113FS31RT	A	C1	1	1	13.58	0.1585	32	0.004953		ILS, INELASTIC DEFORMATION
	TCDQA114FS31RT	A	C1	1	1	13.80	0.1585	32	0.004952		ILS, INELASTIC DEFORMATION
	TCDQA115FS31RT	A	C1	1	1	13.80	0.1585	32	0.004952		ILS, INELASTIC DEFORMATION
SBSFS32RT	TCDQA112FS32RT	A	C1	1	1	13.76	0.1584	32	0.004950	13.80	ILS, INELASTIC DEFORMATION
	TCDQA113FS32RT	A	C1	1	1	13.81	0.1581	32	0.004940		ILS, INELASTIC DEFORMATION
	TCDQA114FS32RT	A	C1	1	1	13.92	0.1579	32	0.004933		ILS, INELASTIC DEFORMATION
	TCDQA115FS32RT	A	C1	1	1	13.68	0.1575	32	0.004922		ILS, INELASTIC DEFORMATION
	TCDQA116FS32RT	A	C1	1	1	13.85	0.1584	32	0.004950		ILS, INELASTIC DEFORMATION
SBSFS33RT	TCDQA111FS33RT	A	C1	1	1	13.60	0.1576	32	0.004925	13.77	ILS, INELASTIC DEFORMATION
	TCDQA112FS33RT	A	C1	1	1	13.83	0.1581	32	0.004940		ILS, INELASTIC DEFORMATION
	TCDQA113FS33RT	A	C1	1	1	13.87	0.1577	32	0.004928		ILS, INELASTIC DEFORMATION
	TCDQA114FS33RT	A	C1	1	1	13.90	0.1573	32	0.004915		ILS, INELASTIC DEFORMATION
	TCDQA115FS33RT	A	C1	1	1	13.65	0.1572	32	0.004913		ILS, INELASTIC DEFORMATION
SBSFS34RT	TCDQA111FS34RT	A	C1	1	1	13.81	0.1572	32	0.004913	13.81	ILS, INELASTIC DEFORMATION
	TCDQA112FS34RT	A	C1	1	1	13.75	0.1565	32	0.004891		ILS, INELASTIC DEFORMATION
	TCDQA113FS34RT	A	C1	1	1	13.90	0.1563	32	0.004884		ILS, INELASTIC DEFORMATION
	TCDQA114FS34RT	A	C1	1	1	13.81	0.1566	32	0.004893		ILS, INELASTIC DEFORMATION
	TCDQA115FS34RT	A	C1	1	1	13.80	0.1564	32	0.004888		ILS, INELASTIC DEFORMATION
SBSFS35RT	TCDQA111FS35RT	A	C1	1	1	14.00	0.1550	32	0.004845	13.95	ILS, INELASTIC DEFORMATION
	TCDQA112FS35RT	A	C1	1	1	13.80	0.1521	32	0.004752		ILS, INELASTIC DEFORMATION
	TCDQA113FS35RT	A	C1	1	1	13.86	0.1546	32	0.004832		ILS, INELASTIC DEFORMATION
	TCDQA114FS35RT	A	C1	1	1	13.96	0.1545	32	0.004828		ILS, INELASTIC DEFORMATION
	TCDQA115FS35RT	A	C1	1	1	14.15	0.1549	32	0.004840		ILS, INELASTIC DEFORMATION
SBSFS42RT	TCDQA111FS42RT	A	C1	1	1	13.68	0.1519	32	0.004745	13.91	ILS, INELASTIC DEFORMATION
	TCDQA112FS42RT	A	C1	1	1	13.64	0.1531	32	0.004784		ILS, INELASTIC DEFORMATION
	TCDQA115FS42RT	A	C1	1	1	14.08	0.1509	32	0.004714		ILS, INELASTIC DEFORMATION
	TCDQA116FS42RT	A	C1	1	1	14.14	0.1521	32	0.004753		ILS, INELASTIC DEFORMATION
	TCDQA117FS42RT	A	C1	1	1	14.02	0.1522	32	0.004756		ILS, INELASTIC DEFORMATION
SBSFS43RT	TCDQA111FS43RT	A	C1	1	1	11.74	0.1496	32	0.004674	11.44	ILS, INELASTIC DEFORMATION
	TCDQA112FS43RT	A	C1	1	1	11.41	0.1513	32	0.004727		ILS, INELASTIC DEFORMATION
	TCDQA113FS43RT	A	C1	1	1	11.40	0.1510	32	0.004720		ILS, INELASTIC DEFORMATION
	TCDQA114FS43RT	A	C1	1	1	11.24	0.1511	32	0.004721		ILS, INELASTIC DEFORMATION
	TCDQA115FS43RT	A	C1	1	1	11.41	0.1508	32	0.004711		ILS, INELASTIC DEFORMATION

7.1.2 SBSFS Elevated Temperature Test Data

7.1.2.1 SBSFS ET1(180°F) Data

Code	Type of Fluid	Exposure
SBSFS12ET1	Jet A Fuel	90 days min @ 70°F±10°F
SBSFS13ET1	MIL-PRF-5606 Hydraulic Oil	
SBSFS14ET1	MIL-PRF-83282 Hydraulic Oil	
SBSFS17ET1	Sea Water	
SBSFS18ET1	Skydrol LD-4	
SBSFS20ET1	MIL-PRF-87252 PAO Cooling Fluid	
SBSFS23ET1	MIL-PRF-87257B Hydraulic Oil	
SBSFS24ET1	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
SBSFS41ET1	Distilled Water	
SBSFS32ET1	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	90 mins @ 70°F±10°F
SBSFS33ET1	De-icing Fluid SAE AMS 1428 (Type II)	
SBSFS34ET1	De-icing Fluid SAE AMS 1428 (Type IV)	
SBSFS35ET1	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
SBSFS42ET1	Dry	Per section 6.1 Test Plan NTP 3800Q1
SBSFS43ET1	85% Relative Humidity	Per section 6.1 Test Plan NTP 3800Q1

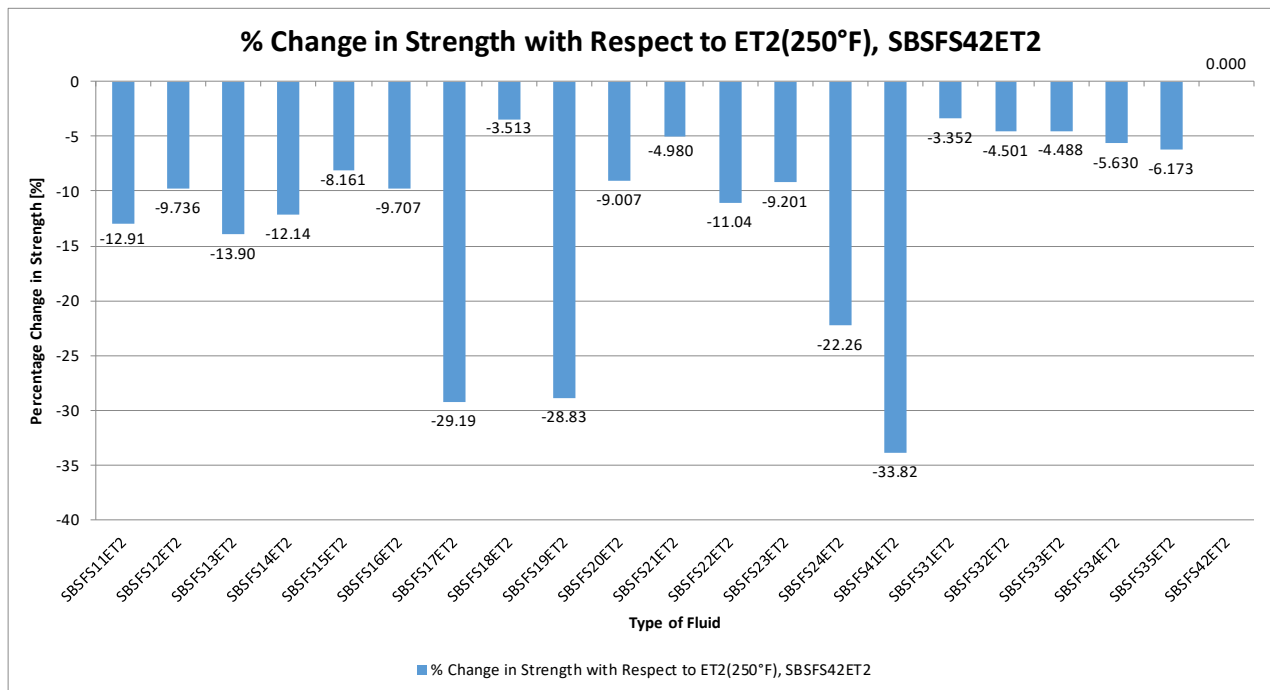
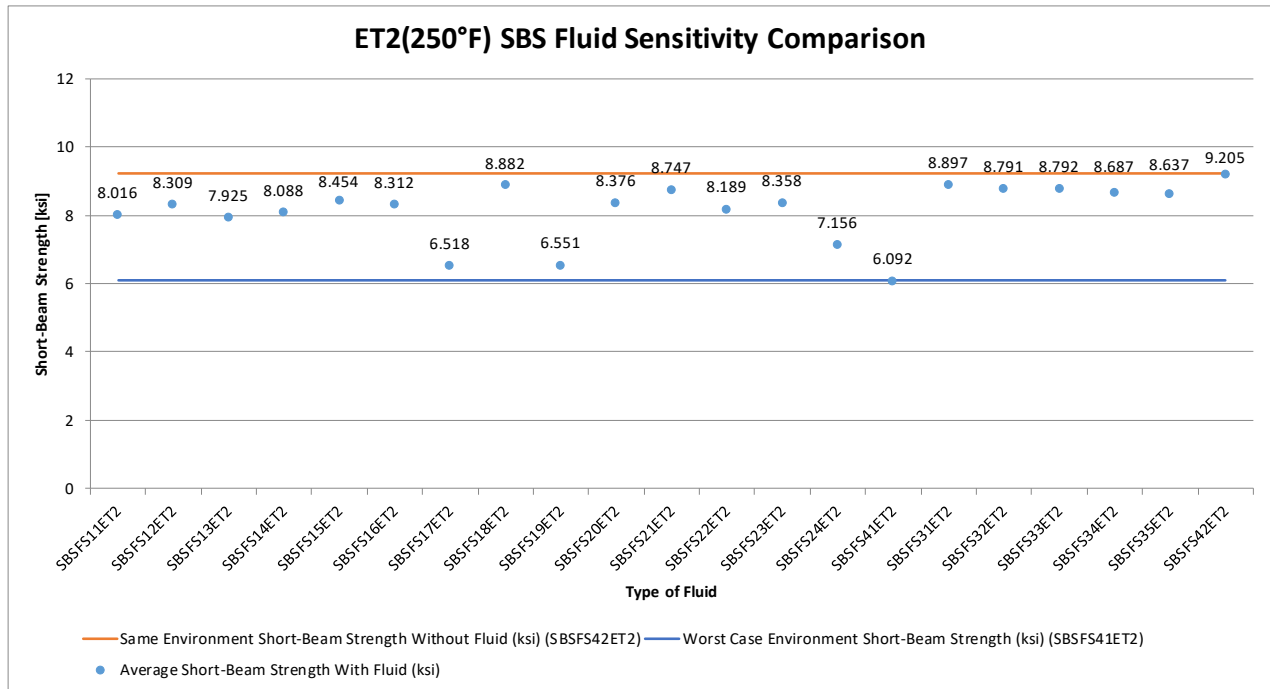


Fluid Sensitivity Screening
Short Beam Strength Properties (SBSFS)--ET1(180°F) Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Average Strength [ksi]	Failure Mode
SBSFS12ET1	TCDQA111FS12ET1	A	C1	1	1	10.27	0.1525	32	0.004766	10.27	ILS
	TCDQA112FS12ET1	A	C1	1	1	10.64	0.1529	32	0.004779		ILS
	TCDQA113FS12ET1	A	C1	1	1	10.01	0.1539	32	0.004808		ILS
	TCDQA114FS12ET1	A	C1	1	1	10.19	0.1518	32	0.004745		ILS
	TCDQA116FS12ET1	A	C1	1	1	10.24	0.1531	32	0.004785		ILS
SBSFS13ET1	TCDQA111FS13ET1	A	C1	1	1	10.32	0.1543	32	0.004821	10.21	ILS
	TCDQA112FS13ET1	A	C1	1	1	10.60	0.1546	32	0.004831		ILS
	TCDQA113FS13ET1	A	C1	1	1	10.06	0.1535	32	0.004796		ILS
	TCDQA115FS13ET1	A	C1	1	1	9.966	0.1539	32	0.004810		ILS
	TCDQA116FS13ET1	A	C1	1	1	10.09	0.1528	32	0.004773		ILS
SBSFS14ET1	TCDQA111FS14ET1	A	C1	1	1	10.16	0.1536	32	0.004798	10.12	ILS
	TCDQA112FS14ET1	A	C1	1	1	10.19	0.1554	32	0.004855		ILS
	TCDQA114FS14ET1	A	C1	1	1	9.909	0.1531	32	0.004784		ILS
	TCDQA115FS14ET1	A	C1	1	1	10.26	0.1549	32	0.004840		ILS
	TCDQA116FS14ET1	A	C1	1	1	10.07	0.1551	32	0.004847		ILS
SBSFS17ET1	TCDQA111FS17ET1	A	C1	1	1	8.351	0.1583	32	0.004947	8.619	ILS
	TCDQA112FS17ET1	A	C1	1	1	8.418	0.1583	32	0.004946		ILS
	TCDQA113FS17ET1	A	C1	1	1	8.618	0.1592	32	0.004976		ILS
	TCDQA114FS17ET1	A	C1	1	1	8.881	0.1579	32	0.004933		ILS
	TCDQA117FS17ET1	A	C1	1	1	8.826	0.1581	32	0.004941		ILS
SBSFS18ET1	TCDQA111FS18ET1	A	C1	1	1	11.20	0.1576	32	0.004924	11.01	ILS
	TCDQA112FS18ET1	A	C1	1	1	10.98	0.1580	32	0.004938		ILS
	TCDQA113FS18ET1	A	C1	1	1	10.82	0.1581	32	0.004940		ILS
	TCDQA114FS18ET1	A	C1	1	1	11.08	0.1583	32	0.004947		ILS
	TCDQA115FS18ET1	A	C1	1	1	10.99	0.1578	32	0.004932		ILS
SBSFS20ET1	TCDQA111FS20ET1	A	C1	1	1	10.36	0.1595	32	0.004985	10.44	ILS
	TCDQA112FS20ET1	A	C1	1	1	10.41	0.1596	32	0.004986		ILS
	TCDQA113FS20ET1	A	C1	1	1	10.42	0.1593	32	0.004978		ILS
	TCDQA115FS20ET1	A	C1	1	1	10.53	0.1595	32	0.004985		ILS
	TCDQA116FS20ET1	A	C1	1	1	10.46	0.1597	32	0.004990		ILS
SBSFS23ET1	TCDQA111FS23ET1	A	C1	1	1	10.53	0.1583	32	0.004948	10.54	ILS
	TCDQA112FS23ET1	A	C1	1	1	10.63	0.1582	32	0.004943		ILS
	TCDQA113FS23ET1	A	C1	1	1	10.57	0.1584	32	0.004951		ILS
	TCDQA114FS23ET1	A	C1	1	1	10.41	0.1579	32	0.004934		ILS
	TCDQA115FS23ET1	A	C1	1	1	10.53	0.1580	32	0.004939		ILS
SBSFS24ET1	TCDQA111FS24ET1	A	C1	1	1	9.353	0.1583	32	0.004947	9.332	ILS
	TCDQA114FS24ET1	A	C1	1	1	9.292	0.1581	32	0.004942		ILS
	TCDQA115FS24ET1	A	C1	1	1	9.326	0.1584	32	0.004948		ILS
	TCDQA116FS24ET1	A	C1	1	1	9.419	0.1583	32	0.004946		ILS
	TCDQA117FS24ET1	A	C1	1	1	9.267	0.1582	32	0.004945		ILS
SBSFS41ET1	TCDQA111FS41ET1	A	C1	1	1	8.212	0.1530	32	0.004780	8.205	ILS
	TCDQA112FS41ET1	A	C1	1	1	8.191	0.1524	32	0.004762		ILS
	TCDQA113FS41ET1	A	C1	1	1	8.307	0.1537	32	0.004804		ILS
	TCDQA115FS41ET1	A	C1	1	1	8.207	0.1536	32	0.004800		ILS
	TCDQA116FS41ET1	A	C1	1	1	8.106	0.1529	32	0.004779		ILS
SBSFS32ET1	TCDQA111FS32ET1	A	C1	1	1	10.39	0.1581	32	0.004940	10.73	ILS
	TCDQA112FS32ET1	A	C1	1	1	10.65	0.1582	32	0.004944		ILS
	TCDQA113FS32ET1	A	C1	1	1	10.89	0.1582	32	0.004943		ILS
	TCDQA114FS32ET1	A	C1	1	1	10.95	0.1583	32	0.004948		ILS
	TCDQA115FS32ET1	A	C1	1	1	10.77	0.1560	32	0.004874		ILS
SBSFS33ET1	TCDQA111FS33ET1	A	C1	1	1	10.71	0.1577	32	0.004928	10.71	ILS
	TCDQA112FS33ET1	A	C1	1	1	10.72	0.1573	32	0.004917		ILS
	TCDQA113FS33ET1	A	C1	1	1	10.73	0.1575	32	0.004921		ILS
	TCDQA114FS33ET1	A	C1	1	1	10.83	0.1570	32	0.004907		ILS
	TCDQA115FS33ET1	A	C1	1	1	10.59	0.1565	32	0.004892		ILS
SBSFS34ET1	TCDQA111FS34ET1	A	C1	1	1	10.74	0.1567	32	0.004897	10.88	ILS
	TCDQA112FS34ET1	A	C1	1	1	10.82	0.1568	32	0.004900		ILS
	TCDQA113FS34ET1	A	C1	1	1	10.92	0.1555	32	0.004858		ILS
	TCDQA114FS34ET1	A	C1	1	1	10.93	0.1558	32	0.004868		ILS
	TCDQA115FS34ET1	A	C1	1	1	11.02	0.1561	32	0.004879		ILS
SBSFS35ET1	TCDQA111FS35ET1	A	C1	1	1	10.62	0.1537	32	0.004803	10.75	ILS
	TCDQA112FS35ET1	A	C1	1	1	11.05	0.1545	32	0.004829		ILS
	TCDQA113FS35ET1	A	C1	1	1	10.69	0.1540	32	0.004813		ILS, COMPRESSION
	TCDQA114FS35ET1	A	C1	1	1	10.82	0.1552	32	0.004850		ILS
	TCDQA117FS35ET1	A	C1	1	1	10.58	0.1536	32	0.004800		ILS
SBSFS42ET1	TCDQA111FS42ET1	A	C1	1	1	11.03	0.1525	32	0.004766	11.09	ILS, INELASTIC DEFORMATION
	TCDQA112FS42ET1	A	C1	1	1	11.01	0.1519	32	0.004748		ILS, INELASTIC DEFORMATION
	TCDQA113FS42ET1	A	C1	1	1	11.03	0.1514	32	0.004730		ILS, INELASTIC DEFORMATION
	TCDQA114FS42ET1	A	C1	1	1	11.13	0.1514	32	0.004730		ILS, INELASTIC DEFORMATION
	TCDQA115FS42ET1	A	C1	1	1	11.24	0.1514	32	0.004732		ILS, INELASTIC DEFORMATION
SBSFS43ET1	TCDQA111FS43ET1	A	C1	1	1	8.028	0.1504	32	0.004699	7.977	ILS, INELASTIC DEFORMATION
	TCDQA112FS43ET1	A	C1	1	1	7.960	0.1506	32	0.004707		ILS, INELASTIC DEFORMATION
	TCDQA113FS43ET1	A	C1	1	1	7.999	0.1509	32	0.004716		ILS, INELASTIC DEFORMATION
	TCDQA114FS43ET1	A	C1	1	1	7.954	0.1509	32	0.004716		ILS, INELASTIC DEFORMATION
	TCDQA115FS43ET1	A	C1	1	1	7.943	0.1507	32	0.004710		ILS, INELASTIC DEFORMATION

7.1.2.2 SBSFS ET2(250°F) Data

Code	Type of Fluid	Exposure
SBSFS11ET2	100 Low lead Fuel	90 days min @ 70°F±10°F
SBSFS12ET2	Jet A Fuel	
SBSFS13ET2	MIL-PRF-5606 Hydraulic Oil	
SBSFS14ET2	MIL-PRF-83282 Hydraulic Oil	
SBSFS15ET2	MIL-PRF-7808 Engine Oil	
SBSFS16ET2	MIL-PRF-23699 Engine Oil	
SBSFS17ET2	Sea Water	
SBSFS18ET2	Skydrol LD-4	
SBSFS19ET2	50% Water with 50% Skydrol LD-4	
SBSFS20ET2	MIL-PRF-87252 PAO Cooling Fluid	
SBSFS21ET2	E85 Fuel (Alternate aircraft fuel)	
SBSFS22ET2	SAE AMS 2629 Jet Reference Fluid	
SBSFS23ET2	MIL-PRF-87257B Hydraulic Oil	
SBSFS24ET2	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
SBSFS41ET2	Distilled Water	
SBSFS31ET2	MEK washing fluid	90 mins @ 70°F±10°F
SBSFS32ET2	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
SBSFS33ET2	De-icing Fluid SAE AMS 1428 (Type II)	
SBSFS34ET2	De-icing Fluid SAE AMS 1428 (Type IV)	
SBSFS35ET2	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
SBSFS42ET2	Dry	Per section 6.1 Test Plan NTP 3800Q1

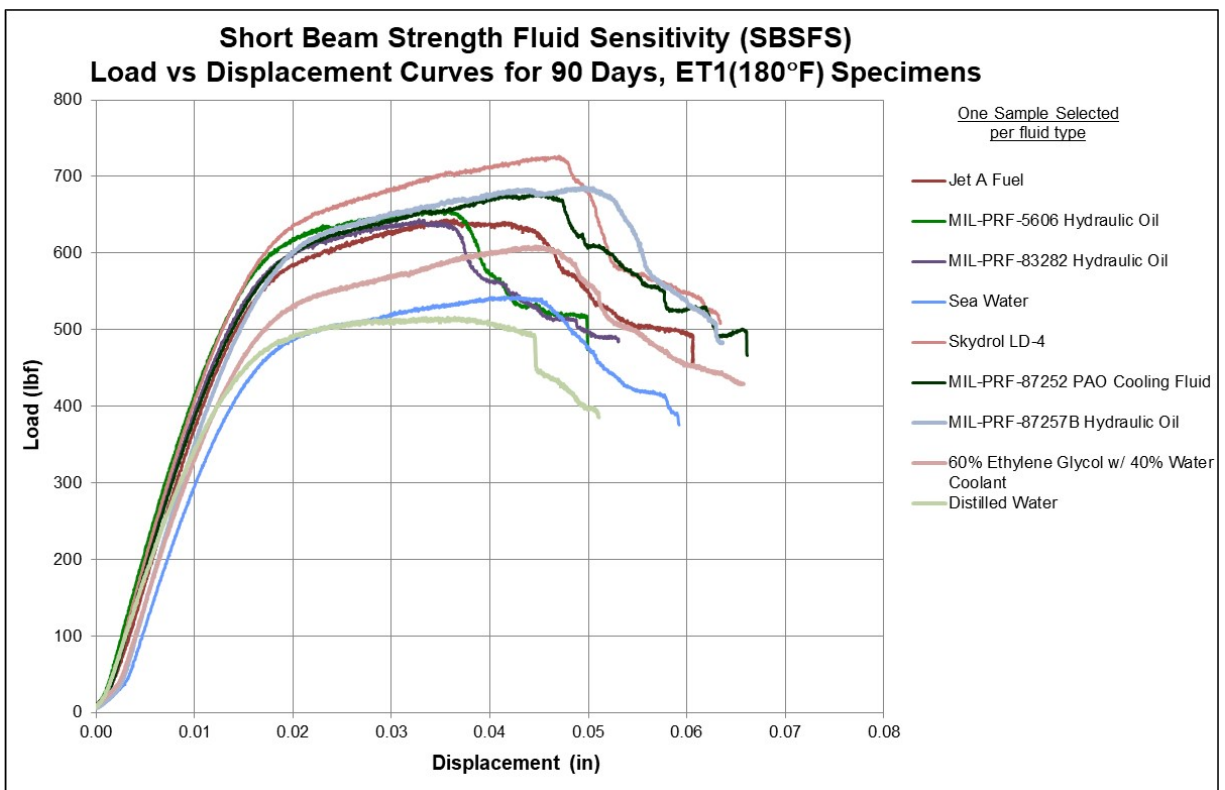
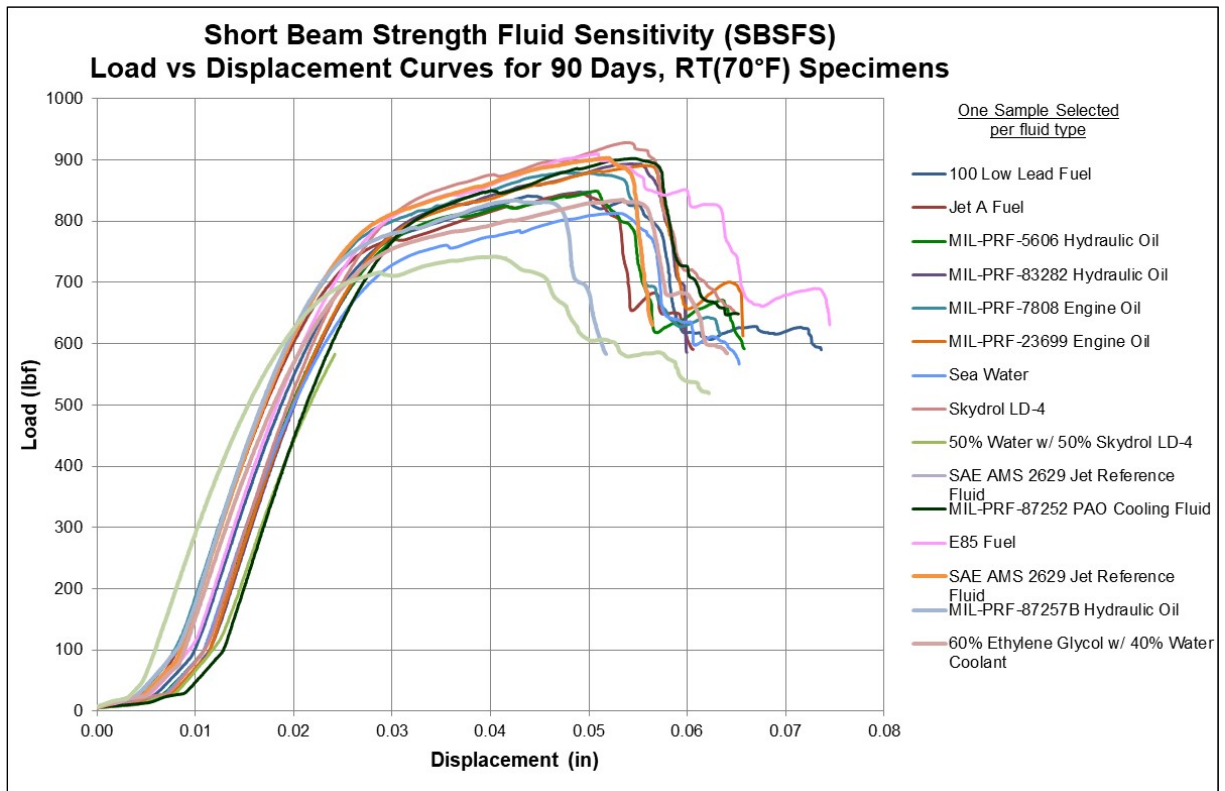


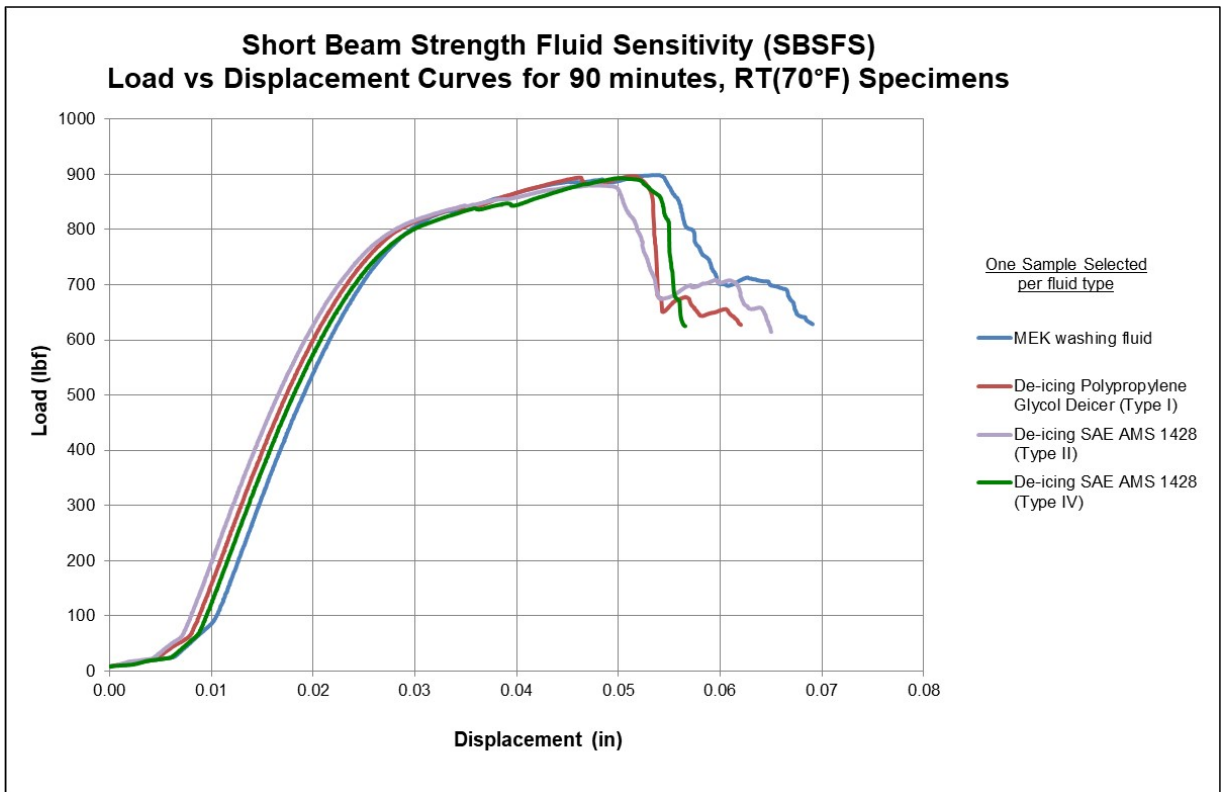
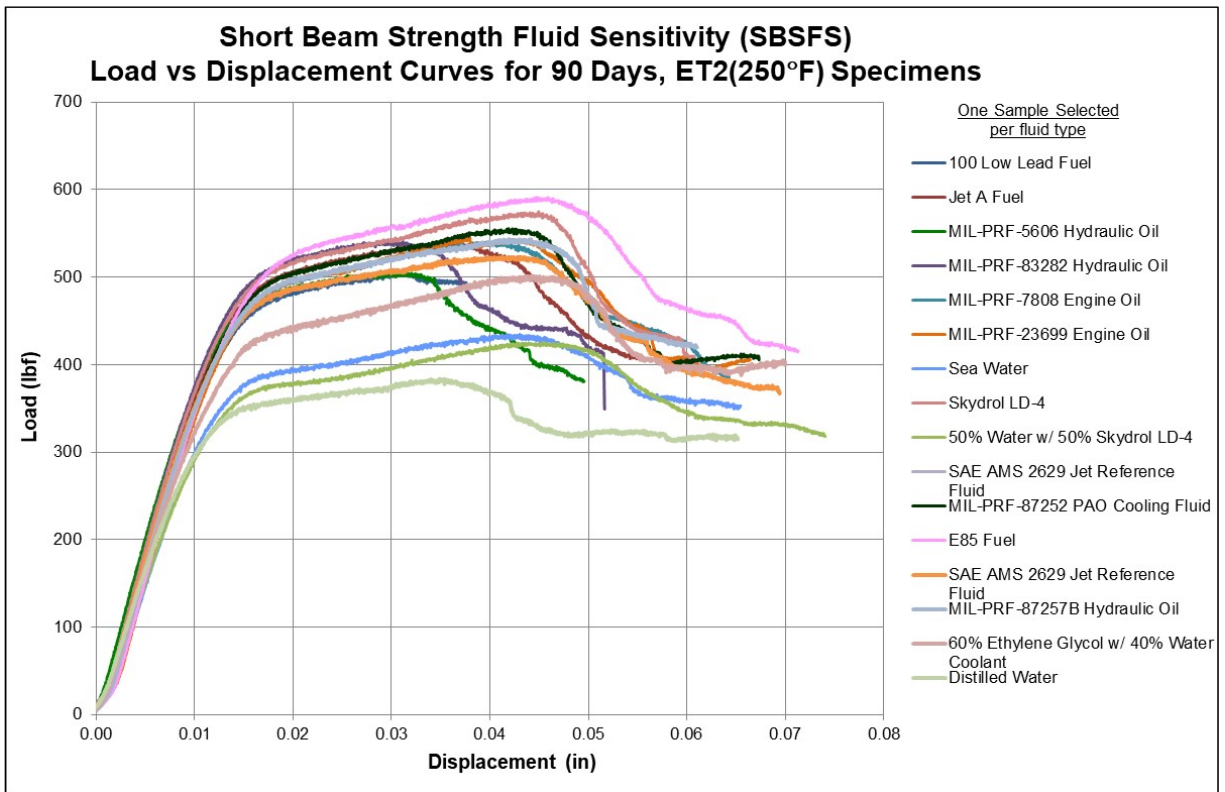
Fluid Sensitivity Screening
Short Beam Strength Properties (SBSFS)--ET2(250°F)Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

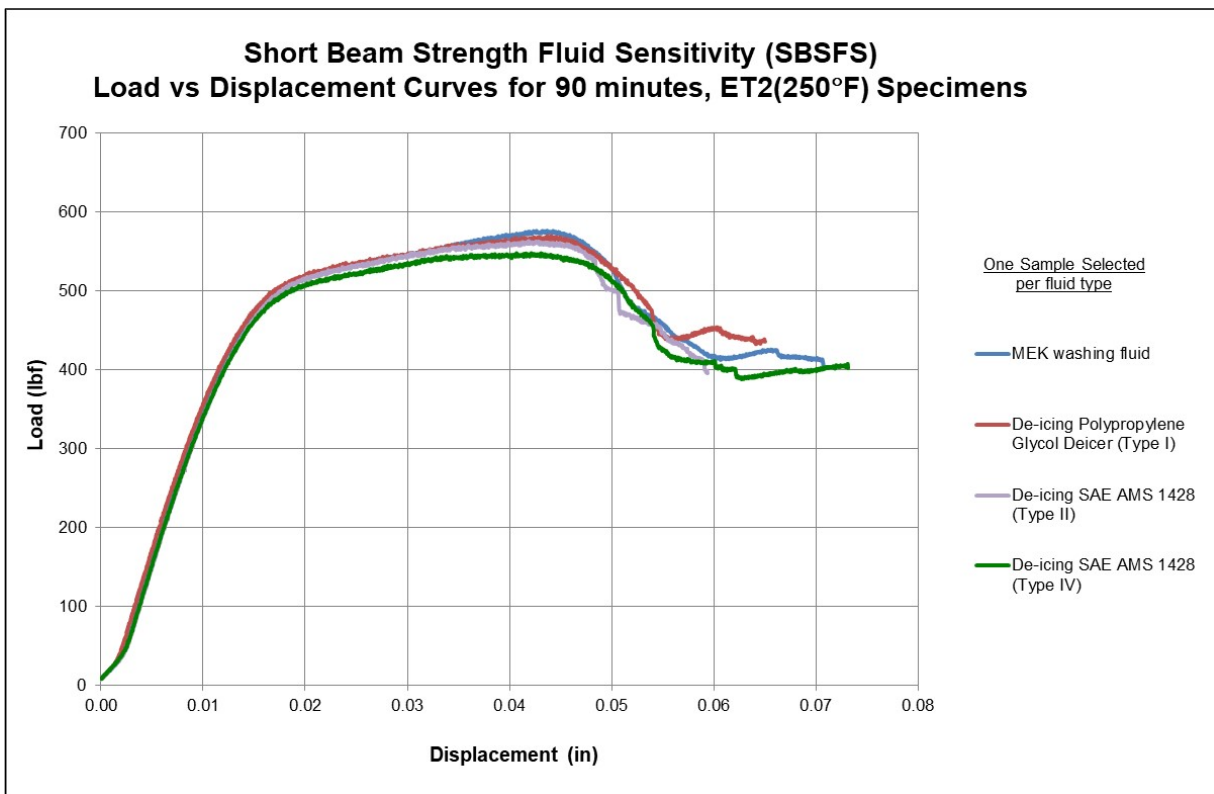
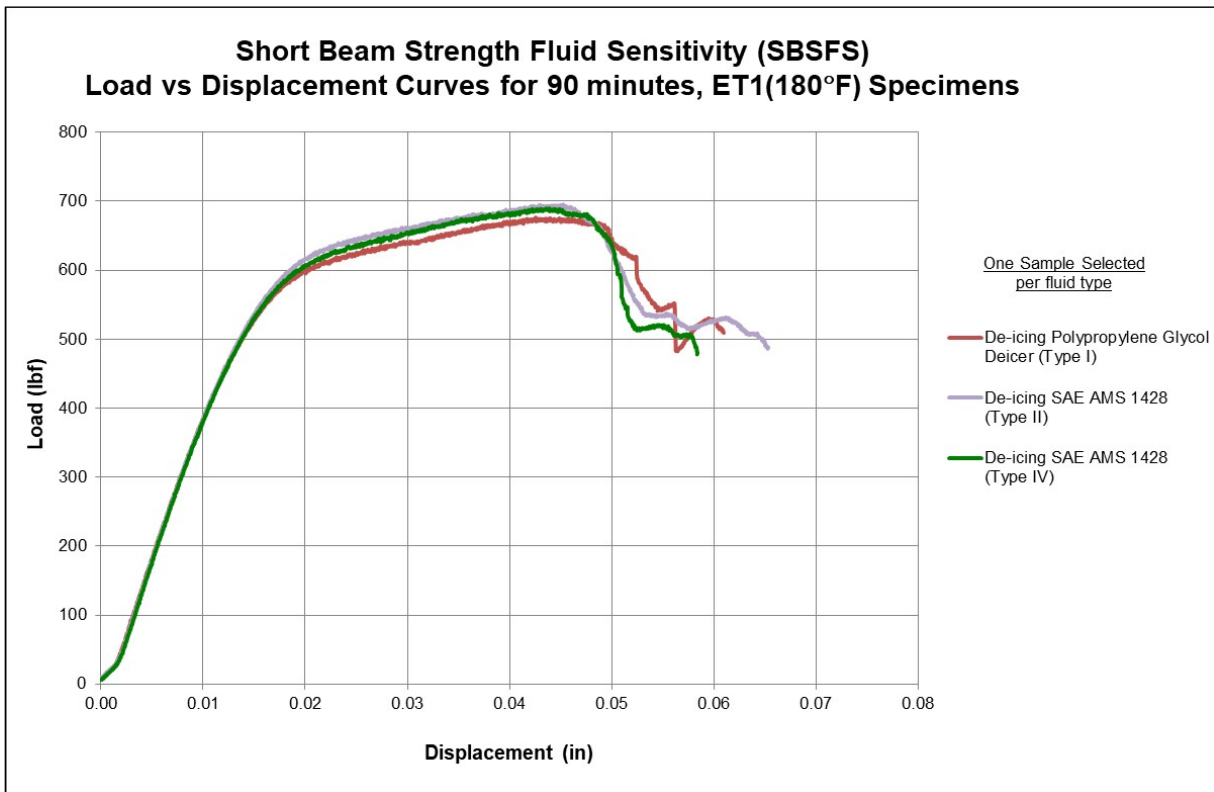
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Average Strength [ksi]	Failure Mode
SBSFS11ET2	TCDQA111FS11ET2	A	C1	1	1	8.057	0.1522	32	0.00476	8.016	ILS
	TCDQA112FS11ET2	A	C1	1	1	8.038	0.1526	32	0.00477		ILS
	TCDQA113FS11ET2	A	C1	1	1	8.012	0.1525	32	0.00477		ILS
	TCDQA114FS11ET2	A	C1	1	1	7.988	0.1526	32	0.00477		ILS
	TCDQA115FS11ET2	A	C1	1	1	7.988	0.1533	32	0.00479		ILS
SBSFS12ET2	TCDQA111FS12ET2	A	C1	1	1	8.561	0.1532	32	0.00479	8.309	ILS
	TCDQA112FS12ET2	A	C1	1	1	8.438	0.1513	32	0.00473		ILS
	TCDQA113FS12ET2	A	C1	1	1	8.244	0.1518	32	0.00474		ILS
	TCDQA114FS12ET2	A	C1	1	1	8.138	0.1522	32	0.00476		ILS
	TCDQA115FS12ET2	A	C1	1	1	8.163	0.1522	32	0.00476		ILS
SBSFS13ET2	TCDQA111FS13ET2	A	C1	1	1	7.933	0.1549	32	0.00484	7.925	ILS
	TCDQA112FS13ET2	A	C1	1	1	7.784	0.1531	32	0.00478		ILS
	TCDQA113FS13ET2	A	C1	1	1	8.214	0.1544	32	0.00482		ILS
	TCDQA114FS13ET2	A	C1	1	1	7.918	0.1540	32	0.00481		ILS
	TCDQA116FS13ET2	A	C1	1	1	7.779	0.1536	32	0.00480		ILS
SBSFS14ET2	TCDQA111FS14ET2	A	C1	1	1	8.470	0.1549	32	0.00484	8.088	ILS
	TCDQA112FS14ET2	A	C1	1	1	8.242	0.1550	32	0.00484		ILS
	TCDQA114FS14ET2	A	C1	1	1	8.007	0.1529	32	0.00478		ILS
	TCDQA115FS14ET2	A	C1	1	1	7.911	0.1538	32	0.00480		ILS
	TCDQA116FS14ET2	A	C1	1	1	7.811	0.1528	32	0.00478		ILS
SBSFS15ET2	TCDQA111FS15ET2	A	C1	1	1	8.373	0.1567	32	0.00490	8.454	ILS
	TCDQA112FS15ET2	A	C1	1	1	8.421	0.1578	32	0.00493		ILS
	TCDQA113FS15ET2	A	C1	1	1	8.452	0.1574	32	0.00492		ILS
	TCDQA114FS15ET2	A	C1	1	1	8.518	0.1588	32	0.00496		ILS
	TCDQA116FS15ET2	A	C1	1	1	8.506	0.1597	32	0.00499		ILS
SBSFS16ET2	TCDQA111FS16ET2	A	C1	1	1	8.386	0.1577	32	0.00493	8.312	ILS
	TCDQA113FS16ET2	A	C1	1	1	8.387	0.1573	32	0.00491		ILS
	TCDQA115FS16ET2	A	C1	1	1	8.182	0.1584	32	0.00495		ILS
	TCDQA116FS16ET2	A	C1	1	1	8.328	0.1585	32	0.00495		ILS
	TCDQA117FS16ET2	A	C1	1	1	8.276	0.1571	32	0.00491		ILS
SBSFS17ET2	TCDQA111FS17ET2	A	C1	1	1	6.662	0.1584	32	0.00495	6.518	ILS
	TCDQA112FS17ET2	A	C1	1	1	6.471	0.1592	32	0.00498		ILS
	TCDQA113FS17ET2	A	C1	1	1	6.433	0.1594	32	0.00498		ILS
	TCDQA114FS17ET2	A	C1	1	1	6.538	0.1570	32	0.00491		ILS
	TCDQA116FS17ET2	A	C1	1	1	6.488	0.1581	32	0.00494		ILS
SBSFS18ET2	TCDQA112FS18ET2	A	C1	1	1	8.935	0.1561	32	0.00488	8.882	ILS
	TCDQA114FS18ET2	A	C1	1	1	8.827	0.1601	32	0.00500		ILS
	TCDQA115FS18ET2	A	C1	1	1	8.874	0.1607	32	0.00502		ILS
	TCDQA116FS18ET2	A	C1	1	1	8.937	0.1583	32	0.00495		ILS
	TCDQA117FS18ET2	A	C1	1	1	8.837	0.1585	32	0.00495		ILS
SBSFS19ET2	TCDQA111FS19ET2	A	C1	1	1	6.537	0.1578	32	0.00493	6.551	ILS
	TCDQA112FS19ET2	A	C1	1	1	6.549	0.1583	32	0.00495		ILS
	TCDQA113FS19ET2	A	C1	1	1	6.626	0.1583	32	0.00495		ILS
	TCDQA114FS19ET2	A	C1	1	1	6.589	0.1582	32	0.00494		ILS
	TCDQA115FS19ET2	A	C1	1	1	6.455	0.1487	32	0.00465		ILS
SBSFS20ET2	TCDQA111FS20ET2	A	C1	1	1	8.464	0.1600	32	0.00500	8.376	ILS
	TCDQA112FS20ET2	A	C1	1	1	8.370	0.1592	32	0.00497		ILS
	TCDQA114FS20ET2	A	C1	1	1	8.292	0.1593	32	0.00498		ILS
	TCDQA115FS20ET2	A	C1	1	1	8.464	0.1597	32	0.00499		ILS
	TCDQA116FS20ET2	A	C1	1	1	8.291	0.1591	32	0.00497		ILS
SBSFS21ET2	TCDQA111FS21ET2	A	C1	1	1	9.033	0.1593	32	0.00498	8.747	ILS
	TCDQA112FS21ET2	A	C1	1	1	8.857	0.1591	32	0.00497		ILS
	TCDQA113FS21ET2	A	C1	1	1	8.646	0.1605	32	0.00502		ILS
	TCDQA114FS21ET2	A	C1	1	1	8.534	0.1593	32	0.00498		ILS
	TCDQA115FS21ET2	A	C1	1	1	8.664	0.1611	32	0.00503		ILS
SBSFS22ET2	TCDQA111FS22ET2	A	C1	1	1	7.997	0.1594	32	0.00498	8.189	ILS
	TCDQA112FS22ET2	A	C1	1	1	8.162	0.1594	32	0.00498		ILS
	TCDQA113FS22ET2	A	C1	1	1	8.218	0.1604	32	0.00501		ILS
	TCDQA114FS22ET2	A	C1	1	1	8.294	0.1593	32	0.00498		ILS
	TCDQA115FS22ET2	A	C1	1	1	8.272	0.1597	32	0.00499		ILS
SBSFS23ET2	TCDQA111FS23ET2	A	C1	1	1	8.345	0.1584	32	0.00495	8.358	ILS
	TCDQA112FS23ET2	A	C1	1	1	8.299	0.1584	32	0.00495		ILS
	TCDQA113FS23ET2	A	C1	1	1	8.314	0.1560	32	0.00488		ILS
	TCDQA114FS23ET2	A	C1	1	1	8.395	0.1579	32	0.00493		ILS
	TCDQA115FS23ET2	A	C1	1	1	8.439	0.1579	32	0.00494		ILS
SBSFS24ET2	TCDQA111FS24ET2	A	C1	1	1	7.708	0.1581	32	0.00494	7.156	ILS
	TCDQA112FS24ET2	A	C1	1	1	7.073	0.1578	32	0.00493		ILS
	TCDQA113FS24ET2	A	C1	1	1	6.869	0.1584	32	0.00495		ILS
	TCDQA114FS24ET2	A	C1	1	1	7.060	0.1583	32	0.00495		ILS
	TCDQA117FS24ET2	A	C1	1	1	7.070	0.1580	32	0.00494		ILS
SBSFS41ET2	TCDQA111FS41ET2	A	C1	1	1	6.082	0.1541	32	0.00481	6.092	ILS
	TCDQA112FS41ET2	A	C1	1	1	6.130	0.1531	32	0.00478		ILS
	TCDQA113FS41ET2	A	C1	1	1	6.075	0.1526	32	0.00477		ILS
	TCDQA114FS41ET2	A	C1	1	1	6.116	0.1532	32	0.00479		ILS
	TCDQA115FS41ET2	A	C1	1	1	6.054	0.1537	32	0.00480		ILS

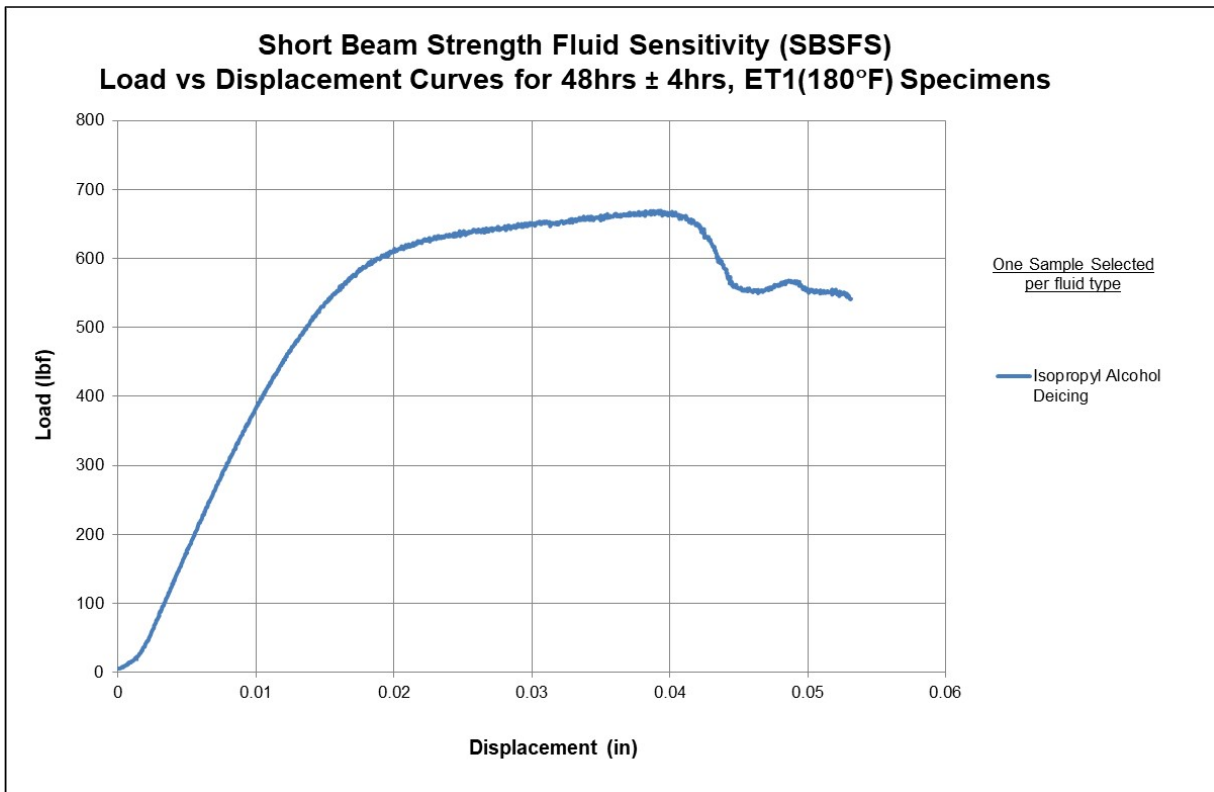
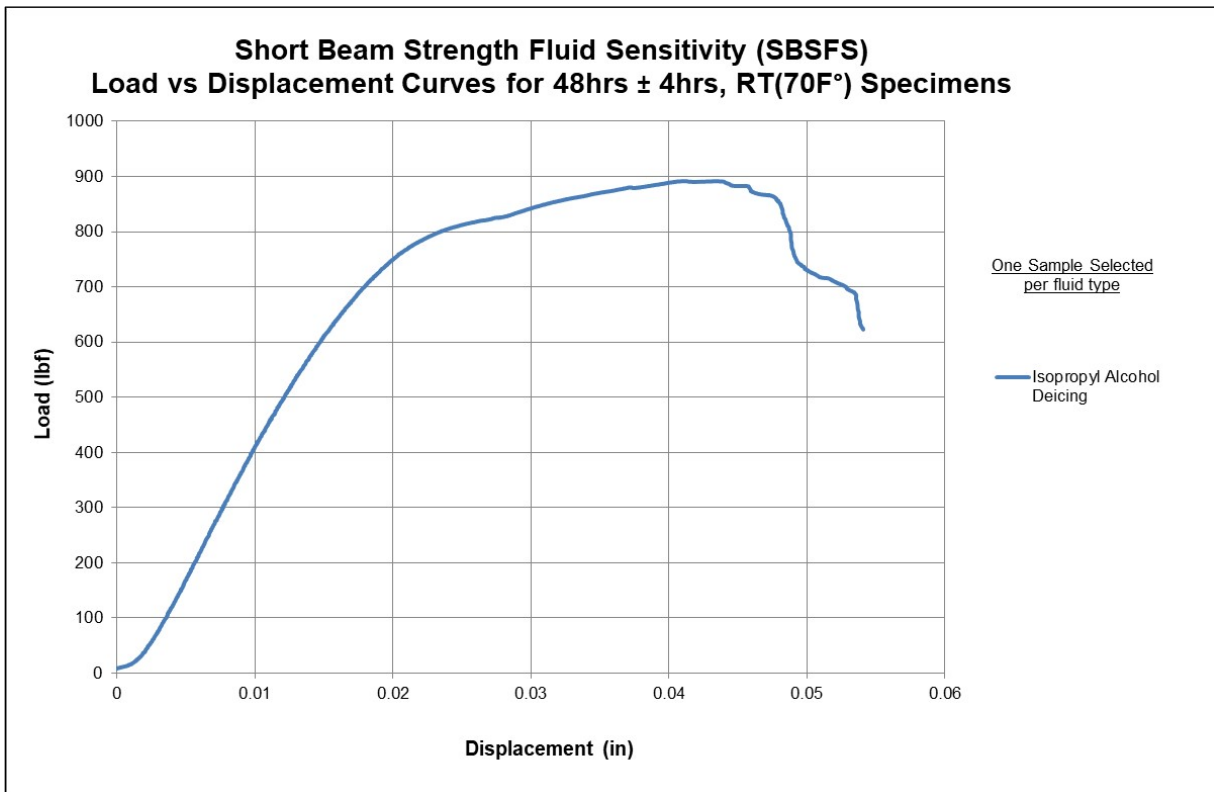
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	TCDQA113FS31ET2	A	C1	1	1	8.929	0.1583	32	0.00495		ILS
	TCDQA115FS31ET2	A	C1	1	1	8.975	0.1582	32	0.00494		ILS
	TCDQA116FS31ET2	A	C1	1	1	8.895	0.1585	32	0.00495		ILS
	TCDQA117FS31ET2	A	C1	1	1	8.808	0.1586	32	0.00496		ILS
SBSFS32ET2	TCDQA111FS32ET2	A	C1	1	1	8.732	0.1585	32	0.00495	8.791	ILS
	TCDQA112FS32ET2	A	C1	1	1	8.905	0.1594	32	0.00498		ILS
	TCDQA114FS32ET2	A	C1	1	1	8.733	0.1579	32	0.00494		ILS
	TCDQA115FS32ET2	A	C1	1	1	8.779	0.1578	32	0.00493		ILS
	TCDQA117FS32ET2	A	C1	1	1	8.805	0.1590	32	0.00497		ILS
SBSFS33ET2	TCDQA111FS33ET2	A	C1	1	1	8.739	0.1571	32	0.00491	8.792	ILS
	TCDQA113FS33ET2	A	C1	1	1	8.772	0.1554	32	0.00486		ILS
	TCDQA115FS33ET2	A	C1	1	1	8.798	0.1543	32	0.00482		ILS
	TCDQA116FS33ET2	A	C1	1	1	8.859	0.1564	32	0.00489		ILS
	TCDQA117FS33ET2	A	C1	1	1	8.793	0.1570	32	0.00491		ILS
SBSFS34ET2	TCDQA112FS34ET2	A	C1	1	1	8.671	0.1538	32	0.00481	8.687	ILS
	TCDQA113FS34ET2	A	C1	1	1	8.686	0.1556	32	0.00486		ILS
	TCDQA114FS34ET2	A	C1	1	1	8.678	0.1562	32	0.00488		ILS
	TCDQA115FS34ET2	A	C1	1	1	8.774	0.1571	32	0.00491		ILS
	TCDQA116FS34ET2	A	C1	1	1	8.625	0.1560	32	0.00488		ILS
SBSFS35ET2	TCDQA111FS35ET2	A	C1	1	1	9.224	0.1540	32	0.00481	8.637	ILS
	TCDQA112FS35ET2	A	C1	1	1	8.645	0.1539	32	0.00481		ILS
	TCDQA114FS35ET2	A	C1	1	1	8.480	0.1541	32	0.00481		ILS
	TCDQA116FS35ET2	A	C1	1	1	8.513	0.1530	32	0.00478		ILS
	TCDQA117FS35ET2	A	C1	1	1	8.324	0.1530	32	0.00478		ILS
SBSFS42ET2	TCDQA111FS42ET2	A	C1	1	1	9.480	0.1522	32	0.00476	9.205	ILS, INELASTIC DEFORMATION
	TCDQA112FS42ET2	A	C1	1	1	9.243	0.1520	32	0.00475		ILS, INELASTIC DEFORMATION
	TCDQA113FS42ET2	A	C1	1	1	9.088	0.1513	32	0.00473		ILS, INELASTIC DEFORMATION
	TCDQA114FS42ET2	A	C1	1	1	9.099	0.1511	32	0.00472		ILS, INELASTIC DEFORMATION
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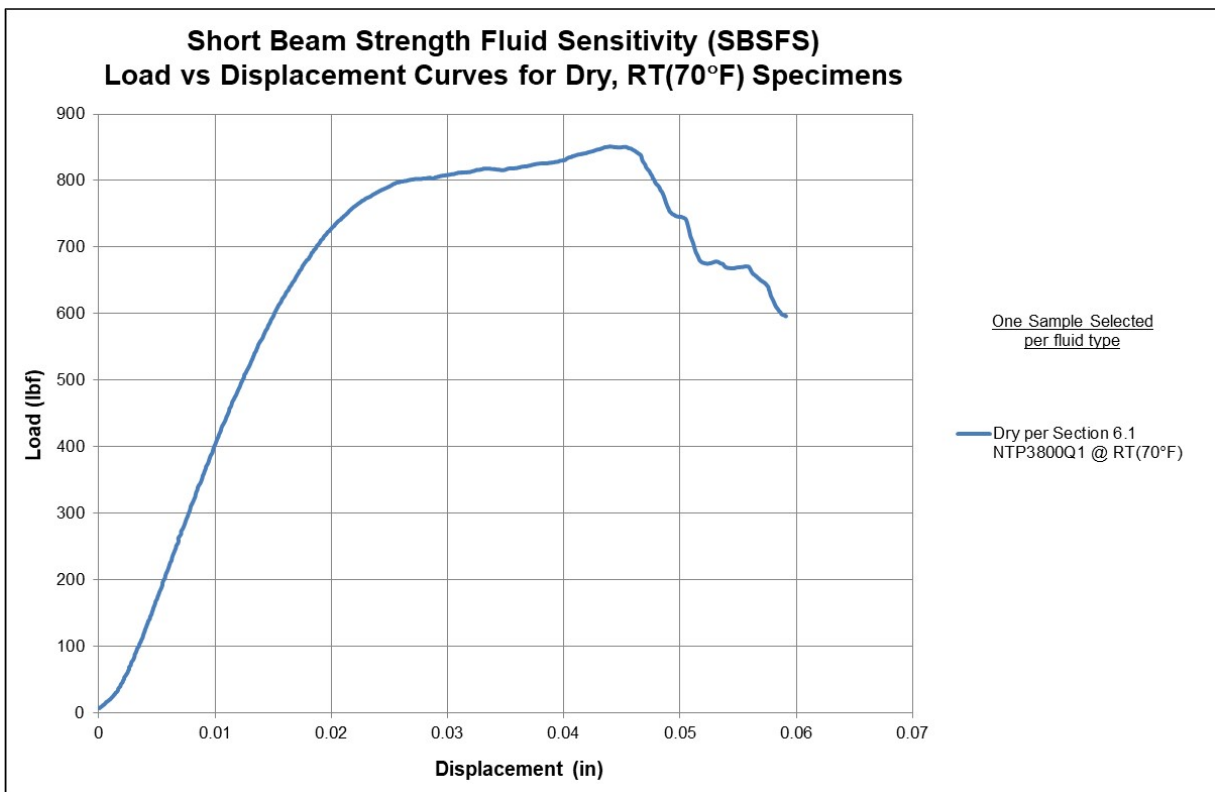
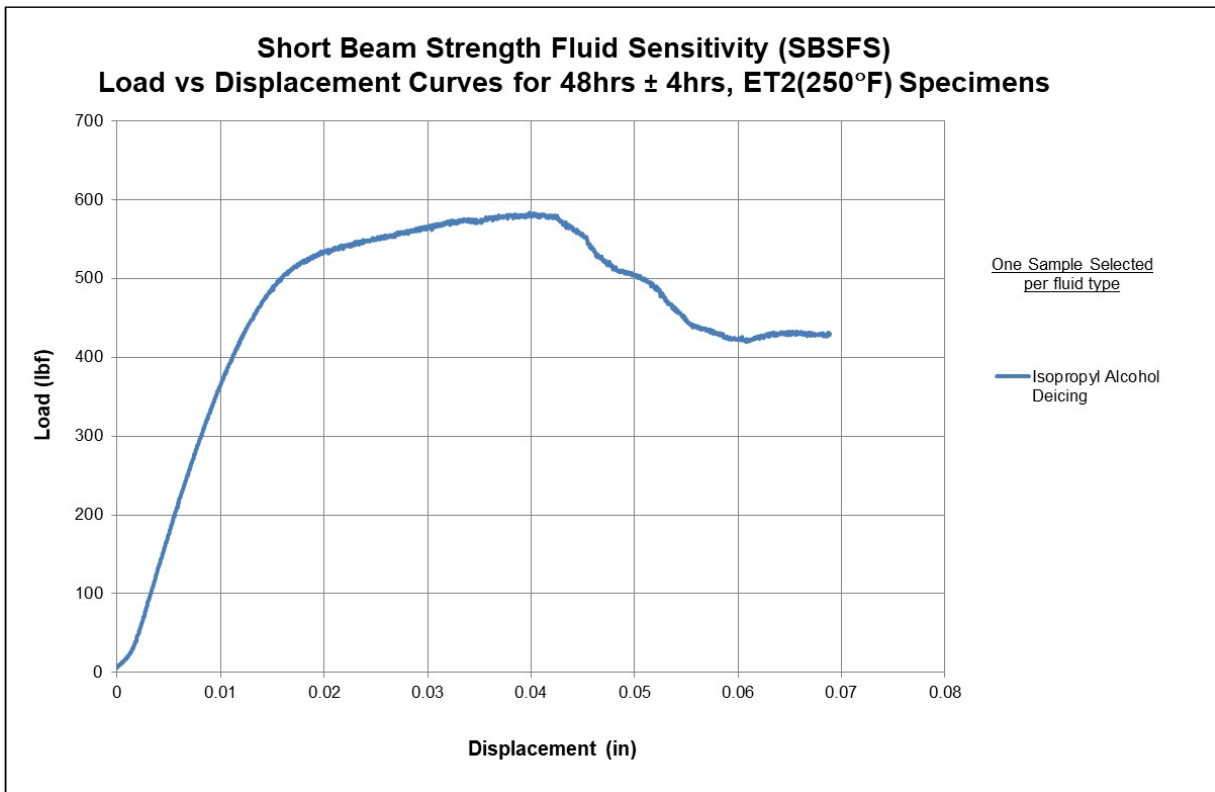
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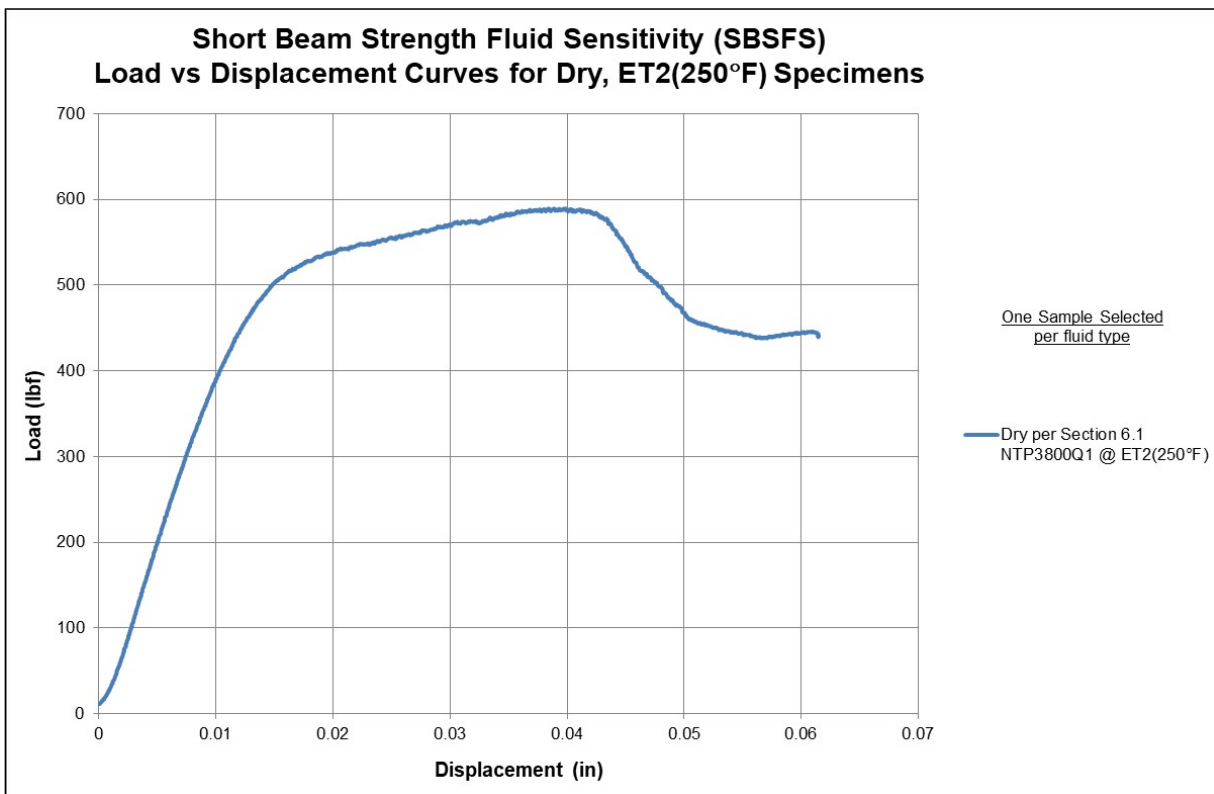
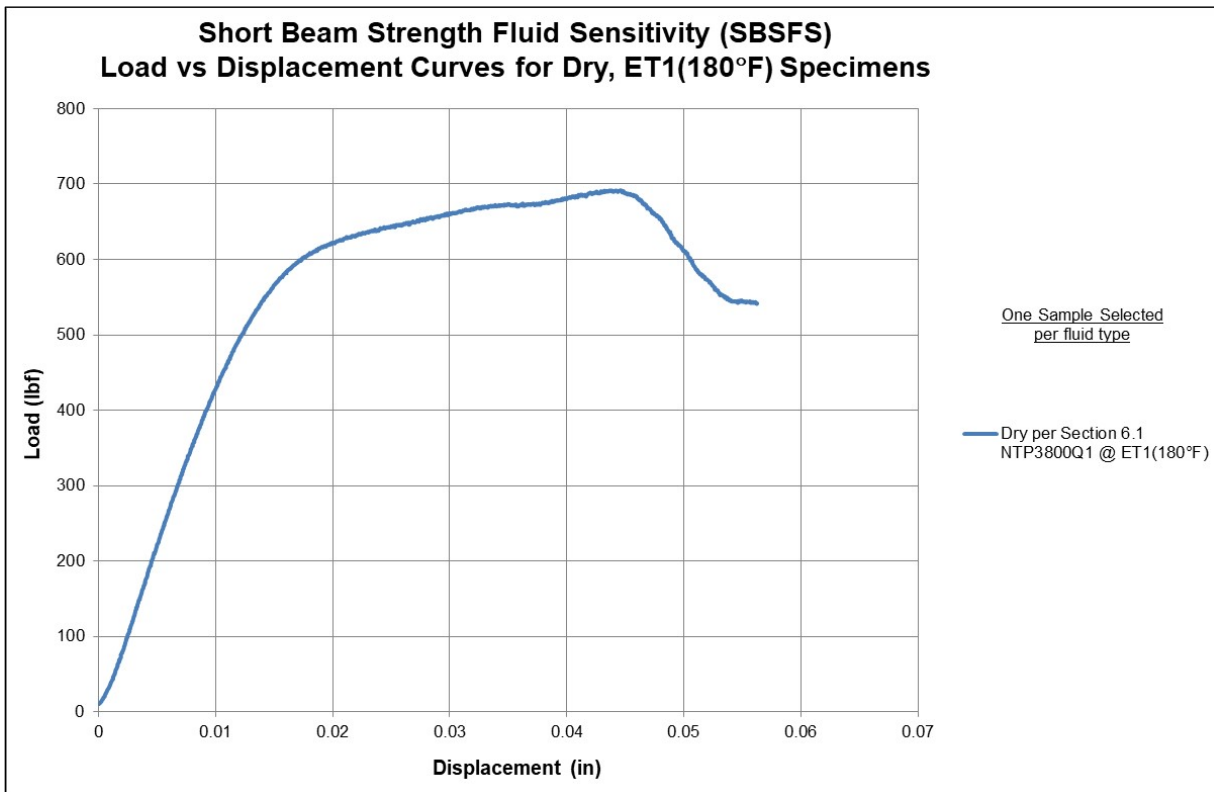


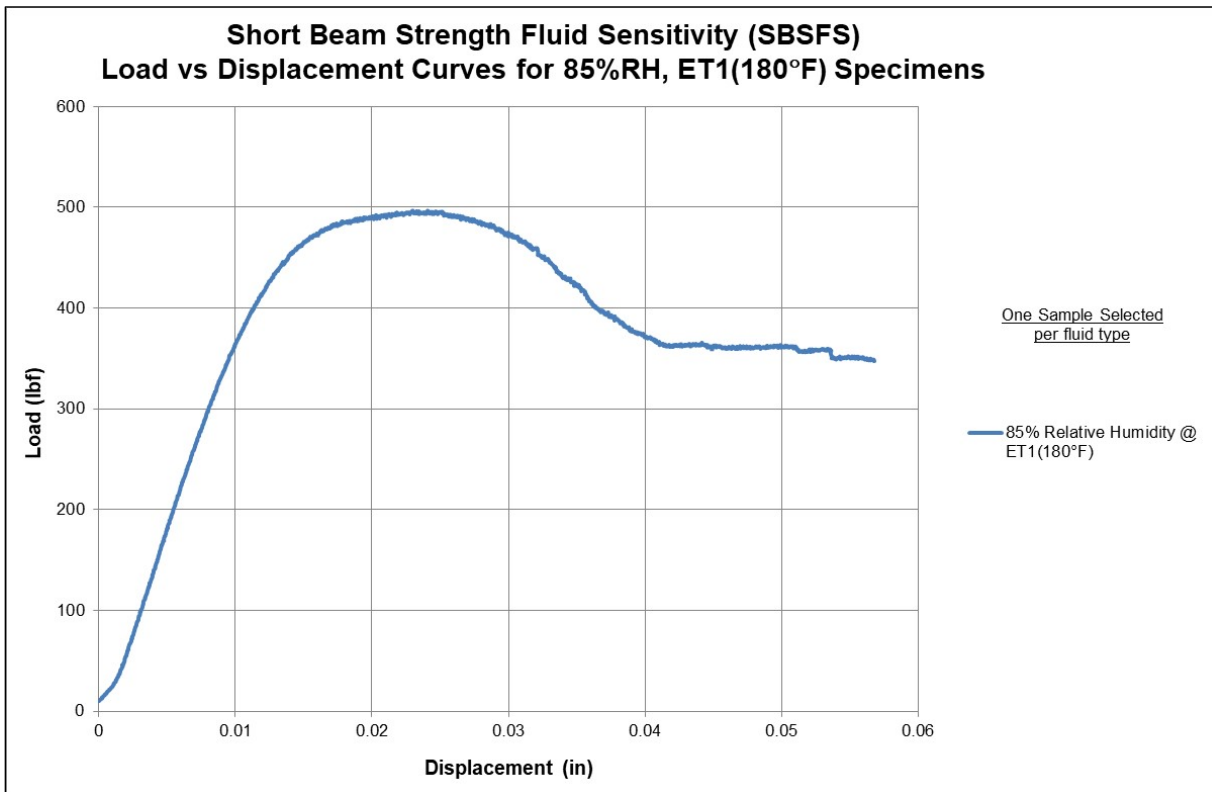
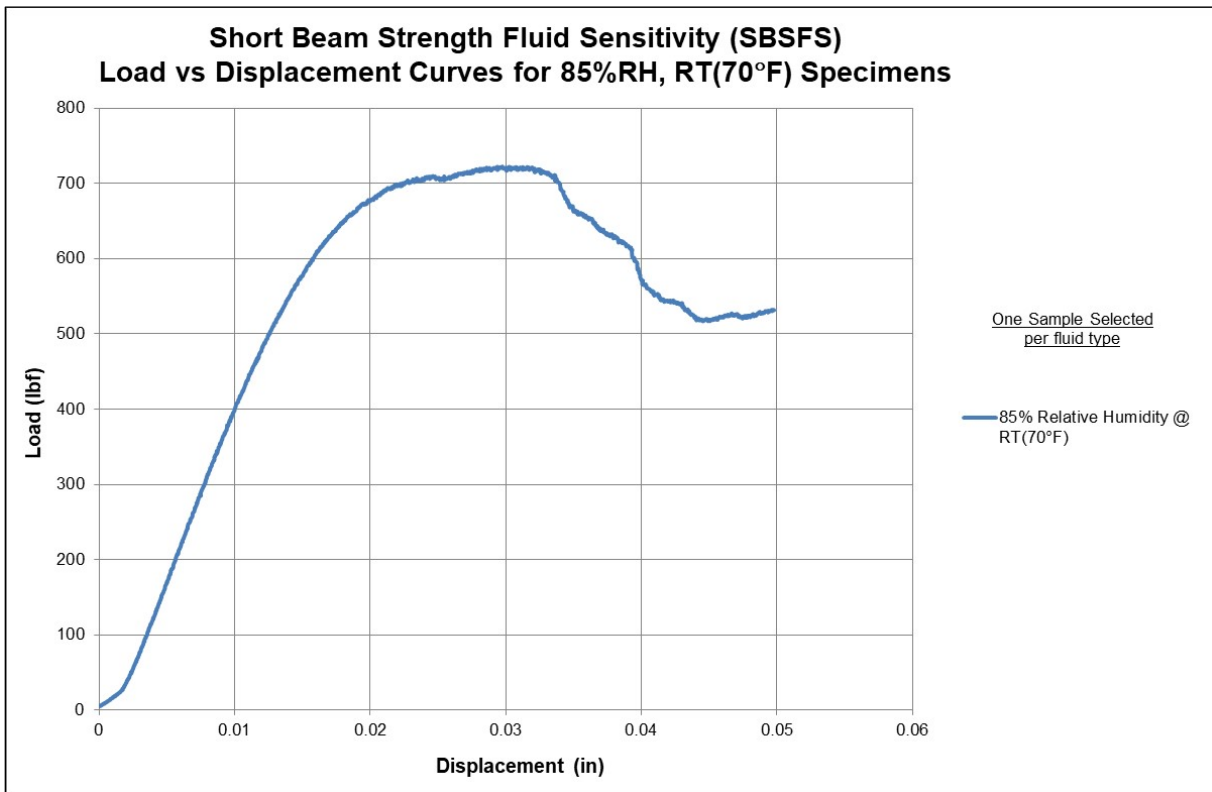








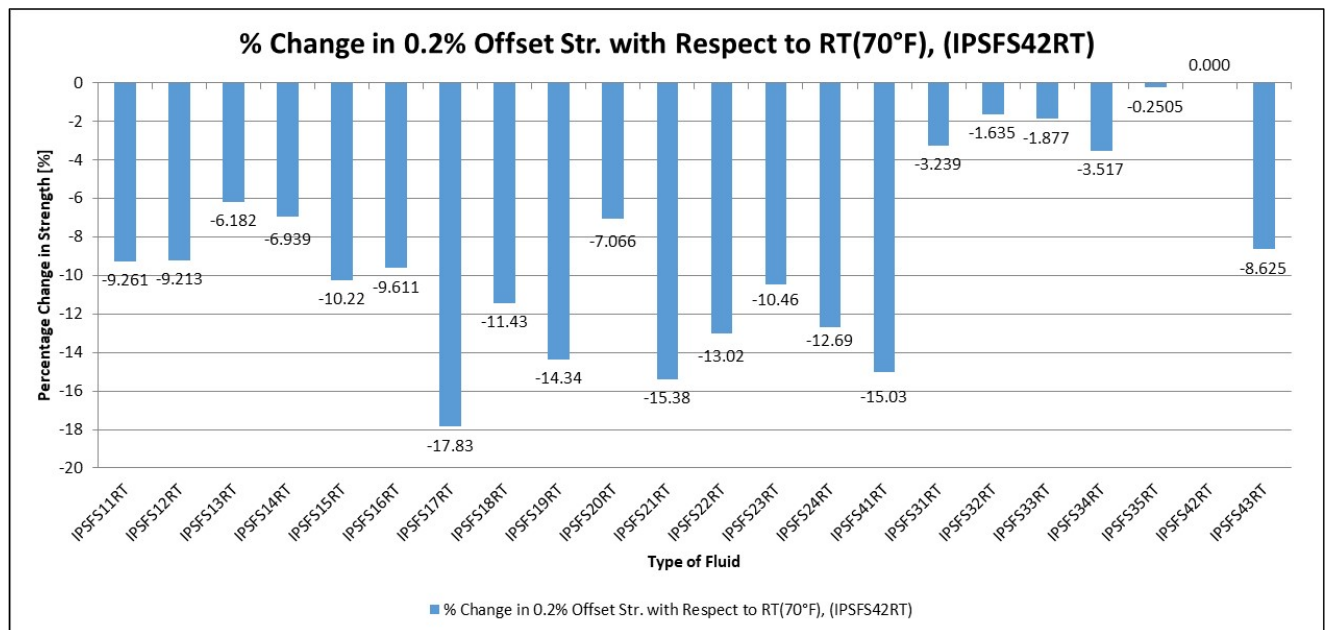
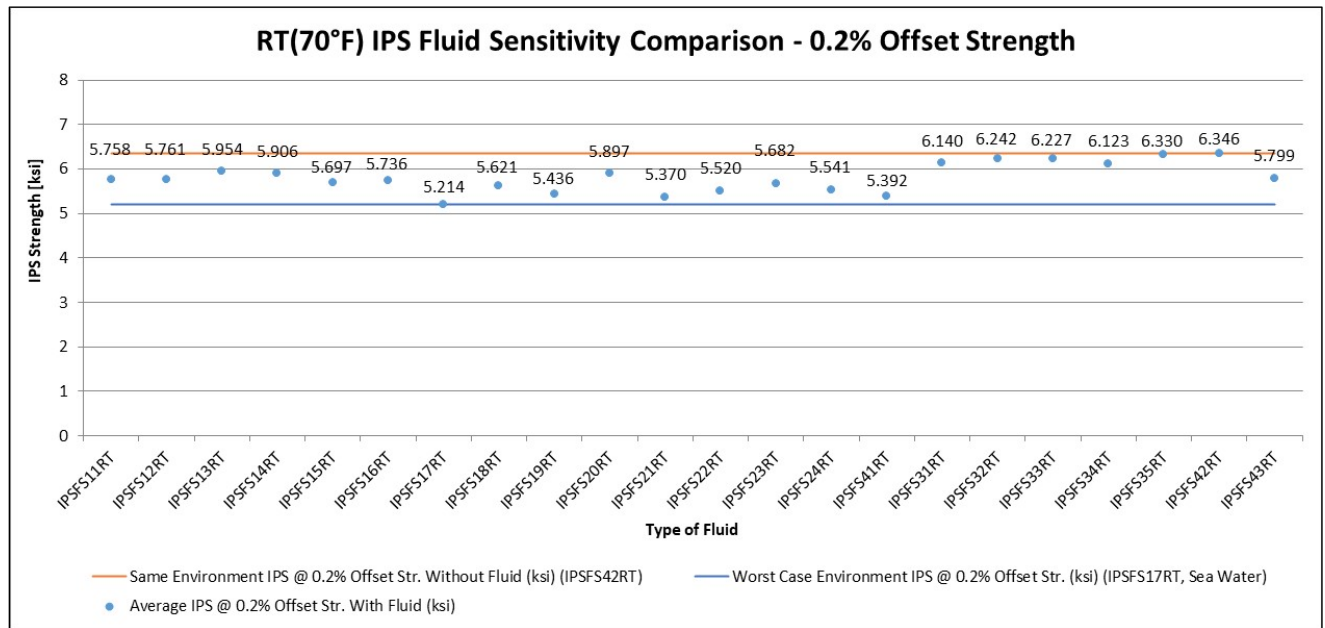


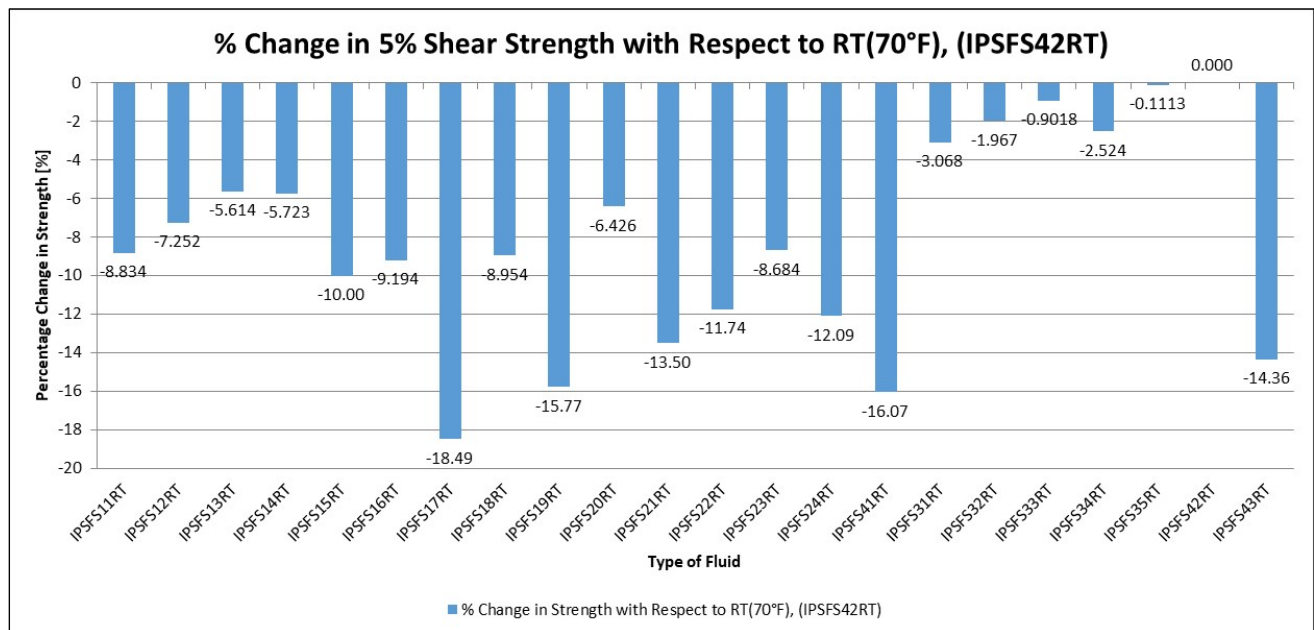
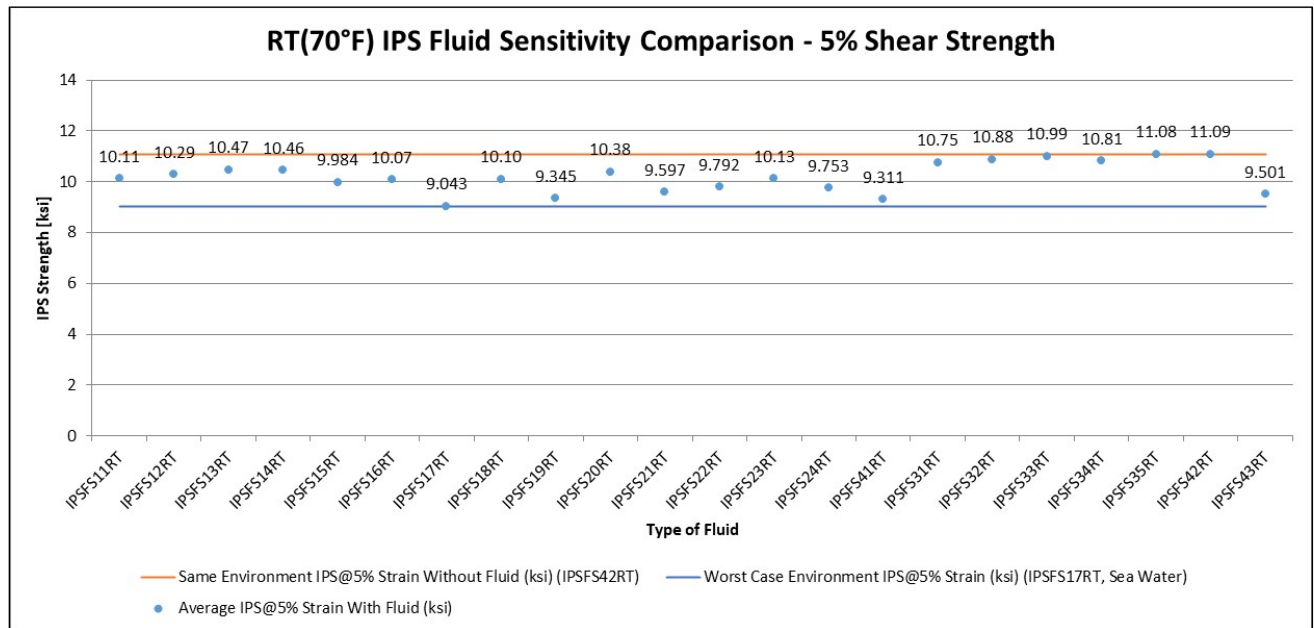


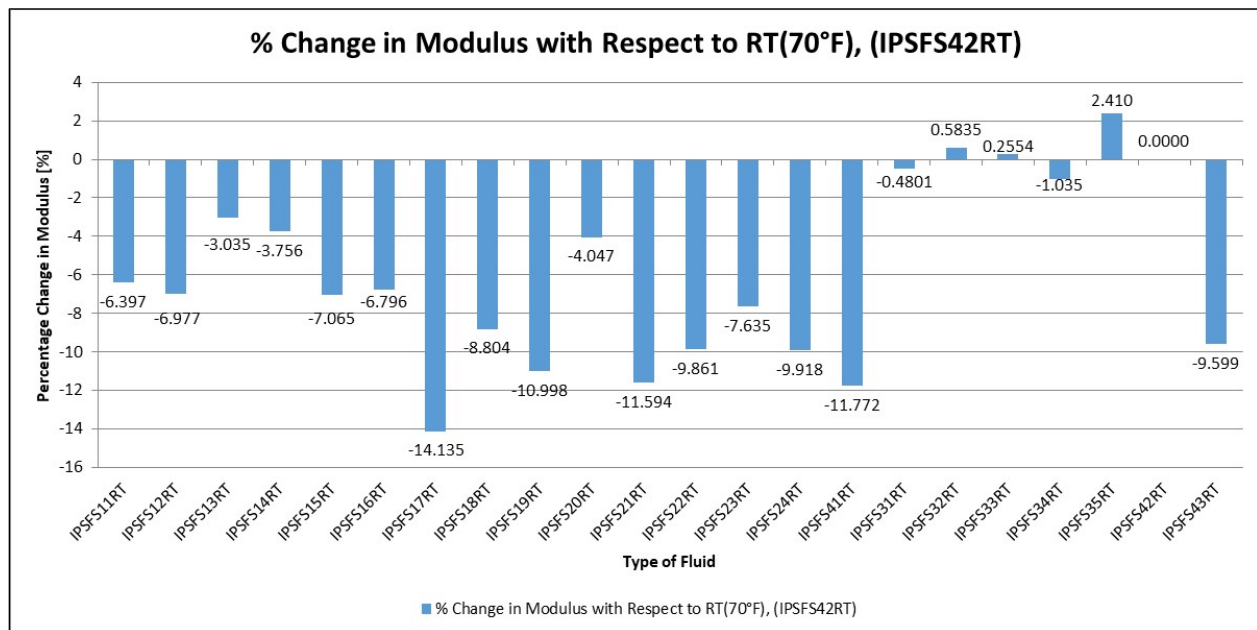
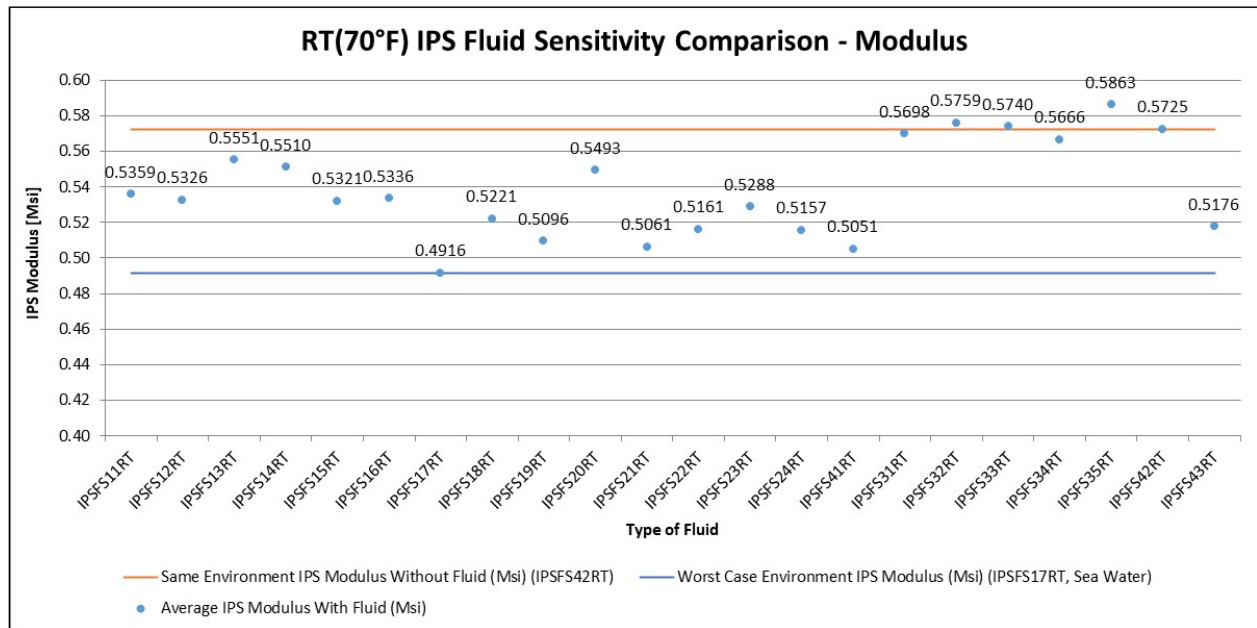
7.2 In-Plane Shear Fluid Sensitivity (IPSFS)

7.2.1 IPSFS Room Temperature Test Data

Code	Type of Fluid	Exposure
IPSFS11RT	100 Low Lead Fuel	90 days min @ 70°F±10°F
IPSFS12RT	Jet A Fuel	
IPSFS13RT	MIL-PRF-5606 Hydraulic Oil	
IPSFS14RT	MIL-PRF-83282 Hydraulic Oil	
IPSFS15RT	MIL-PRF-7808 Engine Oil	
IPSFS16RT	MIL-PRF-23699 Engine Oil	
IPSFS17RT	Sea Water	
IPSFS18RT	Skydrol LD-4	
IPSFS19RT	50% Water with 50% Skydrol LD-4	
IPSFS20RT	MIL-PRF-87252 PAO Cooling Fluid	
IPSFS21RT	E85 Fuel (Alternate aircraft fuel)	
IPSFS22RT	SAE AMS 2629 Jet Reference Fluid	
IPSFS23RT	MIL-PRF-87257B Hydraulic Oil	
IPSFS24RT	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
IPSFS41RT	Distilled Water	
IPSFS31RT	MEK washing fluid	90 mins @ 70°F±10°F
IPSFS32RT	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
IPSFS33RT	De-icing Fluid SAE AMS 1428 (Type II)	
IPSFS34RT	De-icing Fluid SAE AMS 1428 (Type IV)	
IPSFS35RT	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
IPSFS42RT	Dry	Per section 6.1 Test Plan NTP 3800Q1
IPSFS43RT	85% Relative Humidity	Per section 6.1 Test Plan NTP 3800Q1







Fluid Sensitivity Screening In-Plane Shear Properties (IPSFS)--RT(70°F) Strength and Modulus Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC
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												Average		
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]
IPSFS11RT	TCDNA111FS11RT	A	C1	1	1	5.999	10.25	0.5533	0.07372	16	0.004607	5.758	10.11	0.5359
	TCDNA112FS11RT	A	C1	1	1	5.576	9.853	0.5197	0.07643	16	0.004777			
	TCDNA113FS11RT	A	C1	1	1	5.716	10.14	0.5337	0.07492	16	0.004682			
	TCDNA114FS11RT	A	C1	1	1	5.785	10.25	0.5385	0.07477	16	0.004673			
	TCDNA115FS11RT	A	C1	1	1	5.716	10.09	0.5342	0.07538	16	0.004711			
IPSFS12RT	TCDNA111FS12RT	A	C1	1	1	5.787	10.26	0.5346	0.07482	16	0.004676	5.761	10.29	0.5326
	TCDNA112FS12RT	A	C1	1	1	5.687	10.43	0.5260	0.07587	16	0.004742			
	TCDNA113FS12RT	A	C1	1	1	5.663	10.22	0.5216	0.07587	16	0.004742			
	TCDNA114FS12RT	A	C1	1	1	5.765	10.25	0.5343	0.07612	16	0.004757			
	TCDNA115FS12RT*	A	C1	1	1	5.842		0.5404	0.07560	16	0.004725			
TCDNA116FS12RT*	A	C1	1	1	5.824		0.5384	0.07490	16	0.004681				
IPSFS13RT	TCDNA121FS13RT	A	C1	1	1	5.729	10.26	0.5339	0.07423	16	0.004640	5.954	10.47	0.5551
	TCDNA122FS13RT	A	C1	1	1	5.806	10.40	0.5426	0.07377	16	0.004610			
	TCDNA123FS13RT	A	C1	1	1	6.044	10.53	0.5649	0.07245	16	0.004528			
	TCDNA124FS13RT	A	C1	1	1	6.149	10.57	0.5714	0.07123	16	0.004452			
	TCDNA125FS13RT	A	C1	1	1	6.040	10.60	0.5628	0.07327	16	0.004579			
IPSFS14RT	TCDNA131FS14RT	A	C1	1	1	5.938	10.47	0.5551	0.07295	16	0.004559	5.906	10.46	0.5510
	TCDNA132FS14RT	A	C1	1	1	5.913	10.51	0.5519	0.07310	16	0.004569			
	TCDNA133FS14RT	A	C1	1	1	5.999	10.57	0.5615	0.07335	16	0.004584			
	TCDNA134FS14RT	A	C1	1	1	5.882	10.39	0.5504	0.07392	16	0.004620			
	TCDNA135FS14RT	A	C1	1	1	5.796	10.36	0.5362	0.07362	16	0.004601			
IPSFS15RT	TCDNA141FS15RT	A	C1	1	1	5.746	10.00	0.5342	0.07413	16	0.004633	5.697	9.984	0.5321
	TCDNA142FS15RT	A	C1	1	1	5.564	9.841	0.5160	0.07513	16	0.004696			
	TCDNA143FS15RT	A	C1	1	1	5.655	9.961	0.5286	0.07488	16	0.004680			
	TCDNA144FS15RT	A	C1	1	1	5.769	10.07	0.5424	0.07403	16	0.004627			
	TCDNA145FS15RT	A	C1	1	1	5.752	10.05	0.5391	0.07382	16	0.004614			
IPSFS16RT	TCDNA141FS16RT	A	C1	1	1	5.637	9.911	0.5230	0.07523	16	0.004702	5.736	10.07	0.5336
	TCDNA142FS16RT	A	C1	1	1	5.667	10.03	0.5290	0.07577	16	0.004735			
	TCDNA143FS16RT	A	C1	1	1	5.767	10.14	0.5376	0.07522	16	0.004701			
	TCDNA144FS16RT	A	C1	1	1	5.860	10.20	0.5442	0.07500	16	0.004688			
	TCDNA145FS16RT	A	C1	1	1	5.749	10.09	0.5343	0.07547	16	0.004717			
IPSFS17RT	TCDNA151FS17RT	A	C1	1	1	5.255	9.071	0.4964	0.07588	16	0.004743	5.214	9.043	0.4916
	TCDNA152FS17RT	A	C1	1	1	5.126	8.922	0.4820	0.07587	16	0.004742			
	TCDNA153FS17RT	A	C1	1	1	5.135	8.909	0.4847	0.07680	16	0.004800			
	TCDNA154FS17RT	A	C1	1	1	5.302	9.179	0.5007	0.07535	16	0.004709			
	TCDNA155FS17RT	A	C1	1	1	5.253	9.135	0.4942	0.07568	16	0.004730			
IPSFS18RT	TCDNA161FS18RT	A	C1	1	1	5.803	10.18	0.5392	0.07105	16	0.004441	5.621	10.10	0.5221
	TCDNA162FS18RT	A	C1	1	1	5.540	10.01	0.5152	0.07382	16	0.004614			
	TCDNA163FS18RT	A	C1	1	1	5.466	9.946	0.5058	0.07545	16	0.004716			
	TCDNA164FS18RT	A	C1	1	1	5.545	10.05	0.5174	0.07557	16	0.004723			
	TCDNA165FS18RT	A	C1	1	1	5.749	10.31	0.5329	0.07465	16	0.004666			
IPSFS19RT	TCDNA161FS19RT	A	C1	1	1	5.453	9.412	0.5103	0.07403	16	0.004627	5.436	9.345	0.5096
	TCDNA162FS19RT	A	C1	1	1	5.367	9.324	0.5039	0.07410	16	0.004631			
	TCDNA163FS19RT	A	C1	1	1	5.306	9.216	0.4972	0.07417	16	0.004635			
	TCDNA164FS19RT	A	C1	1	1	5.488	9.363	0.5165	0.07275	16	0.004547			
	TCDNA175FS19RT	A	C1	1	1	5.564	9.409	0.5200	0.07127	16	0.004454			
IPSFS20RT	TCDNA171FS20RT	A	C1	1	1	5.674	10.20	0.5309	0.07502	16	0.004689	5.897	10.38	0.5493
	TCDNA172FS20RT	A	C1	1	1	5.882	10.41	0.5470	0.07412	16	0.004632			
	TCDNA173FS20RT	A	C1	1	1	5.980	10.42	0.5575	0.07278	16	0.004549			
	TCDNA174FS20RT	A	C1	1	1	6.105	10.55	0.5676	0.07065	16	0.004416			
	TCDNA175FS20RT	A	C1	1	1	5.847	10.33	0.5437	0.07280	16	0.004550			
IPSFS21RT	TCDNA181FS21RT	A	C1	1	1	5.407	9.651	0.5106	0.07502	16	0.004689	5.370	9.597	0.5061
	TCDNA182FS21RT	A	C1	1	1	5.415	9.637	0.5081	0.07512	16	0.004695			
	TCDNA183FS21RT	A	C1	1	1	5.418	9.653	0.5099	0.07498	16	0.004686			
	TCDNA184FS21RT	A	C1	1	1	5.310	9.563	0.5027	0.07503	16	0.004690			
	TCDNA185FS21RT	A	C1	1	1	5.300	9.480	0.4995	0.07527	16	0.004704			
IPSFS22RT	TCDNA181FS22RT	A	C1	1	1	5.548	9.807	0.5210	0.07448	16	0.004655	5.520	9.792	0.5161
	TCDNA182FS22RT	A	C1	1	1	5.619	9.928	0.5248	0.07420	16	0.004638			
	TCDNA183FS22RT	A	C1	1	1	5.532	9.813	0.5170	0.07495	16	0.004684			
	TCDNA184FS22RT	A	C1	1	1	5.417	9.643	0.5063	0.07512	16	0.004695			
	TCDNA185FS22RT	A	C1	1	1	5.484	9.768	0.5112	0.07430	16	0.004644			
IPSFS23RT	TCDNA191FS23RT	A	C1	1	1	5.731	10.26	0.5351	0.07487	16	0.004679	5.682	10.13	0.5288
	TCDNA192FS23RT	A	C1	1	1	5.591	10.13	0.5216	0.07543	16	0.004715			
	TCDNA193FS23RT	A	C1	1	1	5.598	10.06	0.5196	0.07598	16	0.004749			
	TCDNA194FS23RT	A	C1	1	1	5.665	10.02	0.5258	0.07538	16	0.004711			
	TCDNA195FS23RT	A	C1	1	1	5.824	10.18	0.5419	0.07352	16	0.004595			
IPSFS24RT	TCDNA1101FS24RT	A	C1	1	1	5.507	9.689	0.5142	0.07448	16	0.004655	5.541	9.753	0.5157
	TCDNA1102FS24RT	A	C1	1	1	5.479	9.695	0.5116	0.07490	16	0.004681			
	TCDNA1103FS24RT	A	C1	1	1	5.540	9.764	0.5147	0.07482	16	0.004676			
	TCDNA1104FS24RT	A	C1	1	1	5.582	9.795	0.5197	0.07473	16	0.004671			
	TCDNA1105FS24RT	A	C1	1	1	5.595	9.821	0.5184	0.07435	16	0.004647			
IPSFS41RT	TCDNA1141FS41RT*	A	C1	1	1	5.402		0.5048	0.07345	16	0.004591	5.392	9.311	0.5051
	TCDNA1142FS41RT*	A	C1	1	1	5.408		0.5067	0.07418	16	0.004636			
	TCDNA1143FS41RT*	A	C1	1	1	5.386		0.5058	0.07427	16	0.004642			
	TCDNA1144FS41RT	A	C1	1	1	5.303	9.245	0.4968	0.07468	16	0.004668			
	TCDNA1145FS41RT	A	C1	1	1	5.271	9.193	0.4923	0.07442	16	0.004651			
IPSFS31RT	TCDNA1146FS41RT	A	C1	1	1	5.585	9.497	0.5243	0.07188	16	0.004493	6.140	10.75	0.5698
	TCDNA1101FS31RT	A	C1	1	1	6.079	10.73	0.5619	0.07368	16	0.004605			
	TCDNA1102FS31RT	A	C1	1	1	6.284	10.87	0.5868	0.07233	16	0.004521			
	TCDNA1113FS31RT	A	C1	1	1	6.274	10.78	0.5831	0.07162	16	0.004476			
	TCDNA1114FS31RT	A	C1	1	1	6.037	10.67	0.5581	0.07453	16	0.004658			

IPSFS32RT	TCDNA1111FS32RT	A	C1	1	1	6.354	11.00	0.5852	0.07302	16	0.004564	6.242	10.88	0.5759
	TCDNA1112FS32RT	A	C1	1	1	6.502	10.98	0.6028	0.07185	16	0.004491			
	TCDNA1113FS32RT	A	C1	1	1	6.139	10.80	0.5675	0.07362	16	0.004601			
	TCDNA1114FS32RT	A	C1	1	1	6.019	10.72	0.5543	0.07460	16	0.004663			
	TCDNA1115FS32RT	A	C1	1	1	6.197	10.89	0.5695	0.07455	16	0.004659			
IPSFS33RT	TCDNA1121FS33RT	A	C1	1	1	6.065	10.86	0.5610	0.07487	16	0.004679	6.227	10.99	0.5740
	TCDNA1122FS33RT	A	C1	1	1	6.103	10.91	0.5641	0.07472	16	0.004670			
	TCDNA1123FS33RT	A	C1	1	1	6.242	11.04	0.5747	0.07478	16	0.004674			
	TCDNA1124FS33RT	A	C1	1	1	6.219	11.00	0.5762	0.07420	16	0.004638			
	TCDNA1125FS33RT	A	C1	1	1	6.506	11.16	0.5938	0.07210	16	0.004506			
IPSFS34RT	TCDNA1131FS34RT	A	C1	1	1	5.915	10.60	0.5439	0.07395	16	0.004622	6.123	10.81	0.5666
	TCDNA1132FS34RT	A	C1	1	1	6.084	10.75	0.5629	0.07410	16	0.004631			
	TCDNA1133FS34RT	A	C1	1	1	6.283	10.95	0.5833	0.07317	16	0.004573			
	TCDNA1134FS34RT	A	C1	1	1	6.205	10.93	0.5733	0.07312	16	0.004570			
	TCDNA1135FS34RT	A	C1	1	1	6.127	10.84	0.5697	0.07335	16	0.004584			
IPSFS35RT	TCDNA1131FS35RT	A	C1	1	1	6.227	10.99	0.5740	0.07450	16	0.004656	6.330	11.08	0.5863
	TCDNA1132FS35RT	A	C1	1	1	6.395	11.04	0.5955	0.07297	16	0.004560			
	TCDNA1143FS35RT	A	C1	1	1	6.525	11.24	0.6073	0.07075	16	0.004422			
	TCDNA1144FS35RT	A	C1	1	1	6.300	11.08	0.5807	0.07328	16	0.004580			
	TCDNA1145FS35RT	A	C1	1	1	6.204	11.05	0.5742	0.07495	16	0.004684			
IPSFS42RT	TCDNA1151FS42RT**	A	C1	1	1	7.191		0.5376	0.07328	16	0.004580	6.346	11.09	0.5725
	TCDNA1152FS42RT	A	C1	1	1	6.249	11.22	0.5870	0.07397	16	0.004623			
	TCDNA1153FS42RT	A	C1	1	1	5.986	10.96	0.5856	0.07425	16	0.004641			
	TCDNA1154FS42RT	A	C1	1	1	6.269	11.18	0.5761	0.07382	16	0.004614			
	TCDNA1155FS42RT	A	C1	1	1	6.125	11.06	0.5686	0.07398	16	0.004624			
IPSFS43RT	TCDNA1156FS42RT	A	C1	1	1	6.257	11.04	0.5802	0.07412	16	0.004632	5.799	9.501	0.5176
	TCDNA1161FS43RT	A	C1	1	1	5.976	9.864	0.5332	0.07507	16	0.004692			
	TCDNA1162FS43RT	A	C1	1	1	5.648	9.414	0.5022	0.07427	16	0.004642			
	TCDNA1163FS43RT	A	C1	1	1	6.150	9.665	0.5582	0.07142	16	0.004464			
	TCDNA1164FS43RT	A	C1	1	1	5.648	9.275	0.5032	0.07357	16	0.004598			
	TCDNA1165FS43RT	A	C1	1	1	5.571	9.287	0.4910	0.07435	16	0.004647			

Modulus calculation is obtained from 2000 - 6000 microstrain for all IPS fluid sensitivity tests.

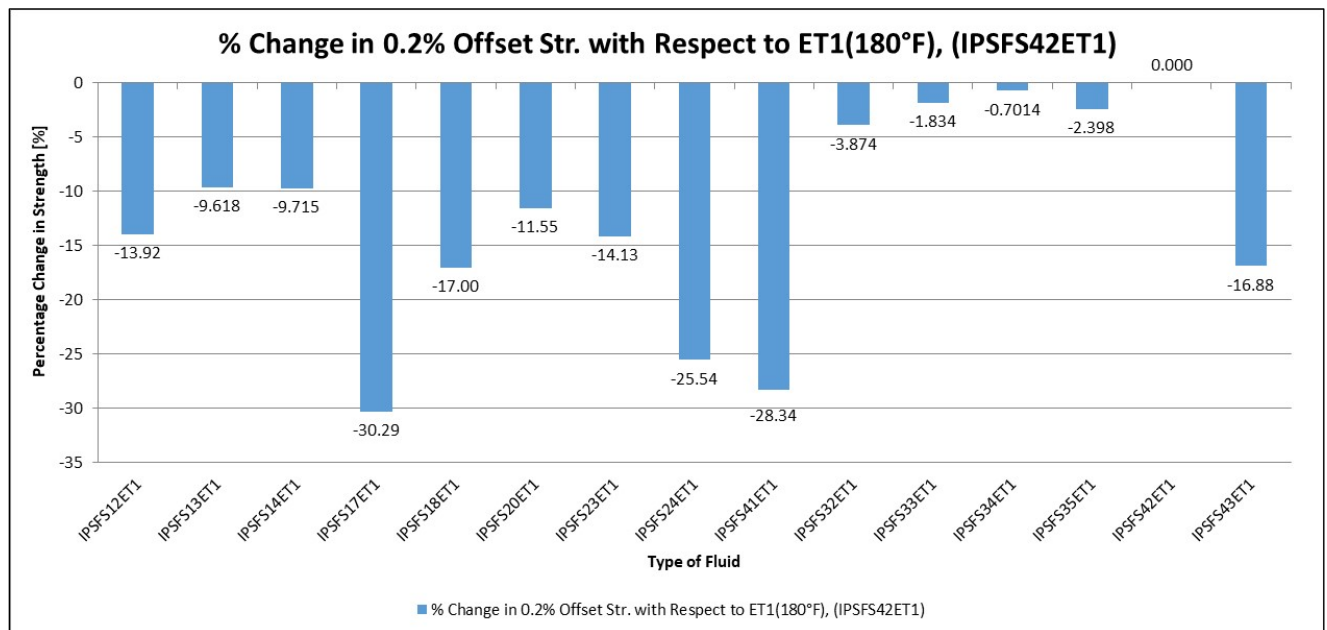
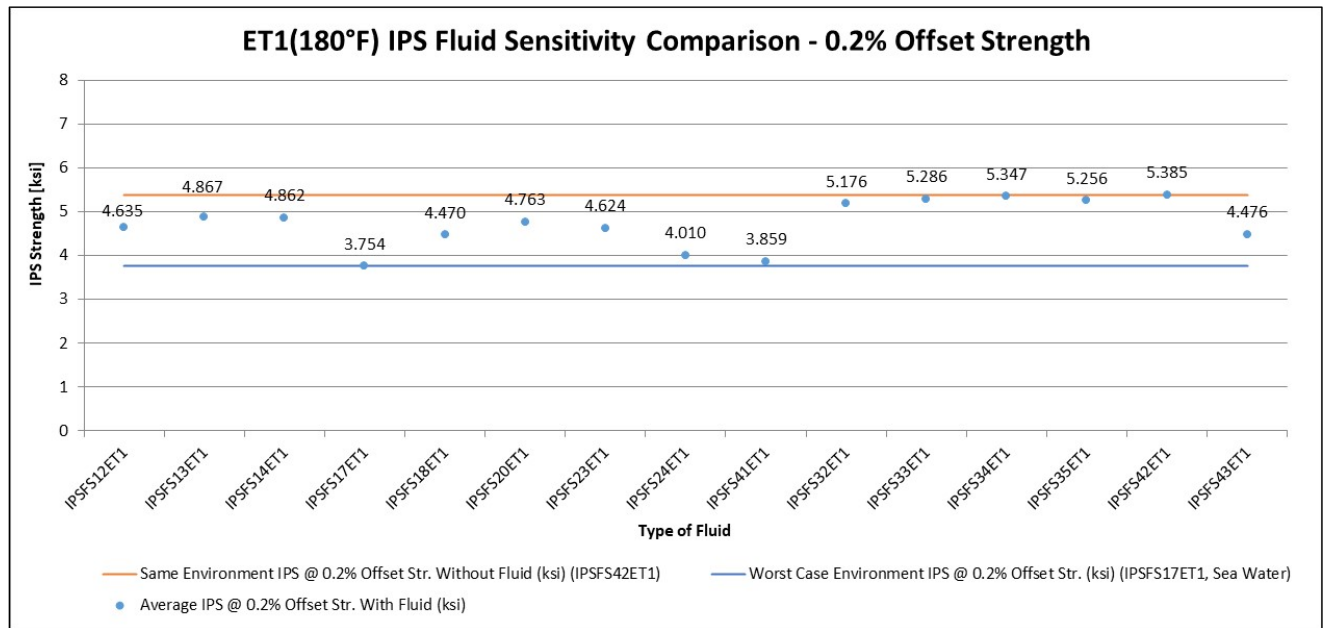
* 5% shear strength not reported because the biaxial extensometer slipped before obtaining a shear strain of 50000 microstrain.

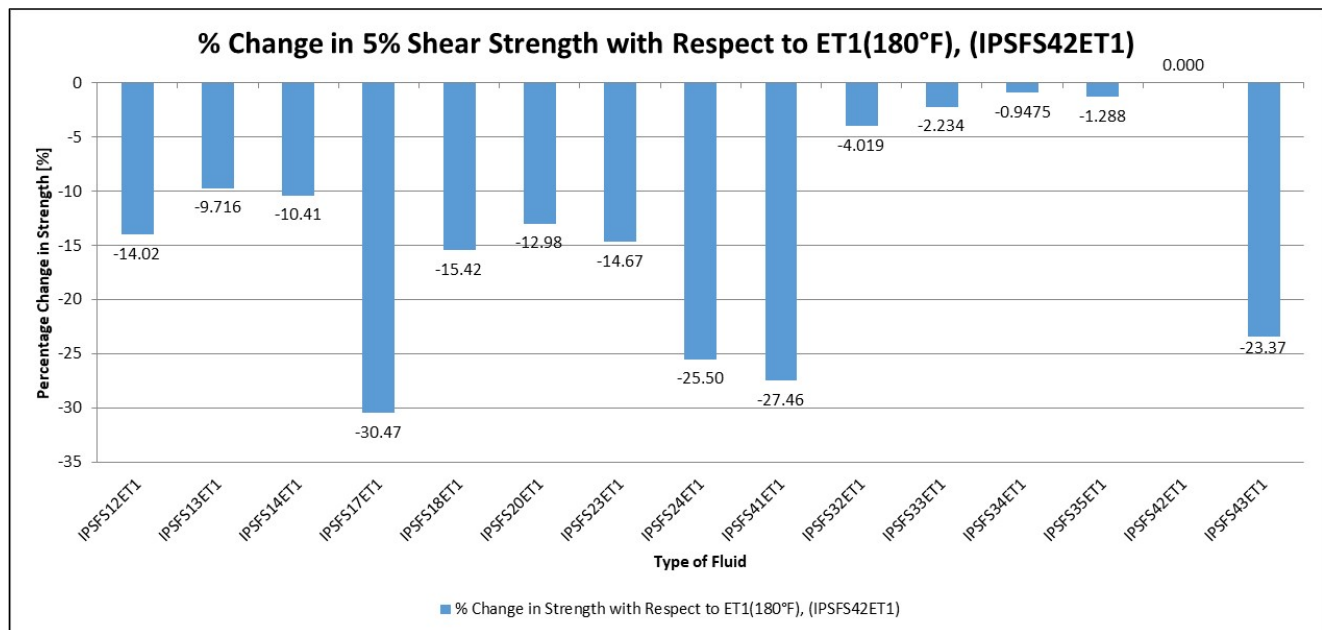
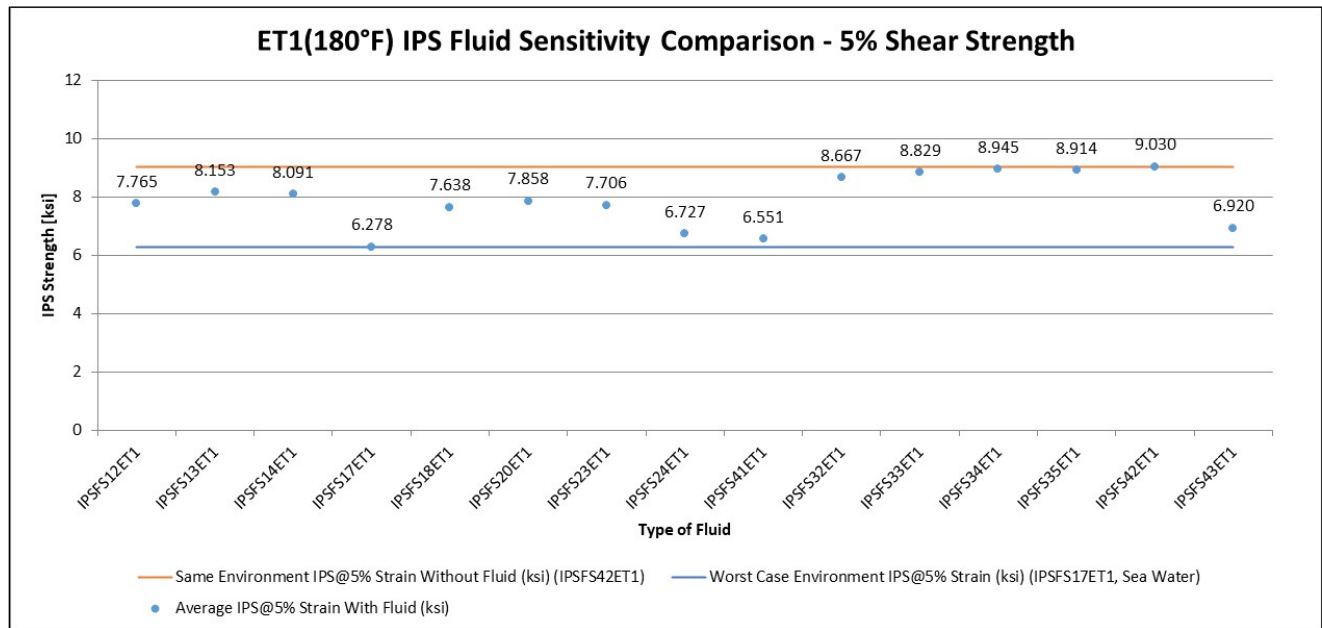
** 5% shear strength not reported due to strain gage failure occurred before reaching a shear strain of 50000 microstrain.

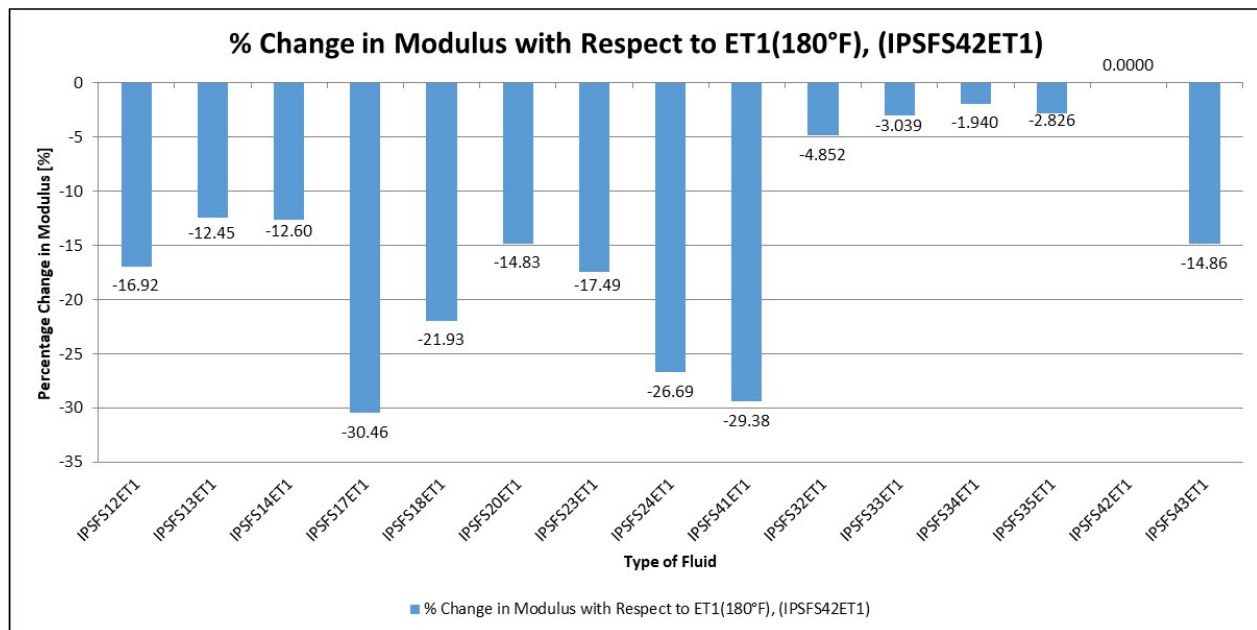
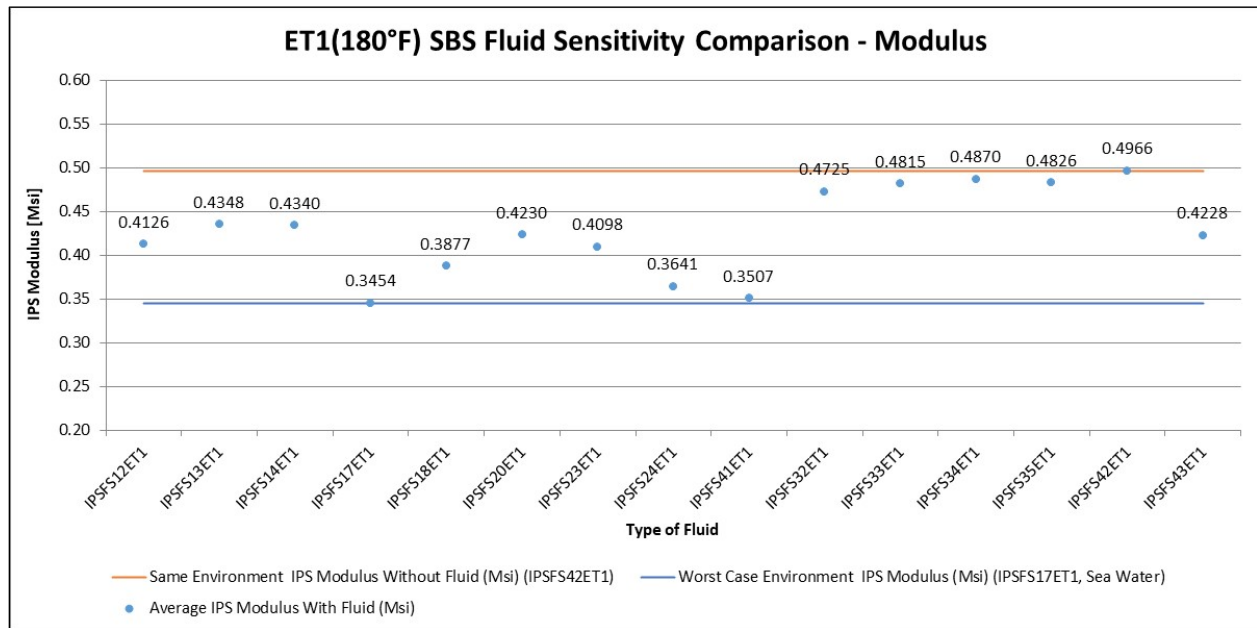
7.2.2 IPSFS Elevated Temperature Test Data

7.2.2.1 IPSFS ET1(180°F) Data

Code	Type of Fluid	Exposure
IPSFS12ET1	Jet A Fuel	90 days min @ 70°F±10°F
IPSFS13ET1	MIL-PRF-5606 Hydraulic Oil	
IPSFS14ET1	MIL-PRF-83282 Hydraulic Oil	
IPSFS17ET1	Sea Water	
IPSFS18ET1	Skydrol LD-4	
IPSFS20ET1	MIL-PRF-87252 PAO Cooling Fluid	
IPSFS23ET1	MIL-PRF-87257B Hydraulic Oil	
IPSFS24ET1	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
IPSFS41ET1	Distilled Water	
IPSFS32ET1	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	90 mins @ 70°F±10°F
IPSFS33ET1	De-icing Fluid SAE AMS 1428 (Type II)	
IPSFS34ET1	De-icing Fluid SAE AMS 1428 (Type IV)	
IPSFS35ET1	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
IPSFS42ET1	Dry	Per section 6.1 Test Plan NTP 3800Q1
IPSFS43ET1	85% Relative Humidity	Per section 6.1 Test Plan NTP 3800Q1





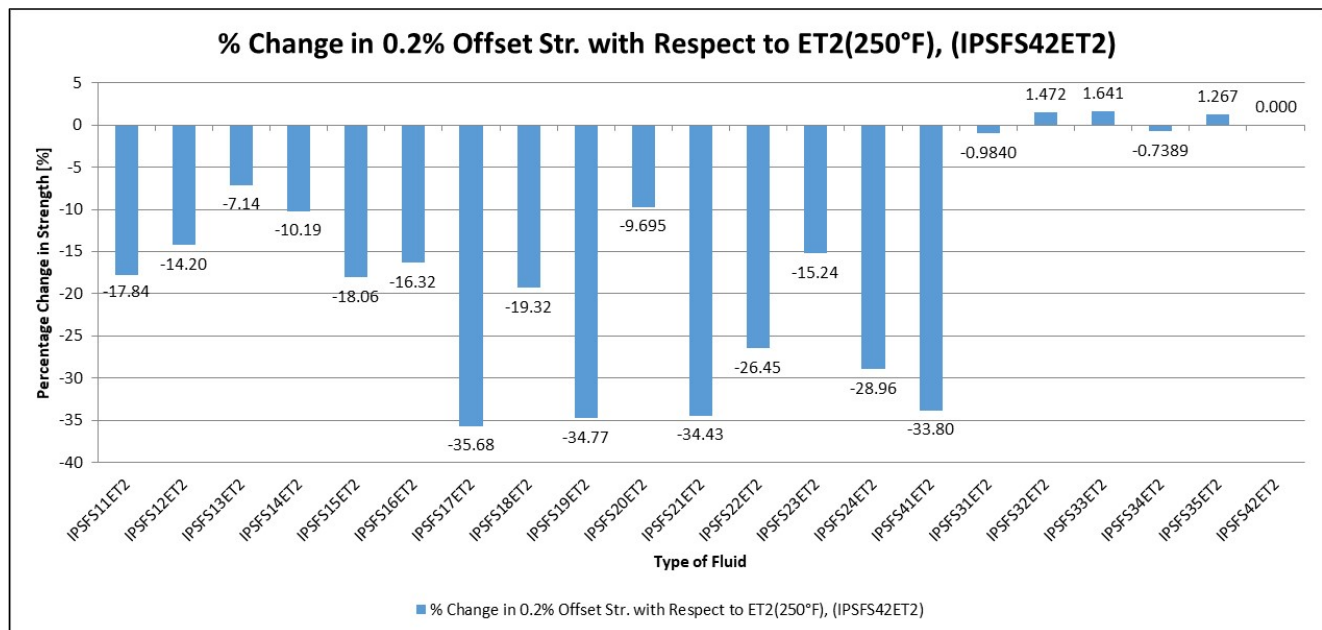
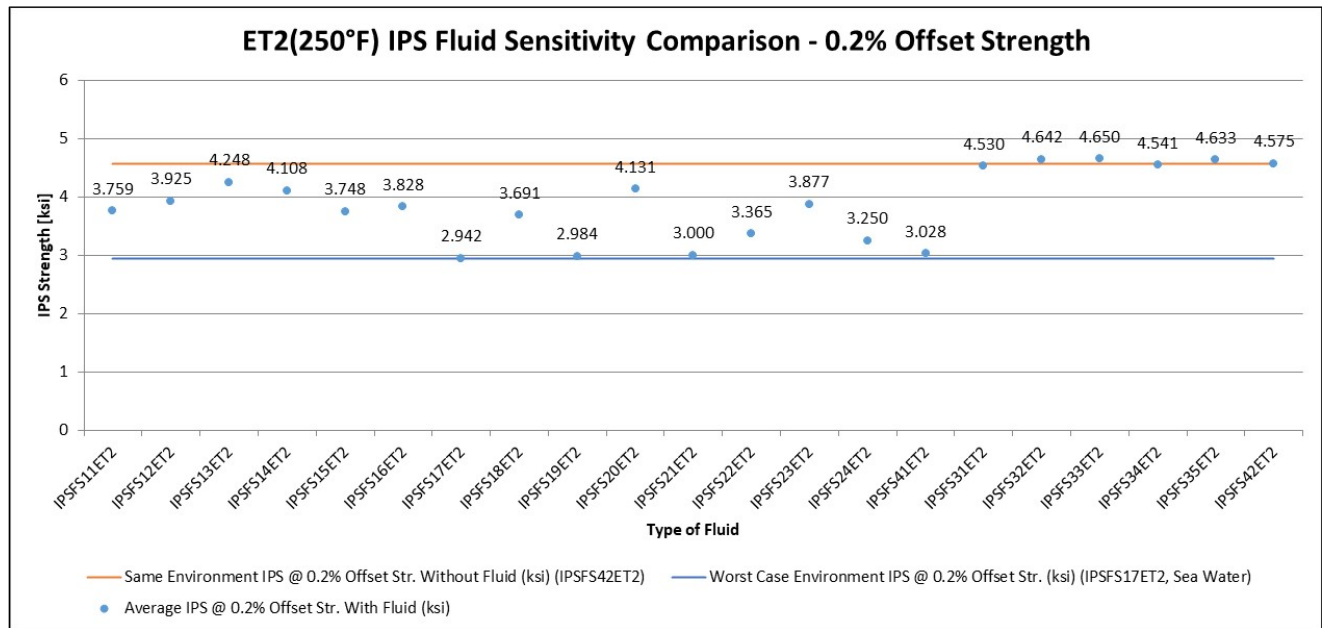


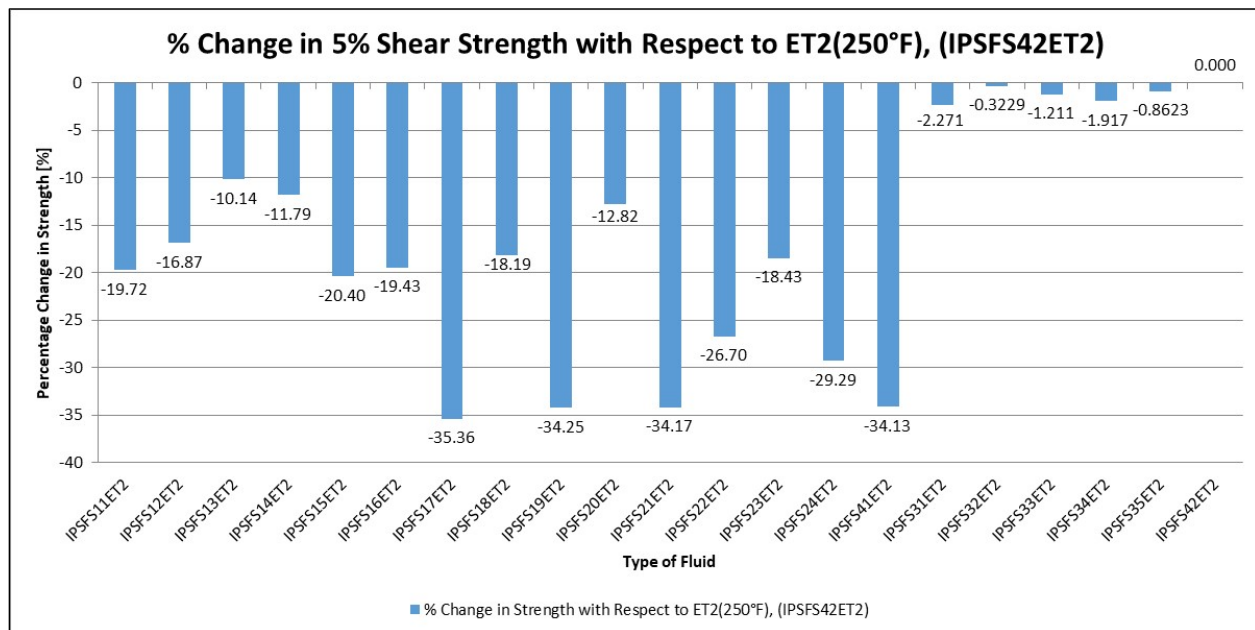
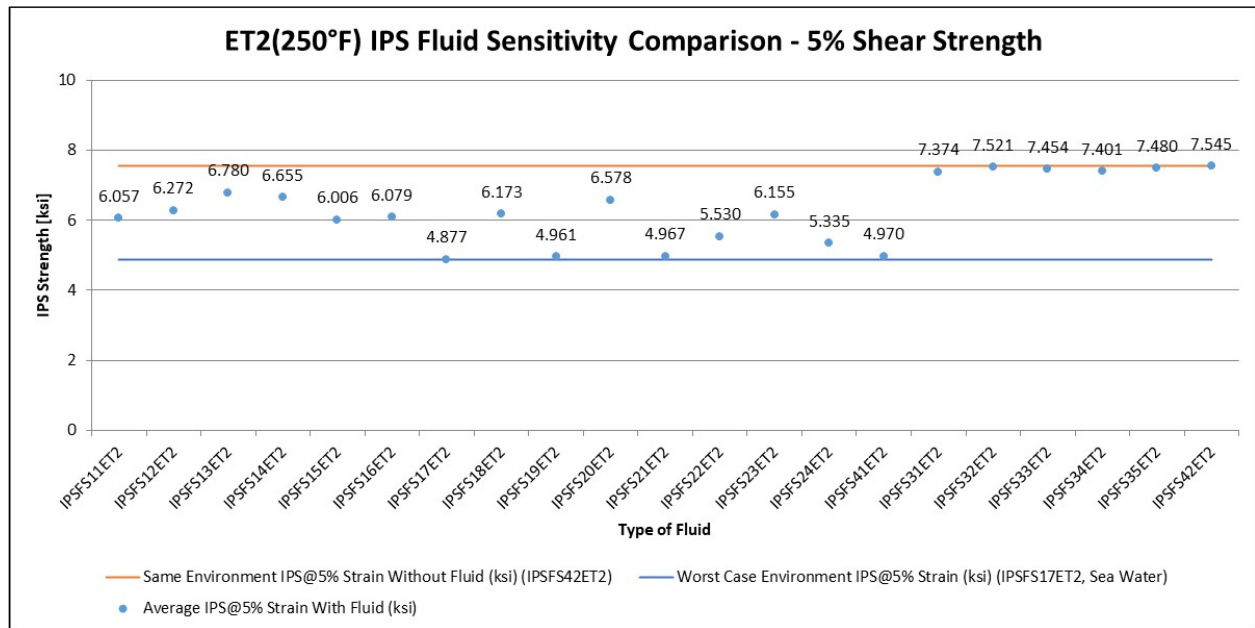
Fluid Sensitivity Screening In-Plane Shear Properties (IPSFS)--ET1(180°F) Strength and Modulus Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC													Average				
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]			
IPSFS12ET1	TCDNA111FS12ET1	A	C1	1	1	4.374	7.539	0.3886	0.07505	16	0.004691	4.635	7.765	0.4126			
	TCDNA112FS12ET1	A	C1	1	1	4.489	7.699	0.3987	0.07590	16	0.004744						
	TCDNA113FS12ET1	A	C1	1	1	4.630	7.805	0.4116	0.07500	16	0.004688						
	TCDNA114FS12ET1	A	C1	1	1	4.636	7.694	0.4109	0.07350	16	0.004594						
	TCDNA125FS12ET1	A	C1	1	1	5.048	8.087	0.4533	0.07092	16	0.004432						
IPSFS13ET1	TCDNA121FS13ET1	A	C1	1	1	4.684	8.110	0.4153	0.07455	16	0.004659	4.867	8.153	0.4348			
	TCDNA122FS13ET1	A	C1	1	1	4.972	8.284	0.4396	0.07415	16	0.004634						
	TCDNA123FS13ET1	A	C1	1	1	4.932	8.219	0.4426	0.07418	16	0.004636						
	TCDNA124FS13ET1	A	C1	1	1	4.813	8.079	0.4326	0.07415	16	0.004634						
	TCDNA125FS13ET1	A	C1	1	1	4.964	8.174	0.4448	0.07447	16	0.004654						
TCDNA126FS13ET1	A	C1	1	1	4.837	8.053	0.4339	0.07460	16	0.004663							
IPSFS14ET1	TCDNA131FS14ET1	A	C1	1	1	4.886	8.064	0.4362	0.07203	16	0.004502	4.862	8.091	0.4340			
	TCDNA132FS14ET1	A	C1	1	1	5.027	8.275	0.4512	0.07103	16	0.004440						
	TCDNA133FS14ET1	A	C1	1	1	4.803	8.030	0.4292	0.07305	16	0.004566						
	TCDNA134FS14ET1	A	C1	1	1	4.785	8.016	0.4265	0.07422	16	0.004639						
	TCDNA135FS14ET1	A	C1	1	1	4.809	8.068	0.4270	0.07470	16	0.004669						
IPSFS17ET1	TCDNA151FS17ET1	A	C1	1	1	3.793	6.256	0.3561	0.07433	16	0.004646	3.754	6.278	0.3454			
	TCDNA152FS17ET1	A	C1	1	1	3.943	6.494	0.3569	0.07218	16	0.004511						
	TCDNA153FS17ET1	A	C1	1	1	3.710	6.264	0.3386	0.07687	16	0.004804						
	TCDNA154FS17ET1	A	C1	1	1	3.675	6.163	0.3382	0.07737	16	0.004835						
	TCDNA155FS17ET1	A	C1	1	1	3.649	6.214	0.3370	0.07767	16	0.004854						
IPSFS18ET1	TCDNA161FS18ET1	A	C1	1	1	4.542	7.792	0.3930	0.07468	16	0.004668	4.470	7.638	0.3877			
	TCDNA162FS18ET1	A	C1	1	1	4.458	7.663	0.3901	0.07497	16	0.004685						
	TCDNA163FS18ET1	A	C1	1	1	4.382	7.501	0.3775	0.07562	16	0.004726						
	TCDNA164FS18ET1	A	C1	1	1	4.419	7.544	0.3823	0.07478	16	0.004674						
	TCDNA165FS18ET1	A	C1	1	1	4.547	7.688	0.3956	0.07275	16	0.004547						
IPSFS20ET1	TCDNA171FS20ET1	A	C1	1	1	4.567	7.650	0.4067	0.07375	16	0.004609	4.763	7.858	0.4230			
	TCDNA172FS20ET1	A	C1	1	1	4.823	7.895	0.4302	0.07362	16	0.004601						
	TCDNA173FS20ET1	A	C1	1	1	4.823	7.959	0.4284	0.07280	16	0.004550						
	TCDNA174FS20ET1	A	C1	1	1	4.734	7.785	0.4214	0.07302	16	0.004564						
	TCDNA175FS20ET1	A	C1	1	1	4.869	8.004	0.4281	0.07380	16	0.004613						
IPSFS23ET1	TCDNA191FS23ET1	A	C1	1	1	4.575	7.559	0.4058	0.07393	16	0.004621	4.624	7.706	0.4098			
	TCDNA192FS23ET1	A	C1	1	1	4.562	7.809	0.4047	0.07455	16	0.004659						
	TCDNA193FS23ET1	A	C1	1	1	4.594	7.721	0.4101	0.07478	16	0.004674						
	TCDNA194FS23ET1	A	C1	1	1	4.695	7.690	0.4163	0.07452	16	0.004657						
	TCDNA195FS23ET1	A	C1	1	1	4.704	7.794	0.4101	0.07382	16	0.004614						
TCDNA196FS23ET1	A	C1	1	1	4.615	7.660	0.4117	0.07403	16	0.004627							
IPSFS24ET1	TCDNA1101FS24ET1	A	C1	1	1	3.955	6.724	0.3558	0.07475	16	0.004672	4.010	6.727	0.3641			
	TCDNA1102FS24ET1	A	C1	1	1	3.919	6.644	0.3546	0.07425	16	0.004641						
	TCDNA1103FS24ET1	A	C1	1	1	4.028	6.719	0.3667	0.07238	16	0.004524						
	TCDNA1104FS24ET1	A	C1	1	1	4.240	6.959	0.3866	0.07105	16	0.004441						
	TCDNA1105FS24ET1	A	C1	1	1	3.908	6.591	0.3566	0.07298	16	0.004561						
IPSFS41ET1	TCDNA1151FS41ET1	A	C1	1	1	3.975	6.550	0.3624	0.07090	16	0.004431	3.859	6.551	0.3507			
	TCDNA1152FS41ET1	A	C1	1	1	3.814	6.492	0.3489	0.07352	16	0.004595						
	TCDNA1153FS41ET1	A	C1	1	1	3.779	6.547	0.3458	0.07422	16	0.004639						
	TCDNA1154FS41ET1	A	C1	1	1	3.834	6.530	0.3446	0.07468	16	0.004668						
	TCDNA1155FS41ET1	A	C1	1	1	3.893	6.634	0.3520	0.07450	16	0.004656						
IPSFS32ET1	TCDNA1111FS32ET1	A	C1	1	1	5.260	8.762	0.4830	0.07378	16	0.004611	5.176	8.667	0.4725			
	TCDNA1112FS32ET1	A	C1	1	1	5.195	8.718	0.4763	0.07375	16	0.004609						
	TCDNA1113FS32ET1	A	C1	1	1	5.161	8.657	0.4724	0.07473	16	0.004671						
	TCDNA1114FS32ET1	A	C1	1	1	5.054	8.588	0.4583	0.07493	16	0.004683						
	TCDNA1115FS32ET1	A	C1	1	1	5.099	8.529	0.4636	0.07437	16	0.004648						
TCDNA1116FS32ET1	A	C1	1	1	5.290	8.750	0.4816	0.07320	16	0.004575							
IPSFS33ET1	TCDNA1121FS33ET1	A	C1	1	1	5.300	8.879	0.4851	0.07252	16	0.004532	5.286	8.829	0.4815			
	TCDNA1122FS33ET1	A	C1	1	1	5.277	8.825	0.4785	0.07273	16	0.004546						
	TCDNA1123FS33ET1	A	C1	1	1	5.295	8.838	0.4818	0.07303	16	0.004565						
	TCDNA1124FS33ET1	A	C1	1	1	5.317	8.834	0.4845	0.07273	16	0.004546						
	TCDNA1125FS33ET1	A	C1	1	1	5.243	8.767	0.4778	0.07290	16	0.004556						
IPSFS34ET1	TCDNA1131FS34ET1	A	C1	1	1	5.206	8.803	0.4695	0.07437	16	0.004648	5.347	8.945	0.4870			
	TCDNA1132FS34ET1	A	C1	1	1	5.249	8.898	0.4785	0.07350	16	0.004594						
	TCDNA1133FS34ET1	A	C1	1	1	5.488	9.155	0.4989	0.07187	16	0.004492						
	TCDNA1134FS34ET1	A	C1	1	1	5.472	9.018	0.4999	0.07162	16	0.004476						
	TCDNA1135FS34ET1	A	C1	1	1	5.321	8.850	0.4881	0.07377	16	0.004610						
IPSFS35ET1	TCDNA1141FS35ET1	A	C1	1	1	5.273	8.912	0.4817	0.07453	16	0.004658	5.256	8.914	0.4826			
	TCDNA1142FS35ET1	A	C1	1	1	5.349	9.071	0.4933	0.07458	16	0.004661						
	TCDNA1143FS35ET1	A	C1	1	1	5.363	9.068	0.4918	0.07445	16	0.004653						
	TCDNA1144FS35ET1	A	C1	1	1	5.195	8.855	0.4776	0.07482	16	0.004676						
	TCDNA1145FS35ET1	A	C1	1	1	5.101	8.663	0.4684	0.07538	16	0.004711						
IPSFS42ET1	TCDNA1151FS42ET1	A	C1	1	1	5.383	9.034	0.4972	0.07423	16	0.004640	5.385	9.030	0.4966			
	TCDNA1152FS42ET1	A	C1	1	1	5.201	8.887	0.4780	0.07415	16	0.004634						
	TCDNA1153FS42ET1	A	C1	1	1	5.291	8.988	0.4847	0.07367	16	0.004604						
	TCDNA1154FS42ET1	A	C1	1	1	5.479	9.142	0.5054	0.07225	16	0.004516						
	TCDNA1165FS42ET1	A	C1	1	1	5.581	9.129	0.5180	0.07107	16	0.004442						
TCDNA1166FS42ET1	A	C1	1	1	5.376	9.003	0.4963	0.07352	16	0.004595							
IPSFS43ET1	TCDNA1161FS43ET1	A	C1	1	1	4.510	6.956	0.4273	0.07417	16	0.004635	4.476	6.920	0.4228			
	TCDNA1162FS43ET1	A	C1	1	1	4.473	6.892	0.4231	0.07388	16	0.004618						
	TCDNA1163FS43ET1	A	C1	1	1	4.480	6.901	0.4234	0.07295	16	0.004559						
	TCDNA1164FS43ET1	A	C1	1	1	4.464	6.921	0.4191	0.07385	16	0.004616						
	TCDNA1165FS43ET1	A	C1	1	1	4.454	6.927	0.4213	0.07407	16	0.004629						

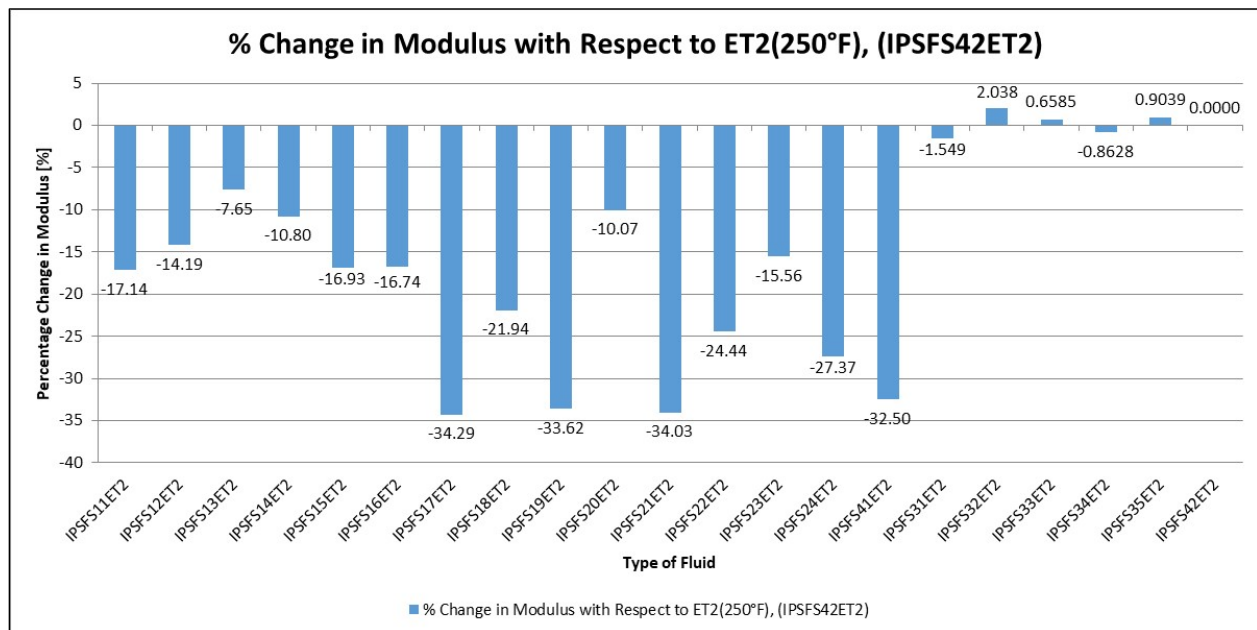
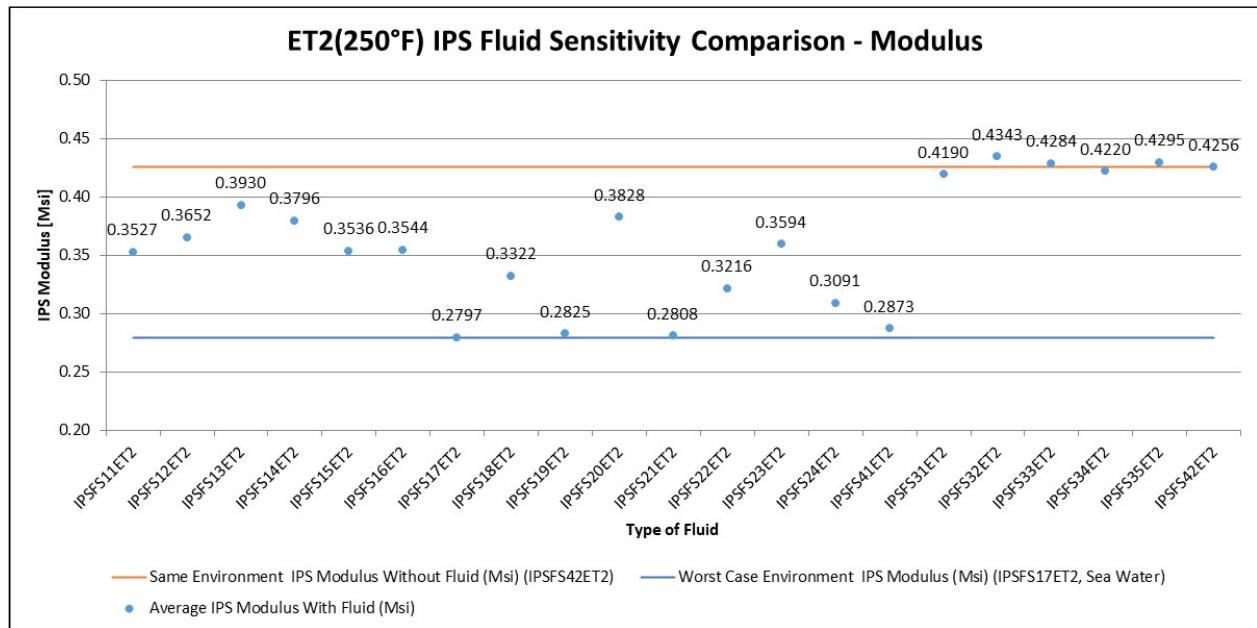
Modulus calculation is obtained from 2000 - 6000 microstrain for all IPS fluid sensitivity tests.

7.2.2.2 IPSFS ET2(250°F) Data

Code	Type of Fluid	Exposure
IPSFS11ET2	100 Low lead Fuel	90 days min @ 70°F±10°F
IPSFS12ET2	Jet A Fuel	
IPSFS13ET2	MIL-PRF-5606 Hydraulic Oil	
IPSFS14ET2	MIL-PRF-83282 Hydraulic Oil	
IPSFS15ET2	MIL-PRF-7808 Engine Oil	
IPSFS16ET2	MIL-PRF-23699 Engine Oil	
IPSFS17ET2	Sea Water	
IPSFS18ET2	Skydrol LD-4	
IPSFS19ET2	50% Water with 50% Skydrol LD-4	
IPSFS20ET2	MIL-PRF-87252 PAO Cooling Fluid	
IPSFS21ET2	E85 Fuel (Alternate aircraft fuel)	
IPSFS22ET2	SAE AMS 2629 Jet Reference Fluid	
IPSFS23ET2	MIL-PRF-87257B Hydraulic Oil	
IPSFS24ET2	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
IPSFS41ET2	Distilled Water	
IPSFS31ET2	MEK washing fluid	90 mins @ 70°F±10°F
IPSFS32ET2	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
IPSFS33ET2	De-icing Fluid SAE AMS 1428 (Type II)	
IPSFS34ET2	De-icing Fluid SAE AMS 1428 (Type IV)	
IPSFS35ET2	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
IPSFS42ET2	Dry	Per section 6.1 Test Plan NTP 3800Q1







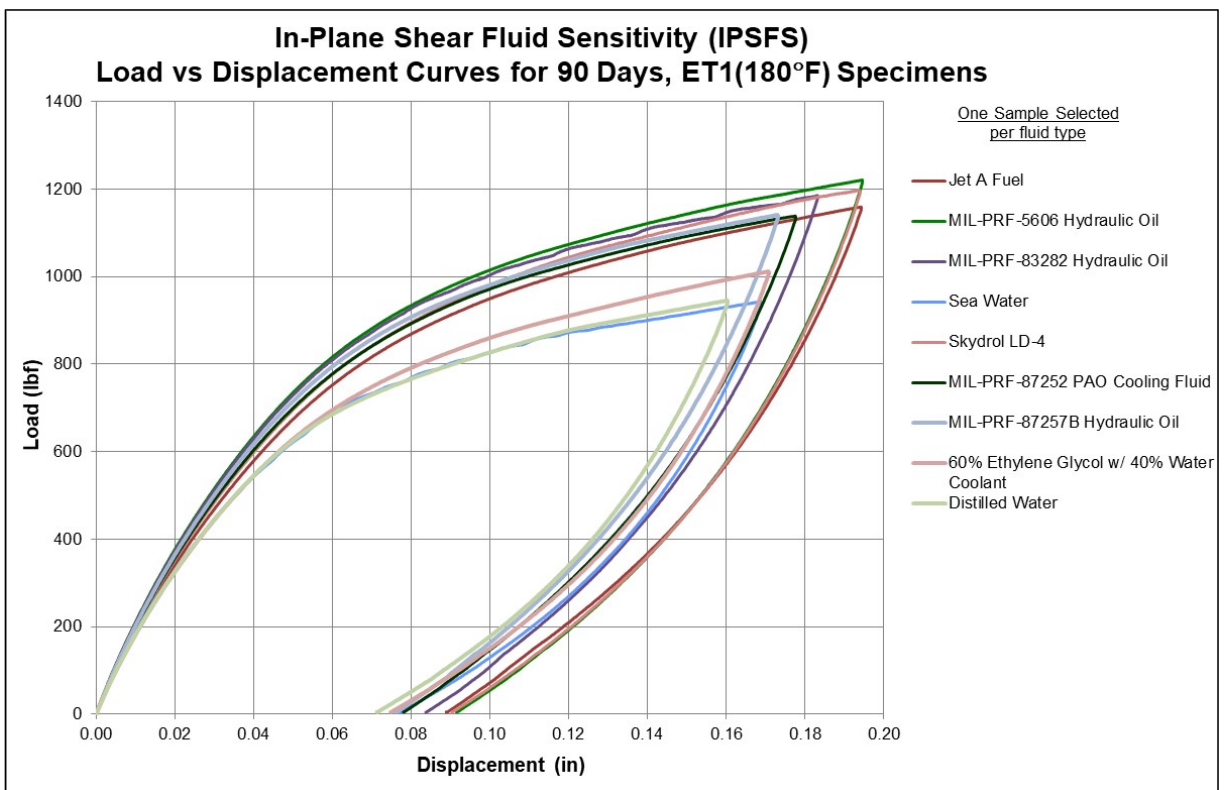
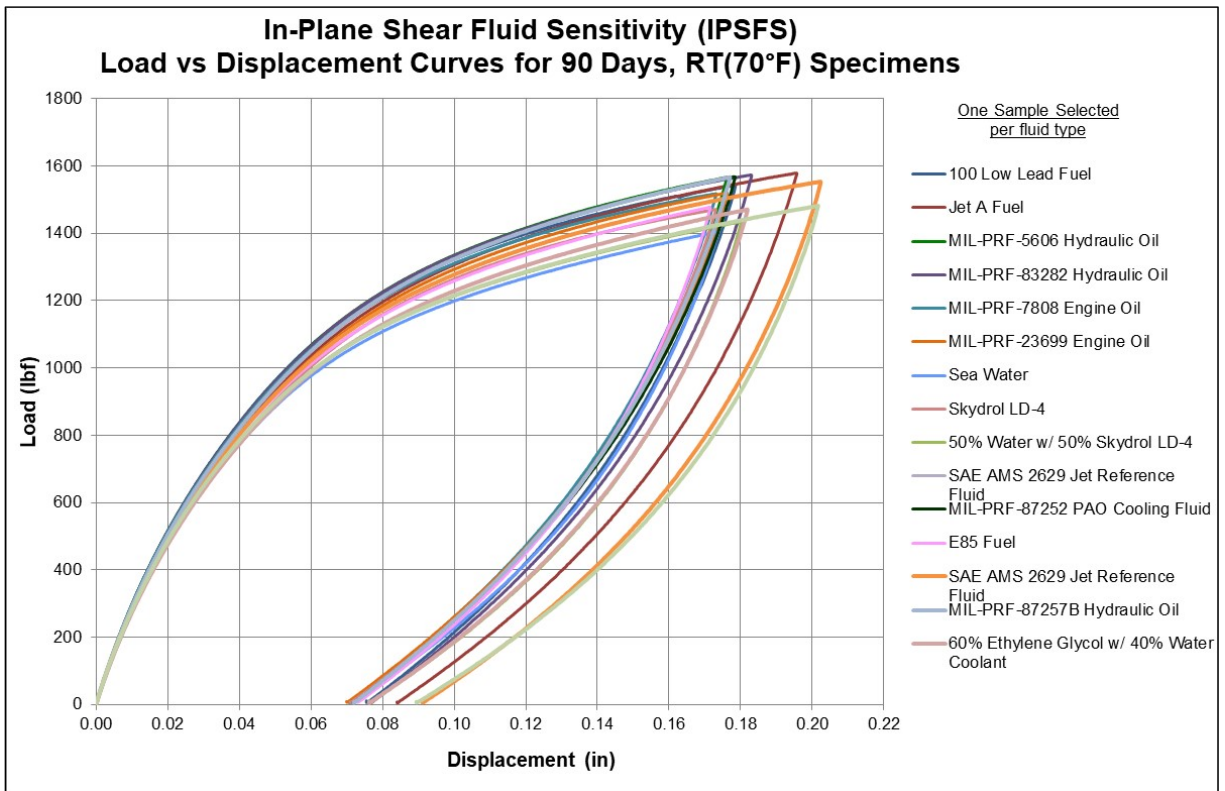
Fluid Sensitivity Screening
In-Plane Shear Properties (IPSFS)--ET2(250°F) Strength and Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

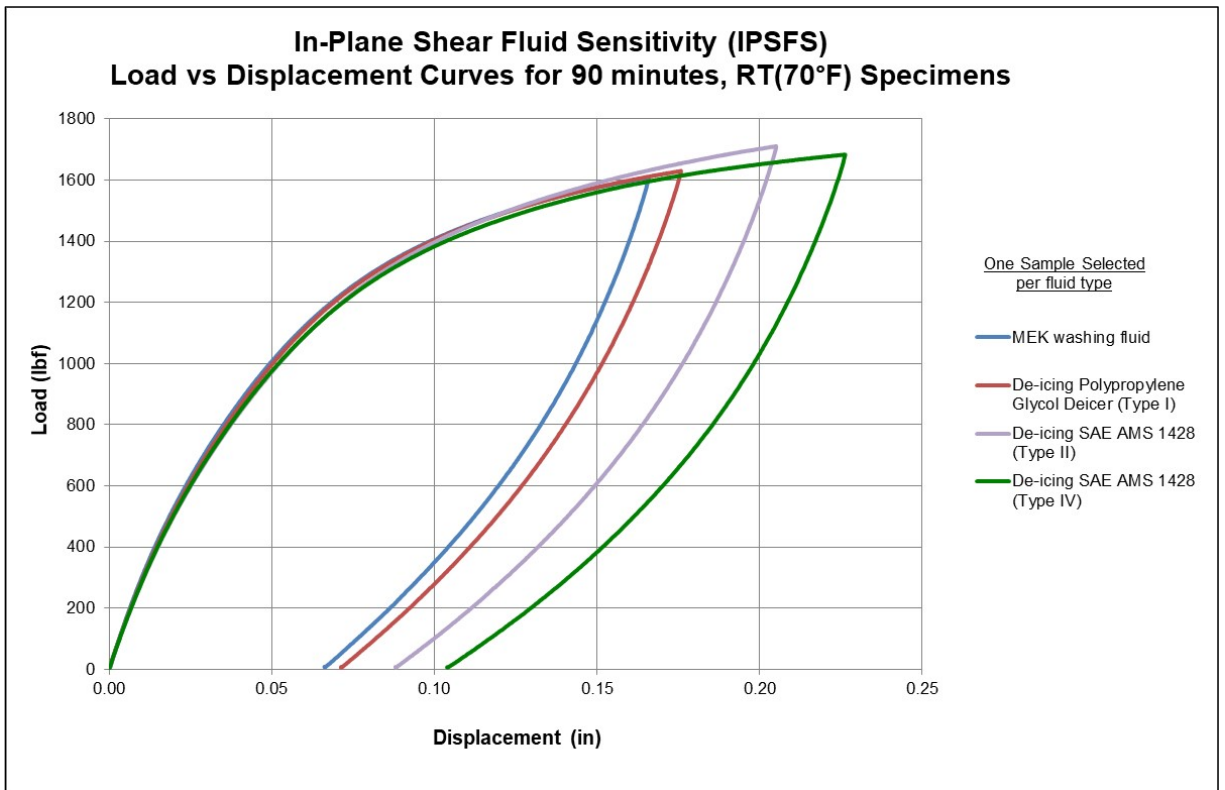
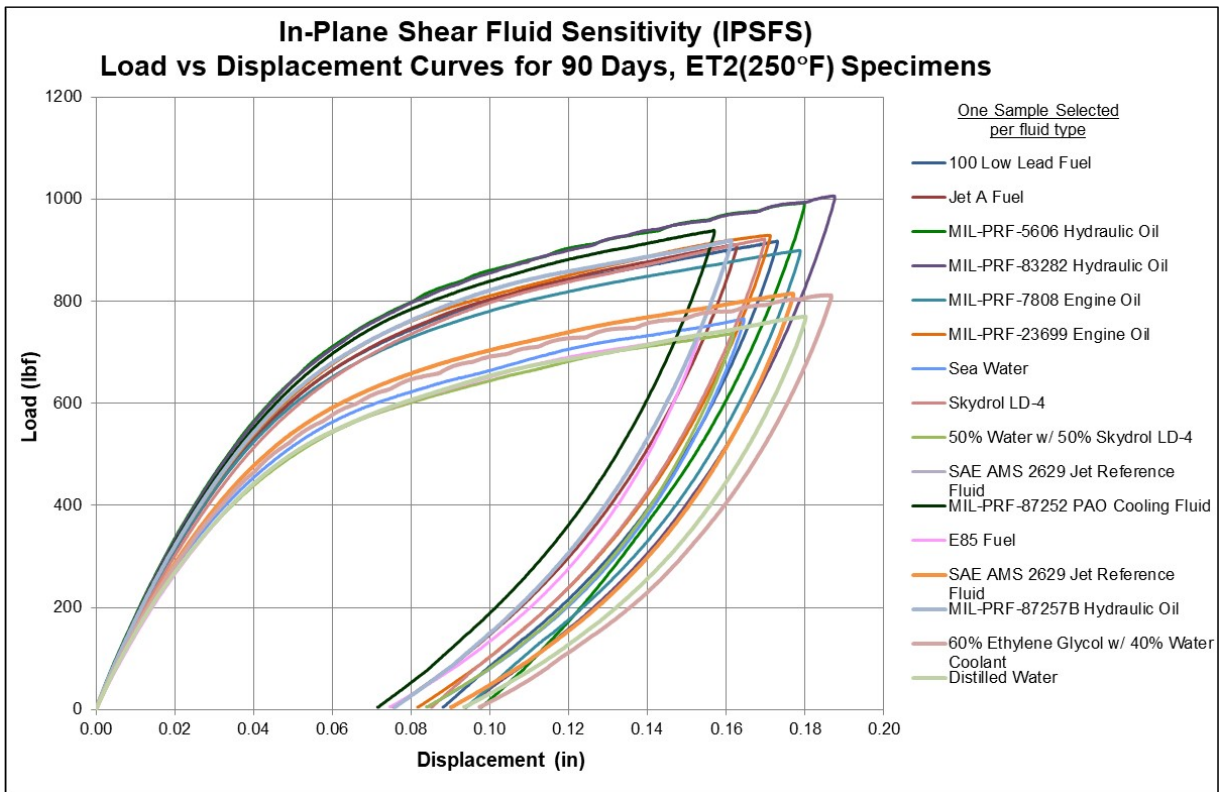
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t _{ply} [in]	Average		
												0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]
IPSFS11ET2	TCDNA111FS11ET2	A	C1	1	1	3.771	6.054	0.3497	0.07442	16	0.004651	3.759	6.057	0.3527
	TCDNA112FS11ET2	A	C1	1	1	3.744	6.047	0.3571	0.07537	16	0.004710			
	TCDNA113FS11ET2	A	C1	1	1	3.710	6.071	0.3497	0.07492	16	0.004682			
	TCDNA114FS11ET2	A	C1	1	1	3.730	5.975	0.3426	0.07505	16	0.004691			
	TCDNA115FS11ET2	A	C1	1	1	3.838	6.137	0.3643	0.07322	16	0.004576			
IPSFS12ET2	TCDNA121FS12ET2	A	C1	1	1	3.766	6.076	0.3491	0.07368	16	0.004605	3.925	6.272	0.3652
	TCDNA122FS12ET2	A	C1	1	1	4.018	6.421	0.3739	0.07350	16	0.004594			
	TCDNA123FS12ET2	A	C1	1	1	3.961	6.337	0.3694	0.07408	16	0.004630			
	TCDNA124FS12ET2	A	C1	1	1	3.870	6.169	0.3617	0.07387	16	0.004617			
	TCDNA125FS12ET2	A	C1	1	1	3.975	6.312	0.3697	0.07387	16	0.004617			
TCDNA126FS12ET2	A	C1	1	1	3.958	6.318	0.3677	0.07400	16	0.004625				
IPSFS13ET2	TCDNA121FS13ET2	A	C1	1	1	4.136	6.663	0.3855	0.07393	16	0.004621	4.248	6.780	0.3930
	TCDNA122FS13ET2	A	C1	1	1	4.454	6.918	0.4065	0.07183	16	0.004490			
	TCDNA133FS13ET2	A	C1	1	1	4.408	6.955	0.4100	0.07068	16	0.004418			
	TCDNA134FS13ET2	A	C1	1	1	4.148	6.706	0.3879	0.07253	16	0.004533			
	TCDNA135FS13ET2	A	C1	1	1	4.095	6.657	0.3754	0.07408	16	0.004630			
IPSFS14ET2	TCDNA131FS14ET2	A	C1	1	1	4.078	6.650	0.3770	0.07413	16	0.004633	4.108	6.655	0.3796
	TCDNA132FS14ET2	A	C1	1	1	4.179	6.762	0.3887	0.07447	16	0.004654			
	TCDNA133FS14ET2	A	C1	1	1	4.106	6.670	0.3795	0.07447	16	0.004654			
	TCDNA134FS14ET2	A	C1	1	1	3.986	6.457	0.3671	0.07438	16	0.004649			
	TCDNA135FS14ET2	A	C1	1	1	4.193	6.738	0.3859	0.07325	16	0.004578			
IPSFS15ET2	TCDNA141FS15ET2	A	C1	1	1	3.685	5.950	0.3517	0.07452	16	0.004657	3.748	6.006	0.3536
	TCDNA142FS15ET2	A	C1	1	1	3.735	5.983	0.3485	0.07438	16	0.004649			
	TCDNA143FS15ET2	A	C1	1	1	3.670	5.940	0.3447	0.07435	16	0.004647			
	TCDNA144FS15ET2	A	C1	1	1	3.779	6.030	0.3540	0.07323	16	0.004577			
	TCDNA145FS15ET2	A	C1	1	1	3.872	6.126	0.3689	0.07235	16	0.004522			
IPSFS16ET2	TCDNA141FS16ET2	A	C1	1	1	3.739	6.085	0.3490	0.07518	16	0.004699	3.828	6.079	0.3544
	TCDNA142FS16ET2	A	C1	1	1	3.949	6.195	0.3632	0.07455	16	0.004659			
	TCDNA153FS16ET2	A	C1	1	1	3.994	6.216	0.3727	0.07448	16	0.004655			
	TCDNA154FS16ET2	A	C1	1	1	3.805	6.018	0.3497	0.07492	16	0.004682			
	TCDNA155FS16ET2	A	C1	1	1	3.652	5.882	0.3373	0.07632	16	0.004770			
IPSFS17ET2	TCDNA151FS17ET2	A	C1	1	1	2.937	4.858	0.2788	0.07720	16	0.004825	2.942	4.877	0.2797
	TCDNA152FS17ET2	A	C1	1	1	2.956	4.897	0.2830	0.07697	16	0.004810			
	TCDNA153FS17ET2	A	C1	1	1	2.906	4.847	0.2747	0.07648	16	0.004780			
	TCDNA154FS17ET2	A	C1	1	1	2.936	4.864	0.2773	0.07652	16	0.004782			
	TCDNA155FS17ET2	A	C1	1	1	2.977	4.919	0.2846	0.07688	16	0.004805			
IPSFS18ET2	TCDNA161FS18ET2	A	C1	1	1	3.706	6.137	0.3293	0.07337	16	0.004585	3.691	6.173	0.3322
	TCDNA162FS18ET2	A	C1	1	1	3.633	6.127	0.3284	0.07415	16	0.004634			
	TCDNA163FS18ET2	A	C1	1	1	3.670	6.205	0.3290	0.07453	16	0.004658			
	TCDNA164FS18ET2	A	C1	1	1	3.759	6.248	0.3380	0.07395	16	0.004622			
	TCDNA165FS18ET2	A	C1	1	1	3.684	6.148	0.3364	0.07380	16	0.004613			
IPSFS19ET2	TCDNA171FS19ET2	A	C1	1	1	2.917	4.858	0.2765	0.07503	16	0.004690	2.984	4.961	0.2825
	TCDNA172FS19ET2	A	C1	1	1	2.957	4.956	0.2803	0.07503	16	0.004690			
	TCDNA173FS19ET2	A	C1	1	1	2.990	5.045	0.2843	0.07490	16	0.004681			
	TCDNA174FS19ET2	A	C1	1	1	3.019	5.003	0.2878	0.07465	16	0.004666			
	TCDNA175FS19ET2	A	C1	1	1	3.037	4.945	0.2837	0.07413	16	0.004633			
IPSFS20ET2	TCDNA171FS20ET2	A	C1	1	1	3.925	6.321	0.3628	0.07357	16	0.004598	4.131	6.578	0.3828
	TCDNA172FS20ET2	A	C1	1	1	4.301	6.738	0.3983	0.07183	16	0.004490			
	TCDNA183FS20ET2	A	C1	1	1	4.295	6.772	0.4008	0.07160	16	0.004475			
	TCDNA184FS20ET2	A	C1	1	1	4.049	6.475	0.3747	0.07353	16	0.004596			
	TCDNA185FS20ET2	A	C1	1	1	4.085	6.584	0.3772	0.07517	16	0.004698			
IPSFS21ET2	TCDNA181FS21ET2	A	C1	1	1	3.060	4.974	0.2831	0.07308	16	0.004568	3.000	4.967	0.2808
	TCDNA182FS21ET2	A	C1	1	1	3.196	5.208	0.3021	0.07142	16	0.004464			
	TCDNA183FS21ET2	A	C1	1	1	2.977	4.938	0.2794	0.07307	16	0.004567			
	TCDNA184FS21ET2	A	C1	1	1	2.842	4.827	0.2665	0.07447	16	0.004654			
	TCDNA185FS21ET2	A	C1	1	1	2.922	4.889	0.2727	0.07437	16	0.004648			
IPSFS22ET2	TCDNA191FS22ET2	A	C1	1	1	3.477	5.611	0.3347	0.07147	16	0.004467	3.365	5.530	0.3216
	TCDNA192FS22ET2	A	C1	1	1	3.363	5.507	0.3207	0.07385	16	0.004616			
	TCDNA193FS22ET2	A	C1	1	1	3.275	5.439	0.3140	0.07525	16	0.004703			
	TCDNA194FS22ET2	A	C1	1	1	3.312	5.486	0.3181	0.07542	16	0.004714			
	TCDNA195FS22ET2	A	C1	1	1	3.396	5.610	0.3206	0.07498	16	0.004686			
IPSFS23ET2	TCDNA191FS23ET2	A	C1	1	1	3.867	6.105	0.3565	0.07448	16	0.004655	3.877	6.155	0.3594
	TCDNA192FS23ET2	A	C1	1	1	3.810	6.096	0.3473	0.07512	16	0.004695			
	TCDNA193FS23ET2	A	C1	1	1	3.884	6.148	0.3565	0.07385	16	0.004616			
	TCDNA194FS23ET2	A	C1	1	1	3.924	6.221	0.3672	0.07250	16	0.004531			
	TCDNA1105FS23ET2	A	C1	1	1	3.901	6.204	0.3696	0.07160	16	0.004475			
IPSFS24ET2	TCDNA1101FS24ET2	A	C1	1	1	3.319	5.419	0.3134	0.07347	16	0.004592	3.250	5.335	0.3091
	TCDNA1102FS24ET2	A	C1	1	1	3.253	5.353	0.3142	0.07373	16	0.004608			
	TCDNA1103FS24ET2	A	C1	1	1	3.258	5.324	0.3107	0.07347	16	0.004592			
	TCDNA1104FS24ET2	A	C1	1	1	3.231	5.341	0.3058	0.07328	16	0.004580			
	TCDNA1105FS24ET2	A	C1	1	1	3.188	5.240	0.3017	0.07402	16	0.004626			
IPSFS41ET2	TCDNA1151FS41ET2	A	C1	1	1	3.126	5.106	0.2944	0.07443	16	0.004652	3.028	4.970	0.2873
	TCDNA1152FS41ET2	A	C1	1	1	3.040	5.026	0.2914	0.07470	16	0.004669			
	TCDNA1153FS41ET2	A	C1	1	1	2.950	4.895	0.2796	0.07503	16	0.004690			
	TCDNA1154FS41ET2	A	C1	1	1	2.963	4.867	0.2799	0.07430	16	0.004644			
	TCDNA1155FS41ET2	A	C1	1	1	3.062	4.955	0.2911	0.07238	16	0.004524			
IPSFS31ET2	TCDNA1111FS31ET2	A	C1	1	1	4.634	7.518	0.4307	0.07530	16	0.004706	4.530	7.374	0.4190
	TCDNA1112FS31ET2	A	C1	1	1	4.582	7.473	0.4279	0.07470	16	0.004669			
	TCDNA1113FS31ET2	A	C1	1	1	4.578	7.376	0.4152	0.07525	16	0.004703			
	TCDNA1114FS31ET2	A	C1	1	1	4.431	7.289	0.4138	0.07575	16	0.004734			
	TCDNA1115FS31ET2	A	C1	1	1	4.422	7.214	0.4076	0.07600	16	0.004750			

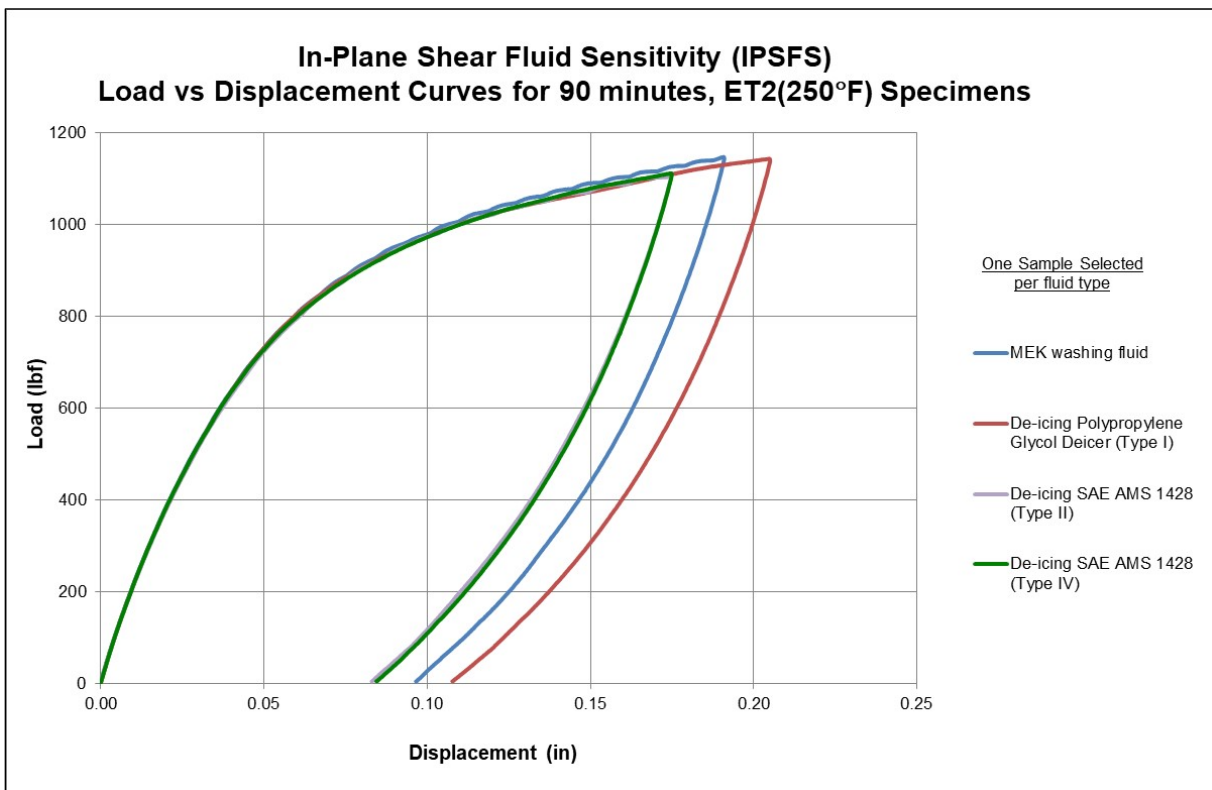
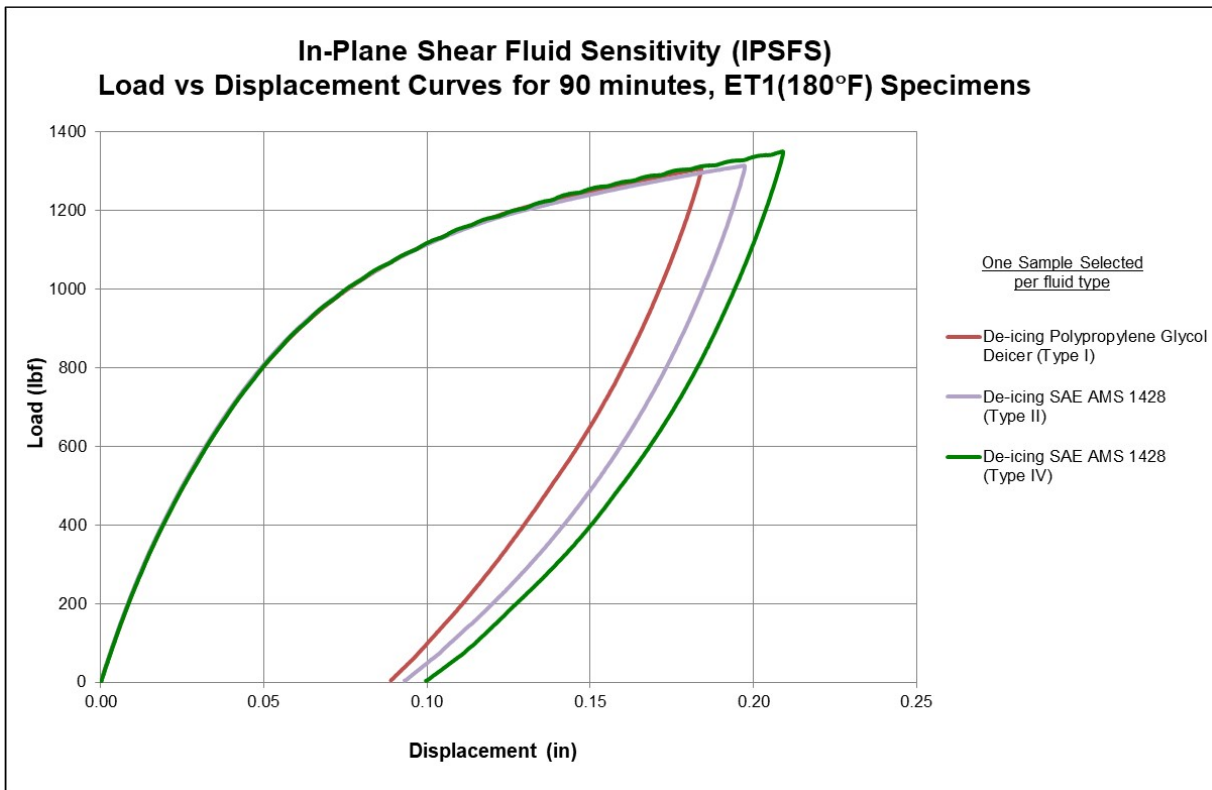
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	TCDNA1122FS32ET2	A	C1	1	1	4.708	7.542	0.4342	0.07367	16	0.004604			
	TCDNA1123FS32ET2	A	C1	1	1	4.589	7.456	0.4203	0.07477	16	0.004673			
	TCDNA1124FS32ET2	A	C1	1	1	4.539	7.450	0.4224	0.07500	16	0.004688			
IPSFS33ET2	TCDNA1125FS32ET2	A	C1	1	1	4.584	7.490	0.4205	0.07482	16	0.004676	4.650	7.454	0.4284
	TCDNA1121FS33ET2	A	C1	1	1	4.562	7.463	0.4236	0.07348	16	0.004593			
	TCDNA1122FS33ET2	A	C1	1	1	4.439	7.269	0.4111	0.07372	16	0.004607			
	TCDNA1123FS33ET2	A	C1	1	1	4.546	7.340	0.4160	0.07378	16	0.004611			
IPSFS34ET2	TCDNA1124FS33ET2	A	C1	1	1	4.882	7.577	0.4434	0.07203	16	0.004502	4.541	7.401	0.4220
	TCDNA1135FS33ET2	A	C1	1	1	4.820	7.620	0.4479	0.07097	16	0.004435			
	TCDNA1131FS34ET2	A	C1	1	1	4.518	7.326	0.4209	0.07522	16	0.004701			
	TCDNA1132FS34ET2	A	C1	1	1	4.509	7.531	0.4189	0.07482	16	0.004676			
IPSFS35ET2	TCDNA1133FS34ET2	A	C1	1	1	4.569	7.433	0.4248	0.07463	16	0.004665	4.633	7.480	0.4295
	TCDNA1134FS34ET2	A	C1	1	1	4.534	7.370	0.4241	0.07497	16	0.004685			
	TCDNA1135FS34ET2	A	C1	1	1	4.555	7.356	0.4218	0.07525	16	0.004703			
	TCDNA1136FS34ET2	A	C1	1	1	4.560	7.388	0.4212	0.07498	16	0.004686			
IPSFS42ET2	TCDNA1141FS35ET2	A	C1	1	1	4.623	7.492	0.4311	0.07240	16	0.004525	4.575	7.545	0.4256
	TCDNA1142FS35ET2	A	C1	1	1	4.867	7.661	0.4504	0.07142	16	0.004464			
	TCDNA1143FS35ET2	A	C1	1	1	4.569	7.429	0.4235	0.07325	16	0.004578			
	TCDNA1144FS35ET2	A	C1	1	1	4.499	7.351	0.4157	0.07390	16	0.004619			
IPSFS42ET2	TCDNA1145FS35ET2	A	C1	1	1	4.605	7.469	0.4267	0.07430	16	0.004644	4.575	7.545	0.4256
	TCDNA1161FS42ET2	A	C1	1	1	4.547	7.527	0.4307	0.07528	16	0.004705			
	TCDNA1162FS42ET2	A	C1	1	1	4.529	7.488	0.4362	0.07592	16	0.004745			
	TCDNA1163FS42ET2	A	C1	1	1	4.594	7.573	0.4253	0.07492	16	0.004682			
IPSFS42ET2	TCDNA1164FS42ET2	A	C1	1	1	4.707	7.644	0.4398	0.07490	16	0.004681	4.575	7.545	0.4256
	TCDNA1165FS42ET2	A	C1	1	1	4.655	7.675	0.4313	0.07458	16	0.004661			
	TCDNA1166FS42ET2	A	C1	1	1	4.415	7.364	0.3904	0.07560	16	0.004725			

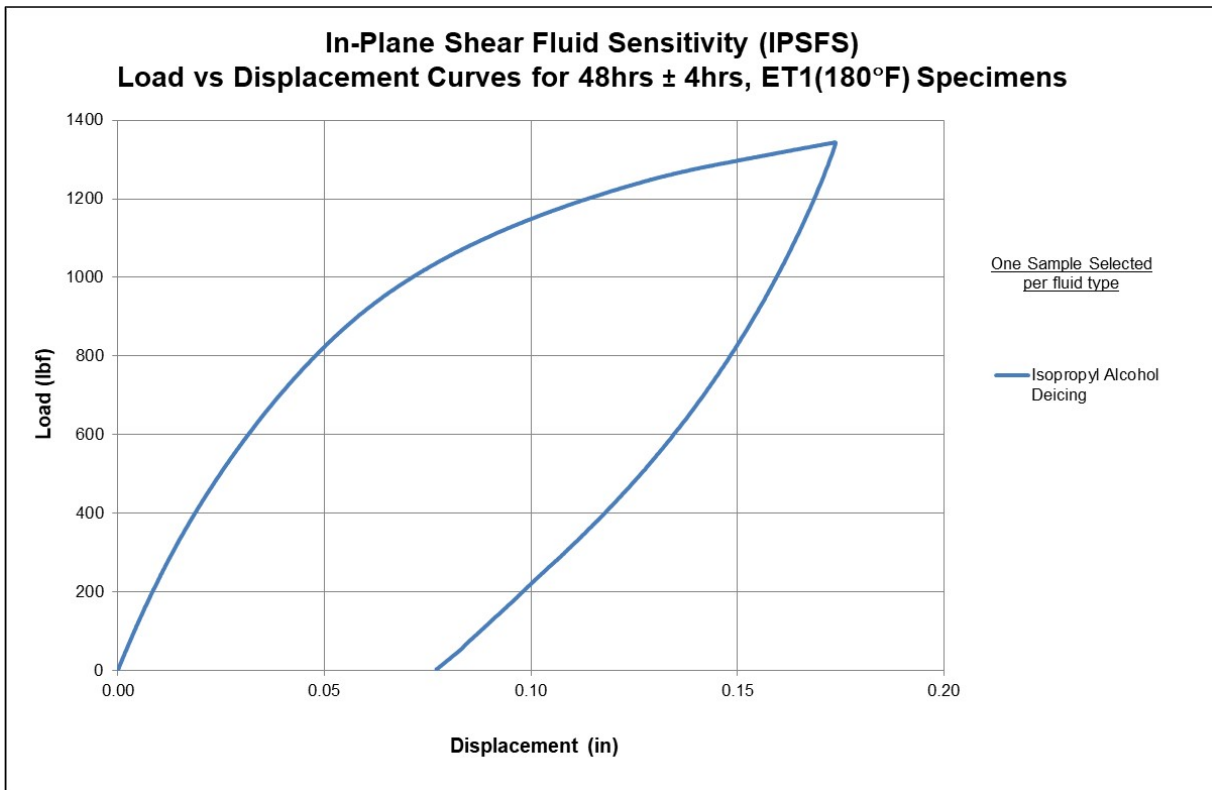
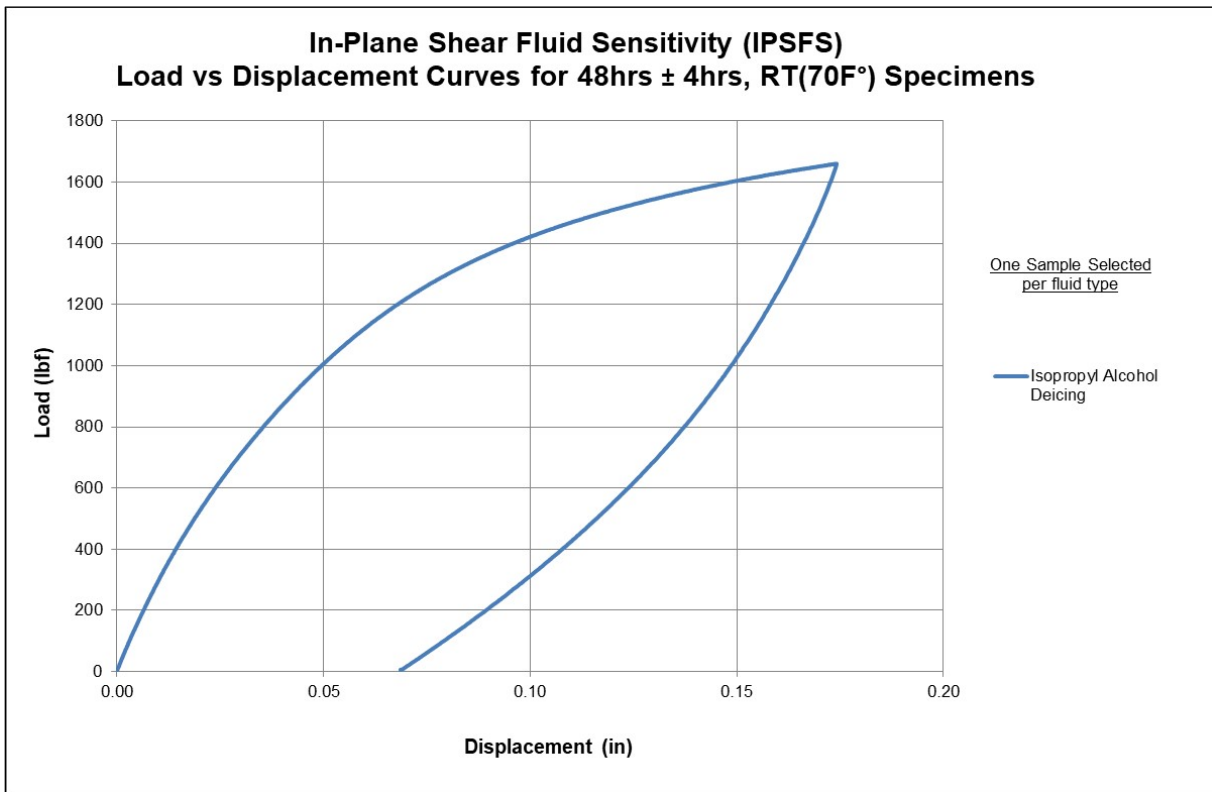
Modulus calculation is obtained from 2000 - 6000 microstrain for all IPS fluid sensitivity tests.

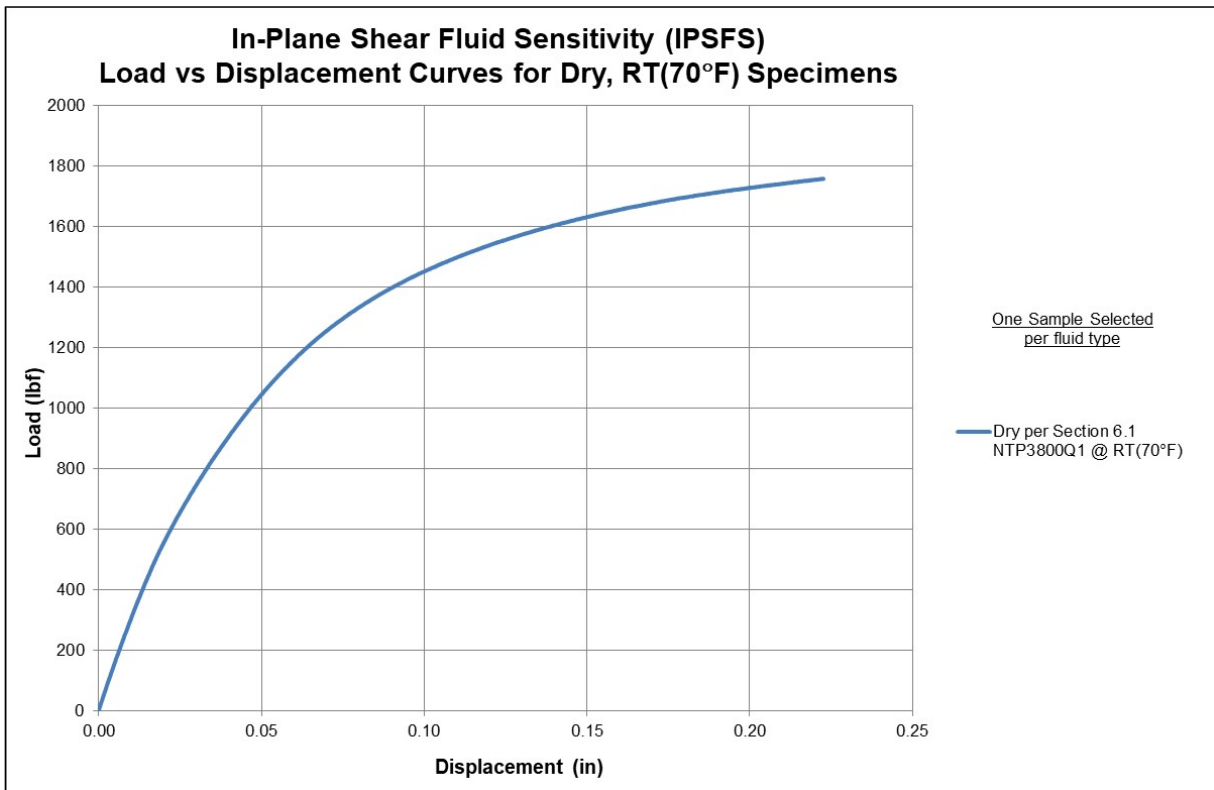
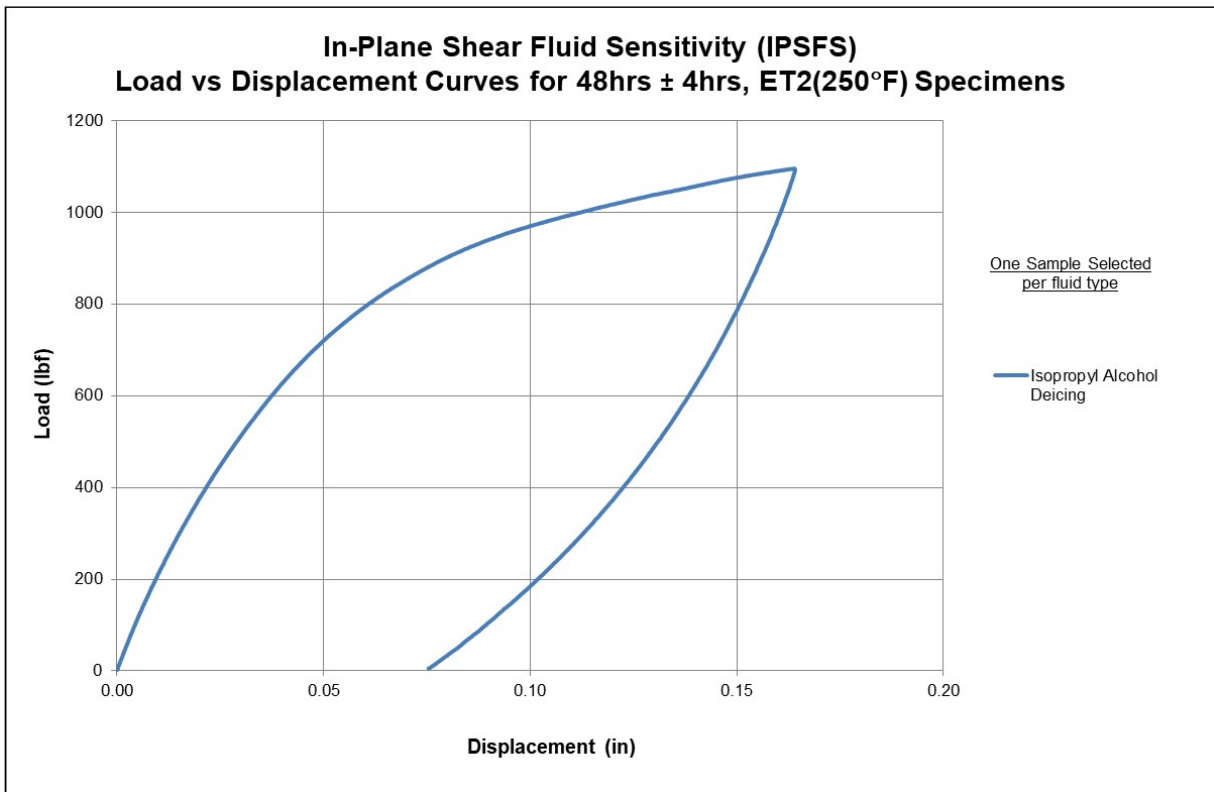
7.2.3 IPSFS Load Displacement Curves

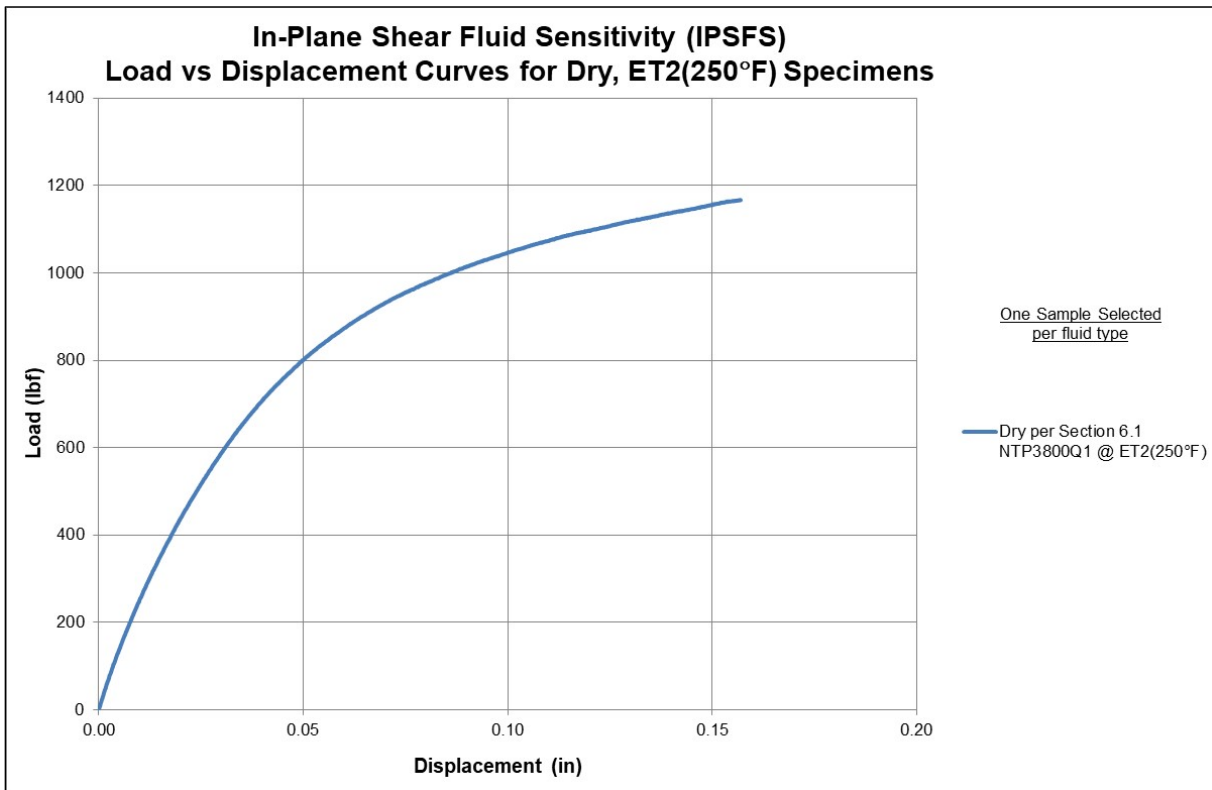
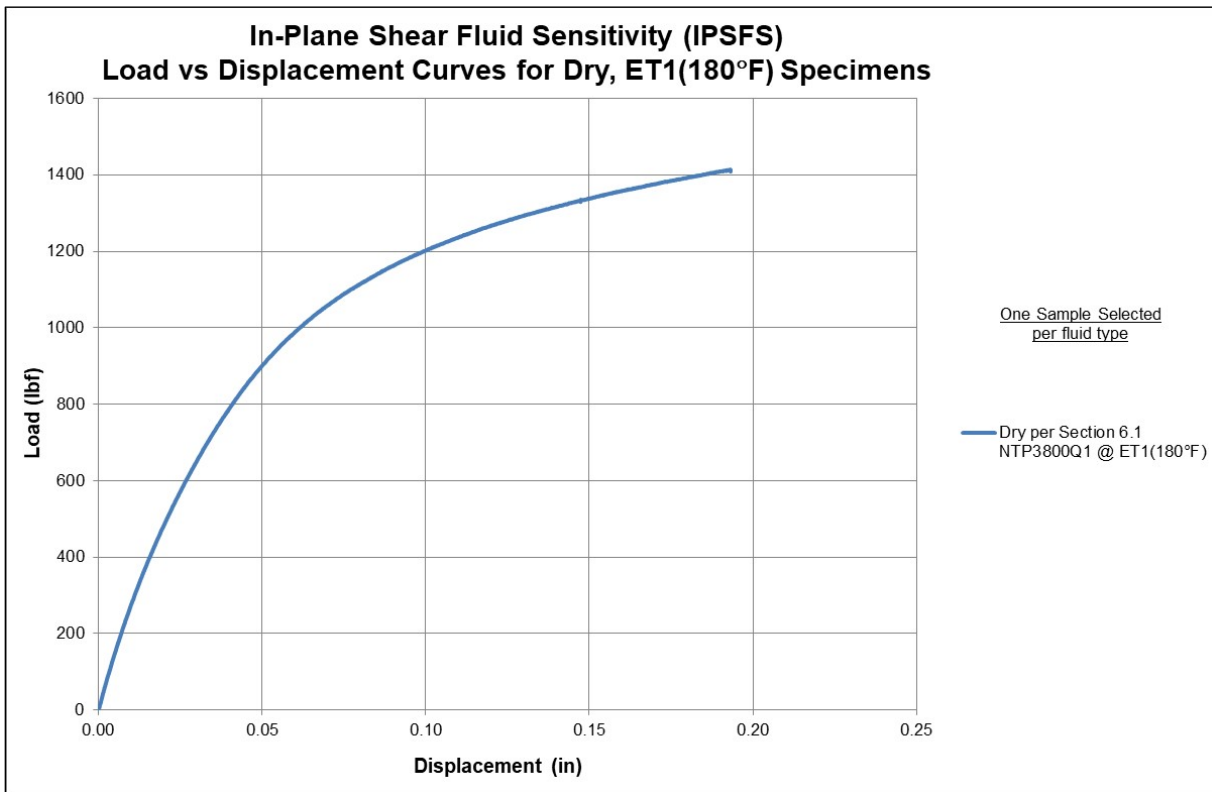


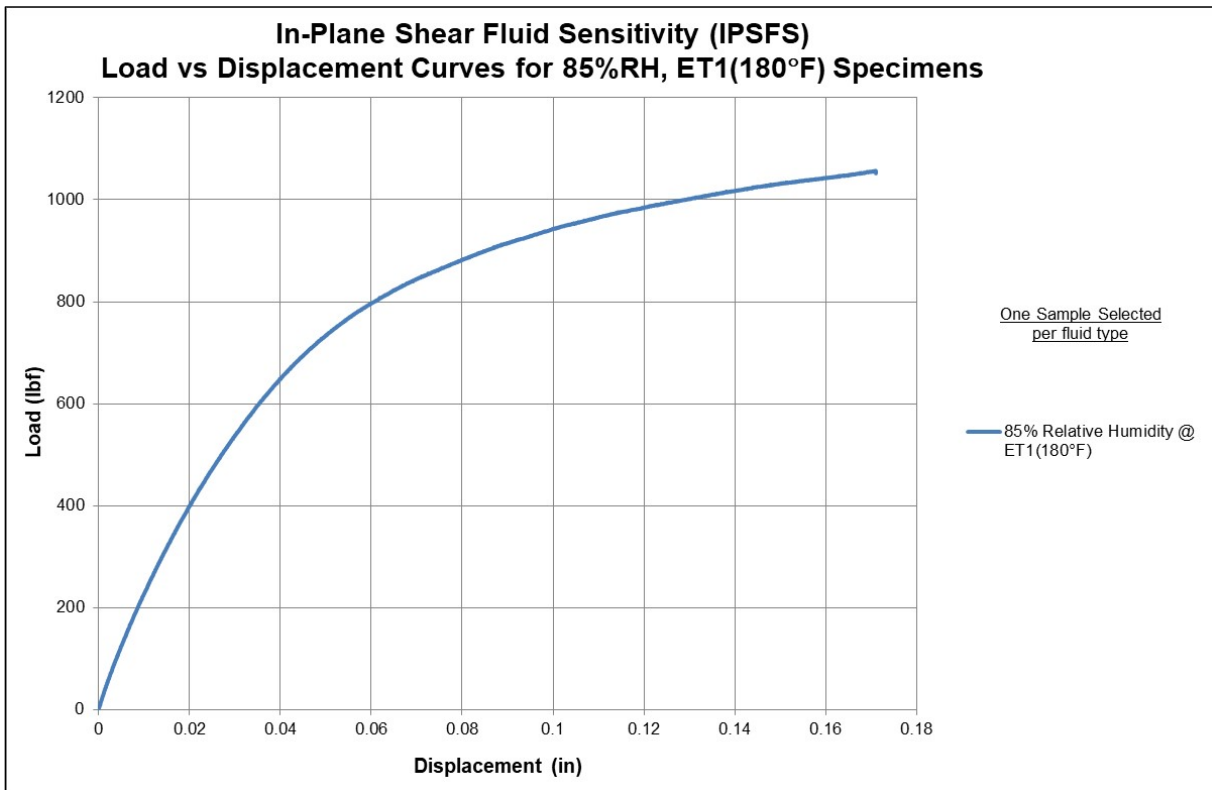
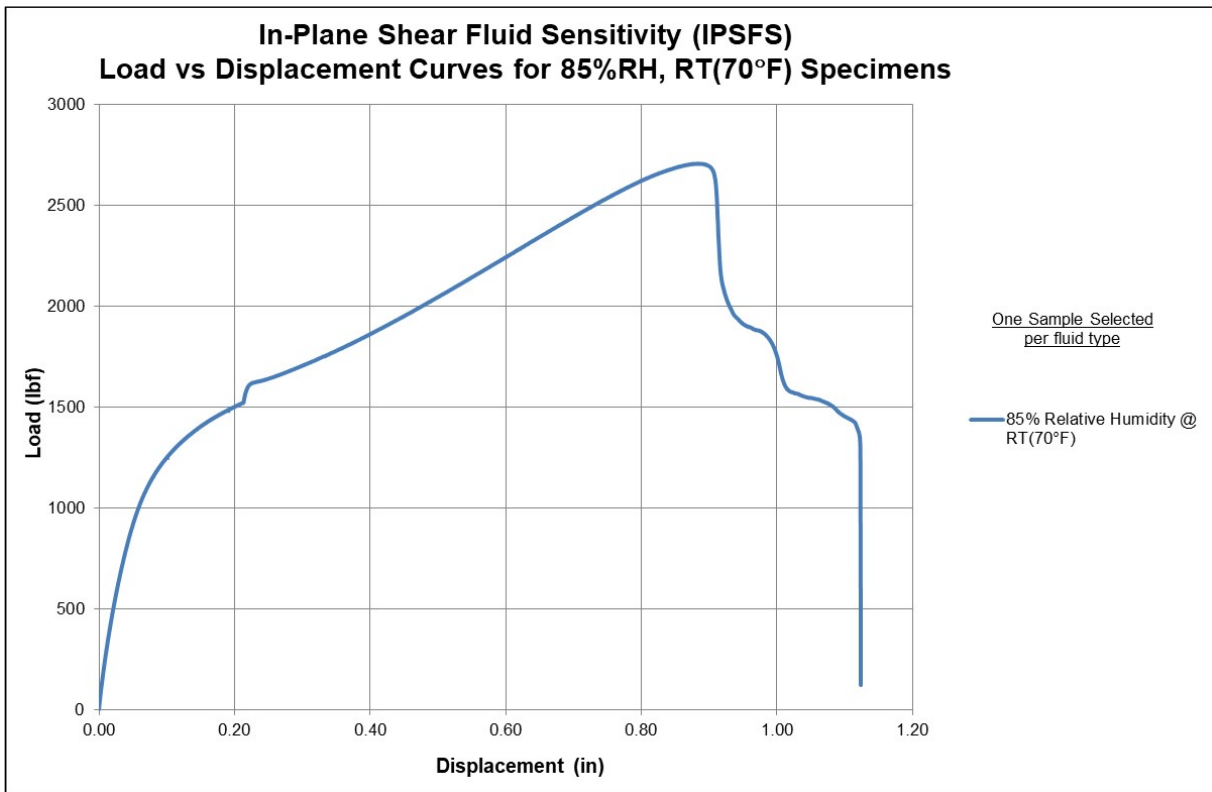






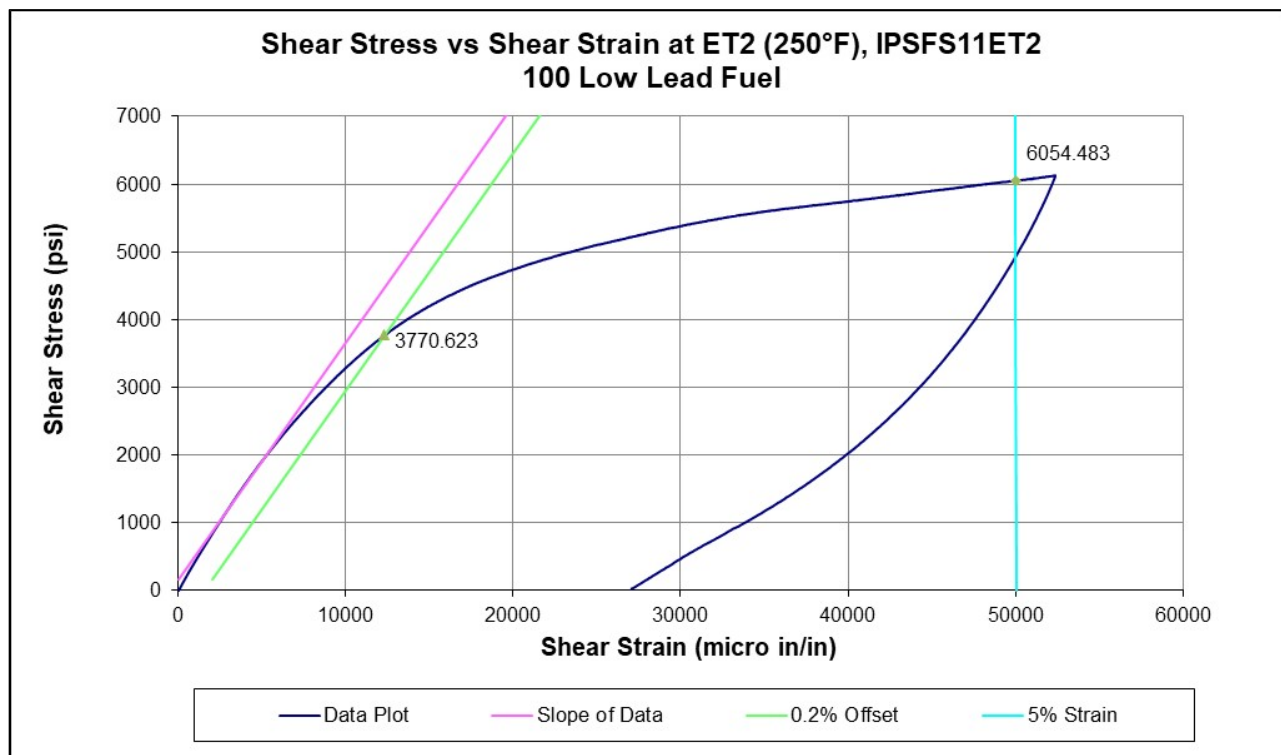
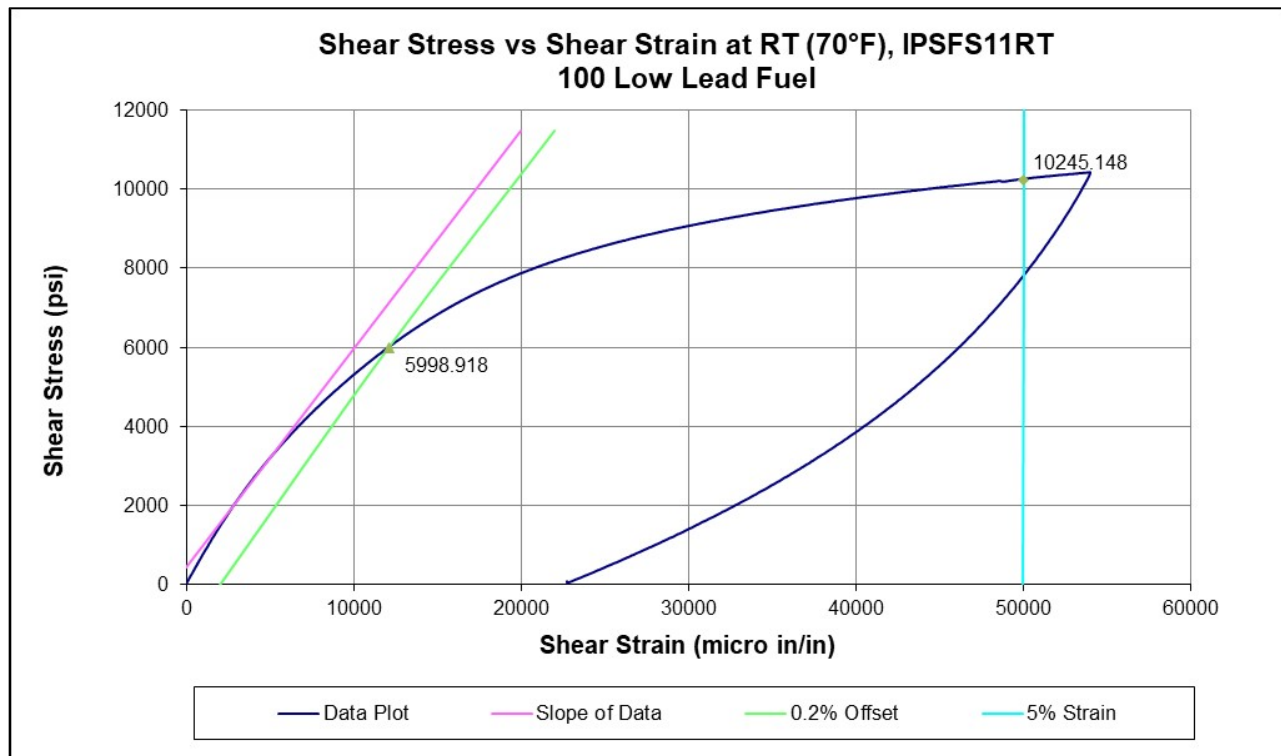


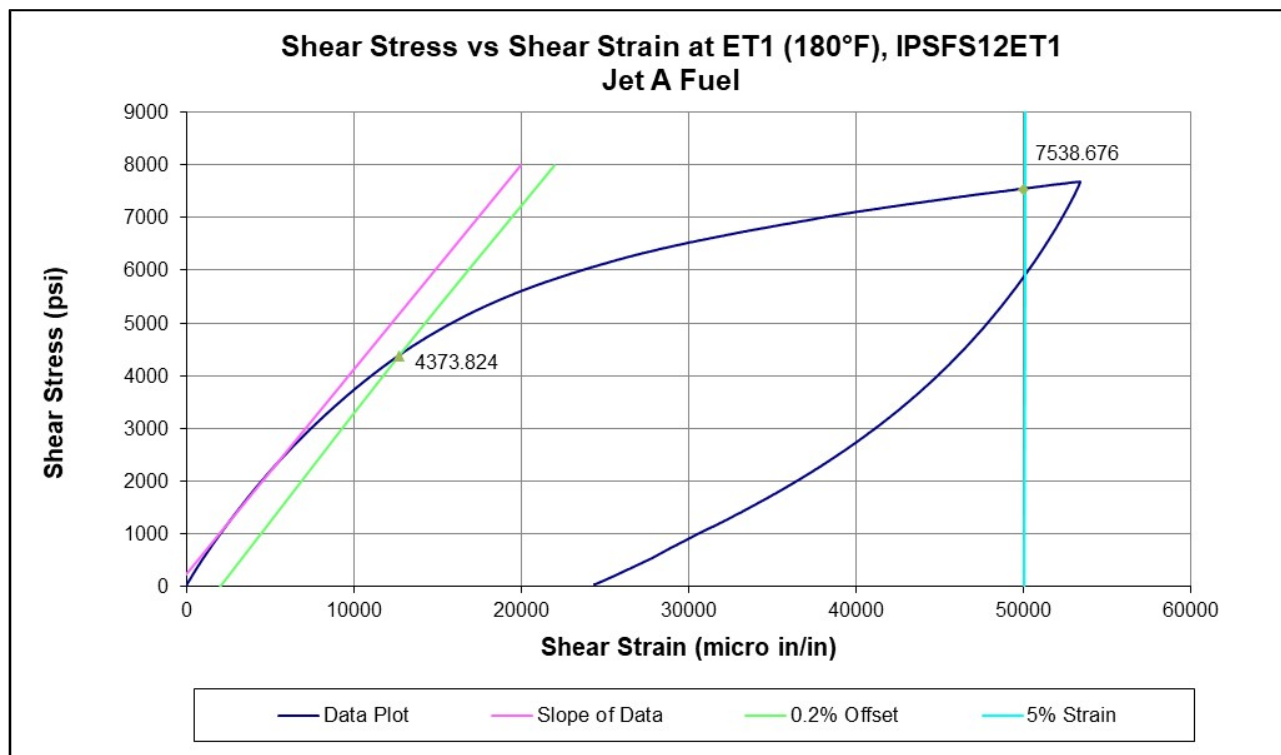
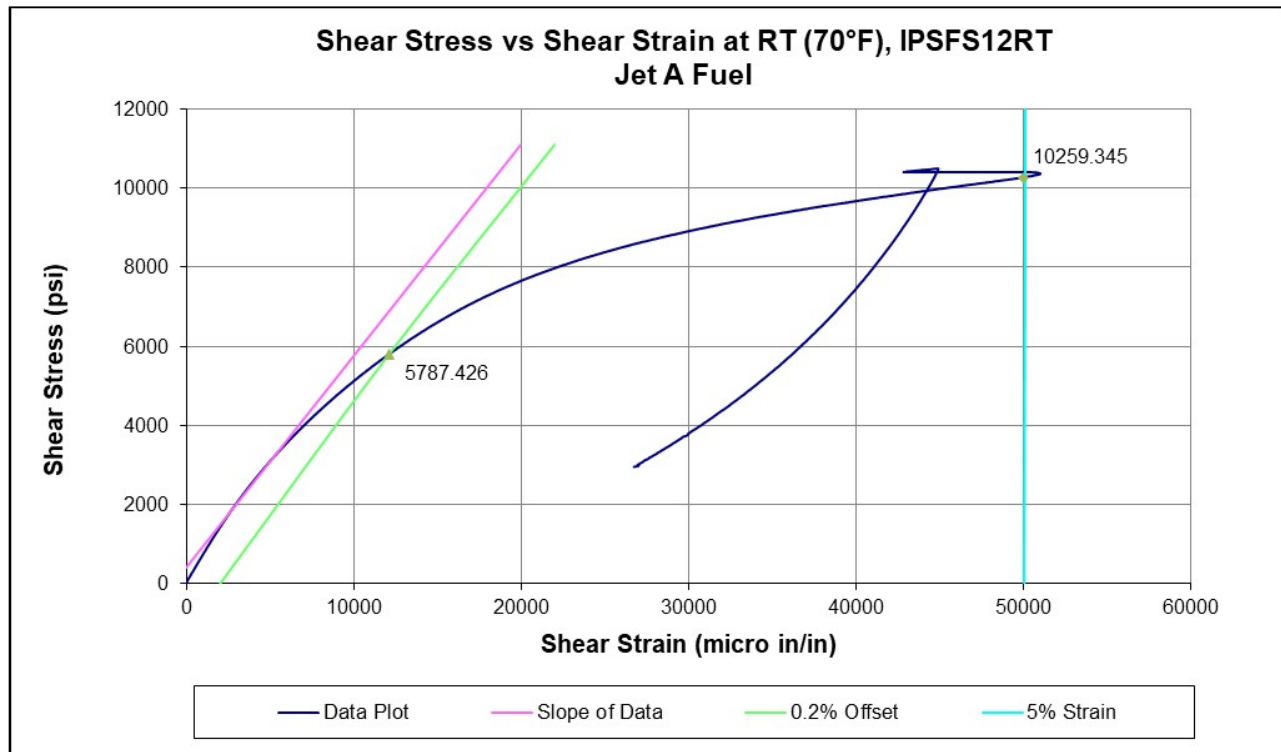


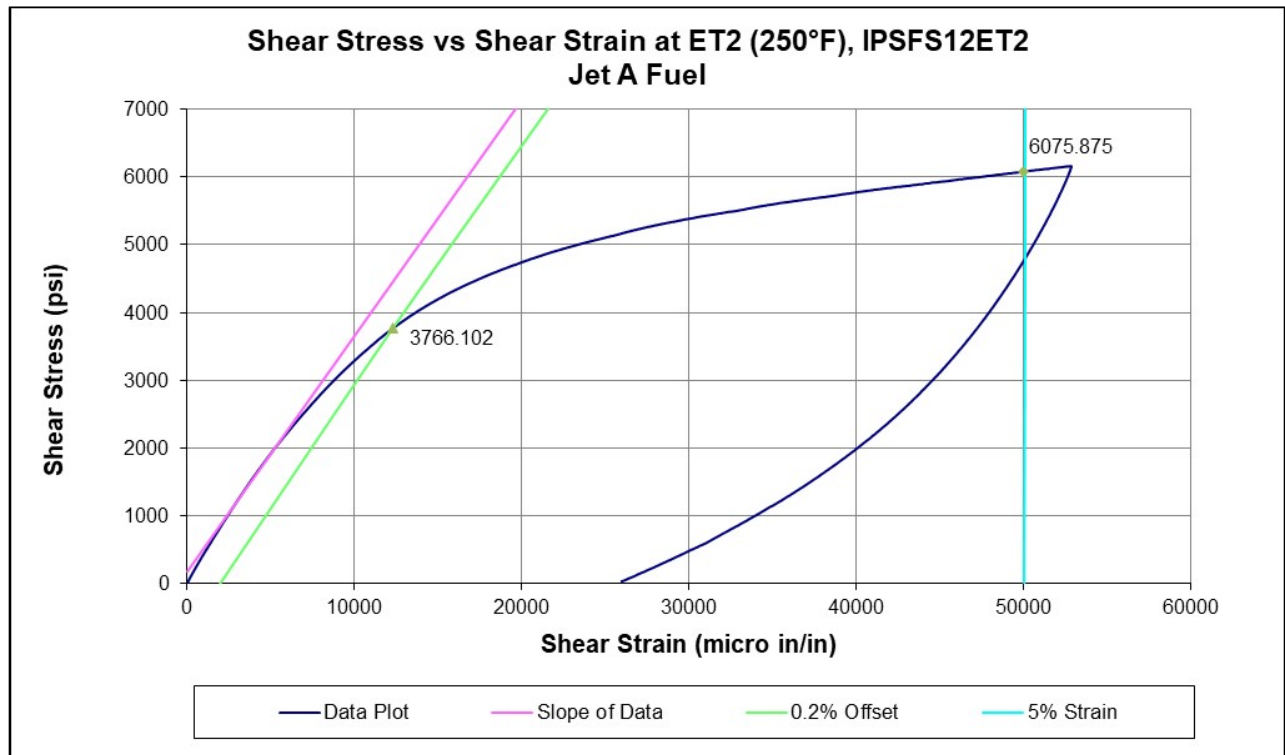


7.2.4 IPSFS Stress vs. Strain Curve

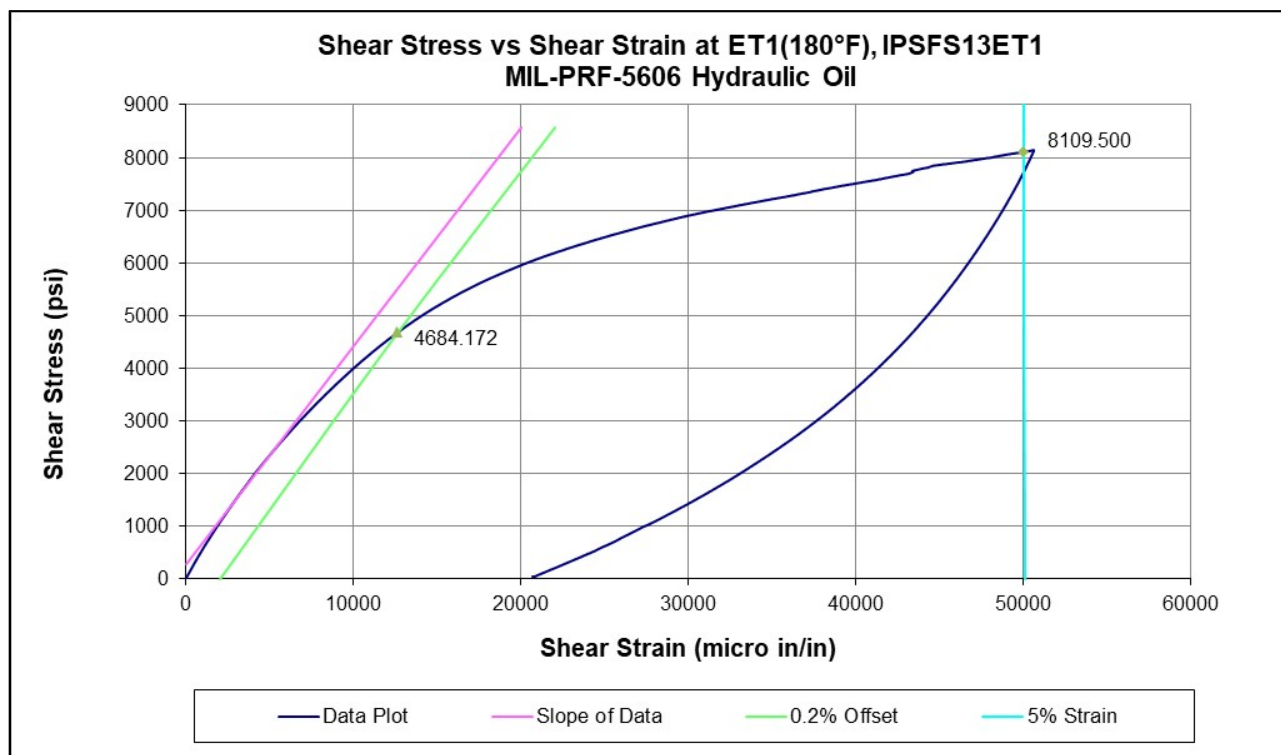
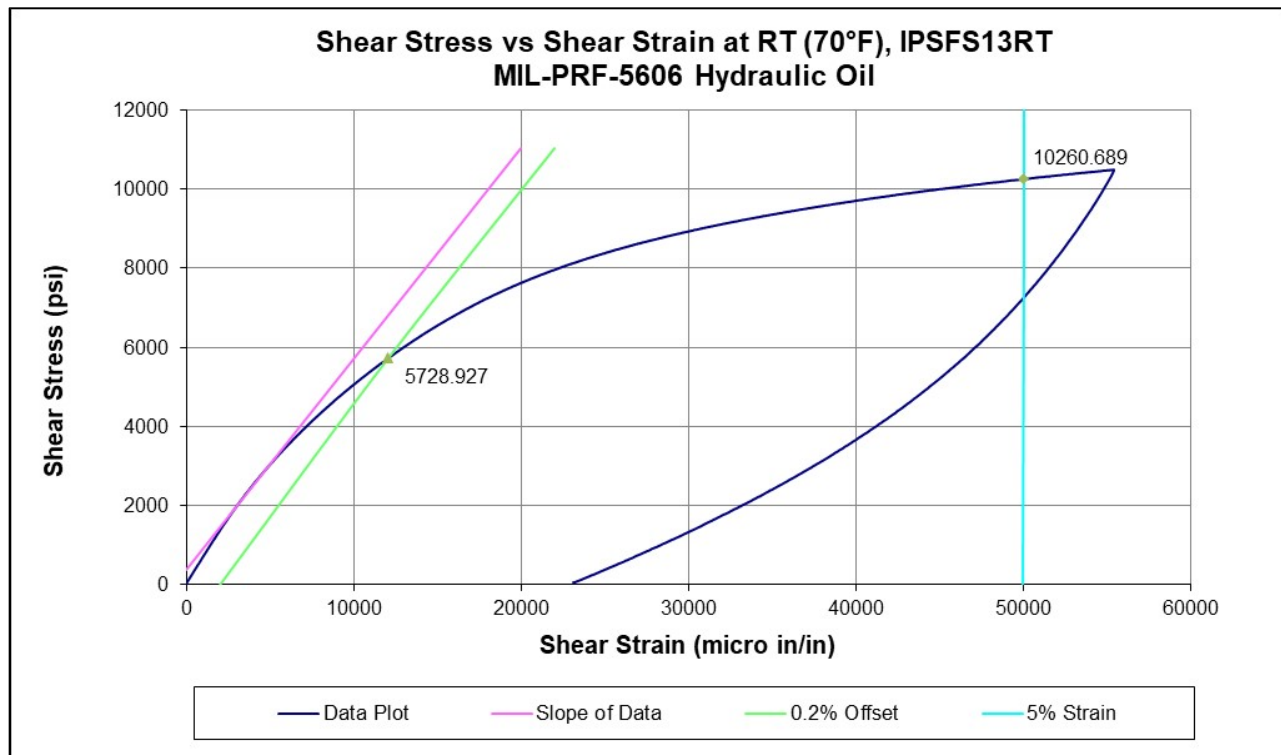
7.2.4.1 100 Low Lead Fuel (IPSFS11RT / IPSFS11ET2)

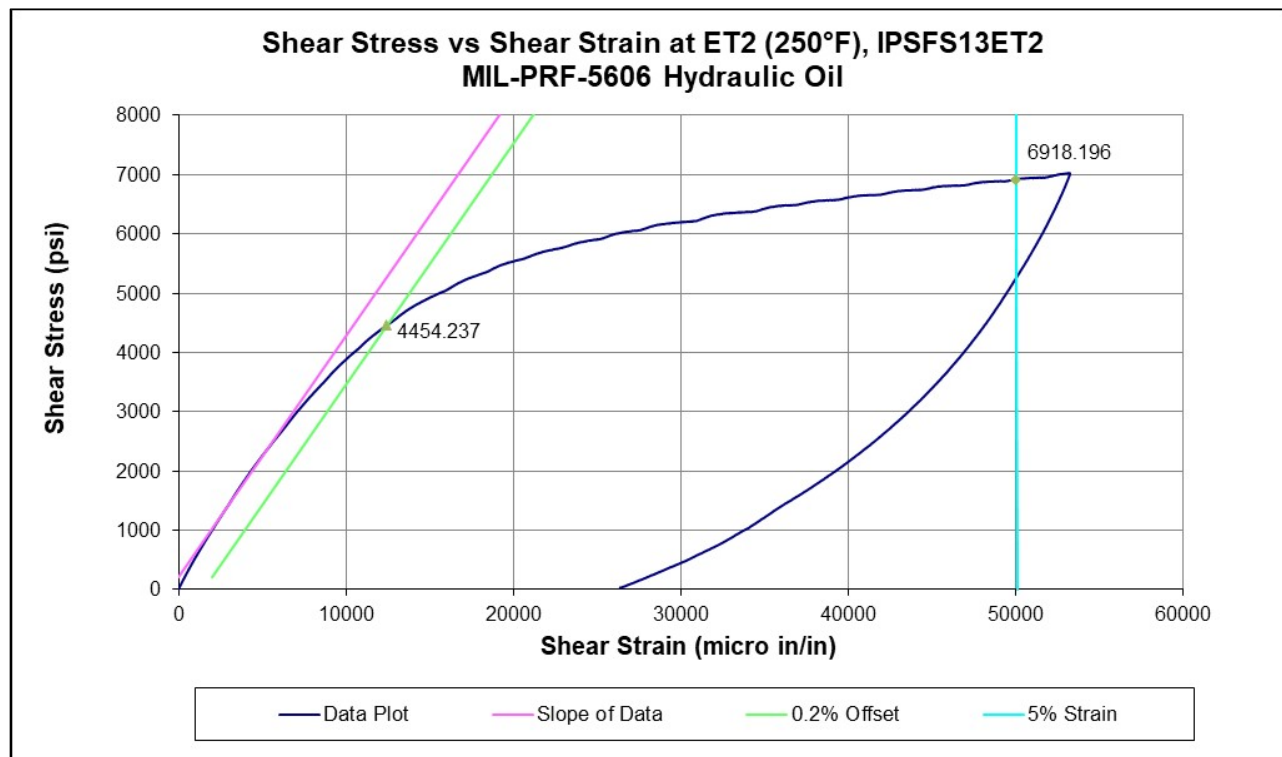


7.2.4.2 Jet A Fuel (IPSFS12RT / IPSFS12ET1 / IPSFS12ET2)

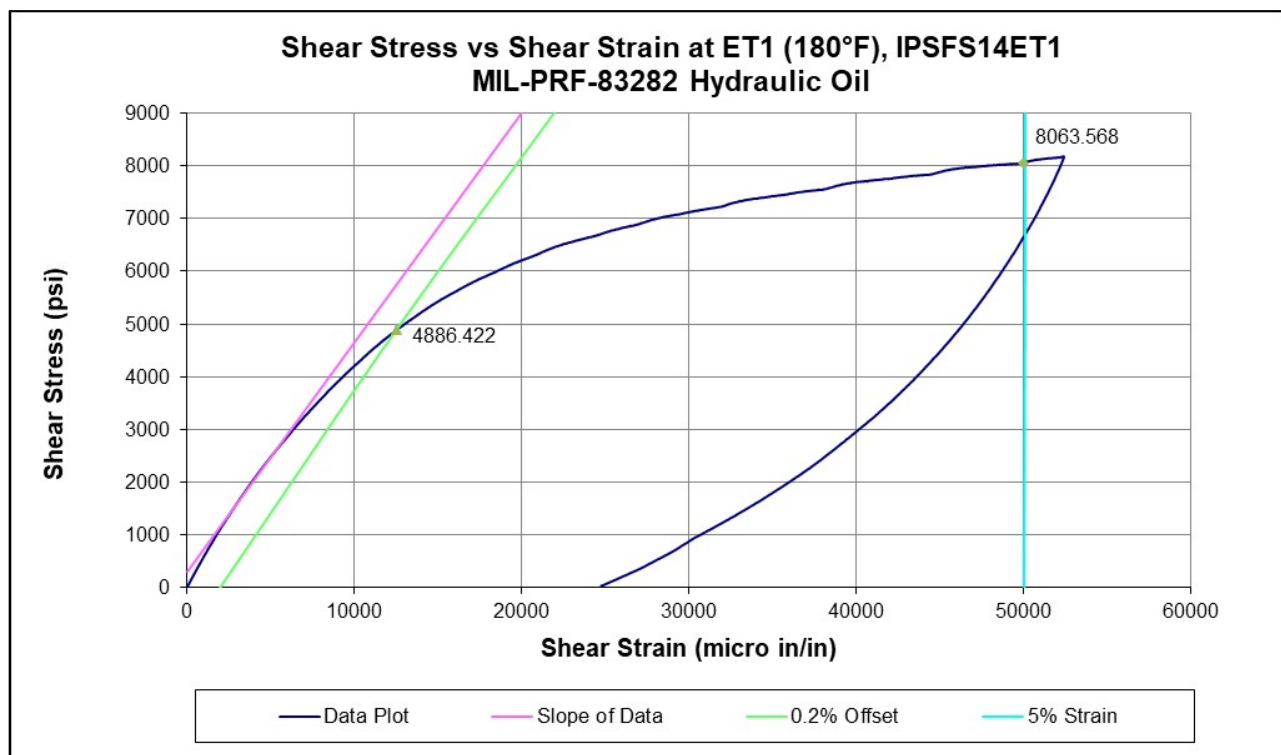
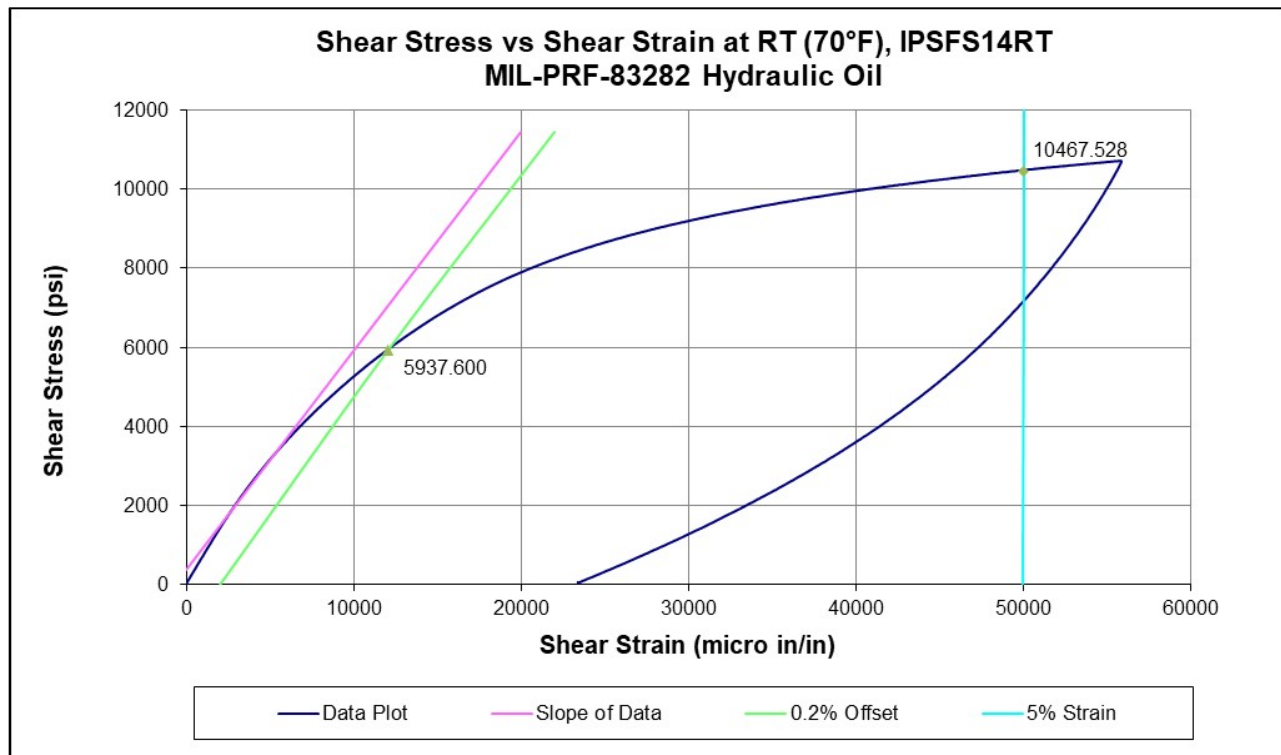


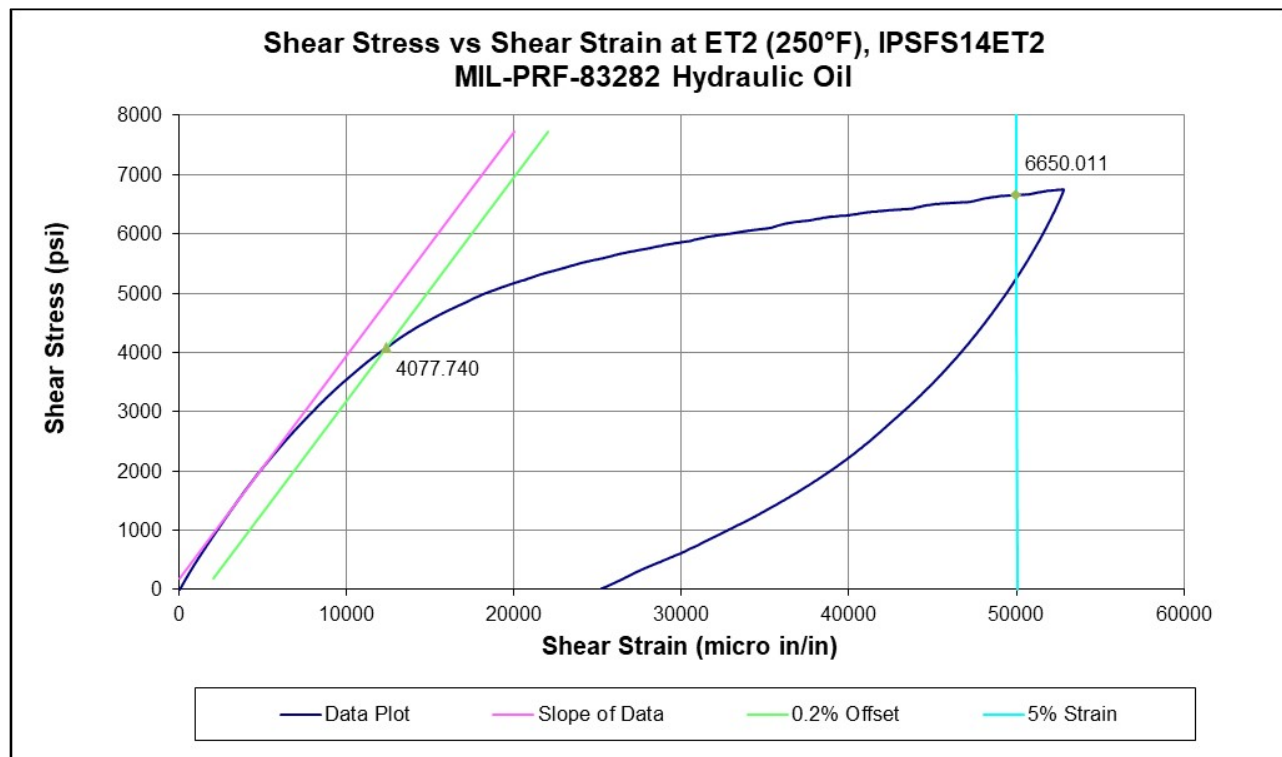
7.2.4.3 MIL-PRF-5606 Hydraulic Oil (IPSFS13RT / IPSFS13ET1 / IPSFS13ET2)

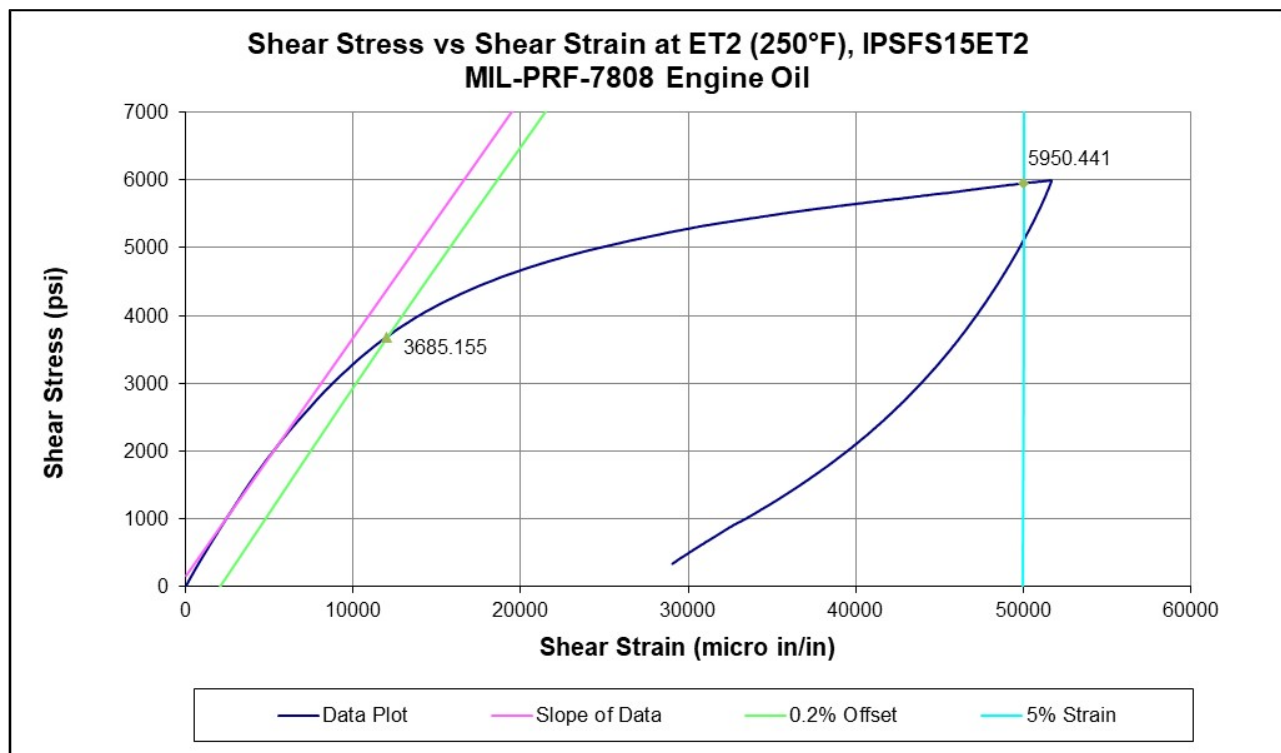
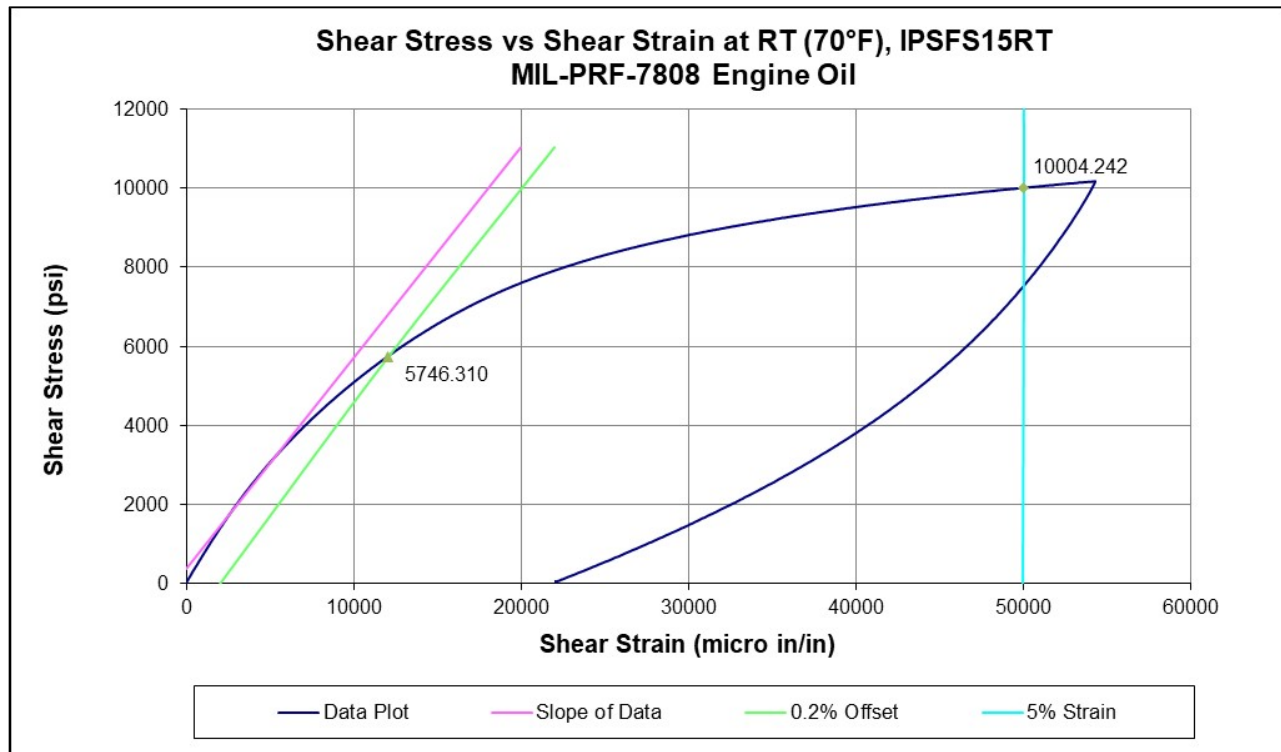




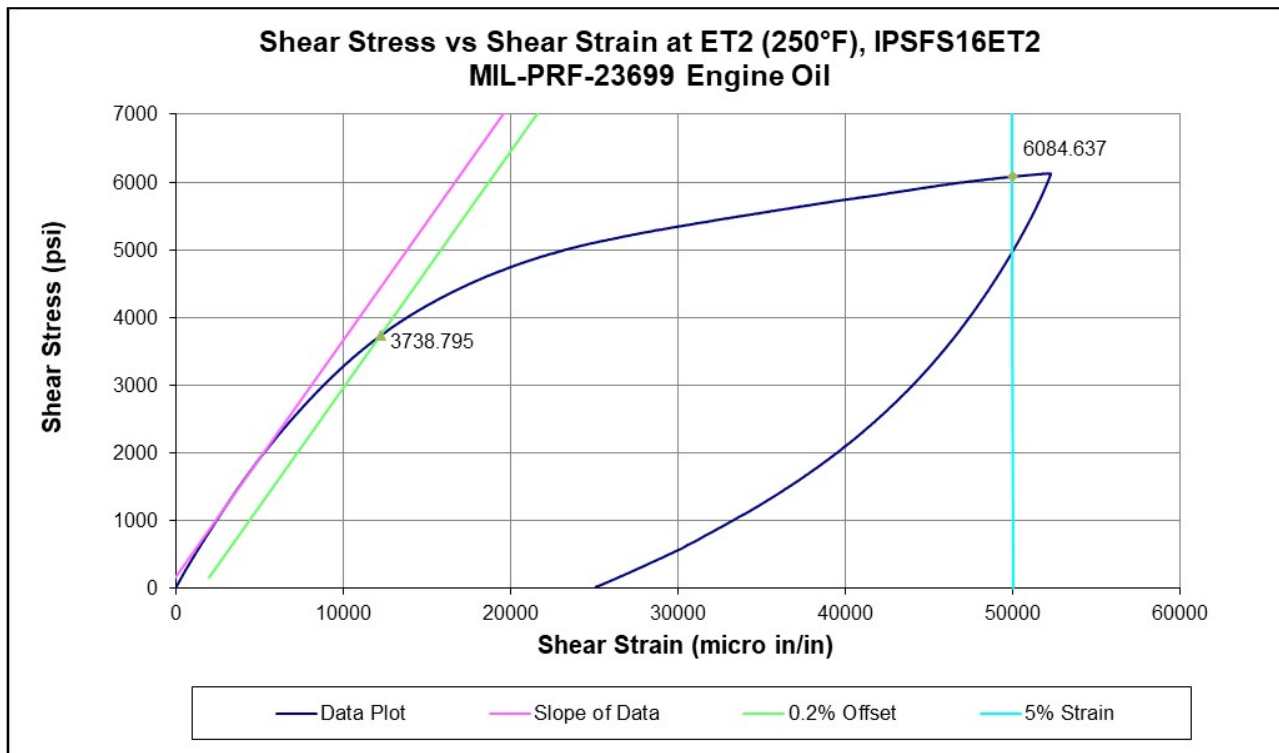
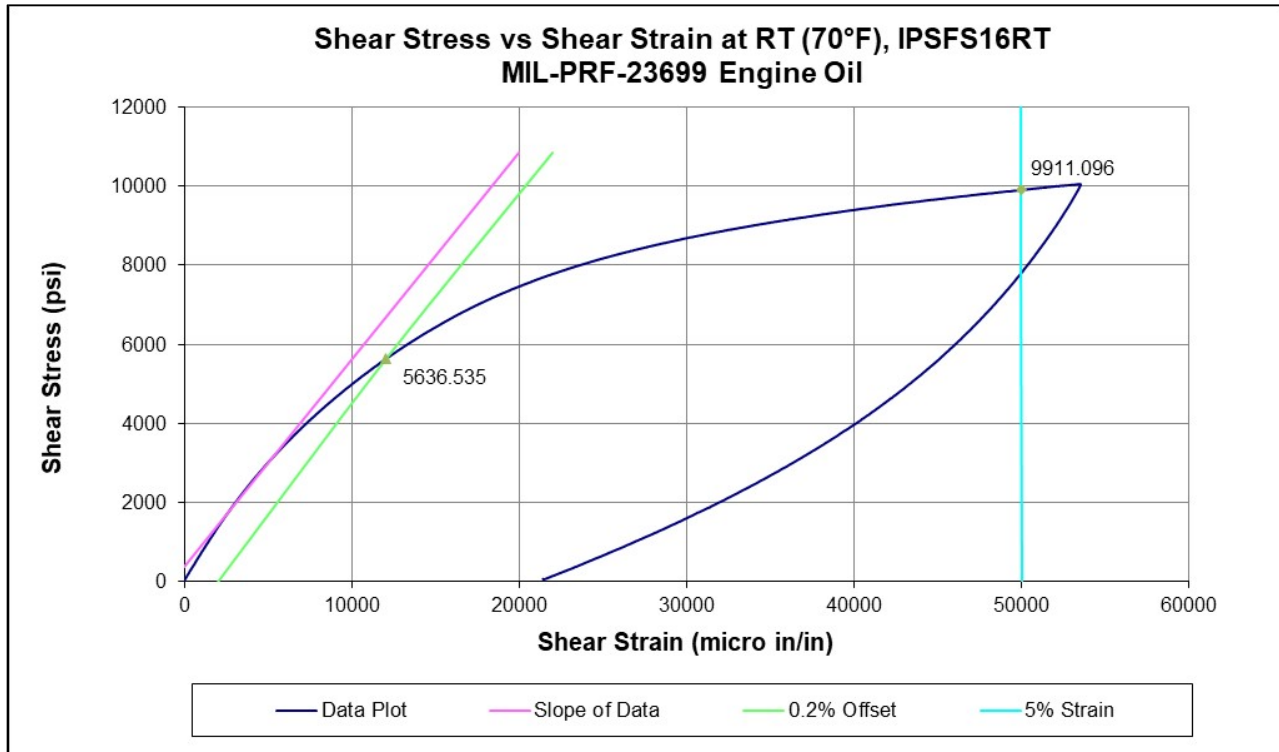
7.2.4.4 MIL-PRF-83282 Hydraulic Oil (IPSFS14RT / IPSFS14ET1 / IPSFS14ET2)



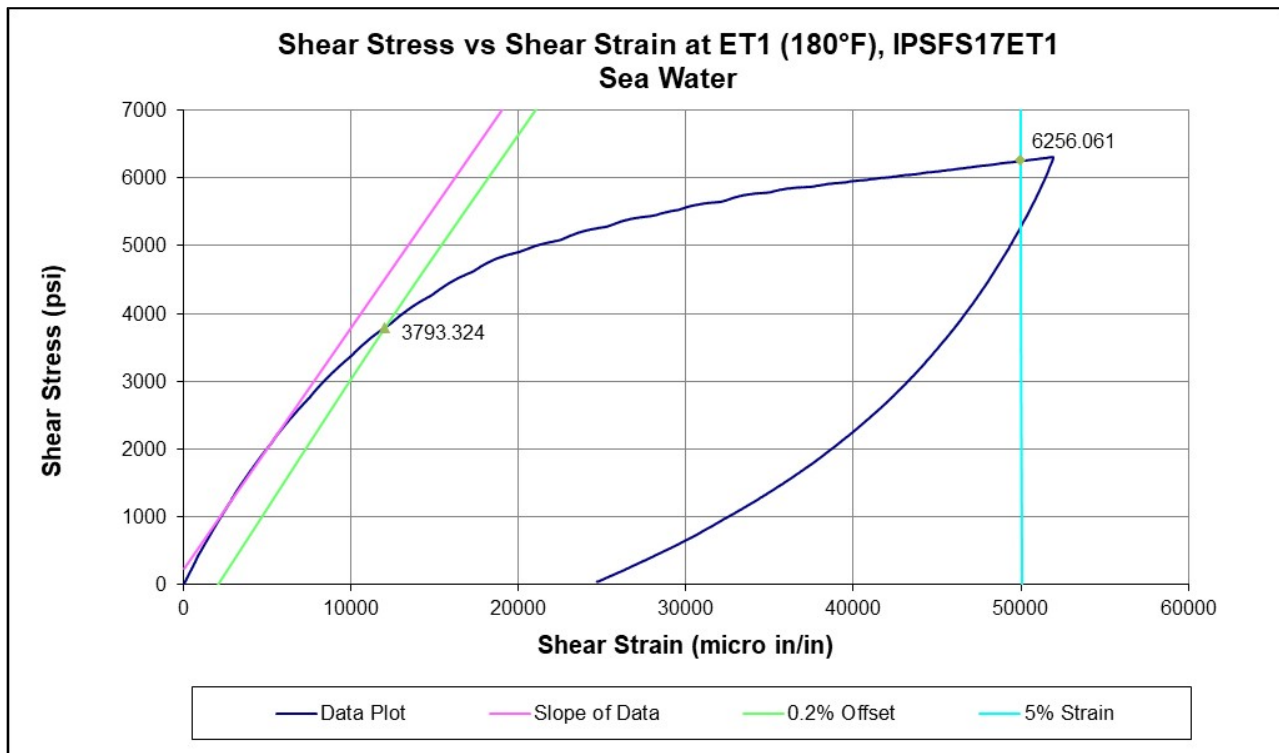
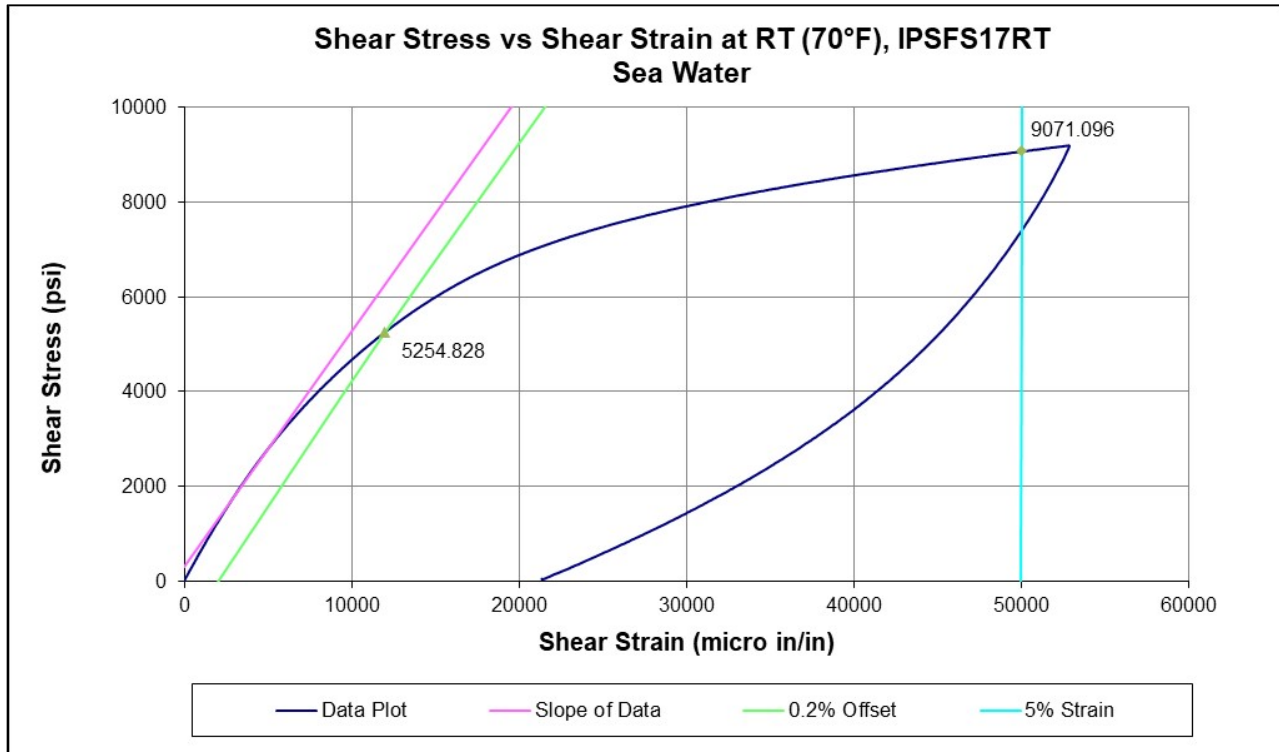


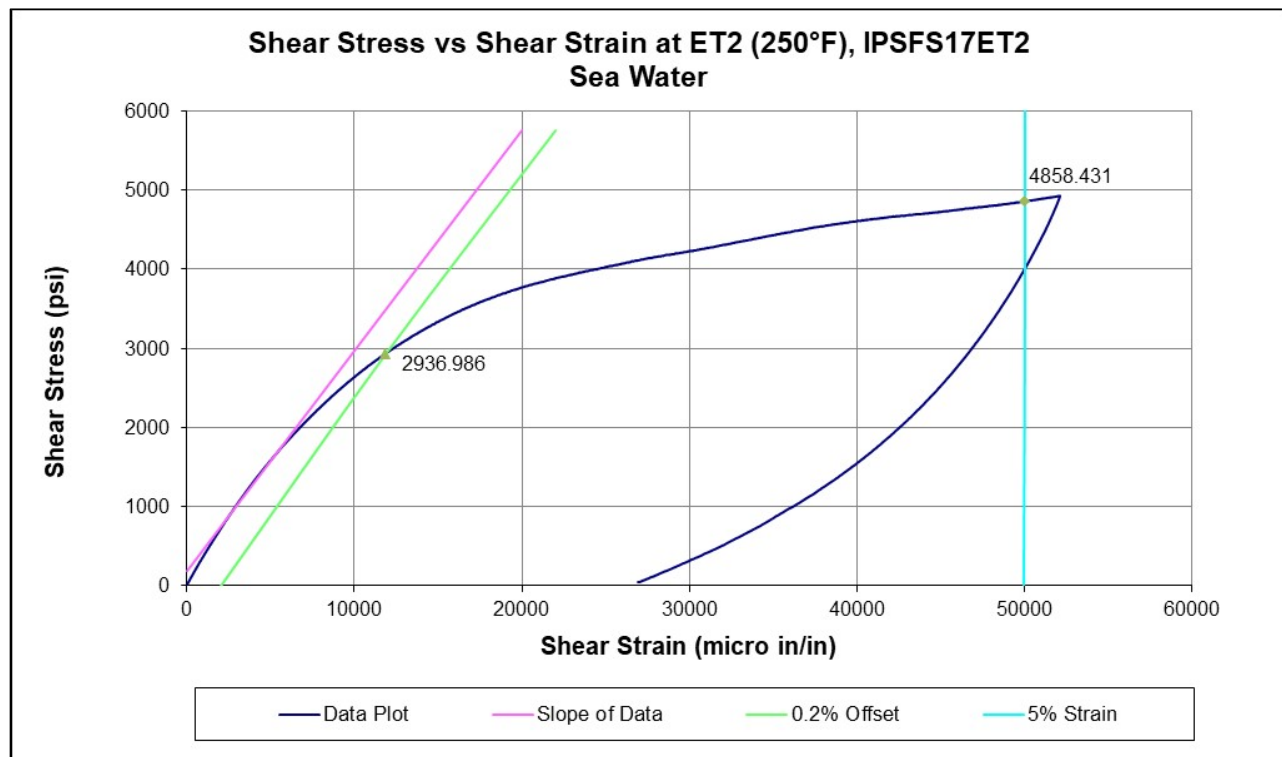
7.2.4.5 MIL-PRF-7808 Engine Oil (IPSFS15RT / IPSFS15ET2)

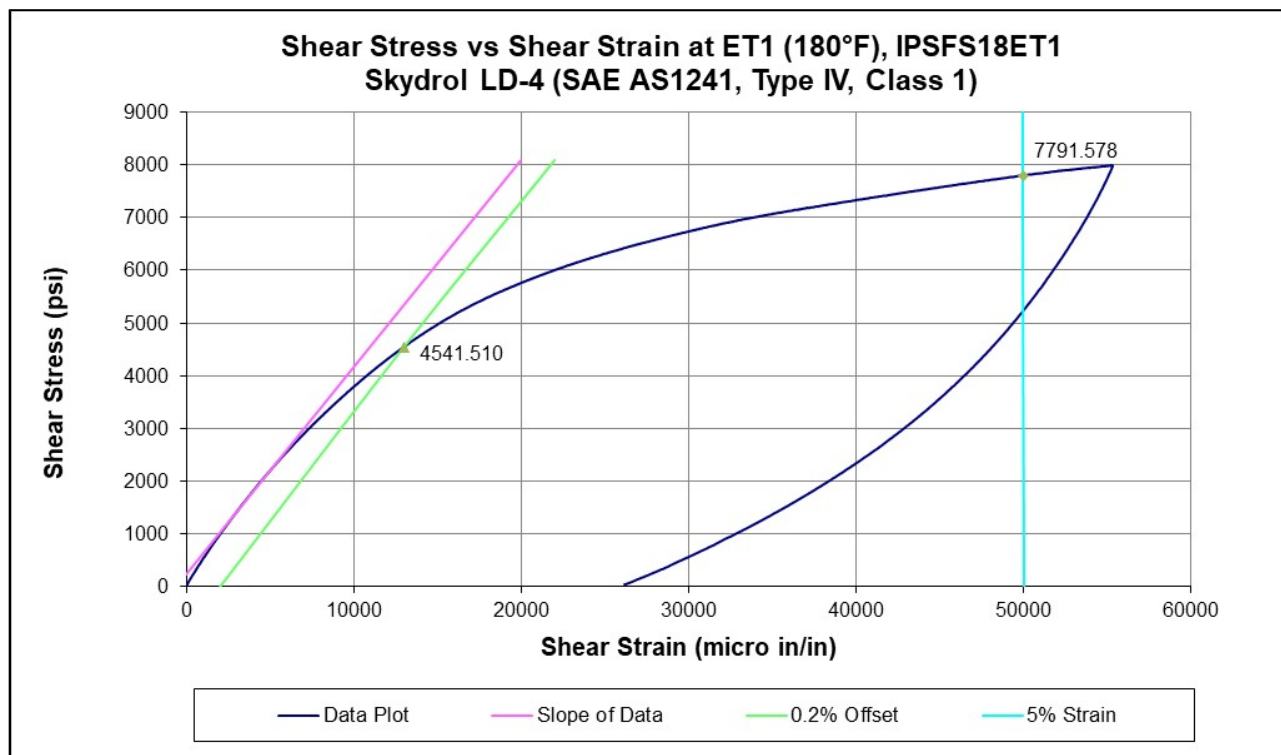
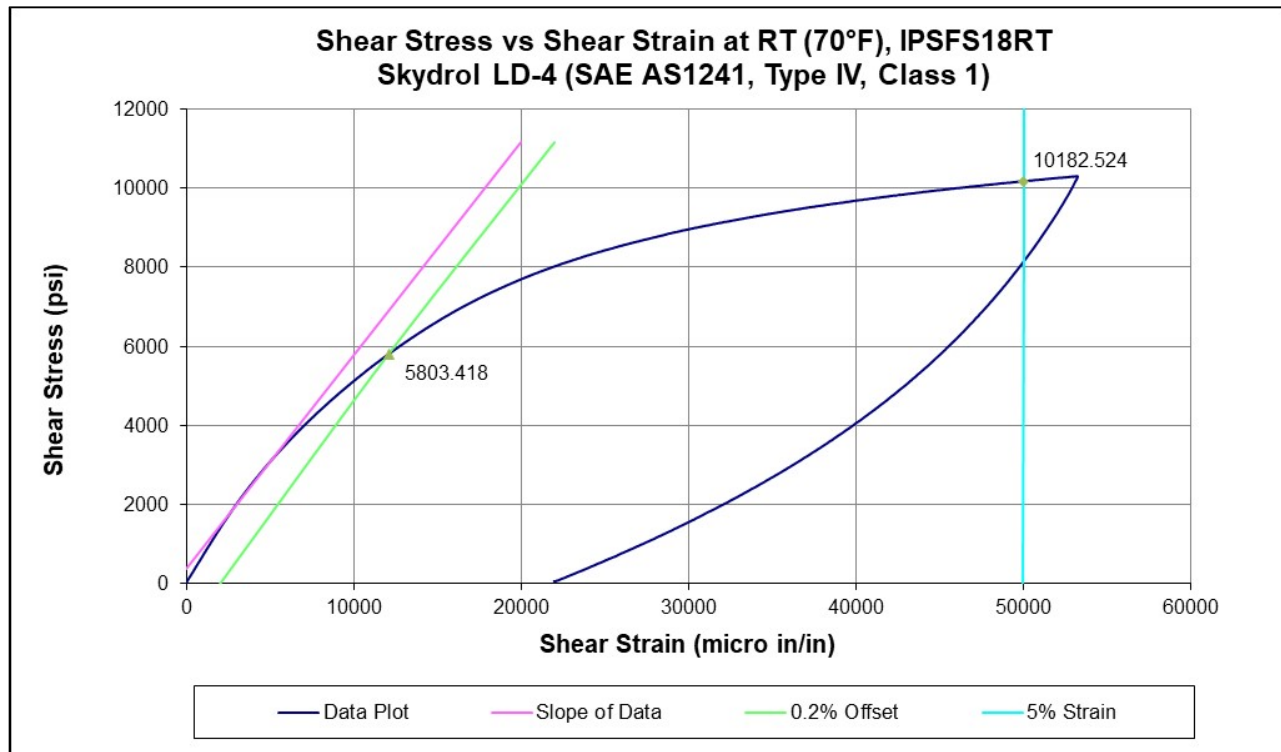
7.2.4.6 MIL-PRF-23699 Engine Oil (IPSFS16RT / IPSFS16ET2)

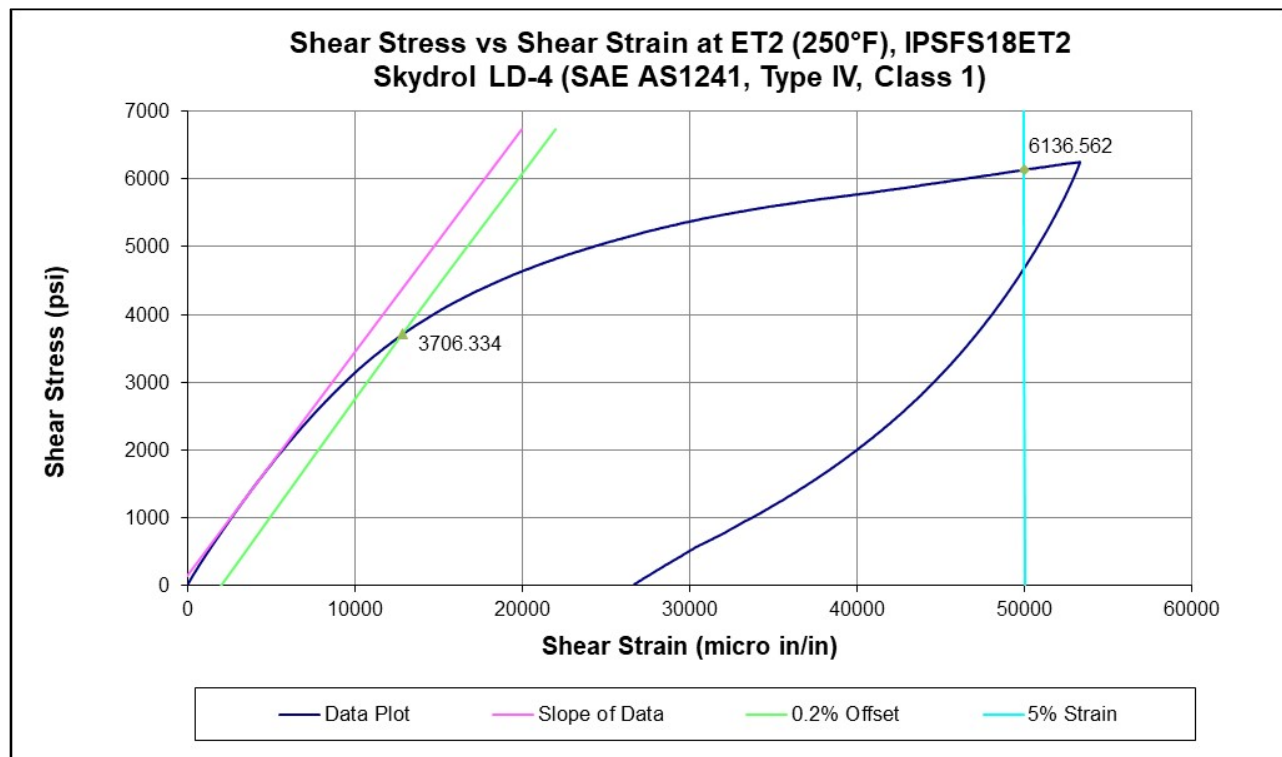


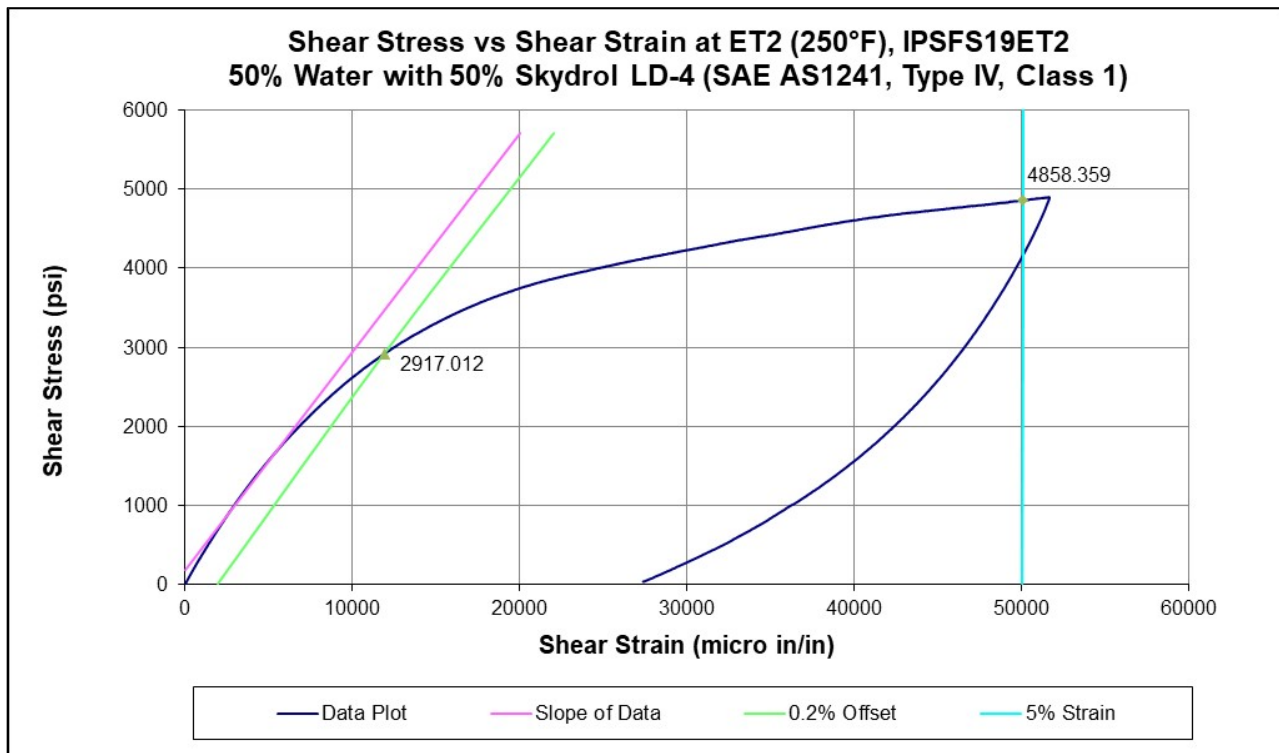
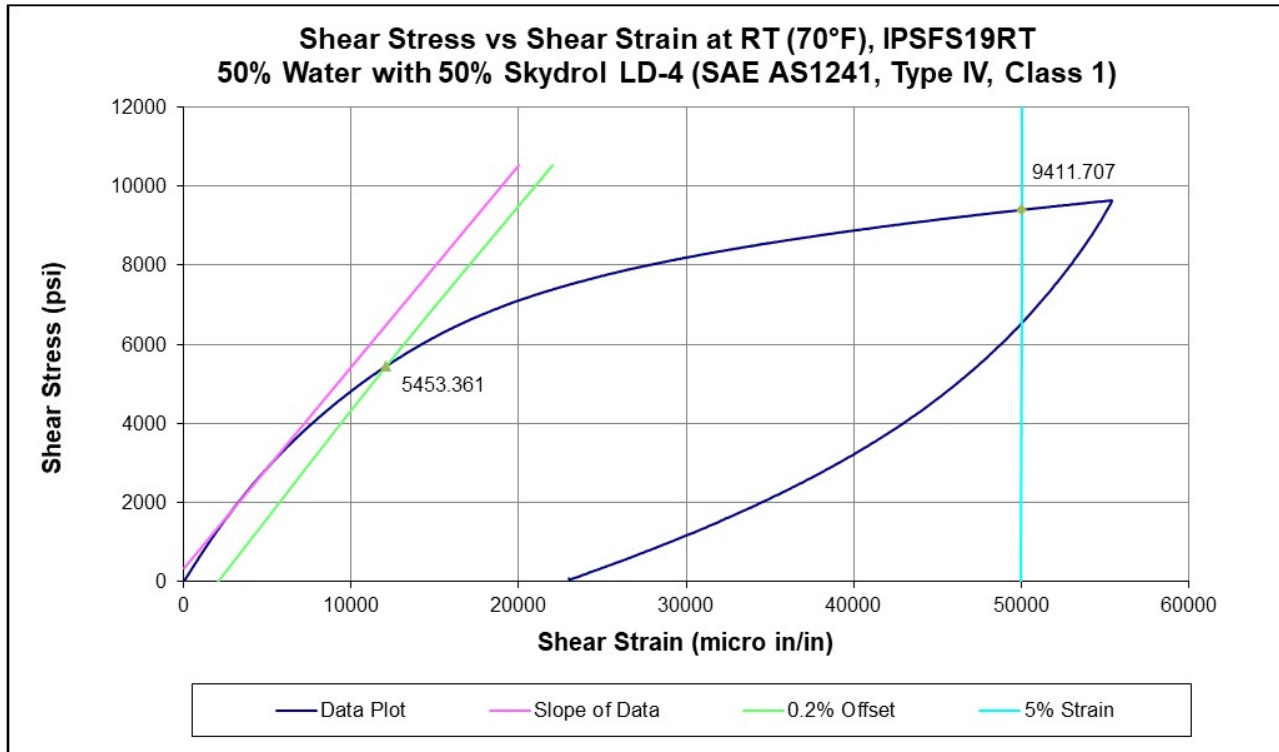
7.2.4.7 Sea Water (IPSFS17RT / IPSFS17ET1 / IPSFS17ET2)



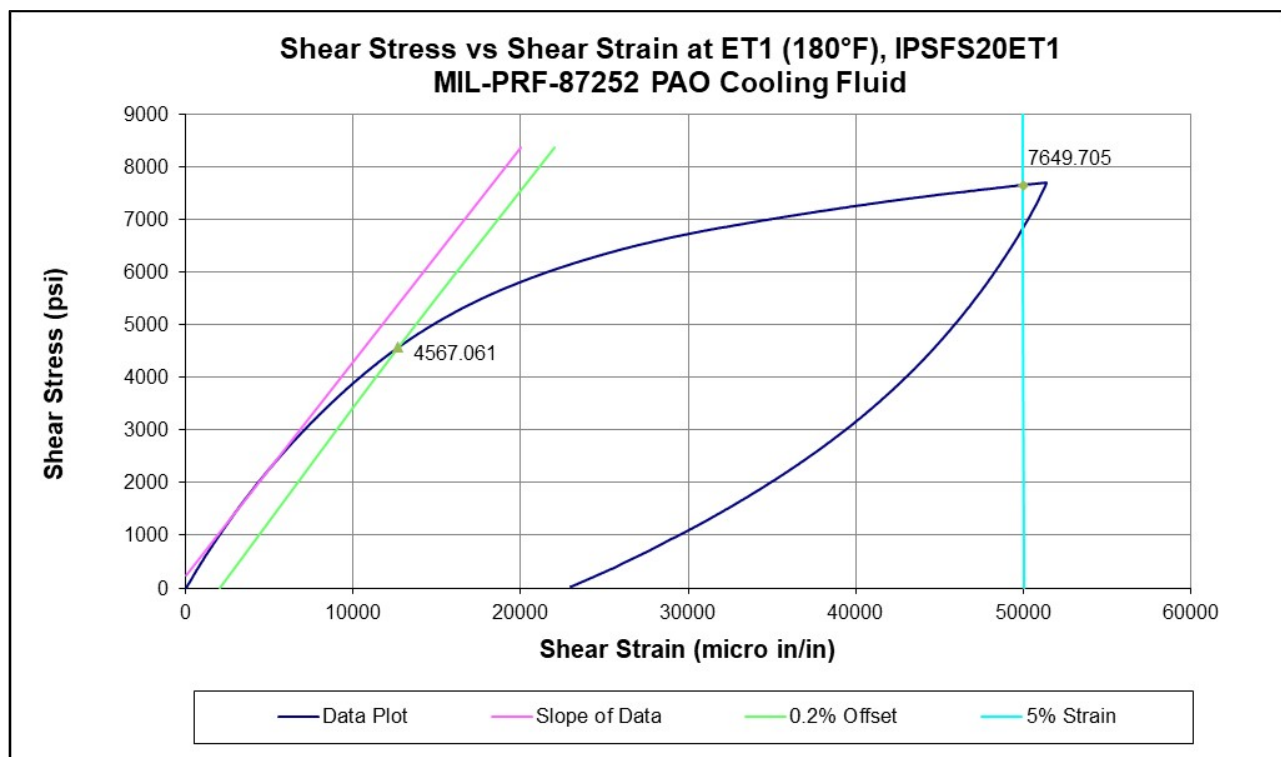
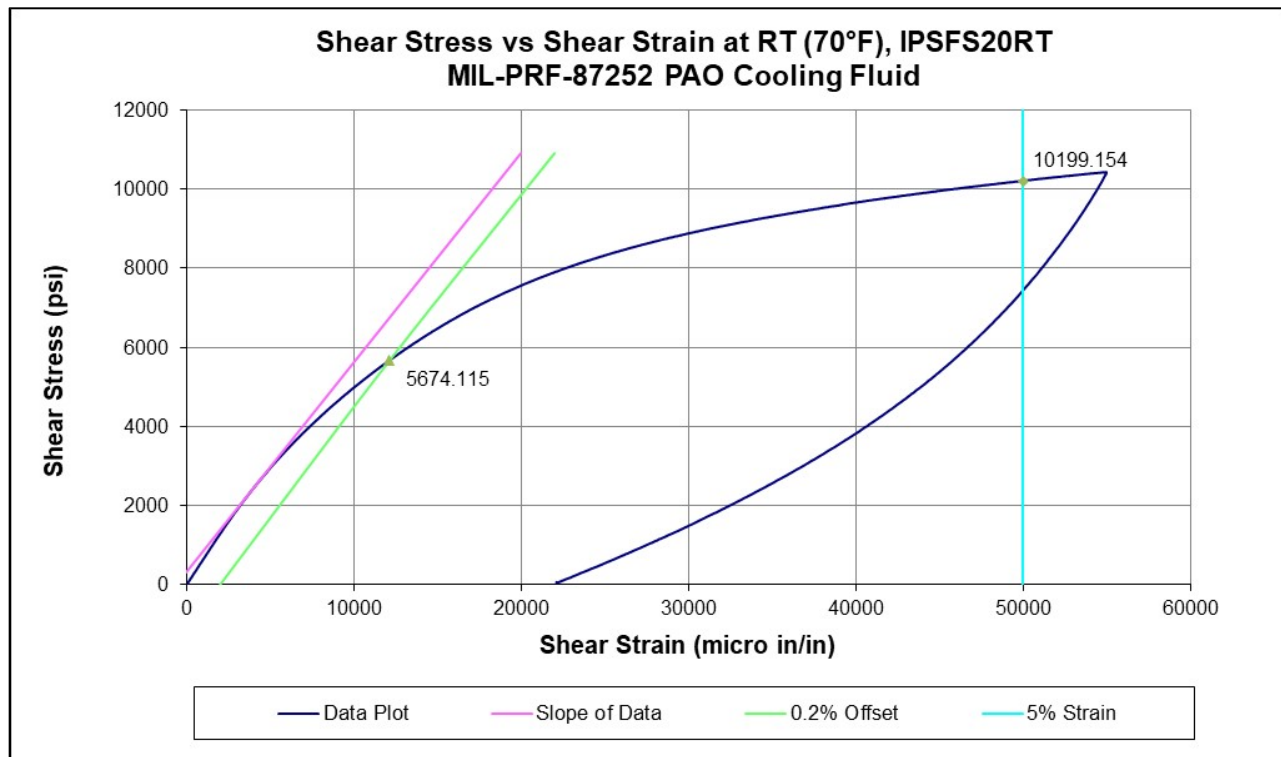


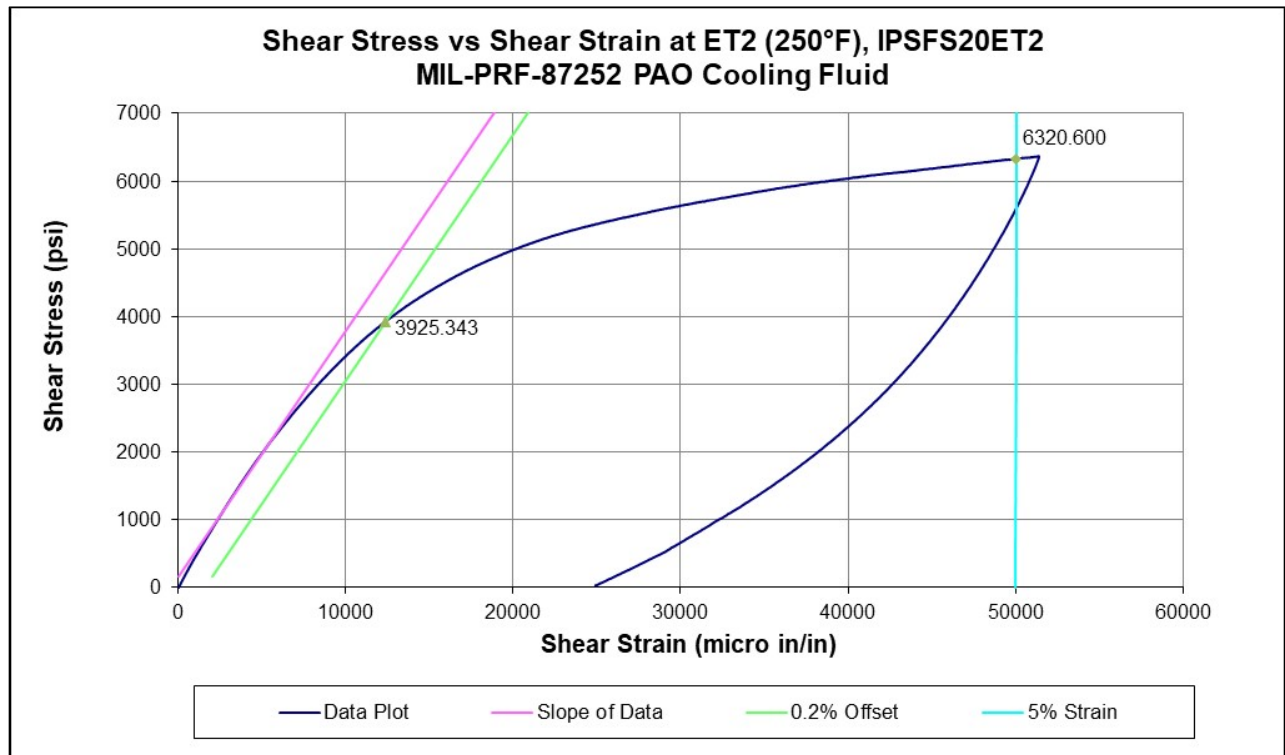
7.2.4.8 Skydrol LD-4 (IPSFS18RT / IPSFS18ET1 / IPSFS18ET2)



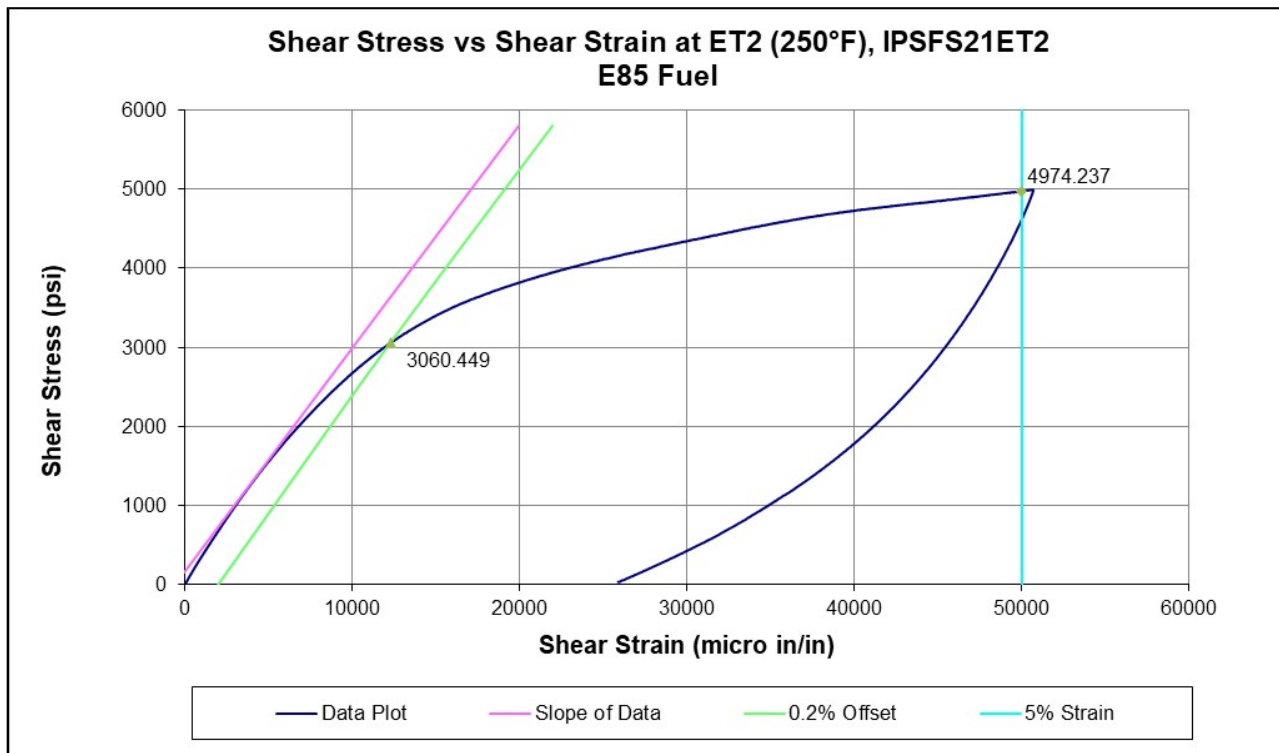
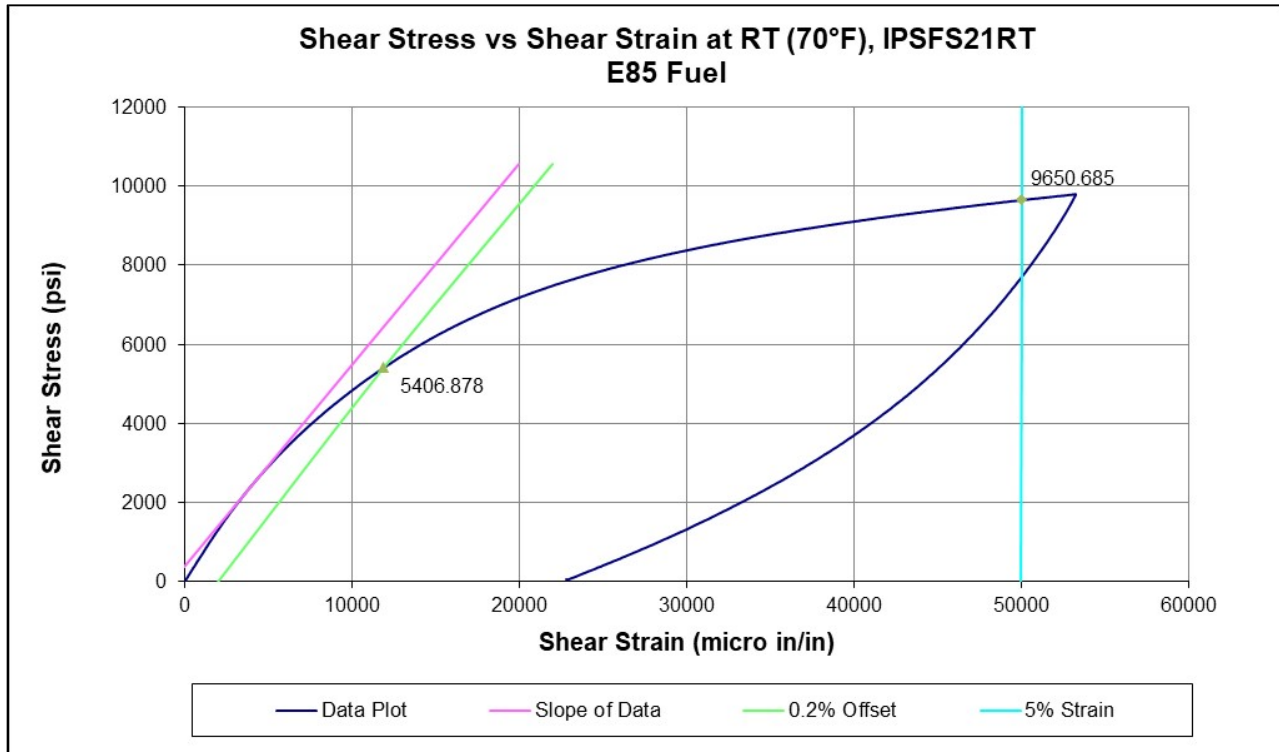
7.2.4.9 50% Water with 50% Skydrol LD-4 (IPSFS19RT / IPSFS19ET2)

7.2.4.10 MIL-PRF-87252 PAO Cooling Fluid (IPSFS20RT / IPSFS20ET1 / IPSFS20ET2)

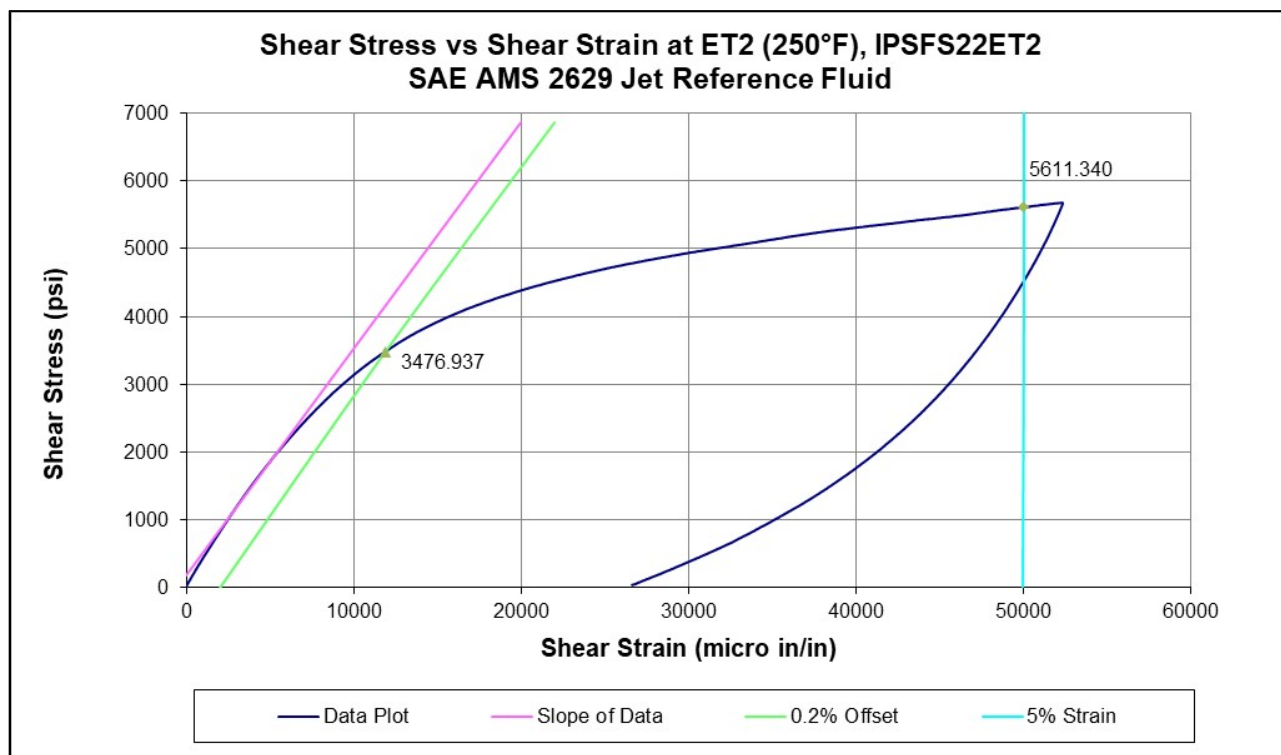
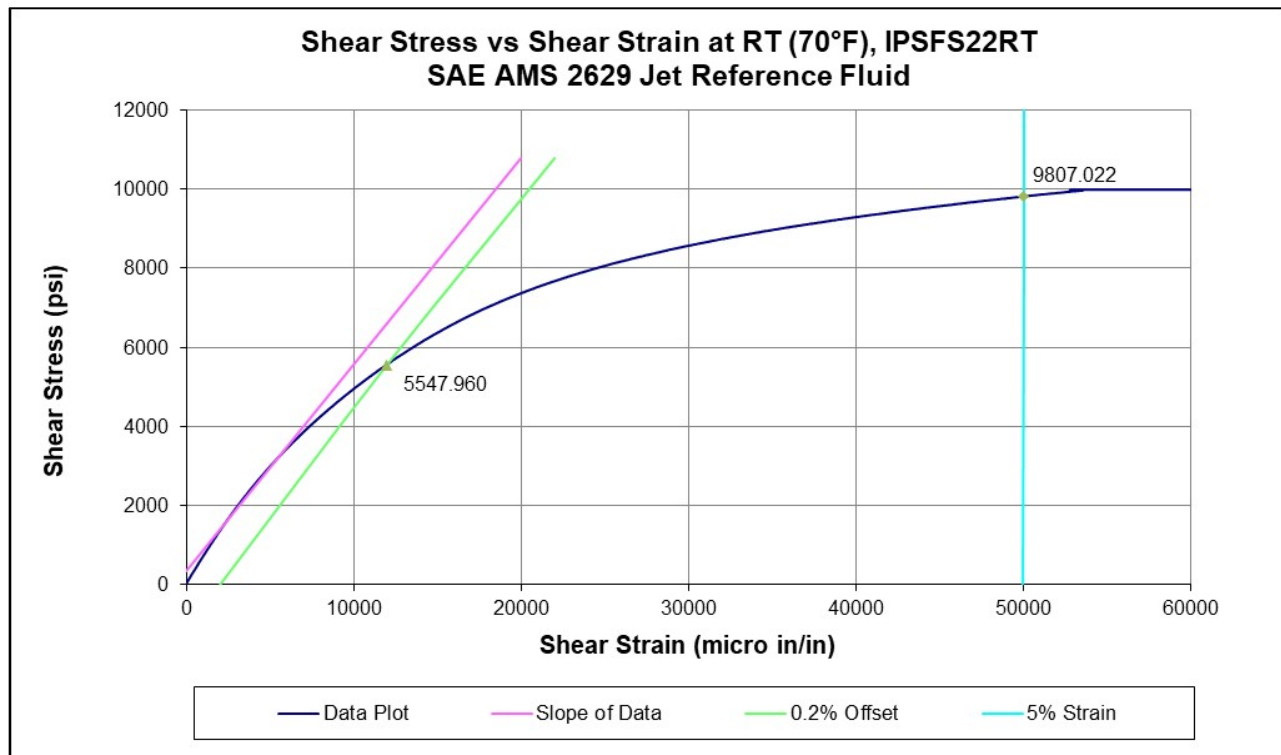




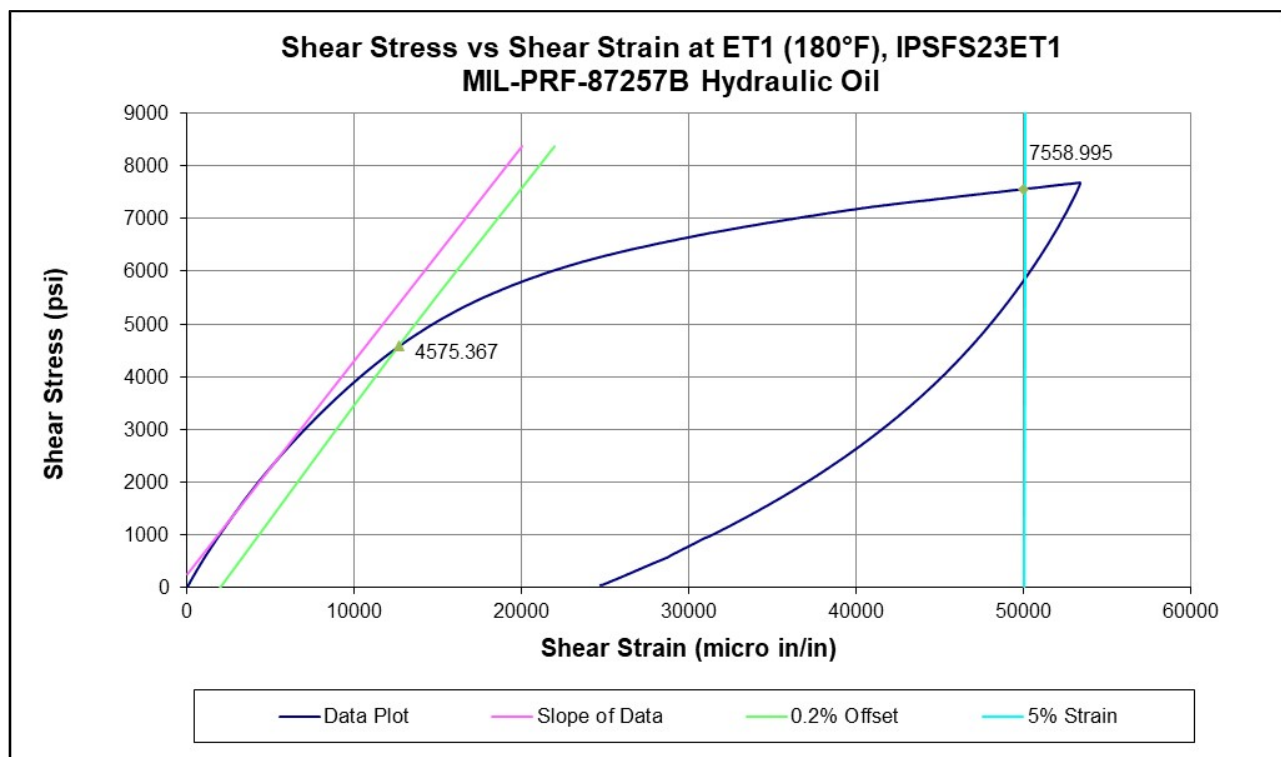
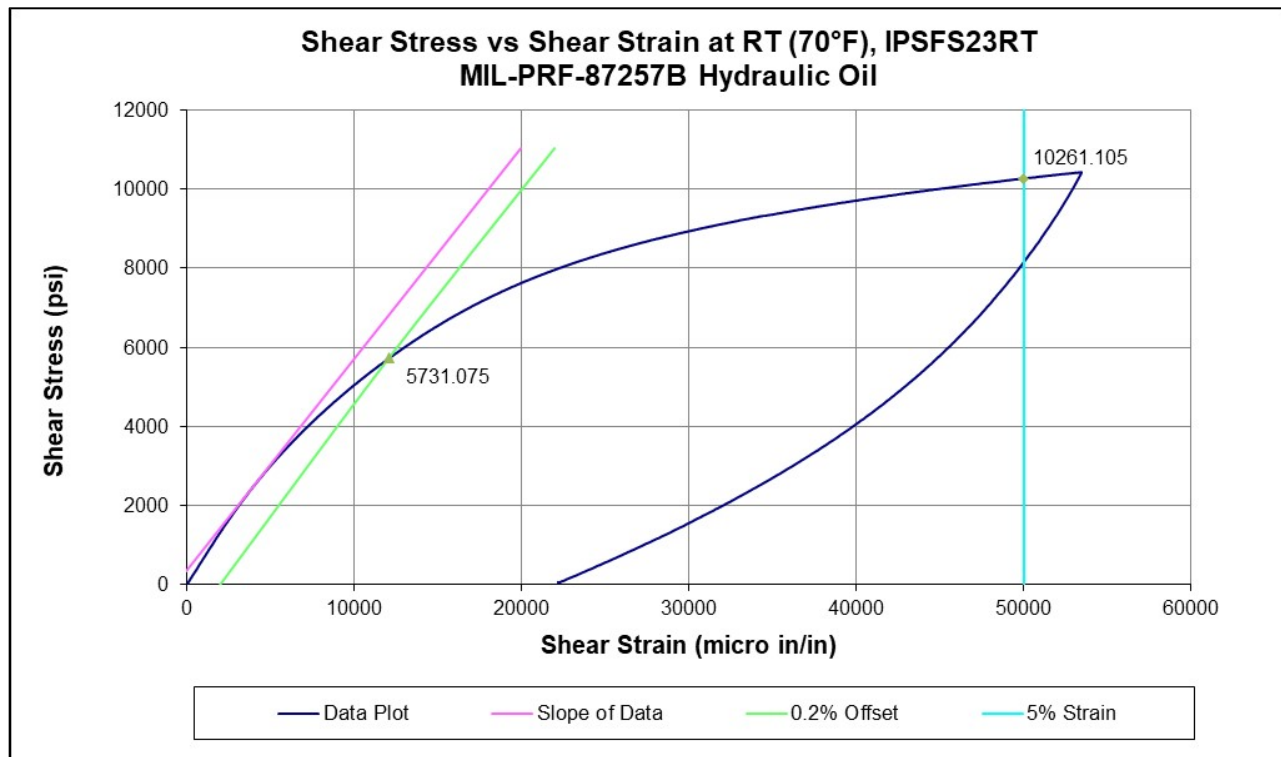
7.2.4.11 E85 Fuel (IPSFS21RT / IPSFS21ET2)

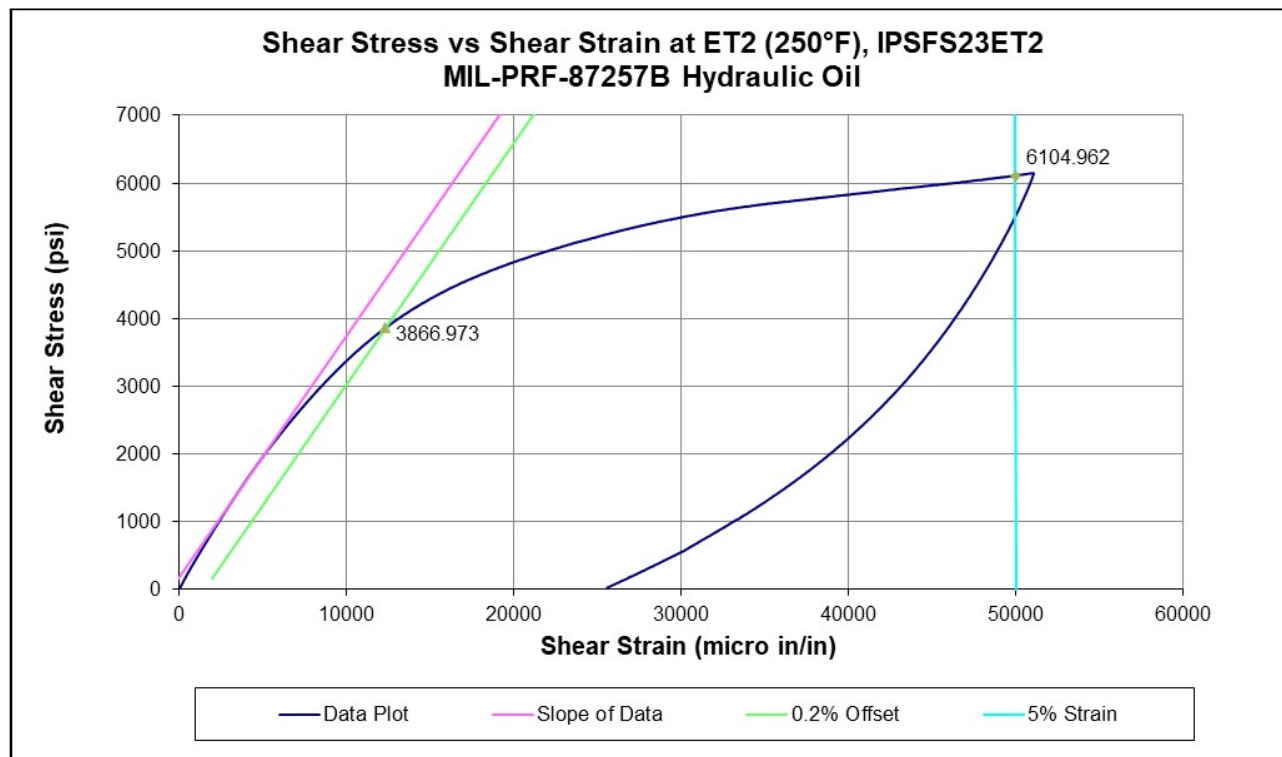


7.2.4.12 SAE AMS 2629 Jet Reference Fluid (IPSFS22RT / IPSFS22ET2)

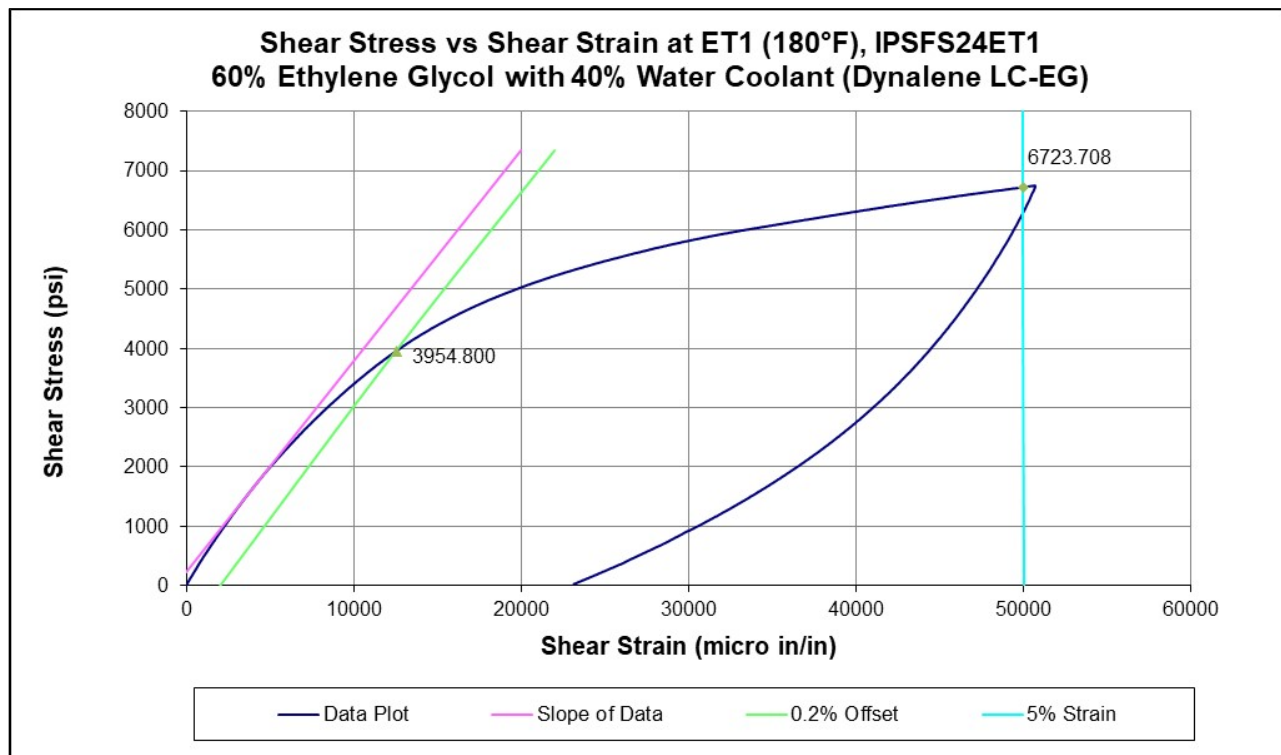
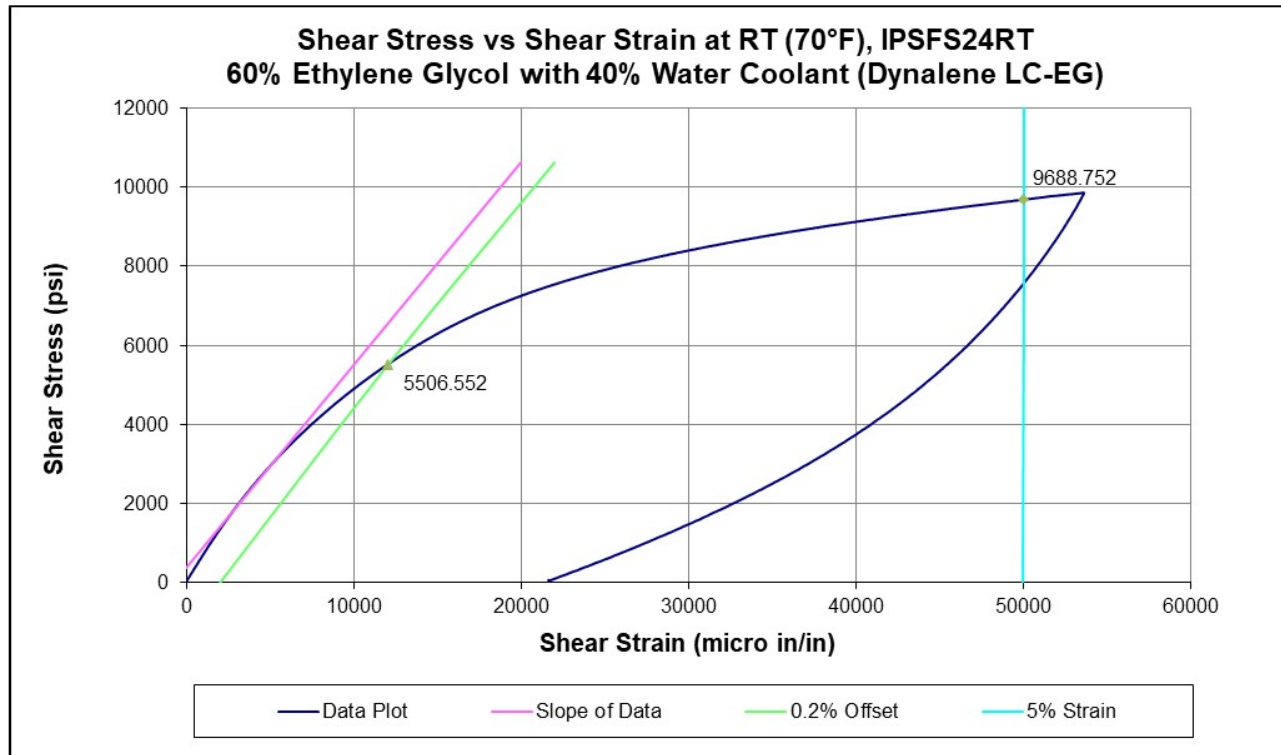


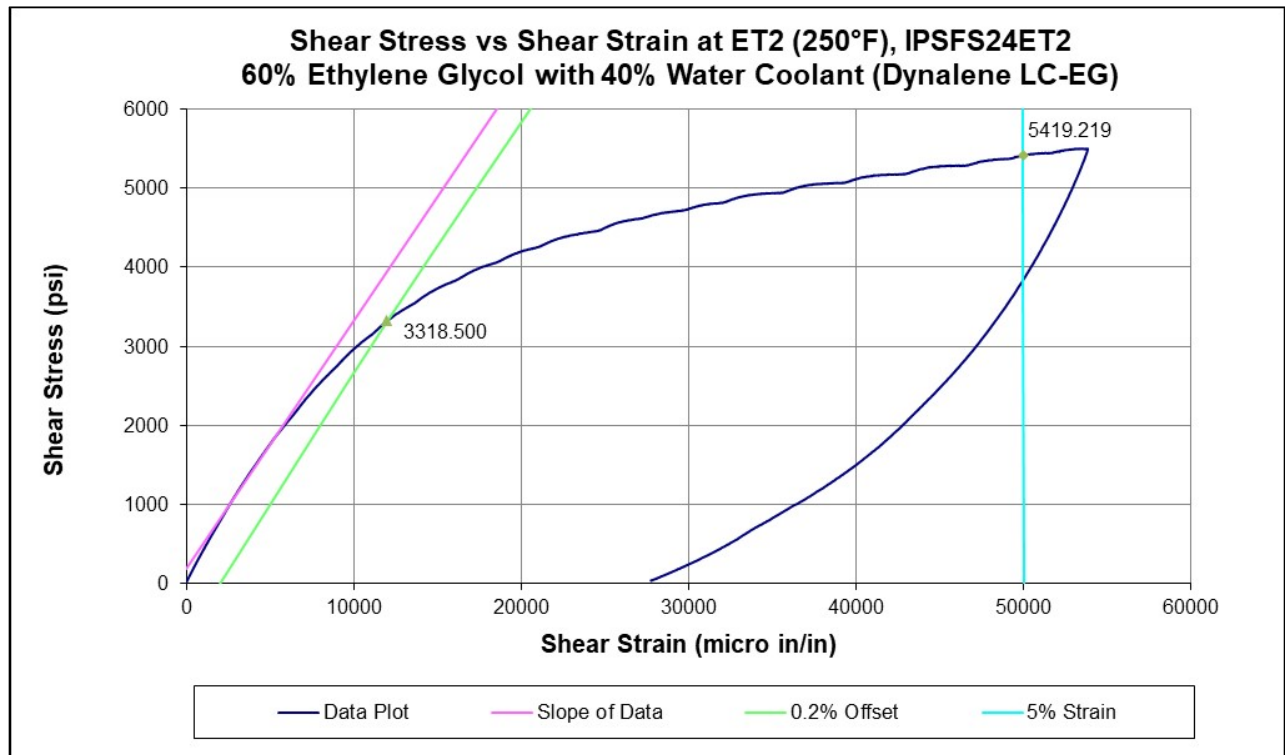
7.2.4.13 MIL-PRF-87257B Hydraulic Oil (IPSFS23RT / IPSFS23ET1 / IPSFS23ET2)



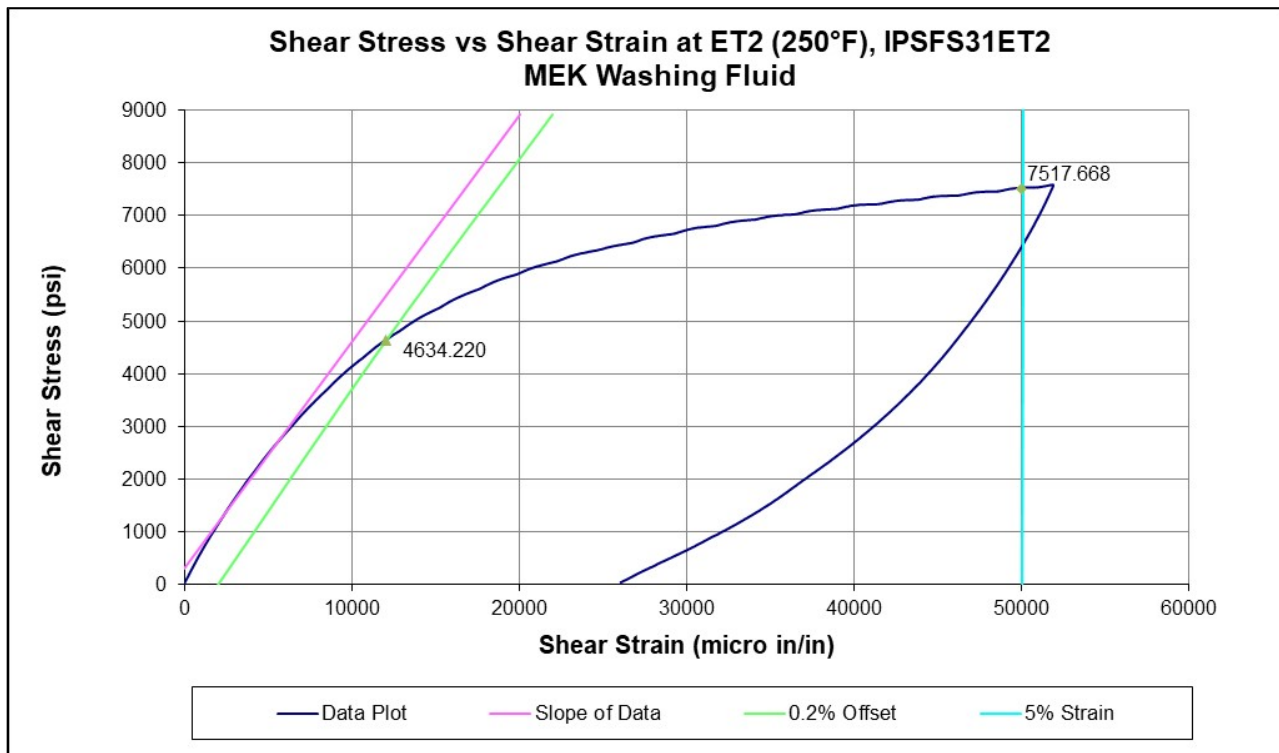
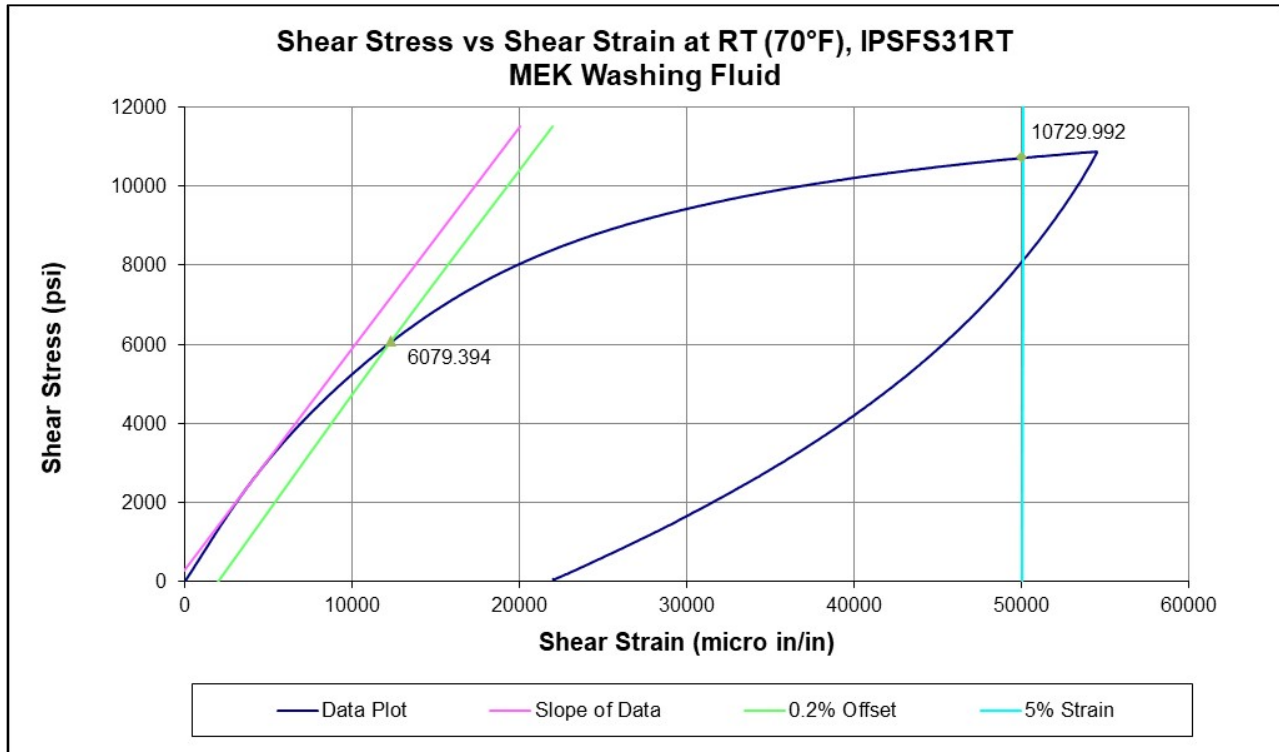


7.2.4.14 60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG) (IPSFS24RT / IPSFS24ET1 / IPSFS24ET2)

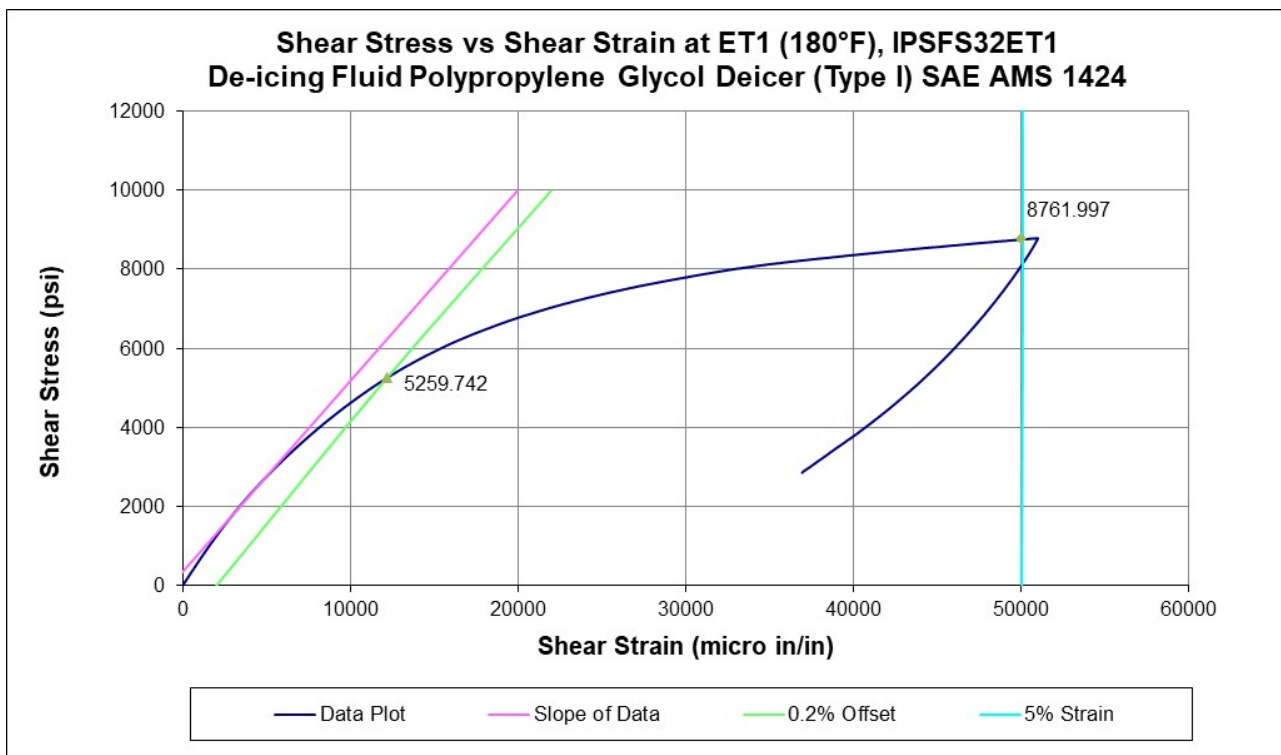
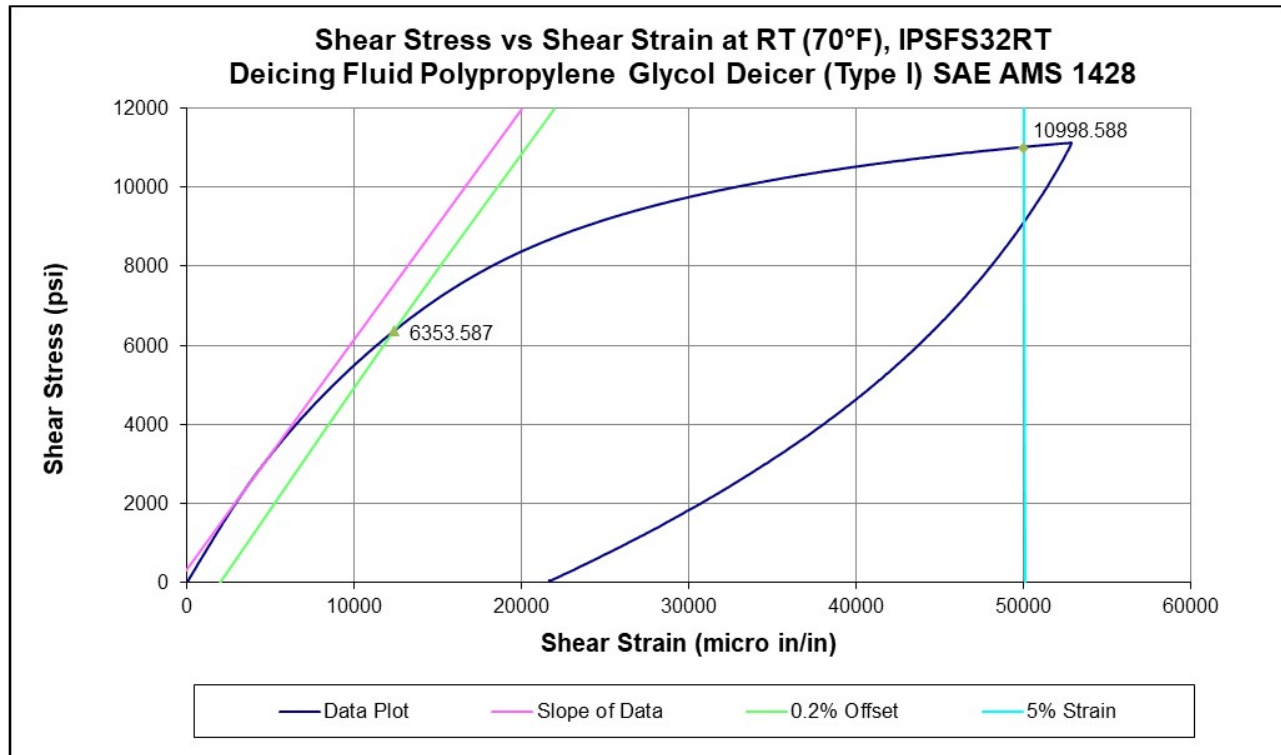


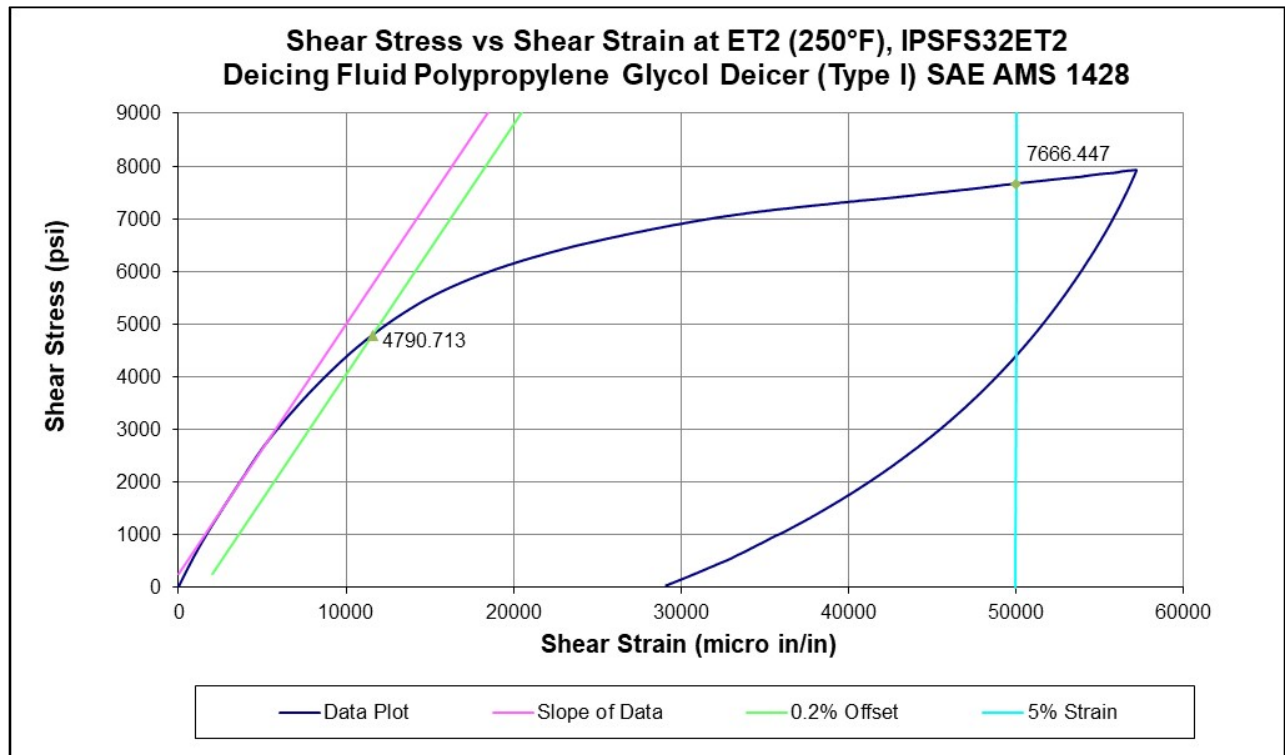


7.2.4.15 MEK Washing Fluid (IPSFS31RT / IPSFS31ET2)

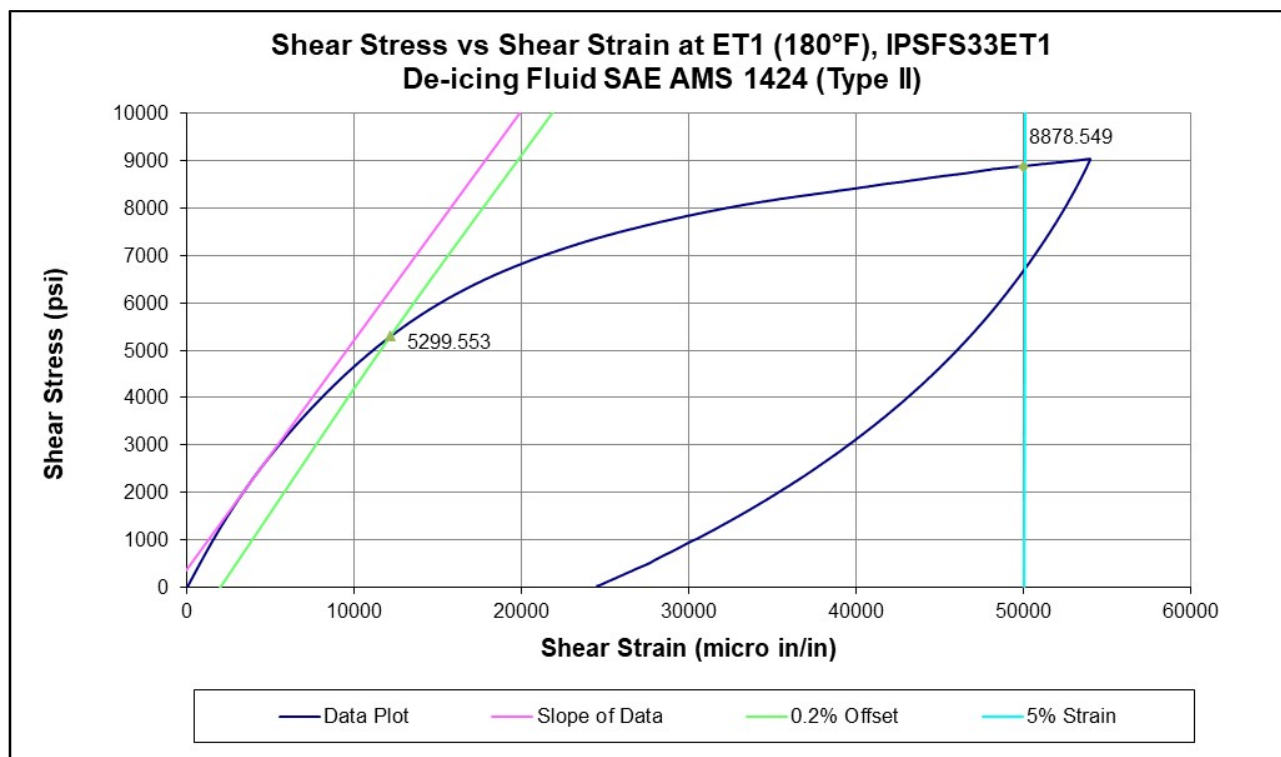
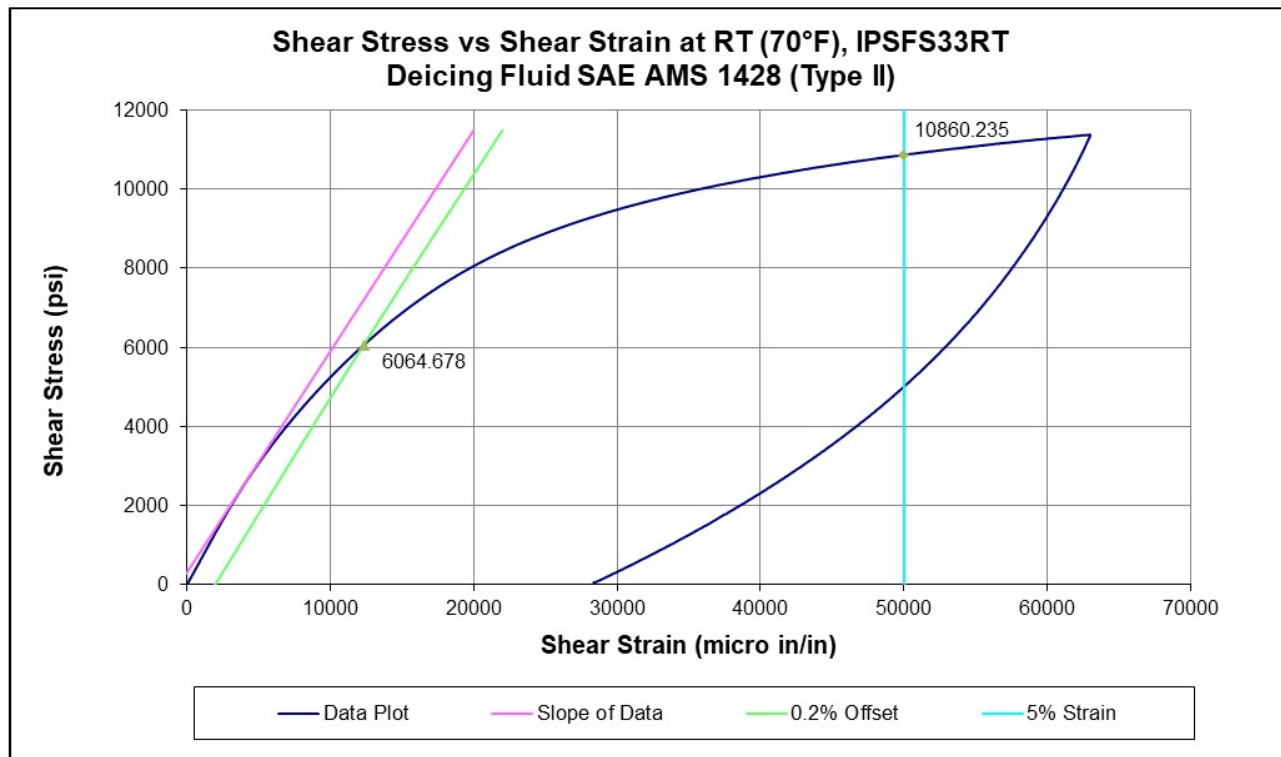


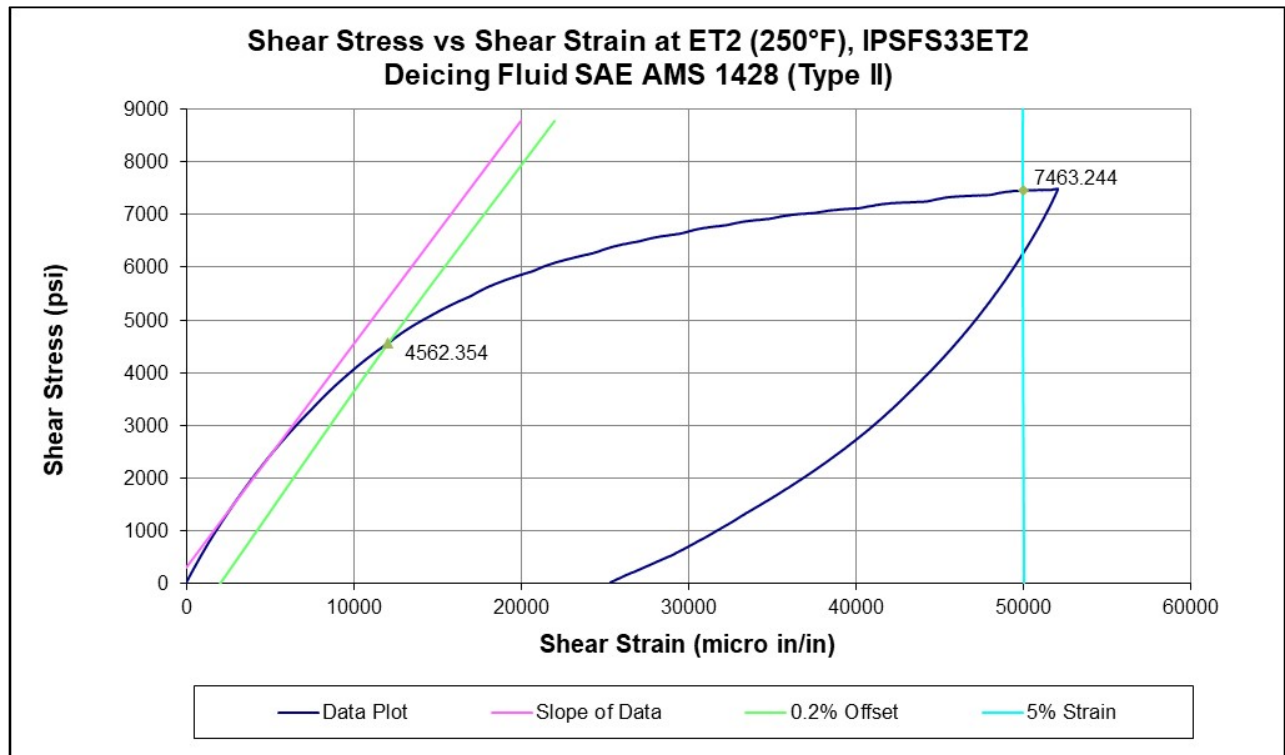
7.2.4.16 Deicing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1428 (IPSFS32RT / IPSFS32ET1 / IPSFS32ET2)



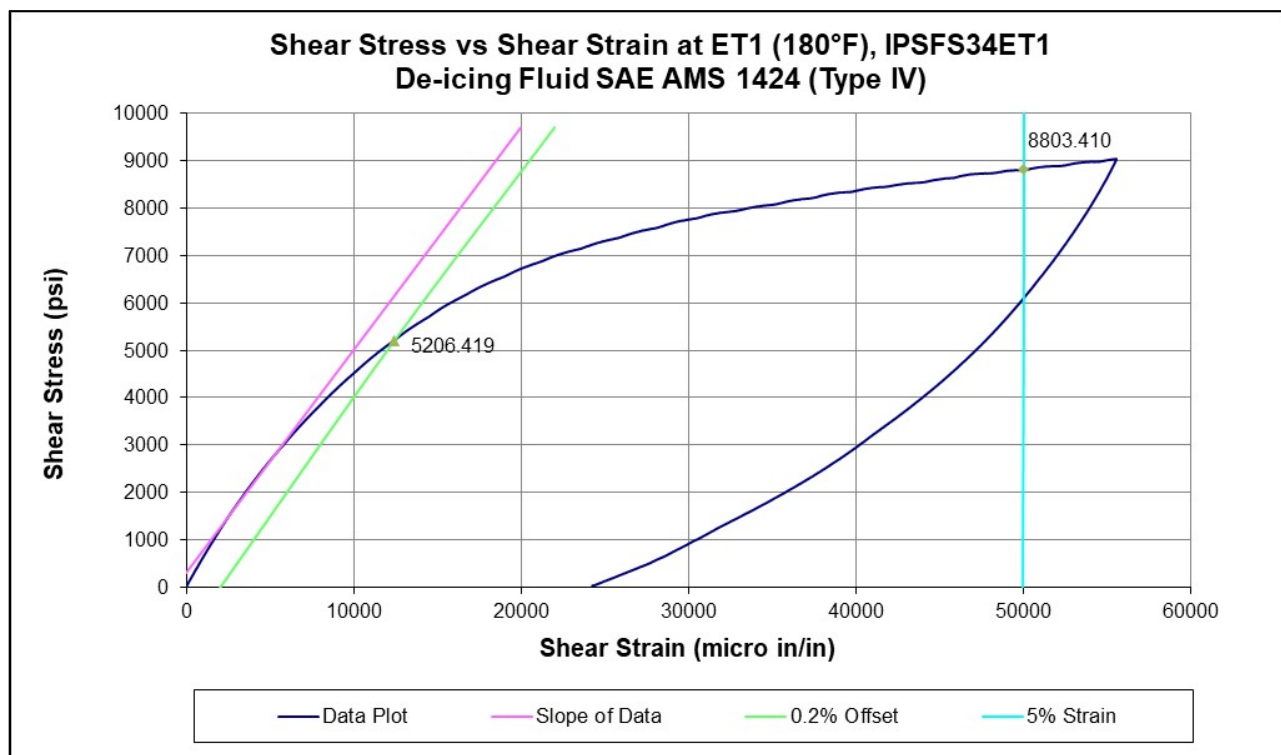
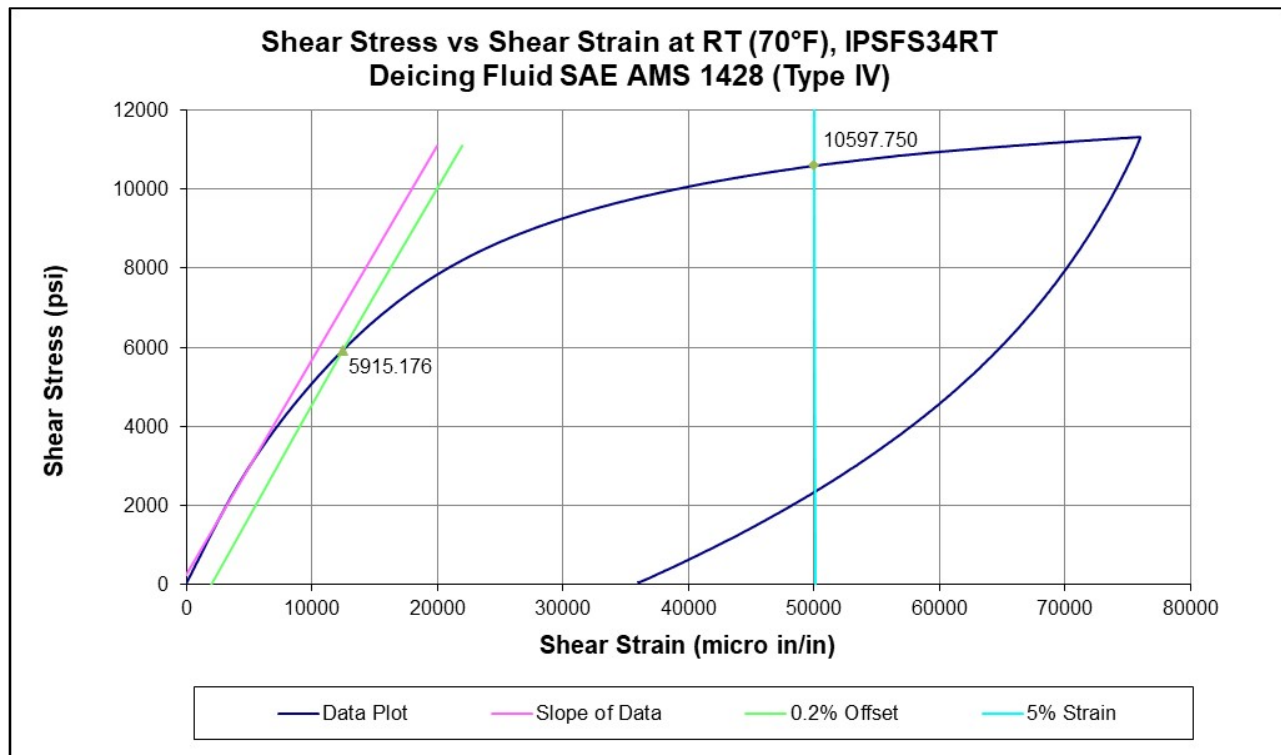


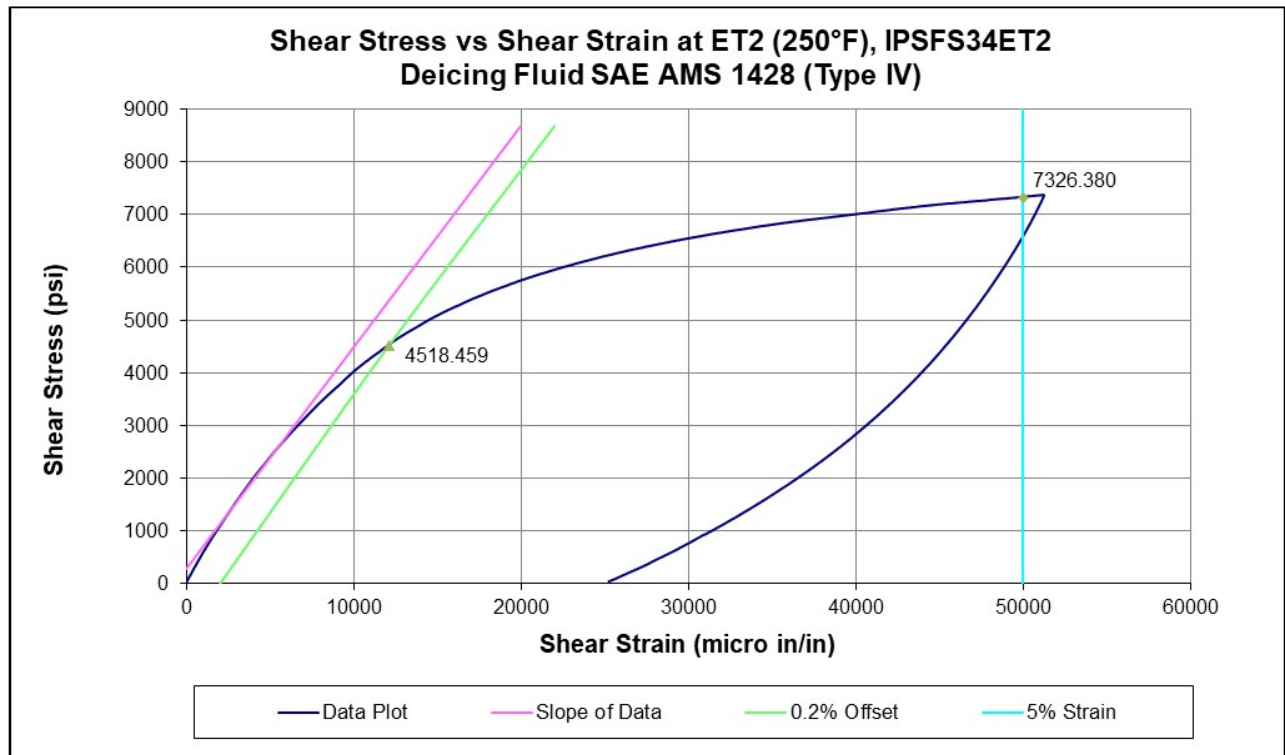
7.2.4.17 Deicing Fluid SAE AMS 1428 (Type II) (IPSFS33RT / IPSFS33ET1 / IPSFS33ET2)



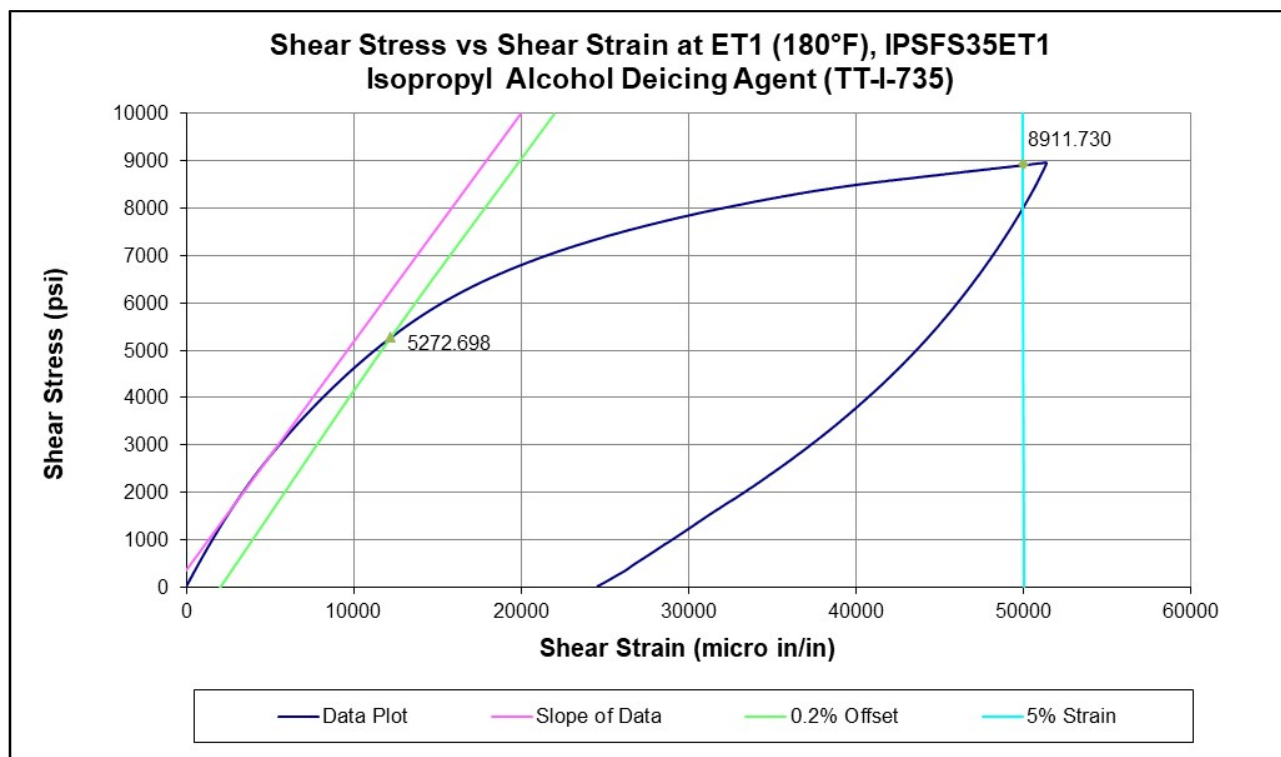
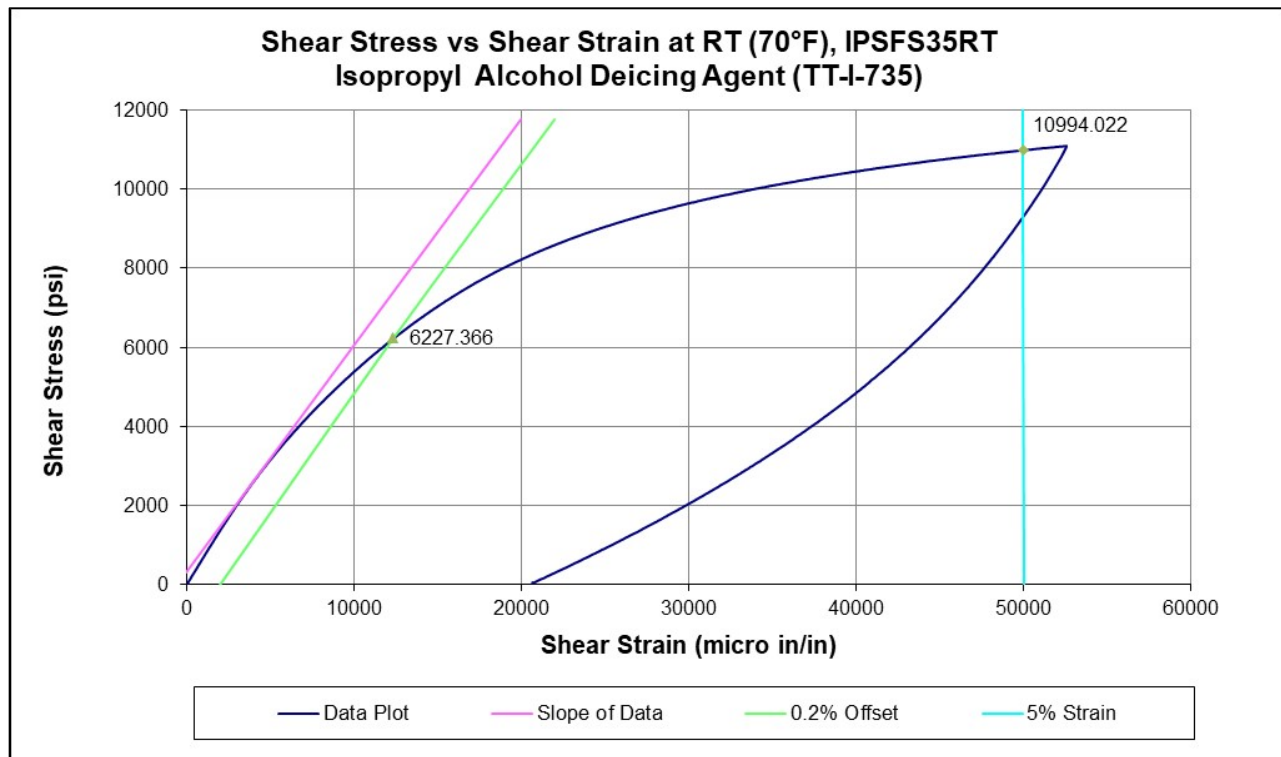


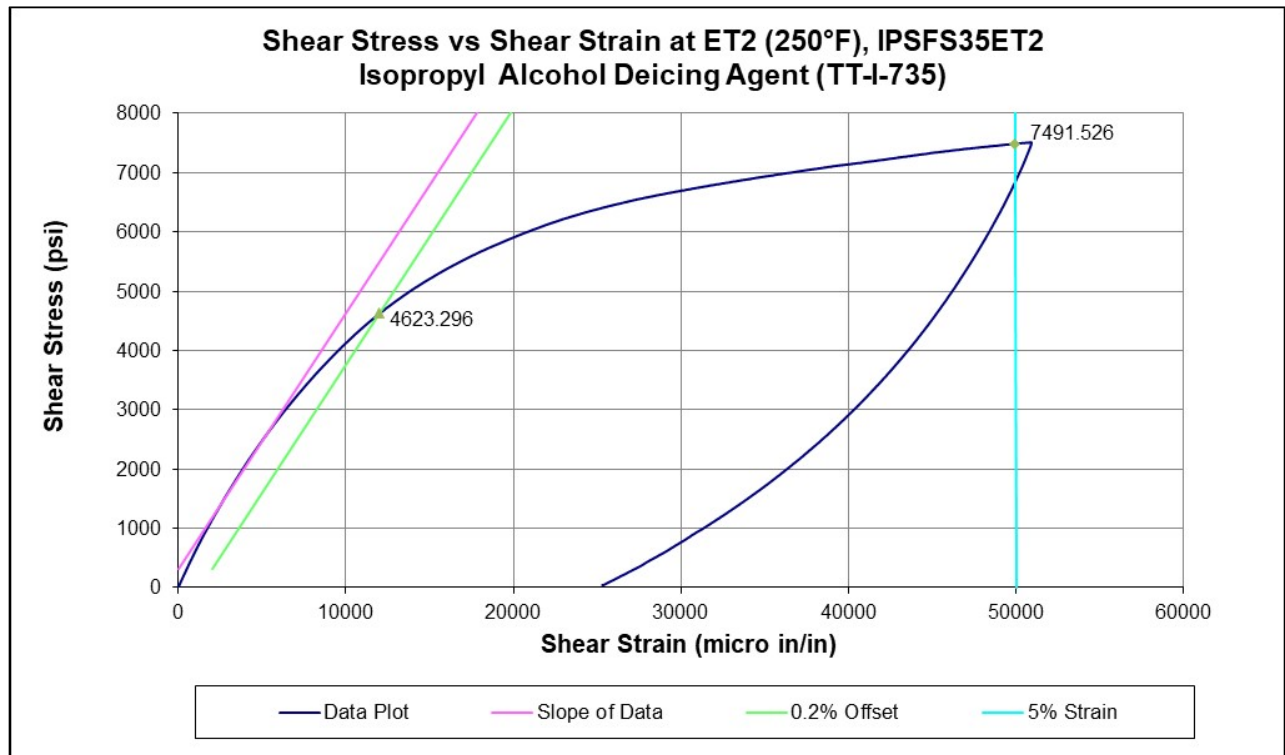
7.2.4.18 Deicing Fluid SAE AMS 1428 (Type IV) (IPSFS34RT / IPSFS34ET1 / IPSFS34ET2)



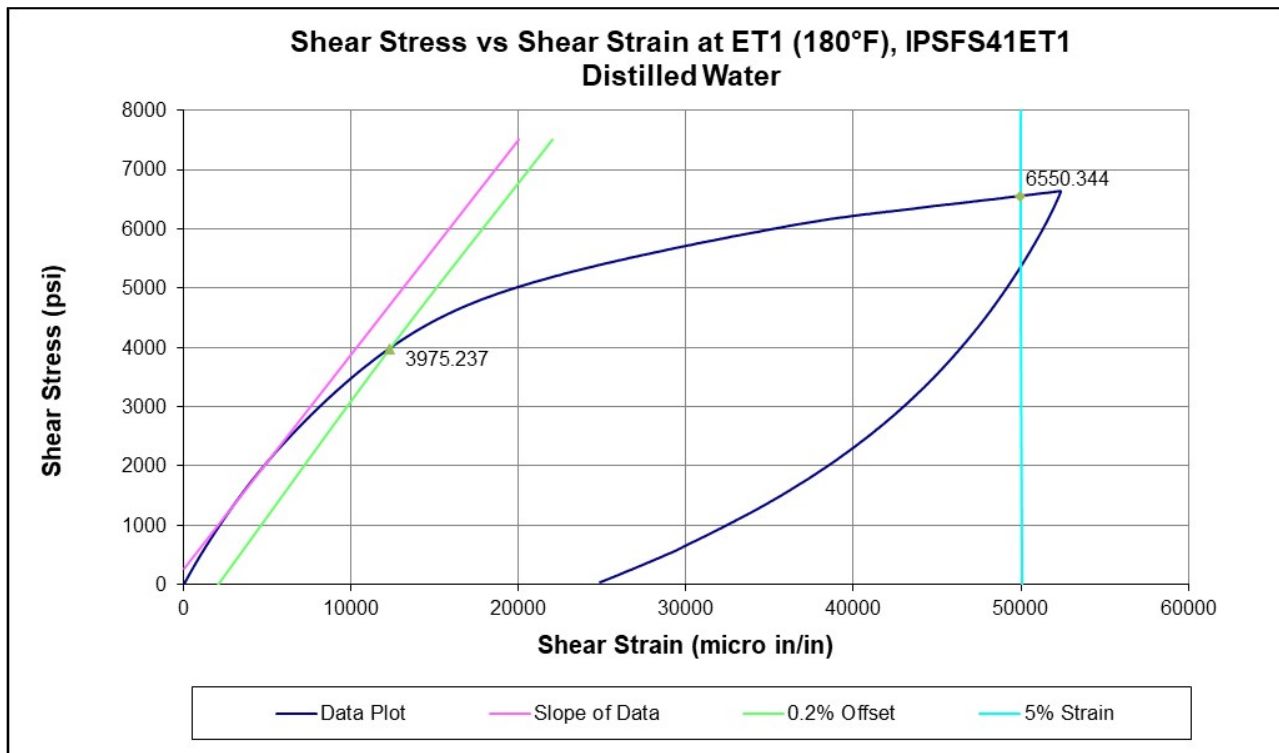
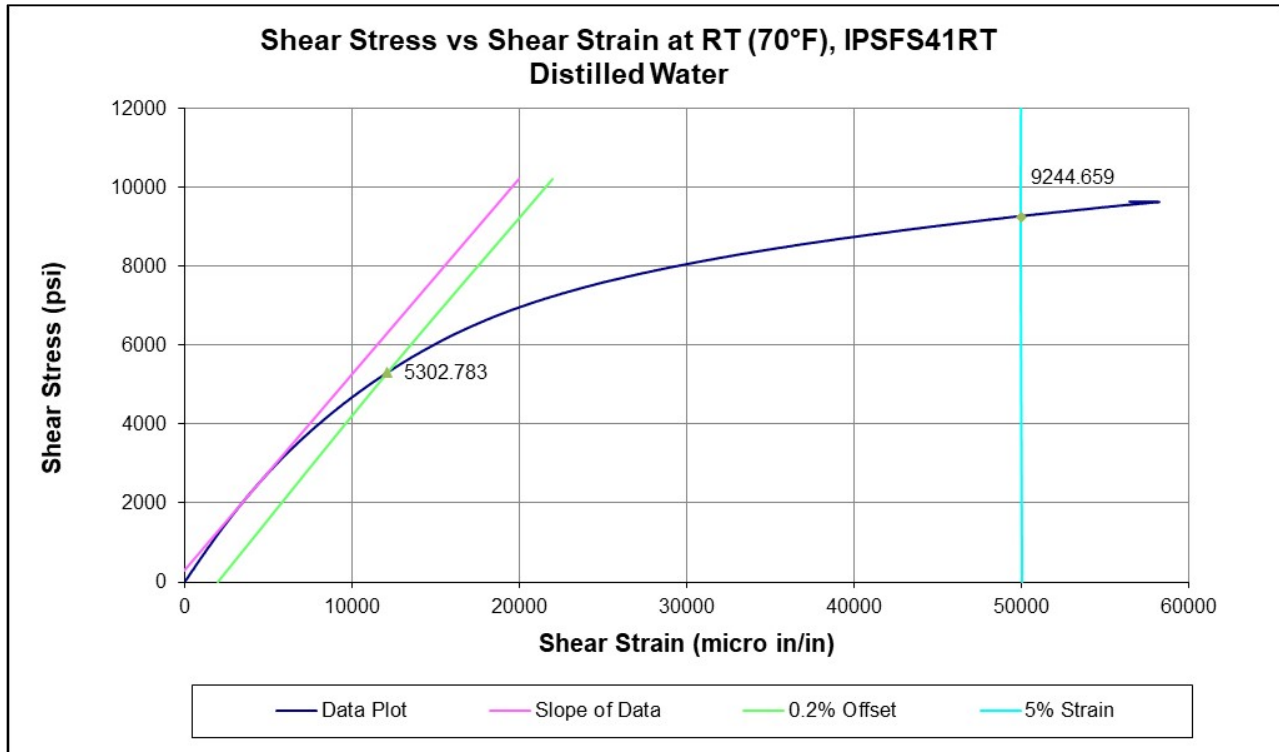


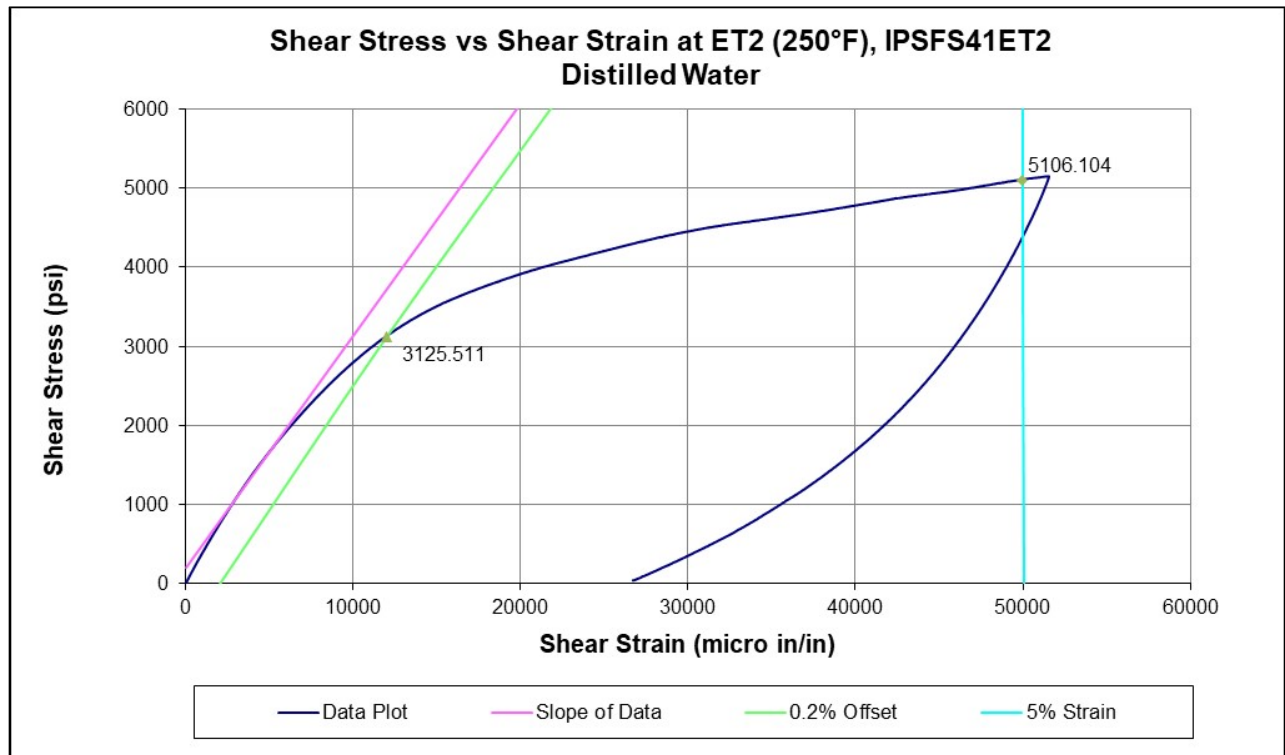
7.2.4.19 Isopropyl Alcohol Deicing Agent (TT-I-735) (IPSFS35RT / IPSFS35ET1 / IPSFS35ET2)



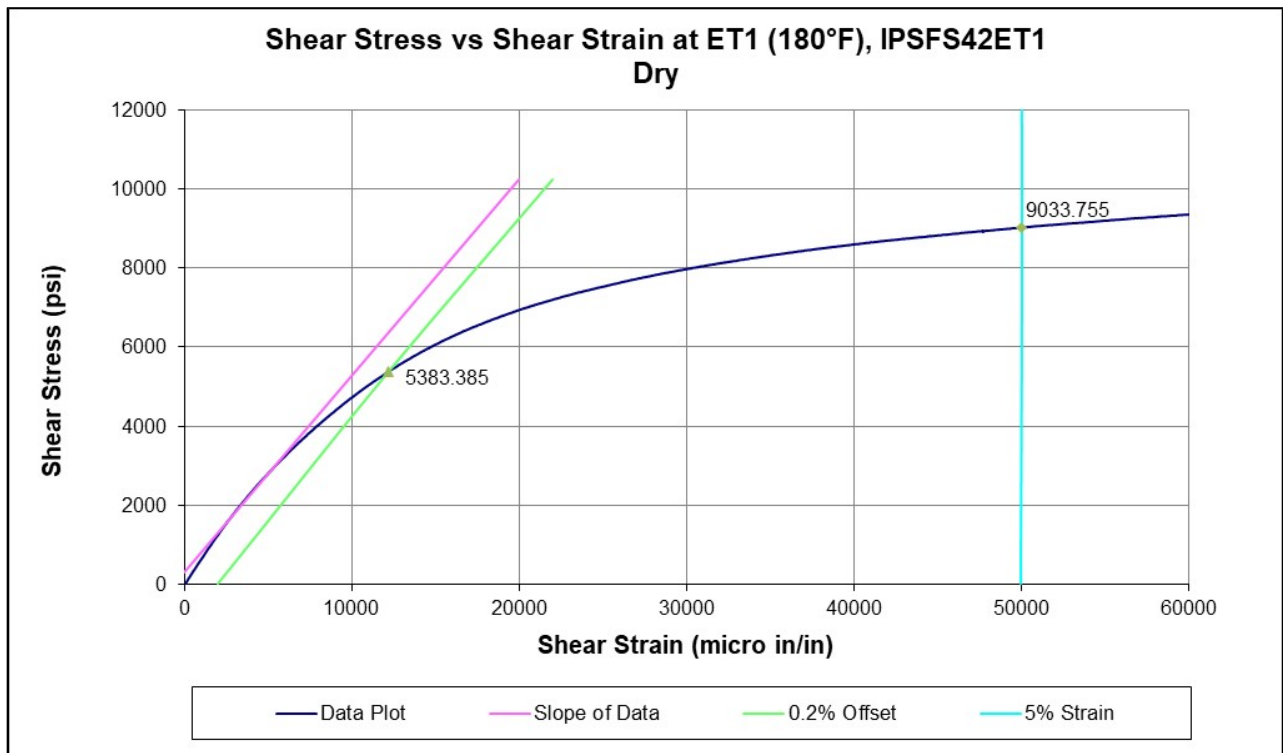
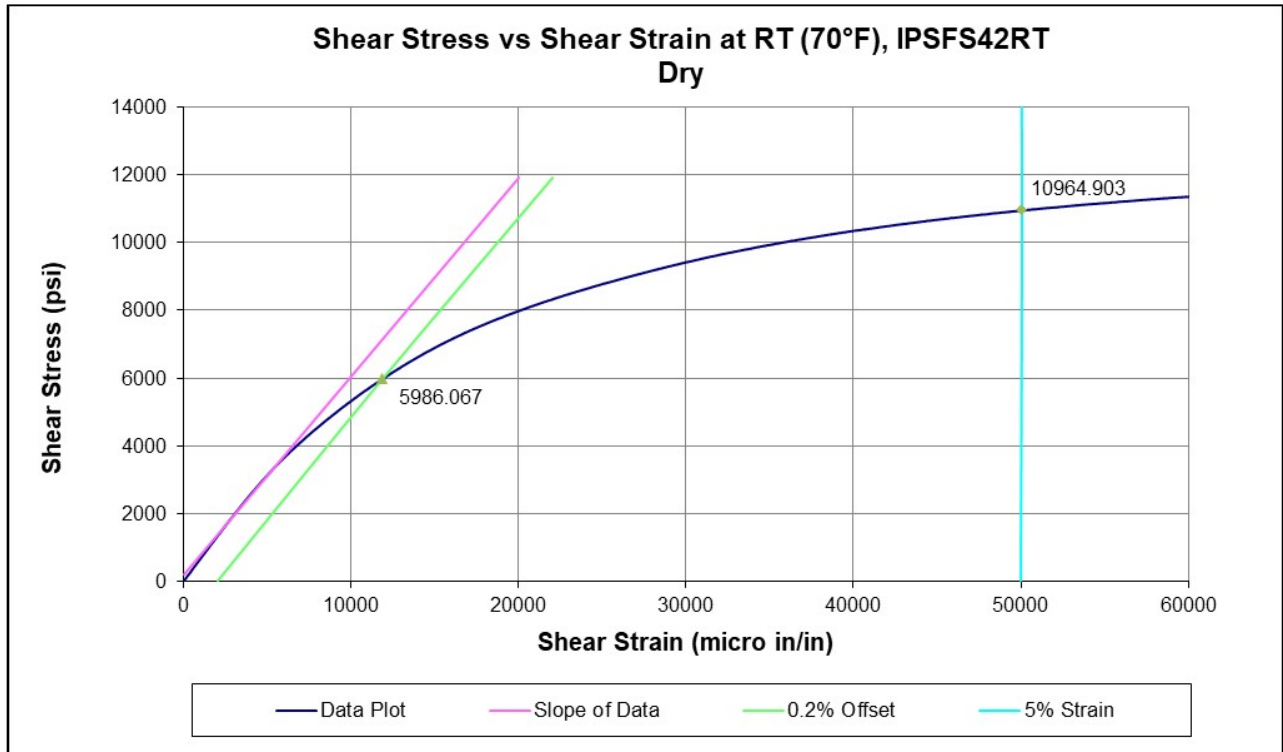


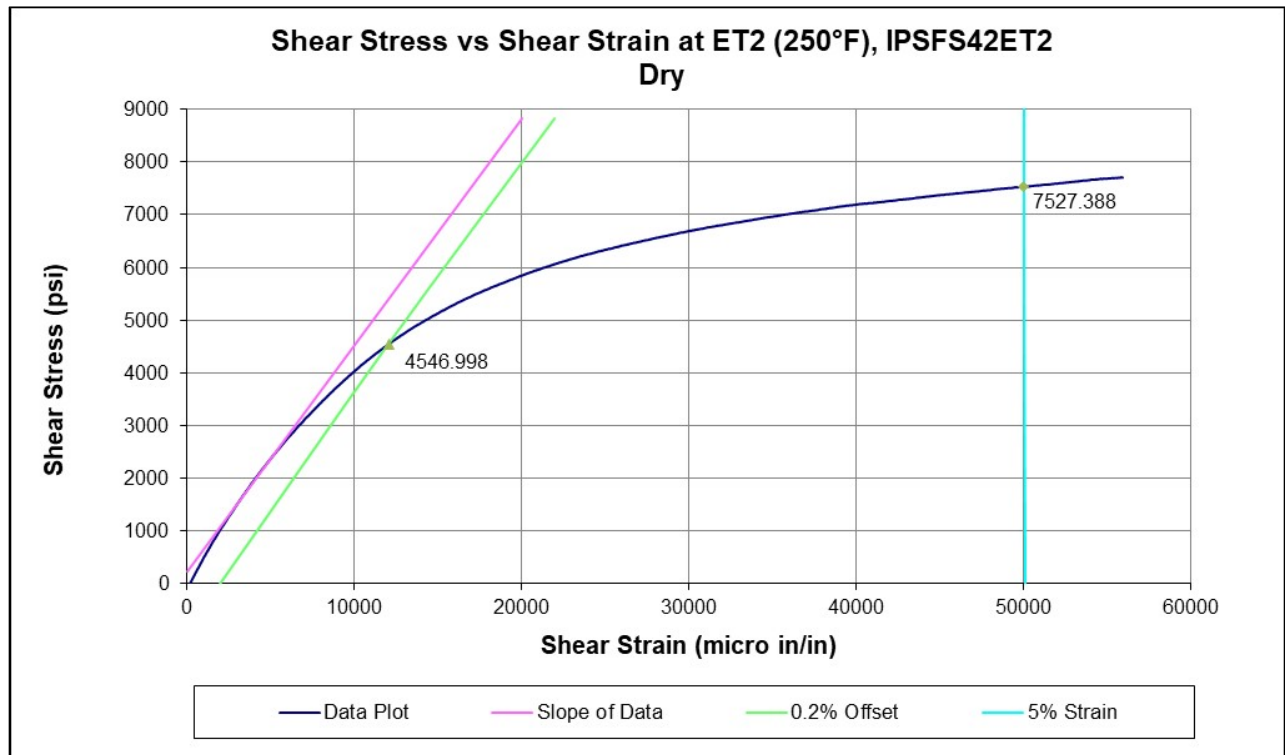
7.2.4.20 Distilled Water (IPSFS41RT / IPSFS41ET1 / IPSFS41ET2)



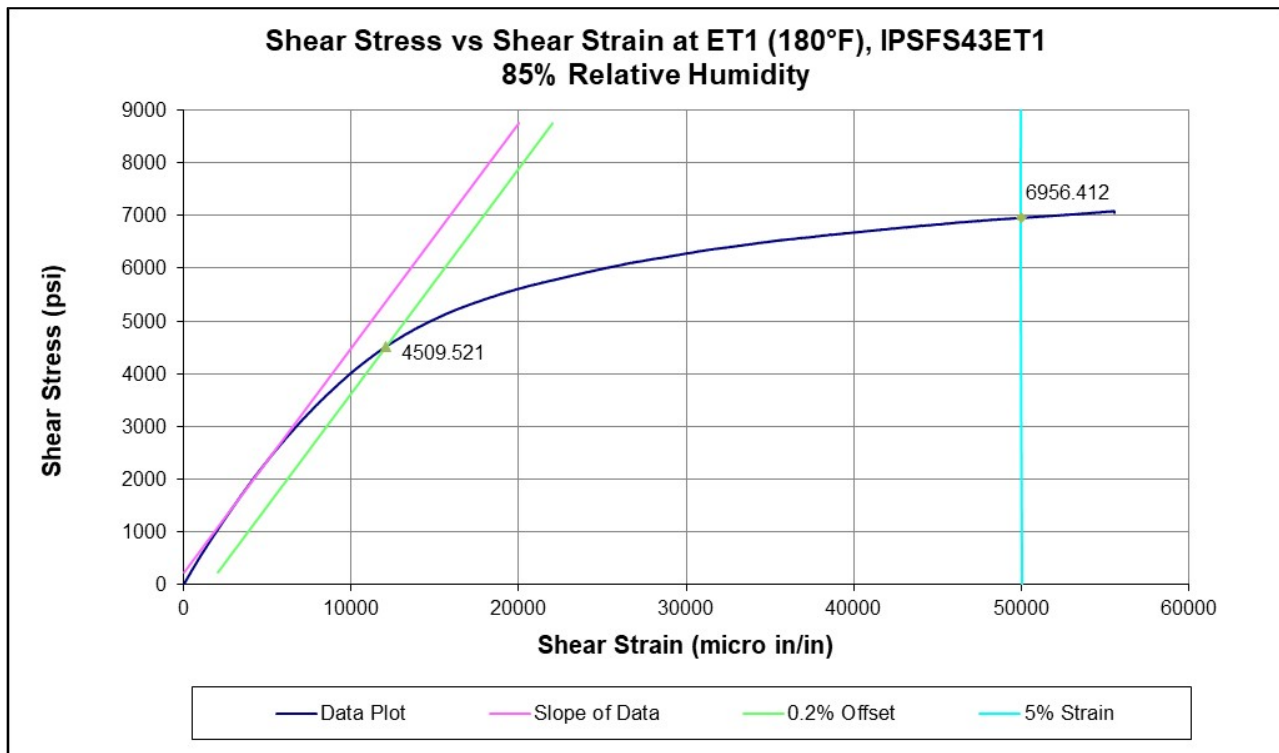
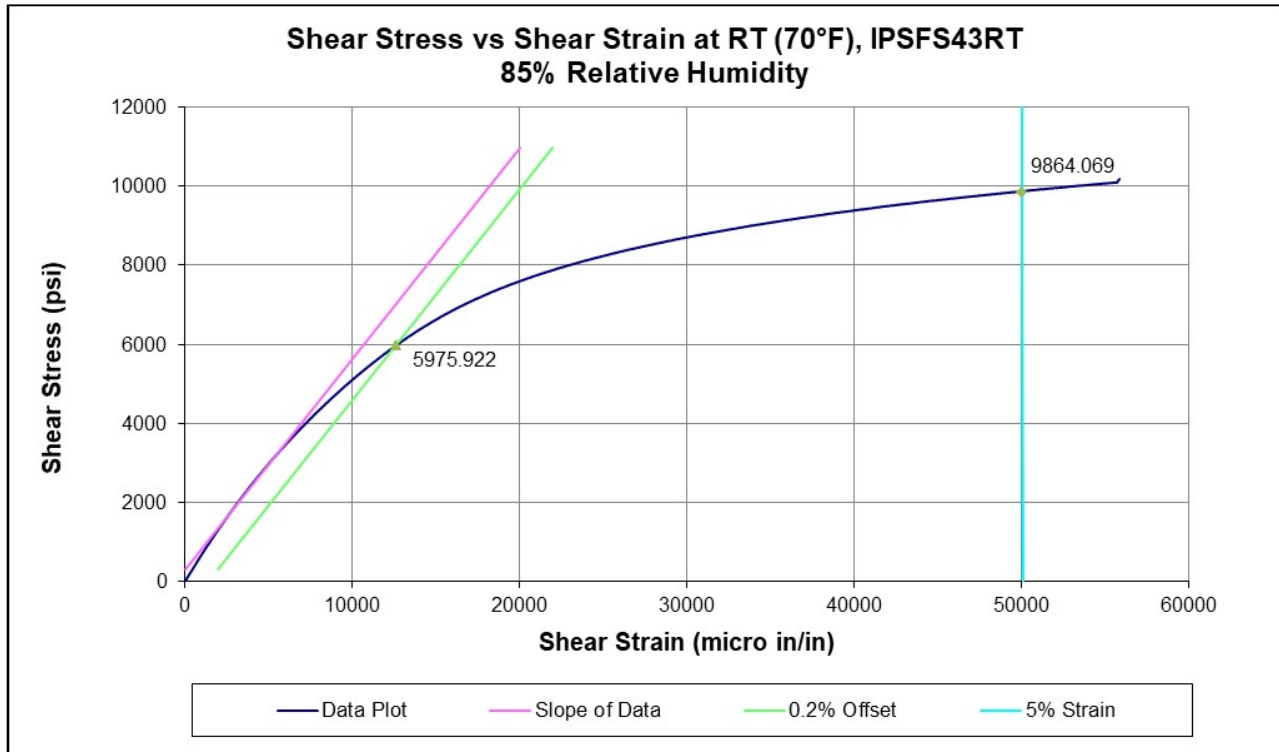


7.2.4.21 Dry (IPSFS42RT / IPSFS42ET1 / IPSFS42ET2)



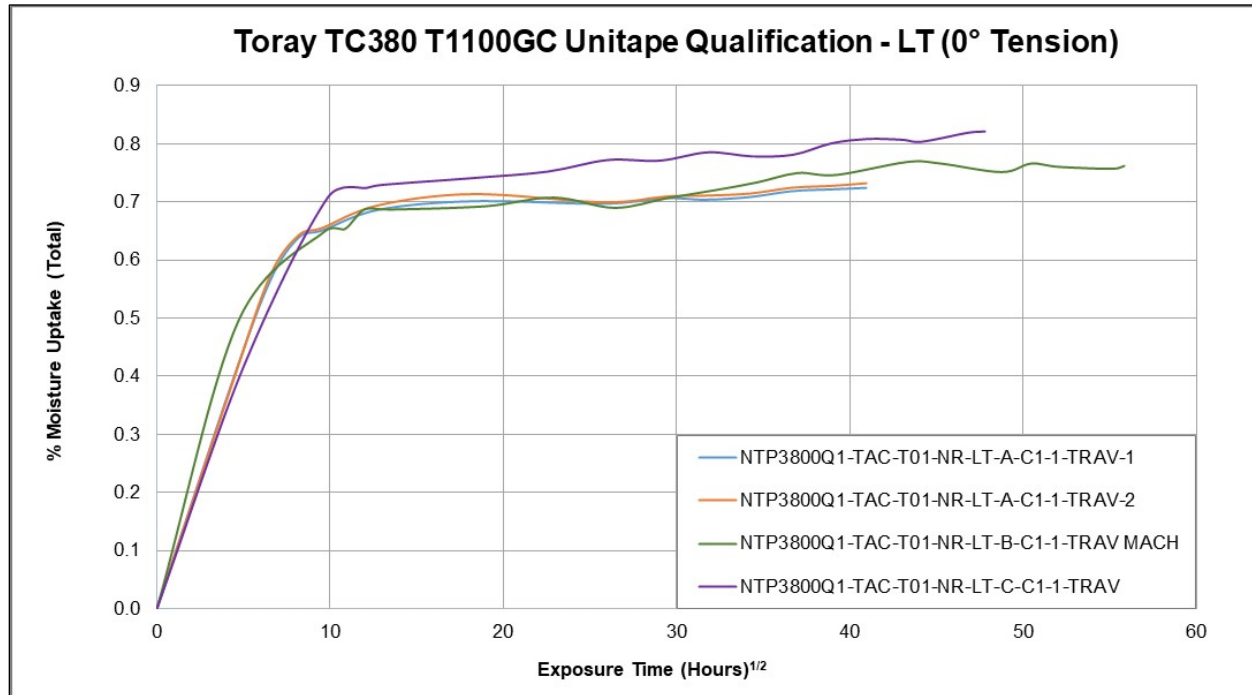


7.2.4.22 85% Relative Humidity (IPSFS43RT / IPSFS43ET1)

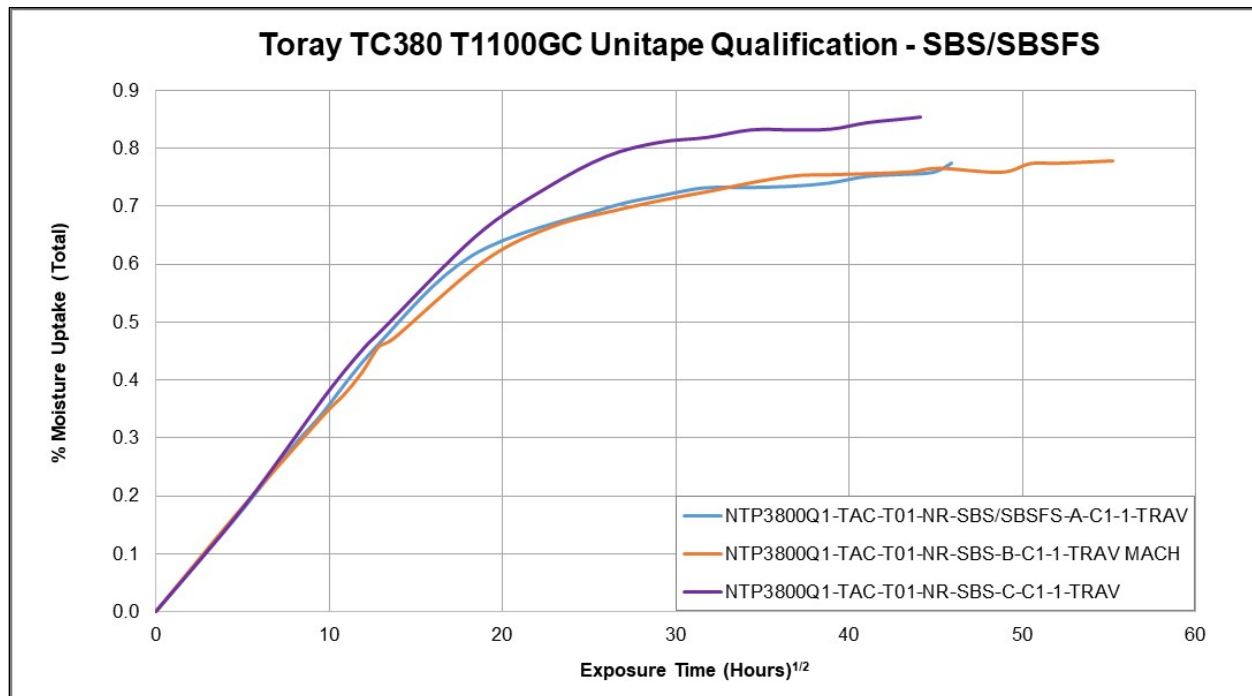


8. Moisture Conditioning Charts

8.1 Longitudinal Tension (LT) – Thinnest Panel



8.2 Short Beam Strength (SBS) / Short Beam Strength Fluid Sensitivity (SBSFS) – Thickest Panel



9. DMA Results

9.1 DMA Dry Data

DMA Results Summary				
Toray Advanced Composites TC380 T1100GC Unitape Qualification DMA Dry				
Sample ID	Onset Storage Modulus		Peak of Tangent Delta	
	T _g [°C]	T _g [°F]	T _g [°C]	T _g [°F]
NTP3800Q1-TAC-T01-NR-LC/TC-A-C1-1-DMA-D	208.53	407.35	215.68	420.22
NTP3800Q1-TAC-T01-NR-LC/TC-A-C2-1-DMA-D	209.43	408.97	216.66	421.99
NTP3800Q1-TAC-T01-NR-LC/TC-B-C1-1-DMA-D	209.74	409.53	216.33	421.39
NTP3800Q1-TAC-T01-NR-LC/TC-B-C2-1-DMA-D	209.84	409.71	216.51	421.72
NTP3800Q1-TAC-T01-NR-LC/TC-C-C1-1-DMA-D	209.33	408.79	216.19	421.14
NTP3800Q1-TAC-T01-NR-LC/TC-C-C2-1-DMA-D	205.00	401.00	212.83	415.09
NTP3800Q1-TAC-T01-NR-LT-A-C1-1-DMA-D	209.71	409.48	217.36	423.25
NTP3800Q1-TAC-T01-NR-LT-A-C2-1-DMA-D	210.35	410.63	218.57	425.43
NTP3800Q1-TAC-T01-NR-LT-B-C1-1-DMA-D	210.28	410.50	218.40	425.12
NTP3800Q1-TAC-T01-NR-LT-B-C2-1-DMA-D	210.21	410.38	218.06	424.51
NTP3800Q1-TAC-T01-NR-LT-C-C1-1-DMA-D	207.99	406.38	216.57	421.83
NTP3800Q1-TAC-T01-NR-LT-C-C2-1-DMA-D	208.88	407.98	217.24	423.03
NTP3800Q1-TAC-T01-NR-SSB1-A-C1-1-DMA-D	209.85	409.73	217.88	424.18
NTP3800Q1-TAC-T01-NR-SSB1-A-C2-1-DMA-D	210.64	411.15	218.83	425.89
NTP3800Q1-TAC-T01-NR-SSB1-B-C1-1-DMA-D	209.85	409.73	217.73	423.91
NTP3800Q1-TAC-T01-NR-SSB1-B-C2-1-DMA-D	208.82	407.88	216.58	421.84
NTP3800Q1-TAC-T01-NR-SSB1-C-C1-1-DMA-D	207.19	404.94	215.59	420.06
NTP3800Q1-TAC-T01-NR-SSB1-C-C2-1-DMA-D	207.67	405.81	215.70	420.26
NTP3800Q1-TAC-T01-NR-SSB2-A-C1-1-DMA-D	208.71	407.68	218.73	425.71
NTP3800Q1-TAC-T01-NR-SSB2-A-C2-1-DMA-D	209.22	408.60	218.79	425.82
NTP3800Q1-TAC-T01-NR-SSB2-B-C1-1-DMA-D	209.91	409.84	219.26	426.67
NTP3800Q1-TAC-T01-NR-SSB2-B-C2-1-DMA-D	209.93	409.87	218.63	425.53
NTP3800Q1-TAC-T01-NR-SSB2-C-C1-1-DMA-D	207.68	405.82	216.85	422.33
NTP3800Q1-TAC-T01-NR-SSB2-C-C2-1-DMA-D	207.38	405.28	216.69	422.04
Average	209.01	408.21	217.15	422.87
Standard Deviation	1.31	2.36	1.45	2.62

9.2 DMA Wet Data

DMA Results Summary				
Toray Advanced Composites TC380 T1100GC Unitape Qualification DMA Wet				
Sample ID	Onset Storage Modulus		Peak of Tangent Delta	
	T _g [°C]	T _g [°F]	T _g [°C]	T _g [°F]
NTP3800Q1-TAC-T01-NR-LC/TC-A-C1-1-DMA-W	163.75	326.75	175.90	348.62
NTP3800Q1-TAC-T01-NR-LC/TC-A-C2-1-DMA-W	164.93	328.87	176.88	350.38
NTP3800Q1-TAC-T01-NR-LC/TC-B-C1-1-DMA-W	164.46	328.03	175.76	348.37
NTP3800Q1-TAC-T01-NR-LC/TC-B-C2-1-DMA-W	164.01	327.22	175.36	347.65
NTP3800Q1-TAC-T01-NR-LC/TC-C-C1-1-DMA-W	163.06	325.51	174.41	345.94
NTP3800Q1-TAC-T01-NR-LC/TC-C-C2-1-DMA-W	161.67	323.01	173.99	345.18
NTP3800Q1-TAC-T01-NR-LT-A-C1-1-DMA-W	170.85	339.53	199.91	391.84
NTP3800Q1-TAC-T01-NR-LT-A-C2-1-DMA-W	172.66	342.79	201.50	394.70
NTP3800Q1-TAC-T01-NR-LT-B-C1-1-DMA-W	171.12	340.02	199.57	391.23
NTP3800Q1-TAC-T01-NR-LT-B-C2-1-DMA-W	170.40	338.72	199.61	391.30
NTP3800Q1-TAC-T01-NR-LT-C-C1-1-DMA-W	169.13	336.43	196.27	385.29
NTP3800Q1-TAC-T01-NR-LT-C-C2-1-DMA-W	169.71	337.48	199.39	390.90
NTP3800Q1-TAC-T01-NR-SSB1-A-C1-1-DMA-W	165.34	329.61	189.07	372.33
NTP3800Q1-TAC-T01-NR-SSB1-A-C2-1-DMA-W	166.94	332.49	189.08	372.34
NTP3800Q1-TAC-T01-NR-SSB1-B-C1-1-DMA-W	163.95	327.11	189.86	373.75
NTP3800Q1-TAC-T01-NR-SSB1-B-C2-1-DMA-W	164.59	328.26	191.13	376.03
NTP3800Q1-TAC-T01-NR-SSB1-C-C1-1-DMA-W	162.37	324.27	185.99	366.78
NTP3800Q1-TAC-T01-NR-SSB1-C-C2-1-DMA-W	162.99	325.38	186.93	368.47
NTP3800Q1-TAC-T01-NR-SSB2-A-C1-1-DMA-W	170.82	339.48	198.33	388.99
NTP3800Q1-TAC-T01-NR-SSB2-A-C2-1-DMA-W	171.60	340.88	198.76	389.77
NTP3800Q1-TAC-T01-NR-SSB2-B-C1-1-DMA-W	168.82	335.88	198.72	389.70
NTP3800Q1-TAC-T01-NR-SSB2-B-C2-1-DMA-W	168.33	334.99	198.17	388.71
NTP3800Q1-TAC-T01-NR-SSB2-C-C1-1-DMA-W	166.91	332.44	198.59	389.46
NTP3800Q1-TAC-T01-NR-SSB2-C-C2-1-DMA-W	166.63	331.93	198.68	389.62
Average	166.88	332.38	190.49	374.89
Standard Deviation	3.35	6.02	9.98	17.96

9.3 DMA Dry Batch A

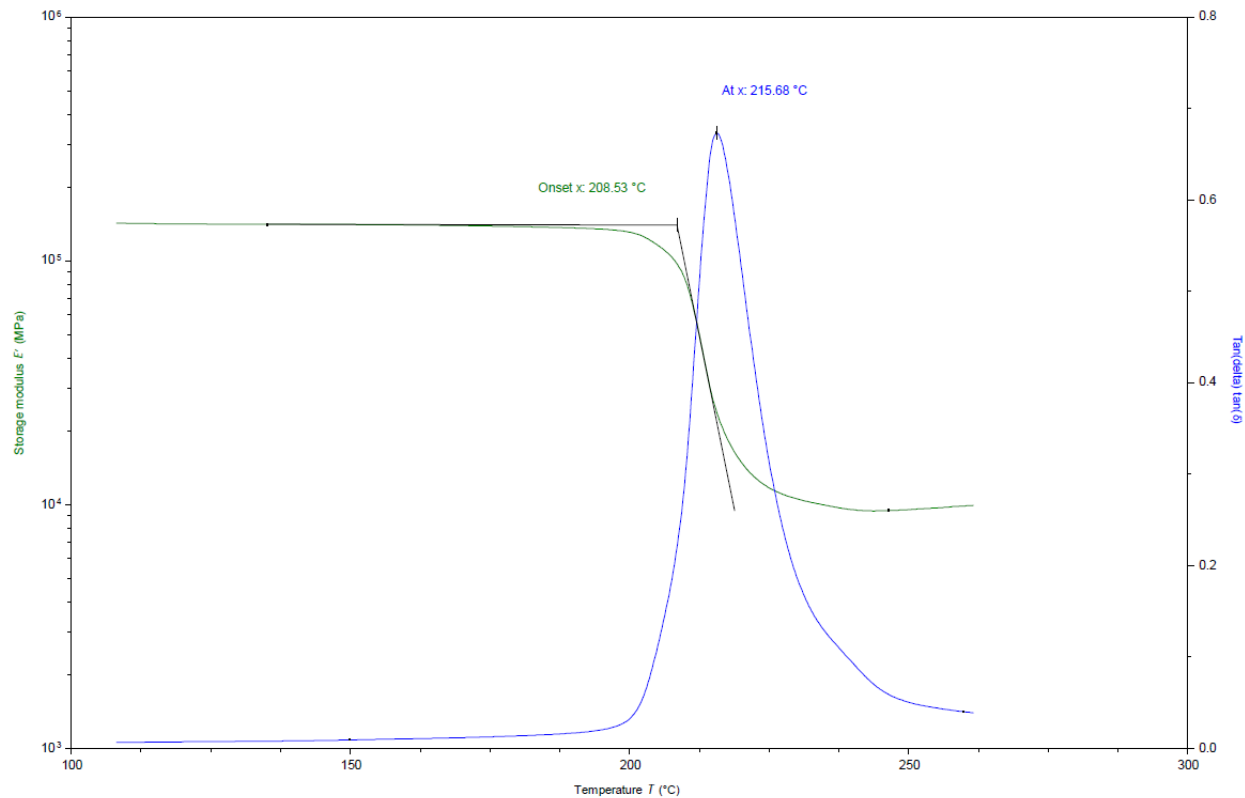
A representative of DMA Dry profile from Batch A is provided below.

Sample: NTP3800Q1-TAC-T01-NR-LC_TC-A-C1-1-DMA-D
Size: 50.00000 x 12.77000 x 2.55000 mm
Procedure name: Oscillation Temperature Ramp

DMA850

File: NTP3800Q1-TAC-T01-NR-LC_TC-A-C1-1-DMA-D
Operator: Ping
Run Date: 11/1/2024 1:40:20 PM
Instrument: DMA 850-0398

NTP3800Q1-TAC-T01-NR-LC_TC-A-C1-1-DMA-D



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9.4 DMA Wet Batch A

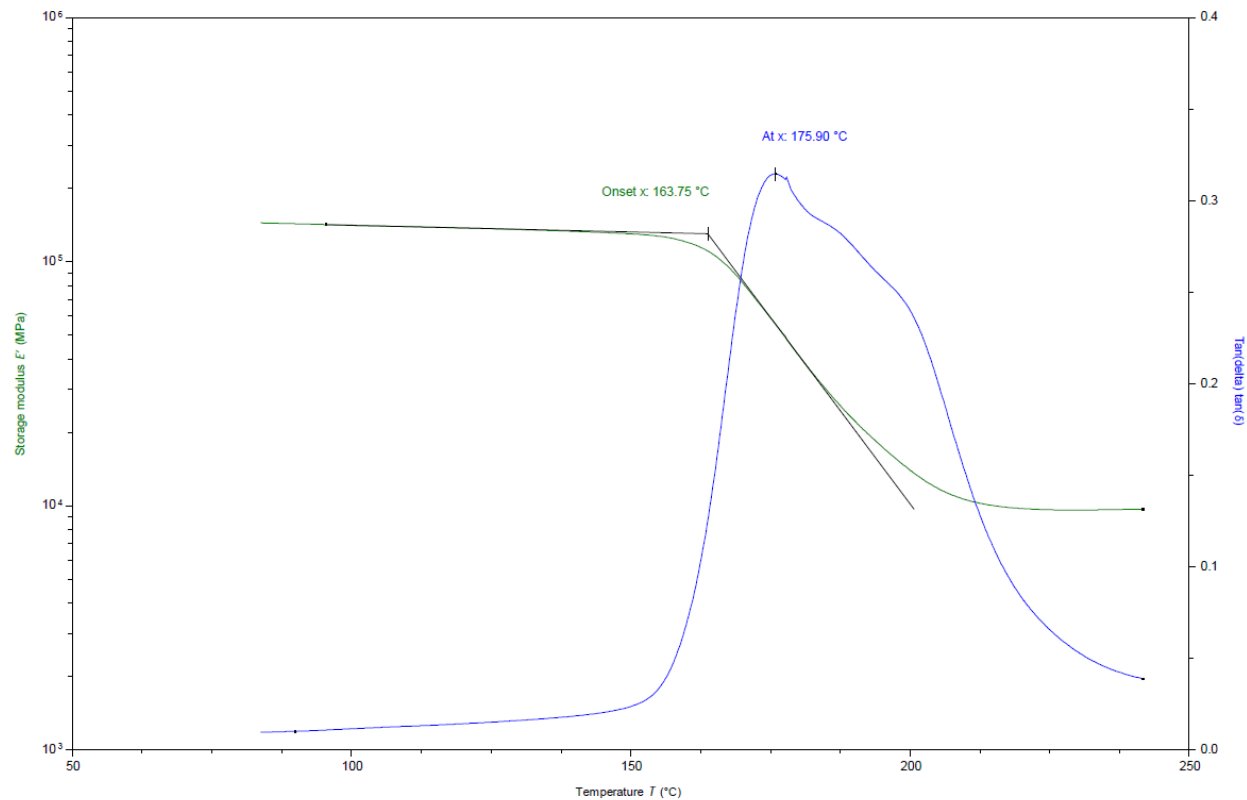
A representative of DMA Wet profile from Batch A is provided below.

Sample: NTP3800Q1-TAC-T01-NR-LC_TC-A-C1-1-DMA-W
Size: 50.00000 x 12.81000 x 2.57000 mm
Procedure name: Oscillation Temperature Ramp

DMA850

File: NTP3800Q1-TAC-T01-NR-LC_TC-A-C1-1-DMA-W
Operator: Ping
Run Date: 2/5/2025 3:29:10 PM
Instrument: DMA 850-0398

NTP3800Q1-TAC-T01-NR-LC_TC-A-C1-1-DMA-W



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10. Moisture Loss

A representative specimen was used to measure the moisture loss for every combination of test temperature and stacking sequence.

Layup	Test Type	Test Temperature	Specimen ID	Weight Pre-Test (g)	Weight Post-Test (g)	Moisture Loss (g)
[0]10	LT	ETW1(180°F)	T01-NR-LT-A-C1-1-TRAV-1	19.25	19.23	0.02340
		ETW2(250°F)	T-01-NR-LT-A-C1-1-TRAV-2	19.43	19.39	0.03910
[0]20	LC	ETW1(180°F)	TCDLA115D	6.914	6.908	0.00600
		ETW2(250°F)	TCDLA115E	6.939	6.928	0.01060
[90]18	TT	ETW1(180°F)	TCDUA115D	22.39	22.38	0.01180
		ETW2(250°F)	TCDUA111E	21.96	21.94	0.01750
[45/-45]4S	IPS	ETW1(180°F)	TCDNA115D	19.24	19.22	0.01650
		ETW2(250°F)	TCDNA115E	18.78	18.76	0.01690
[0]32	SBS	ETW1(180°F)	TCDQA115D	1.088	1.087	0.00070
		ETW2(250°F)	TCDQA115E	1.090	1.088	0.00150
[45/0/-45/90]3S	UNT1	ETW1(180°F)	TCDAA115D	29.08	29.06	0.01570
[45/-45/0/45/-45/45/-45/90/45/-45]S	UNT2	ETW1(180°F)	TCDBA115D	24.09	24.07	0.01700
		ETW2(250°F)	TCDBA115E	24.00	23.98	0.02190
[45/90/-45/0/0/45/0/0/-45/0]S	UNT3	ETW1(180°F)	TCDCA115D	24.47	24.45	0.01340
[90/0/90]7	UNC0	ETW2(250°F)	TCDRA115E	7.073	7.065	0.00880
[45/0/-45/90]3S	UNC1	ETW1(180°F)	TCDWA115D	8.002	7.998	0.00390
		ETW2(250°F)	TCDWA115E	8.054	8.043	0.01040
[45/-45/0/45/-45/45/-45/90/45/-45]S	UNC2	ETW1(180°F)	TCDXA115D	6.663	6.659	0.00430
		ETW2(250°F)	TCDXA115E	6.699	6.686	0.01270
[45/0/-45/90]3S	OHT1	ETW1(180°F)	TCDDA115D	53.10	53.07	0.02580
		ETW2(250°F)	TCDDA115E	51.64	51.58	0.05660
[45/-45/0/45/-45/45/-45/90/45/-45]S	OHT2	ETW1(180°F)	TCDEA115D	44.15	44.12	0.03340
		ETW2(250°F)	TCDEA115E	43.17	43.12	0.05640
[45/90/-45/0/0/45/0/0/-45/0]S	OHT3	ETW1(180°F)	TCDF A115D	44.36	44.34	0.02310
		ETW2(250°F)	TCDF A115E	43.46	43.41	0.04380
[45/0/-45/90]3S	FHT1	ETW1(180°F)	TCD4A115D	52.59	52.57	0.02390
		ETW2(250°F)	TCD4A115E	52.78	52.72	0.05880
[45/-45/0/45/-45/45/-45/90/45/-45]S	FHT2	ETW1(180°F)	TCD5A215D	44.06	44.03	0.02860
		ETW2(250°F)	TCD5A215E	44.32	44.27	0.05280
[45/90/-45/0/0/45/0/0/-45/0]S	FHT3	ETW1(180°F)	TCD6A115D	44.55	44.51	0.03500
		ETW2(250°F)	TCD6A115E	44.79	44.74	0.04940
[45/0/-45/90]3S	FHC1	ETW1(180°F)	TCD7A115D	52.78	52.76	0.02840
		ETW2(250°F)	TCD7A115E	52.96	52.91	0.05020
[45/-45/0/45/-45/45/-45/90/45/-45]S	FHC2	ETW1(180°F)	TCD8A115D	43.94	43.92	0.02570
		ETW2(250°F)	TCD8A115E	44.24	44.12	0.12020
[45/90/-45/0/0/45/0/0/-45/0]S	FHC3	ETW1(180°F)	TCD9A115D	44.21	44.18	0.02870
		ETW2(250°F)	TCD9A115E	44.60	44.55	0.05690
[45/0/-45/90]3S	OHC1	ETW1(180°F)	TCDGA115D	52.44	52.41	0.02510
		ETW2(250°F)	TCDGA115E	51.22	51.16	0.05430
[45/-45/0/45/-45/45/-45/90/45/-45]S	OHC2	ETW1(180°F)	TCDDHA115D	43.86	43.83	0.02570
		ETW2(250°F)	TCDDHA115E	42.80	42.73	0.06470
[45/90/-45/0/0/45/0/0/-45/0]S	OHC3	ETW1(180°F)	TCDDIA115D	44.20	44.17	0.03080
		ETW2(250°F)	TCDDIA115E	43.18	43.13	0.05270
[45/0/-45/90]3S	SSB1	ETW1(180°F)	TCD1A115D	23.97	23.96	0.01580
		ETW2(250°F)	TCD1A115E	23.79	23.75	0.03040
[45/-45/0/45/-45/45/-45/90/45/-45]S	SSB2	ETW1(180°F)	TCD2A115D	19.66	19.64	0.01810
		ETW2(250°F)	TCD2A115E	19.45	19.42	0.03060
[45/90/-45/0/0/45/0/0/-45/0]S	SSB3	ETW1(180°F)	TCD3A115D	20.24	20.22	0.01780
		ETW2(250°F)	TCD3A115E	19.89	19.86	0.02880
[0]16S	ILT	ETW1(180°F)	TCDMA115D	31.08	31.07	0.01387

11. Deviations

N/A