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Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40% RC Qualification Material Property Data Report

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1. Introduction

1.1 Scope

The test methods and results described in this document are intended to provide basic composite properties essential to most methods of analysis and are consistent with CMH-17 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 does 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 a 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 T800HB 6K 2x2 Twill 200gsm with 40% RC Material Allowables Statistical Analysis Report NCP-RP-2025-011 Rev –. The qualification material was procured to NCAMP Material Specification NMS 380/2 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 3801Q1 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 380/2. NMS 380/2 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 380/2.* NMS 380/2 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 Used

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
$F_{12}^{s5\% \text{ strain}}$	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
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

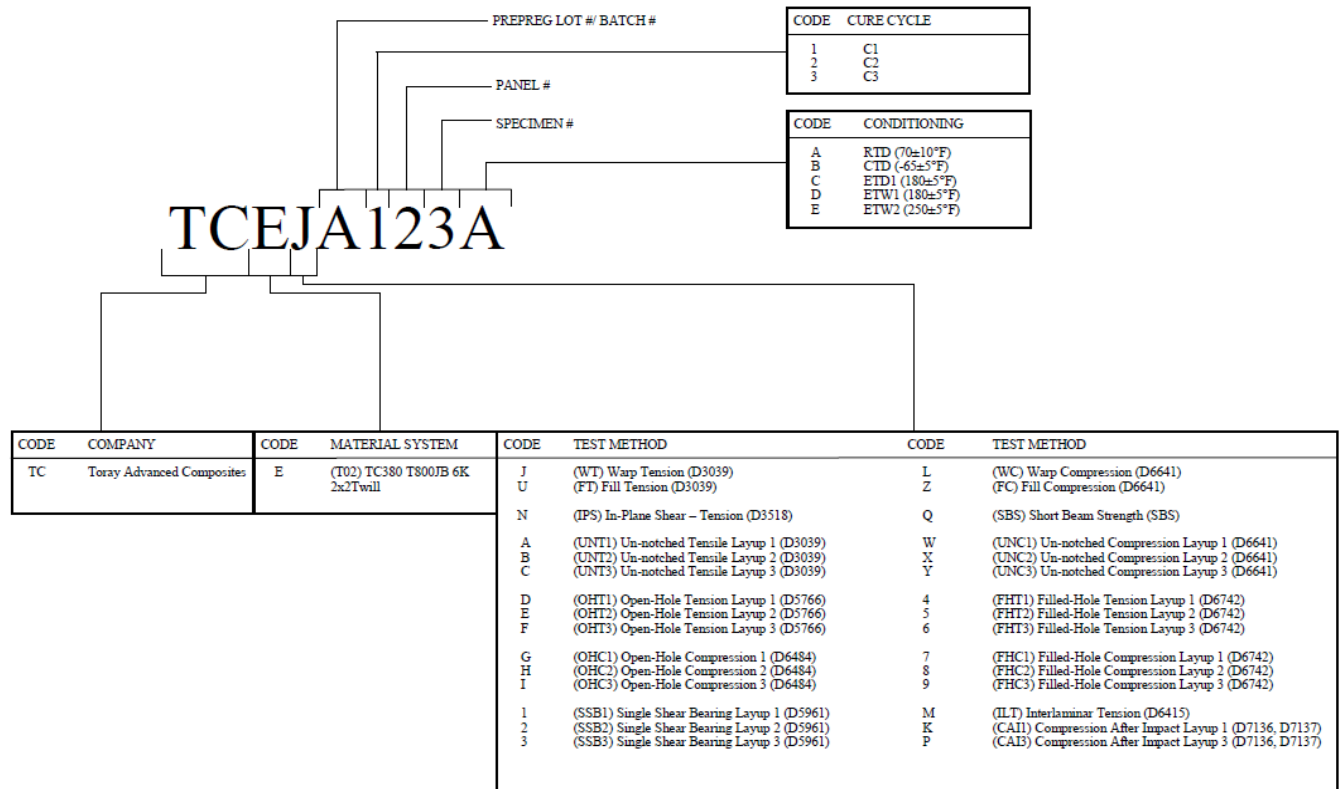


Figure 1-1: Naming Format

1.4 Test Method 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 Mechanical 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.

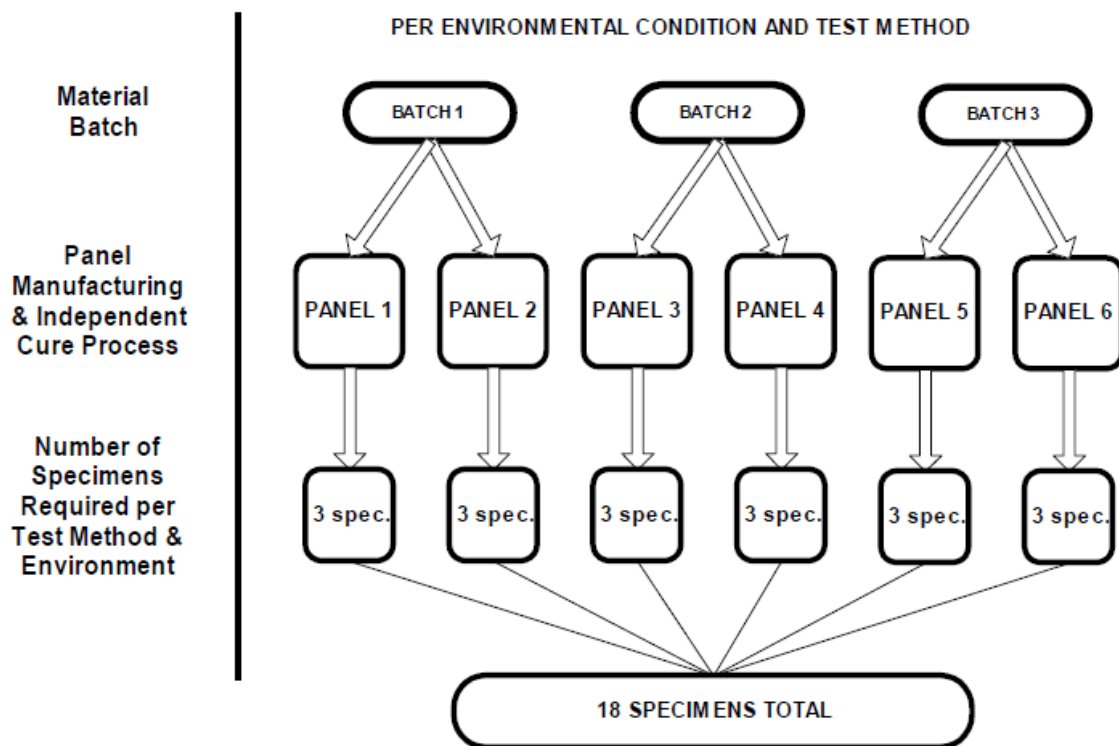


Figure 1-2: Specimen Selection Methodology

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

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

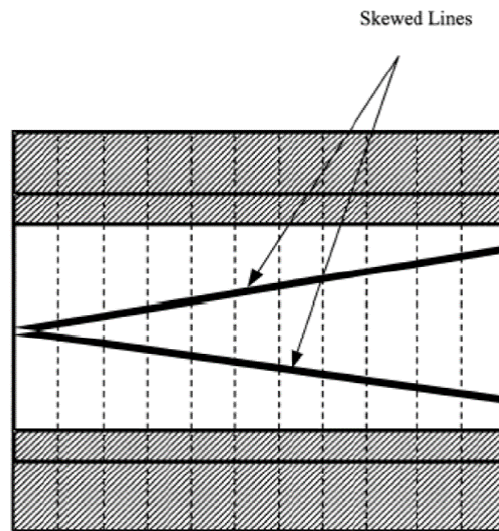


Figure 1-3: Specimen Traceability Line

1.5.2 Specimen & Testing Details

1.5.2.1 Tabbing

No tabs were used for this program.

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

1.5.2.3 Specimen Strain Device Used

Corresponding Gage ID can be obtained from Appendix 1 of NTP 3801Q1 Rev B.

Uniaxial gages were used on:

- All of CTD Tension specimens except Warp Tension specimens.

- All conditions of combined loading compression specimens.

- Two RTD Tension specimens except Warp Tension for obtaining full stress strain curves.

- Two RTD Open Hole Compression specimens for detecting buckling.

- One CAI unimpacted specimen for balancing.

Biaxial gages were used on:

- All conditions of IPS specimens.

- All of CTD Warp Tension specimens.

- Two RTD Warp Tension specimens for obtaining full stress strain curves.

Uniaxial extensometers were used on:

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

Biaxial extensometers were used on:

- All of RTD, ETD1, ETW1 and ETW2 Warp Tension 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 Code	Test Type and Direction	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)
[0] ₁₂	WT	ASTM D3039 0° Warp Tension	Strength, Modulus and Poisson's Ratio	3x2x3	3x2x3 ³	3x2x3	3x2x3	3x2x3
[0] ₁₂	WC	ASTM D6641 0° Warp Compression	Strength and Modulus	3x2x3	3x2x3 ^{1&3}	3x2x3	3x2x3	3x2x3
[90] ₁₂	FT	ASTM D3039 90° Fill Tension	Strength and Modulus	3x2x3	3x2x3 ³	3x2x3	3x2x3	3x2x3
[90] ₁₂	FC	ASTM D6641 90° Fill Compression	Strength and Modulus	3x2x3	3x2x3 ^{1&3}	3x2x3	3x2x3	3x2x3
[45/-45] _{2S}	IPS	ASTM D3518 In-Plane Shear ²	0.2% Offset Strength, 5% Strength and Modulus	3x2x3	3x2x3 ³	3x2x3	3x2x3	3x2x3
[0] ₂₂	SBS	ASTM D2344 Short Beam Shear	Strength	3x2x3	3x2x3	1x2x3 ⁴	3x2x3	3x2x3
Notes: 1. Back-to-back strain gages are needed on the first two specimens. If no buckling is observed, the remaining specimens will require a strain gage on one side of the specimens only. 2. Gripped (tab) length is 1.5±0.5 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. 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 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 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)
(25/50/25 - QI) UNT1	ASTM D3039 Un-notched Tension [45/0/-45/90] _S	Strength & Modulus	3x2x3	3x2x3 ³		3x2x3	3x2x3
(10/80/10 - SF) UNT2	ASTM D3039 Un-notched Tension [45/-45/90/45/-45] _S	Strength & Modulus	1x2x3 ⁵	1x2x3 ^{3&5}		3x2x3	3x2x3
(40/20/40 - HD) UNT3	ASTM D3039 Un-notched Tension [0/90/-45/0/90] _S	Strength & Modulus	3x2x3	3x2x3 ³		3x2x3	3x2x3
(25/50/25 - QI) UNC1	ASTM D6641 Un-notched Compression [45/0/-45/90] _{2S}	Strength & Modulus	1x2x3 ⁵	3x2x3 ^{1&3}		3x2x3	3x2x3
(10/80/10 - SF) UNC2	ASTM D6641 Un-notched Compression [45/-45/90/45/-45] _S	Strength & Modulus	1x2x3 ⁵	3x2x3 ^{1&3}		3x2x3	3x2x3
(40/20/40 - HD) UNC3	ASTM D6641 Un-notched Compression [0/90/-45/0/90] _S	Strength & Modulus	1x2x3 ⁵	3x2x3 ^{1&3}		3x2x3	3x2x3
(25/50/25 - QI) OHT1	ASTM D5766 Open-Hole Tension [45/0/-45/90] _{2S}	Strength	3x2x3	3x2x3	3x2x3	3x2x3	3x2x3
(10/80/10 - SF) OHT2	ASTM D5766 Open-Hole Tension [45/-45/90/45/-45] _S	Strength	3x2x3	3x2x3	1x2x3 ⁵	3x2x3	3x2x3
(40/20/40 - HD) OHT3	ASTM D5766 Open-Hole Tension [0/90/-45/0/90] _S	Strength	3x2x3	3x2x3	1x2x3 ⁵	3x2x3	3x2x3
(25/50/25 - QI) FHT1	ASTM D6742 Filled-Hole Tension [45/0/-45/90] _{2S}	Strength	3x2x3	3x2x3		3x2x3	3x2x3
(10/80/10 - SF) FHT2	ASTM D6742 Filled-Hole Tension [45/-45/90/45/-45] _S	Strength	3x2x3	3x2x3		3x2x3	3x2x3
(40/20/40 - HD) FHT3	ASTM D6742 Filled-Hole Tension [0/90/-45/0/90] _S	Strength	3x2x3	3x2x3		3x2x3	3x2x3
(25/50/25 - QI) OHC1	ASTM D6484 Open-Hole Compression [45/0/-45/90] _{2S}	Strength	3x2x3	3x2x3 ¹	3x2x3 ⁵	3x2x3	3x2x3
(10/80/10 - SF) OHC2	ASTM D6484 Open-Hole Compression [45/-45/90/45/-45] _{2S}	Strength	3x2x3	3x2x3 ¹	1x2x3 ⁵	3x2x3	3x2x3
(40/20/40 - HD) OHC3	ASTM D6484 Open-Hole Compression [0/90/-45/0/90] _{2S}	Strength	3x2x3	3x2x3 ¹	1x2x3 ⁵	3x2x3	3x2x3
(25/50/25 - QI) FHC1	ASTM D6742 Filled-Hole Compression [45/0/-45/90] _{2S}	Strength	1x2x3 ⁵	3x2x3		3x2x3	3x2x3
(10/80/10 - SF) FHC2	ASTM D6742 Filled-Hole Compression [45/-45/90/45/-45] _{2S}	Strength	1x2x3 ⁵	3x2x3		3x2x3	3x2x3
(40/20/40 - HD) FHC3	ASTM D6742 Filled-Hole Compression [0/90/-45/0/90] _{2S}	Strength	2x2x3 ⁶	2x2x3 ⁶		3x2x3	3x2x3
(25/50/25 - QI) SSB1	ASTM D5961 Proc.C Single Shear Bearing [45/0/-45/90] _{2S}	2% Offset Strength, Ultimate Strength & Chord Stiffness		3x2x3		3x2x3	3x2x3
(10/80/10 - SF) SSB2	ASTM D5961 Proc.C Single Shear Bearing [45/-45/90/45/-45] _{2S}	2% Offset Strength, Ultimate Strength & Chord Stiffness		3x2x3		3x2x3	3x2x3
(40/20/40 - HD) SSB3	ASTM D5961 Proc.C Single Shear Bearing [0/90/-45/0/90] _{2S}	2% Offset Strength, Ultimate Strength & Chord Stiffness		3x2x3		3x2x3	3x2x3
(50/0/50) ILT	ASTM D6415 Interlaminar Tension Strength [0] ₂₀ (note: curved panel)	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] _{3S}	Strength	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)
(40/20/40 - HD) CAI3	ASTM D7136 & D7137 Compression After Impact (1500 in.lb/in) ⁴ [0/90/-45/0/90] _{2S}	Strength		1x2x3 ⁵			
Notes: 1. Back-to-back strain gages are needed on the first two specimens. If no buckling is observed, the remaining specimens will require a strain gage on one side of the specimens only. 2. Loading direction is generally along the 0° direction. Layups are balanced at mid-plane per NPS 83800 Section 4.2.1 Figure 1. 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. 6. Specimens were machined from Batch A and Batch B 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: - 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. - Method II. - 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. - 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 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. - Required on panels that appear voidy in C-scan or visually only via ASTM D3171 Method I.		

Table 1-4: Physical Testing 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 24 hours minimum. After drying, specimens were kept in a desiccator until mechanical testing. Alternatively, the specimens were left at 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 is very slow at ambient temperature, there was no requirement to maintain relative humidity levels.

For wet conditioning, specimens were dried 250°F±5°F for 24 hours minimum 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_{-0}^{+1} 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_{-0}^{+1} minutes after the specimen reached the test temperature. During the test, the temperature, as measured on the specimen, was within $\pm 5^{\circ}\text{F}$ of the required test temperature.

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

1.5.7 Fluid Sensitivity Screening

Table 1-5 lists the requirements for fluid sensitivity screening, which requires ASTM D2344 Short Beam Strength testing on [0]₂₂ per Table 1-5. Specimens were dried at 250°F±5°F for 24 hours minimum before being subjected to the conditions indicated, five replicates per fluid and one cure cycle.

Specimens were cleaned with a dry towel prior to the tests. In addition to short beam strength, load versus displacement curves were plotted to aid in the identification of matrix/resin softening. Since load versus displacement curves are influenced by test machine and fixture compliance, all the tests were performed with the identical machine and fixture, through a single setup. It was intended that the fluid resistance testing be performed on a limited number of reinforcement types and that engineering judgment be 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 would be unnecessary since exposure to water moisture to equilibrium level is an inherent part of the multi batch allowables test program. Users must evaluate the applicability of the exposure conditions and time on case-by-case basis. For example, the exposure condition for jet fuel may not fully represent the condition of integral fuel tanks.

	Exposure	Test Condition	Code
<u>Extended Contact:</u>			
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	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	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	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	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	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
<u>Short Duration Contact:</u>			
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
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	250°F	SBSFS32ET2
Isopropyl Alcohol Deicing Agent (TT-I-735)	48±4 hours @70°F±10°F	70°F	SBSFS33RT
	48±4 hours @70°F±10°F	250°F	SBSFS33ET2
<u>Control Tests:</u>			
Distilled Water	90 days min. at 70°F±10°F	70°F	SBSFS41RT
	90 days min. at 70°F±10°F	250°F	SBSFS41ET2
Dry	Per section 6.1 Test Plan NTP 3801Q1	70°F	SBSFS42RT
	Per section 6.1 Test Plan NTP 3801Q1.	250°F	SBSFS42ET2
85% Relative Humidity	Per section 6.1 Test Plan NTP 3801Q1	70°F	SBSFS43RT
	Per section 6.1 Test Plan NTP 3801Q1	250°F	SBSFS43ET2
Notes:			
1. Specimens were machined from Batch A panels.			

Table 1-5: SBS 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:

- In-plane shear strength and modulus
- SBS
- Poisson's ratio
- ILT

After normalizing, data scatter reduced or remained the same. If data scatter increased significantly after normalizing, the reason was investigated. Wherever properties are normalized, both measured and normalized data were reported.

The theoretically calculated cured ply thickness of 0.008800 inches has been used as the nominal cured ply thickness (CPT) for normalization purpose. This has been done at the request of the material supplier. The following normalization formula was used:

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

For Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40% RC prepreg material the defined CPT was 0.008800 inches. The average as measured CPT of the qualification panels was 0.008755 inches. The lowest and highest CPT measured were 0.008308 inches and 0.009247 inches respectively.

1.5.9 Inspection Verification

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

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

1.5.10 Material Pedigree Information

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

2. Test Results

2.1 Lamina Level Test Summary

Prepreg Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC						Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg Lamina Properties Summary					
Material Specification: NMS 380/2											
Process Specification: NPS 83800											
Fabric: T800HB 6K 40B						Resin: TC380					
Tg(dry): 407.00°F						Tg(wet): 329.80°F					
						Tg METHOD: ASTM D7028					
		Lot #1		Lot #2		Lot #3					
Fiber Lot		JB123E2		JB123G1		JB124A1					
Date of fiber manufacture		5/1/2023		7/1/2023		1/1/2024		Date of testing		10/30/2024 - 9/2/2025	
Resin Lot		032624-49M		051024-9M		061224-22M		Date of data submittal		9/4/2025	
						061224-23M					
Date of resin manufacture		3/26/2024		5/10/2024		6/12/2024					
Prepreg Lot		032924-1T3		052924-1F6		071324-1T3					
Date of prepreg manufacture		3/29/2024		5/29/2024		7/13/2024					
Date of composite manufacture		7/19/2024 - 5/13/2025									
LAMINA MECHANICAL PROPERTY SUMMARY											
Data reported as: Normalized & Measured											
(Normalized by CPT=0.008800 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]	157.3	159.0	156.7	165.8	160.9	171.2	161.3	164.2	160.9	160.5	
E ₁ ^t [Msi]	10.32	10.43	10.10	10.73	10.26	10.92	10.24	10.42	10.27	10.25	
ν ₁₂ ^t		0.04598		0.04224		0.04034		0.03954		0.03778	
F ₂ ^{tu} [ksi]	152.4	153.6	148.0	154.0	154.8	157.3	148.0	150.4	141.5	142.4	
E ₂ ^t [Msi]	10.21	10.29	9.909	10.32	9.909	10.07	10.05	10.21	10.02	10.09	
F ₁ ^{cu} [ksi]	108.0	109.1	95.20	101.1	82.57	83.09	69.42	71.03	57.10	59.08	
E ₁ ^c [Msi]	9.469	9.569	9.235	9.865	9.586	9.566	9.655	9.872	9.698	10.05	
F ₂ ^{cu} [ksi]	103.8	104.5	90.20	90.31	78.75	79.32	69.58	69.97	58.49	59.03	
E ₂ ^c [Msi]	9.242	9.305	9.155	9.162	9.401	9.482	9.457	9.505	9.305	9.395	
F ₁₂ ^{s0.2%} [ksi]		7.960		6.182		5.291		4.252		3.035	
F ₁₂ ^{s5%strain} [ksi]		15.63		11.91		10.25		8.302		6.260	
G ₁₂ ^s [Msi]		0.6265		0.5510		0.4963		0.4319		0.3069	
SBS [ksi]		14.14		11.23		9.057		7.623		5.829	

Table 2-1: Lamina Summary Data

2.2 Laminate Level Test Summary

Prepreg Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC						Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg Laminate Properties Summary	
Material Specification: NMS 380/2							
Process Specification: NPS 83800							
Fabric: T800HB 6K 40B			Resin: TC380				
Tg(dry): 407.00°F		Tg(wet): 329.80°F			Tg METHOD: ASTM D7028		
		Lot #1	Lot #2	Lot #3			
Fiber Lot		JB123E2	JB123G1	JB124A1			
Date of fiber manufacture		5/1/2023	7/1/2023	1/1/2024	Date of testing	10/30/2024 - 9/2/2025	
Resin Lot		032624-49M	051024-9M	061224-22M	Date of data submittal	9/4/2025	
				061224-23M			
Date of resin manufacture		3/26/2024	5/10/2024	6/12/2024			
Prepreg Lot		032924-1T3	052924-1F6	071324-1T3			
Date of prepreg manufacture		3/29/2024	5/29/2024	7/13/2024			
Date of composite manufacture	7/19/2024 - 5/13/2025						
LAMINATE MECHANICAL PROPERTY SUMMARY Data reported as: Normalized & Measured (Normalized by CPT=0.008800 inch)							
Properties	Layup	25/50/25 (Quasi)		10/80/10 (Soft)		40/20/40 (Hard)	
	Test Condition	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT Strength [ksi]	CTD (-65°F)	58.29	56.71	50.91	49.77	71.10	70.32
	RTD (70°F)	59.26	59.16	45.04	44.71	72.93	72.90
	ETD1 (180°F)	59.18	59.10	41.24	40.97	76.71	77.71
	ETW1 (180°F)	58.75	57.31	38.24	37.94	74.42	74.87
	ETW2 (250°F)	58.35	56.86	36.61	35.81	73.85	73.07
OHC Strength [ksi]	CTD (-65°F)	48.81	47.79	45.92	44.97	50.61	49.48
	RTD (70°F)	40.54	40.63	37.93	37.96	41.26	41.31
	ETD1 (180°F)	36.46	36.55	33.72	33.74	37.85	37.76
	ETW1 (180°F)	32.88	32.31	30.04	29.90	34.39	34.34
	ETW2 (250°F)	27.91	27.31	25.18	24.57	30.20	29.58
UNT Strength [ksi]	CTD (-65°F)	118.5	119.2	69.75	70.34	139.4	138.8
	RTD (70°F)	116.6	123.0	65.52	68.89	136.4	143.2
	ETW1 (180°F)	111.0	117.4	59.16	61.68	138.9	145.1
	ETW2 (250°F)	104.6	102.4	55.06	54.24	137.2	133.6
UNT Modulus [Msi]	CTD (-65°F)	7.326	7.367	4.565	4.603	9.311	9.277
	RTD (70°F)	7.001	7.385	4.334	4.558	8.988	9.439
	ETW1 (180°F)	7.035	7.437	4.101	4.277	9.040	9.450
	ETW2 (250°F)	6.717	6.580	3.888	3.831	8.999	8.763
UNC Strength [ksi]	CTD (-65°F)	88.61	91.22	60.72	62.34	93.64	96.66
	RTD (70°F)	78.45	84.00	51.25	54.60	83.27	89.40
	ETW1 (180°F)	62.81	64.20	38.71	39.32	66.02	67.75
	ETW2 (250°F)	52.40	52.61	32.03	32.00	57.69	57.99
UNC Modulus [Msi]	CTD (-65°F)	6.679	6.875	4.355	4.470	8.500	8.772
	RTD (70°F)	6.498	6.957	4.083	4.350	8.267	8.892
	ETW1 (180°F)	6.551	6.698	3.953	4.019	8.524	8.699
	ETW2 (250°F)	6.490	6.516	3.733	3.731	8.544	8.593
FHT Strength [ksi]	CTD (-65°F)	60.91	59.66	58.59	57.21	74.12	73.13
	RTD (70°F)	60.51	60.69	50.66	50.71	72.17	71.99
	ETW1 (180°F)	61.46	61.34	42.65	42.49	72.54	72.55
	ETW2 (250°F)	59.95	59.08	39.90	39.06	70.17	69.90
FHC Strength [ksi]	CTD (-65°F)	90.69**	89.09	65.39**	63.74**	96.96**	94.07
	RTD (70°F)	75.87	75.75	54.63**	54.71**	78.50	78.07
	ETW1 (180°F)	59.19	59.77	43.02**	43.26**	63.22	63.62
	ETW2 (250°F)	51.19	50.37	36.05**	35.25**	52.84	51.91
SSB Proc. C 2% Offset Strength [ksi]	RTD (70°F)	103.6	110.8	100.3	106.1	92.29	97.69
	ETW1 (180°F)	91.87	97.94	86.09	90.32	82.14	86.75
	ETW2 (250°F)	87.55	85.38	79.86	77.96	74.76	73.04
SSB Proc. C Ultimate Strength [ksi]	RTD (70°F)	125.0	133.7	123.0	130.1	116.5	123.4
	ETW1 (180°F)	107.7	114.9	104.9	110.1	100.8	106.6
	ETW2 (250°F)	100.8	98.33	97.32	94.99	92.21	90.10
SSB Proc. C Chord Stiffness [Msi]	RTD (70°F)	1.502	1.607	1.044	1.104	1.343	1.423
	ETW1 (180°F)	1.489	1.589	1.044	1.095	1.335	1.412
	ETW2 (250°F)	1.462	1.426	0.9953	0.9716	1.293	1.263
CBS* [lb]	CTD (-65°F)		558.0				
	RTD (70°F)		459.8				
	ETW1 (180°F)		308.0				
ILT* [ksi]	CTD (-65°F)		15.78				
	RTD (70°F)		13.20				
	ETW1 (180°F)		8.404				
CAI Strength [ksi]	CTD (-65°F)	51.12	50.80				
	RTD (70°F)	43.34	43.79			41.52	41.87

* The actual layup for ILT is [0]20, (50/0/50).

** 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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg			
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Exposure	Type of Fluid	Fluid Code	Average Strength [ksi]
90 days min @ 70°F±10°F	100 Low lead Fuel	SBSFS11RT	10.95
	Jet A Fuel	SBSFS12RT	11.03
	MIL-PRF-5606 Hydraulic Oil	SBSFS13RT	10.99
	MIL-PRF-83282 Hydraulic Oil	SBSFS14RT	11.00
	MIL-PRF-7808 Engine Oil	SBSFS15RT	10.88
	MIL-PRF-23699 Engine Oil	SBSFS16RT	10.72
	Sea Water	SBSFS17RT	10.26
	Skydrol LD-4	SBSFS18RT	10.78
	50% Water with 50% Skydrol LD-4	SBSFS19RT	10.10
	Distilled Water	SBSFS41RT	10.30
90 mins @ 70°F±10°F	MEK washing fluid	SBSFS31RT	10.62
	Polypropylene Glycol Deicer (Type I) SAE AMS 1424	SBSFS32RT* (Isopropyl Glycol Deicer)	10.89
48±4 hrs @ 70°F±10°F	Isopropyl Alcohol Deicing (TT-I-735)	SBSFS33RT** (Polypropylene Glycol Deicer)	10.92
Per section 6.1 Test Plan NTP 3801Q1	Dry	SBSFS42RT	10.87
Per section 6.1 Test Plan NTP 3801Q1	85% Relative Humidity	SBSFS43RT	10.14

*SBSFS32RT - Deviated from test plan NTP 3801Q1 Rev B, specimens were soaked in Isopropyl Alcohol Deicing for 48 hours.

**SBSFS33RT - Deviated from test plan NTP 3801Q1 Rev B, specimens were soaked in Polypropylene Glycol Deicer for 90 minutes.

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

Fluid Sensitivity Screening Short Beam Strength Properties (SBSFS)--ET2(250°F) Strength Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg			
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Exposure	Type of Fluid	Fluid Code	Average Strength [ksi]
90 days min @ 70°F±10°F	100 Low lead Fuel	SBSFS11ET2	7.494
	Jet A Fuel	SBSFS12ET2	7.615
	MIL-PRF-5606 Hydraulic Oil	SBSFS13ET2	7.468
	MIL-PRF-83282 Hydraulic Oil	SBSFS14ET2	7.530
	MIL-PRF-7808 Engine Oil	SBSFS15ET2	7.178
	MIL-PRF-23699 Engine Oil	SBSFS16ET2	7.325
	Sea Water	SBSFS17ET2	5.863
	Skydrol LD-4	SBSFS18ET2	7.353
	50% Water with 50% Skydrol LD-4	SBSFS19ET2	6.113
	Distilled Water	SBSFS41ET2	5.823
90 mins @ 70°F±10°F	MEK washing fluid	SBSFS31ET2	7.616
	Polypropylene Glycol Deicer (Type I) SAE AMS 1424	SBSFS32ET2	7.621
48±4 hrs @ 70°F±10°F	Isopropyl Alcohol Deicing (TT-I-735)	SBSFS33ET2	7.636
Per section 6.1 Test Plan NTP 3801Q1	Dry	SBSFS42ET2	7.607
Per section 6.1 Test Plan NTP 3801Q1	85% Relative Humidity	SBSFS43ET2	5.753

Table 2-4: SBS 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 T800HB 6K 2x2 Twill Qualification				
Test Temperature	Mean			
	Onset Storage Modulus		Peak of Tangent Delta	
	T _g [°C]	T _g [°F]	T _g [°C]	T _g [°F]
DMA Tg (Dry)	208.33	407.00	217.74	423.93
DMA Tg (Wet)	165.45	329.80	182.45	360.41

Table 2-5: DMA Summary Data

2.5 Individual Test Summaries

2.5.1 Warp Tension Properties (WT)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm with 40%RC prepreg						Tension, 1-axis Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm with 40%RC prepreg [0]12					
Resin content:		36.68 %wt		Comp. density:		1.507 g/cc					
Fiber volume:		53.04 %vol									
Ply count:		12									
Test method:		ASTM D3039-17		Modulus calculation:		1000-3000 microstrain					
Normalized by:		0.008800		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		TCEJX XXXB		TCEJX XXXA		TCEJX XXXC		TCEJX XXXD		TCEJX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F _{1^W} [ksi]	Mean	157.3	159.0	156.7	165.8	160.9	171.2	161.3	164.2	160.9	160.5
	Minimum	146.5	145.4	146.4	151.1	149.2	156.1	156.3	156.9	151.1	150.2
	Maximum	164.2	166.5	165.3	182.4	171.2	186.7	165.8	171.8	166.8	168.4
	C.V.(%)	3.414	4.045	3.375	5.228	4.201	4.540	1.778	2.753	2.392	3.220
	No. Specimens	18		22		20		19		19	
No. Prepreg Lots		3		3		3		3		3	
E _{1^t} [Msi]	Mean	10.32	10.43	10.10	10.73	10.26	10.92	10.24	10.42	10.27	10.25
	Minimum	10.04	10.05	9.881	10.09	10.14	10.47	10.08	9.961	10.11	9.827
	Maximum	10.72	10.83	10.29	11.49	10.37	11.59	10.35	10.92	10.42	10.72
	C.V.(%)	1.484	2.078	1.154	3.645	0.5462	3.042	0.7336	2.723	0.8041	2.248
	No. Specimens	18		20		20		19		19	
No. Prepreg Lots		3		3		3		3		3	
ν _{12^t}	Mean	0.04598		0.04224		0.04034		0.03954		0.03778	
	Minimum	0.01885		0.03229		0.02954		0.03157		0.02792	
	Maximum	0.07542		0.05049		0.08036		0.05066		0.04426	
	C.V.(%)	27.74		15.14		28.63		16.48		13.23	
	No. Specimens	18		20		20		19		19	
No. Prepreg Lots		3		3		3		3		3	

2.5.2 Fill Tension Properties (FT)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg							Tension, 2-axis Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [90]12					
Resin content:	35.46 %wt		Comp. density: 1.511 g/cc									
Fiber volume:	54.18 %vol											
Ply count:	12											
Test method:	ASTM D3039-17		Modulus calculation: 1000-3000 microstrain									
Normalized by:	0.008800		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			TCEUX XXXB		TCEUX XXXA		TCEUX XXXC		TCEUX XXXD		TCEUX XXXE	
			Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F ₂ ^{tu} [ksi]	Mean	152.4	153.6	148.0	154.0	154.8	157.3	148.0	150.4	141.5	142.4	
	Minimum	133.8	135.4	137.3	142.7	144.7	147.7	139.9	142.2	125.1	125.6	
	Maximum	164.7	166.7	161.8	165.2	162.8	164.9	152.0	155.4	149.3	150.9	
	C.V.(%)	5.794	5.595	4.576	4.102	2.548	2.464	2.278	2.403	3.929	3.826	
	No. Specimens	18		19		21		23		19		
No. Prepreg Lots		3		3		3		3		3		
E ₂ ⁱ [Msi]	Mean	10.21	10.29	9.909	10.32	9.909	10.07	10.05	10.21	10.02	10.09	
	Minimum	9.817	9.879	9.377	9.535	9.687	9.811	9.498	9.576	9.583	9.624	
	Maximum	10.45	10.55	10.47	11.01	10.32	10.49	10.90	11.01	11.22	11.40	
	C.V.(%)	1.733	1.826	2.741	4.610	1.534	1.594	3.378	3.493	3.474	3.972	
	No. Specimens	18		19		21		23		19		
No. Prepreg Lots		3		3		3		3		3		

2.5.3 Warp Compression Properties (WC)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg							Compression, 1-axis Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [0]12					
Resin content:	38.62 %wt		Comp. density: 1.494 g/cc									
Fiber volume:	50.98 %vol											
Ply count:	12											
Test method:	ASTM D6641-23		Modulus calculation: 1000-3000 microstrain									
Normalized by:	0.008800		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			TCELX XXXB		TCELX XXXA		TCELX XXXC		TCELX XXXD		TCELX XXXE	
			Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F ₁ ^{cu} [ksi]	Mean		108.0	109.1	95.20	101.1	82.57	83.09	69.42	71.03	57.10	59.08
	Minimum		89.34	92.09	87.10	88.94	74.70	73.30	61.15	62.19	48.72	51.66
	Maximum		119.6	119.7	101.5	110.1	89.76	93.24	77.50	77.59	64.27	64.83
	C.V.(%)		7.662	6.663	4.538	5.807	5.122	5.894	5.599	5.432	7.765	6.651
	No. Specimens		18		21		21		21		18	
No. Prepreg Lots		3		3		3		3		3		
E ₁ ^c [Msi]	Mean		9.469	9.569	9.235	9.865	9.586	9.566	9.655	9.872	9.698	10.05
	Minimum		9.193	9.104	8.807	9.444	9.443	9.340	9.197	9.473	9.347	9.391
	Maximum		9.700	9.869	9.778	10.44	9.947	9.925	10.03	10.27	9.944	10.90
	C.V.(%)		1.683	1.778	2.707	3.078	1.331	1.757	2.088	2.513	1.831	4.806
	No. Specimens		18		18		18		18		18	
No. Prepreg Lots		3		3		3		3		3		

2.5.4 Fill Compression Properties (FC)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg		Compression, 2-axis Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [90]12									
Resin content:	38.62 %wt	Comp. density: 1.494 g/cc									
Fiber volume:	50.98 %vol										
Ply count:	12										
Test method:	ASTM D6641-23	Modulus calculation: 1000-3000 microstrain									
Normalized by:	0.008800	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		TCEZX XXXB		TCEZX XXXA		TCEZX XXXC		TCEZX XXXD		TCEZX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₂^{cu} [ksi]	Mean	103.8	104.5	90.20	90.31	78.75	79.32	69.58	69.97	58.49	59.03
	Minimum	89.81	88.81	83.44	83.09	70.52	69.51	58.19	58.33	50.02	50.02
	Maximum	114.7	115.7	97.61	96.36	85.20	84.54	77.48	78.00	62.97	63.45
	C.V.(%)	6.206	6.416	5.050	4.719	4.411	4.207	5.988	5.750	5.097	5.317
	No. Specimens	18		20		23		20		19	
	No. Prepreg Lots	3		3		3		3		3	
E₂^c [Msi]	Mean	9.242	9.305	9.155	9.162	9.401	9.482	9.457	9.505	9.305	9.395
	Minimum	8.949	9.027	8.678	8.699	8.988	8.854	9.212	9.247	8.967	9.007
	Maximum	9.524	9.470	9.483	9.633	9.865	9.951	9.726	9.817	9.780	9.963
	C.V.(%)	1.687	1.425	2.168	2.517	2.804	3.395	1.479	1.878	2.550	2.833
	No. Specimens	19		18		18		18		18	
	No. Prepreg Lots	3		3		3		3		3	

2.5.5 In-Plane Shear Properties (IPS)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm with 40%RC prepreg						In-Plane Shear Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm with 40%RC prepreg [45/-45]2S					
Resin content: 36.50 %wt		Comp. density: 1.506 g/cc									
Fiber volume: 53.15 %vol											
Ply count: 8											
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		TCENX XXXB		TCENX XXXA		TCENX XXXC		TCENX XXXD		TCENX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₁₂^{s0.2%} [ksi]	Mean		7.960		6.182		5.291		4.252		3.035
	Minimum		7.539		5.871		4.809		3.890		2.682
	Maximum		8.868		6.732		6.313		5.008		3.673
	C.V.(%)		4.130		3.366		7.284		6.671		7.832
	No. Specimens		24		24		26		28		28
No. Prepreg Lots		3		3		3		3		3	
F₁₂^{s5% strain} [ksi]	Mean		15.63		11.91		10.25		8.302		6.260
	Minimum		14.58		11.24		8.910		7.187		5.277
	Maximum		17.48		12.94		13.37		10.48		8.527
	C.V.(%)		4.772		3.856		12.79		11.16		12.81
	No. Specimens		24		24		26		28		28
No. Prepreg Lots		3		3		3		3		3	
G₁₂^s [Msi]	Mean		0.6265		0.5510		0.4963		0.4319		0.3069
	Minimum		0.5865		0.5238		0.4485		0.3999		0.2747
	Maximum		0.6665		0.6048		0.5903		0.5133		0.3594
	C.V.(%)		3.774		3.694		6.784		6.580		6.640
	No. Specimens		24		24		25		28		28
No. Prepreg Lots		3		3		3		3		3	

2.5.6 Lamina Short-Beam Strength Properties (SBS)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg		Short-Beam Strength Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg [0]22			
Resin content: 39.25 %wt	Comp. density: 1.491 g/cc				
Fiber volume: 50.32 %vol					
Ply count: 22					
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	TCEQX XXXB	TCEQX XXXA	TCEQX XXXC	TCEQX XXXD	TCEQX XXXE
	Normalized	Measured	Normalized	Measured	Normalized
SBS [ksi]					
Mean	14.14	11.23	9.057	7.623	5.829
Minimum	13.28	10.43	8.759	7.216	5.637
Maximum	14.65	11.73	9.337	7.991	6.153
C.V.(%)	2.260	3.593	2.844	2.947	2.110
No. Specimens	18	18	6	18	18
No. Prepreg Lots	3	3	1	3	3

2.5.7 “25/50/25” Unnotched Tension 1 Properties (UNT1)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg		Comp. density: 1.493 g/cc		Unnotched Tension 1 Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg [45/0/-45/90]S			
Resin content: 38.69 %wt							
Fiber volume: 50.87 %vol							
Ply count: 8							
Test method: ASTM D3039-17		Modulus calculation: 1000-3000 microstrain					
Normalized by: 0.008800		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		TCEAX XXXB	TCEAX XXXA	TCEAX XXXD		TCEAX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT1 Strength [ksi]	Mean	118.5	119.2	116.6	123.0	111.0	117.4
	Minimum	108.1	109.5	108.8	111.7	100.1	106.1
	Maximum	127.1	129.6	120.2	134.3	117.9	129.8
	C.V.(%)	3.887	4.282	2.771	5.377	4.472	6.181
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	
UNT1 Modulus [Msi]	Mean	7.326	7.367	7.001	7.385	7.035	7.437
	Minimum	7.133	7.018	6.853	7.003	6.911	7.129
	Maximum	7.620	7.687	7.198	8.030	7.169	7.936
	C.V.(%)	1.744	2.569	1.569	4.624	1.259	2.977
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	

2.5.8 “10/80/10” Unnotched Tension 2 Properties (UNT2)

Material:	Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Unnotched Tension 2 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [45/-45/90/45/-45]S				
Resin content:	37.91 %wt		Comp. density: 1.499 g/cc						
Fiber volume:	51.71 %vol								
Ply count:	10								
Test method:	ASTM D3039-17		Modulus calculation: 1000-3000 microstrain						
Normalized by:	0.008800		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		TCEBX XXXB		TCEBX XXXA		TCEBX XXXD		TCEBX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT2 Strength [ksi]	Mean	69.75	70.34	65.52	68.89	59.16	61.68	55.06	54.24
	Minimum	68.22	68.51	64.55	66.40	55.85	58.92	53.89	52.25
	Maximum	70.83	71.68	66.73	70.65	60.84	65.10	57.08	56.42
	C.V.(%)	1.364	1.645	1.348	2.503	1.988	2.960	1.561	2.407
	No. Specimens	6		6		18		18	
No. Prepreg Lots		1		1		3		3	
UNT2 Modulus [Msi]	Mean	4.565	4.603	4.334	4.558	4.101	4.277	3.888	3.831
	Minimum	4.390	4.387	4.290	4.356	3.952	3.994	3.678	3.622
	Maximum	4.690	4.737	4.367	4.751	4.231	4.551	4.210	4.192
	C.V.(%)	2.494	2.964	0.6691	3.428	1.871	3.733	3.691	4.592
	No. Specimens	6		6		18		18	
No. Prepreg Lots		1		1		3		3	

2.5.9 “40/20/40” Unnotched Tension 3 Properties (UNT3)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm with 40%RC prepreg		Comp. density: 1.503 g/cc		Unnotched Tension 3 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [0/90/-45/0/90]S			
Resin content: 37.70 %wt							
Fiber volume: 52.01 %vol							
Ply count: 10							
Test method: ASTM D3039-17		Modulus calculation: 1000-3000 microstrain					
Normalized by: 0.008800		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		TCECX XXXB	TCECX XXXA	TCECX XXXD		TCECX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT3 Strength [ksi]	Mean	139.4	138.8	136.4	143.2	138.9	145.1
	Minimum	132.8	132.7	131.4	130.0	129.4	136.1
	Maximum	148.1	145.7	148.0	155.6	146.2	156.5
	C.V.(%)	2.794	2.378	3.732	4.594	3.399	4.148
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	
UNT3 Modulus [Msi]	Mean	9.311	9.277	8.988	9.439	9.040	9.450
	Minimum	8.955	8.711	8.850	8.837	8.889	8.996
	Maximum	9.723	9.699	9.245	9.932	9.349	9.796
	C.V.(%)	1.718	3.147	1.247	3.652	1.166	2.951
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	

2.5.10 “25/50/25” Unnotched Compression 1 Properties (UNC1)

Material:	Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Unnotched Compression 1 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [45/0/-45/90]2S				
Resin content:	38.56 %wt		Comp. den: 1.494 g/cc						
Fiber volume:	51.01 %vol								
Ply count:	16								
Test method:	ASTM D6641-23		Modulus calculation: 1000-3000 microstrain						
Normalized by:	0.008800		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		TCEWX XXXB		TCEWX XXXA		TCEWX XXXD		TCEWX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNC1 Strength [ksi]	Mean	88.61	91.22	78.45	84.00	62.81	64.20	52.40	52.61
	Minimum	85.29	87.32	71.08	76.76	58.82	58.66	46.85	47.56
	Maximum	93.89	96.43	84.03	93.42	65.74	68.94	57.22	56.83
	C.V.(%)	4.072	4.385	4.830	5.504	2.804	4.673	5.946	5.799
	No. Specimens	6		18		18		18	
	No. Prepreg Lots	1		3		3		3	
UNC1 Modulus [Msi]	Mean	6.679	6.875	6.498	6.957	6.551	6.698	6.490	6.516
	Minimum	6.609	6.769	6.093	6.402	6.341	6.255	6.331	6.350
	Maximum	6.788	6.948	6.870	7.419	6.800	7.403	6.648	6.763
	C.V.(%)	1.043	0.8854	3.423	4.054	1.889	5.127	1.290	1.574
	No. Specimens	6		18		18		18	
	No. Prepreg Lots	1		3		3		3	

2.5.11 “10/80/10” Unnotched Compression 2 Properties (UNC2)

Material:	Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Unnotched Compression 2 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [45/-45/90/45/-45]S				
Resin content:	38.70 %wt		Comp. density: 1.493 g/cc						
Fiber volume:	50.86 %vol								
Ply count:	10								
Test method:	ASTM D6641-23		Modulus calculation: 1000-3000 microstrain						
Normalized by:	0.008800		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		TCEXX XXXB		TCEXX XXXA		TCEXX XXXD		TCEXX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNC2 Strength [ksi]	Mean	60.72	62.34	51.25	54.60	38.71	39.32	32.03	32.00
	Minimum	56.34	57.39	48.19	49.78	36.52	36.02	28.35	28.74
	Maximum	65.39	67.59	54.42	60.27	40.12	43.94	34.05	33.64
	C.V.(%)	5.454	6.120	3.347	5.071	3.014	5.646	3.700	3.387
	No. Specimens	6		18		18		18	
	No. Prepreg Lots	1		3		3		3	
UNC2 Modulus [Msi]	Mean	4.355	4.470	4.083	4.350	3.953	4.019	3.733	3.731
	Minimum	4.223	4.398	3.841	3.911	3.754	3.694	3.580	3.573
	Maximum	4.448	4.602	4.314	4.734	4.112	4.485	3.853	3.891
	C.V.(%)	1.893	1.646	3.306	5.546	2.300	6.658	2.309	2.724
	No. Specimens	6		18		18		18	
	No. Prepreg Lots	1		3		3		3	

2.5.12 “40/20/40” Unnotched Compression 3 Properties (UNC3)

Material:	Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Unnotched Compression 3 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [0/90/-45/0/90]S					
Resin content:	38.74 %wt		Comp. density: 1.499 g/cc							
Fiber volume:	51.03 %vol									
Ply count:	10									
Test method:	ASTM D6641-23		Modulus calculation: 1000-3000 microstrain							
Normalized by:	0.008800		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			TCEYX XXXB		TCEYX XXXA		TCEYX XXXD		TCEYX XXXE	
			Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNC3 Strength [ksi]	Mean	93.64	96.66	83.27	89.40	66.02	67.75	57.69	57.99	
	Minimum	87.14	89.81	76.35	80.78	59.61	59.23	54.36	54.91	
	Maximum	99.72	104.1	90.81	99.27	71.31	74.77	63.91	63.76	
	C.V.(%)	4.853	5.354	4.829	5.561	4.668	6.322	4.085	3.538	
	No. Specimens	6		19		19		18		
	No. Prepreg Lots	1		3		3		3		
UNC3 Modulus [Msi]	Mean	8.500	8.772	8.267	8.892	8.524	8.699	8.544	8.593	
	Minimum	8.231	8.531	7.763	8.493	8.317	8.176	8.248	8.208	
	Maximum	8.802	9.186	8.611	9.440	8.756	9.375	8.898	9.129	
	C.V.(%)	2.571	2.842	3.035	2.998	1.453	4.200	2.093	3.007	
	No. Specimens	6		18		18		18		
	No. Prepreg Lots	1		3		3		3		

2.5.13 “25/50/25” Open-Hole Tension 1 Properties (OHT1)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm with 40%RC prepreg		Open-Hole Tension 1 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm with 40%RC prepreg [45/0/-45/90]2S									
Resin content:	37.19 %wt	Comp. density: 1.506 g/cc									
Fiber volume:	52.57 %vol										
Ply count:	16										
Test method: ASTM D5766-23											
Normalized by: 0.008800 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		TCEDX XXXB		TCEDX XXXA		TCEDX XXXC		TCEDX XXXD		TCEDX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT1 Strength [ksi]	Mean	58.29	56.71	59.26	59.16	59.18	59.10	58.75	57.31	58.35	56.86
	Minimum	55.44	53.49	57.58	56.35	57.62	55.82	57.03	55.07	55.39	53.37
	Maximum	60.57	60.14	61.51	63.07	61.95	62.14	61.11	59.25	62.54	62.03
	C.V.(%)	2.200	2.710	2.188	3.337	1.980	3.248	1.946	2.061	3.145	3.586
	No. Specimens	18		18		18		18		18	
No. Prepreg Lots		3		3		3		3		3	

2.5.14 “10/80/10” Open-Hole Tension 2 Properties (OHT2)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg		Open-Hole Tension 2 Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg [45/-45/90/45/-45]S									
Resin content:	36.77 %wt	Comp. density: 1.507 g/cc									
Fiber volume:	52.93 %vol										
Ply count:	10										
Test method: ASTM D5766-23											
Normalized by: 0.008800 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		TCEEX XXXB		TCEEX XXXA		TCEEX XXXC		TCEEX XXXD		TCEEX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT2 Strength [ksi]	Mean	50.91	49.77	45.04	44.71	41.24	40.97	38.24	37.94	36.61	35.81
	Minimum	49.06	47.31	41.66	41.70	40.33	39.11	36.87	35.65	34.67	33.77
	Maximum	53.04	51.85	49.99	49.25	42.30	43.23	39.92	40.21	40.54	39.78
	C.V.(%)	2.817	3.069	4.754	5.477	1.758	3.910	2.757	3.537	4.094	4.402
	No. Specimens	18		18		6		18		18	
No. Prepreg Lots		3		3		1		3		3	

2.5.15 “40/20/40” Open-Hole Tension 3 Properties (OHT3)

Material: Toray Advanced Composites TC380 T800HB 6K 2X2 Twill 200gsm with 40%RC prepreg		Open-Hole Tension 3 Toray Advanced Composites TC380 T800HB 6K 2X2 Twill 200gsm with 40%RC prepreg [0/90/-45/0/90]S									
Resin content:	36.45 %wt	Comp. density: 1.510 g/cc									
Fiber volume:	53.32 %vol										
Ply count:	10										
Test method: ASTM D5766-23											
Normalized by: 0.008800 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		TCEFX XXXB		TCEFX XXXA		TCEFX XXXC		TCEFX XXXD		TCEFX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT3 Strength [ksi]	Mean	71.10	70.32	72.93	72.90	76.71	77.71	74.42	74.87	73.85	73.07
	Minimum	64.42	64.14	70.42	68.01	71.30	71.89	72.26	71.00	69.49	69.85
	Maximum	76.41	76.11	75.05	79.31	81.24	82.56	78.09	78.69	76.53	75.91
	C.V.(%)	4.478	4.457	2.271	4.072	4.772	4.980	2.233	3.191	2.656	2.543
	No. Specimens	18		18		6		18		18	
No. Prepreg Lots		3		3		1		3		3	

2.5.16 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg		Comp. density: 1.509 g/cc		Filled-Hole Tension 1 Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg [45/0/-45/90]2S				
Resin content: 36.79 %wt								
Fiber volume: 53.00 %vol								
Ply count: 16								
Test method: ASTM D6742-23								
Normalized by: 0.008800		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	TCE4X XXXB		TCE4X XXXA		TCE4X XXXD		TCE4X XXXE	
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHT1 Strength [ksi]								
Mean	60.91	59.66	60.51	60.69	61.46	61.34	59.95	59.08
Minimum	57.94	56.24	58.64	57.38	59.50	57.83	58.49	57.09
Maximum	63.56	62.47	63.51	64.50	63.69	65.29	63.00	63.87
C.V.(%)	2.764	3.184	2.001	3.528	1.859	3.378	1.845	2.986
No. Specimens	18		18		18		18	
No. Prepreg Lots	3		3		3		3	

2.5.17 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)

Material:		Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Filled-Hole Tension 2			
Resin content:		36.63 %wt		Comp. density: 1.506 g/cc		Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg			
Fiber volume:		53.03 %vol				[45/-45/90/45/-45]S			
Ply count:		10							
Test method:		ASTM D6742-23							
Normalized by:		0.008800		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		TCE5X XXXB		TCE5X XXXA		TCE5X XXXD		TCE5X XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHT2 Strength [ksi]	Mean	58.59	57.21	50.66	50.71	42.65	42.49	39.90	39.06
	Minimum	55.85	54.17	48.41	46.91	40.99	39.18	37.48	37.08
	Maximum	60.27	59.57	54.86	56.94	44.68	45.92	43.87	43.97
	C.V.(%)	2.075	2.743	3.663	5.460	2.539	4.643	3.638	4.379
	No. Specimens	18		18		18		18	
	No. Prepreg Lots	3		3		3		3	

2.5.18 “40/20/40” Filled-Hole Tension 3 Properties (FHT3)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg		Comp. density: 1.508 g/cc		Filled-Hole Tension 3 Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg [0/90/-45/0/90]S				
Resin content: 36.41 %wt								
Fiber volume: 53.30 %vol								
Ply count: 10								
Test method: ASTM D6742-23								
Normalized by: 0.008800		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	TCE6X XXXB		TCE6X XXXA		TCE6X XXXD		TCE6X XXXE	
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHT3 Strength [ksi]								
Mean	74.12	73.13	72.17	71.99	72.54	72.55	70.17	69.90
Minimum	68.65	66.68	65.34	64.98	67.17	66.63	67.08	66.47
Maximum	79.00	77.43	76.53	80.21	76.02	79.42	75.55	74.45
C.V.(%)	4.191	4.377	3.722	4.819	2.908	4.188	3.256	3.211
No. Specimens	19		19		23		23	
No. Prepreg Lots	3		3		3		3	

2.5.19 “25/50/25” Open-Hole Compression 1 Properties (OHC1)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg		Open-Hole Compression 1 Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg [45/0/-45/90]2S									
Resin content:	36.78 %wt	Comp. density: 1.507 g/cc									
Fiber volume:	52.91 %vol										
Ply count:	16										
Test method:	ASTM D6484-23										
Normalized by:	0.008800	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		TCEGX XXXB		TCEGX XXXA		TCEGX XXXC		TCEGX XXXD		TCEGX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHC1 Strength [ksi]	Mean	48.81	47.79	40.54	40.63	36.46	36.55	32.88	32.31	27.91	27.31
	Minimum	46.27	44.53	38.65	38.12	33.74	33.29	30.93	30.80	25.89	25.25
	Maximum	51.40	50.72	42.66	43.37	38.44	38.58	34.22	34.25	29.30	29.33
	C.V.(%)	2.654	2.780	2.929	3.301	3.040	3.851	2.499	2.759	2.571	2.940
	No. Specimens	18		18		18		18		18	
	No. Prepreg Lots	3		3		3		3		3	

2.5.20 “10/80/10” Open-Hole Compression 2 Properties (OHC2)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg		Open-Hole Compression 2 Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg [45/-45/90/45/-45]2S									
Resin content:	38.15 %wt	Comp. density: 1.501 g/cc									
Fiber volume:	51.58 %vol										
Ply count:	20										
Test method:	ASTM D6484-23										
Normalized by:	0.008800	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		TCEHX XXXB		TCEHX XXXA		TCEHX XXXC		TCEHX XXXD		TCEHX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHC2 Strength [ksi]	Mean	45.92	44.97	37.93	37.96	33.72	33.74	30.04	29.90	25.18	24.57
	Minimum	44.35	43.00	34.93	35.78	33.03	32.51	28.03	28.34	23.82	23.26
	Maximum	47.53	46.46	40.58	39.55	34.32	35.67	31.39	30.91	26.68	26.11
	C.V.(%)	1.821	1.761	3.102	2.705	1.384	3.392	3.168	2.071	3.134	3.273
	No. Specimens	18		18		6		18		18	
	No. Prepreg Lots	3		3		1		3		3	

2.5.21 “40/20/40” Open-Hole Compression 3 Properties (OHC3)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg						Open-Hole Compression 3 Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg [0/90/-45/0/90]2S					
Resin content: 37.39 %wt		Comp. density: 1.505 g/cc									
Fiber volume: 52.36 %vol											
Ply count: 20											
Test method: ASTM D6484-23											
Normalized by: 0.008800 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		TCEIX XXXB		TCEIX XXXA		TCEIX XXXC		TCEIX XXXD		TCEIX XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHC3 Strength [ksi]	Mean	50.61	49.48	41.26	41.31	37.85	37.76	34.39	34.34	30.20	29.58
	Minimum	47.92	47.02	38.95	39.70	36.76	36.11	32.47	32.80	28.10	27.66
	Maximum	53.54	52.33	42.67	44.58	39.01	40.12	36.06	36.08	31.73	30.92
	C.V.(%)	2.763	2.381	2.556	2.925	1.893	4.372	2.862	2.557	3.401	3.268
	No. Specimens	18		18		6		18		18	
	No. Prepreg Lots	3		3		1		3		3	

2.5.22 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)

Material:	Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Filled-Hole Compression 1 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [45/0/-45/90]2S				
Resin content:	36.80 %w t		Comp. density: 1.508 g/cc						
Fiber volume:	52.96 %vol								
Ply count:	16								
Test method:	ASTM D6742-23								
Normalized by:	0.008800		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		TCE7X XXXB		TCE7X XXXA		TCE7X XXXD		TCE7X XXXE	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
FHC1 Strength [ksi]	Mean	90.69	89.09	75.87	75.75	59.19	59.77	51.19	50.37
	Minimum	84.15	82.78	70.64	71.48	50.82	52.87	43.91	42.66
	Maximum	93.04	91.18	80.89	80.47	66.24	65.17	56.43	56.30
	C.V.(%)	3.190	3.041	3.907	3.693	5.860	5.229	6.475	6.478
	No. Specimens	8		21		26		23	
	No. Prepreg Lots	1		3		3		3	

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. Shaded values indicated FHC1>UNC1.

2.5.23 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

Material:	Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg					Filled-Hole Compression 2 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [45/-45/90/45/-45]2S				
Resin content:	37.39 %wt		Comp. density: 1.506 g/cc							
Fiber volume:	52.38 %vol									
Ply count:	20									
Test method:	ASTM D6742-23									
Normalized by:	0.008800		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		TCE8X XXXB		TCE8X XXXA		TCE8X XXXD		TCE8X XXXE		
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	
FHC2 Strength [ksi]	Mean	65.39	63.74	54.63	54.71	43.02	43.26	36.05	35.25	
	Minimum	63.04	61.52	52.97	52.48	39.42	40.86	34.41	33.42	
	Maximum	68.30	67.00	55.98	58.27	45.12	45.71	38.55	38.06	
	C.V.(%)	3.206	3.423	1.765	2.472	3.360	2.966	3.373	4.018	
	No. Specimens	7		20		20		20		
	No. Prepreg Lots	1		3		3		3		

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. Shaded values indicated FHC2>UNC2.

2.5.24 “40/20/40” Filled-Hole Compression 3 Properties (FHC3)

Material:	Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg					Filled-Hole Compression 3 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [0/90/-45/0/90]2S				
Resin content:	37.27 %wt		Comp. density: 1.505 g/cc							
Fiber volume:	52.46 %vol									
Ply count:	20									
Test method:	ASTM D6742-23									
Normalized by:	0.008800		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		TCE9X XXXB		TCE9X XXXA		TCE9X XXXD		TCE9X XXXE		
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	
FHC3 Strength [ksi]	Mean	96.96	94.07	78.50	78.07	63.22	63.62	52.84	51.91	
	Minimum	87.64	86.66	69.40	71.87	58.42	58.23	48.81	47.98	
	Maximum	104.0	98.85	83.25	82.31	69.28	67.21	56.89	56.73	
	C.V.(%)	4.416	3.555	4.994	3.769	5.135	4.246	4.557	4.862	
	No. Specimens	15		14		19		21		
	No. Prepreg Lots	2		2		3		3		

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. Shaded values indicated FHC3>UNC3.

2.5.25 “25/50/25” Single-Shear Bearing 1 Properties (SSB1, Proc. C)

Material:		Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Single-Shear Bearing 1 Proc. C Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [45/0/-45/90]2S					
Resin content:		40.60 %wt		Comp. density: 1.479 g/cc							
Fiber volume:		48.82 %vol									
Ply count:		16									
Test method:		ASTM D5961-23, Proc. C									
Normalized by:		0.008800		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		TCE1X XXXA		TCE1X XXXD		TCE1X XXXE					
		Normalized	Measured	Normalized	Measured	Normalized	Measured				
SSB1, Proc. C 2% Offset Strength [ksi]	Mean	103.6	110.8	91.87	97.94	87.55	85.38				
	Minimum	94.43	101.3	85.27	88.86	79.91	79.61				
	Maximum	114.7	119.7	100.1	104.5	94.68	91.36				
	C.V.(%)	4.808	4.515	4.802	4.128	3.998	3.363				
	No. Specimens	18		18		18					
	No. Prepreg Lots	3		3		3					
SSB1, Proc. C Ultimate Strength [ksi]	Mean	125.0	133.7	107.7	114.9	100.8	98.33				
	Minimum	117.9	127.8	100.7	105.2	93.28	92.33				
	Maximum	130.4	141.5	122.0	125.9	108.2	107.3				
	C.V.(%)	2.280	2.507	4.441	4.356	3.997	4.034				
	No. Specimens	18		18		18					
	No. Prepreg Lots	3		3		3					
SSB1, Proc. C Chord Stiffness [Msi]	Mean	1.502	1.607	1.489	1.589	1.462	1.426				
	Minimum	1.439	1.516	1.363	1.401	1.416	1.366				
	Maximum	1.575	1.735	1.544	1.714	1.493	1.487				
	C.V.(%)	2.452	3.565	2.988	4.534	1.555	2.546				
	No. Specimens	18		18		18					
	No. Prepreg Lots	3		3		3					

2.5.26 “10/80/10” Single-Shear Bearing 2 Properties (SSB2, Proc. C)

Material:		Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Single-Shear Bearing 2 Proc. C Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [45/-45/90/45/-45]2S			
Resin content:		40.61 %wt		Comp. density: 1.481 g/cc					
Fiber volume:		48.87 %vol							
Ply count:		20							
Test method:		ASTM D5961-23, Proc. C							
Normalized by:		0.008800		in. CPT					
		RTD		ETW1		ETW2			
Test Temperature [°F]		70		180		250			
Moisture Conditioning		Dry		Equilibrium		Equilibrium			
Equilibrium at T, RH				160F,85%		160F,85%			
Source code		TCE2X XXXA		TCE2X XXXD		TCE2X XXXE			
		Normalized	Measured	Normalized	Measured	Normalized	Measured		
SSB2, Proc. C 2% Offset Strength [ksi]	Mean	100.3	106.1	86.09	90.32	79.86	77.96		
	Minimum	92.78	94.93	82.28	84.86	75.77	73.88		
	Maximum	108.6	113.0	90.45	96.05	83.73	82.81		
	C.V.(%)	4.511	4.246	2.935	3.674	3.328	3.798		
	No. Specimens	18		18		18			
	No. Prepreg Lots	3		3		3			
SSB2, Proc. C Ultimate Strength [ksi]	Mean	123.0	130.1	104.9	110.1	97.32	94.99		
	Minimum	116.0	123.7	98.90	104.3	93.95	92.23		
	Maximum	130.9	138.9	111.3	116.3	102.1	99.82		
	C.V.(%)	3.070	3.066	3.098	3.558	2.554	2.542		
	No. Specimens	18		18		18			
	No. Prepreg Lots	3		3		3			
SSB2, Proc. C Chord Stiffness [Msi]	Mean	1.044	1.104	1.044	1.095	0.9953	0.9716		
	Minimum	0.9685	0.9916	0.9921	1.005	0.9243	0.8888		
	Maximum	1.172	1.227	1.089	1.186	1.041	1.023		
	C.V.(%)	4.470	5.279	2.917	5.036	3.264	3.749		
	No. Specimens	18		18		18			
	No. Prepreg Lots	3		3		3			

2.5.27 “40/20/40” Single-Shear Bearing 3 Properties (SSB3, Proc. C)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Single-Shear Bearing 3 Proc. C			
Resin content: 38.47 %wt		Comp. density: 1.496 g/cc		Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [0/90/-45/0/90]2S			
Fiber volume: 51.15 %vol							
Ply count: 20							
Test method: ASTM D5961-23, Proc. C							
Normalized by: 0.008800 in. CPT							
		RTD		ETW1		ETW2	
Test Temperature [°F]		70		180		250	
Moisture Conditioning		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH				160F,85%		160F,85%	
Source code		TCE3X XXXA		TCE3X XXXD		TCE3X XXXE	

2.5.28 “25/50/25” Compression After Impact 1 Properties (CAI1)

Material:		Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg				Compression After Impact 1 Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [45/0/-45/90]3S			
Resin content:		37.86 %wt		Comp. density: 1.502 g/cc					
Fiber volume:		51.87 %vol							
Ply count:		24							
Test method:		ASTM D7136-20/D7137-23							
Normalized by:		0.008800		in. CPT					
		CTD		RTD					
Test Temperature [°F]		-65		70					
Moisture Conditioning		Dry		Dry					
Equilibrium at T, RH									
Source code		TCEKX XXXB		TCEKX XXXA					
		Normalized	Measured	Normalized	Measured				
CAI1 Strength [ksi]	Mean	51.12	50.80	43.34	43.79				
	Minimum	48.81	48.27	40.87	40.87				
	Maximum	54.29	53.16	45.76	46.81				
	C.V.(%)	2.860	2.418	2.918	3.297				
	No. Specimens	18		18					
	No. Prepreg Lots	3		3					

2.5.29 “40/20/40” Compression After Impact 3 Properties (CAI3)

Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg				Compression After Impact 3 Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg [0/90/-45/0/90]2S			
Resin content: 38.39 %wt		Comp. density: 1.503 g/cc					
Fiber volume: 51.43 %vol							
Ply count: 20							
Test method: ASTM D7136-20/D7137-23							
Normalized by: 0.008800 in. CPT							
		RTD					
Test Temperature [°F]		70					
Moisture Conditioning		Dry					
Equilibrium at T, RH							
Source code		TCEPX XXXA					
		Normalized	Measured				
CAI3 Strength [ksi]	Mean	41.52	41.87				
	Minimum	40.56	40.76				
	Maximum	43.54	42.55				
	C.V.(%)	2.800	1.730				
	No. Specimens	6					
No. Prepreg Lots		1					

2.5.30 Interlaminar Tension Properties (ILT)

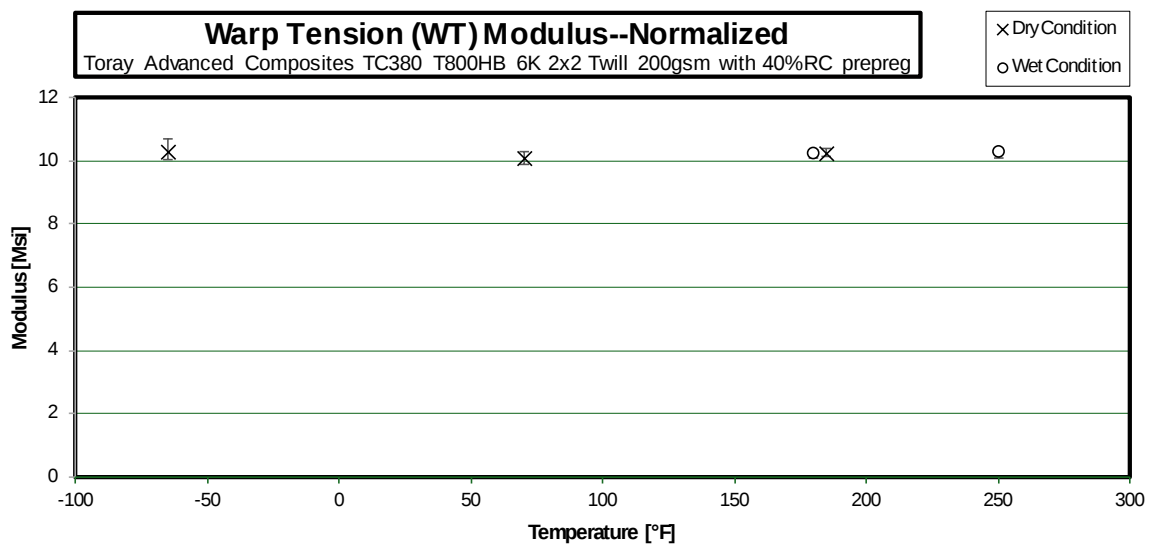
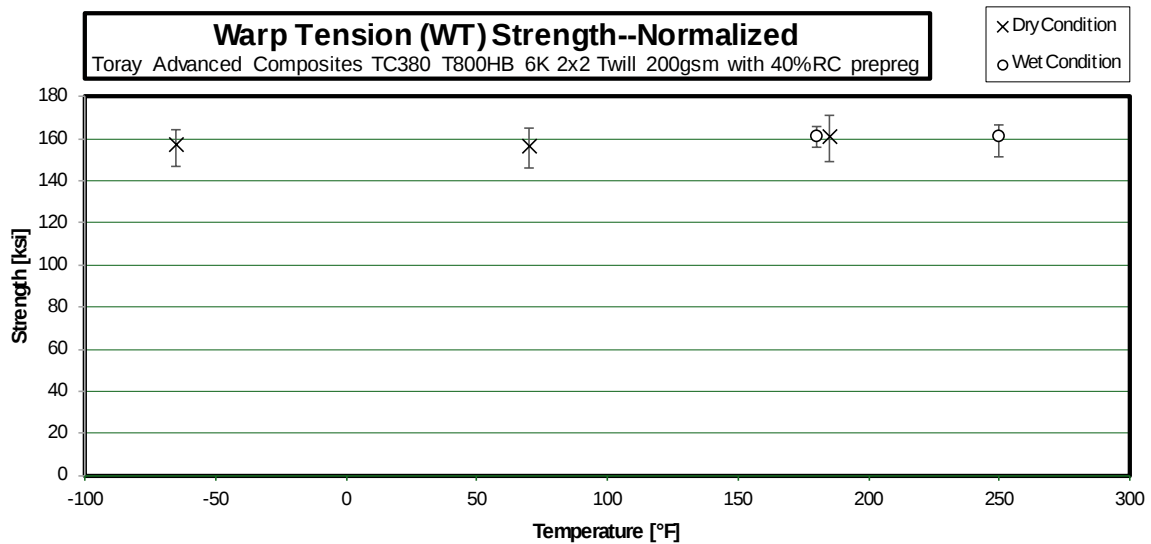
Material: Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm with 40%RC prepreg		Comp. density: 1.487 g/cc		Interlaminar Tension Toray Advanced Composites TC380 T800HB 6K 2x2 Tw ill 200gsm w ith 40%RC prepreg [0]20	
Resin content: 40.18 %wt					
Fiber volume: 49.42 %vol					
Ply count: 20					
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	TCEMX XXXB		TCEMX XXXA		TCEMX XXXD
	Normalized	Measured	Normalized	Measured	Normalized Measured
CBS [lb]					
Mean		558.0		459.8	308.0
Minimum		536.7		437.2	273.1
Maximum		585.3		498.4	359.8
C.V.(%)		3.175		4.731	10.50
No. Specimens		6		6	7
No. Prepreg Lots		1		1	1
ILT [ksi]					
Mean		15.78		13.20	8.404
Minimum		15.28		12.65	7.663
Maximum		16.73		14.17	9.589
C.V.(%)		3.128		4.198	9.367
No. Specimens		6		6	7
No. Prepreg Lots		1		1	1

3. Individual Test Charts

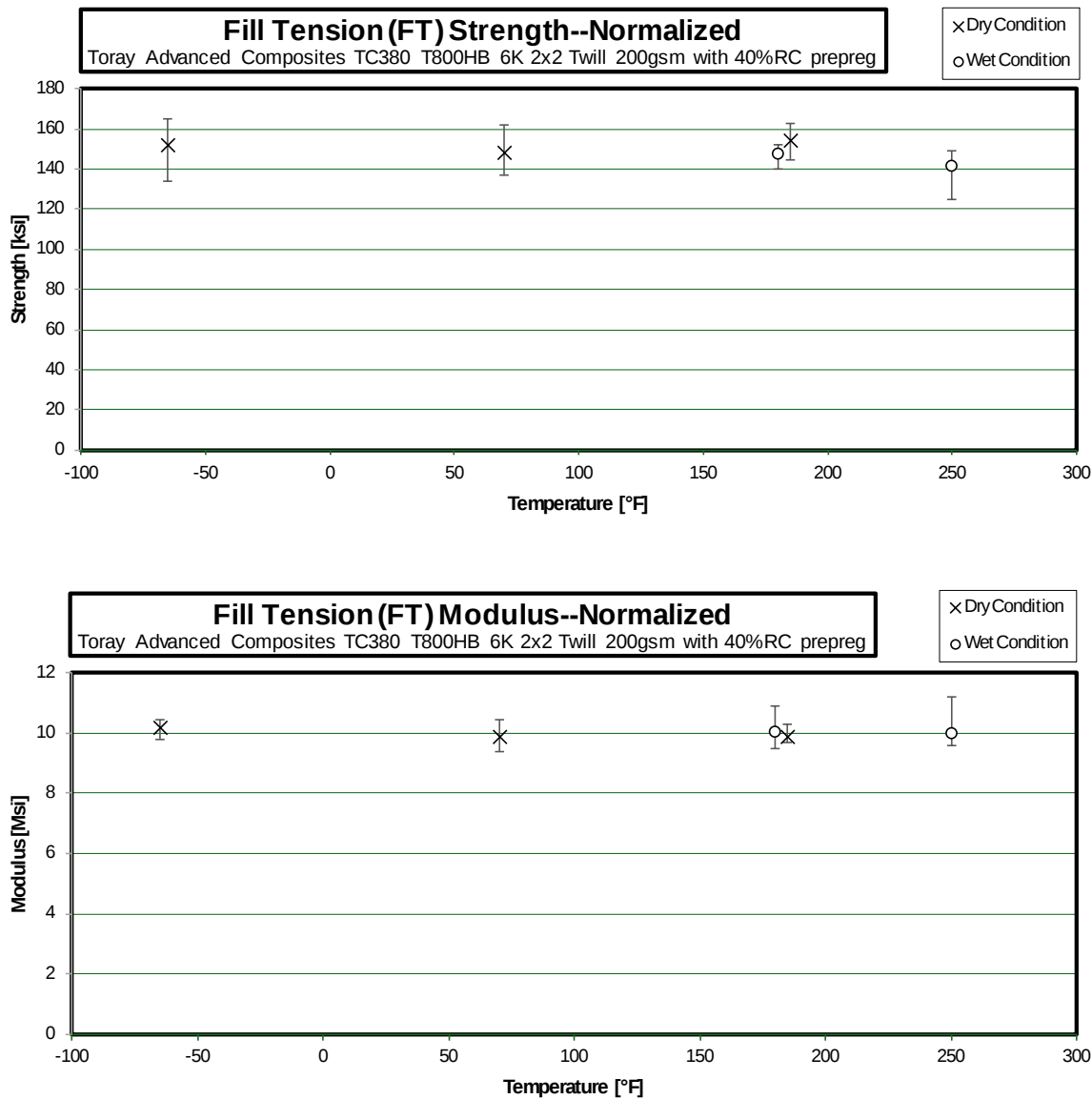
The material property test charts display a combination of all three batches and both cure cycles for a particular property as a function of test temperature for dry and wet test conditions. The average is plotted for each material property and the minimum to maximum range is represented by vertical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

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

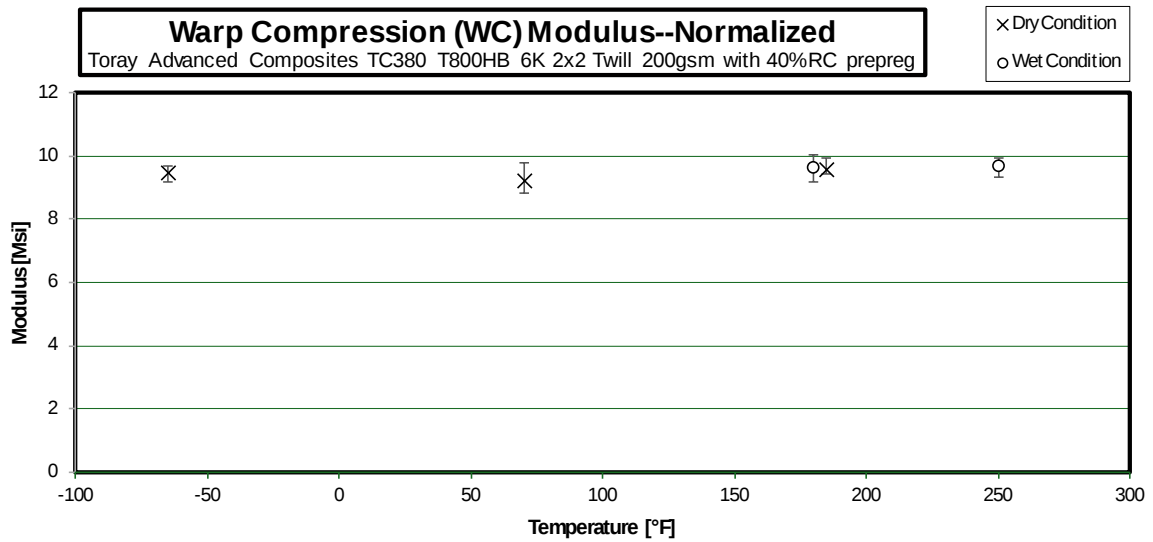
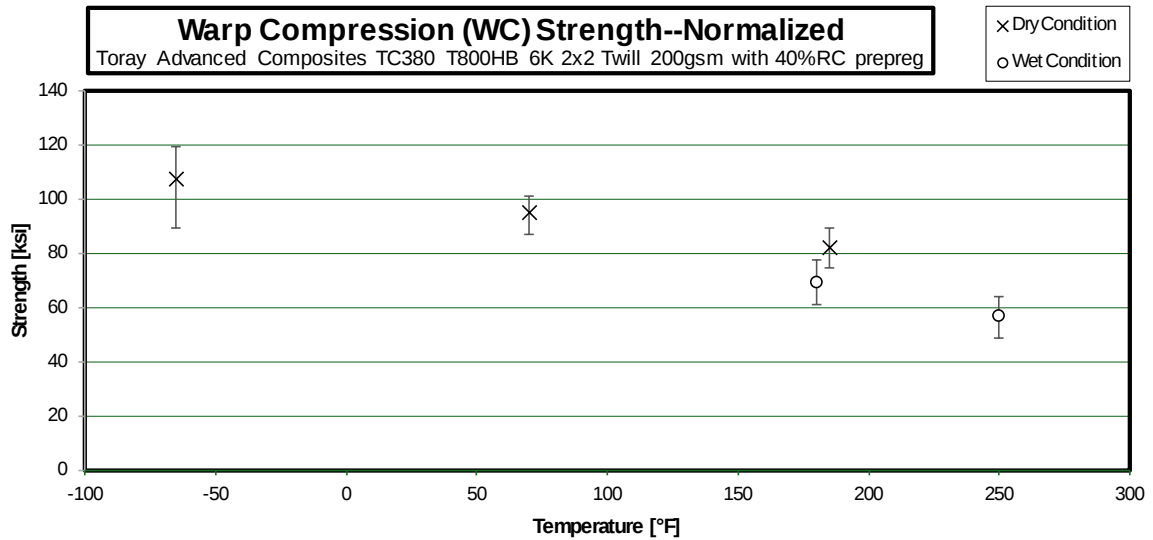
3.1 Warp Tension Properties (WT)



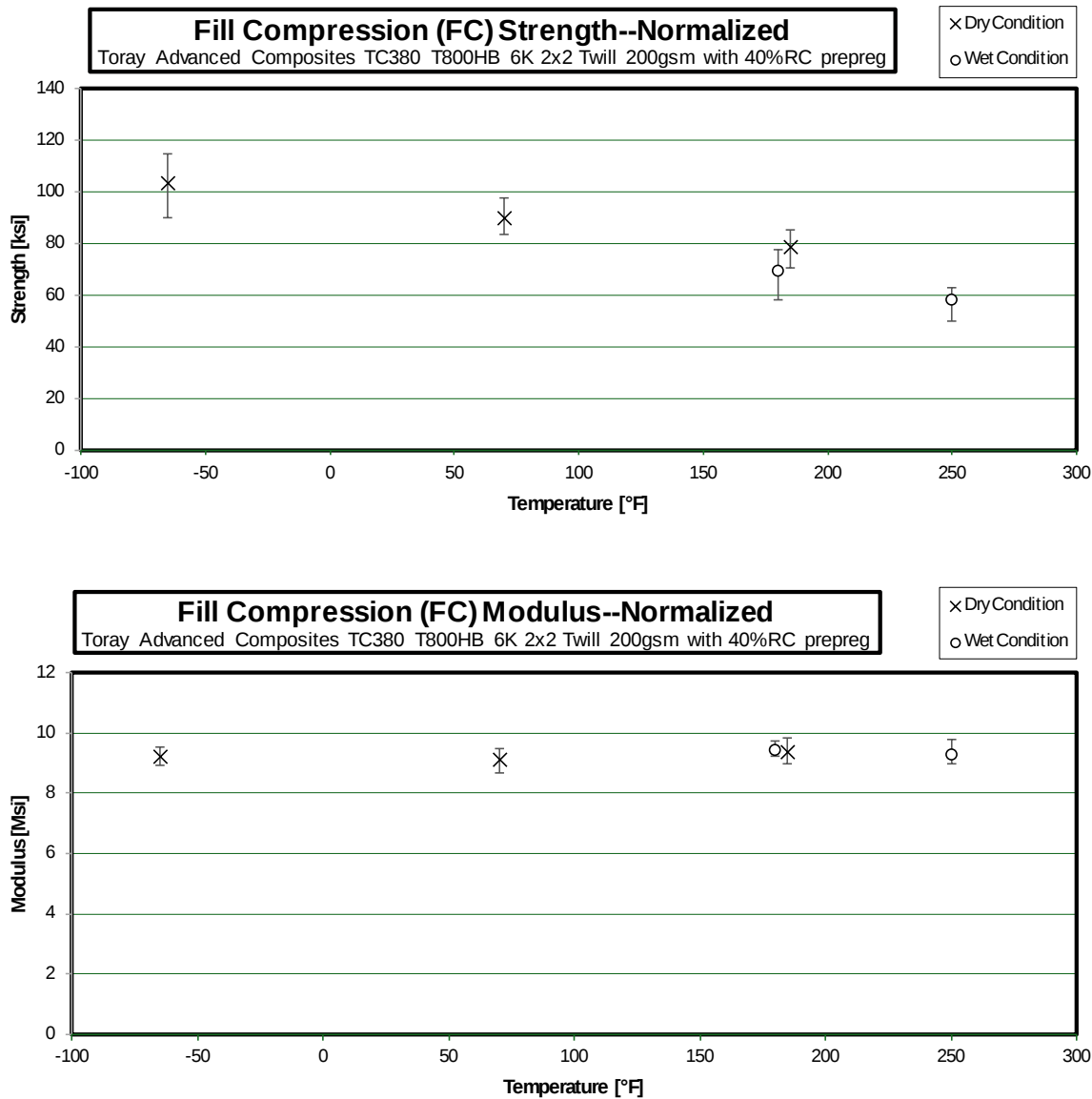
3.2 Fill Tension Properties (FT)



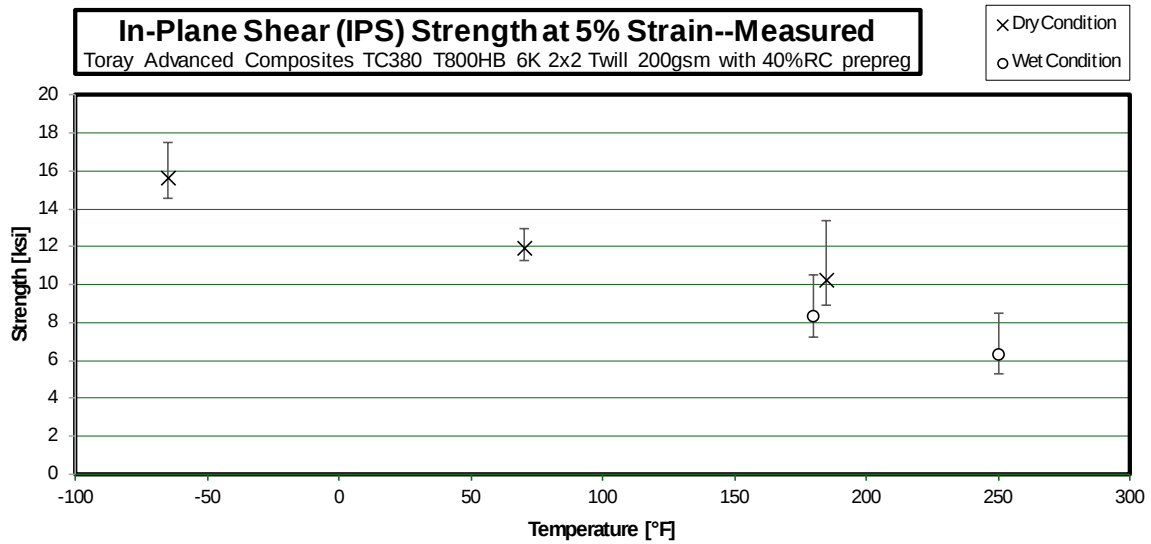
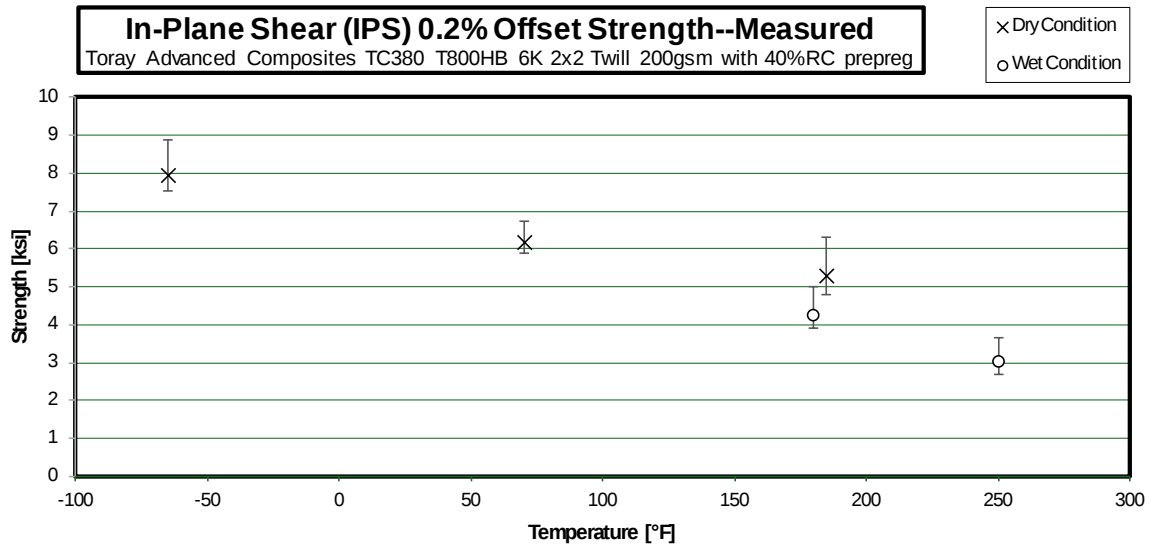
3.3 Warp Compression Properties (WC)

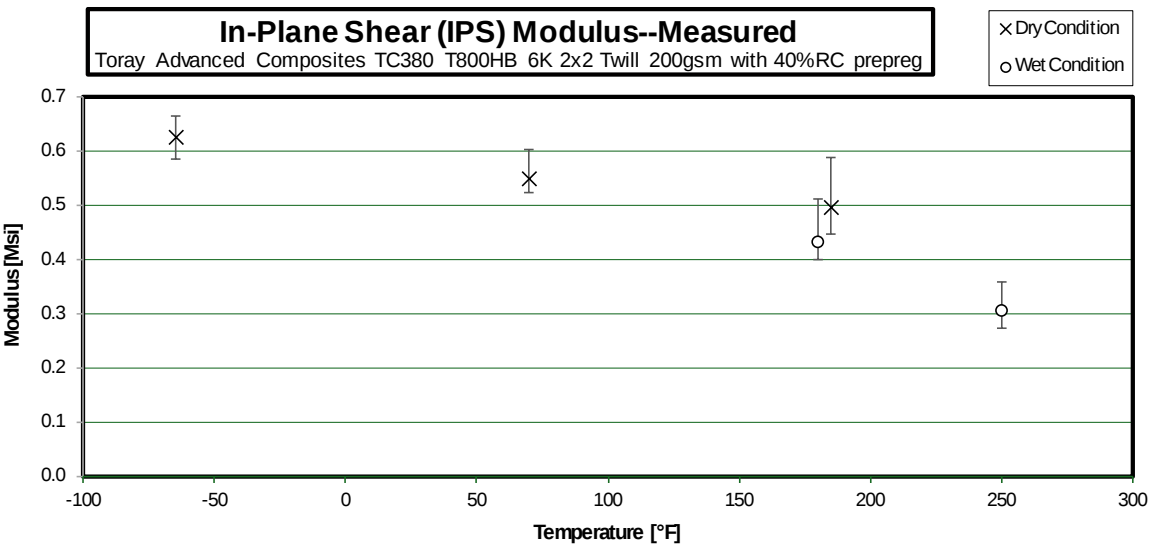


3.4 Fill Compression Properties (FC)

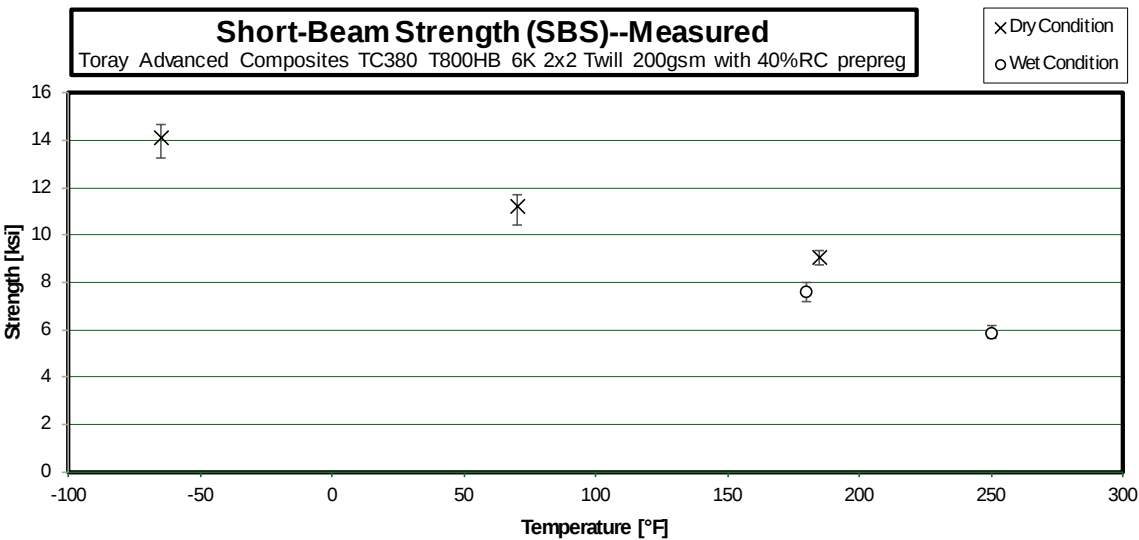


3.5 In-Plane Shear Properties (IPS)

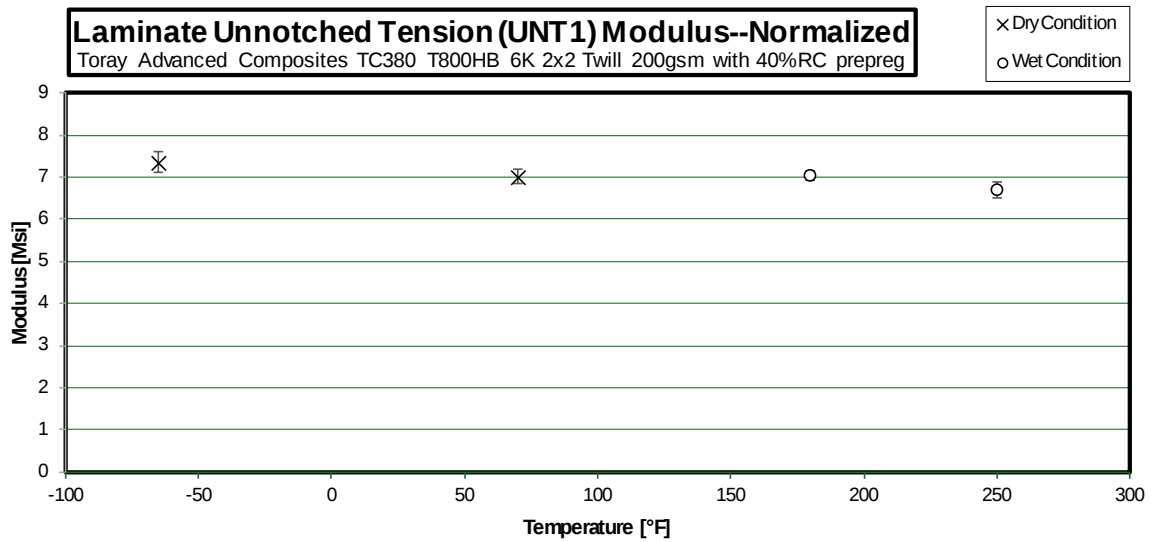
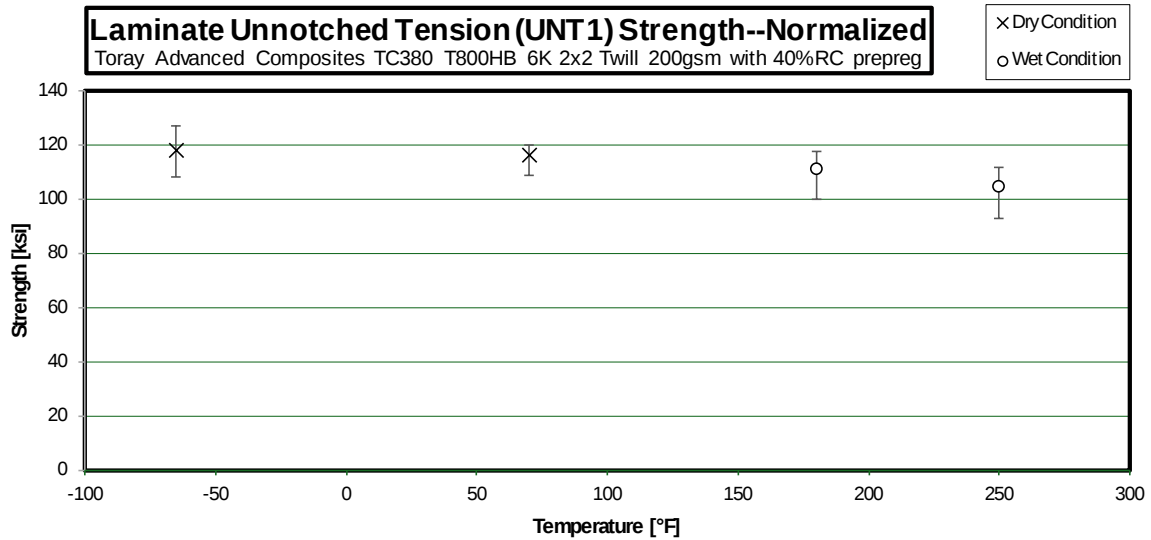




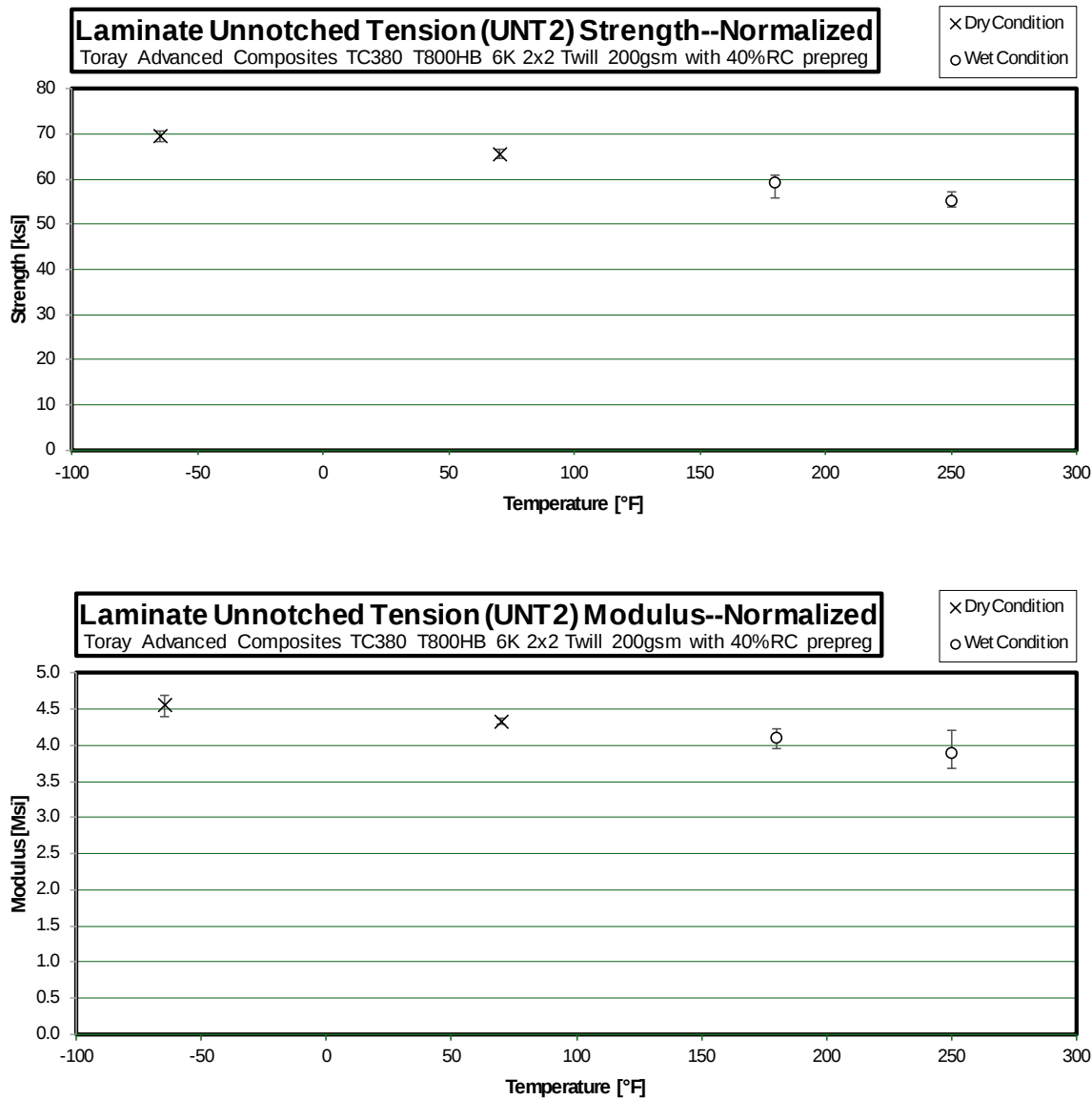
3.6 Lamina Short-Beam Strength Properties (SBS)



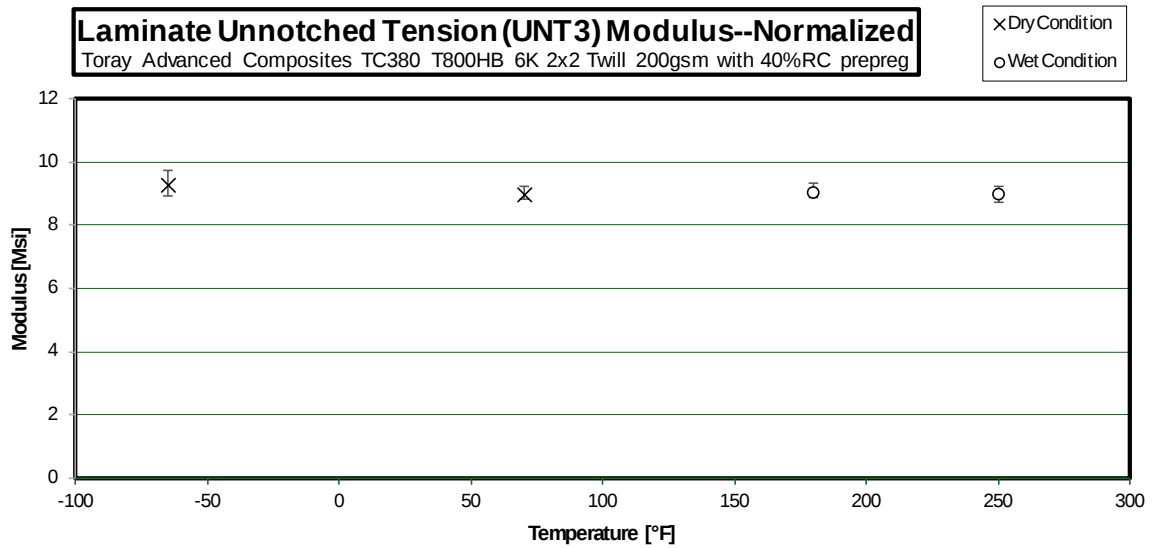
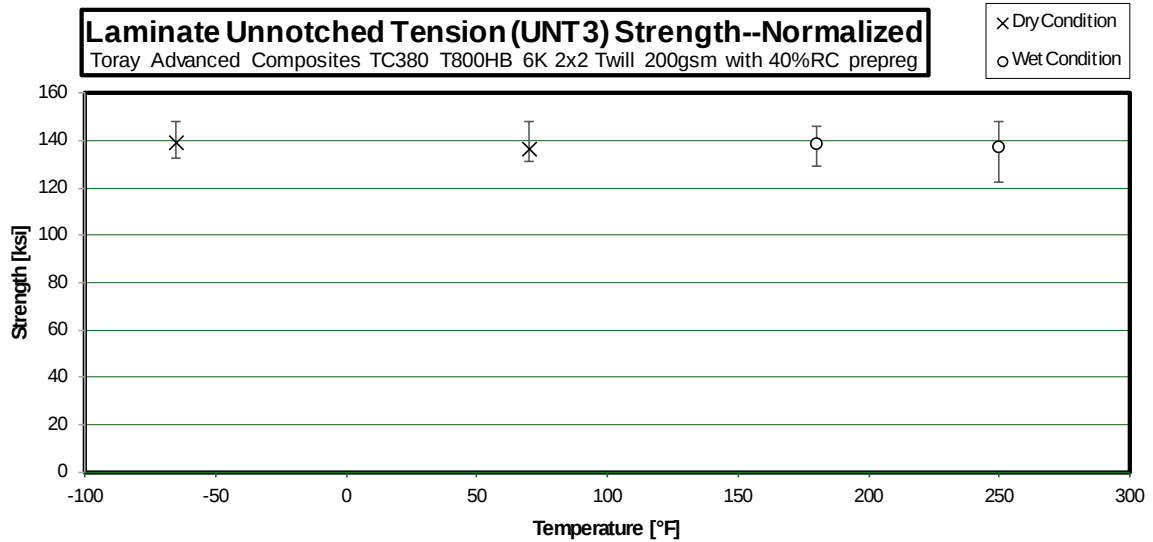
3.7 “25/50/25” Unnotched Tension 1 Properties (UNT1)



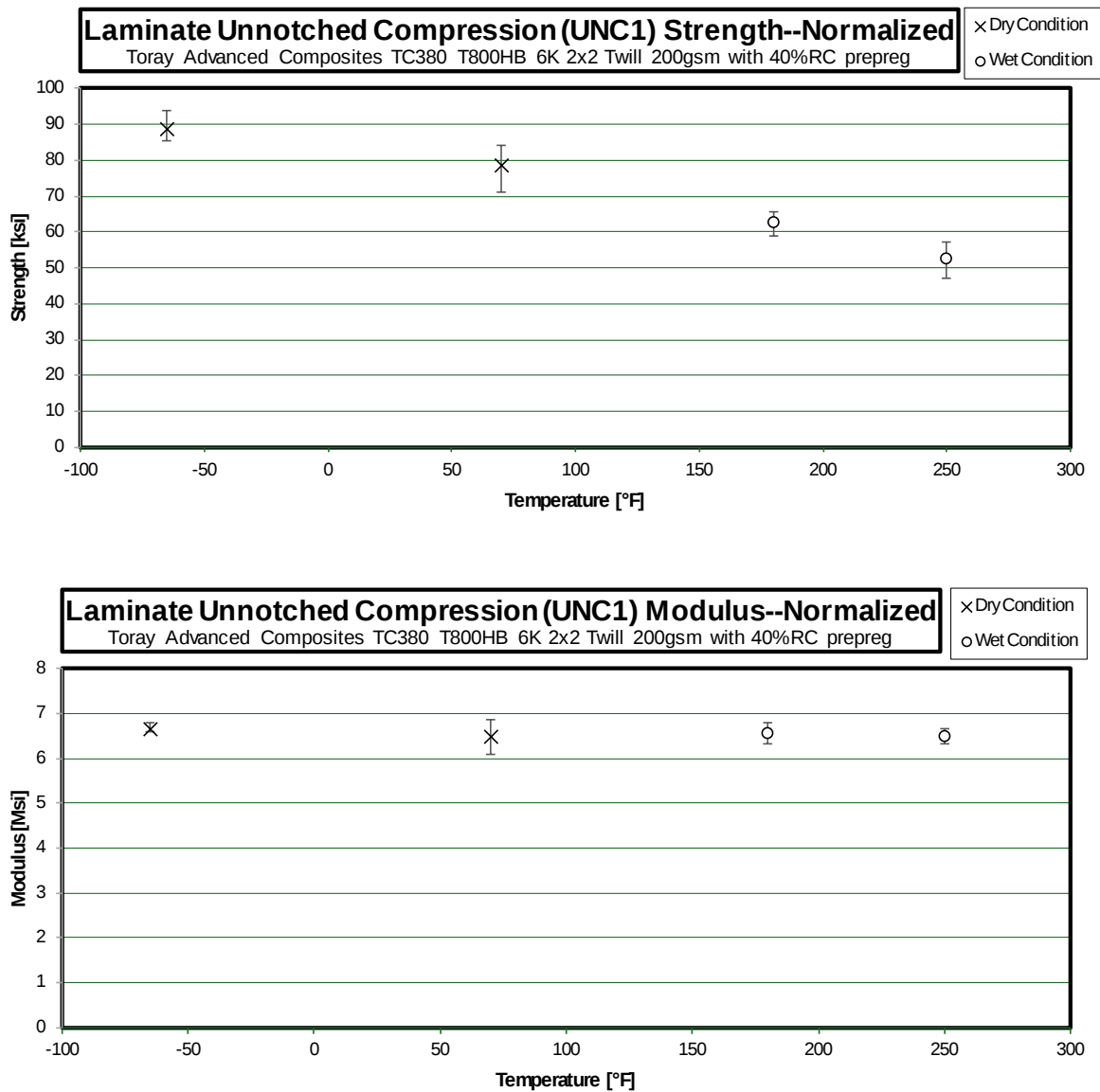
3.8 “10/80/10” Unnotched Tension 2 Properties (UNT2)



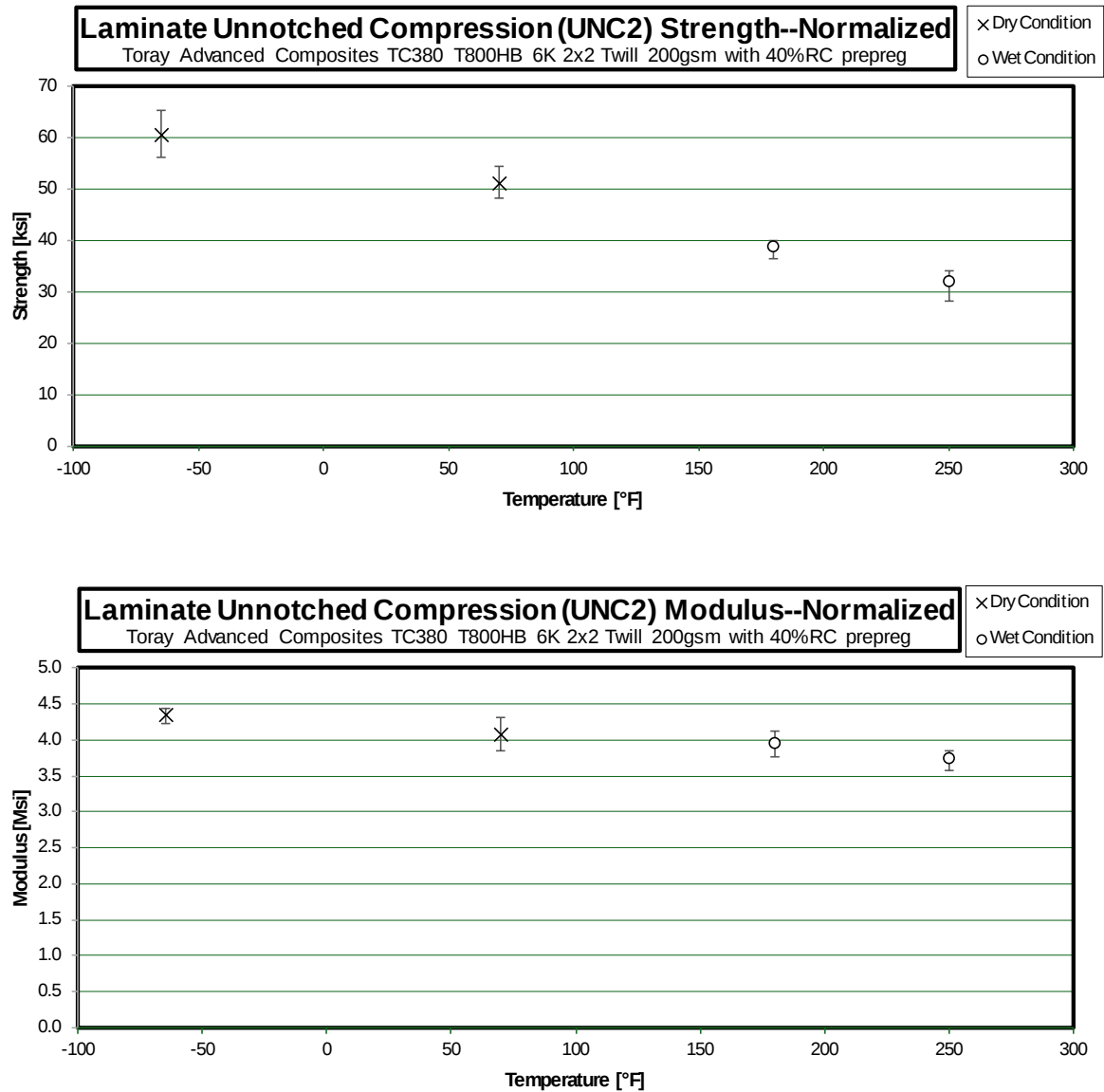
3.9 “40/20/40” Unnotched Tension 3 Properties (UNT3)



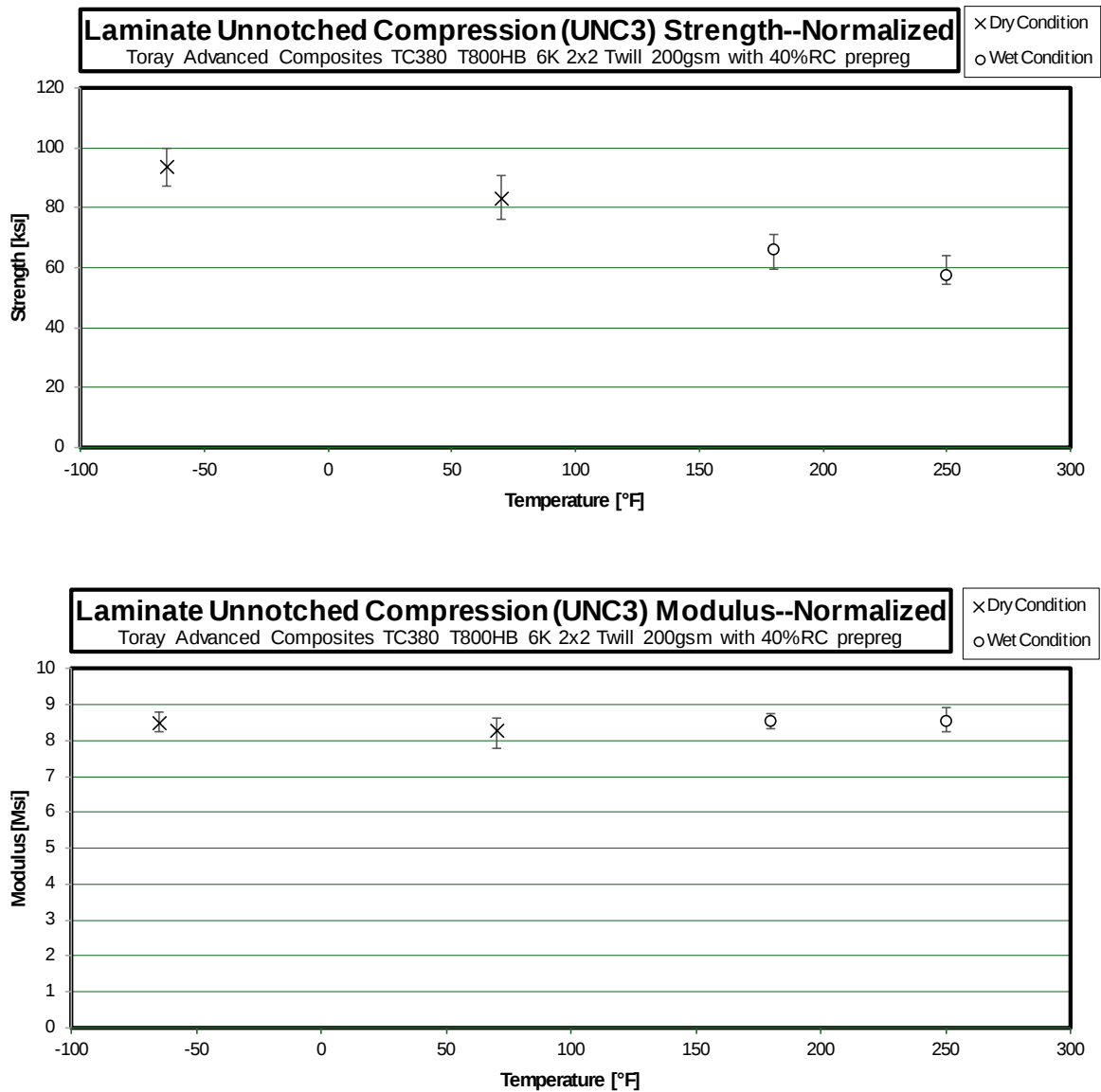
3.10 “25/50/25” Unnotched Compression 1 Properties (UNC1)



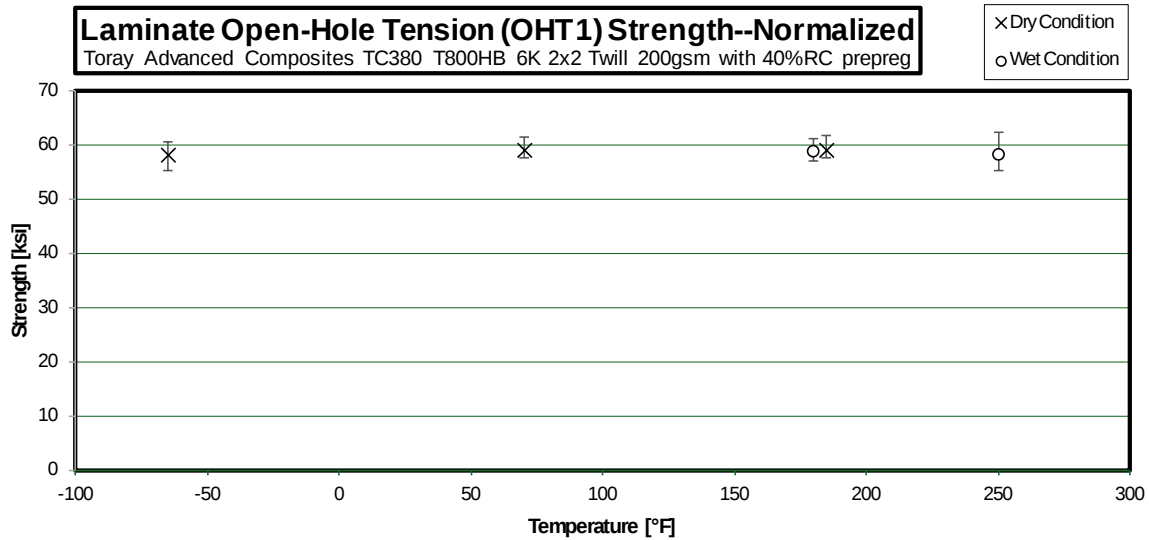
3.11 “10/80/10” Unnotched Compression 2 Properties (UNC2)



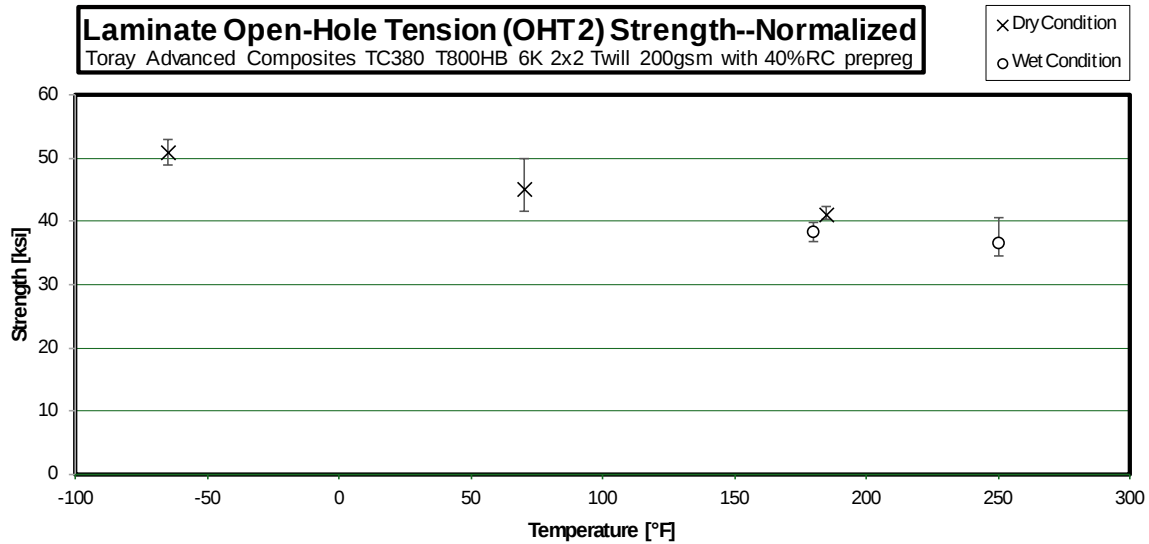
3.12 “40/20/40” Unnotched Compression 3 Properties (UNC3)



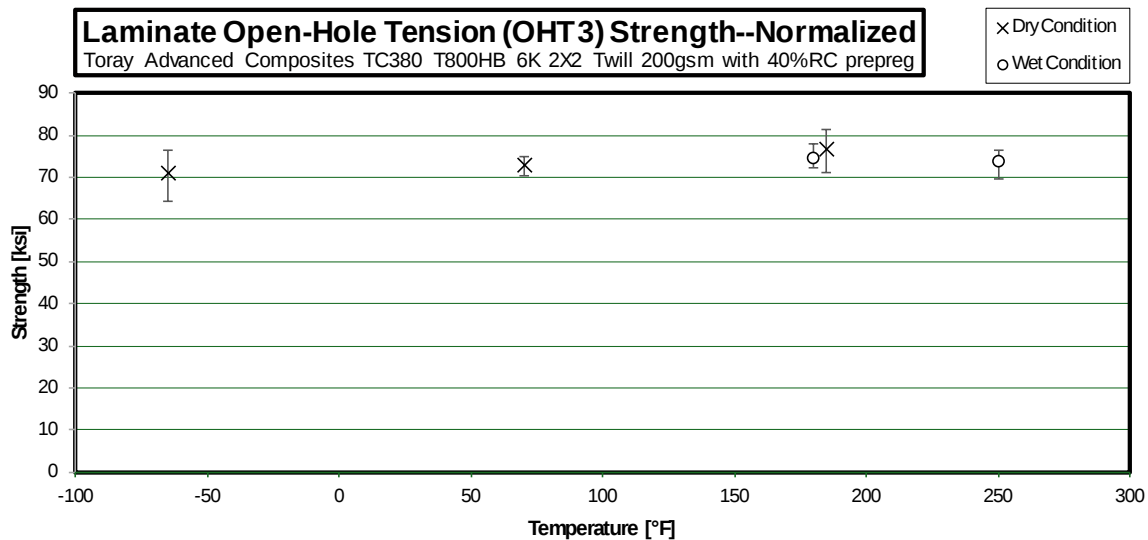
3.13 “25/50/25” Open-Hole Tension 1 Properties (OHT1)



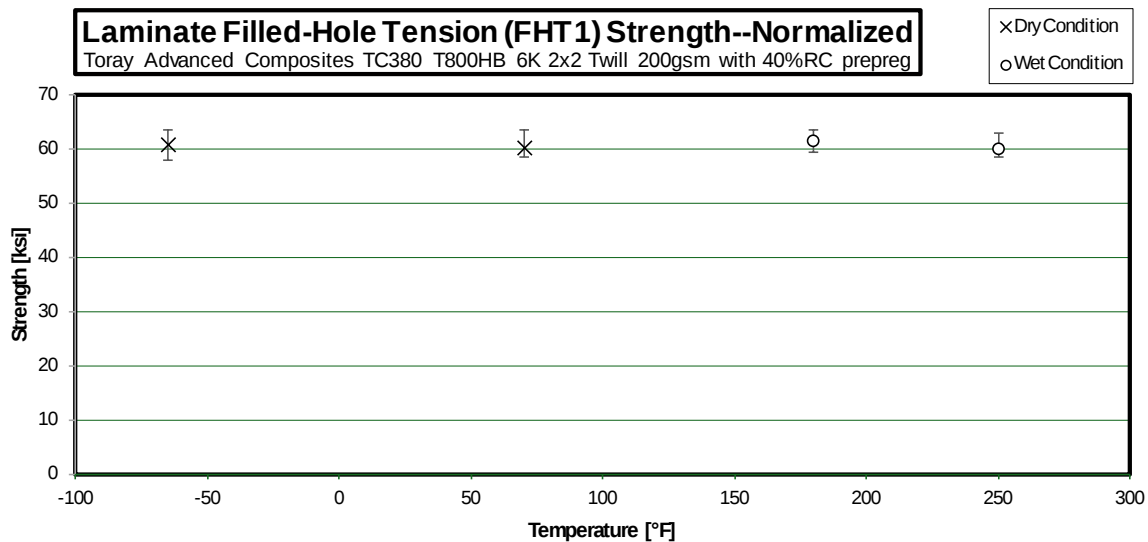
3.14 “10/80/10” Open-Hole Tension 2 Properties (OHT2)



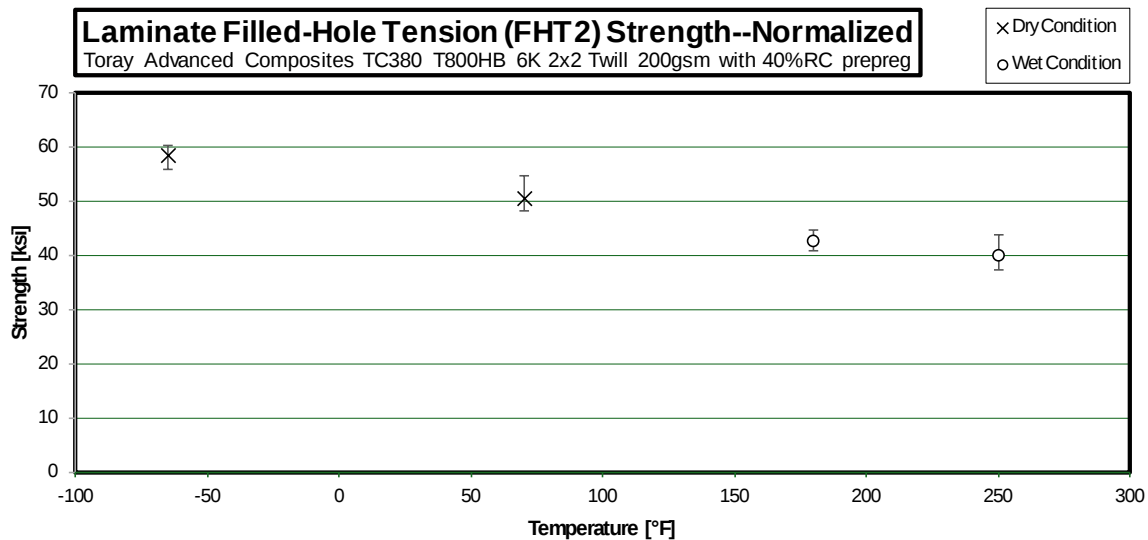
3.15 “40/20/40” Open-Hole Tension 3 Properties (OHT3)



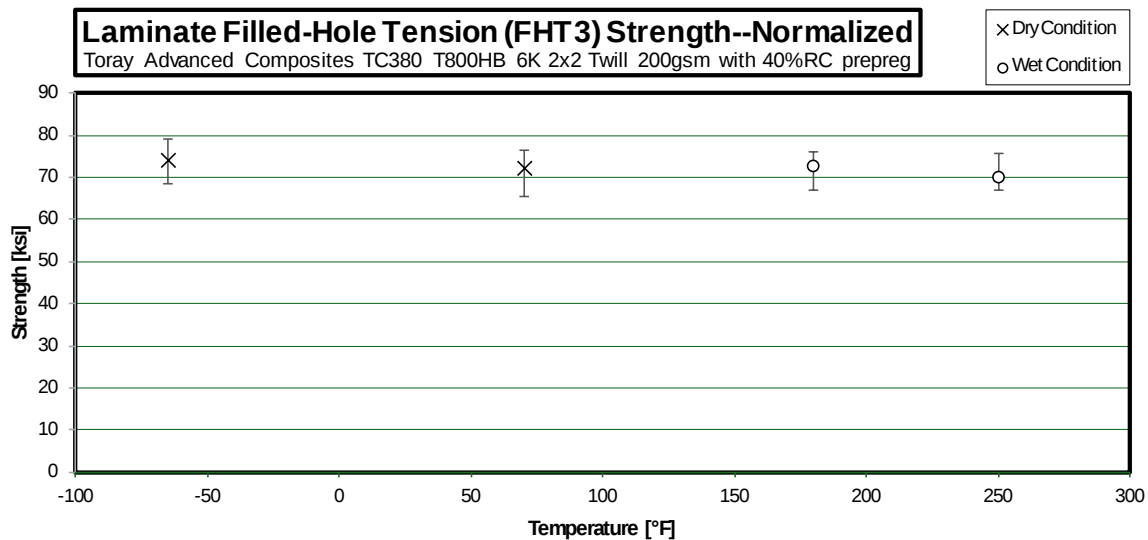
3.16 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)



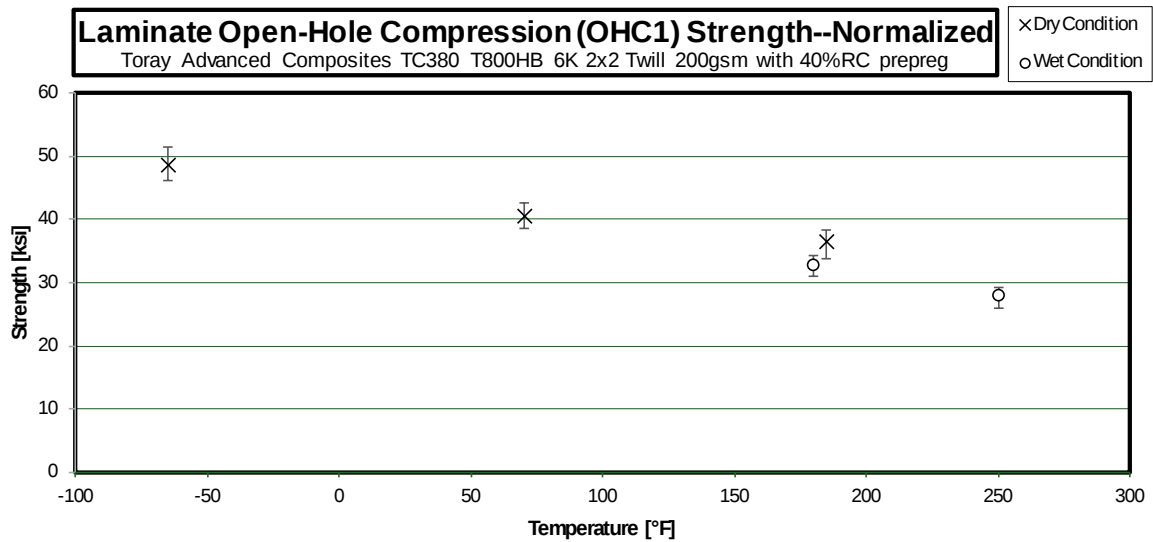
3.17 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)



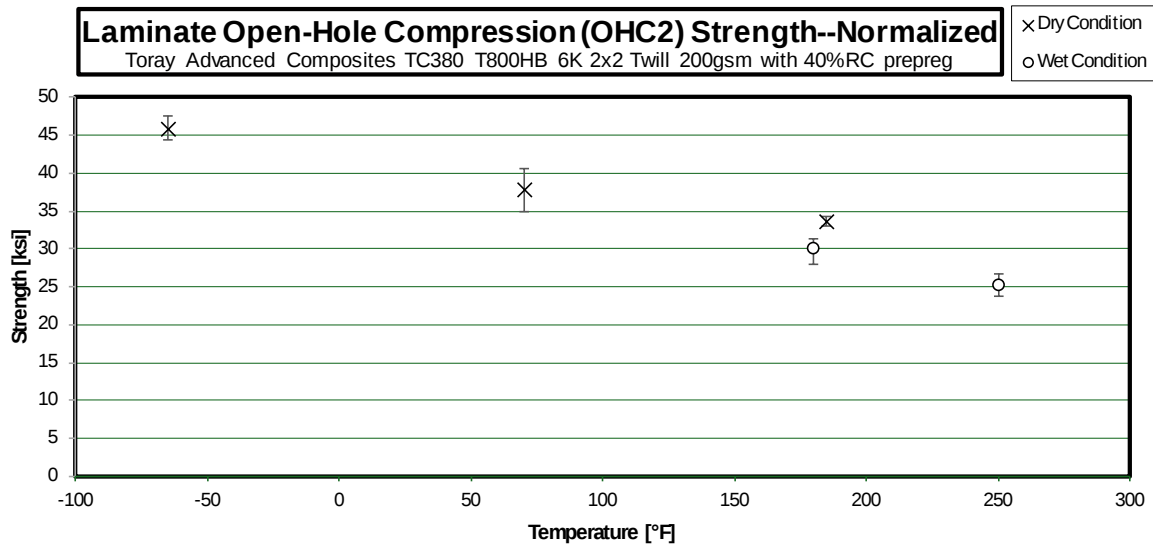
3.18 “40/20/40” Filled-Hole Tension 3 Properties (FHT3)



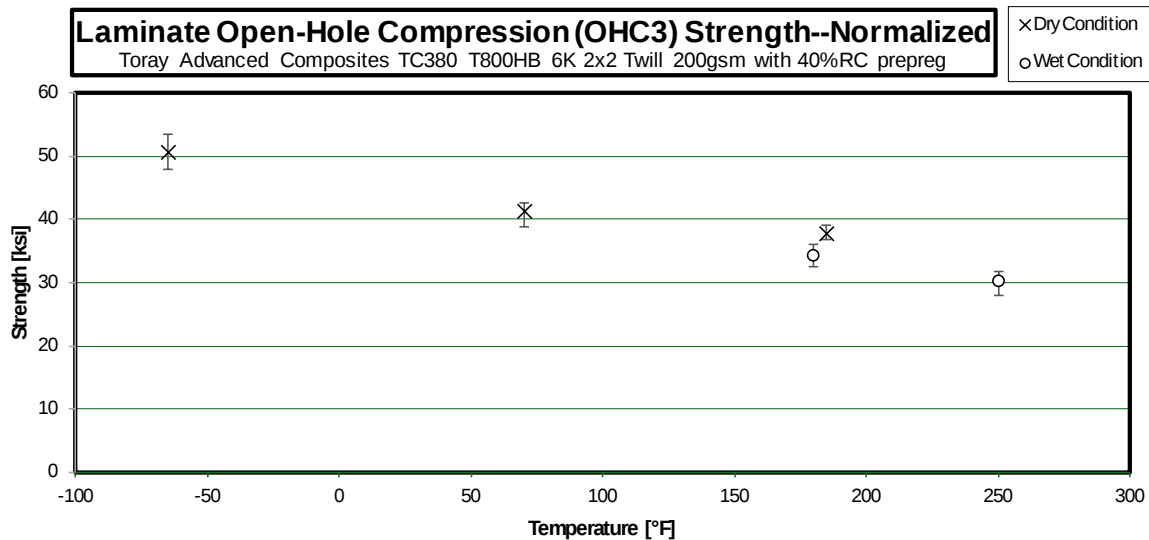
3.19 “25/50/25” Open-Hole Compression 1 Properties (OHC1)



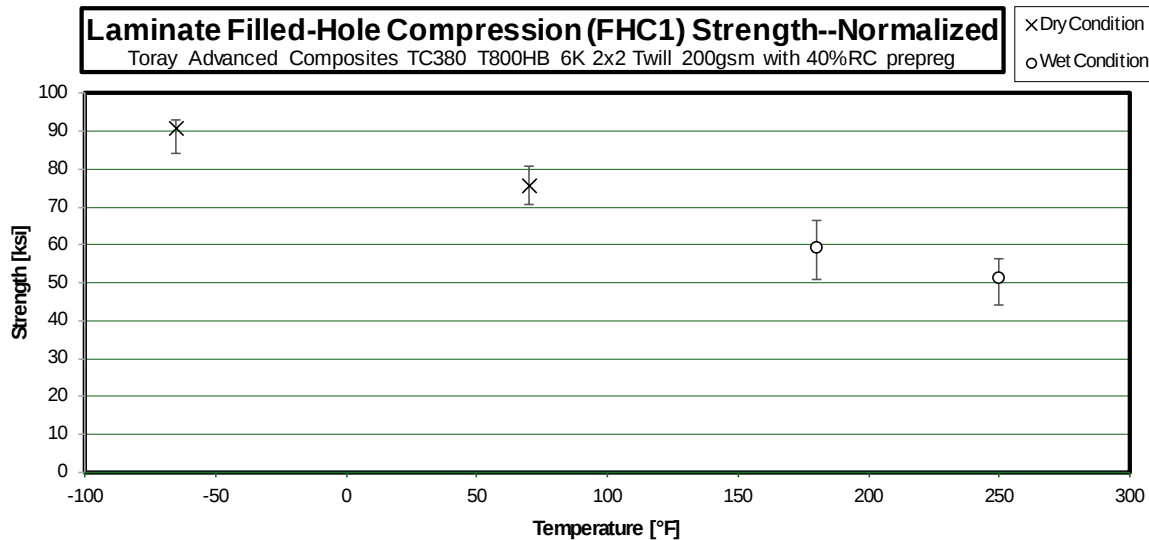
3.20 “10/80/10” Open-Hole Compression 2 Properties (OHC2)



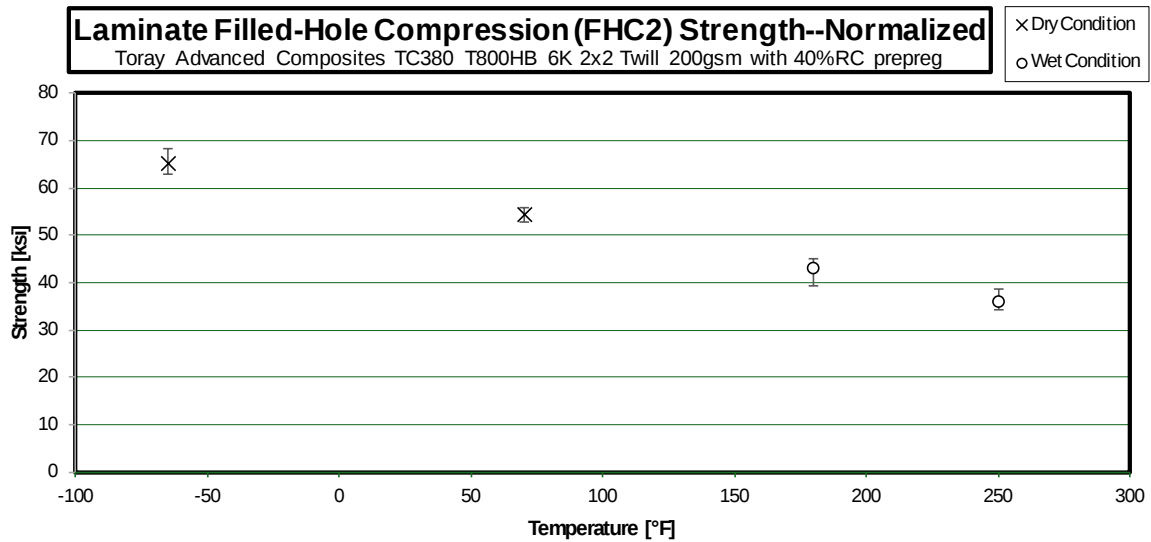
3.21 “40/20/40” Open-Hole Compression 3 Properties (OHC3)



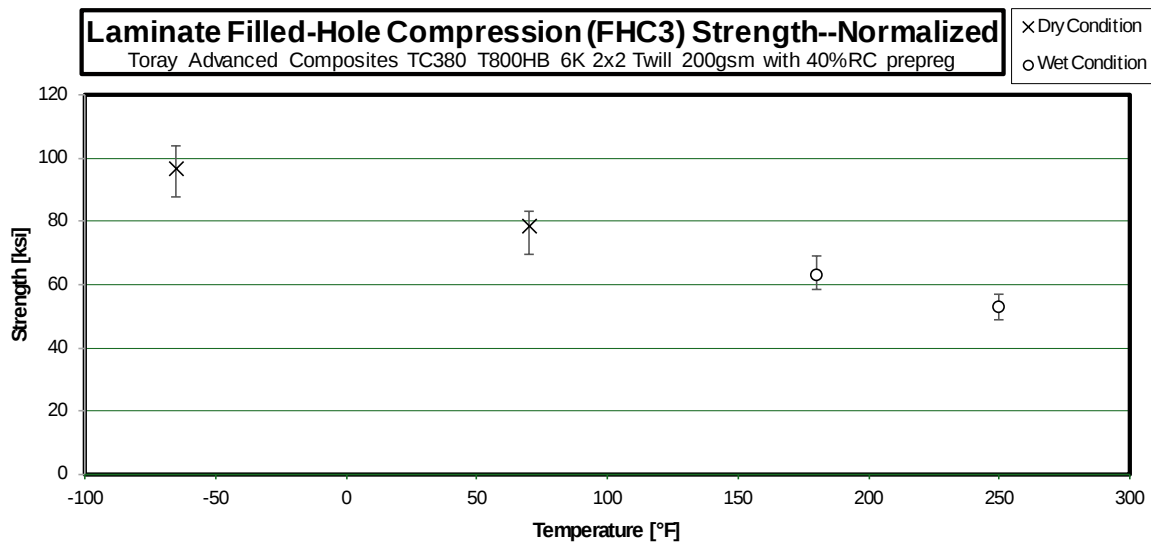
3.22 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)



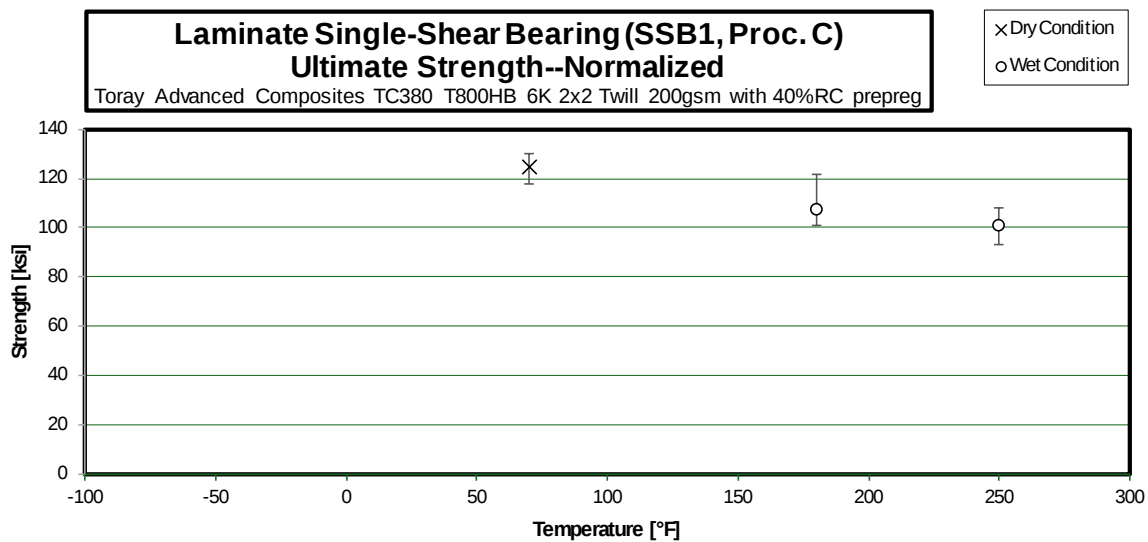
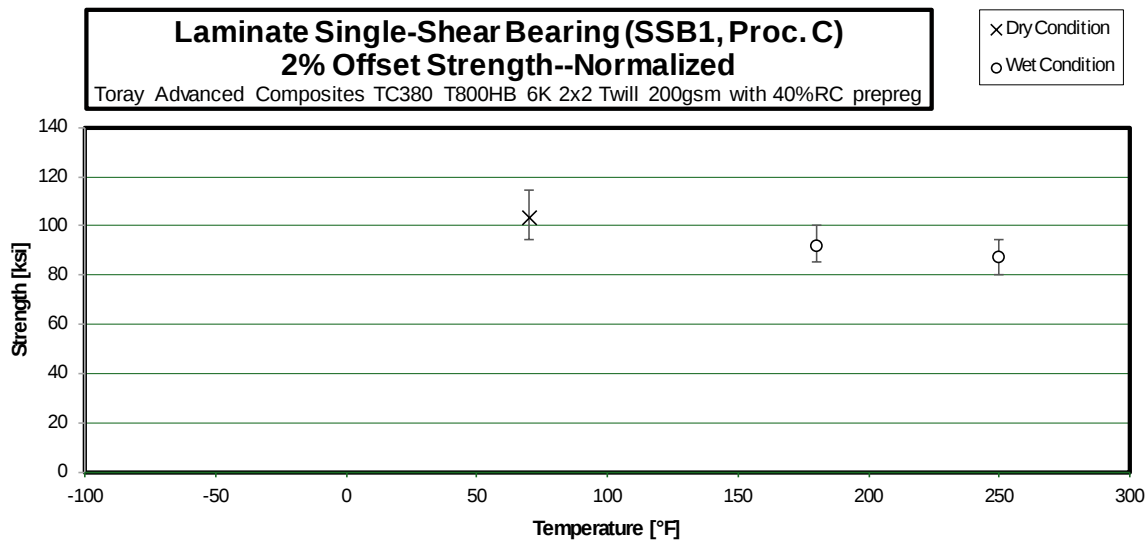
3.23 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

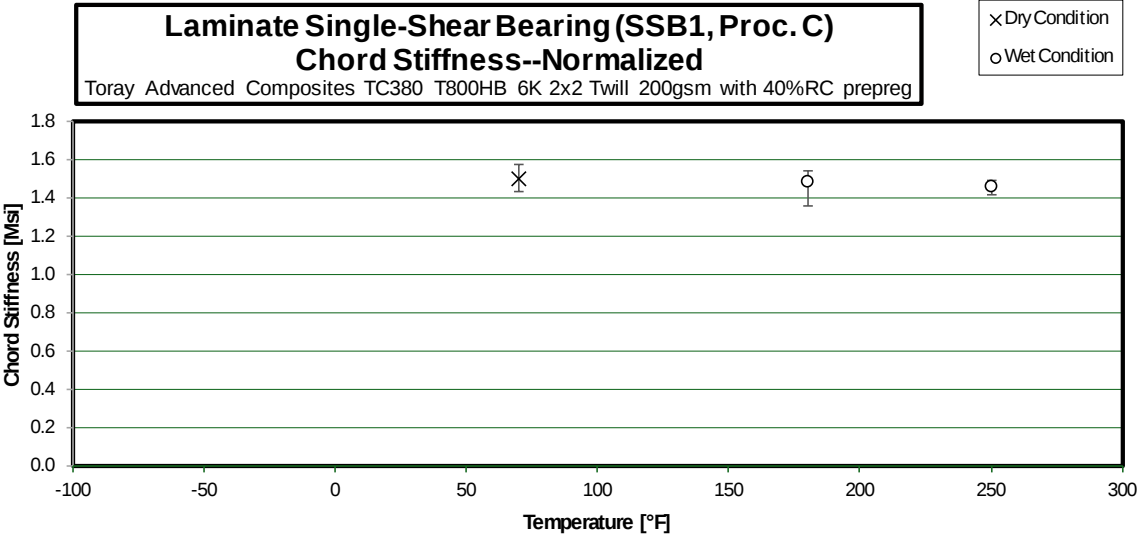


3.24 “40/20/40” Filled-Hole Compression 3 Properties (FHC3)

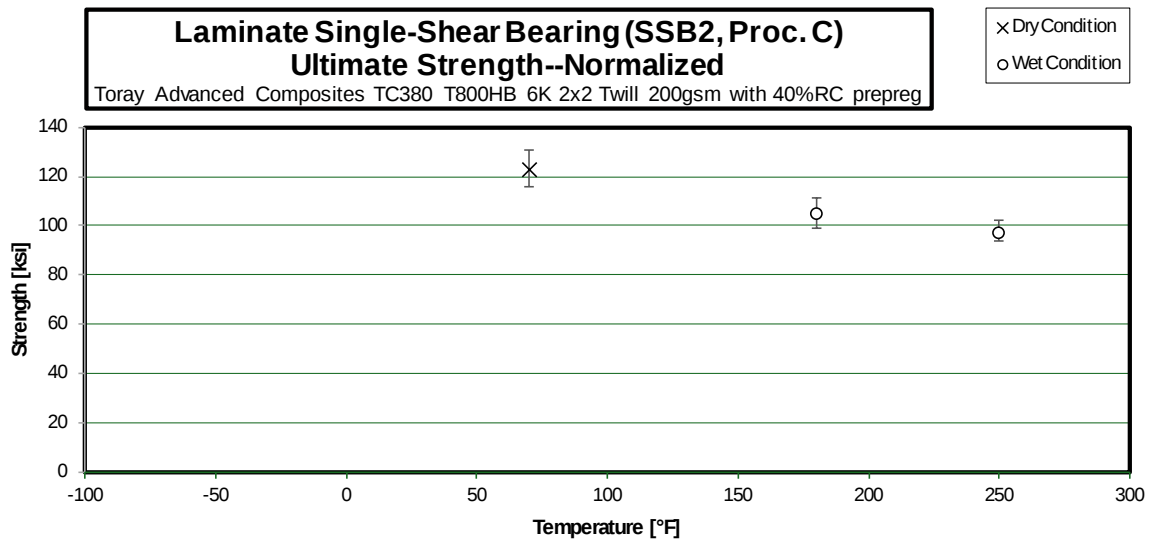
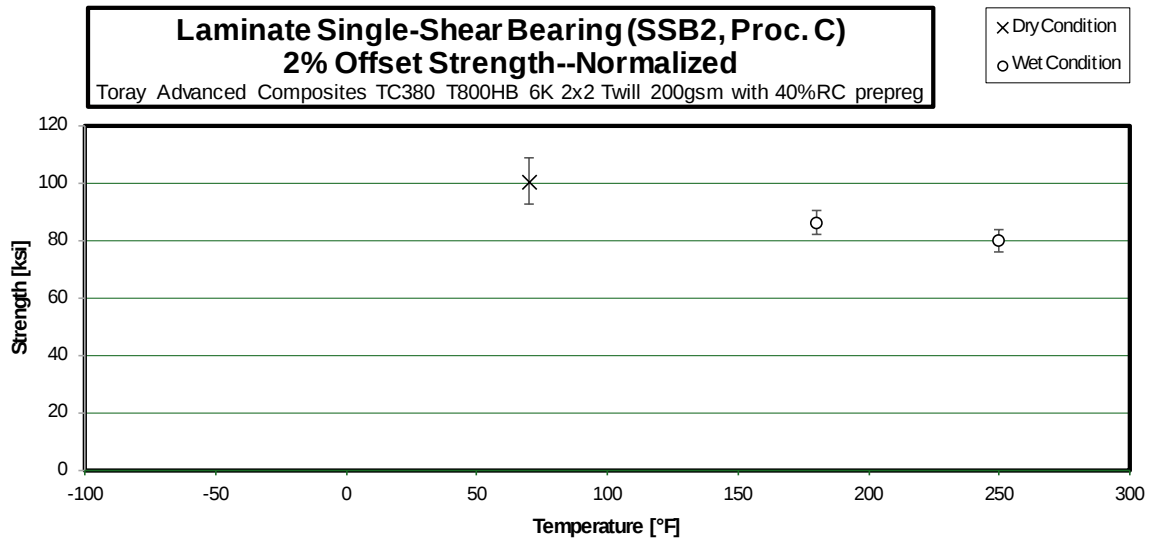


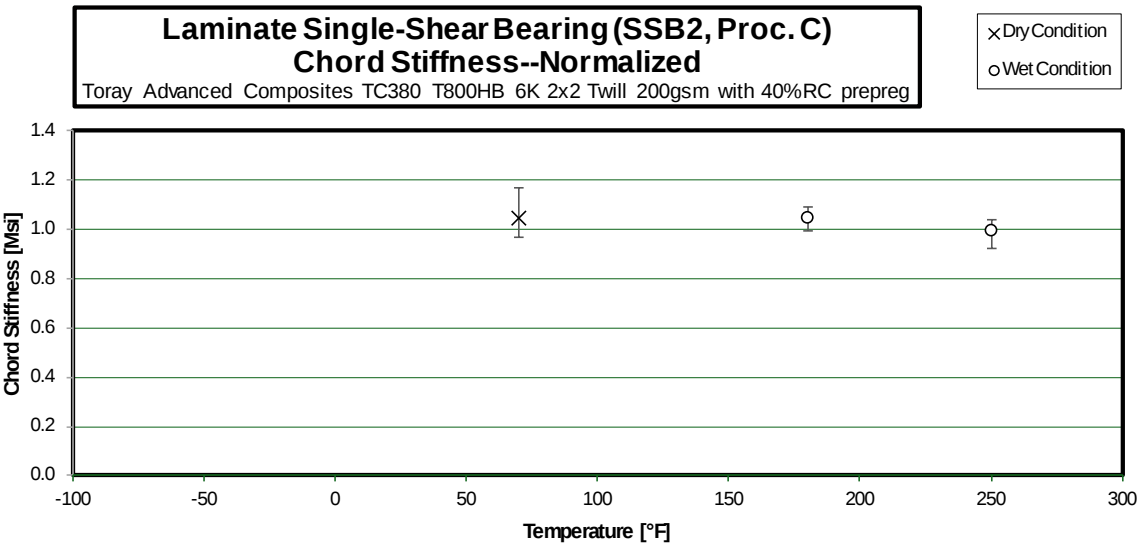
3.25 “25/50/25” Single-Shear Bearing 1 Properties (SSB1, Proc. C)



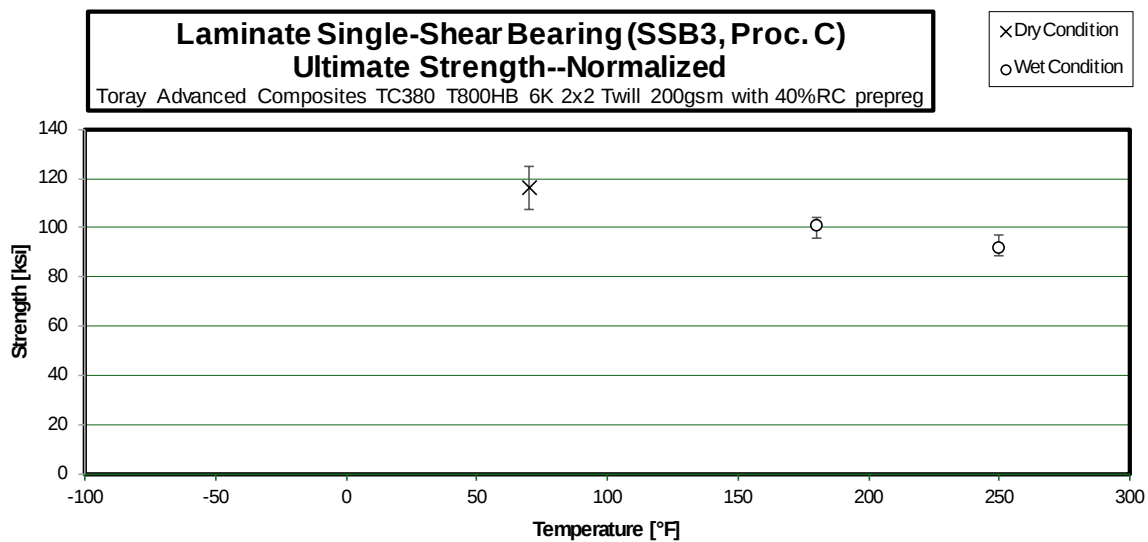
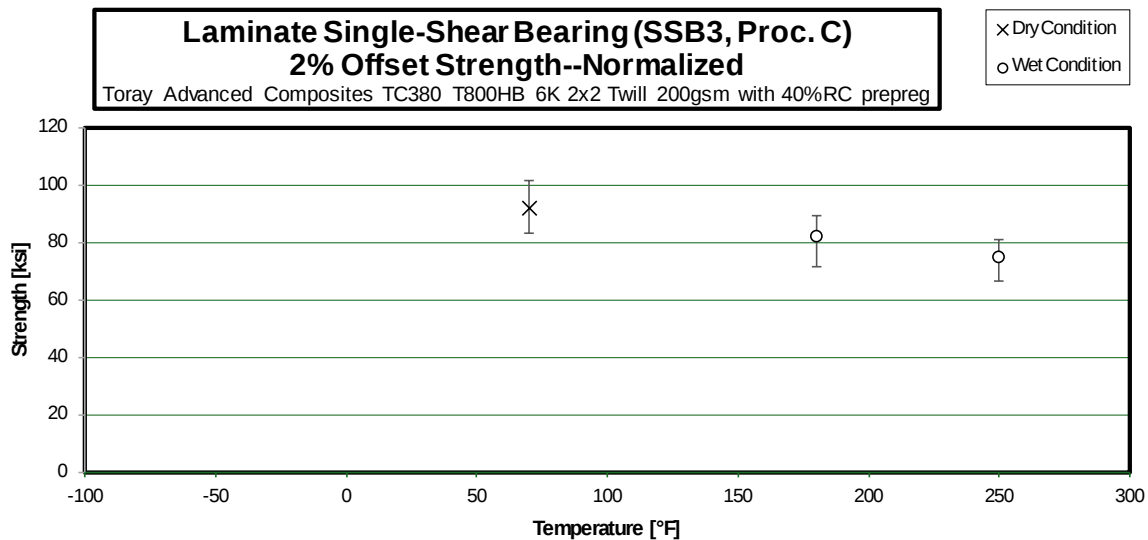


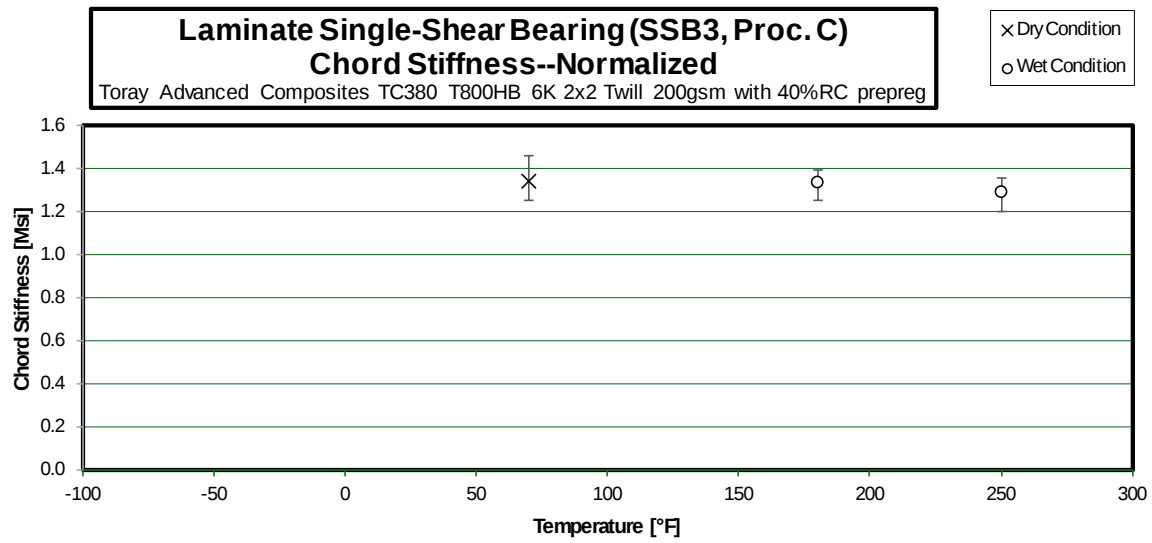
3.26 “10/80/10” Single-Shear Bearing 2 Properties (SSB2, Proc. C)



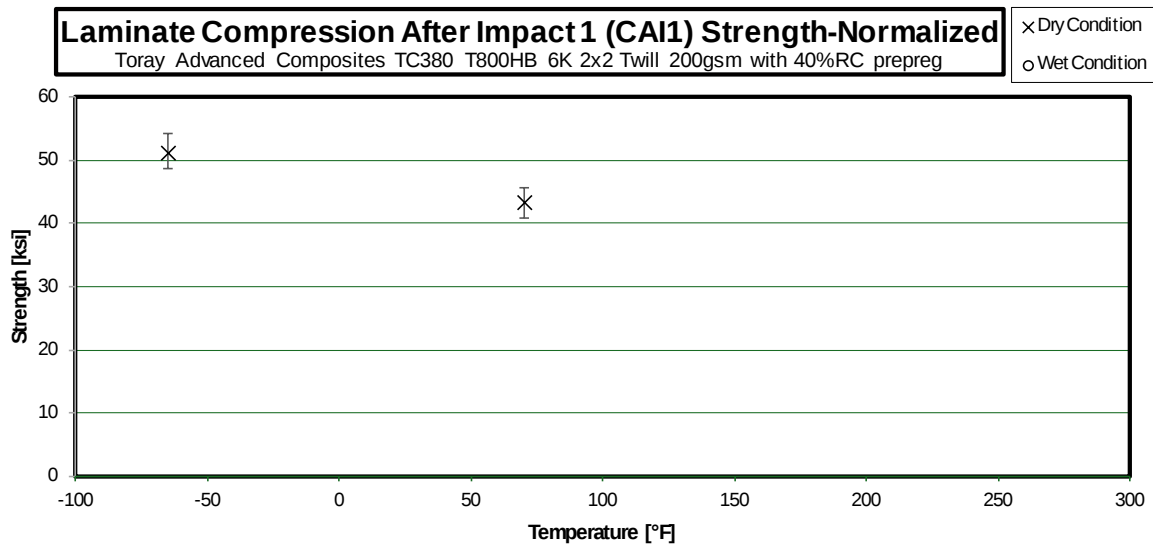


3.27 “40/20/40” Single-Shear Bearing 3 Properties (SSB3, Proc. C)

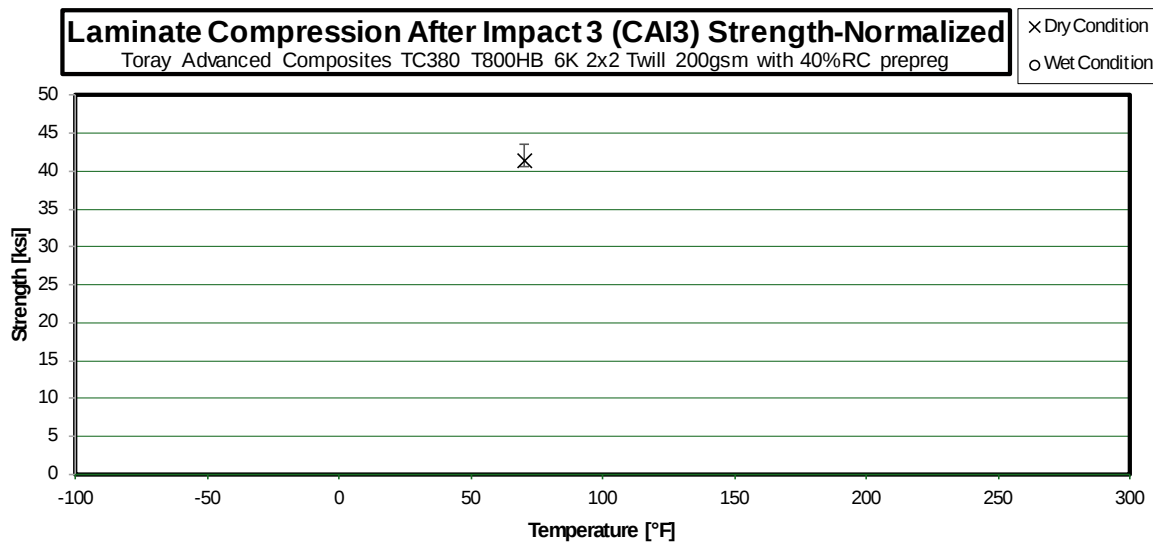




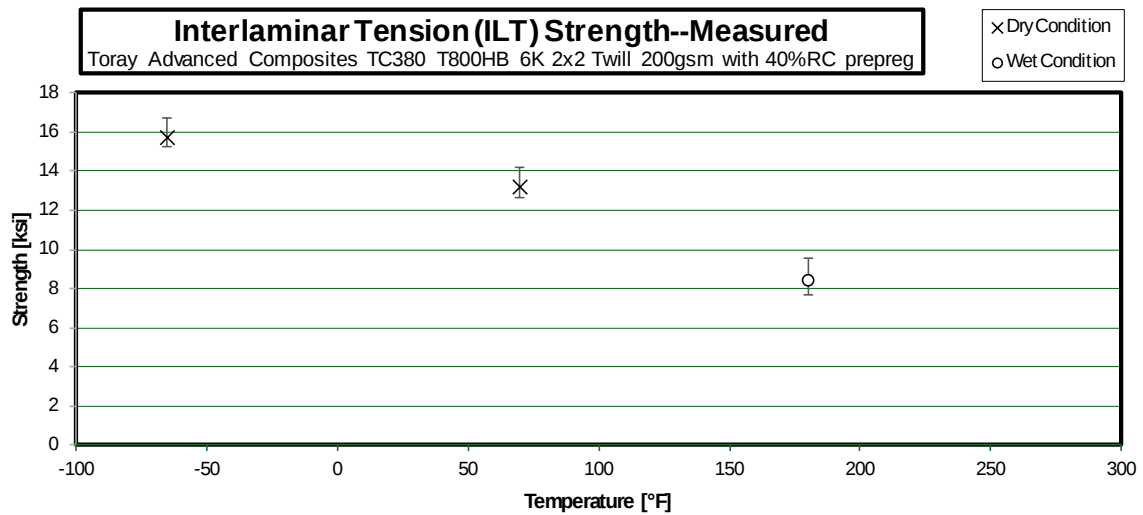
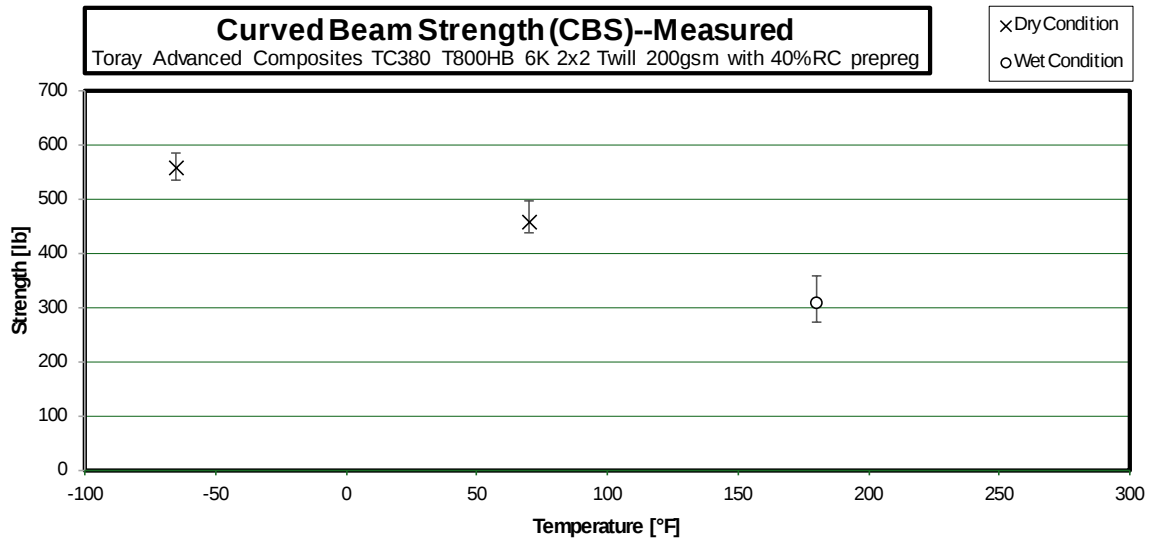
3.28 “25/50/25” Compression After Impact 1 Properties (CAI1)



3.29 “40/20/40” Compression After Impact 3 Properties (CAI3)



3.30 Interlaminar Tension Properties (ILT)



4. Raw Data

4.1 Warp Tension Properties (WT)

**Warp Tension Properties (WT)--CTD (-65°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

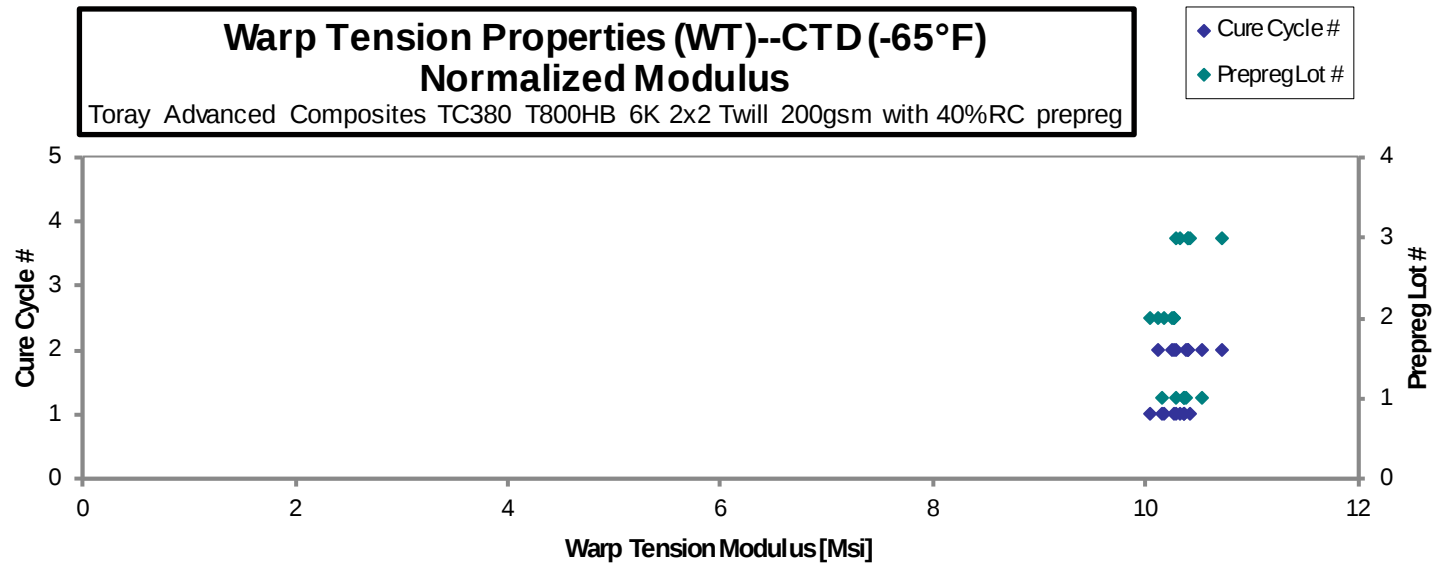
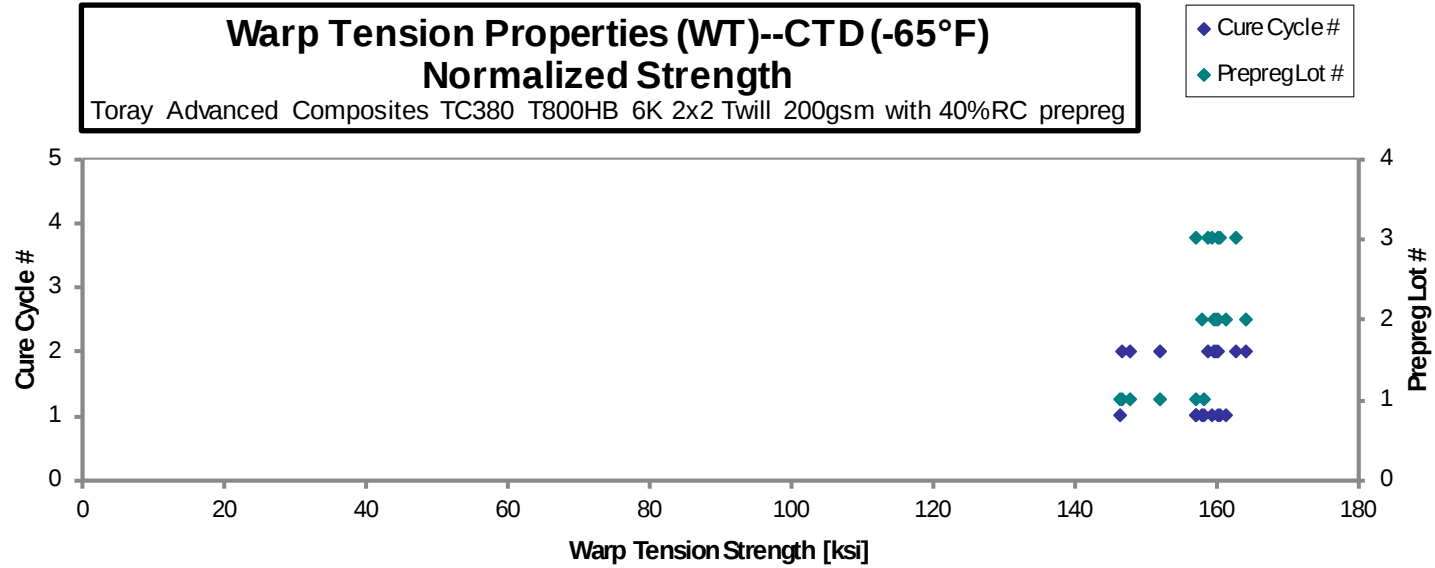
normalizing
t_{ply} [in]
0.008800

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
TCEJA111B	A	C1	1	1	156.7	10.32	0.04996	0.1060	12	LAT, LAB
TCEJA112B	A	C1	1	1	156.5	10.05	0.03827	0.1068	12	LAT
TCEJA113B	A	C1	1	1	145.4	10.28	0.03726	0.1064	12	LAT
TCEJA211B	A	C2	1	2	153.1	10.46	0.04982	0.1048	12	LAT
TCEJA212B	A	C2	1	2	148.4	10.32	0.05145	0.1052	12	LAB
TCEJA213B	A	C2	1	2	147.6	10.60	0.06085	0.1049	12	LAB
TCEJB111B	B	C1	2	1	163.0	10.37	0.04268	0.1045	12	LAB
TCEJB112B	B	C1	2	1	159.3	10.26	0.03244	0.1048	12	LAB
TCEJB113B	B	C1	2	1	163.5	10.24	0.01885	0.1036	12	LAT, LAB
TCEJB211B	B	C2	2	2	161.6	10.35	0.05985	0.1045	12	LAB
TCEJB212B	B	C2	2	2	160.1	10.16	0.02876	0.1052	12	LAB
TCEJB213B	B	C2	2	2	165.3	10.33	0.04867	0.1049	12	LAB
TCEJC111B	C	C1	3	1	162.1	10.65	0.04503	0.1024	12	M(A,L)AT
TCEJC112B	C	C1	3	1	166.5	10.81	0.04674	0.1018	12	M(A,L)AB
TCEJC113B	C	C1	3	1	164.3	10.62	0.04188	0.1024	12	LAB
TCEJC211B	C	C2	3	2	163.0	10.57	0.05163	0.1038	12	M(A,L)AB
TCEJC212B	C	C2	3	2	164.9	10.53	0.04817	0.1043	12	M(A,L)WT, LAB
TCEJC213B	C	C2	3	2	160.5	10.83	0.07542	0.1045	12	M(A,L)AT

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008833	157.2	10.36
0.008900	158.3	10.16
0.008869	146.5	10.36
0.008733	152.0	10.38
0.008768	147.9	10.28
0.008739	146.6	10.53
0.008711	161.3	10.26
0.008733	158.1	10.18
0.008632	160.4	10.04
0.008710	159.9	10.25
0.008769	159.6	10.13
0.008744	164.2	10.26
0.008536	157.3	10.33
0.008481	160.4	10.42
0.008533	159.3	10.30
0.008653	160.3	10.40
0.008688	162.8	10.40
0.008708	158.8	10.72

Average 159.0 10.43 0.04598
Standard Dev. 6.431 0.2168 0.01275
Coeff. of Var. [%] 4.045 2.078 27.74
Min. 145.4 10.05 0.01885
Max. 166.5 10.83 0.07542
Number of Spec. 18 18 18

Average_{norm} 0.008708 157.3 10.32
Standard Dev._{norm} 5.370 0.1532
Coeff. of Var. [%]_{norm} 3.414 1.484
Min. 0.008481 146.5 10.04
Max. 0.008900 164.2 10.72
Number of Spec. 18 18 18



**Warp Tension Properties (WT)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

0.008800

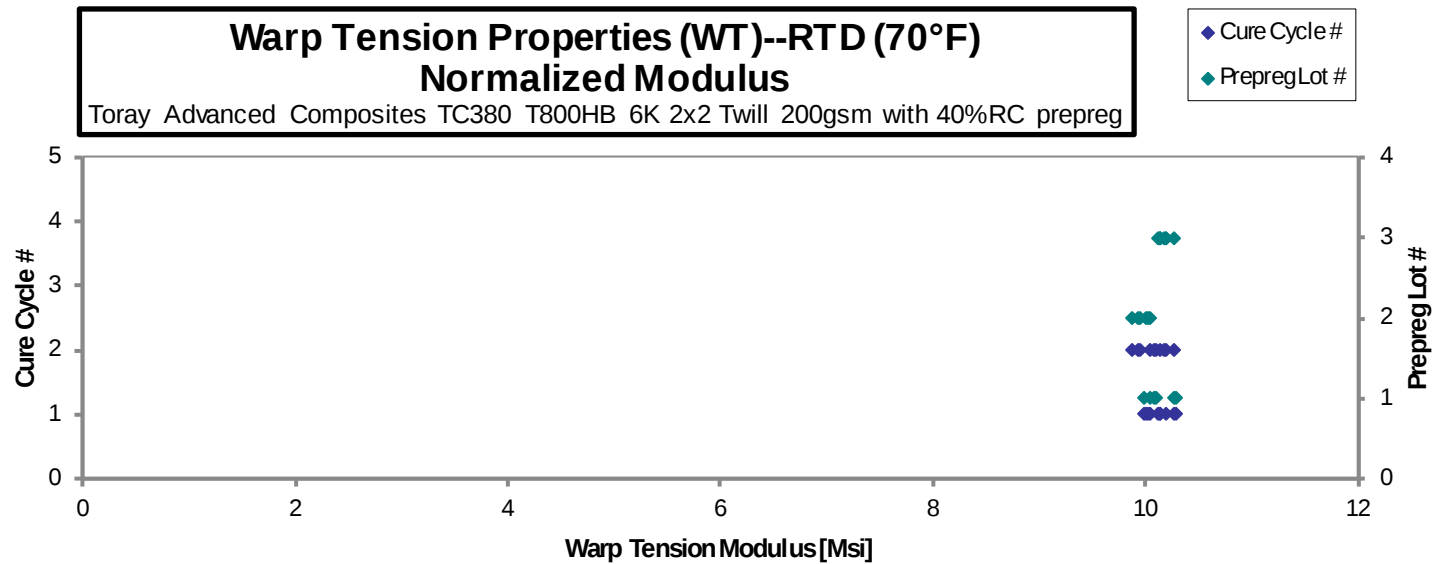
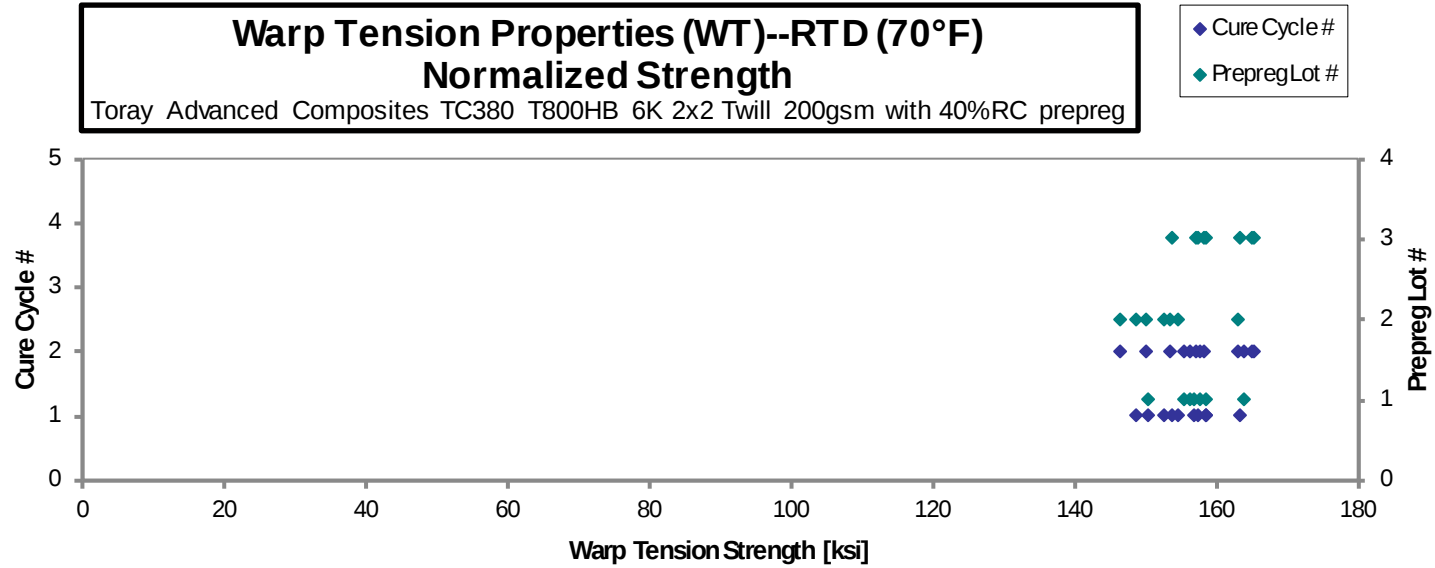
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEJA111A	A	C1	1	1	168.2	11.49	0.03310	0.09442	12	LAB
TCEJA112A	A	C1	1	1	168.2	10.92	0.04154	0.09948	12	LAB
TCEJA113A	A	C1	1	1	161.4	10.27	0.03759	0.1027	12	LGT, LAB
TCEJA211A	A	C2	1	2	181.8	11.18	0.05009	0.09522	12	LAB, LWT
TCEJA212A	A	C2	1	2	169.0	10.76	0.04720	0.09852	12	LAT, LAB
TCEJA213A	A	C2	1	2	161.1	10.47	0.04462	0.1019	12	LAT
TCEJA214A*	A	C2	1	2	158.8			0.1039	12	LAB, LWT
TCEJB111A	B	C1	2	1	172.3	11.30	0.04764	0.09357	12	LAT, LWB
TCEJB112A	B	C1	2	1	159.2	10.74	0.03927	0.09853	12	LWT, LAB
TCEJB113A	B	C1	2	1	161.3	10.48	0.04750	0.1013	12	LWT, LAB
TCEJB211A	B	C2	2	2	179.3	10.94	0.05000	0.09600	12	LWT, LAB
TCEJB212A	B	C2	2	2	154.1	10.45	0.04840	0.1003	12	LAT
TCEJB213A	B	C2	2	2	156.7	10.09	0.05049	0.1034	12	LAT
TCEJB214A*	B	C2	2	2	151.1			0.1049	12	LAT
TCEJC111A	C	C1	3	1	182.4	11.39	0.03279	0.09450	12	M(A,L)AT, M(A,L)WB
TCEJC112A	C	C1	3	1	170.3	10.89	0.03520	0.09827	12	LAT, LWB
TCEJC113A	C	C1	3	1	164.5	10.57	0.03229	0.1012	12	LAT, LWB
TCEJC114A	C	C1	3	1	157.8	10.41	0.03283	0.1028	12	LWT, LAB
TCEJC211A	C	C2	3	2	175.2	10.88	0.04062	0.09960	12	M(A,L)WT, M(A,L)IB
TCEJC212A	C	C2	3	2	164.1	10.64	0.04441	0.1011	12	LAT
TCEJC213A	C	C2	3	2	168.7	10.42	0.04575	0.1033	12	M(A,L)WT, LAB
TCEJC214A	C	C2	3	2	161.0	10.31	0.04340	0.1039	12	LAB

* Specimen was not gaged, only strength is reported.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.007868	150.4	10.27
0.008290	158.5	10.29
0.008557	156.9	9.987
0.007935	163.9	10.08
0.008210	157.6	10.04
0.008492	155.5	10.10
0.008661	156.3	
0.007797	152.6	10.02
0.008211	148.6	10.02
0.008440	154.7	10.05
0.008000	163.0	9.942
0.008357	146.4	9.922
0.008614	153.4	9.881
0.008744	150.1	
0.007875	163.3	10.20
0.008189	158.5	10.13
0.008429	157.5	10.12
0.008568	153.6	10.14
0.008300	165.3	10.26
0.008422	157.1	10.18
0.008608	165.1	10.19
0.008654	158.3	10.14

Average	165.8	10.73	0.04224
Standard Dev.	8.665	0.3911	0.006395
Coeff. of Var. [%]	5.228	3.645	15.14
Min.	151.1	10.09	0.03229
Max.	182.4	11.49	0.05049
Number of Spec.	22	20	20

Average _{norm}	0.008328	156.7	10.10
Standard Dev. _{norm}		5.288	0.1165
Coeff. of Var. [%] _{norm}		3.375	1.154
Min.	0.007797	146.4	9.881
Max.	0.008744	165.3	10.29
Number of Spec.	22	22	20



**Warp Tension Properties (WT)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

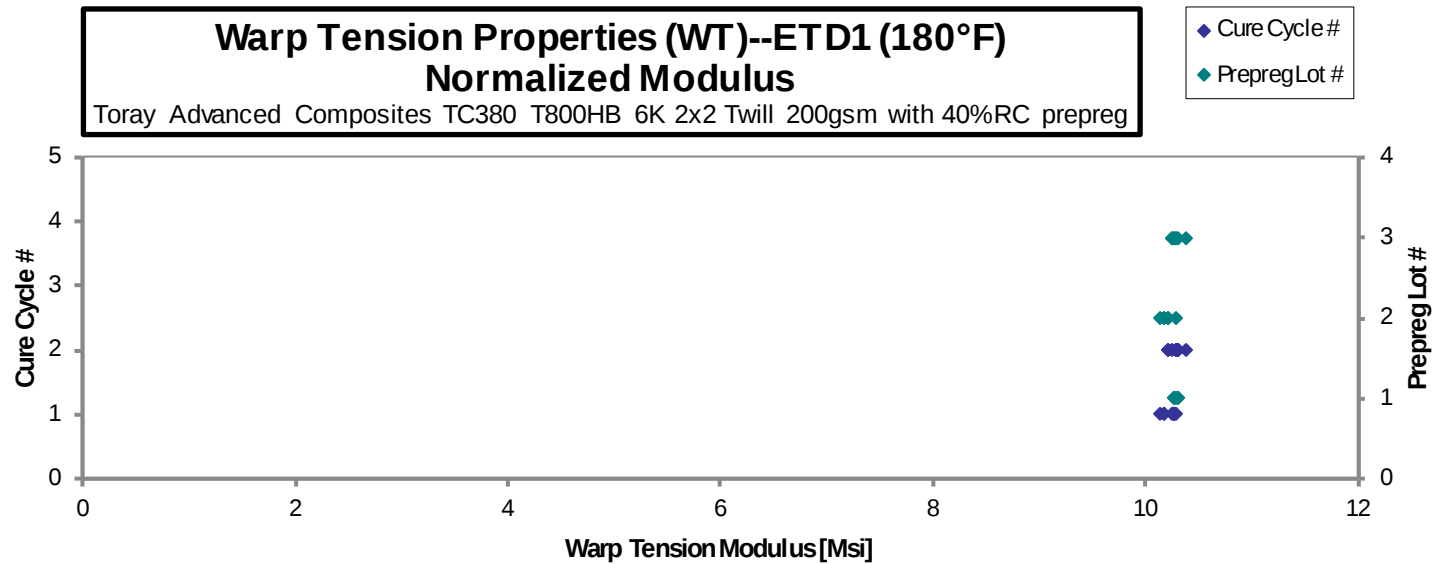
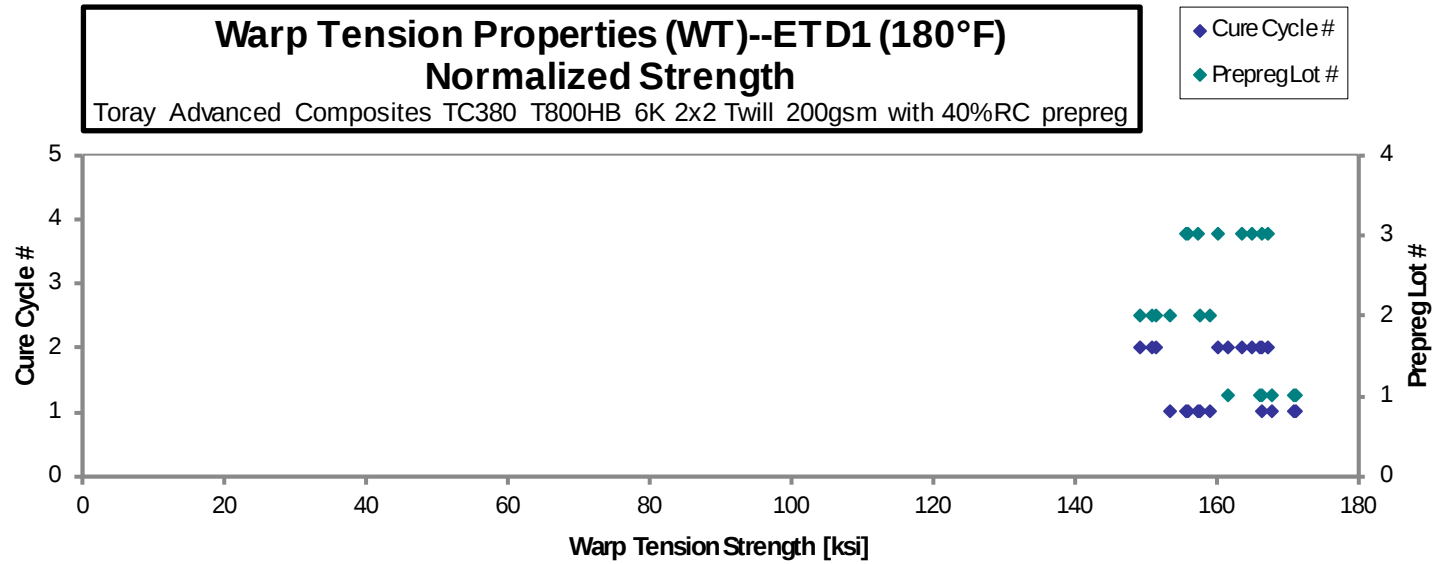
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEJA111C	A	C1	1	1	174.4	10.47	0.08036	0.1036	12	LWT, LIB
TCEJA112C	A	C1	1	1	176.5	10.59	0.04881	0.1024	12	LAT, LWB
TCEJA113C	A	C1	1	1	180.4	11.02	0.04348	0.09833	12	LWB, LAT
TCEJA211C	A	C2	1	2	173.2	10.73	0.03474	0.1015	12	LWT, LAB
TCEJA212C	A	C2	1	2	173.7	11.05	0.03444	0.09832	12	LAT, LGM
TCEJA213C	A	C2	1	2	186.7	11.59	0.03122	0.09398	12	LAT, LAB
TCEJB111C	B	C1	2	1	163.9	10.57	0.04086	0.1016	12	LAB
TCEJB112C	B	C1	2	1	169.5	10.84	0.02954	0.09917	12	LAT, LAB
TCEJB113C	B	C1	2	1	170.5	11.27	0.03090	0.09500	12	LWT, LAB
TCEJB211C	B	C2	2	2	156.1	10.55	0.04384	0.1022	12	LWT, LAB
TCEJB212C	B	C2	2	2	159.0	10.88	0.04651	0.09907	12	LAT, LAB
TCEJB213C	B	C2	2	2	167.6	11.39	0.03014	0.09537	12	LAB
TCEJC111C	C	C1	3	1	162.3	10.70	0.03430	0.1015	12	LWT, LIB
TCEJC112C	C	C1	3	1	166.4	10.97	0.03268	0.09883	12	LWT, LAB
TCEJC113C	C	C1	3	1	173.1	11.28	0.03109	0.09605	12	M(A,L)WT, LAB
TCEJC114C	C	C1	3	1	185.6	11.46	0.03447	0.09470	12	LAT, LWB
TCEJC211C	C	C2	3	2	170.7	10.58	0.04196	0.1036	12	LWB, LAT
TCEJC212C	C	C2	3	2	169.9	10.65	0.05048	0.1017	12	LAB, LWT
TCEJC213C	C	C2	3	2	174.7	10.89	0.04408	0.09973	12	LWB, LAT
TCEJC214C	C	C2	3	2	169.2	10.88	0.04283	0.1001	12	LAB, LIT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008635	171.2	10.28
0.008529	171.0	10.26
0.008194	167.9	10.26
0.008456	166.4	10.31
0.008193	161.7	10.29
0.007832	166.2	10.32
0.008464	157.7	10.17
0.008264	159.2	10.18
0.007917	153.4	10.14
0.008514	151.0	10.21
0.008256	149.2	10.21
0.007947	151.4	10.29
0.008461	156.1	10.29
0.008236	155.8	10.27
0.008004	157.4	10.26
0.007892	166.4	10.28
0.008629	167.4	10.37
0.008471	163.5	10.25
0.008311	165.0	10.29
0.008340	160.4	10.31

Average	171.2	10.92	0.04034
Standard Dev.	7.771	0.3321	0.01155
Coeff. of Var. [%]	4.540	3.042	28.63
Min.	156.1	10.47	0.02954
Max.	186.7	11.59	0.08036
Number of Spec.	20	20	20

Average _{norm}	0.008277	160.9	10.26
Standard Dev. _{norm}		6.761	0.05605
Coeff. of Var. [%] _{norm}		4.201	0.5462
Min.	0.007832	149.2	10.14
Max.	0.008635	171.2	10.37
Number of Spec.	20	20	20



**Warp Tension Properties (WT)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

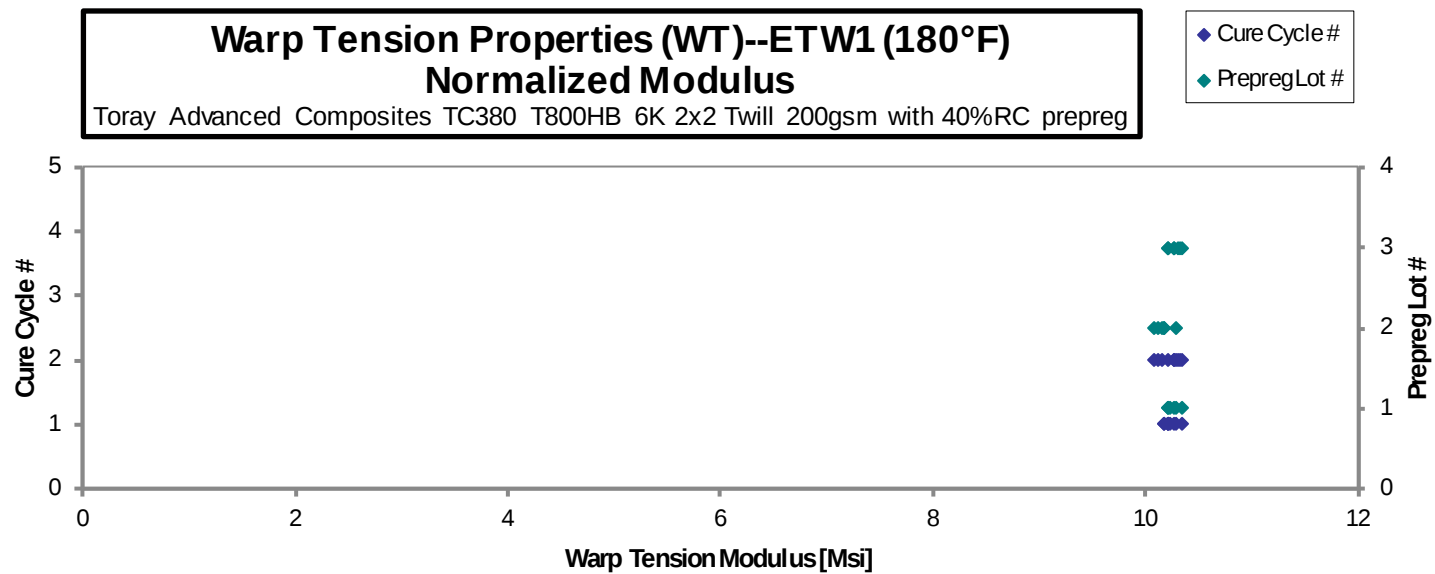
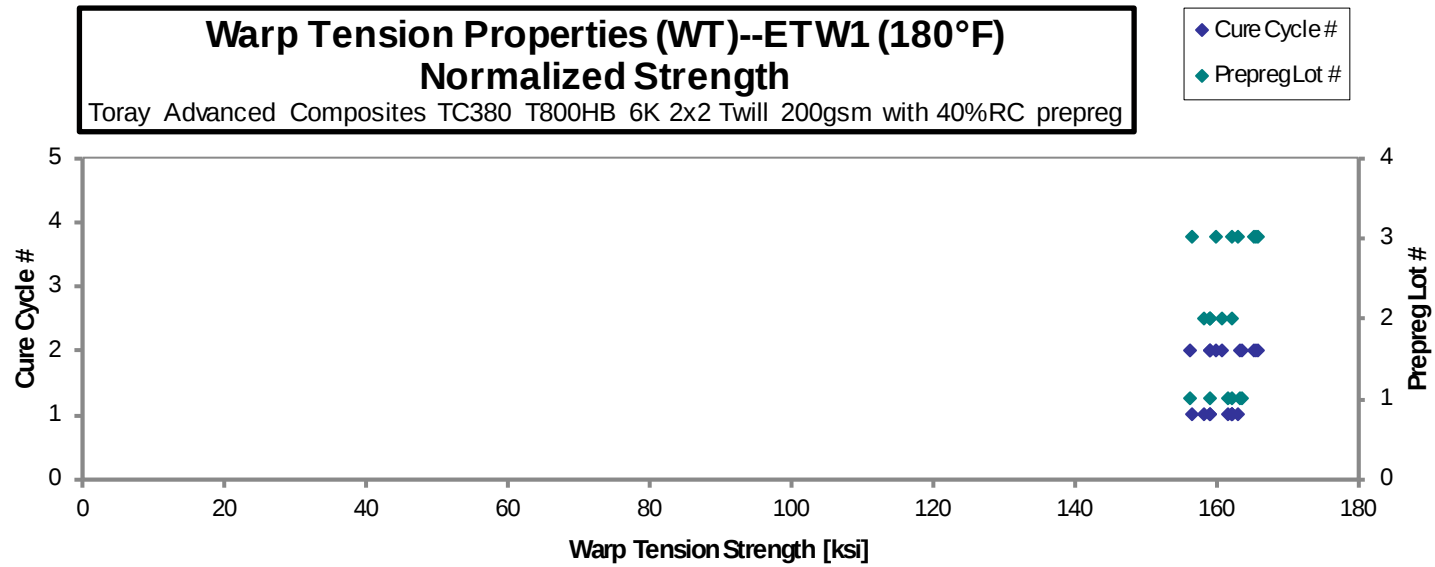
 t_{ply} [in]

0.008800

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	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCEJA111D	A	C1	1	1	171.0	10.92	0.03190	0.1001	12	LWB, LIT	0.008344	162.2	10.35
TCEJA112D	A	C1	1	1	163.3	10.33	0.04670	0.1046	12	LWB, LIT	0.008717	161.8	10.23
TCEJA113D	A	C1	1	1	156.9	10.06	0.04859	0.1072	12	LAT, LIB	0.008931	159.2	10.21
TCEJA211D	A	C2	1	2	163.5	10.68	0.04218	0.1009	12	LAT, LAB	0.008411	156.3	10.21
TCEJA212D	A	C2	1	2	166.7	10.45	0.04162	0.1037	12	LWB, LIT	0.008644	163.8	10.26
TCEJA213D	A	C2	1	2	162.0	10.21	0.04114	0.1065	12	LAT, LIB	0.008872	163.3	10.29
TCEJB111D	B	C1	2	1	171.7	10.89	0.03268	0.09977	12	LWT, LIB	0.008314	162.2	10.29
TCEJB112D	B	C1	2	1	161.3	10.37	0.04080	0.1037	12	LWB, LAT	0.008640	158.4	10.18
TCEJB113D	B	C1	2	1	158.6	10.15	0.03157	0.1060	12	LWT, LIB	0.008831	159.1	10.18
TCEJB211D	B	C2	2	2	165.2	10.55	0.03931	0.1016	12	LAT, LIB	0.008469	159.0	10.15
TCEJB212D	B	C2	2	2	159.7	10.12	0.03377	0.1052	12	LAT, LIB	0.008769	159.2	10.08
TCEJB213D	B	C2	2	2	158.5	9.961	0.03417	0.1072	12	LWB, LAT	0.008932	160.9	10.11
TCEJC111D	C	C1	3	1	166.2	10.83	0.03301	0.09953	12	LAT, LAB	0.008294	156.6	10.21
TCEJC112D	C	C1	3	1	165.2	10.39	0.03264	0.1038	12	LWB, LIT	0.008650	162.4	10.21
TCEJC113D	C	C1	3	1	161.7	10.18	0.03279	0.1065	12	LWT, LAB	0.008876	163.1	10.26
TCEJC211D	C	C2	3	2	171.8	10.72	0.04587	0.1019	12	LWT, LIB	0.008488	165.7	10.34
TCEJC212D	C	C2	3	2	167.8	10.48	0.05066	0.1040	12	AWB, LAT	0.008668	165.3	10.33
TCEJC213D	C	C2	3	2	167.6	10.39	0.04721	0.1045	12	LIT, LAB	0.008707	165.8	10.28
TCEJC214D	C	C2	3	2	160.8	10.36	0.04463	0.1051	12	M(A,L)WT, LIB	0.008757	160.0	10.31

Average 164.2 10.42 0.03954
 Standard Dev. 4.520 0.2838 0.006516
 Coeff. of Var. [%] 2.753 2.723 16.48
 Min. 156.9 9.961 0.03157
 Max. 171.8 10.92 0.05066
 Number of Spec. 19 19 19

Average_{norm} 0.008648 161.3 10.24
 Standard Dev._{norm} 2.867 0.07509
 Coeff. of Var. [%]_{norm} 1.778 0.7336
 Min. 0.008294 156.3 10.08
 Max. 0.008932 165.8 10.35
 Number of Spec. 19 19 19



**Warp Tension Properties (WT)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

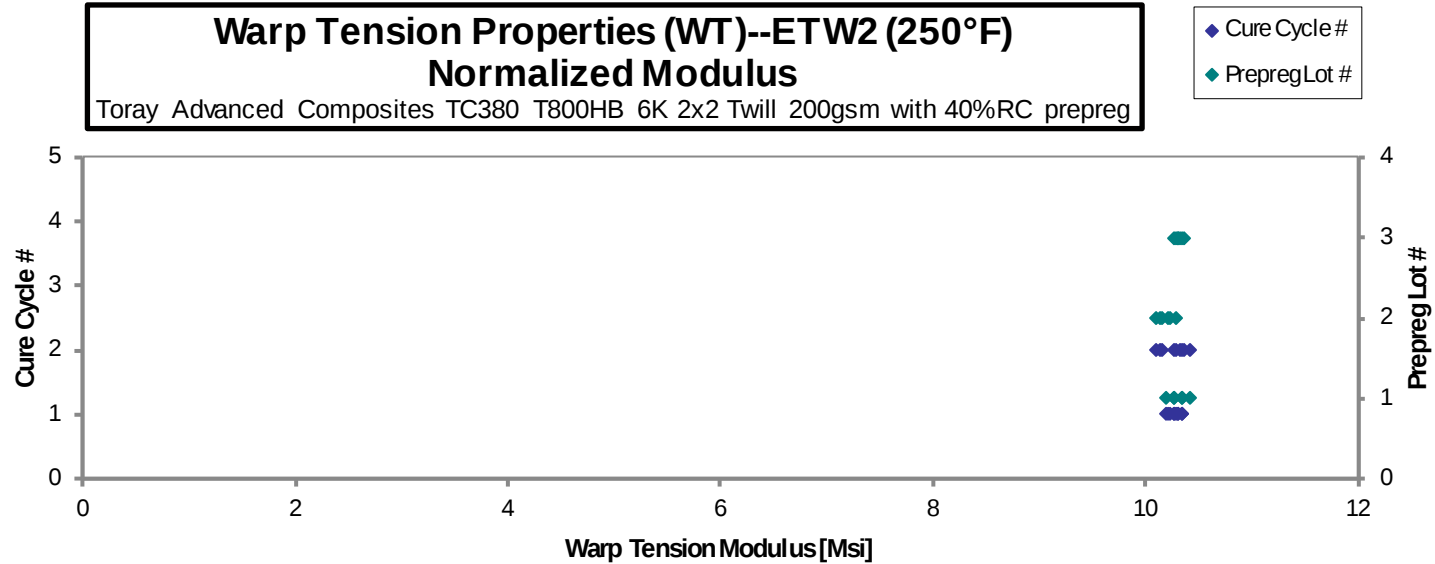
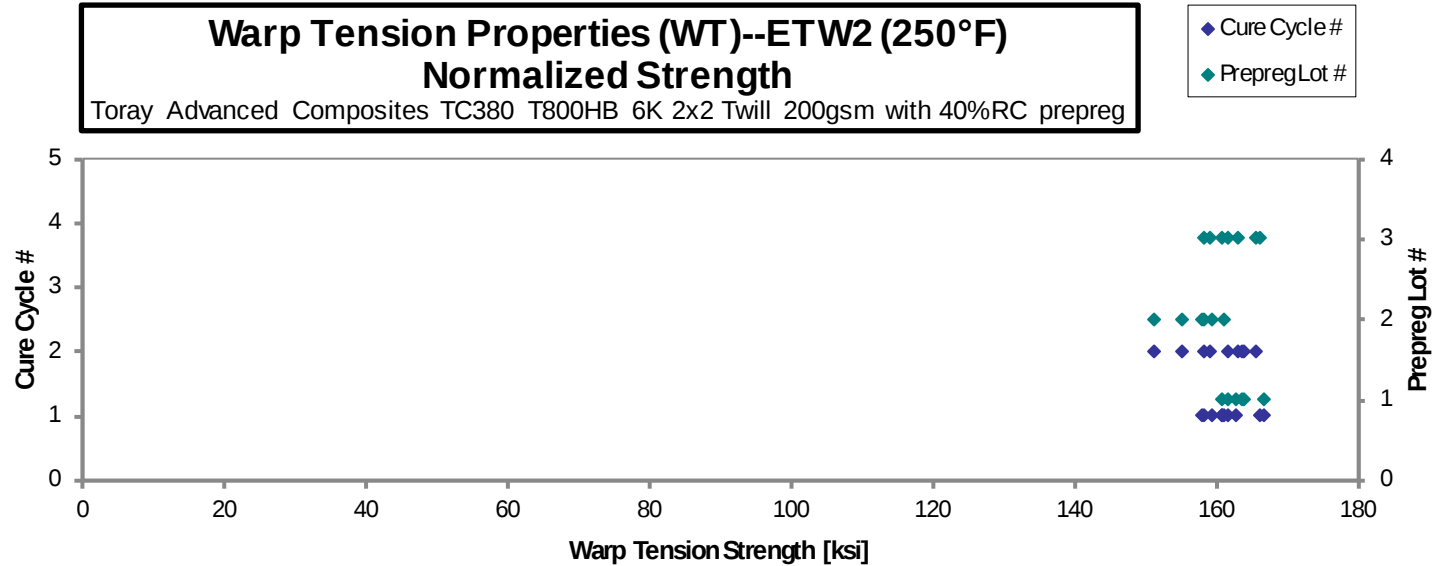
t_{ply} [in]

0.008800

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	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
TCEJA111E	A	C1	1	1	153.9	9.827	0.02938	0.1103	12	LWT, LIB	0.009189	160.7	10.26
TCEJA112E	A	C1	1	1	158.9	10.10	0.03631	0.1083	12	LAT, LWB	0.009021	162.9	10.35
TCEJA113E	A	C1	1	1	166.2	10.16	0.04426	0.1060	12	LAT, LWB	0.008832	166.8	10.20
TCEJA211E	A	C2	1	2	160.3	10.06	0.03676	0.1079	12	LWT, LIB	0.008988	163.7	10.27
TCEJA212E	A	C2	1	2	160.9	10.30	0.04239	0.1061	12	LWT, LIB	0.008840	161.6	10.35
TCEJA213E	A	C2	1	2	167.3	10.63	0.04096	0.1035	12	LGT, LIB	0.008621	163.9	10.42
TCEJB111E	B	C1	2	1	158.3	10.04	0.03742	0.1074	12	LAT, LWB	0.008953	161.1	10.22
TCEJB112E	B	C1	2	1	157.2	10.24	0.03804	0.1061	12	LWT, LIB	0.008844	158.0	10.29
TCEJB113E	B	C1	2	1	162.1	10.41	0.04196	0.1039	12	LAT, LWB	0.008657	159.5	10.24
TCEJB211E	B	C2	2	2	154.3	9.895	0.04304	0.1083	12	LWB, LIT	0.009028	158.3	10.15
TCEJB212E	B	C2	2	2	150.2	10.04	0.04265	0.1063	12	LWT, LAB	0.008854	151.1	10.11
TCEJB213E	B	C2	2	2	158.0	10.33	0.03958	0.1037	12	LAT, LIB	0.008642	155.2	10.14
TCEJC111E	C	C1	3	1	158.7	10.22	0.02947	0.1070	12	LAT, LWB	0.008913	160.8	10.35
TCEJC112E	C	C1	3	1	156.7	10.17	0.03483	0.1067	12	LWT, LWB	0.008889	158.3	10.28
TCEJC113E	C	C1	3	1	168.1	10.44	0.03282	0.1043	12	LAT, LIB	0.008690	166.0	10.31
TCEJC114E	C	C1	3	1	168.4	10.72	0.02792	0.1014	12	LWT, LAB	0.008451	161.7	10.30
TCEJC211E	C	C2	3	2	163.9	10.41	0.03890	0.1051	12	LWB, LAT	0.008761	163.2	10.37
TCEJC212E	C	C2	3	2	160.0	10.34	0.03786	0.1051	12	LWB, LAT	0.008757	159.3	10.29
TCEJC213E	C	C2	3	2	166.5	10.38	0.04321	0.1051	12	LWT, LWB	0.008756	165.7	10.33

Average	160.5	10.25	0.03778
Standard Dev.	5.169	0.2303	0.004998
Coeff. of Var. [%]	3.220	2.248	13.23
Min.	150.2	9.827	0.02792
Max.	168.4	10.72	0.04426
Number of Spec.	19	19	19

Average _{norm}	0.008826	160.9	10.27
Standard Dev _{norm}		3.849	0.08261
Coeff. of Var. [%] _{norm}		2.392	0.8041
Min.	0.008451	151.1	10.11
Max.	0.009189	166.8	10.42
Number of Spec.	19	19	19



4.2 Fill Tension Properties (FT)

**Fill Tension Properties (FT)--CTD (-65°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

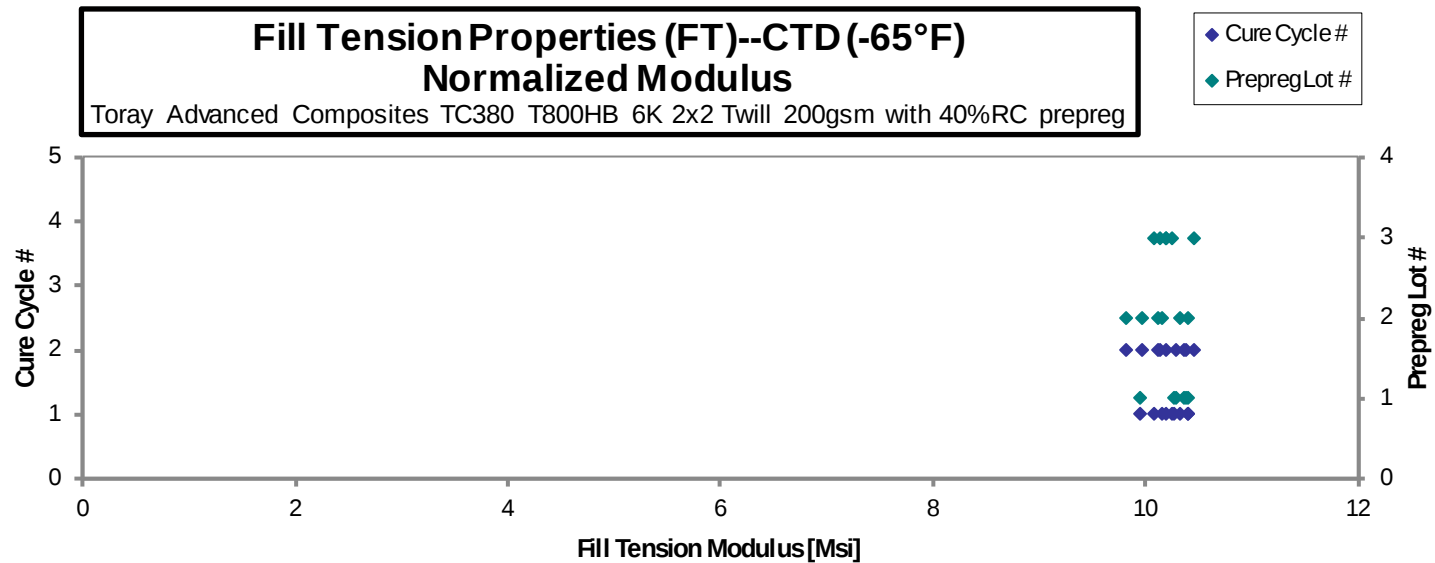
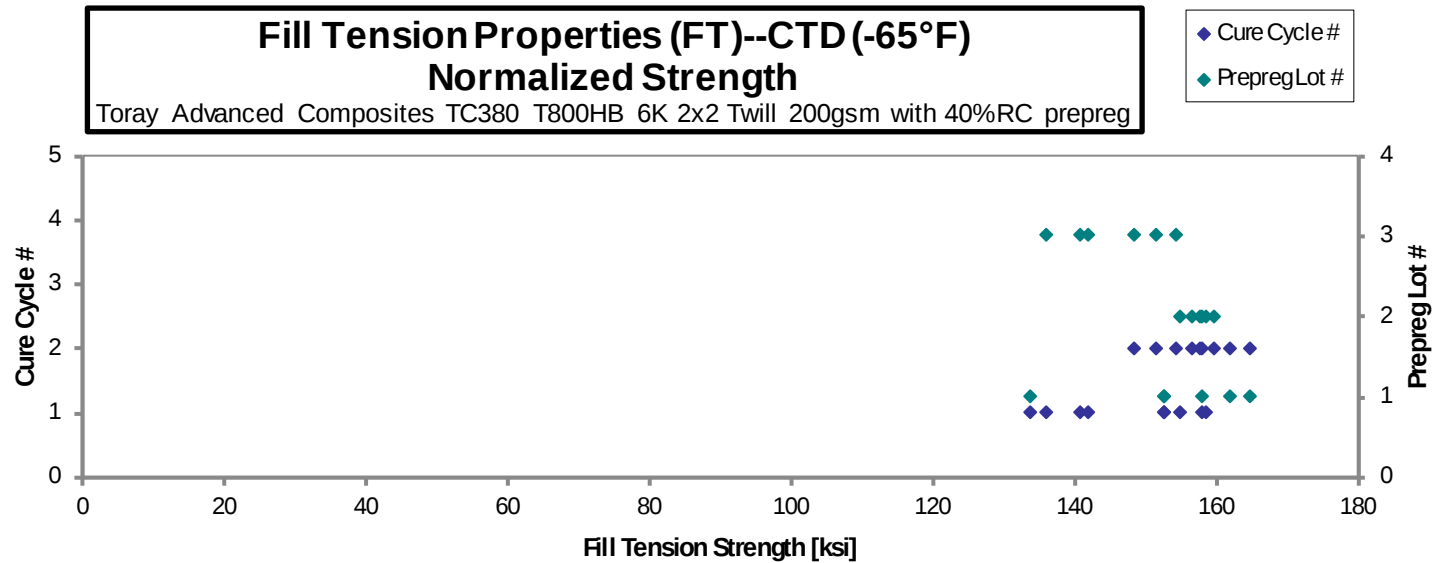
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEUA111B	A	C1	1	1	135.4	10.07	0.1044	12	LAB
TCEUA112B	A	C1	1	1	155.1	10.44	0.1039	12	LAT
TCEUA113B	A	C1	1	1	153.9	10.49	0.1047	12	LAT
TCEUA211B	A	C2	1	2	166.7	10.41	0.1043	12	LAT, LAB
TCEUA212B	A	C2	1	2	163.3	10.47	0.1048	12	LAT, LWB
TCEUA213B	A	C2	1	2	160.8	10.54	0.1038	12	LAT, LWB
TCEUB111B	B	C1	2	1	157.8	10.37	0.1060	12	LGM
TCEUB112B	B	C1	2	1	156.2	10.20	0.1068	12	LWT, LAB
TCEUB113B	B	C1	2	1	154.9	10.15	0.1056	12	LAT
TCEUB211B	B	C2	2	2	160.8	10.20	0.1048	12	LAT
TCEUB212B	B	C2	2	2	157.4	10.01	0.1051	12	LAB
TCEUB213B	B	C2	2	2	158.8	9.879	0.1049	12	LWT, LAB
TCEUC111B	C	C1	3	1	143.2	10.28	0.1047	12	LAT
TCEUC112B	C	C1	3	1	143.1	10.25	0.1040	12	LAT
TCEUC113B	C	C1	3	1	138.0	10.41	0.1041	12	LAT
TCEUC211B	C	C2	3	2	156.1	10.24	0.1045	12	LWB, LAT
TCEUC212B	C	C2	3	2	152.9	10.30	0.1046	12	LAB, LAT
TCEUC213B	C	C2	3	2	149.8	10.55	0.1046	12	LAB, M(A,L)WT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008700	133.8	9.955
0.008658	152.6	10.27
0.008728	152.6	10.41
0.008694	164.7	10.29
0.008735	162.1	10.39
0.008651	158.1	10.36
0.008833	158.4	10.41
0.008897	157.9	10.32
0.008801	154.9	10.15
0.008735	159.6	10.12
0.008757	156.6	9.960
0.008744	157.8	9.817
0.008726	142.0	10.19
0.008667	140.9	10.09
0.008672	136.0	10.26
0.008707	154.4	10.13
0.008717	151.5	10.20
0.008718	148.4	10.45

Average 153.6 10.29
 Standard Dev. 8.592 0.1879
 Coeff. of Var. [%] 5.595 1.826
 Min. 135.4 9.879
 Max. 166.7 10.55
 Number of Spec. 18 18

Average_{norm} 0.008730 152.4 10.21
 Standard Dev._{norm} 8.828 0.1769
 Coeff. of Var. [%]_{norm} 5.794 1.733
 Min. 0.008651 133.8 9.817
 Max. 0.008897 164.7 10.45
 Number of Spec. 18 18 18



Fill Tension Properties (FT)--RTD (70°F)
Strength & Modulus

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

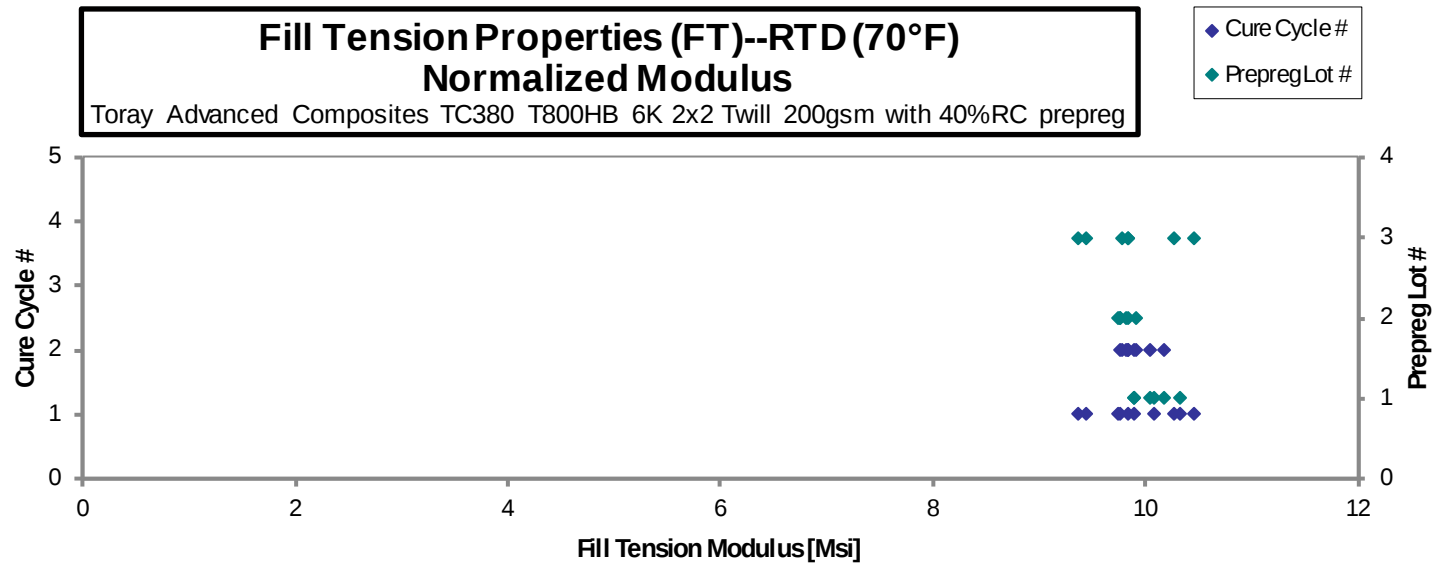
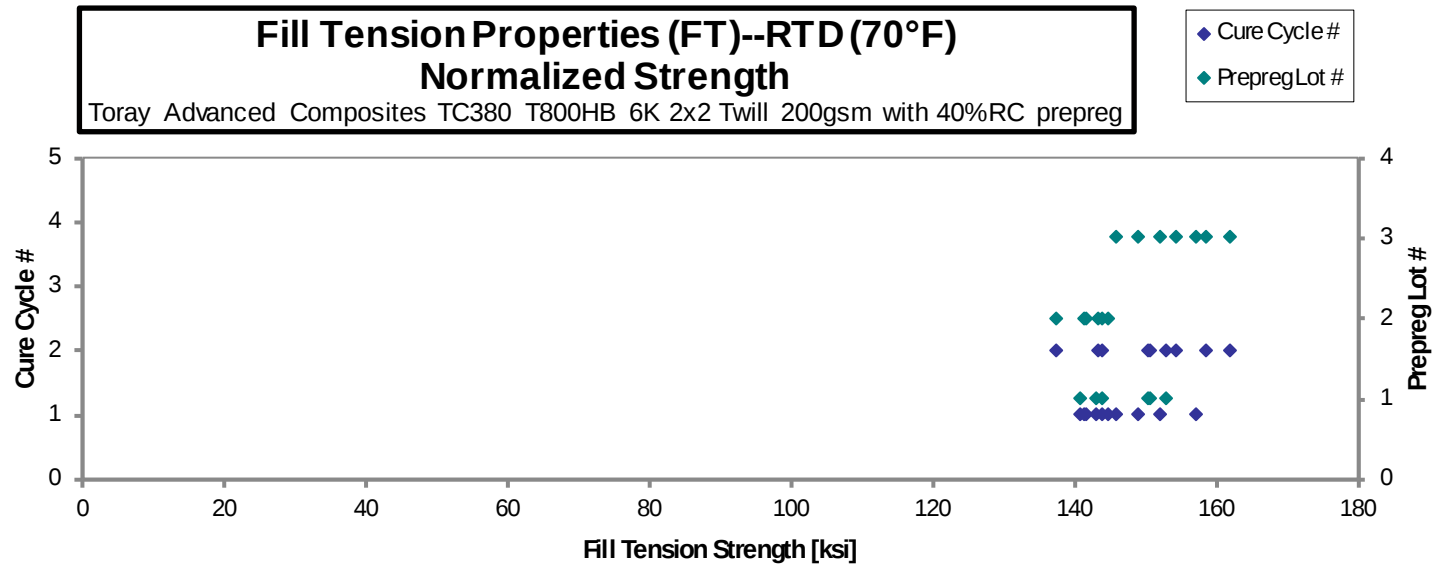
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEUA111A	A	C1	1	1	153.8	11.01	0.09660	12	LAB
TCEUA112A	A	C1	1	1	151.8	10.95	0.09957	12	LAT
TCEUA113A	A	C1	1	1	147.0	10.12	0.1033	12	LAB
TCEUA211A	A	C2	1	2	165.2	11.00	0.09767	12	LGB, LWT
TCEUA212A	A	C2	1	2	155.6	10.24	0.1020	12	LWB, LAT
TCEUA213A	A	C2	1	2	152.9	10.19	0.1041	12	LWB, LAT
TCEUB111A	B	C1	2	1	155.3	10.69	0.09632	12	LWB, LAT
TCEUB112A	B	C1	2	1	151.5	10.21	0.1010	12	LAT
TCEUB113A	B	C1	2	1	142.7	9.941	0.1046	12	LWB, LAT
TCEUB211A	B	C2	2	2	157.4	10.87	0.09625	12	LAB, LAT
TCEUB212A	B	C2	2	2	144.9	10.37	0.1000	12	LAB, LAT
TCEUB213A	B	C2	2	2	147.7	10.01	0.1030	12	LAB, LAT
TCEUC111A	C	C1	3	1	160.8	10.85	0.09983	12	M(A,L)WT, LAB
TCEUC112A	C	C1	3	1	159.9	10.64	0.1039	12	M(A,L)AT, M(A,L)WB
TCEUC113A	C	C1	3	1	147.3	9.535	0.1046	12	LAT, M(A,L)AB
TCEUC114A	C	C1	3	1	152.9	9.618	0.1030	12	LAT, M(A,L)WB
TCEUC211A	C	C2	3	2	162.3	10.01	0.1032	12	M(A,L)WT, LAB
TCEUC212A	C	C2	3	2	155.2	9.902	0.1049	12	LWT, LAB
TCEUC213A	C	C2	3	2	162.3	9.871	0.1053	12	LAT, LWB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008050	140.7	10.08
0.008297	143.1	10.32
0.008607	143.8	9.901
0.008139	152.8	10.17
0.008499	150.3	9.889
0.008675	150.7	10.05
0.008026	141.7	9.751
0.008413	144.8	9.761
0.008715	141.3	9.845
0.008021	143.4	9.911
0.008336	137.3	9.820
0.008582	144.0	9.757
0.008319	152.0	10.26
0.008654	157.3	10.47
0.008718	145.9	9.447
0.008579	149.0	9.377
0.008601	158.6	9.784
0.008743	154.2	9.838
0.008772	161.8	9.840

Average **154.0** **10.32**
Standard Dev. **6.318** **0.4756**
Coeff. of Var. [%] **4.102** **4.610**
Min. **142.7** **9.535**
Max. **165.2** **11.01**
Number of Spec. **19** **19**

Average_{norm} **0.008460** **148.0** **9.909**
Standard Dev._{norm} **6.774** **0.2716**
Coeff. of Var. [%]_{norm} **4.576** **2.741**
Min. **0.008021** **137.3** **9.377**
Max. **0.008772** **161.8** **10.47**
Number of Spec. **19** **19** **19**



**Fill Tension Properties (FT)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

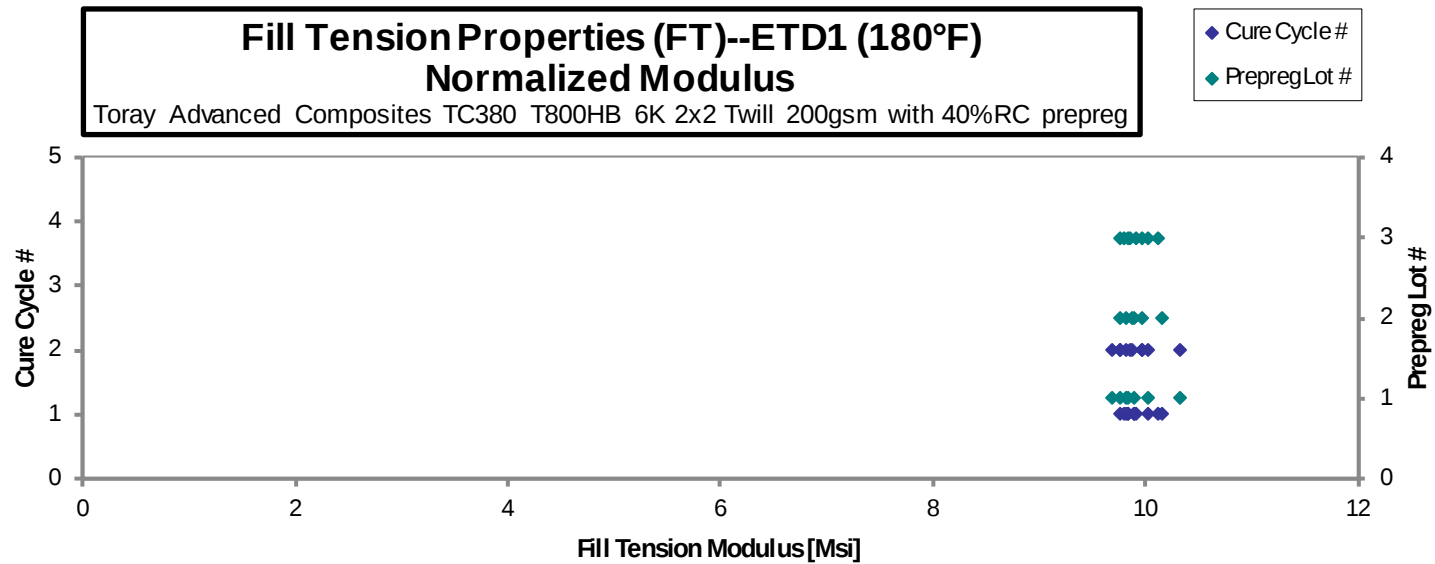
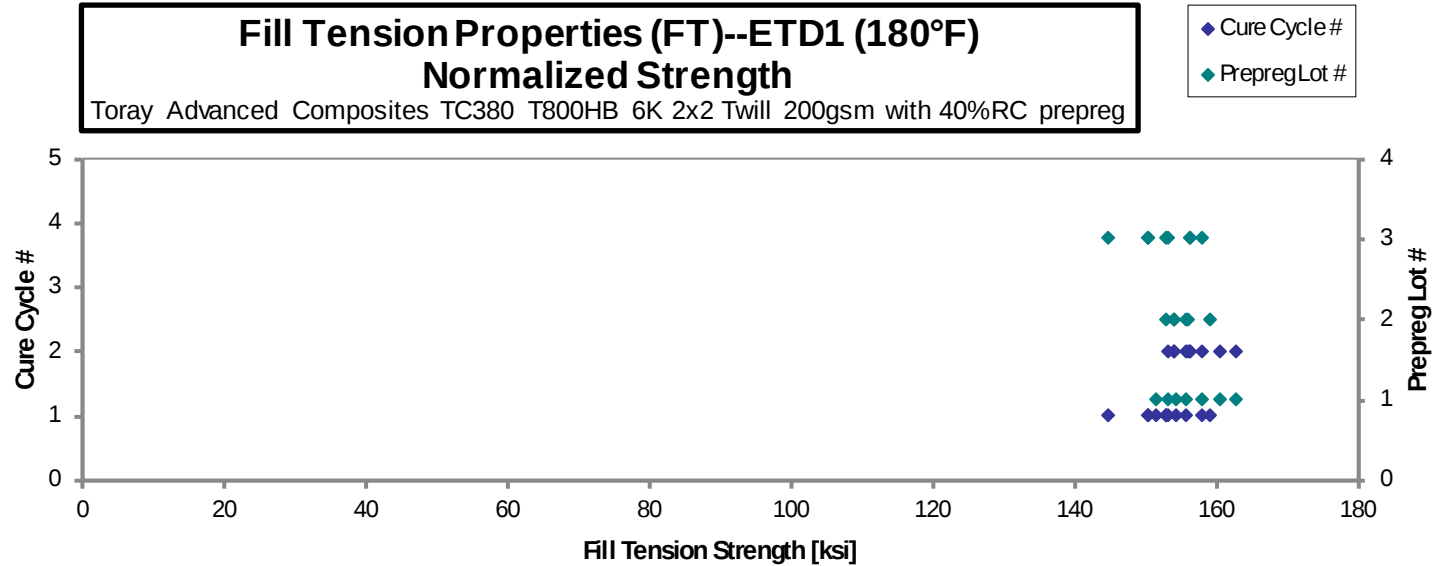
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEUA111C	A	C1	1	1	156.7	10.26	0.1032	12	LWT, LAB
TCEUA112C	A	C1	1	1	158.2	10.07	0.1031	12	LAT
TCEUA113C	A	C1	1	1	155.9	10.20	0.1026	12	LAT
TCEUA114C	A	C1	1	1	162.3	10.10	0.1028	12	LAT
TCEUA211C	A	C2	1	2	163.8	9.951	0.1035	12	LWT, LAB
TCEUA212C	A	C2	1	2	164.9	9.811	0.1043	12	LWT, LWB
TCEUA213C	A	C2	1	2	158.4	10.49	0.1039	12	LWT, LWB
TCEUB111C	B	C1	2	1	154.1	9.835	0.1048	12	LAT, LWB
TCEUB112C	B	C1	2	1	160.3	9.971	0.1049	12	LAT, LWB
TCEUB113C	B	C1	2	1	155.7	10.15	0.1056	12	LAT, LGB
TCEUB211C	B	C2	2	2	157.8	9.924	0.1044	12	LAT
TCEUB212C	B	C2	2	2	157.7	10.21	0.1031	12	LAB, LAT
TCEUB213C	B	C2	2	2	156.1	10.01	0.1042	12	LAB
TCEUC111C	C	C1	3	1	153.8	10.03	0.1033	12	LWT, LAT
TCEUC112C	C	C1	3	1	152.7	10.27	0.1041	12	LAT
TCEUC113C	C	C1	3	1	147.7	10.11	0.1035	12	LAT, LWB
TCEUC114C	C	C1	3	1	155.5	9.988	0.1039	12	LGT, LAB
TCEUC211C	C	C2	3	2	160.1	9.994	0.1041	12	LWB, LIT
TCEUC212C	C	C2	3	2	154.6	10.06	0.1046	12	LAB, LWT
TCEUC213C	C	C2	3	2	158.2	10.13	0.1044	12	LAB, LWT
TCEUC214C	C	C2	3	2	158.8	9.907	0.1040	12	LWB, LWT

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008600	153.2	10.02
0.008588	154.3	9.826
0.008547	151.4	9.903
0.008568	158.0	9.835
0.008625	160.5	9.753
0.008689	162.8	9.687
0.008654	155.8	10.32
0.008735	153.0	9.762
0.008738	159.2	9.901
0.008799	155.7	10.15
0.008700	156.0	9.811
0.008592	154.0	9.967
0.008682	154.0	9.879
0.008606	150.4	9.809
0.008671	150.4	10.12
0.008621	144.7	9.909
0.008661	153.0	9.830
0.008678	157.9	9.855
0.008714	153.1	9.964
0.008703	156.4	10.02
0.008669	156.4	9.760

Average 157.3 10.07
 Standard Dev. 3.876 0.1605
 Coeff. of Var. [%] 2.464 1.594
 Min. 147.7 9.811
 Max. 164.9 10.49
 Number of Spec. 21 21

Average_{norm} 0.008659 154.8 9.909
 Standard Dev._{norm} 3.944 0.1520
 Coeff. of Var. [%]_{norm} 2.548 1.534
 Min. 0.008547 144.7 9.687
 Max. 0.008799 162.8 10.32
 Number of Spec. 21 21 21



**Fill Tension Properties (FT)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

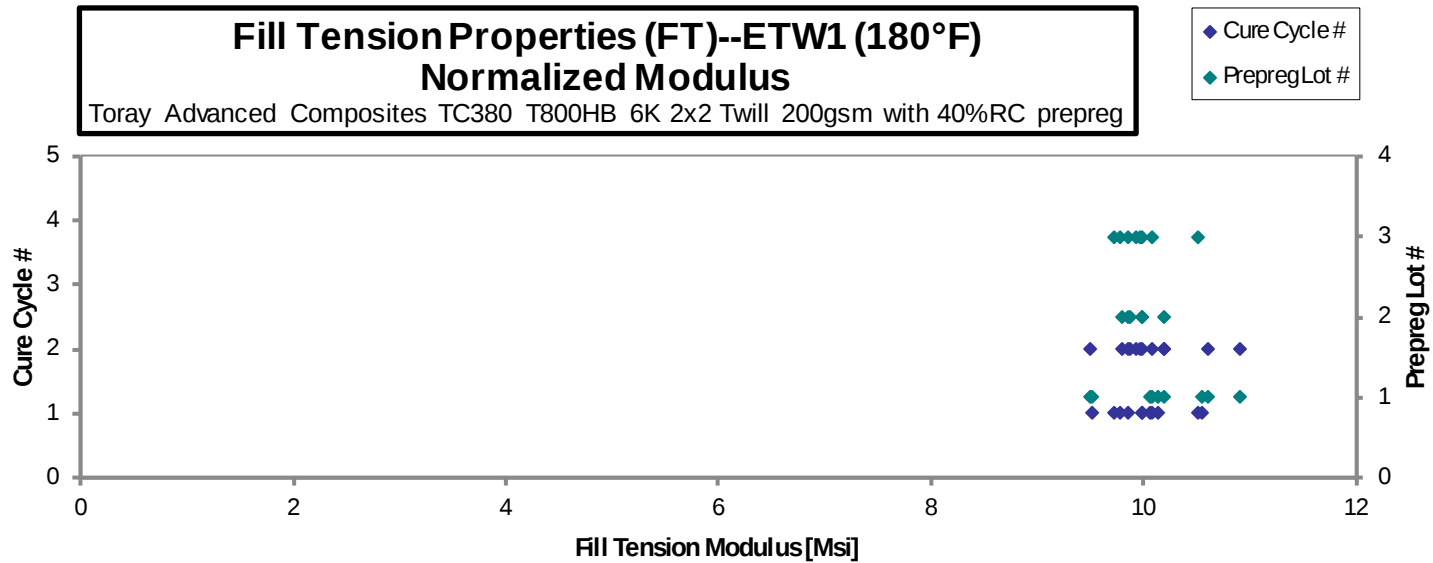
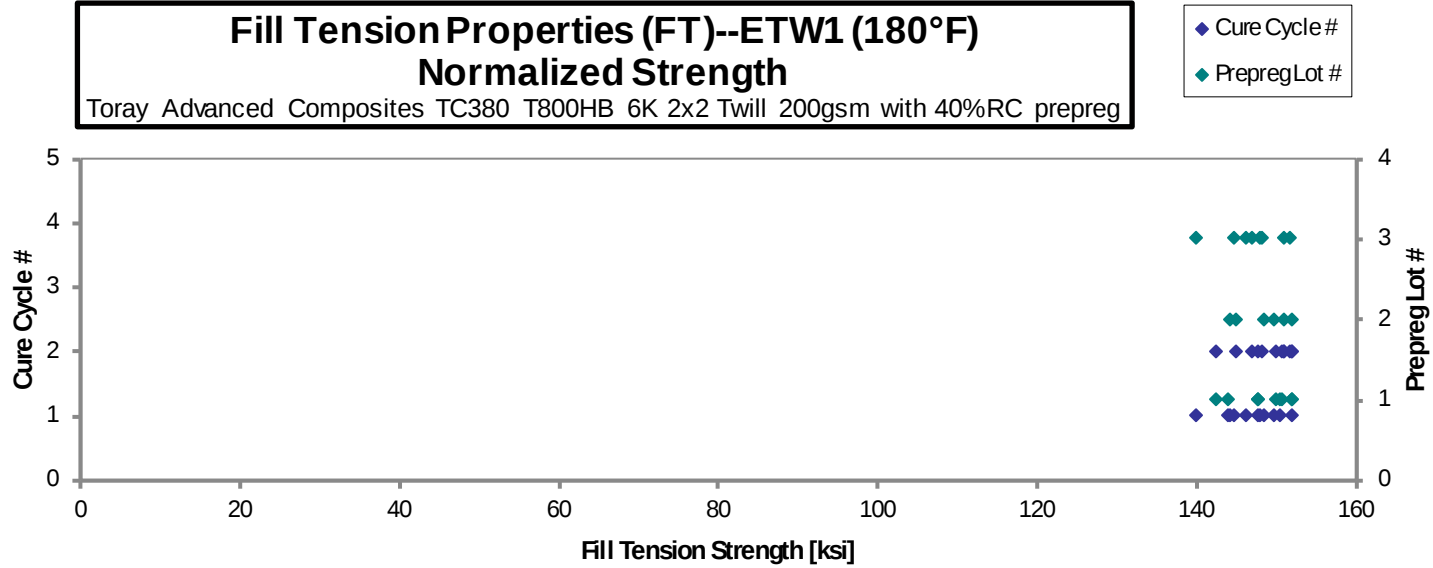
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEUA111D	A	C1	1	1	153.6	10.28	0.1034	12	LWT, LAB
TCEUA112D	A	C1	1	1	147.7	10.40	0.1029	12	LWT, LAB
TCEUA113D	A	C1	1	1	152.2	10.87	0.1025	12	LWB, LAT
TCEUA114D	A	C1	1	1	155.4	9.732	0.1033	12	LWB, LAT
TCEUA211D	A	C2	1	2	149.5	10.31	0.1044	12	LWT, LWB
TCEUA212D	A	C2	1	2	152.7	10.80	0.1038	12	LWT, LAB
TCEUA213D	A	C2	1	2	152.9	10.22	0.1041	12	LWB, LAT
TCEUA214D	A	C2	1	2	153.4	11.01	0.1046	12	LWT, LAB
TCEUA215D	A	C2	1	2	143.6	9.576	0.1048	12	LWB, LAT
TCEUB111D	B	C1	2	1	149.6	10.07	0.1048	12	LAB, LWT
TCEUB112D	B	C1	2	1	145.8	10.09	0.1045	12	LAB, LWT
TCEUB113D	B	C1	2	1	151.2	9.960	0.1046	12	LAB, LWT
TCEUB211D	B	C2	2	2	154.8	9.996	0.1036	12	LWB, LAT
TCEUB212D	B	C2	2	2	154.4	10.10	0.1033	12	LWB, LAT
TCEUB213D	B	C2	2	2	148.0	10.42	0.1034	12	LWB, LAT
TCEUC111D	C	C1	3	1	148.6	10.68	0.1040	12	LAT, LWB, LGB
TCEUC112D	C	C1	3	1	150.6	9.964	0.1037	12	LWT, LWB
TCEUC113D	C	C1	3	1	146.7	9.862	0.1041	12	LWB, LAT
TCEUC114D	C	C1	3	1	142.2	10.25	0.1039	12	LAB, AWT, AGT
TCEUC211D	C	C2	3	2	154.8	10.17	0.1034	12	LAB, AWT, LGM
TCEUC212D	C	C2	3	2	149.3	10.01	0.1040	12	LAT, LWT, LIB
TCEUC213D	C	C2	3	2	152.5	10.03	0.1046	12	LWT, LWB
TCEUC214D	C	C2	3	2	150.2	10.11	0.1042	12	LWT, LGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008615	150.4	10.07
0.008575	143.9	10.13
0.008543	147.8	10.56
0.008607	152.0	9.518
0.008697	147.7	10.19
0.008646	150.0	10.61
0.008676	150.7	10.08
0.008715	152.0	10.90
0.008729	142.4	9.498
0.008729	148.4	9.986
0.008707	144.3	9.983
0.008714	149.7	9.863
0.008635	151.9	9.808
0.008604	150.9	9.878
0.008618	144.9	10.20
0.008665	146.3	10.52
0.008642	147.9	9.785
0.008676	144.6	9.724
0.008660	139.9	10.08
0.008619	151.7	9.964
0.008664	147.0	9.860
0.008713	151.0	9.935
0.008685	148.2	9.982

Average 150.4 10.21
 Standard Dev. 3.614 0.3568
 Coeff. of Var. [%] 2.403 3.493
 Min. 142.2 9.576
 Max. 155.4 11.01
 Number of Spec. 23 23

Average_{norm} 0.008658 148.0 10.05
 Standard Dev._{norm} 3.371 0.3395
 Coeff. of Var. [%]_{norm} 2.278 3.378
 Min. 0.008543 139.9 9.498
 Max. 0.008729 152.0 10.90
 Number of Spec. 23 23 23



**Fill Tension Properties (FT)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

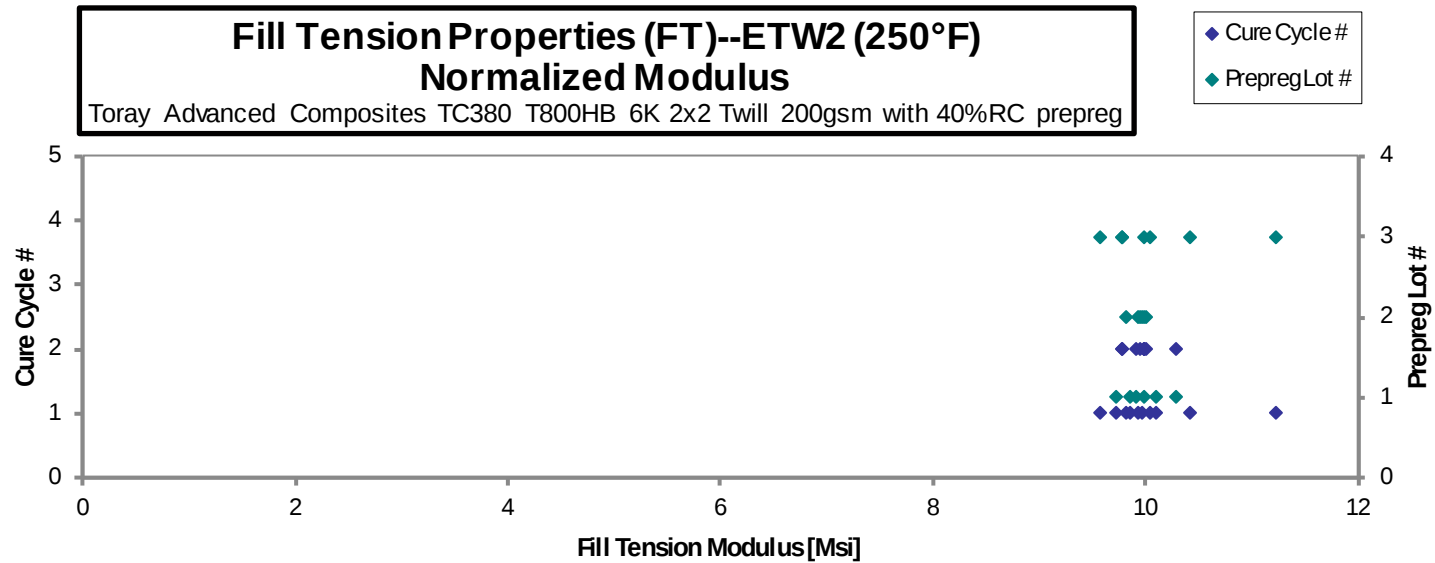
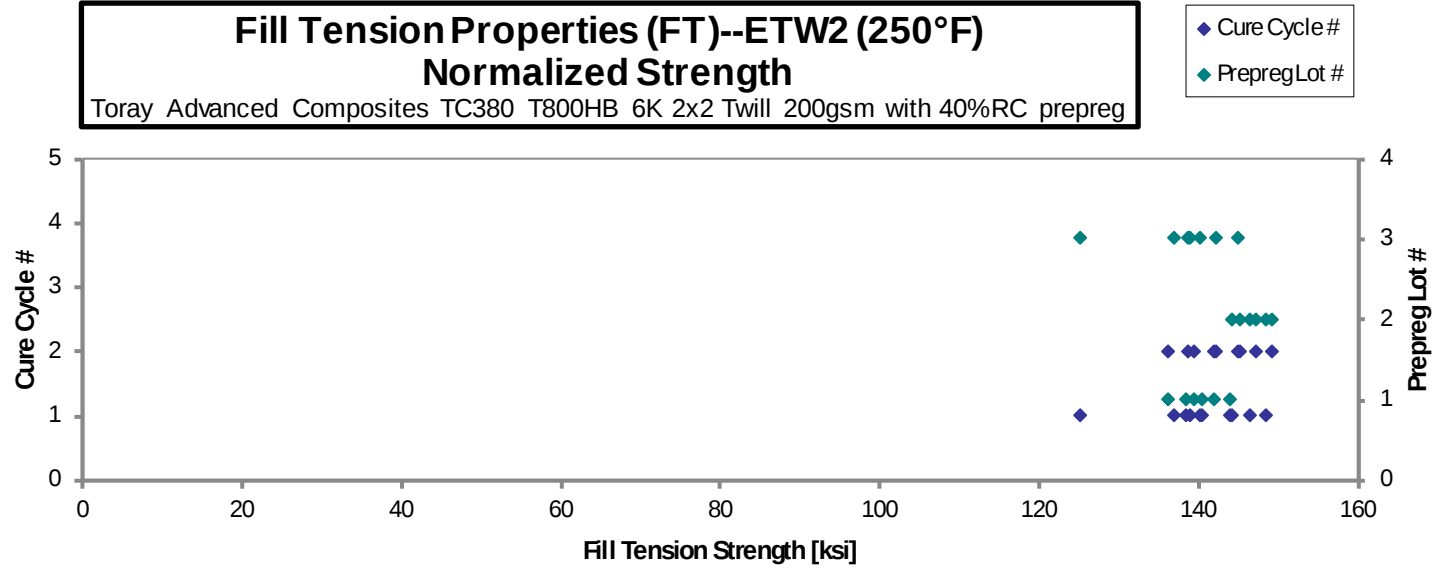
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEUA111E	A	C1	1	1	146.0	9.988	0.1042	12	LWB, LAT
TCEUA112E	A	C1	1	1	140.2	10.23	0.1042	12	LAB, LAT
TCEUA113E	A	C1	1	1	141.9	9.824	0.1045	12	LWB, LAT
TCEUA211E	A	C2	1	2	136.7	10.33	0.1052	12	LWB, LAT
TCEUA212E	A	C2	1	2	142.5	9.950	0.1051	12	LWB, LAT
TCEUA213E	A	C2	1	2	140.0	10.03	0.1052	12	LWT, LAB
TCEUB111E	B	C1	2	1	141.2	9.763	0.1078	12	LWT, LAB
TCEUB112E	B	C1	2	1	145.3	9.852	0.1065	12	LWB, LAT
TCEUB113E	B	C1	2	1	147.6	9.758	0.1062	12	LWB, LAT
TCEUB211E	B	C2	2	2	150.9	10.05	0.1045	12	LAT, LWB
TCEUB212E	B	C2	2	2	147.6	10.03	0.1053	12	LAT, LWB
TCEUB213E	B	C2	2	2	147.0	10.11	0.1043	12	LAT, LWB
TCEUC111E	C	C1	3	1	125.6	9.624	0.1052	12	M(A,L)WT, LWB
TCEUC112E	C	C1	3	1	142.5	11.40	0.1040	12	LIT, LWB
TCEUC113E	C	C1	3	1	138.8	10.18	0.1041	12	LWT, LWB
TCEUC114E	C	C1	3	1	143.1	10.72	0.1026	12	AWT, LAB
TCEUC211E	C	C2	3	2	139.3	10.03	0.1051	12	LWT, M(A,L)GB
TCEUC212E	C	C2	3	2	146.2	9.873	0.1047	12	LAT, LGB
TCEUC213E	C	C2	3	2	143.8	9.889	0.1045	12	M(A,L)GM

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008681	144.0	9.852
0.008686	138.4	10.10
0.008707	140.4	9.720
0.008768	136.2	10.29
0.008758	141.8	9.903
0.008765	139.5	9.989
0.008985	144.2	9.968
0.008872	146.5	9.933
0.008853	148.5	9.817
0.008708	149.3	9.947
0.008775	147.1	10.00
0.008688	145.1	9.980
0.008763	125.1	9.583
0.008665	140.3	11.22
0.008678	136.9	10.04
0.008547	139.0	10.42
0.008757	138.6	9.985
0.008724	145.0	9.787
0.008707	142.3	9.784

Average **142.4** **10.09**
Standard Dev. **5.450** **0.4006**
Coeff. of Var. [%] **3.826** **3.972**
Min. **125.6** **9.624**
Max. **150.9** **11.40**
Number of Spec. **19** **19**

Average_{norm} **0.008741** **141.5** **10.02**
Standard Dev._{norm} **5.558** **0.3479**
Coeff. of Var. [%]_{norm} **3.929** **3.474**
Min. **0.008547** **125.1** **9.583**
Max. **0.008985** **149.3** **11.22**
Number of Spec. **19** **19** **19**



4.3 Warp Compression Properties (WC)

Warp Compression Properties (WC)--CTD (-65°F) Strength & Modulus

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

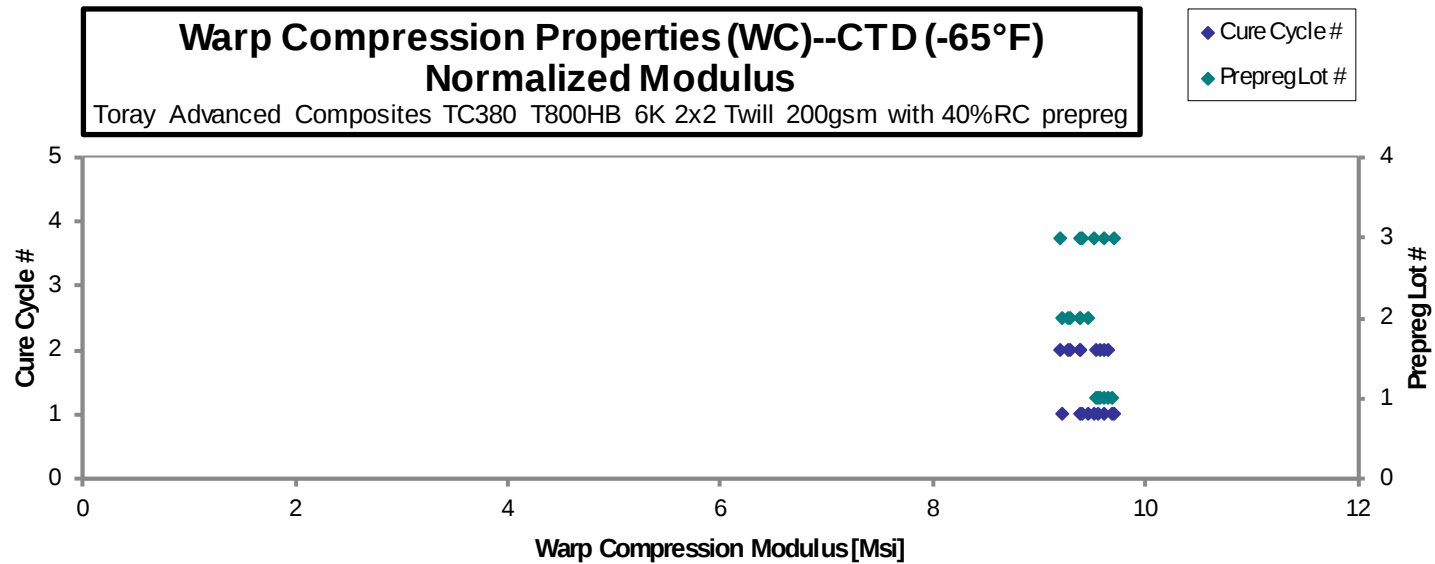
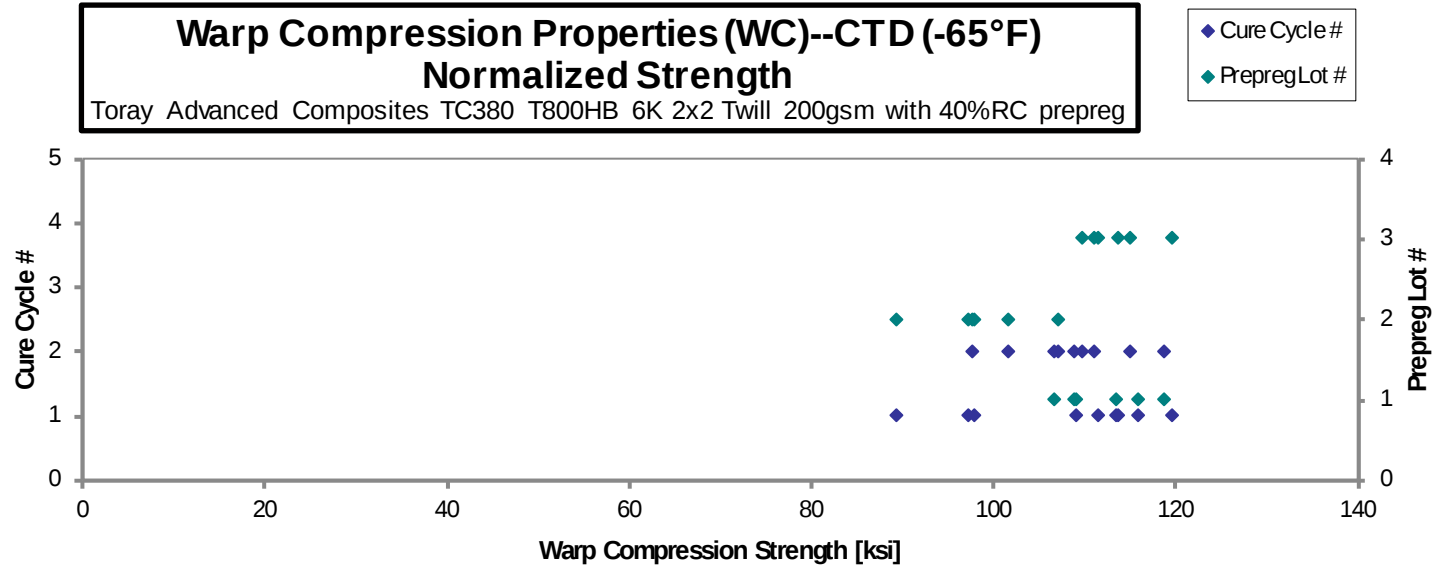
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCELA111B	A	C1	1	1	115.0	9.742	0.1042	12	BAB, HAB/HIB
TCELA112B	A	C1	1	1	110.0	9.635	0.1047	12	BAT
TCELA113B	A	C1	1	1	115.4	9.653	0.1059	12	BAT
TCELA211B	A	C2	1	2	119.7	9.621	0.1047	12	BAB
TCELA212B	A	C2	1	2	106.6	9.638	0.1057	12	BGM
TCELA213B	A	C2	1	2	107.9	9.483	0.1066	12	BGM
TCELB111B	B	C1	2	1	102.1	9.869	0.1013	12	BGM
TCELB112B	B	C1	2	1	92.09	9.673	0.1025	12	BGM
TCELB113B	B	C1	2	1	99.53	9.442	0.1031	12	BAB
TCELB211B	B	C2	2	2	112.5	9.749	0.1006	12	BGM
TCELB212B	B	C2	2	2	100.8	9.558	0.1024	12	BGM
TCELB213B	B	C2	2	2	103.6	9.585	0.1035	12	BGM
TCELC111B	C	C1	3	1	111.9	9.437	0.1053	12	BGM
TCELC112B	C	C1	3	1	113.4	9.501	0.1059	12	BGM
TCELC113B	C	C1	3	1	119.2	9.663	0.1060	12	BAT
TCELC211B	C	C2	3	2	114.9	9.384	0.1056	12	BGM
TCELC212B	C	C2	3	2	108.7	9.104	0.1066	12	BAT
TCELC213B	C	C2	3	2	109.8	9.497	0.1068	12	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008685	113.5	9.614
0.008725	109.1	9.553
0.008826	115.8	9.682
0.008728	118.7	9.542
0.008807	106.6	9.645
0.008882	108.9	9.571
0.008438	97.86	9.462
0.008538	89.34	9.385
0.008593	97.19	9.220
0.008385	107.2	9.289
0.008532	97.74	9.267
0.008622	101.5	9.391
0.008771	111.5	9.406
0.008824	113.7	9.526
0.008833	119.6	9.700
0.008800	114.9	9.384
0.008886	109.7	9.193
0.008901	111.1	9.606

Average 109.1 9.569
 Standard Dev. 7.266 0.1702
 Coeff. of Var. [%] 6.663 1.778
 Min. 92.09 9.104
 Max. 119.7 9.869
 Number of Spec. 18 18

Average_{norm} 0.008710 108.0 9.469
 Standard Dev._{norm} 8.275 0.1593
 Coeff. of Var. [%]_{norm} 7.662 1.683
 Min. 0.008385 89.34 9.193
 Max. 0.008901 119.6 9.700
 Number of Spec. 18 18 18



**Warp Compression Properties (WC)--RTD (70°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

0.008800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCELA111A*	A	C1	1	1	104.5	10.09	0.09662	12	BGM, HAB
TCELA112A*	A	C1	1	1	100.1	9.913	0.09900	12	BAB
TCELA113A	A	C1	1	1	105.1	9.472	0.1012	12	HAB/HIB
TCELA114A**	A	C1	1	1	103.1		0.1029	12	HAB/HIB
TCELA211A	A	C2	1	2	108.4	9.498	0.09792	12	HAB, HIB
TCELA212A	A	C2	1	2	102.8	9.565	0.1005	12	HAT, HIT
TCELA213A	A	C2	1	2	99.22	9.485	0.1021	12	BAB
TCELA214A**	A	C2	1	2	91.06		0.1038	12	BAB
TCELB111A	B	C1	2	1	108.2	10.44	0.09268	12	BAT
TCELB112A	B	C1	2	1	100.2	9.884	0.09550	12	BGM
TCELB113A	B	C1	2	1	98.78	9.696	0.09743	12	BAB
TCELB211A	B	C2	2	2	110.1	10.20	0.09292	12	BAT
TCELB212A	B	C2	2	2	103.4	10.33	0.09540	12	HAB, HIB
TCELB213A	B	C2	2	2	104.9	10.08	0.09797	12	BAB
TCELC111A	C	C1	3	1	97.65	10.00	0.1000	12	M(B,H)AT
TCELC112A	C	C1	3	1	105.5	9.991	0.1017	12	BGM, HAT
TCELC113A	C	C1	3	1	90.49	9.687	0.1030	12	M(B,H)AT
TCELC211A	C	C2	3	2	105.0	9.818	0.1007	12	BAB, HIB
TCELC212A	C	C2	3	2	95.88	9.444	0.1025	12	BGM, HIT
TCELC213A	C	C2	3	2	88.94	9.985	0.1034	12	BAT
TCELC214A**	C	C2	3	2	98.88		0.1046	12	BAT, HIT

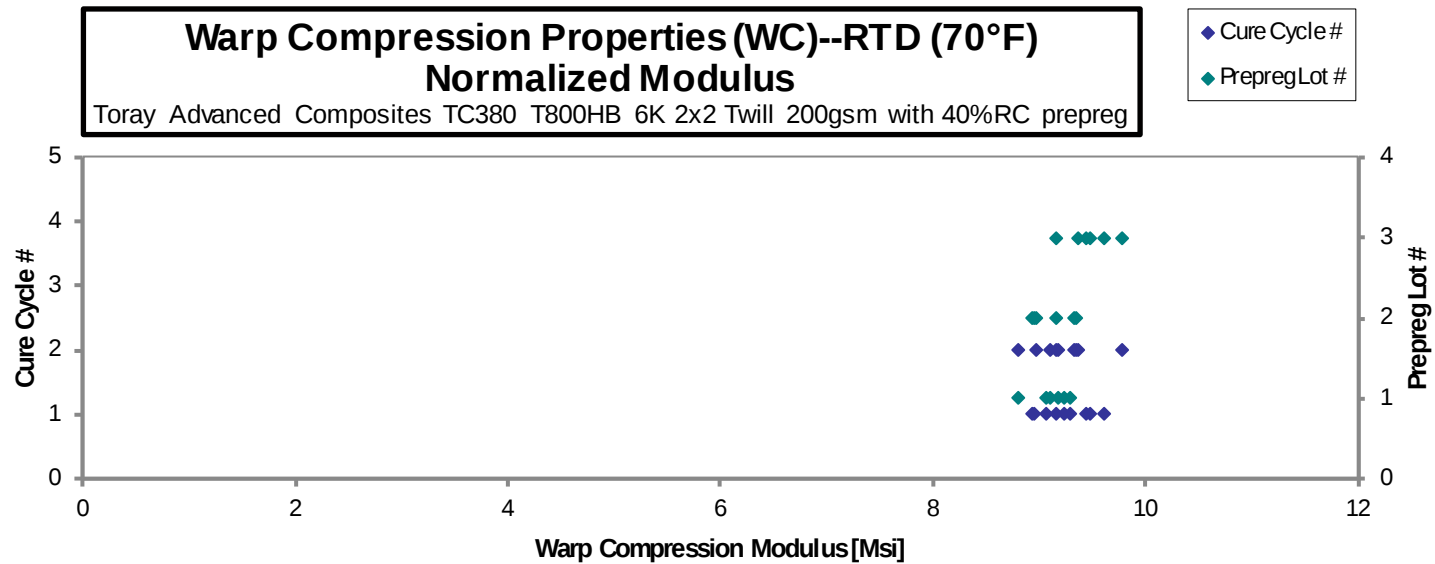
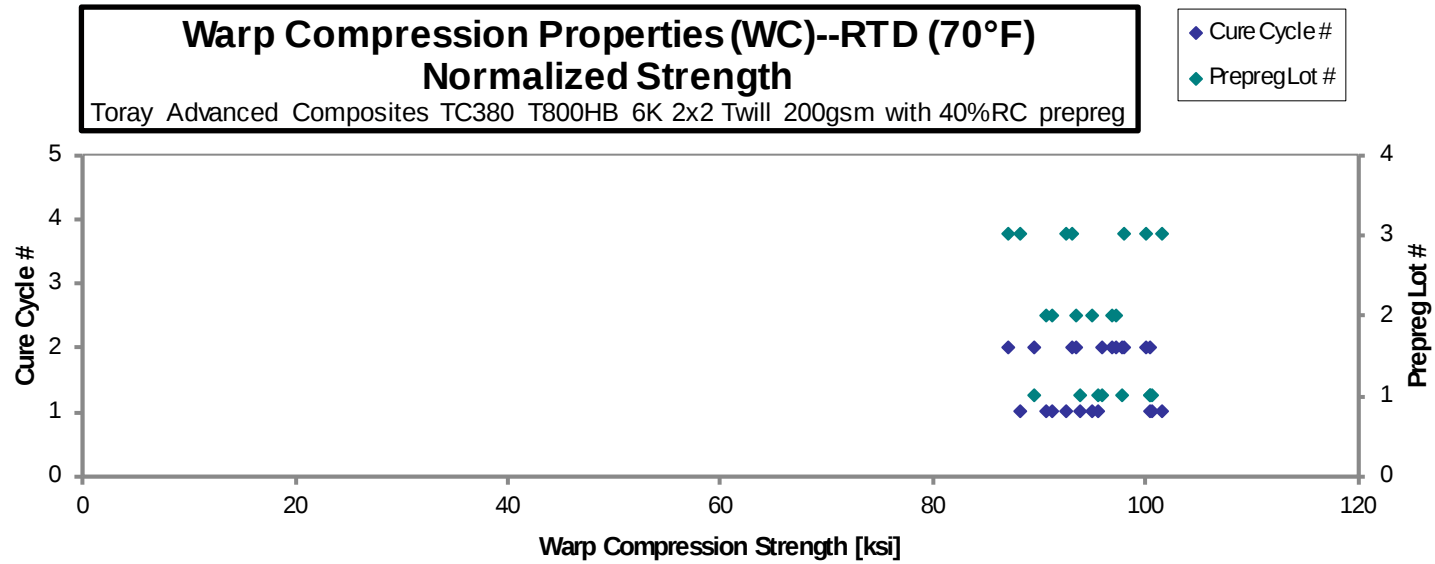
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008051	95.58	9.235
0.008250	93.85	9.293
0.008431	100.7	9.075
0.008571	100.5	
0.008160	100.5	8.807
0.008372	97.82	9.100
0.008511	95.97	9.173
0.008647	89.48	
0.007724	95.00	9.161
0.007958	90.66	8.939
0.008119	91.14	8.946
0.007743	96.89	8.975
0.007950	93.40	9.332
0.008164	97.30	9.347
0.008335	92.49	9.471
0.008471	101.5	9.618
0.008579	88.22	9.443
0.008394	100.1	9.365
0.008542	93.07	9.167
0.008618	87.10	9.778
0.008717	97.95	

* Modulus are average values of 2 strain gages.

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

Average	101.1	9.865
Standard Dev.	5.868	0.3037
Coeff. of Var. [%]	5.807	3.078
Min.	88.94	9.444
Max.	110.1	10.44
Number of Spec.	21	18

Average _{norm}	0.008300	95.20	9.235
Standard Dev. _{norm}		4.320	0.2499
Coeff. of Var. [%] _{norm}		4.538	2.707
Min.	0.007724	87.10	8.807
Max.	0.008717	101.5	9.778
Number of Spec.	21	21	18



**Warp Compression Properties (WC)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

0.008800

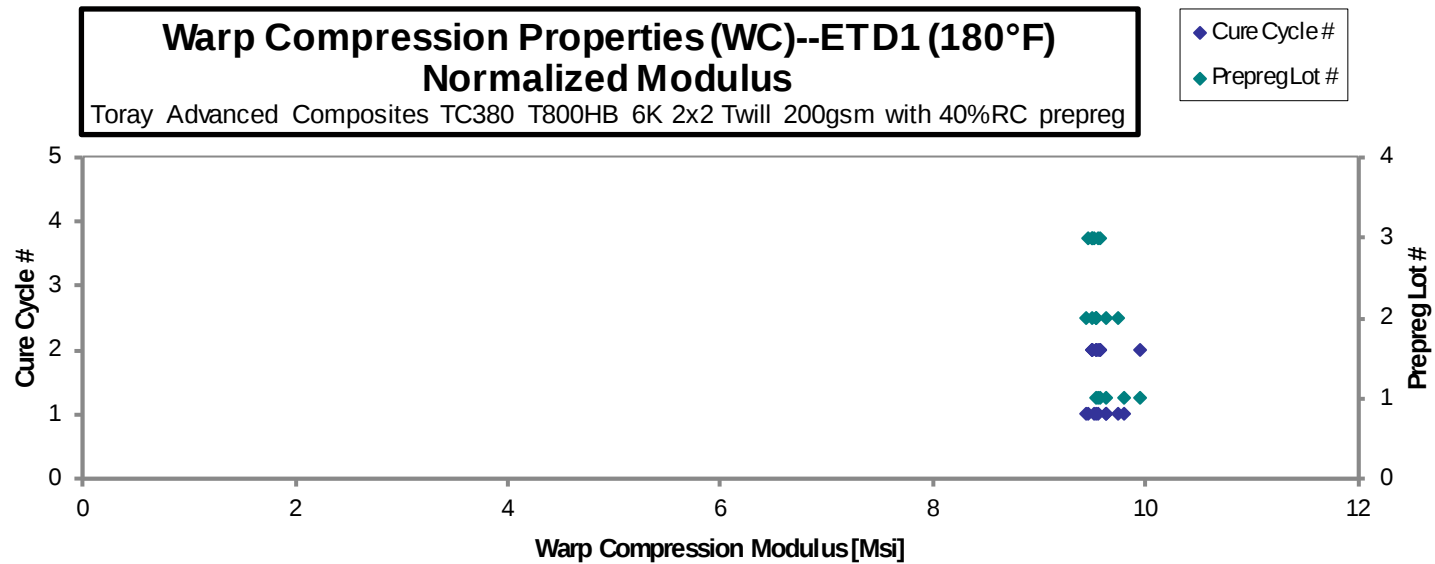
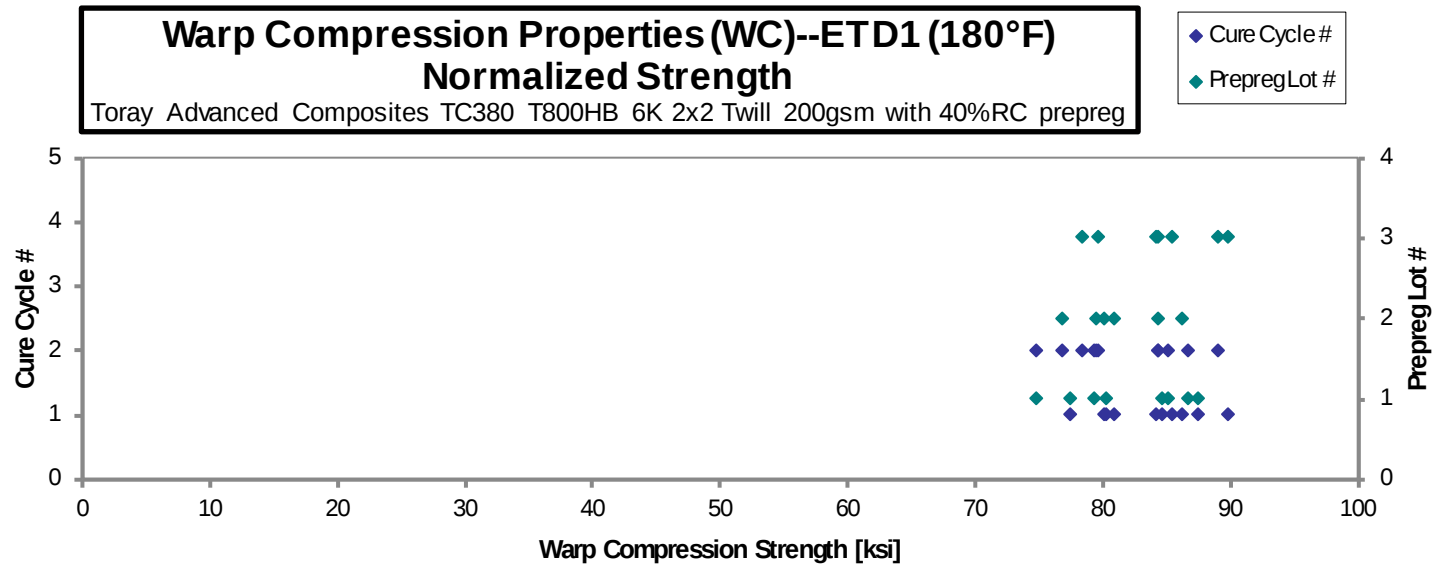
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCELA111C	A	C1	1	1	86.03	9.633	0.1074	12	BAB, HAB, HIB
TCELA112C	A	C1	1	1	76.68	9.533	0.1066	12	BAB, HAB, HIB
TCELA113C	A	C1	1	1	83.28	9.374	0.1073	12	BAB
TCELA114C*	A	C1	1	1	87.69		0.09657	12	BAB
TCELA211C	A	C2	1	2	73.30	9.760	0.1076	12	BAB
TCELA212C	A	C2	1	2	77.44	9.353	0.1082	12	BAB
TCELA213C	A	C2	1	2	83.31	9.340	0.1080	12	BAT, HAT/HIT
TCELA214C*	A	C2	1	2	93.24		0.09815	12	BAB
TCELB111C	B	C1	2	1	81.50	9.611	0.1038	12	BAB, HIB
TCELB112C	B	C1	2	1	82.44	9.925	0.1037	12	BAB
TCELB113C	B	C1	2	1	87.86	9.821	0.1036	12	M(B,H)AB
TCELB211C	B	C2	2	2	77.92	9.677	0.1041	12	BAB
TCELB212C	B	C2	2	2	85.77	9.660	0.1038	12	BAB, HAB/HIB
TCELB213C	B	C2	2	2	80.78	9.706	0.1038	12	BAB, HAB/HIB
TCELC111C	C	C1	3	1	85.28	9.505	0.1057	12	BAT
TCELC112C	C	C1	3	1	89.35	9.503	0.1061	12	BAB, HIB
TCELC113C	C	C1	3	1	84.06	9.456	0.1057	12	BAT
TCELC211C	C	C2	3	2	88.19	9.412	0.1066	12	HAT, HIT
TCELC212C	C	C2	3	2	83.60	9.428	0.1065	12	BAB
TCELC213C	C	C2	3	2	77.63	9.496	0.1066	12	BAB, HIB
TCELC214C*	C	C2	3	2	79.62		0.1057	12	BAB, HIB

* Specimen was not gaged, only strength is reported.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008951	87.51	9.799
0.008883	77.41	9.623
0.008944	84.65	9.528
0.008047	80.19	
0.008968	74.70	9.947
0.009015	79.34	9.582
0.008997	85.18	9.550
0.008179	86.66	
0.008646	80.07	9.443
0.008642	80.95	9.747
0.008631	86.17	9.631
0.008675	76.81	9.540
0.008650	84.30	9.495
0.008650	79.41	9.541
0.008807	85.35	9.513
0.008840	89.76	9.547
0.008810	84.15	9.467
0.008883	89.02	9.502
0.008872	84.28	9.506
0.008881	78.34	9.583
0.008807	79.69	

Average 83.09 9.566
Standard Dev. 4.897 0.1681
Coeff. of Var. [%] 5.894 1.757
Min. 73.30 9.340
Max. 93.24 9.925
Number of Spec. 21 18

Average_{norm} 0.008751 82.57 9.586
Standard Dev._{norm} 4.229 0.1276
Coeff. of Var. [%]_{norm} 5.122 1.331
Min. 0.008047 74.70 9.443
Max. 0.009015 89.76 9.947
Number of Spec. 21 21 18



**Warp Compression Properties (WC)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

0.008800

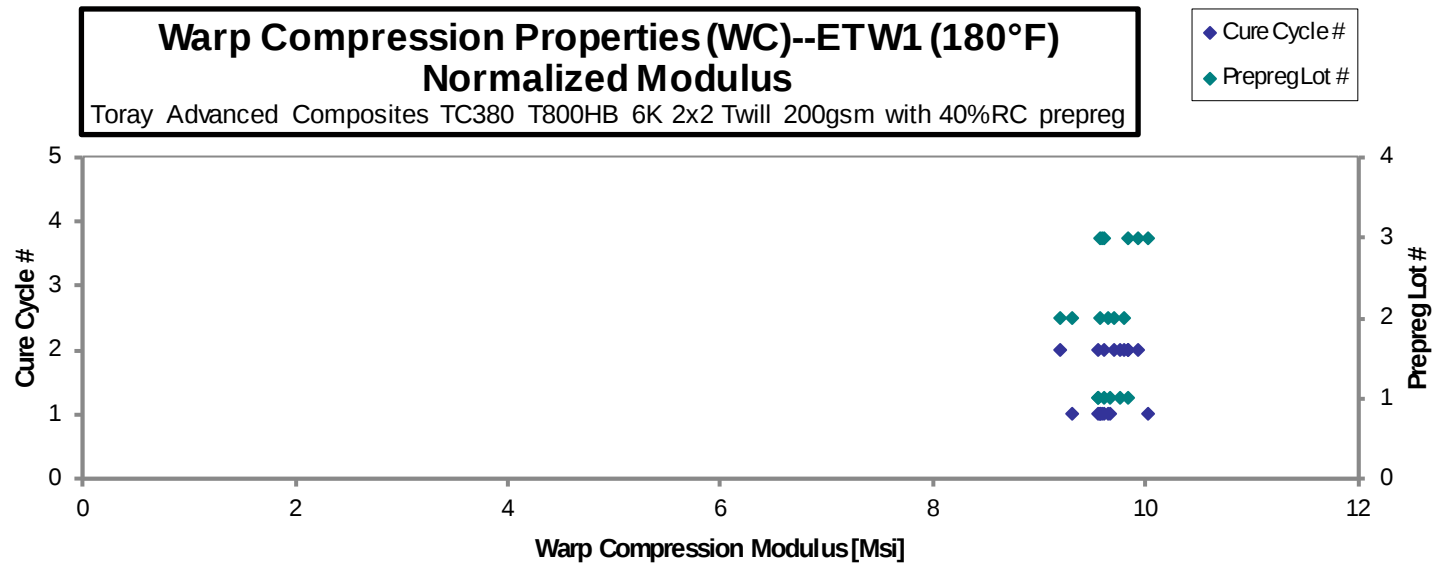
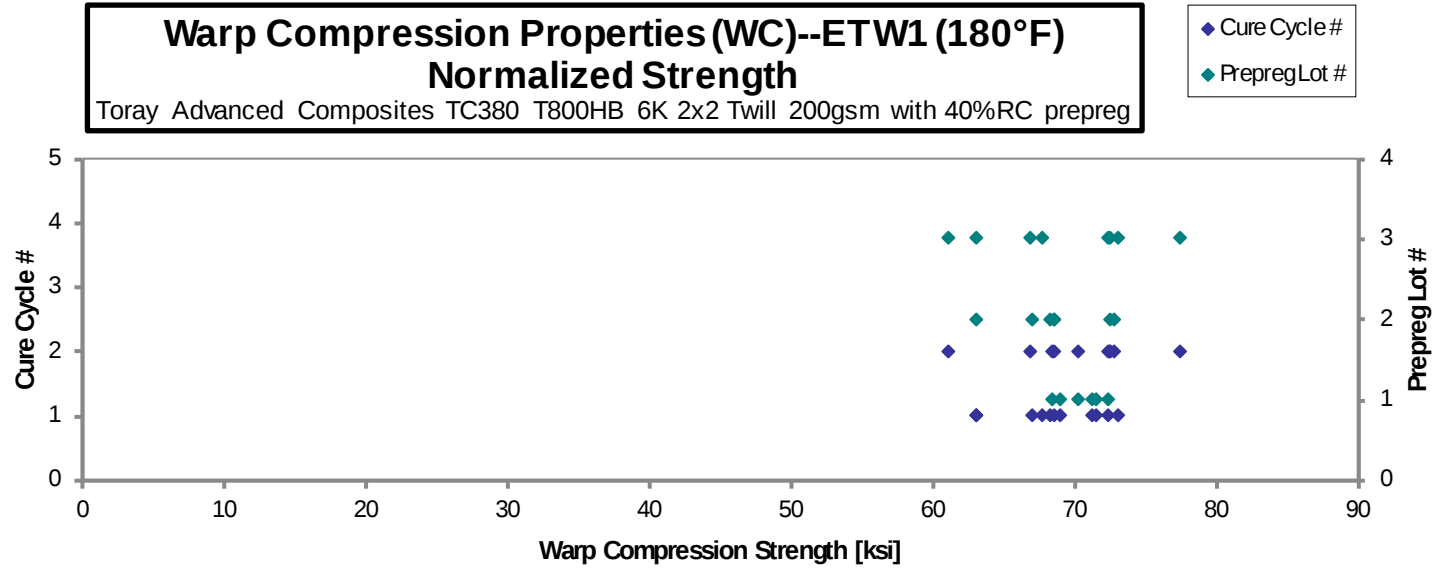
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCELA111D	A	C1	1	1	73.41	10.17	0.09918	12	BAB
TCELA112D	A	C1	1	1	74.15	9.968	0.1018	12	BAB, HIB
TCELA113D	A	C1	1	1	72.67	9.861	0.1035	12	BAB
TCELA211D	A	C2	1	2	71.93	10.27	0.1004	12	BAB
TCELA212D	A	C2	1	2	71.92	10.06	0.1032	12	BAT, HIT
TCELA213D	A	C2	1	2	73.07	9.633	0.1047	12	BAT, HIT
TCELB111D	B	C1	2	1	70.14	9.863	0.1033	12	HAB/HIB
TCELB112D	B	C1	2	1	68.54	9.533	0.1032	12	BAT
TCELB113D	B	C1	2	1	70.58	9.880	0.1023	12	HAB
TCELB114D*	B	C1	2	1	66.26		0.1005	12	BGM
TCELB211D	B	C2	2	2	69.72	9.977	0.1038	12	BAB
TCELB213D	B	C2	2	2	74.67	9.473	0.1025	12	BAT, HIT
TCELB214D	B	C2	2	2	75.69	10.09	0.1015	12	HAT, HIT
TCELC111D	C	C1	3	1	72.82	9.544	0.1060	12	HAT/HIT
TCELC112D	C	C1	3	1	72.37	9.588	0.1057	12	BAB
TCELC113D	C	C1	3	1	68.20	10.09	0.1049	12	BAT
TCELC114D*	C	C1	3	1	63.89		0.1043	12	BAT
TCELC211D	C	C2	3	2	77.59	9.624	0.1055	12	BAT
TCELC212D	C	C2	3	2	67.59	9.947	0.1045	12	BAT
TCELC213D	C	C2	3	2	62.19	10.11	0.1038	12	BAB
TCELC214D*	C	C2	3	2	74.25		0.1031	12	BAT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008265	68.95	9.556
0.008485	71.49	9.611
0.008622	71.20	9.662
0.008369	68.41	9.770
0.008603	70.31	9.833
0.008721	72.41	9.546
0.008606	68.59	9.645
0.008600	66.98	9.317
0.008521	68.34	9.567
0.008376	63.07	
0.008651	68.55	9.809
0.008543	72.49	9.197
0.008457	72.74	9.699
0.008829	73.06	9.576
0.008804	72.40	9.592
0.008743	67.76	10.03
0.008693	63.11	
0.008790	77.50	9.613
0.008706	66.87	9.840
0.008653	61.15	9.940
0.008594	72.51	

* Specimen was not gaged, only strength is reported.

Average 71.03 9.872
Standard Dev. 3.858 0.2480
Coeff. of Var. [%] 5.432 2.513
Min. 62.19 9.473
Max. 77.59 10.27
Number of Spec. 21 18

Average_{norm} 0.008602 69.42 9.655
Standard Dev._{norm} 3.887 0.2016
Coeff. of Var. [%]_{norm} 5.599 2.088
Min. 0.008265 61.15 9.197
Max. 0.008829 77.50 10.03
Number of Spec. 21 21 18



**Warp Compression Properties (WC)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

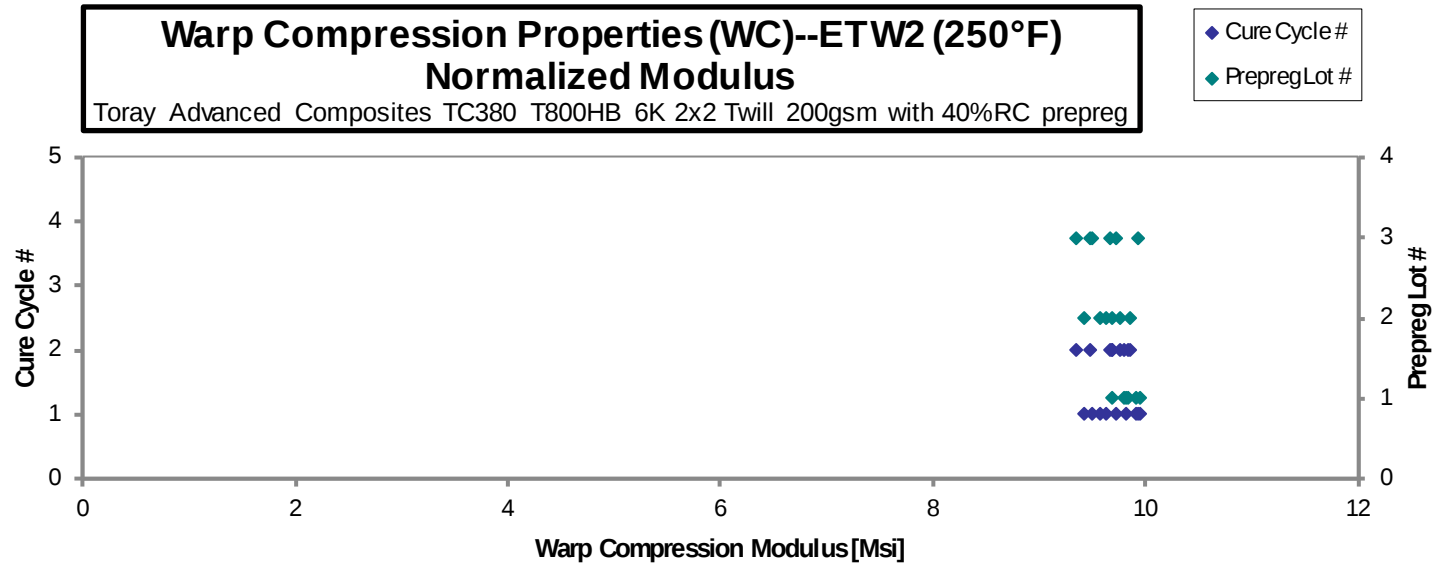
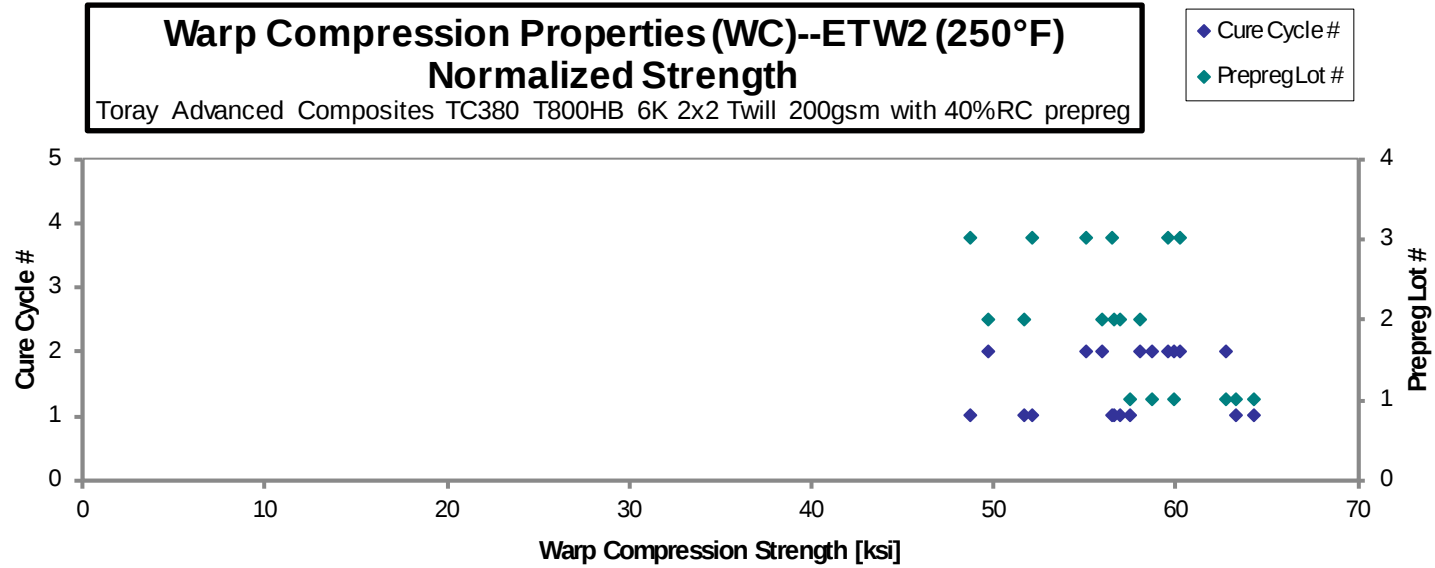
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCELA111E	A	C1	1	1	61.99	9.705	0.1078	12	HAT, HIT
TCELA112E	A	C1	1	1	62.54	9.550	0.1085	12	BAB, HIB
TCELA113E	A	C1	1	1	55.58	9.619	0.1092	12	BAT, HIT
TCELA211E	A	C2	1	2	57.19	9.436	0.1084	12	HAT
TCELA212E	A	C2	1	2	60.47	9.477	0.1095	12	BAB
TCELA213E	A	C2	1	2	57.49	9.391	0.1101	12	HAB, HIB
TCELB111E	B	C1	2	1	55.62	10.15	0.09808	12	M(B,H)AT
TCELB112E	B	C1	2	1	62.05	10.49	0.09697	12	M(B,H)AT, HIT
TCELB113E	B	C1	2	1	63.61	10.74	0.09403	12	M(B,H)AT, HIT
TCELB211E	B	C2	2	2	53.33	10.58	0.09840	12	BAB
TCELB212E	B	C2	2	2	61.27	10.59	0.09650	12	HAT, HIT
TCELB213E	B	C2	2	2	64.83	10.90	0.09455	12	BAB, HIT
TCELC111E	C	C1	3	1	54.15	9.869	0.1016	12	BAB
TCELC112E	C	C1	3	1	51.66	10.53	0.09958	12	BAT
TCELC113E	C	C1	3	1	58.19	10.02	0.1026	12	M(B,H)AT
TCELC211E	C	C2	3	2	57.88	9.949	0.1005	12	M(B,H)AT, HIT
TCELC212E	C	C2	3	2	63.33	9.935	0.09935	12	BAB
TCELC213E	C	C2	3	2	62.22	9.995	0.1022	12	M(B,H)AB, HIB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008983	63.28	9.907
0.009043	64.27	9.814
0.009097	57.45	9.944
0.009033	58.71	9.686
0.009128	62.72	9.830
0.009178	59.96	9.795
0.008174	51.66	9.431
0.008081	56.98	9.636
0.007836	56.64	9.567
0.008200	49.70	9.861
0.008042	55.99	9.679
0.007879	58.05	9.757
0.008469	52.12	9.498
0.008299	48.72	9.928
0.008553	56.56	9.734
0.008378	55.11	9.472
0.008279	59.58	9.347
0.008519	60.23	9.676

Average 59.08 10.05
 Standard Dev. 3.929 0.4831
 Coeff. of Var. [%] 6.651 4.806
 Min. 51.66 9.391
 Max. 64.83 10.90
 Number of Spec. 18 18

Average_{norm} 0.008509 57.10 9.698
 Standard Dev._{norm} 4.433 0.1776
 Coeff. of Var. [%]_{norm} 7.765 1.831
 Min. 0.007836 48.72 9.347
 Max. 0.009178 64.27 9.944
 Number of Spec. 18 18 18



4.4 Fill Compression Properties (FC)

Fill Compression Properties (FC)--CTD (-65°F) Strength & Modulus

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

0.008800

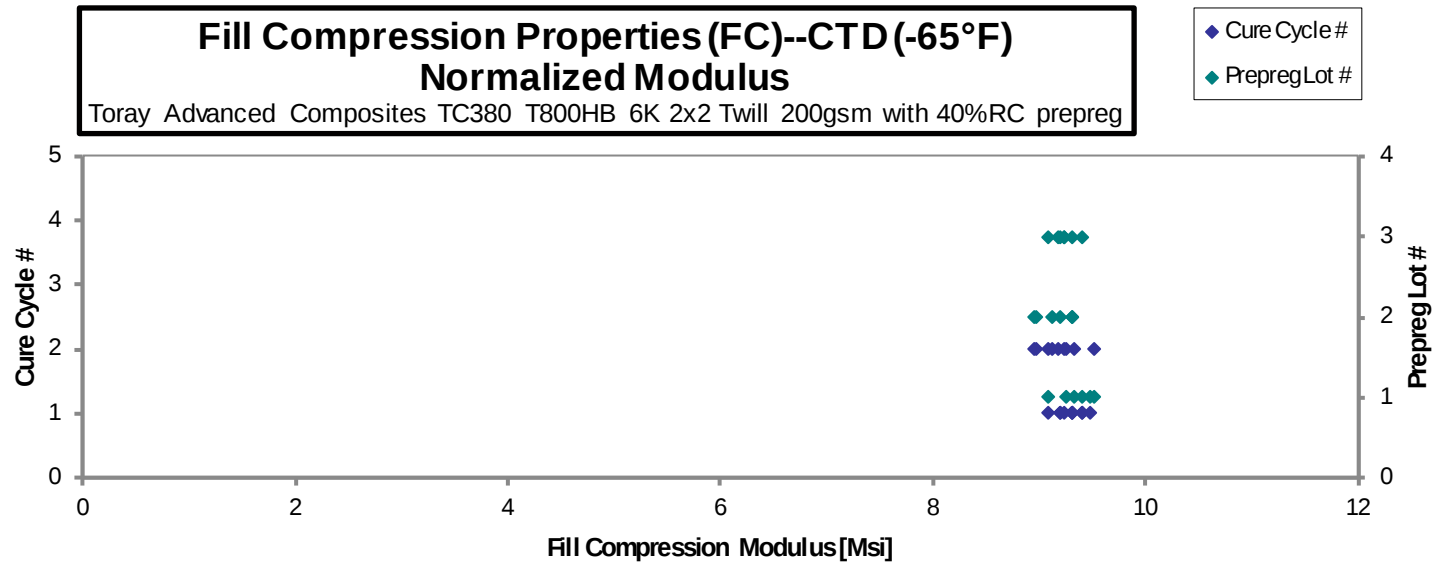
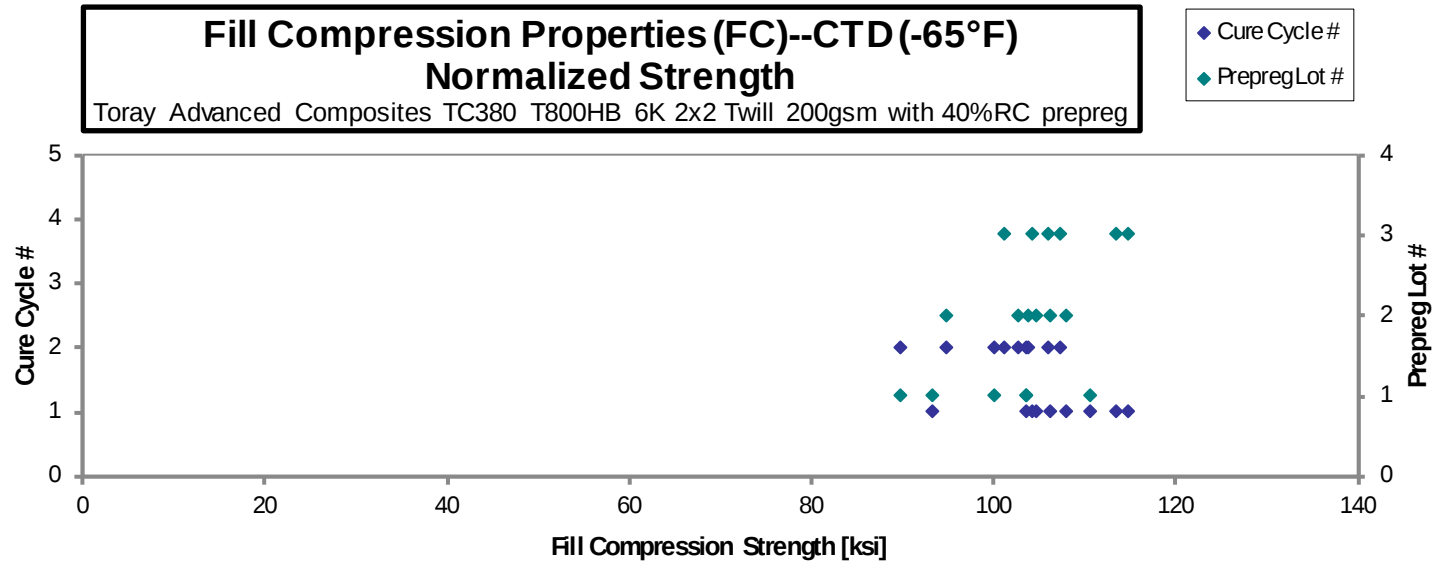
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEZA111B	A	C1	1	1	109.3	9.380	0.1068	12	BAB
TCEZA112B	A	C1	1	1	104.8	9.197	0.1044	12	BAB
TCEZA113B	A	C1	1	1	93.72	9.432	0.1052	12	BAB
TCEZA211B	A	C2	1	2	102.5	9.157	0.1066	12	BGM
TCEZA212B	A	C2	1	2	88.81	9.234	0.1068	12	BAT
TCEZA213B	A	C2	1	2	99.40	9.454	0.1064	12	BGM
TCEZB111B	B	C1	2	1	106.1	9.449	0.1041	12	BGM
TCEZB112B	B	C1	2	1	109.7	9.469	0.1039	12	BAB
TCEZB113B	B	C1	2	1	108.5	9.393	0.1034	12	BGM
TCEZB211B	B	C2	2	2	97.32	9.367	0.1028	12	BAB
TCEZB212B	B	C2	2	2	107.1	9.267	0.1023	12	BAB
TCEZB213B	B	C2	2	2	106.2	9.263	0.1020	12	BGM
TCEZC111B	C	C1	3	1	105.3	9.290	0.1045	12	BAB
TCEZC112B*	C	C1	3	1		9.470	0.1048	12	CIT
TCEZC113B	C	C1	3	1	114.2	9.369	0.1049	12	BGM
TCEZC114B	C	C1	3	1	115.7	9.323	0.1047	12	BGM
TCEZC211B	C	C2	3	2	100.4	9.102	0.1064	12	BGM
TCEZC212B	C	C2	3	2	106.3	9.158	0.1065	12	BGM
TCEZC213B	C	C2	3	2	105.2	9.027	0.1064	12	BAT

* Strength not reported due to unacceptable failure mode.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008900	110.5	9.486
0.008699	103.6	9.091
0.008768	93.38	9.397
0.008886	103.5	9.246
0.008899	89.81	9.337
0.008865	100.1	9.524
0.008676	104.6	9.316
0.008656	107.9	9.314
0.008618	106.3	9.198
0.008568	94.75	9.120
0.008522	103.8	8.974
0.008501	102.6	8.949
0.008710	104.2	9.195
0.008735		9.399
0.008738	113.4	9.303
0.008724	114.7	9.242
0.008869	101.2	9.174
0.008875	107.2	9.236
0.008865	106.0	9.094

Average 104.5 9.305
 Standard Dev. 6.703 0.1326
 Coeff. of Var. [%] 6.416 1.425
 Min. 88.81 9.027
 Max. 115.7 9.470
 Number of Spec. 18 19

Average_{norm} 0.008741 103.8 9.242
 Standard Dev._{norm} 6.439 0.1559
 Coeff. of Var. [%]_{norm} 6.206 1.687
 Min. 0.008501 89.81 8.949
 Max. 0.008900 114.7 9.524
 Number of Spec. 19 18 19



Fill Compression Properties (FC)--RTD (70°F)**Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

0.008800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEZA111A*	A	C1	1	1	85.57	9.027	0.1066	12	BAT
TCEZA112A*	A	C1	1	1	90.98	8.988	0.1069	12	BAB
TCEZA113A	A	C1	1	1	96.36	8.927	0.1070	12	M(B,H)AT
TCEZA114A**	A	C1	1	1	94.45		0.1070	12	M(B,H)AB, HIB
TCEZA211A	A	C2	1	2	88.44	8.699	0.1067	12	BAB
TCEZA212A	A	C2	1	2	94.02	9.220	0.1072	12	BGM
TCEZA213A	A	C2	1	2	94.86	9.015	0.1060	12	BGM
TCEZB111A	B	C1	2	1	87.64	9.314	0.1045	12	BAB
TCEZB112A	B	C1	2	1	88.16	9.633	0.1040	12	BGM
TCEZB113A	B	C1	2	1	93.06	9.405	0.1035	12	BAB
TCEZB211A	B	C2	2	2	85.08	9.351	0.1036	12	BAT
TCEZB212A	B	C2	2	2	95.94	9.163	0.1048	12	BAT
TCEZB213A	B	C2	2	2	87.71	8.872	0.1033	12	BAT
TCEZB214A**	B	C2	2	2	89.04		0.1033	12	BGM
TCEZC111A***	C	C1	3	1		9.410	0.1049	12	HIT
TCEZC112A	C	C1	3	1	88.19	9.369	0.1050	12	BAB
TCEZC113A	C	C1	3	1	96.18	9.175	0.1055	12	M(B,H)AT
TCEZC114A**	C	C1	3	1	92.60		0.1045	12	BGM
TCEZC211A	C	C2	3	2	83.50	9.006	0.1067	12	BAB
TCEZC212A	C	C2	3	2	83.09	9.232	0.1073	12	BGM
TCEZC213A	C	C2	3	2	91.28	9.110	0.1064	12	BAB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008885	86.39	9.114
0.008910	92.11	9.100
0.008914	97.61	9.043
0.008914	95.67	
0.008888	89.32	8.786
0.008932	95.43	9.358
0.008832	95.20	9.047
0.008707	86.71	9.216
0.008663	86.78	9.483
0.008624	91.19	9.217
0.008631	83.44	9.171
0.008731	95.18	9.091
0.008608	85.80	8.678
0.008610	87.11	
0.008743		9.349
0.008746	87.65	9.311
0.008793	96.10	9.167
0.008706	91.61	
0.008892	84.37	9.099
0.008942	84.42	9.380
0.008865	91.96	9.178

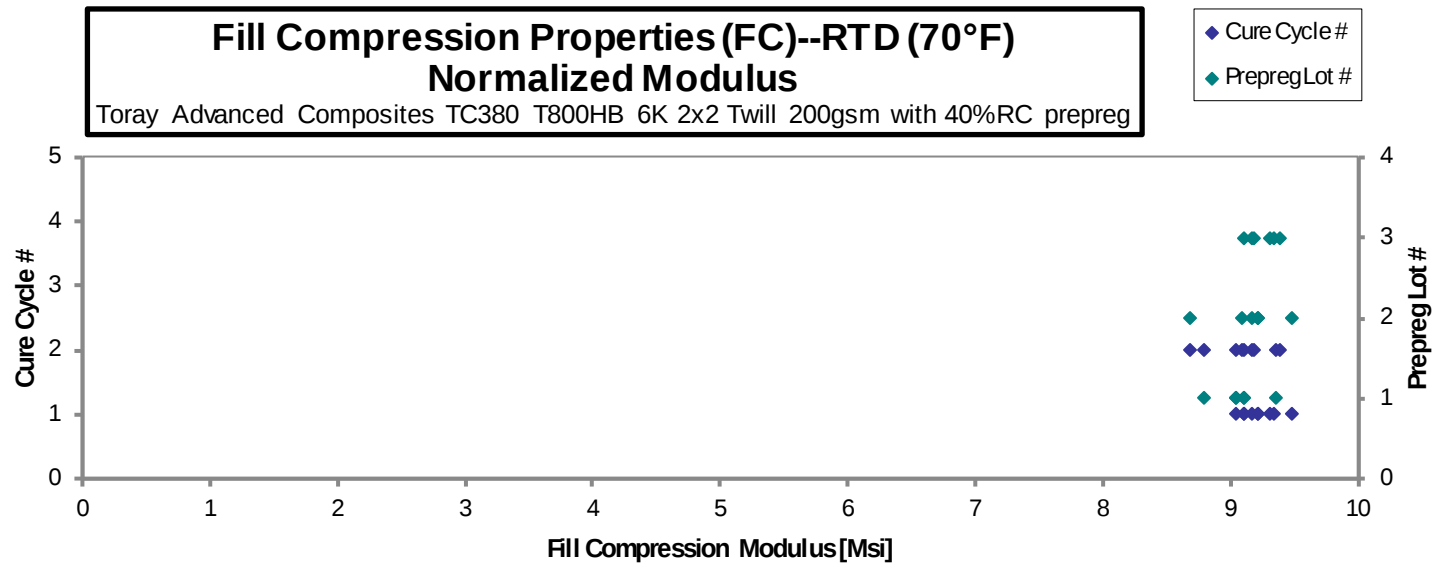
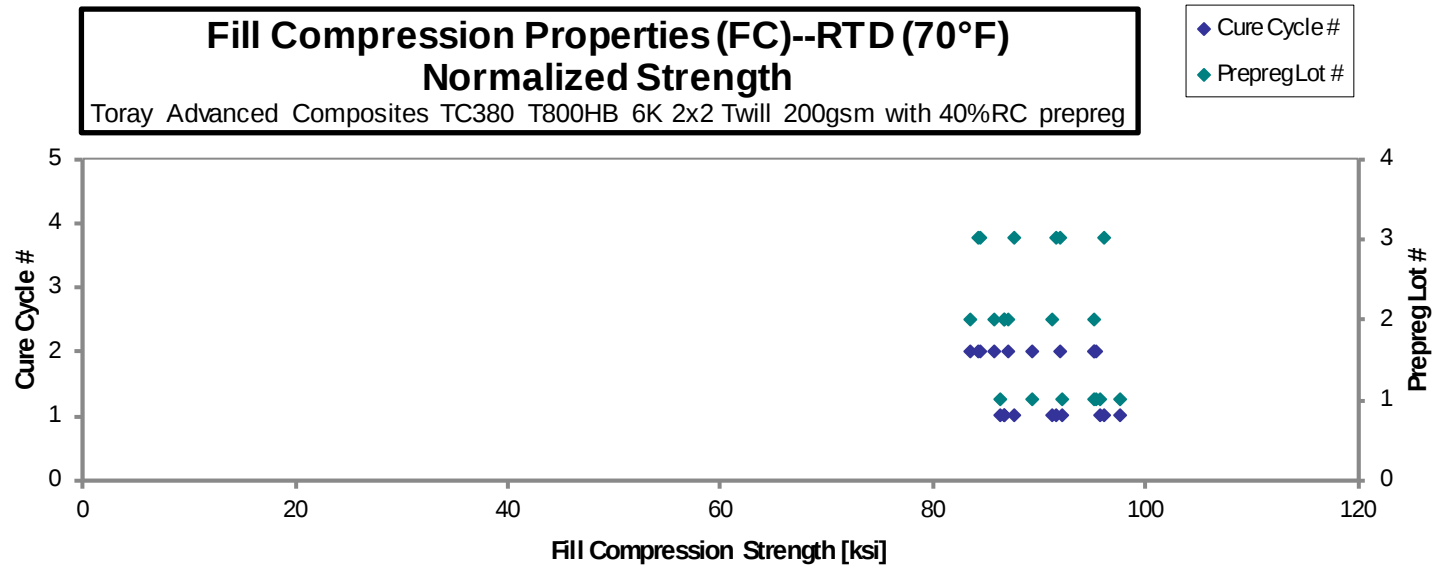
* Modulus are averaged values of 2 strain gages.

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

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

Average	90.31	9.162
Standard Dev.	4.262	0.2306
Coeff. of Var. [%]	4.719	2.517
Min.	83.09	8.699
Max.	96.36	9.633
Number of Spec.	20	18

Average _{norm}	0.008787	90.20	9.155
Standard Dev. _{norm}		4.555	0.1985
Coeff. of Var. [%] _{norm}		5.050	2.168
Min.	0.008608	83.44	8.678
Max.	0.008942	97.61	9.483
Number of Spec.	21	20	18



**Fill Compression Properties (FC)--ETD1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

0.008800

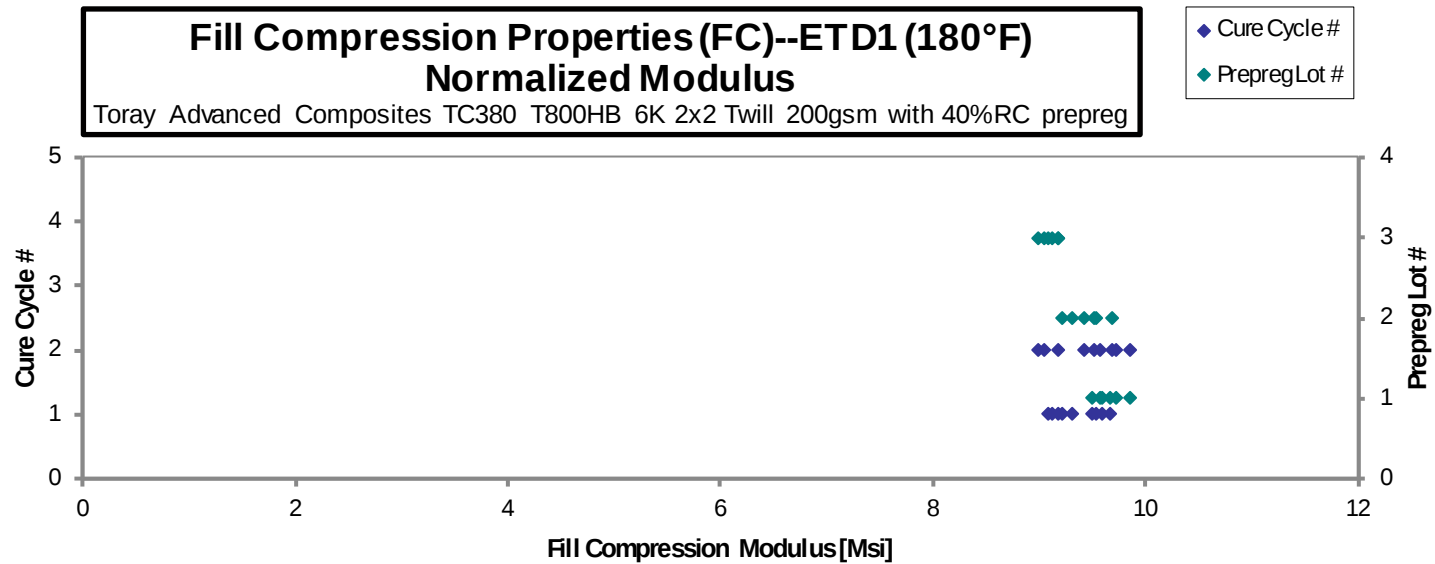
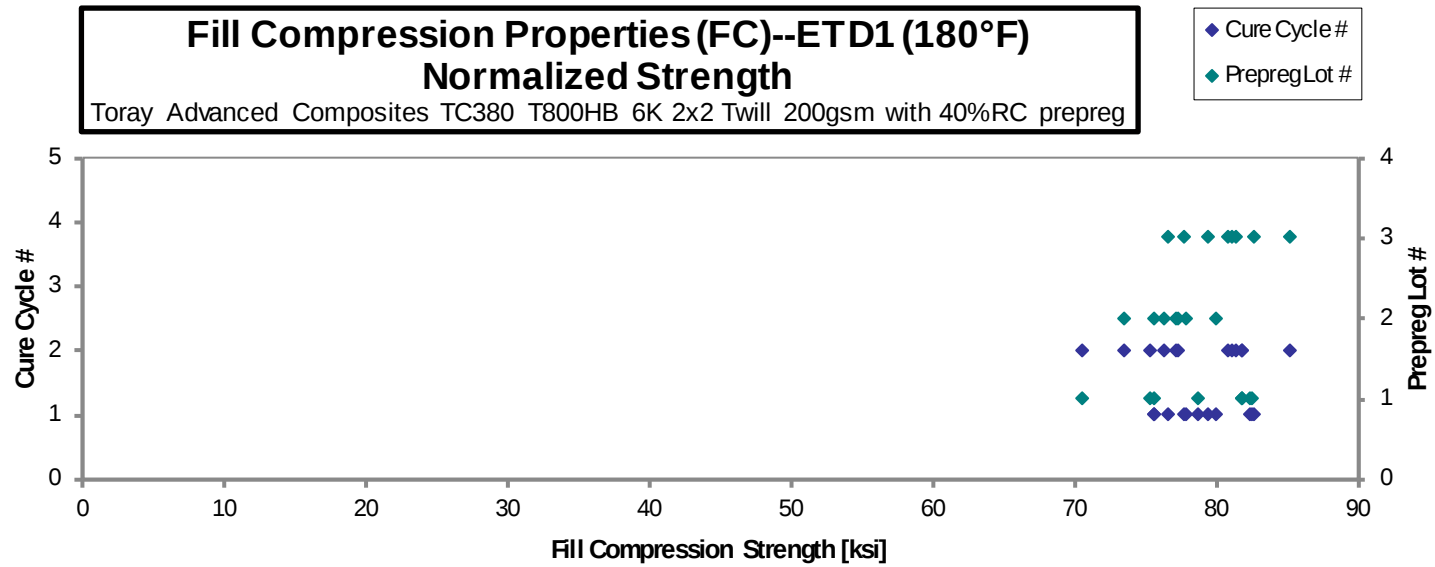
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEZA111C	A	C1	1	1	84.00	9.849	0.1037	12	BAB, HAB/HIB
TCEZA112C	A	C1	1	1	80.32	9.776	0.1035	12	BAB, HAB/HIB
TCEZA113C	A	C1	1	1	76.80	9.642	0.1039	12	BAB
TCEZA114C*	A	C1	1	1	83.06		0.1048	12	BGM
TCEZA211C	A	C2	1	2	80.97	9.464	0.1068	12	BAT, HAT/HIT
TCEZA212C	A	C2	1	2	74.71	9.640	0.1065	12	BAB, HIB
TCEZA213C	A	C2	1	2	80.70	9.730	0.1071	12	BAT
TCEZA214C*	A	C2	1	2	69.51		0.1071	12	BAT
TCEZB111C	B	C1	2	1	79.25	9.388	0.1037	12	BAT
TCEZB112C	B	C1	2	1	81.45	9.493	0.1036	12	BAT
TCEZB113C	B	C1	2	1	77.29	9.749	0.1033	12	BAT
TCEZB211C	B	C2	2	2	78.52	9.791	0.1027	12	BAT, HAT/HIT
TCEZB212C	B	C2	2	2	79.50	9.951	0.1028	12	HAT/HIT
TCEZB213C	B	C2	2	2	75.08	9.635	0.1033	12	BAB, HAB/HIB
TCEZB214C*	B	C2	2	2	78.54		0.1037	12	BAB
TCEZC111C	C	C1	3	1	80.04	9.152	0.1048	12	BAT, HIT
TCEZC112C	C	C1	3	1	83.29	9.258	0.1047	12	BAT, HIT
TCEZC113C	C	C1	3	1	77.32	9.217	0.1046	12	BAB, HIB
TCEZC114C*	C	C1	3	1	78.52		0.1045	12	BAB, CIB, CIT
TCEZC211C	C	C2	3	2	84.54	8.986	0.1064	12	M(B,H)AT
TCEZC212C	C	C2	3	2	80.81	9.109	0.1064	12	BAB, HIB
TCEZC213C	C	C2	3	2	79.58	8.854	0.1072	12	BAB, HIB
TCEZC214C*	C	C2	3	2	80.45		0.1064	12	M(B,H)AT, HIT

* Specimen was not gaged, only strength is reported.

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008644	82.52	9.675
0.008628	78.75	9.585
0.008661	75.58	9.490
0.008729	82.39	
0.008897	81.86	9.568
0.008878	75.37	9.725
0.008922	81.82	9.865
0.008928	70.52	
0.008640	77.81	9.217
0.008636	79.93	9.316
0.008604	75.57	9.532
0.008560	76.37	9.524
0.008563	77.36	9.682
0.008611	73.47	9.428
0.008640	77.11	
0.008736	79.46	9.085
0.008728	82.60	9.182
0.008715	76.58	9.129
0.008706	77.68	
0.008868	85.20	9.055
0.008863	81.39	9.174
0.008933	80.78	8.988
0.008865	81.05	

Average 79.32 9.482
Standard Dev. 3.337 0.3219
Coeff. of Var. [%] 4.207 3.395
Min. 69.51 8.854
Max. 84.54 9.951
Number of Spec. 23 18

Average_{norm} 0.008737 78.75 9.401
Standard Dev._{norm} 3.474 0.2636
Coeff. of Var. [%]_{norm} 4.411 2.804
Min. 0.008560 70.52 8.988
Max. 0.008933 85.20 9.865
Number of Spec. 23 23 18



**Fill Compression Properties (FC)--ETW1 (180°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

0.008800

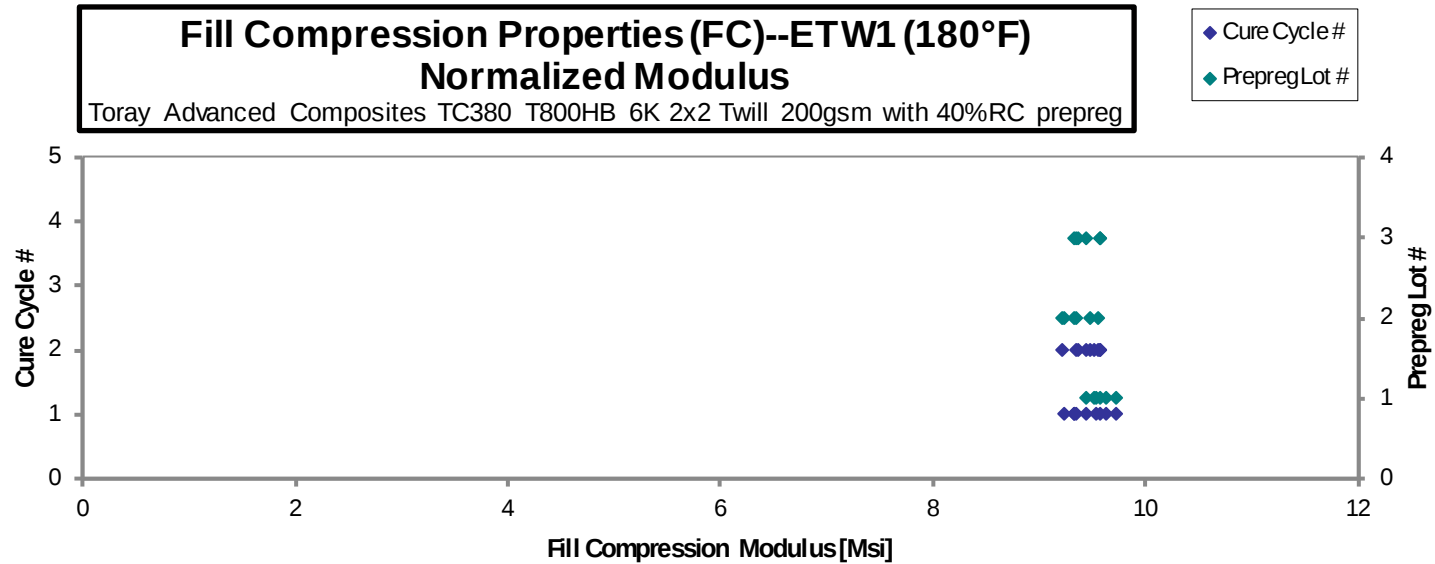
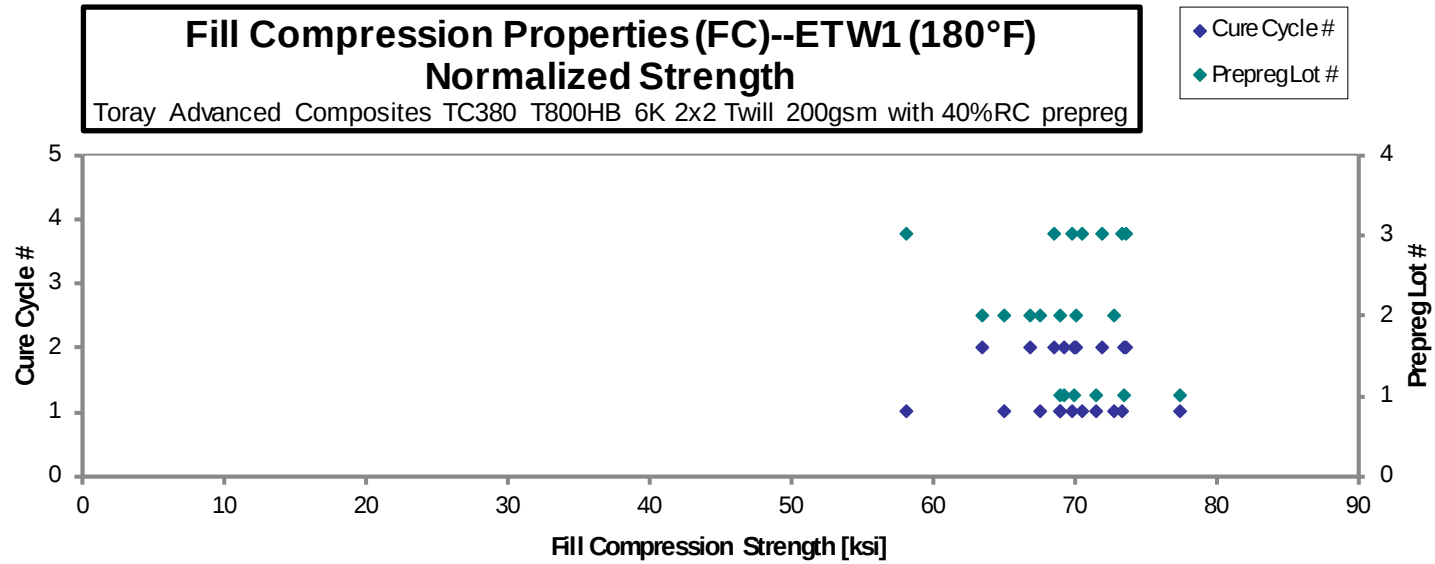
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEZA111D	A	C1	1	1	71.74	9.661	0.1052	12	BAB
TCEZA112D	A	C1	1	1	69.12	9.754	0.1053	12	HAB
TCEZA113D	A	C1	1	1	78.00	9.601	0.1049	12	HAB/HIB
TCEZA211D	A	C2	1	2	72.12	9.345	0.1076	12	BAB
TCEZA212D	A	C2	1	2	68.07	9.273	0.1074	12	BGM
TCEZA213D	A	C2	1	2	68.54	9.378	0.1078	12	HAB, HIB
TCEZB111D	B	C1	2	1	66.26	9.421	0.1036	12	HAT/HIT
TCEZB112D	B	C1	2	1	69.35	9.571	0.1029	12	BAB
TCEZB113D	B	C1	2	1	70.48	9.554	0.1034	12	BAB
TCEZB114D*	B	C1	2	1	74.34		0.1034	12	HAT, HIT
TCEZB211D	B	C2	2	2	71.83	9.786	0.1030	12	M(B,H)AB, HIB
TCEZB212D	B	C2	2	2	69.23	9.817	0.1021	12	BAB
TCEZB213D	B	C2	2	2	64.84	9.402	0.1035	12	BAB
TCEZC111D	C	C1	3	1	71.23	9.413	0.1047	12	BAT, HIT
TCEZC112D	C	C1	3	1	73.97	9.665	0.1047	12	BAB, HIT
TCEZC113D	C	C1	3	1	58.33	9.460	0.1053	12	BAB
TCEZC114D*	C	C1	3	1	70.09		0.1053	12	BAT
TCEZC211D	C	C2	3	2	68.12	9.297	0.1063	12	BAT, HIT
TCEZC212D	C	C2	3	2	72.72	9.247	0.1069	12	BAT, HIT
TCEZC213D	C	C2	3	2	71.01	9.440	0.1071	12	BAB

* Specimen was not gaged, only strength is reported.

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008765	71.46	9.623
0.008775	68.92	9.726
0.008742	77.48	9.537
0.008967	73.49	9.522
0.008953	69.25	9.434
0.008986	69.99	9.576
0.008629	64.98	9.238
0.008578	67.60	9.330
0.008617	69.01	9.355
0.008614	72.76	
0.008585	70.07	9.547
0.008504	66.91	9.487
0.008622	63.53	9.212
0.008722	70.60	9.330
0.008722	73.32	9.580
0.008778	58.19	9.437
0.008771	69.86	
0.008856	68.55	9.355
0.008911	73.64	9.363
0.008924	72.01	9.573

Average 69.97 9.505
 Standard Dev. 4.023 0.1785
 Coeff. of Var. [%] 5.750 1.878
 Min. 58.33 9.247
 Max. 78.00 9.817
 Number of Spec. 20 18

Average_{norm} 0.008751 69.58 9.457
 Standard Dev._{norm} 4.167 0.1399
 Coeff. of Var. [%]_{norm} 5.988 1.479
 Min. 0.008504 58.19 9.212
 Max. 0.008986 77.48 9.726
 Number of Spec. 20 20 18



**Fill Compression Properties (FC)--ETW2 (250°F)
Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

0.008800

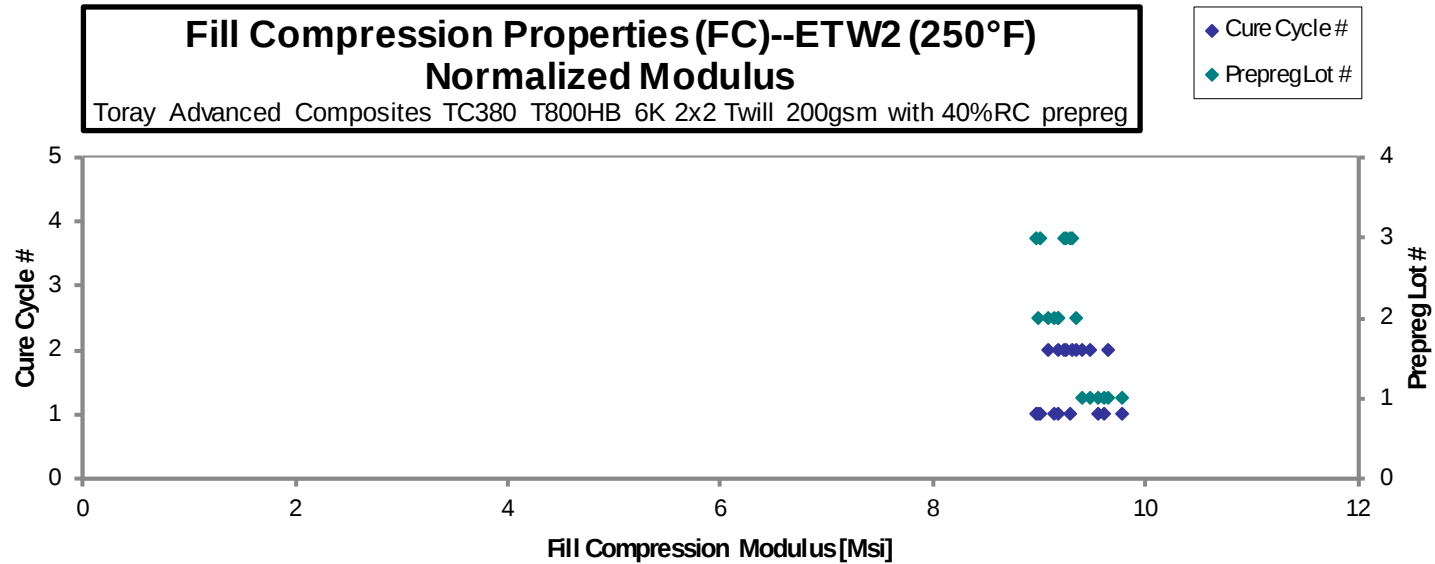
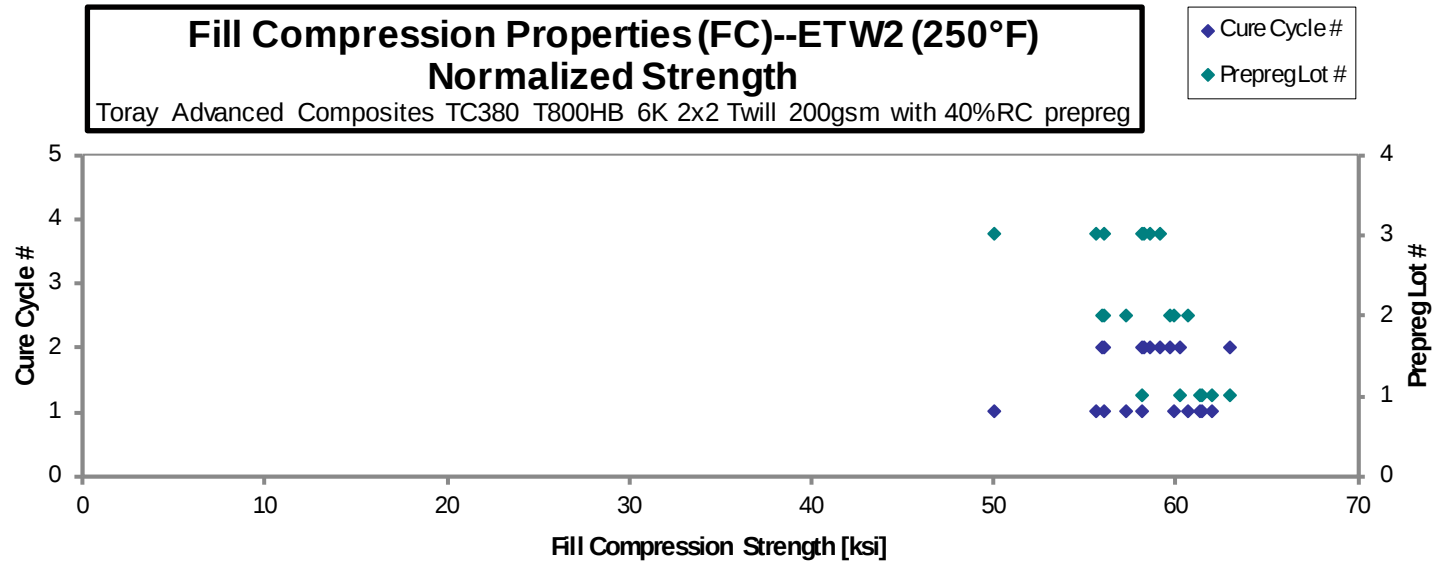
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEZA111E	A	C1	1	1	61.84	9.628	0.1048	12	HAT/HIT
TCEZA112E	A	C1	1	1	62.56	9.963	0.1037	12	HGM, HIT
TCEZA113E	A	C1	1	1	63.45	9.843	0.1031	12	HAT/HIT
TCEZA211E	A	C2	1	2	62.55	9.423	0.1063	12	M(B,H)AB
TCEZA212E	A	C2	1	2	59.96	9.366	0.1060	12	BAT, HAT/HIT
TCEZA213E	A	C2	1	2	58.37	9.689	0.1052	12	HAB/HIB
TCEZB111E	B	C1	2	1	59.26	9.448	0.1021	12	M(B,H)AB
TCEZB112E	B	C1	2	1	61.69	9.338	0.1038	12	HAT, HIT
TCEZB113E	B	C1	2	1	60.87	9.144	0.1039	12	HAB
TCEZB211E	B	C2	2	2	61.35	9.608	0.1027	12	HAT/HIT
TCEZB212E	B	C2	2	2	57.57	9.327	0.1028	12	HAT
TCEZB213E	B	C2	2	2	57.47	9.424	0.1029	12	HAT
TCEZC111E	C	C1	3	1	56.14	9.304	0.1055	12	BAT, HIT
TCEZC112E	C	C1	3	1	55.79	9.051	0.1052	12	BAT
TCEZC113E	C	C1	3	1	58.39	9.007	0.1051	12	BAT
TCEZC114E*	C	C1	3	1	50.02		0.1056	12	BAB
TCEZC211E	C	C2	3	2	58.14	9.167	0.1064	12	M(B,H)AT, HIT
TCEZC212E	C	C2	3	2	57.68	9.157	0.1067	12	M(B,H)AB, HIB
TCEZC213E	C	C2	3	2	58.47	9.214	0.1068	12	M(B,H)AT, HIT

* Specimen was not gaged, only strength is reported.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008735	61.38	9.557
0.008639	61.41	9.780
0.008590	61.94	9.608
0.008858	62.97	9.486
0.008833	60.19	9.402
0.008768	58.16	9.654
0.008511	57.31	9.138
0.008651	60.65	9.180
0.008657	59.88	8.996
0.008560	59.67	9.346
0.008565	56.04	9.078
0.008576	56.01	9.185
0.008789	56.06	9.292
0.008767	55.58	9.017
0.008761	58.13	8.967
0.008800	50.02	
0.008869	58.60	9.239
0.008888	58.26	9.248
0.008900	59.13	9.318

Average 59.03 9.395
Standard Dev. 3.139 0.2661
Coeff. of Var. [%] 5.317 2.833
Min. 50.02 9.007
Max. 63.45 9.963
Number of Spec. 19 18

Average_{norm} 0.008722 58.49 9.305
Standard Dev_{norm} 2.981 0.2373
Coeff. of Var. [%]_{norm} 5.097 2.550
Min. 0.008511 50.02 8.967
Max. 0.008900 62.97 9.780
Number of Spec. 19 19 18

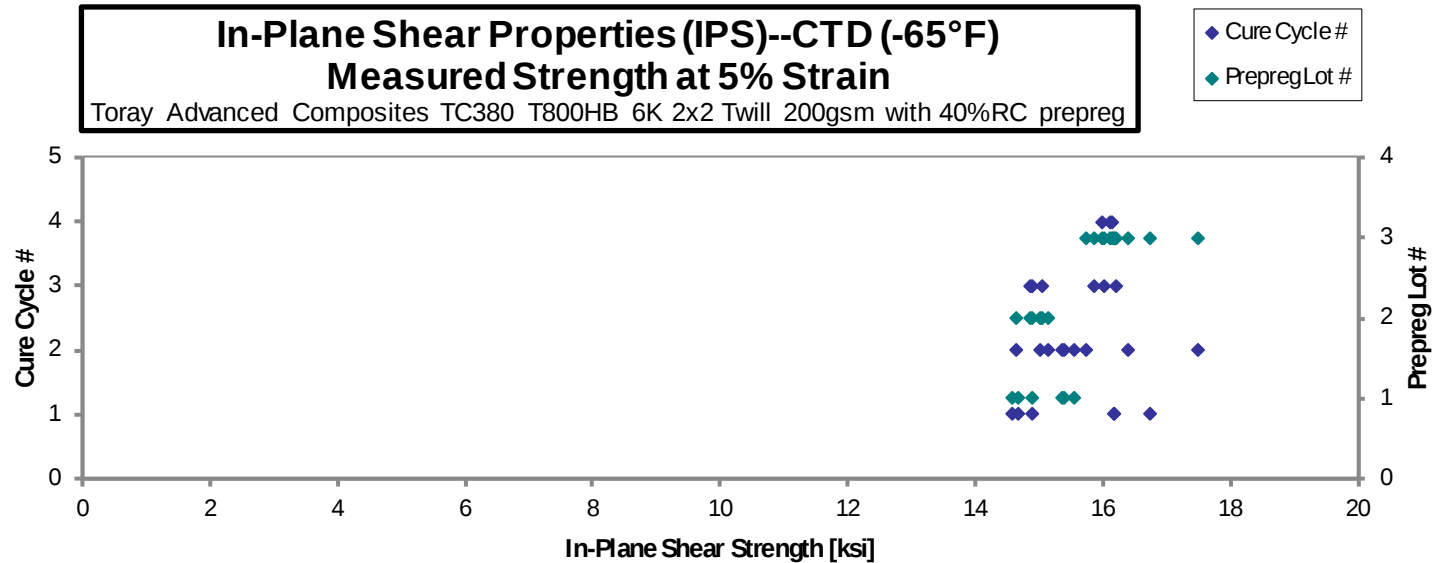
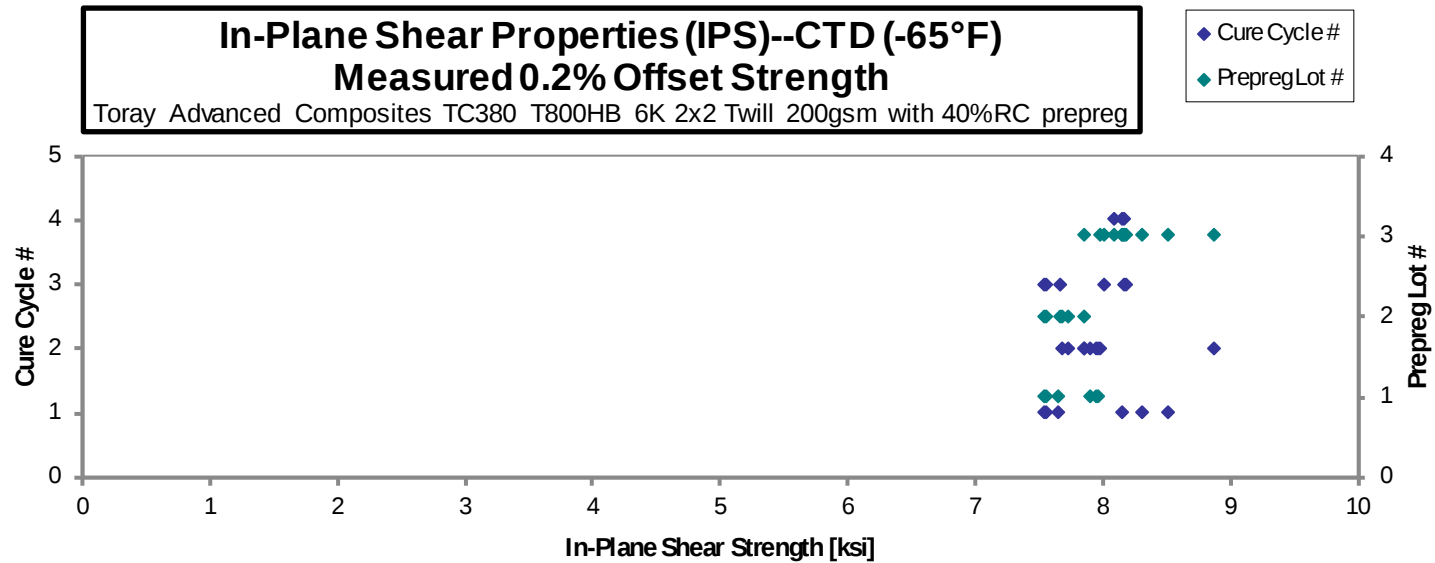


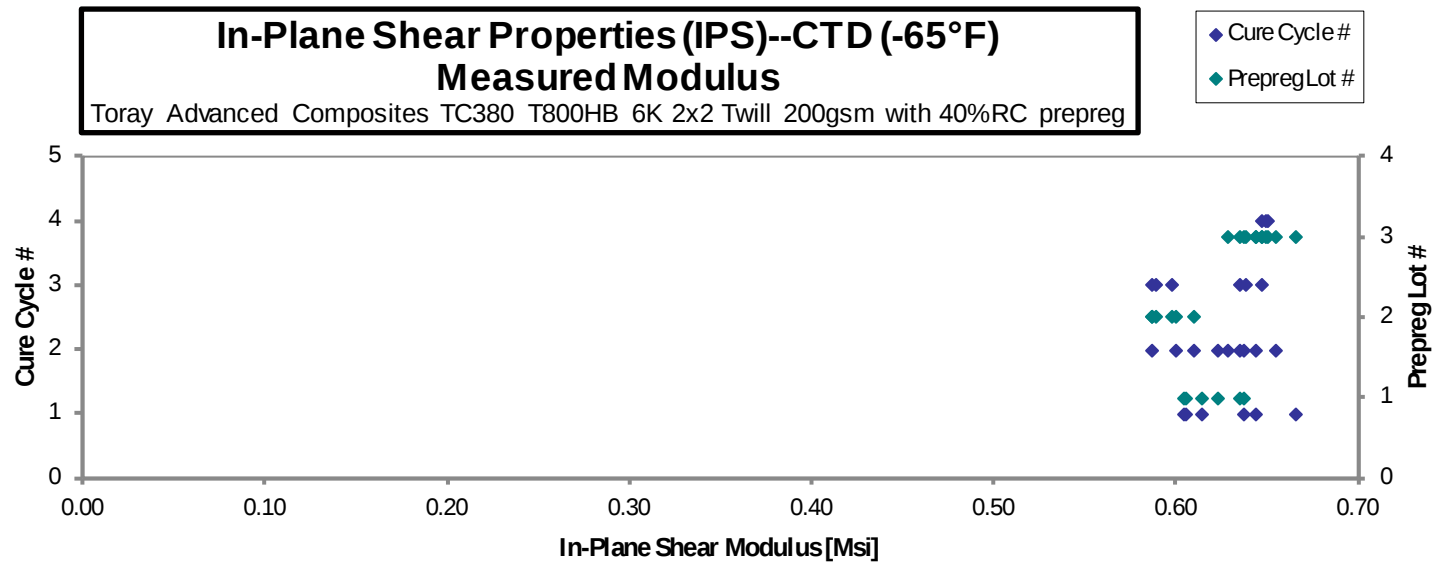
4.5 In-Plane Shear Properties (IPS)

In-Plane Shear Properties (IPS)--CTD (-65°F)										
Strength & Modulus										
Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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]
TCENA111B	A	C1	1	1	7.656	14.89	0.6142	0.07142	8	0.008927
TCENA112B	A	C1	1	1	7.560	14.67	0.6062	0.07202	8	0.009002
TCENA113B	A	C1	1	1	7.544	14.58	0.6048	0.07242	8	0.009052
TCENA211B	A	C2	1	2	7.942	15.54	0.6369	0.06977	8	0.008721
TCENA212B	A	C2	1	2	7.960	15.40	0.6357	0.06937	8	0.008671
TCENA213B	A	C2	1	2	7.905	15.36	0.6235	0.06997	8	0.008746
TCENB211B	B	C2	2	2	7.851	15.13	0.6097	0.06908	8	0.008635
TCENB212B	B	C2	2	2	7.684	15.02	0.6007	0.06967	8	0.008708
TCENB213B	B	C2	2	2	7.734	14.64	0.5873	0.06998	8	0.008748
TCENB311B	B	C3	2	3	7.669	15.04	0.5975	0.07037	8	0.008796
TCENB312B	B	C3	2	3	7.555	14.89	0.5895	0.07087	8	0.008858
TCENB313B	B	C3	2	3	7.539	14.87	0.5865	0.07093	8	0.008867
TCENC111B	C	C1	3	1	8.151	16.18	0.6439	0.06883	8	0.008604
TCENC112B	C	C1	3	1	8.303	16.17	0.6378	0.06848	8	0.008560
TCENC113B	C	C1	3	1	8.516	16.75	0.6665	0.06748	8	0.008435
TCENC211B	C	C2	3	2	7.980	15.73	0.6287	0.07062	8	0.008827
TCENC212B	C	C2	3	2	7.860	16.39	0.6445	0.07088	8	0.008860
TCENC213B	C	C2	3	2	8.868	17.48	0.6545	0.07035	8	0.008794
TCENC311B	C	C3	3	3	8.167	16.20	0.6471	0.06915	8	0.008644
TCENC312B	C	C3	3	3	8.181	15.86	0.6353	0.06933	8	0.008667
TCENC313B	C	C3	3	3	8.004	16.01	0.6384	0.06950	8	0.008688
TCENC411B	C	C4	3	4	8.174	16.11	0.6507	0.06803	8	0.008504
TCENC412B	C	C4	3	4	8.088	15.98	0.6473	0.06773	8	0.008467
TCENC413B	C	C4	3	4	8.152	16.14	0.6493	0.06772	8	0.008465

Average	7.960	15.63	0.6265	0.008719
Standard Dev.	0.3287	0.7456	0.02364	
Coeff. of Var. [%]	4.130	4.772	3.774	
Min.	7.539	14.58	0.5865	0.008435
Max.	8.868	17.48	0.6665	0.009052
Number of Spec.	24	24	24	24



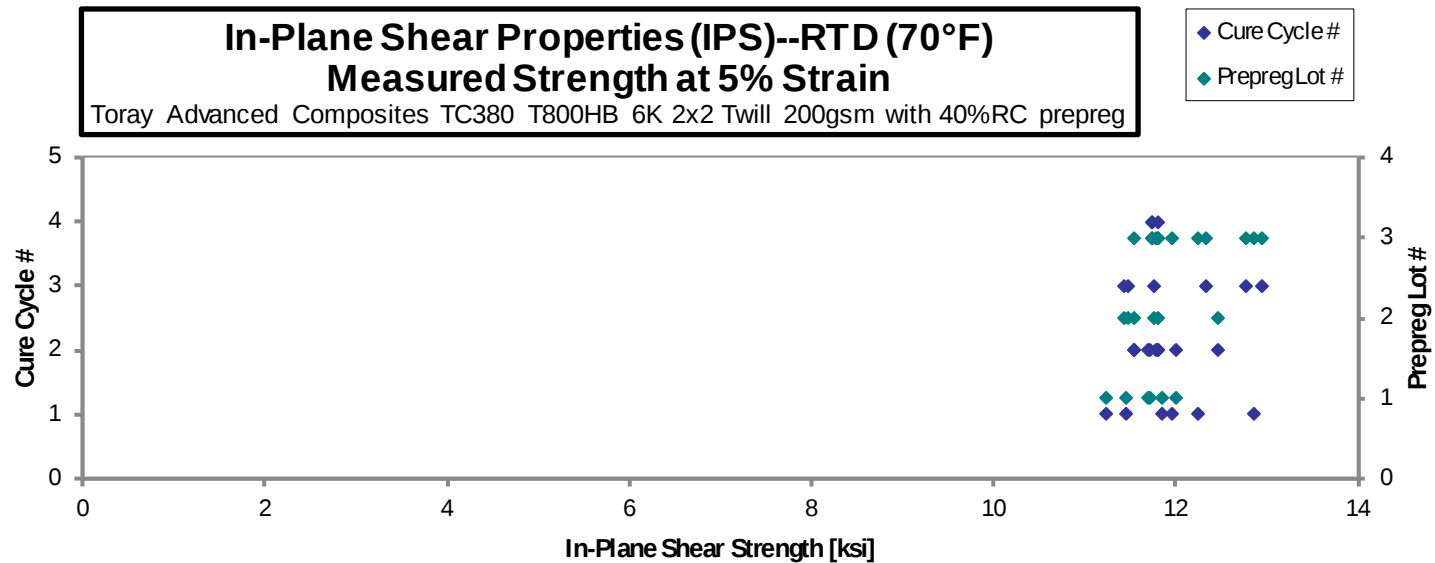
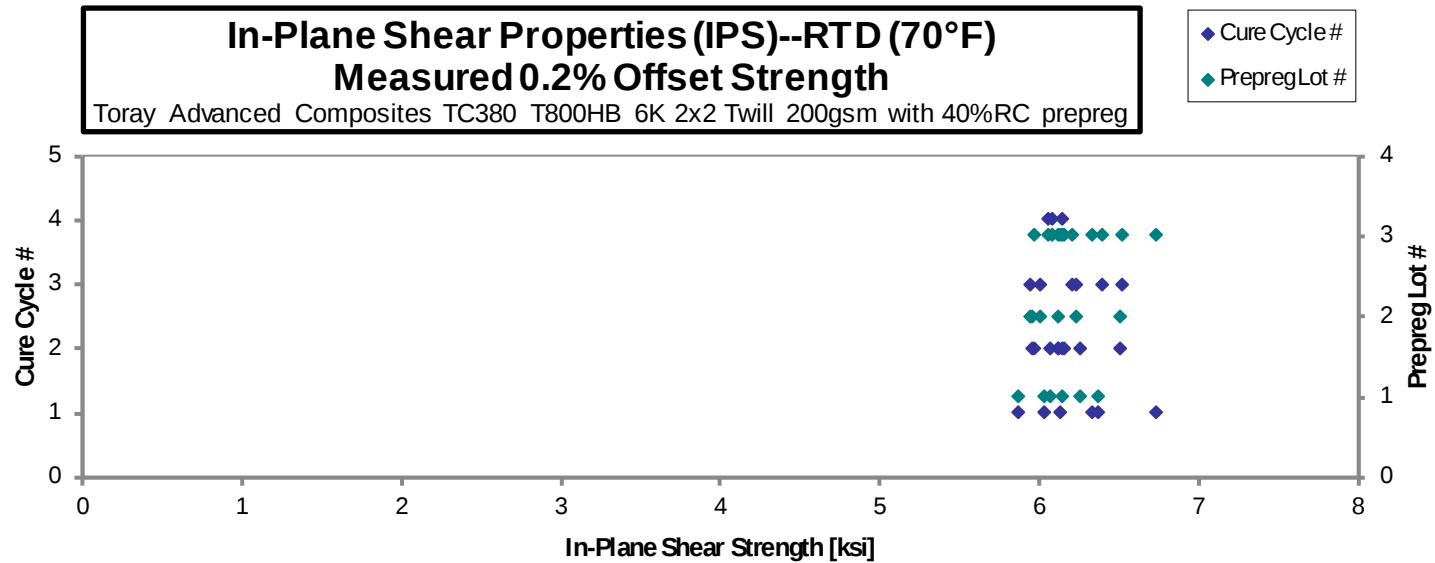


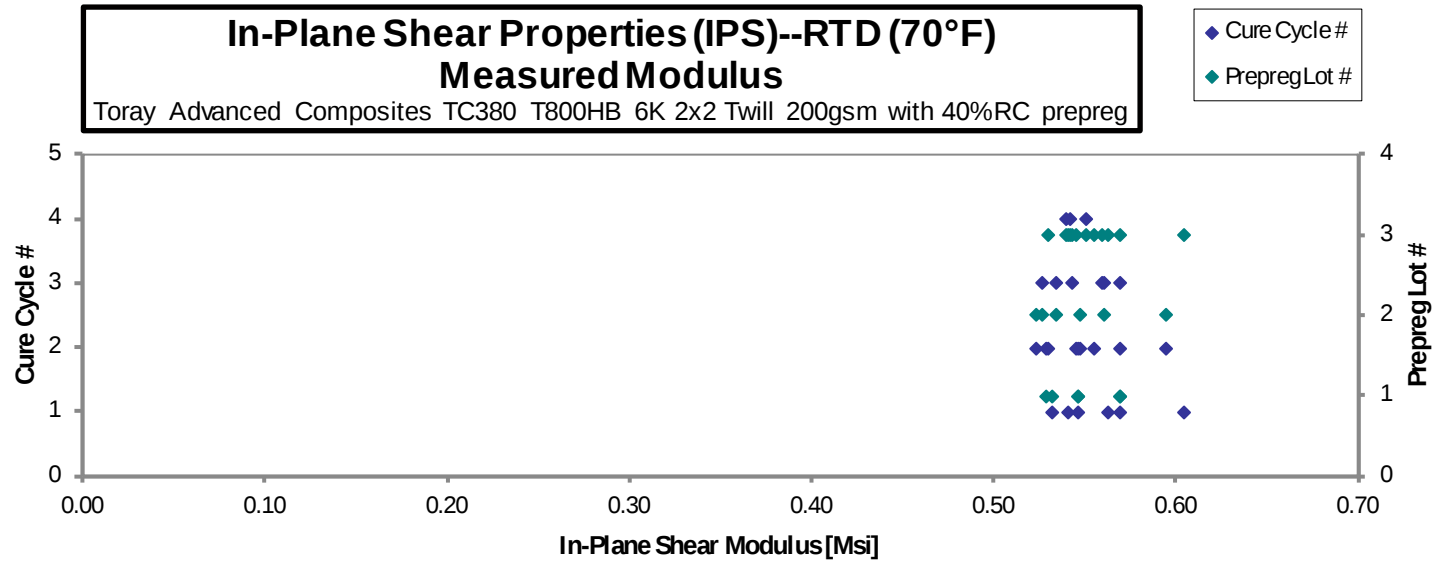
In-Plane Shear Properties (IPS)--RTD (70°F)**Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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]
TCENA111A	A	C1	1	1	6.373	11.84	0.5696	0.06365	8	0.007956
TCENA112A	A	C1	1	1	6.026	11.46	0.5467	0.06723	8	0.008404
TCENA113A	A	C1	1	1	5.871	11.24	0.5317	0.06960	8	0.008700
TCENA212A	A	C2	1	2	6.255	11.99	0.5700	0.06595	8	0.008244
TCENA213A	A	C2	1	2	6.070	11.71	0.5461	0.06835	8	0.008544
TCENA214A	A	C2	1	2	6.148	11.72	0.5285	0.06890	8	0.008613
TCENB211A	B	C2	2	2	6.506	12.46	0.5945	0.06075	8	0.007594
TCENB212A	B	C2	2	2	6.124	11.80	0.5471	0.06455	8	0.008069
TCENB213A	B	C2	2	2	5.951	11.53	0.5238	0.06722	8	0.008402
TCENB311A	B	C3	2	3	6.227	11.75	0.5603	0.06235	8	0.007794
TCENB312A	B	C3	2	3	6.013	11.48	0.5343	0.06543	8	0.008179
TCENB313A	B	C3	2	3	5.943	11.43	0.5269	0.06767	8	0.008458
TCENC111A	C	C1	3	1	6.732	12.86	0.6048	0.06185	8	0.007731
TCENC112A	C	C1	3	1	6.329	12.25	0.5631	0.06513	8	0.008142
TCENC113A	C	C1	3	1	6.130	11.95	0.5411	0.06758	8	0.008448
TCENC211A	C	C2	3	2	6.160	11.79	0.5548	0.06667	8	0.008333
TCENC212A	C	C2	3	2	6.121	11.80	0.5452	0.06837	8	0.008546
TCENC213A	C	C2	3	2	5.963	11.54	0.5298	0.06965	8	0.008706
TCENC311A	C	C3	3	3	6.525	12.94	0.5691	0.06622	8	0.008277
TCENC312A	C	C3	3	3	6.397	12.77	0.5600	0.06803	8	0.008504
TCENC313A	C	C3	3	3	6.210	12.33	0.5428	0.06925	8	0.008656
TCENC411A	C	C4	3	4	6.151	11.80	0.5510	0.06638	8	0.008298
TCENC412A	C	C4	3	4	6.080	11.75	0.5426	0.06728	8	0.008410
TCENC413A	C	C4	3	4	6.062	11.74	0.5398	0.06793	8	0.008492

Average	6.182	11.91	0.5510	0.008313
Standard Dev.	0.2081	0.4594	0.02036	
Coeff. of Var. [%]	3.366	3.856	3.694	
Min.	5.871	11.24	0.5238	0.007594
Max.	6.732	12.94	0.6048	0.008706
Number of Spec.	24	24	24	24





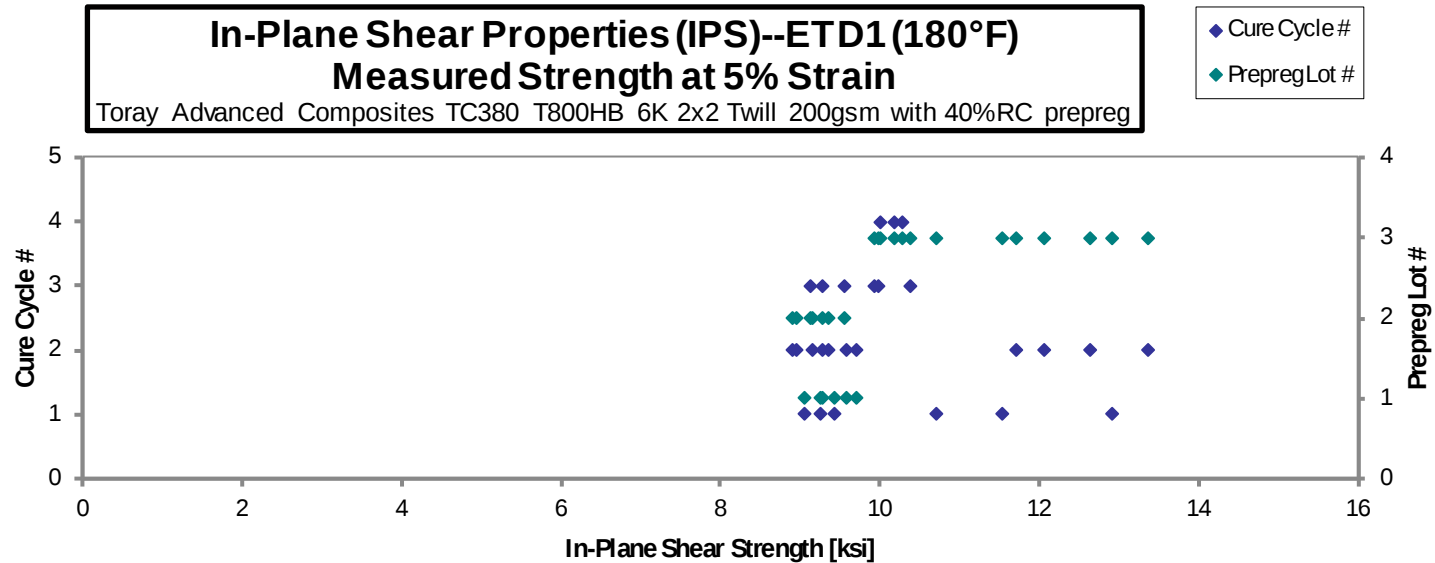
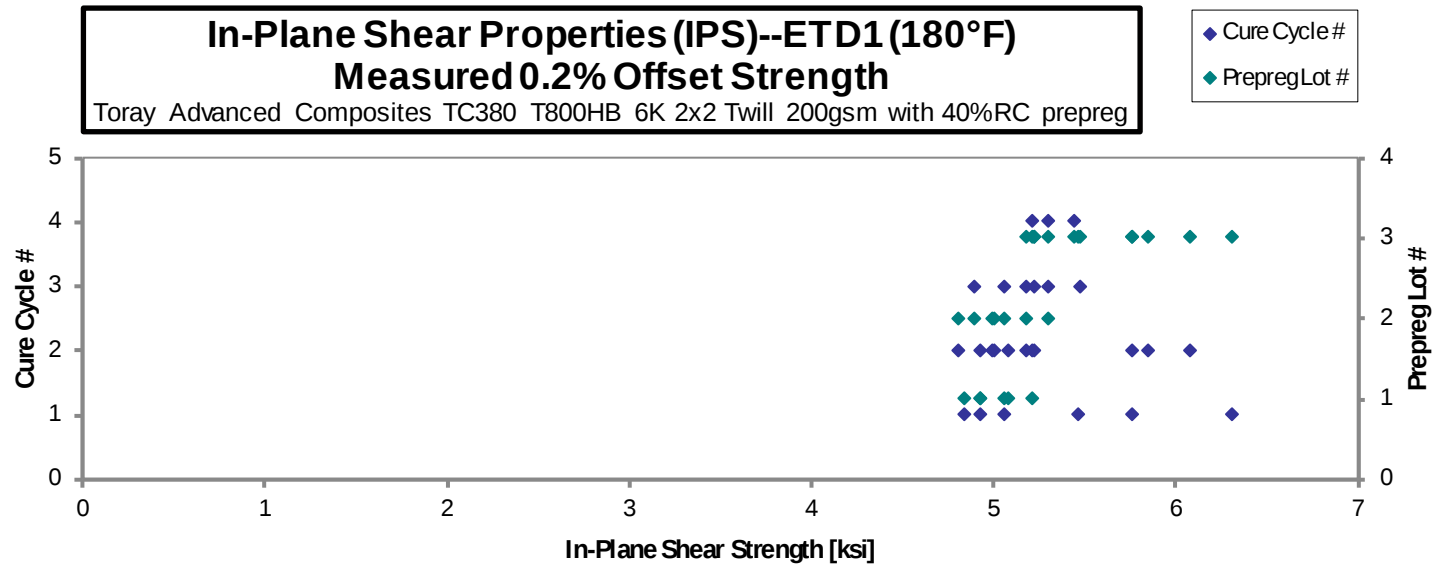
In-Plane Shear Properties (IPS)--ETD1 (180°F)**Strength & Modulus**

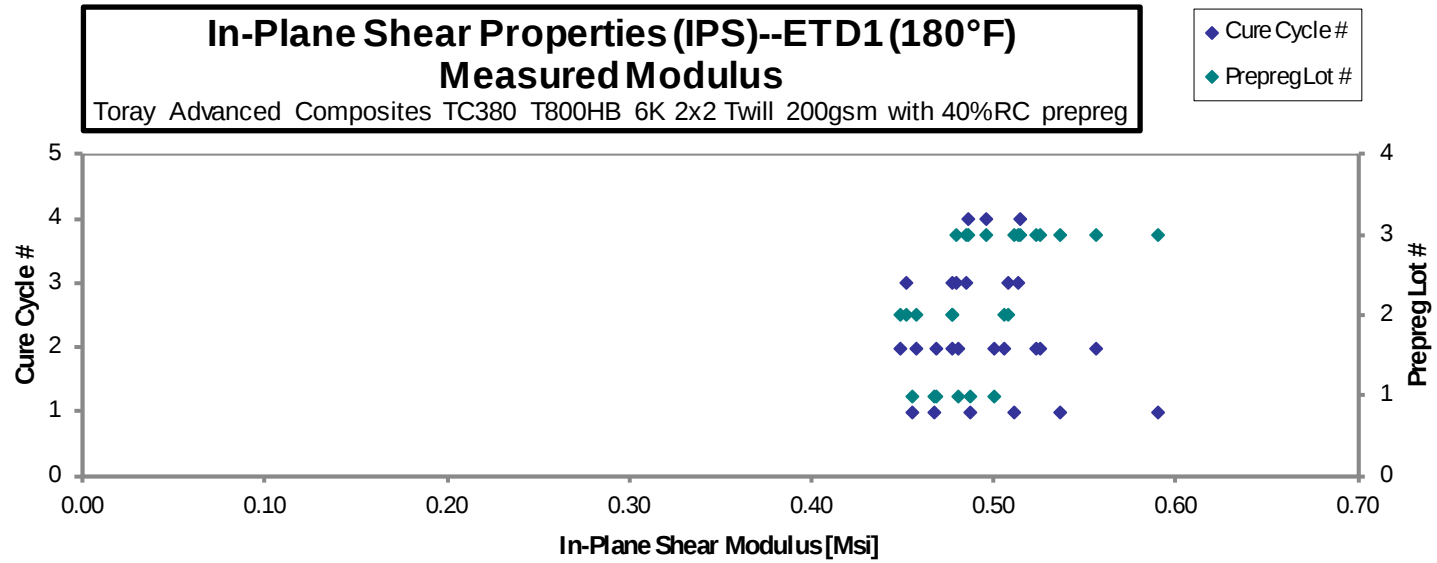
Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

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]
TCENA111C	A	C1	1	1	4.835	9.064	0.4558	0.07112	8	0.008890
TCENA112C	A	C1	1	1	4.932	9.251	0.4672	0.06917	8	0.008646
TCENA113C	A	C1	1	1	5.064	9.434	0.4876	0.06617	8	0.008271
TCENA211C	A	C2	1	2	4.929	9.276	0.4687	0.06852	8	0.008565
TCENA212C	A	C2	1	2	5.077	9.582	0.4802	0.06665	8	0.008331
TCENA213C	A	C2	1	2	5.213	9.708	0.5005	0.06427	8	0.008033
TCENB211C	B	C2	2	2	4.995	8.962	0.4485	0.06845	8	0.008556
TCENB212C	B	C2	2	2	4.809	8.910	0.4580	0.06722	8	0.008402
TCENB213C	B	C2	2	2	5.004	9.153	0.4779	0.06413	8	0.008017
TCENB214C	B	C2	2	2	5.176	9.358	0.5059	0.06193	8	0.007742
TCENB311C	B	C3	2	3	4.898	9.131	0.4524	0.06723	8	0.008404
TCENB312C	B	C3	2	3	5.059	9.279	0.4773	0.06445	8	0.008056
TCENB313C	B	C3	2	3	5.300	9.567	0.5081	0.06085	8	0.007606
TCENC111C	C	C1	3	1	5.462	10.71	0.5111	0.06857	8	0.008571
TCENC112C	C	C1	3	1	5.761	11.54	0.5368	0.06687	8	0.008358
TCENC113C	C	C1	3	1	6.313	12.91	0.5903	0.06403	8	0.008004
TCENC211C*	C	C2	3	2	5.227	13.37		0.06982	8	0.008727
TCENC212C	C	C2	3	2	5.844	12.07	0.5256	0.06892	8	0.008615
TCENC213C	C	C2	3	2	5.761	11.72	0.5232	0.06752	8	0.008440
TCENC214C	C	C2	3	2	6.074	12.63	0.5558	0.06622	8	0.008277
TCENC311C	C	C3	3	3	5.184	9.935	0.4793	0.06913	8	0.008642
TCENC312C	C	C3	3	3	5.226	9.986	0.4855	0.06787	8	0.008483
TCENC313C	C	C3	3	3	5.470	10.38	0.5141	0.06542	8	0.008177
TCENC411C	C	C4	3	4	5.214	10.00	0.4857	0.06792	8	0.008490
TCENC412C	C	C4	3	4	5.304	10.18	0.4962	0.06657	8	0.008321
TCENC413C	C	C4	3	4	5.443	10.28	0.5146	0.06438	8	0.008048

* Modulus not reported due to specimen slippage occurred during 1st testing run, 0.2% offset strength and 5% strain were obtained from 2nd testing run.

Average	5.291	10.25	0.4963	0.008333
Standard Dev.	0.3854	1.310	0.03366	
Coeff. of Var. [%]	7.284	12.79	6.784	
Min.	4.809	8.910	0.4485	0.007606
Max.	6.313	13.37	0.5903	0.008890
Number of Spec.	26	26	25	26



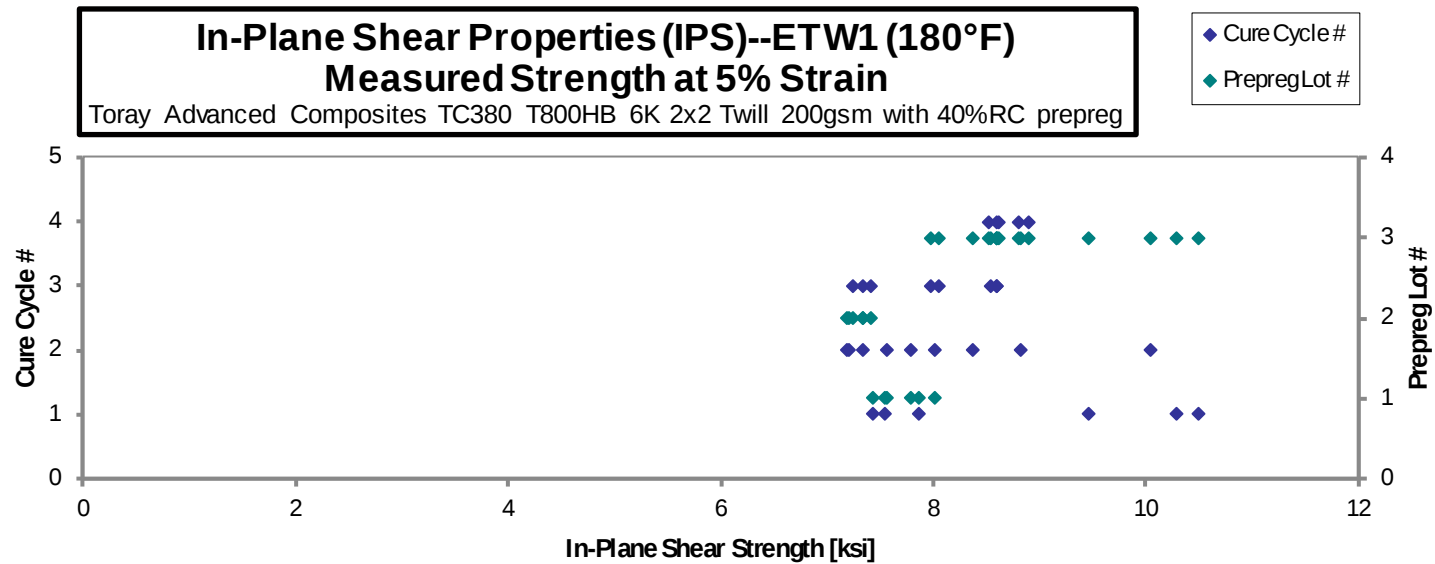
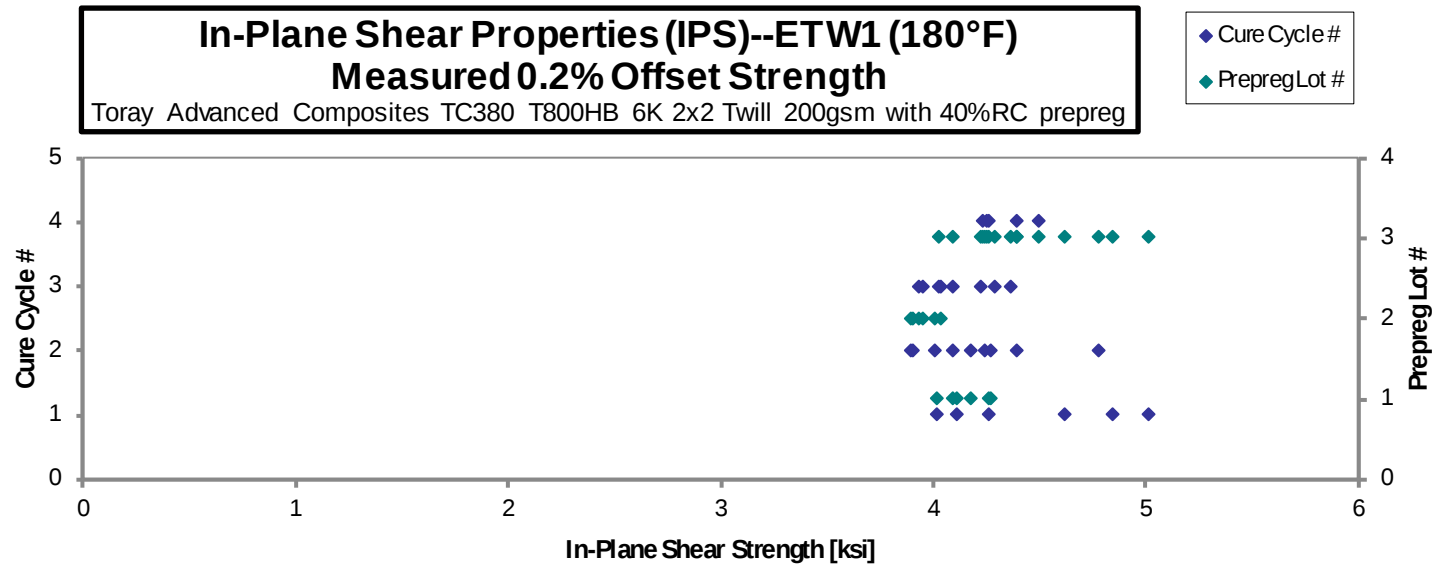


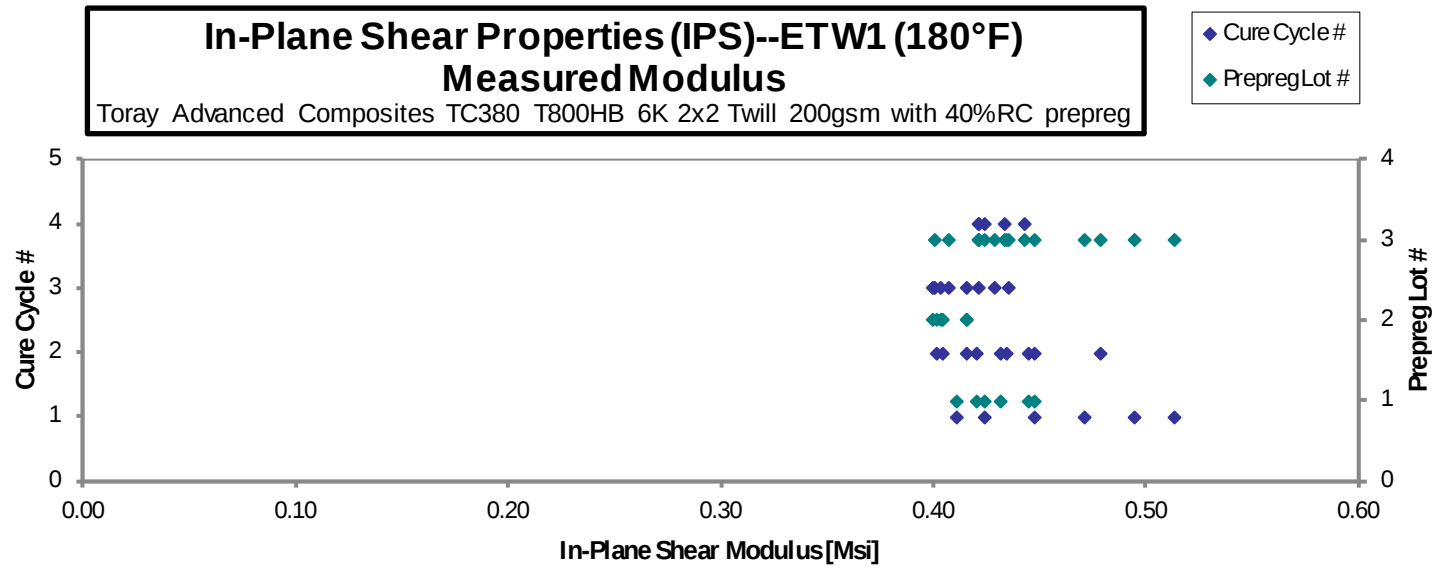
In-Plane Shear Properties (IPS)--ETW1 (180°F)**Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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]
TCENA111D	A	C1	1	1	4.257	7.864	0.4474	0.06828	8	0.008535
TCENA112D	A	C1	1	1	4.111	7.547	0.4242	0.07088	8	0.008860
TCENA113D	A	C1	1	1	4.016	7.421	0.4112	0.07237	8	0.009046
TCENA211D	A	C2	1	2	4.267	8.003	0.4448	0.06772	8	0.008465
TCENA212D	A	C2	1	2	4.175	7.775	0.4316	0.07018	8	0.008773
TCENA213D	A	C2	1	2	4.091	7.551	0.4206	0.07182	8	0.008977
TCENB211D	B	C2	2	2	4.000	7.337	0.4151	0.06623	8	0.008279
TCENB212D	B	C2	2	2	3.890	7.187	0.4039	0.06873	8	0.008592
TCENB213D	B	C2	2	2	3.900	7.206	0.4018	0.07068	8	0.008835
TCENB311D	B	C3	2	3	4.029	7.412	0.4151	0.06740	8	0.008425
TCENB312D	B	C3	2	3	3.930	7.241	0.4029	0.07032	8	0.008790
TCENB313D	B	C3	2	3	3.950	7.340	0.3999	0.07160	8	0.008950
TCENC111D	C	C1	3	1	5.008	10.48	0.5133	0.06655	8	0.008319
TCENC112D	C	C1	3	1	4.837	10.28	0.4947	0.06997	8	0.008746
TCENC113D	C	C1	3	1	4.612	9.450	0.4704	0.07062	8	0.008827
TCENC211D	C	C2	3	2	4.770	10.04	0.4787	0.06883	8	0.008604
TCENC212D	C	C2	3	2	4.388	8.816	0.4473	0.07048	8	0.008810
TCENC213D	C	C2	3	2	4.240	8.365	0.4346	0.07093	8	0.008867
TCENC311D	C	C3	3	3	4.363	8.587	0.4350	0.06952	8	0.008690
TCENC312D	C	C3	3	3	4.290	8.541	0.4290	0.07035	8	0.008794
TCENC313D	C	C3	3	3	4.218	8.582	0.4213	0.07078	8	0.008848
TCENC314D	C	C3	3	3	4.085	8.052	0.4071	0.07112	8	0.008890
TCENC315D	C	C3	3	3	4.026	7.974	0.4001	0.07042	8	0.008802
TCENC411D	C	C4	3	4	4.490	8.805	0.4429	0.06868	8	0.008585
TCENC412D	C	C4	3	4	4.257	8.604	0.4236	0.07025	8	0.008781
TCENC413D	C	C4	3	4	4.390	8.883	0.4332	0.06987	8	0.008733
TCENC414D	C	C4	3	4	4.245	8.584	0.4211	0.07092	8	0.008865
TCENC415D	C	C4	3	4	4.230	8.525	0.4215	0.07067	8	0.008833

Average	4.252	8.302	0.4319	0.008733
Standard Dev.	0.2837	0.9262	0.02842	
Coeff. of Var. [%]	6.671	11.16	6.580	
Min.	3.890	7.187	0.3999	0.008279
Max.	5.008	10.48	0.5133	0.009046
Number of Spec.	28	28	28	28



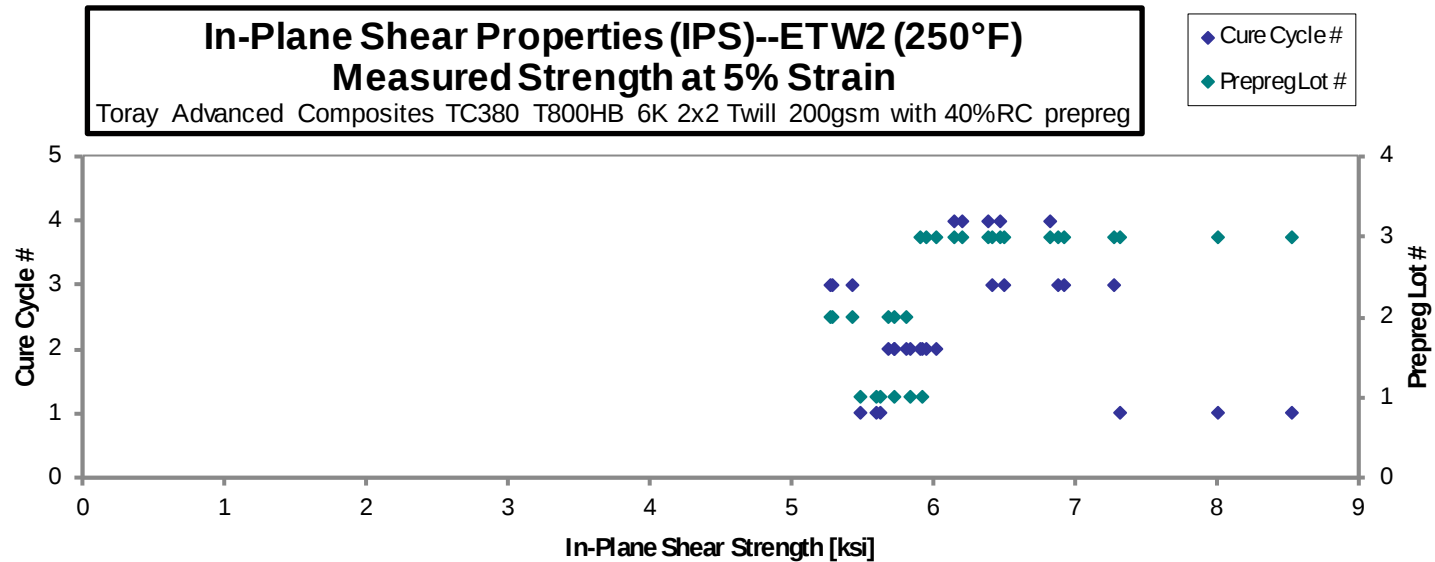
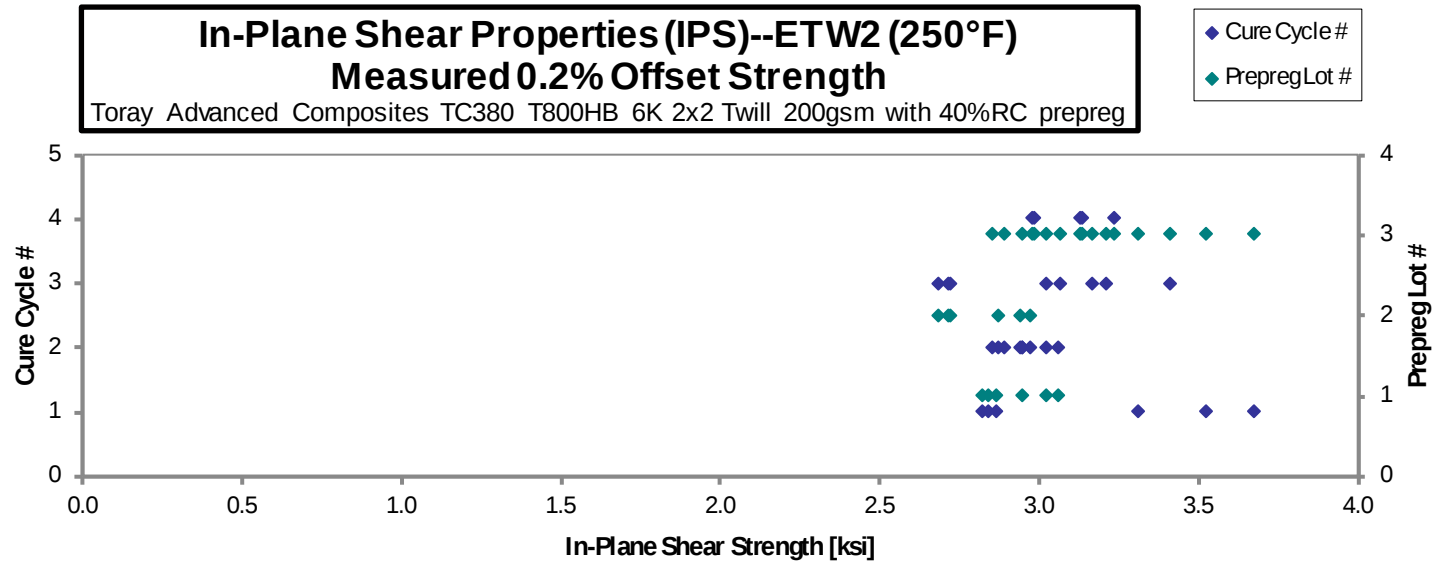


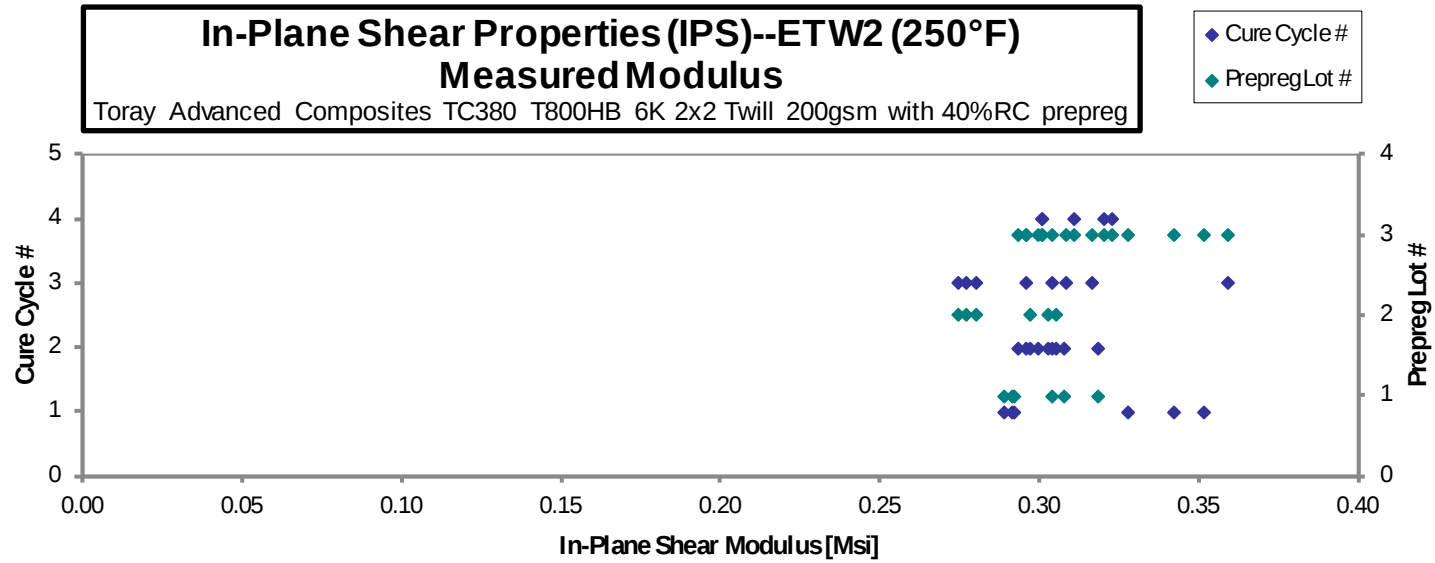
In-Plane Shear Properties (IPS)--ETW2 (250°F)**Strength & Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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]
TCENA111E	A	C1	1	1	2.822	5.494	0.2891	0.07333	8	0.009167
TCENA112E	A	C1	1	1	2.867	5.604	0.2917	0.07257	8	0.009071
TCENA113E	A	C1	1	1	2.838	5.630	0.2919	0.07198	8	0.008998
TCENA211E	A	C2	1	2	2.946	5.725	0.3044	0.07288	8	0.009110
TCENA212E	A	C2	1	2	3.060	5.925	0.3183	0.07253	8	0.009067
TCENA213E	A	C2	1	2	3.022	5.846	0.3081	0.07147	8	0.008933
TCENB211E	B	C2	2	2	2.940	5.731	0.3029	0.07138	8	0.008923
TCENB212E	B	C2	2	2	2.872	5.685	0.2974	0.07107	8	0.008883
TCENB213E	B	C2	2	2	2.973	5.807	0.3052	0.06965	8	0.008706
TCENB311E	B	C3	2	3	2.721	5.277	0.2773	0.07235	8	0.009044
TCENB312E	B	C3	2	3	2.682	5.287	0.2747	0.07170	8	0.008963
TCENB313E	B	C3	2	3	2.712	5.431	0.2802	0.06947	8	0.008683
TCENC111E	C	C1	3	1	3.673	8.527	0.3518	0.07100	8	0.008875
TCENC112E	C	C1	3	1	3.526	8.012	0.3425	0.07152	8	0.008940
TCENC113E	C	C1	3	1	3.308	7.319	0.3277	0.07022	8	0.008777
TCENC211E	C	C2	3	2	2.893	5.959	0.2935	0.07070	8	0.008838
TCENC212E	C	C2	3	2	2.850	5.918	0.2957	0.07042	8	0.008802
TCENC213E	C	C2	3	2	2.948	6.028	0.2999	0.07008	8	0.008760
TCENC311E	C	C3	3	3	3.068	6.509	0.3044	0.07055	8	0.008819
TCENC312E	C	C3	3	3	3.023	6.415	0.2958	0.07033	8	0.008792
TCENC313E	C	C3	3	3	3.167	6.884	0.3085	0.07025	8	0.008781
TCENC314E	C	C3	3	3	3.213	6.926	0.3167	0.06867	8	0.008583
TCENC315E	C	C3	3	3	3.408	7.281	0.3594	0.06557	8	0.008196
TCENC411E	C	C4	3	4	3.234	6.826	0.3226	0.06963	8	0.008704
TCENC412E	C	C4	3	4	3.126	6.470	0.3107	0.07032	8	0.008790
TCENC413E	C	C4	3	4	2.985	6.215	0.3010	0.06982	8	0.008727
TCENC414E	C	C4	3	4	2.980	6.147	0.3007	0.06862	8	0.008577
TCENC415E	C	C4	3	4	3.135	6.397	0.3202	0.06487	8	0.008108

Average	3.035	6.260	0.3069	0.008808
Standard Dev.	0.2377	0.8016	0.02038	
Coeff. of Var. [%]	7.832	12.81	6.640	
Min.	2.682	5.277	0.2747	0.008108
Max.	3.673	8.527	0.3594	0.009167
Number of Spec.	28	28	28	28





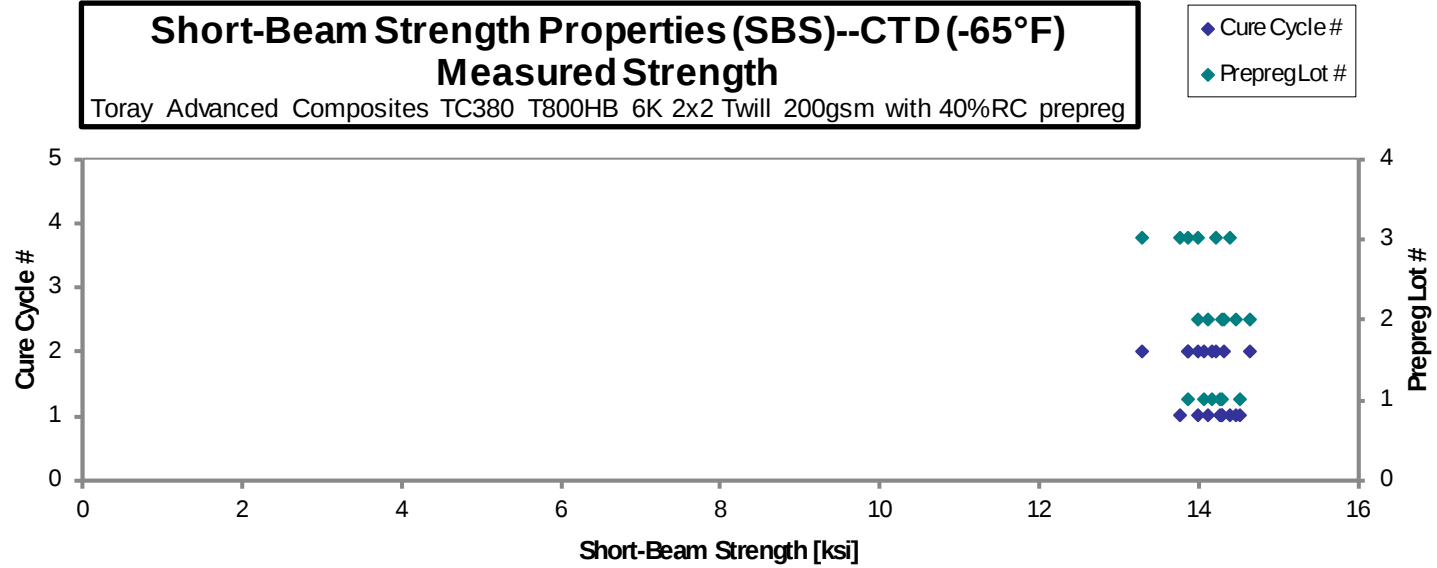
4.6 Lamina Short-Beam Strength Properties (SBS)

Short-Beam Strength Properties (SBS)--CTD (-65°F) Strength

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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
TCEQA111B	A	C1	1	1	14.29	0.1981	22	0.009006	INTERLAMINAR SHEAR, COMPRESSION
TCEQA112B	A	C1	1	1	14.51	0.1936	22	0.008798	INTERLAMINAR SHEAR, COMPRESSION
TCEQA114B	A	C1	1	1	14.27	0.1925	22	0.008751	INTERLAMINAR SHEAR, COMPRESSION
TCEQA211B	A	C2	1	2	14.17	0.1814	22	0.008245	INTERLAMINAR SHEAR, COMPRESSION
TCEQA212B	A	C2	1	2	14.08	0.1827	22	0.008303	INTERLAMINAR SHEAR, COMPRESSION
TCEQA213B	A	C2	1	2	13.86	0.1836	22	0.008345	INTERLAMINAR SHEAR, COMPRESSION
TCEQB111B	B	C1	2	1	14.13	0.1811	22	0.008231	INTERLAMINAR SHEAR, COMPRESSION
TCEQB112B	B	C1	2	1	14.47	0.1815	22	0.008251	INTERLAMINAR SHEAR, COMPRESSION
TCEQB113B	B	C1	2	1	14.29	0.1825	22	0.008295	INTERLAMINAR SHEAR, COMPRESSION
TCEQB211B	B	C2	2	2	14.32	0.1772	22	0.008052	INTERLAMINAR SHEAR, COMPRESSION
TCEQB212B	B	C2	2	2	14.00	0.1783	22	0.008102	INTERLAMINAR SHEAR, COMPRESSION
TCEQB213B	B	C2	2	2	14.65	0.1793	22	0.008148	INTERLAMINAR SHEAR, COMPRESSION
TCEQC111B	C	C1	3	1	14.39	0.1864	22	0.008474	INTERLAMINAR SHEAR
TCEQC112B	C	C1	3	1	14.00	0.1873	22	0.008514	INTERLAMINAR SHEAR
TCEQC113B	C	C1	3	1	13.78	0.1874	22	0.008520	INTERLAMINAR SHEAR
TCEQC211B	C	C2	3	2	13.86	0.1868	22	0.008491	INTERLAMINAR SHEAR
TCEQC212B	C	C2	3	2	14.23	0.1877	22	0.008532	INTERLAMINAR SHEAR, COMPRESSION
TCEQC213B	C	C2	3	2	13.28	0.1878	22	0.008535	INTERLAMINAR SHEAR

Average	14.14	0.008422
Standard Dev.	0.3196	
Coeff. of Var. [%]	2.260	
Min.	13.28	0.008052
Max.	14.65	0.009006
Number of Spec.	18	18



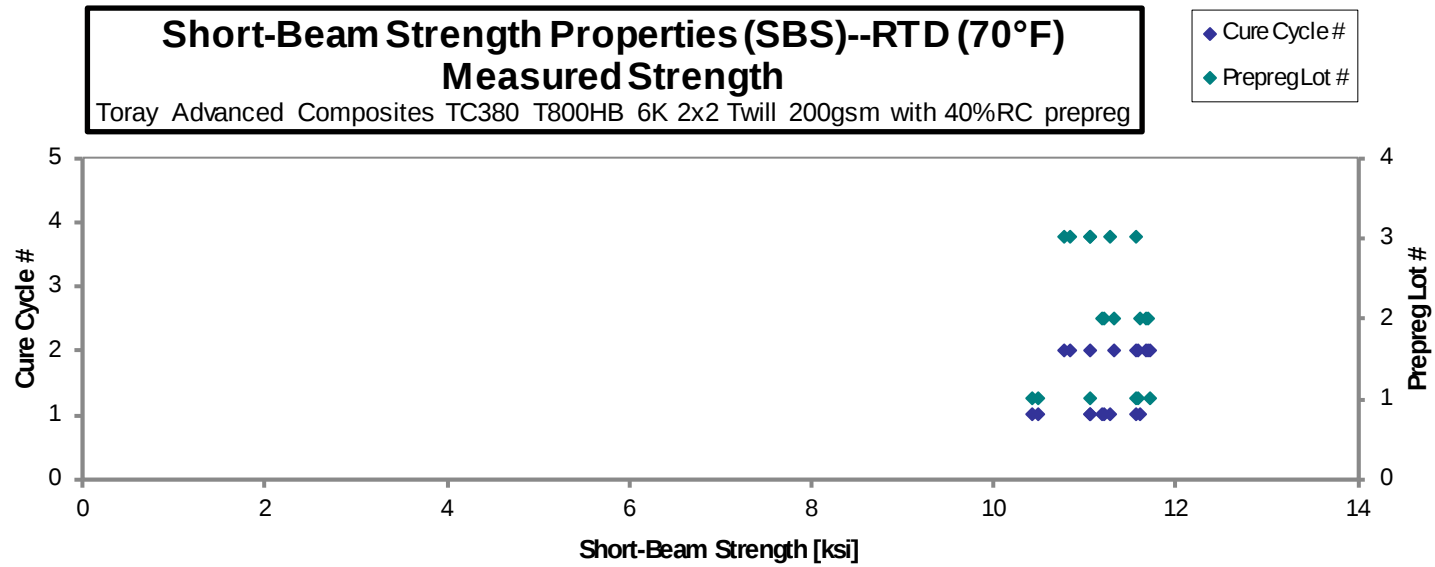
Short-Beam Strength Properties (SBS)--RTD (70°F)

Strength

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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
TCEQA111A	A	C1	1	1	10.43	0.2013	22	0.009152	INTERLAMINAR SHEAR, COMPRESSION
TCEQA112A	A	C1	1	1	11.06	0.2037	22	0.009260	INTERLAMINAR SHEAR, COMPRESSION
TCEQA113A	A	C1	1	1	10.50	0.2016	22	0.009162	INTERLAMINAR SHEAR, COMPRESSION
TCEQA212A	A	C2	1	2	11.73	0.1748	22	0.007944	INTERLAMINAR SHEAR, COMPRESSION
TCEQA213A	A	C2	1	2	11.59	0.1774	22	0.008063	INTERLAMINAR SHEAR, COMPRESSION
TCEQA214A	A	C2	1	2	11.56	0.1792	22	0.008146	INTERLAMINAR SHEAR, COMPRESSION
TCEQB111A	B	C1	2	1	11.60	0.1735	22	0.007885	INTERLAMINAR SHEAR, COMPRESSION
TCEQB112A	B	C1	2	1	11.18	0.1754	22	0.007972	INTERLAMINAR SHEAR, COMPRESSION
TCEQB113A	B	C1	2	1	11.22	0.1777	22	0.008076	INTERLAMINAR SHEAR, COMPRESSION
TCEQB211A	B	C2	2	2	11.67	0.1697	22	0.007714	INTERLAMINAR SHEAR, COMPRESSION
TCEQB212A	B	C2	2	2	11.69	0.1716	22	0.007801	INTERLAMINAR SHEAR
TCEQB213A	B	C2	2	2	11.33	0.1736	22	0.007891	INTERLAMINAR SHEAR, COMPRESSION
TCEQC111A	C	C1	3	1	11.56	0.1823	22	0.008286	INTERLAMINAR SHEAR, COMPRESSION
TCEQC112A	C	C1	3	1	11.27	0.1831	22	0.008324	INTERLAMINAR SHEAR, COMPRESSION
TCEQC113A	C	C1	3	1	11.05	0.1846	22	0.008389	INTERLAMINAR SHEAR
TCEQC211A	C	C2	3	2	10.85	0.1821	22	0.008277	INTERLAMINAR SHEAR, COMPRESSION
TCEQC212A	C	C2	3	2	11.06	0.1826	22	0.008300	INTERLAMINAR SHEAR, COMPRESSION
TCEQC213A	C	C2	3	2	10.77	0.1847	22	0.008395	INTERLAMINAR SHEAR, COMPRESSION

Average	11.23	0.008280
Standard Dev.	0.4034	
Coeff. of Var. [%]	3.593	
Min.	10.43	0.007714
Max.	11.73	0.009260
Number of Spec.	18	18

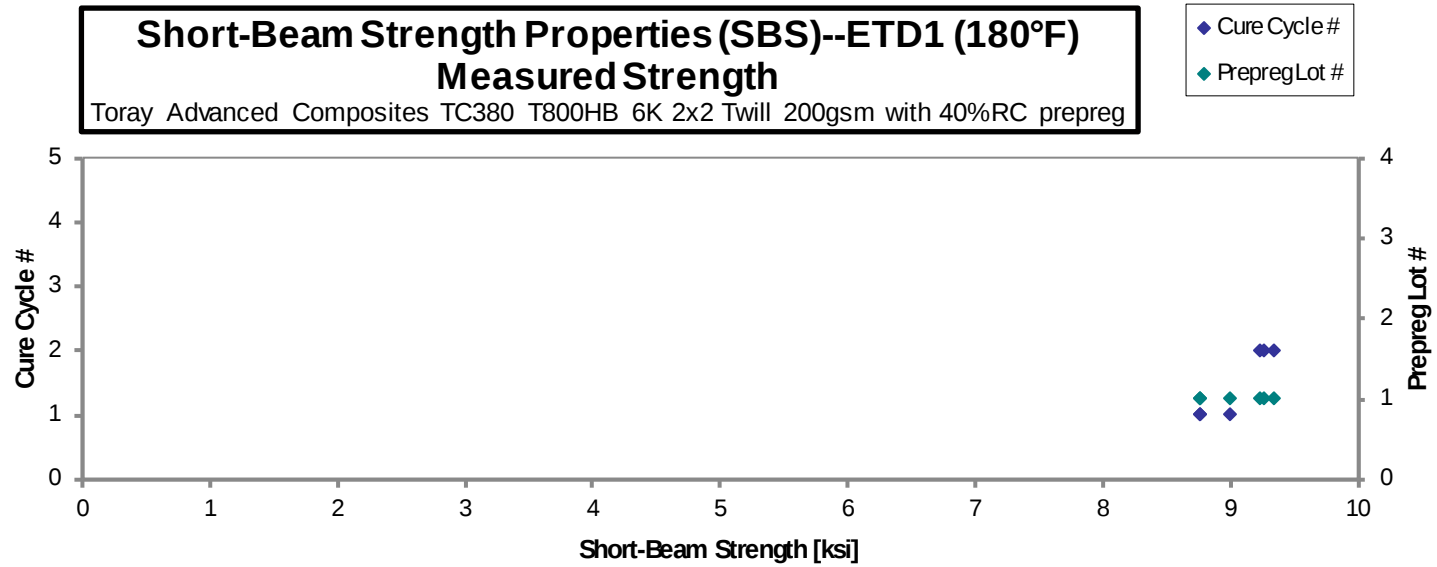


Short-Beam Strength Properties (SBS)--ETD1 (180°F)**Strength**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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
TCEQA112C	A	C1	1	1	8.995	0.1991	22	0.009050	INTERLAMINAR SHEAR, COMPRESSION
TCEQA113C	A	C1	1	1	8.759	0.1995	22	0.009066	INTERLAMINAR SHEAR, COMPRESSION
TCEQA114C	A	C1	1	1	8.760	0.1992	22	0.009055	INTERLAMINAR SHEAR, COMPRESSION
TCEQA211C	A	C2	1	2	9.236	0.1845	22	0.008386	INTERLAMINAR SHEAR, COMPRESSION
TCEQA212C	A	C2	1	2	9.258	0.1848	22	0.008400	INTERLAMINAR SHEAR, COMPRESSION
TCEQA213C	A	C2	1	2	9.337	0.1837	22	0.008348	INTERLAMINAR SHEAR, COMPRESSION

Average	9.057	0.008717
Standard Dev.	0.2576	
Coeff. of Var. [%]	2.844	
Min.	8.759	0.008348
Max.	9.337	0.009066
Number of Spec.	6	6

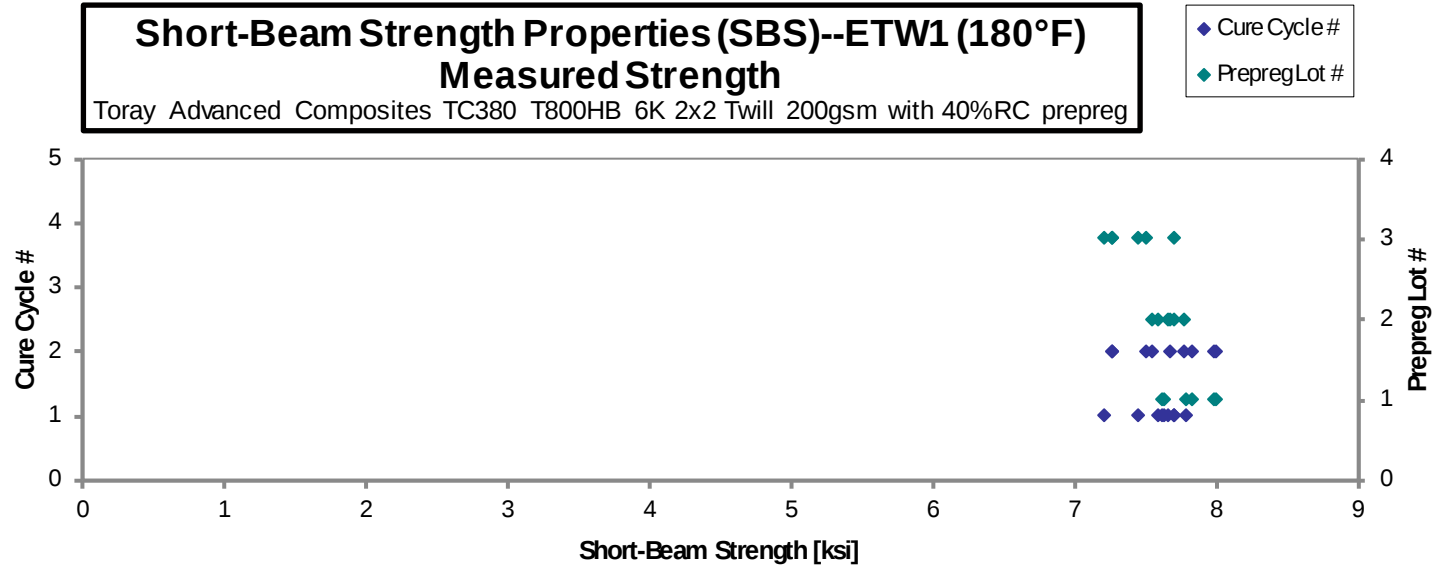


Short-Beam Strength Properties (SBS)--ETW1 (180°F) Strength

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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
TCEQA111D	A	C1	1	1	7.787	0.1985	22	0.009023	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA112D	A	C1	1	1	7.619	0.1981	22	0.009005	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA113D	A	C1	1	1	7.638	0.1984	22	0.009017	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA211D	A	C2	1	2	7.989	0.1814	22	0.008245	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA212D	A	C2	1	2	7.835	0.1795	22	0.008161	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA213D	A	C2	1	2	7.991	0.1778	22	0.008080	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB111D	B	C1	2	1	7.706	0.1832	22	0.008327	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB112D	B	C1	2	1	7.662	0.1773	22	0.008058	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB113D	B	C1	2	1	7.587	0.1798	22	0.008174	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB211D	B	C2	2	2	7.777	0.1796	22	0.008165	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB213D	B	C2	2	2	7.542	0.1769	22	0.008042	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB214D	B	C2	2	2	7.676	0.1797	22	0.008169	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC111D	C	C1	3	1	7.700	0.1878	22	0.008538	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQC112D	C	C1	3	1	7.216	0.1848	22	0.008400	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC113D	C	C1	3	1	7.444	0.1864	22	0.008471	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC211D	C	C2	3	2	7.506	0.1876	22	0.008527	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC212D	C	C2	3	2	7.263	0.1862	22	0.008465	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC213D	C	C2	3	2	7.268	0.1865	22	0.008477	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION

Average	7.623	0.008408
Standard Dev.	0.2247	
Coeff. of Var. [%]	2.947	
Min.	7.216	0.008042
Max.	7.991	0.009023
Number of Spec.	18	18

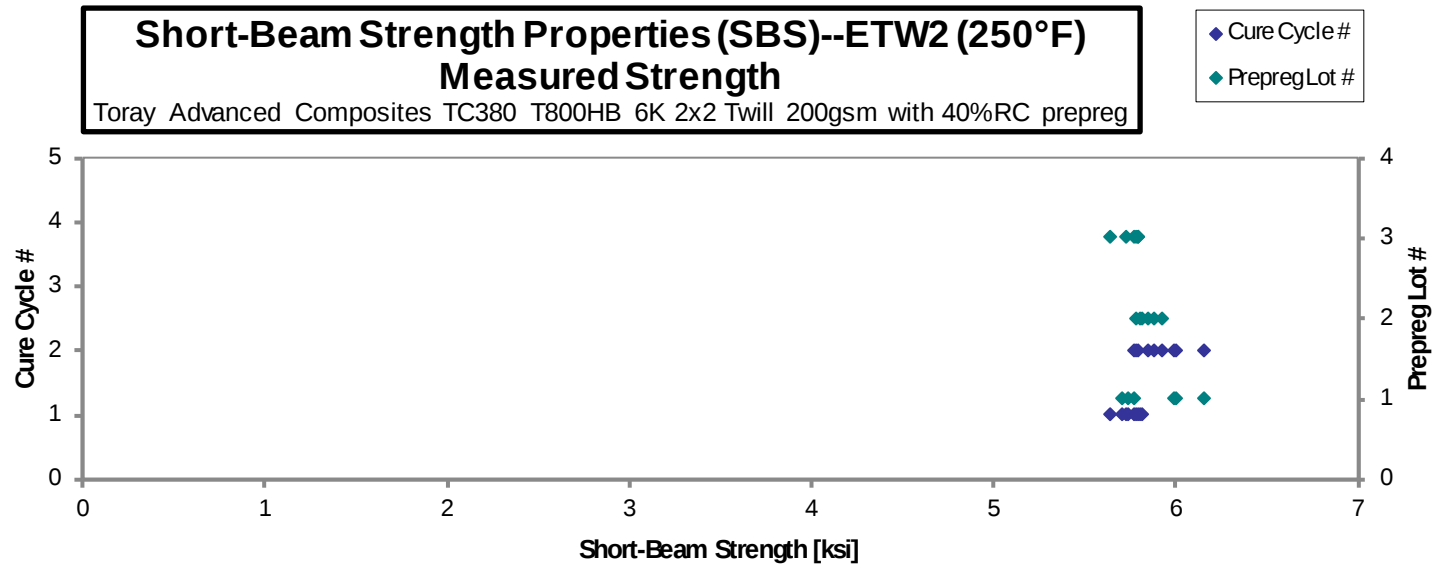


Short-Beam Strength Properties (SBS)--ETW2 (250°F)
Strength

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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
TCEQA111E	A	C1	1	1	5.741	0.1979	22	0.008994	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA112E	A	C1	1	1	5.710	0.2002	22	0.009102	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA113E	A	C1	1	1	5.772	0.2018	22	0.009173	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA212E	A	C2	1	2	6.153	0.1779	22	0.008086	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA213E	A	C2	1	2	5.990	0.1813	22	0.008242	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQA214E	A	C2	1	2	5.999	0.1840	22	0.008364	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB111E	B	C1	2	1	5.786	0.1874	22	0.008517	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB112E	B	C1	2	1	5.813	0.1887	22	0.008579	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB113E	B	C1	2	1	5.802	0.1896	22	0.008618	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB212E	B	C2	2	2	5.843	0.1867	22	0.008485	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB213E	B	C2	2	2	5.883	0.1878	22	0.008534	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQB214E	B	C2	2	2	5.929	0.1877	22	0.008533	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCEQC111E	C	C1	3	1	5.795	0.1907	22	0.008668	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC112E	C	C1	3	1	5.723	0.1915	22	0.008703	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC113E	C	C1	3	1	5.637	0.1923	22	0.008739	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC211E	C	C2	3	2	5.792	0.1919	22	0.008721	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC212E	C	C2	3	2	5.777	0.1923	22	0.008742	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCEQC213E	C	C2	3	2	5.776	0.1931	22	0.008776	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION

Average	5.829	0.008643
Standard Dev.	0.1230	
Coeff. of Var. [%]	2.110	
Min.	5.637	0.008086
Max.	6.153	0.009173
Number of Spec.	18	18



4.7 “25/50/25” Unnotched Tension 1 Properties (UNT1)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

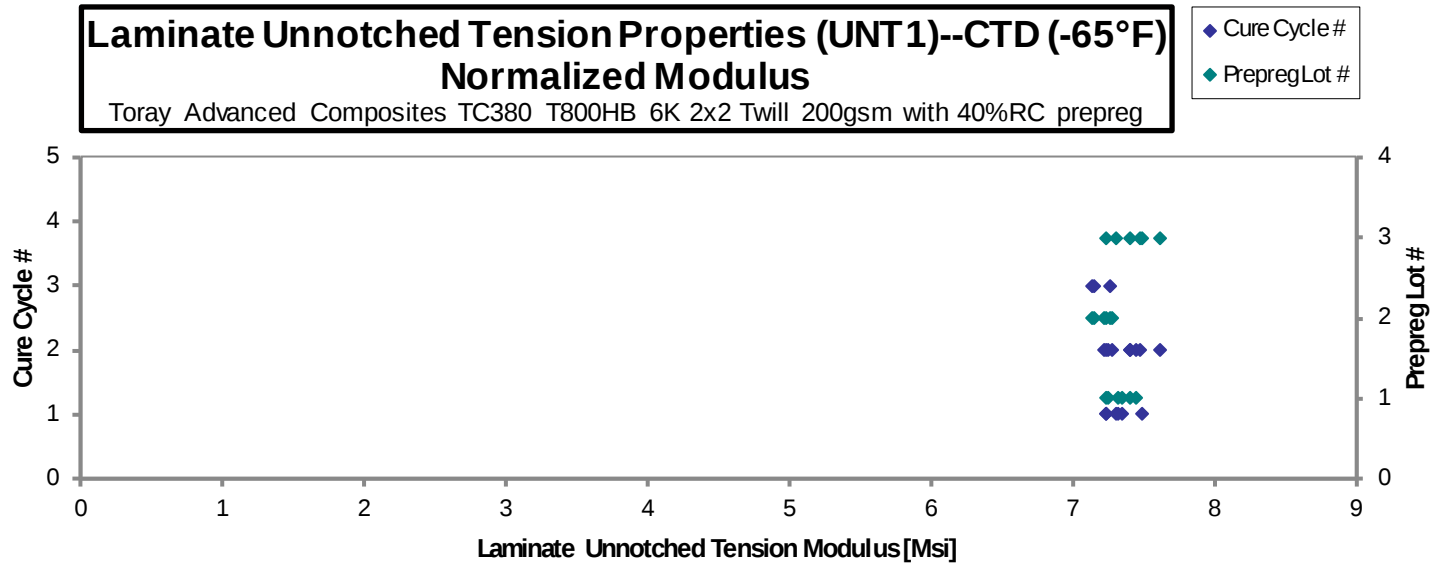
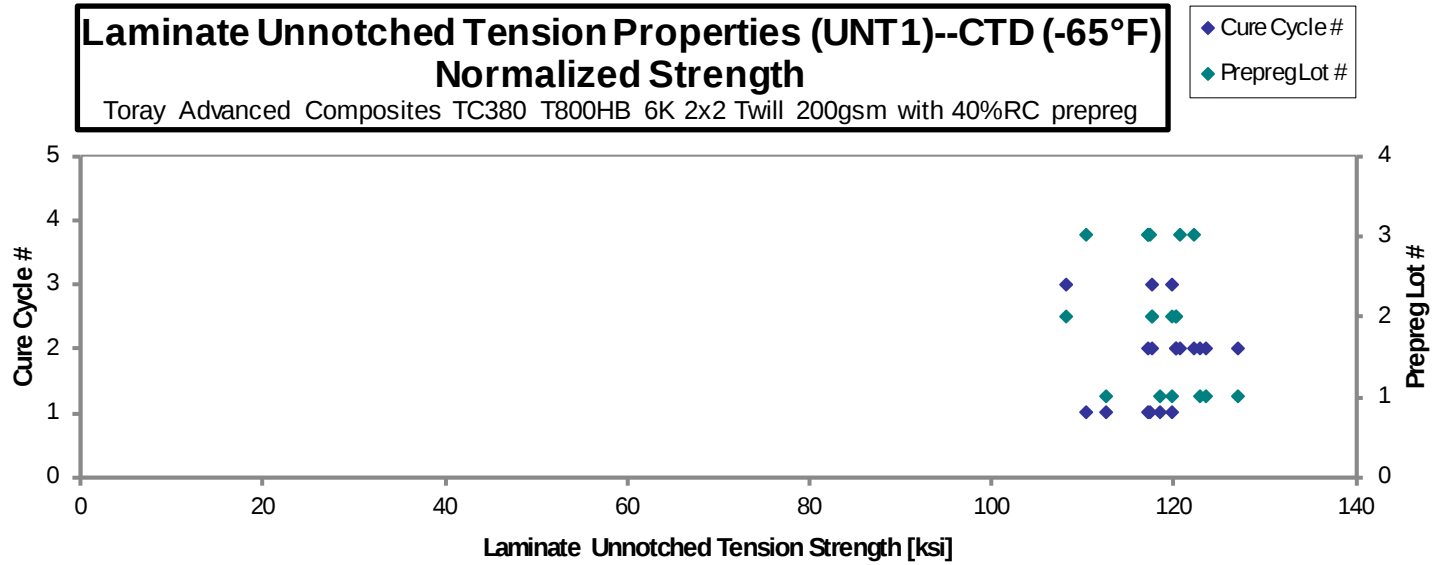
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEAA111B	A	C1	1	1	122.5	7.486	0.06887	8	LWT, LWB
TCEAA112B	A	C1	1	1	120.7	7.380	0.06910	8	LWT, LGM
TCEAA113B	A	C1	1	1	114.2	7.446	0.06943	8	LGM
TCEAA211B	A	C2	1	2	129.6	7.587	0.06907	8	LGB, LGT
TCEAA212B	A	C2	1	2	126.4	7.420	0.06880	8	LGB, LWT
TCEAA213B	A	C2	1	2	124.8	7.531	0.06928	8	LWB, LWT
TCEAB211B	B	C2	2	2	116.7	7.018	0.07250	8	LWT, LGB
TCEAB212B	B	C2	2	2	117.9	7.094	0.07183	8	LWT, LGB
TCEAB213B	B	C2	2	2	115.1	7.113	0.07202	8	LGM
TCEAB311B	B	C3	2	3	117.8	7.150	0.07023	8	LWB, LGT
TCEAB312B	B	C3	2	3	120.6	7.187	0.07000	8	LWB, LWT
TCEAB313B	B	C3	2	3	109.5	7.368	0.06947	8	LWB, LWT
TCEAC111B	C	C1	3	1	117.7	7.273	0.07008	8	AWT, AGB
TCEAC112B	C	C1	3	1	111.1	7.349	0.07002	8	AWT, AWB, AGB
TCEAC113B	C	C1	3	1	118.0	7.520	0.07008	8	AWT, AWB
TCEAC211B	C	C2	3	2	118.2	7.480	0.06977	8	M(A,L)WT, AWB
TCEAC212B	C	C2	3	2	121.2	7.516	0.07008	8	AGM, AWT
TCEAC213B	C	C2	3	2	123.3	7.687	0.06978	8	AWT, AWB

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008608	119.8	7.323
0.008638	118.5	7.243
0.008679	112.6	7.344
0.008633	127.1	7.444
0.008600	123.6	7.251
0.008660	122.8	7.411
0.009063	120.2	7.228
0.008979	120.3	7.239
0.009002	117.7	7.276
0.008779	117.6	7.133
0.008750	119.9	7.146
0.008683	108.1	7.270
0.008760	117.2	7.241
0.008752	110.5	7.309
0.008760	117.5	7.486
0.008721	117.1	7.413
0.008760	120.6	7.482
0.008723	122.2	7.620

Average 119.2 7.367
Standard Dev. 5.104 0.1892
Coeff. of Var. [%] 4.282 2.569
Min. 109.5 7.018
Max. 129.6 7.687
Number of Spec. 18 18

Average_{norm} 0.008753 118.5 7.326
Standard Dev._{norm} 4.607 0.1278
Coeff. of Var. [%]_{norm} 3.887 1.744
Min. 0.008600 108.1 7.133
Max. 0.009063 127.1 7.620
Number of Spec. 18 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

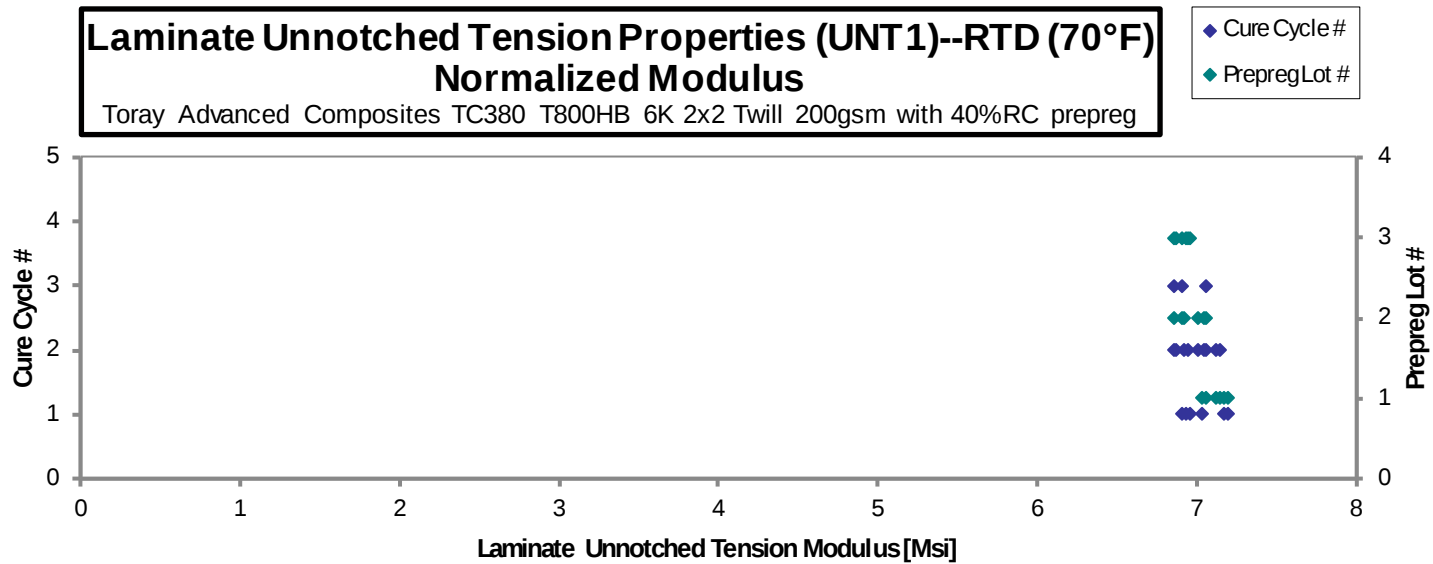
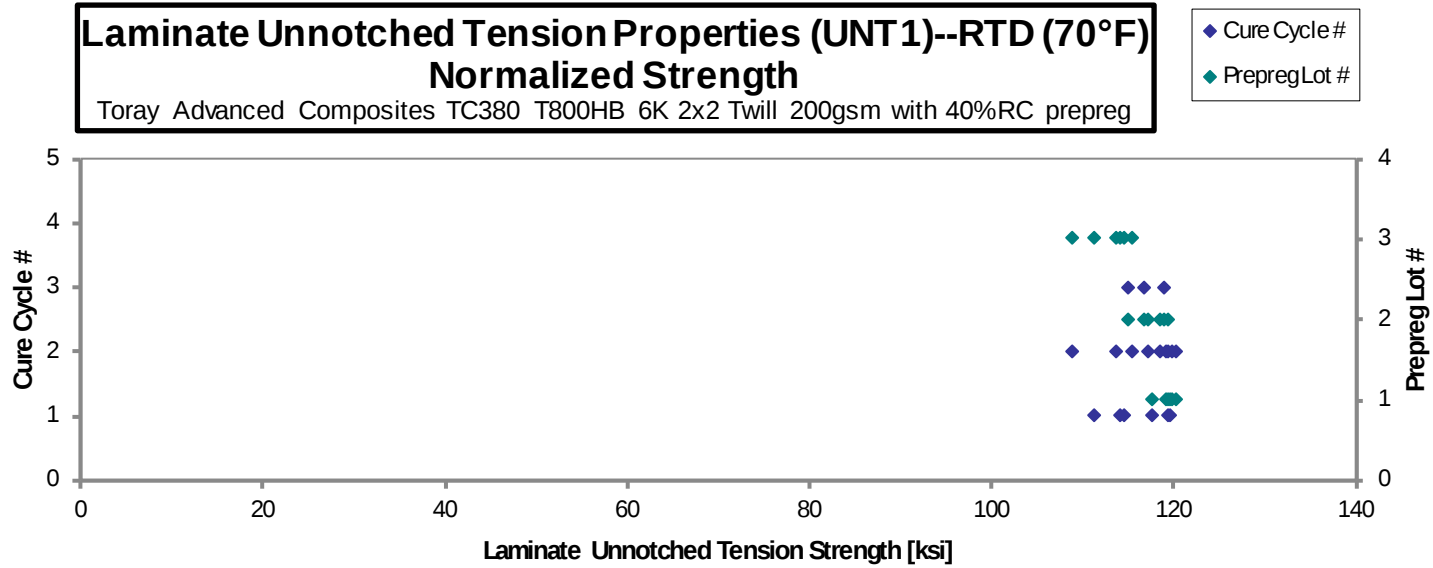
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEAA111A	A	C1	1	1	133.5	8.030	0.06310	8	LGB, LWT
TCEAA112A	A	C1	1	1	126.6	7.721	0.06543	8	M(A,L)WT, LWB
TCEAA113A	A	C1	1	1	125.4	7.386	0.06703	8	LWB, LWT
TCEAA211A	A	C2	1	2	134.3	8.021	0.06277	8	LWB, M(A,L)WT
TCEAA212A	A	C2	1	2	129.2	7.582	0.06552	8	LWB, M(A,L)WT
TCEAA213A	A	C2	1	2	124.3	7.430	0.06745	8	LWB, AWT
TCEAB211A	B	C2	2	2	127.9	7.613	0.06518	8	LGM, LWT, LWB
TCEAB212A	B	C2	2	2	121.9	7.196	0.06775	8	LWB, LWT
TCEAB213A	B	C2	2	2	119.9	7.037	0.07007	8	M(A,L)WB, LGT
TCEAB311A	B	C3	2	3	131.4	7.800	0.06373	8	LGT, LWB
TCEAB312A	B	C3	2	3	120.0	7.218	0.06740	8	LWT, LGB
TCEAB313A	B	C3	2	3	119.2	7.003	0.06890	8	LWB, LGT
TCEAC111A	C	C1	3	1	122.9	7.437	0.06567	8	M(A,L)WT, M(A,L)WB
TCEAC112A	C	C1	3	1	117.2	7.095	0.06855	8	M(A,L)WT, M(A,L)WB
TCEAC113A	C	C1	3	1	112.5	7.033	0.06965	8	M(A,L)GT, M(A,L)WB
TCEAC211A	C	C2	3	2	119.3	7.199	0.06710	8	M(A,L)WT, AWT
TCEAC212A	C	C2	3	2	111.7	7.059	0.06855	8	M(A,L)GM, M(A,L)WT
TCEAC213A	C	C2	3	2	117.4	7.067	0.06918	8	LGT, LWB

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.007888	119.7	7.198
0.008179	117.7	7.176
0.008379	119.4	7.033
0.007846	119.7	7.152
0.008190	120.2	7.056
0.008431	119.1	7.119
0.008148	118.5	7.049
0.008469	117.3	6.926
0.008758	119.3	7.003
0.007967	119.0	7.061
0.008425	114.9	6.910
0.008613	116.7	6.853
0.008208	114.6	6.937
0.008569	114.1	6.908
0.008706	111.3	6.958
0.008388	113.7	6.862
0.008569	108.8	6.873
0.008648	115.3	6.945

Average 123.0 7.385
 Standard Dev. 6.615 0.3415
 Coeff. of Var. [%] 5.377 4.624
 Min. 111.7 7.003
 Max. 134.3 8.030
 Number of Spec. 18 18

Average_{norm} 0.008354 116.6 7.001
 Standard Dev._{norm} 3.231 0.1098
 Coeff. of Var. [%]_{norm} 2.771 1.569
 Min. 0.007846 108.8 6.853
 Max. 0.008758 120.2 7.198
 Number of Spec. 18 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

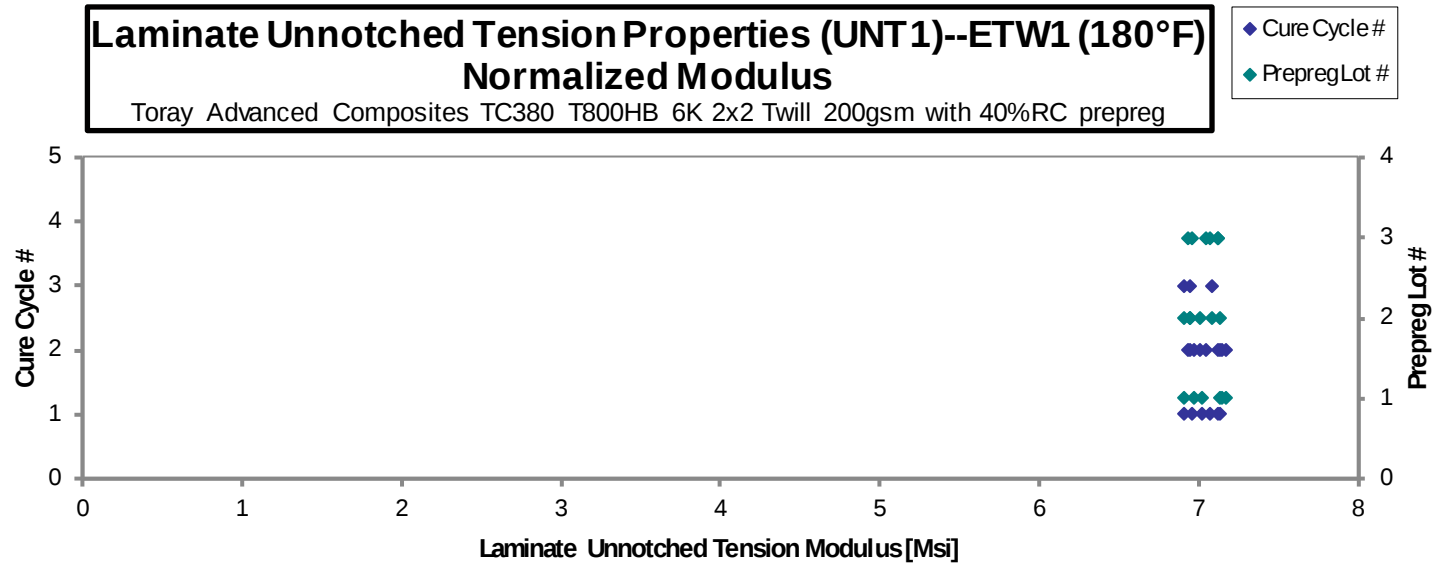
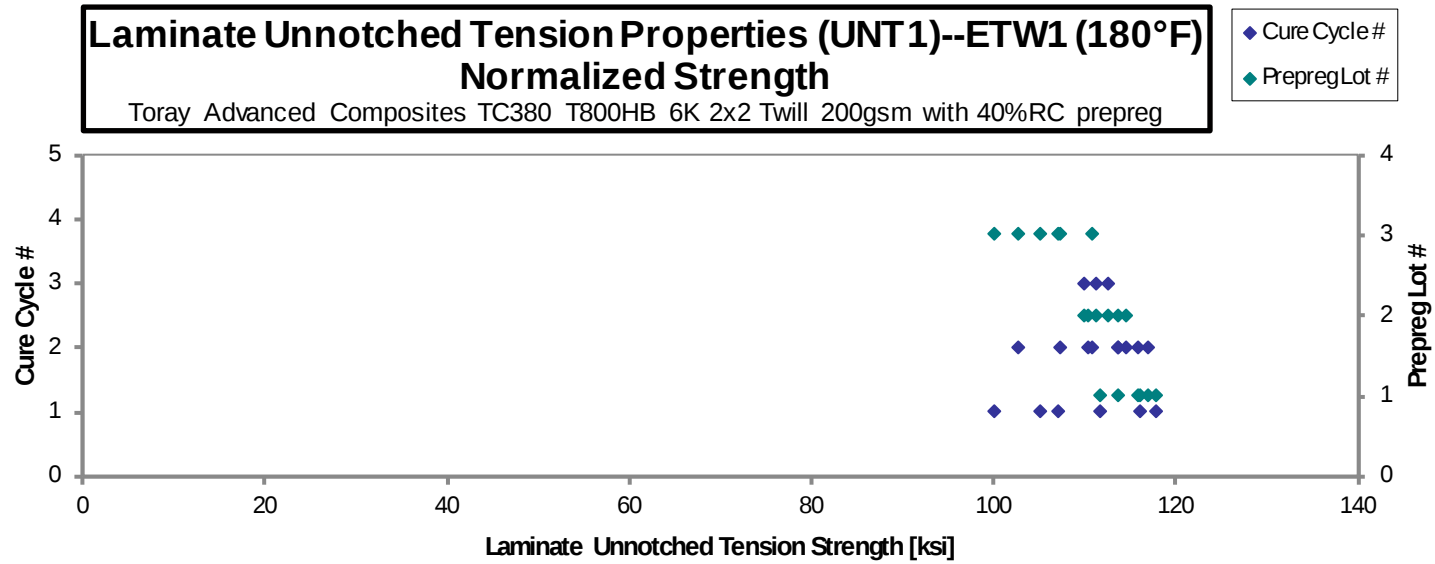
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEAA111D	A	C1	1	1	115.0	7.342	0.06838	8	LGT, LWB
TCEAA112D	A	C1	1	1	129.7	7.601	0.06402	8	LGM, LWT
TCEAA113D	A	C1	1	1	122.6	7.404	0.06672	8	LGB, LWT
TCEAA211D	A	C2	1	2	120.6	7.455	0.06770	8	LWT, LGB
TCEAA212D	A	C2	1	2	129.8	7.929	0.06345	8	LWT, LWB, LGM
TCEAA213D	A	C2	1	2	119.1	7.310	0.06720	8	LGT, LWB
TCEAB211D	B	C2	2	2	112.4	7.129	0.06918	8	LGT, LWB
TCEAB212D	B	C2	2	2	120.1	7.473	0.06722	8	LGT, LWB
TCEAB213D	B	C2	2	2	122.9	7.515	0.06508	8	LGB, LWT
TCEAB311D	B	C3	2	3	116.7	7.340	0.06797	8	LWT, LGB
TCEAB312D	B	C3	2	3	120.4	7.481	0.06503	8	LGT, LWB
TCEAB313D	B	C3	2	3	125.6	7.936	0.06160	8	M(A,L)WB, LGT
TCEAC111D	C	C1	3	1	107.6	7.243	0.06873	8	M(A,L)WT, AWB, AGB
TCEAC112D	C	C1	3	1	112.9	7.341	0.06677	8	LGT, LWB
TCEAC113D	C	C1	3	1	106.6	7.587	0.06608	8	AGT, M(A,L)WB
TCEAC211D	C	C2	3	2	113.6	7.288	0.06875	8	AGT, AWB
TCEAC212D	C	C2	3	2	111.7	7.330	0.06763	8	AGT, AGB, AWB
TCEAC213D	C	C2	3	2	106.1	7.167	0.06817	8	AGT, AGB, AWB

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008548	111.7	7.131
0.008002	117.9	6.911
0.008340	116.1	7.016
0.008463	116.0	7.169
0.007931	117.0	7.146
0.008400	113.7	6.977
0.008648	110.4	7.006
0.008402	114.7	7.135
0.008135	113.6	6.947
0.008496	112.7	7.086
0.008129	111.2	6.911
0.007700	109.9	6.944
0.008592	105.1	7.071
0.008346	107.1	6.962
0.008260	100.1	7.122
0.008594	110.9	7.117
0.008454	107.3	7.041
0.008521	102.8	6.940

Average 117.4 7.437
 Standard Dev. 7.256 0.2214
 Coeff. of Var. [%] 6.181 2.977
 Min. 106.1 7.129
 Max. 129.8 7.936
 Number of Spec. 18 18

Average_{norm} 0.008331 111.0 7.035
 Standard Dev._{norm} 4.964 0.08856
 Coeff. of Var. [%]_{norm} 4.472 1.259
 Min. 0.007700 100.1 6.911
 Max. 0.008648 117.9 7.169
 Number of Spec. 18 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

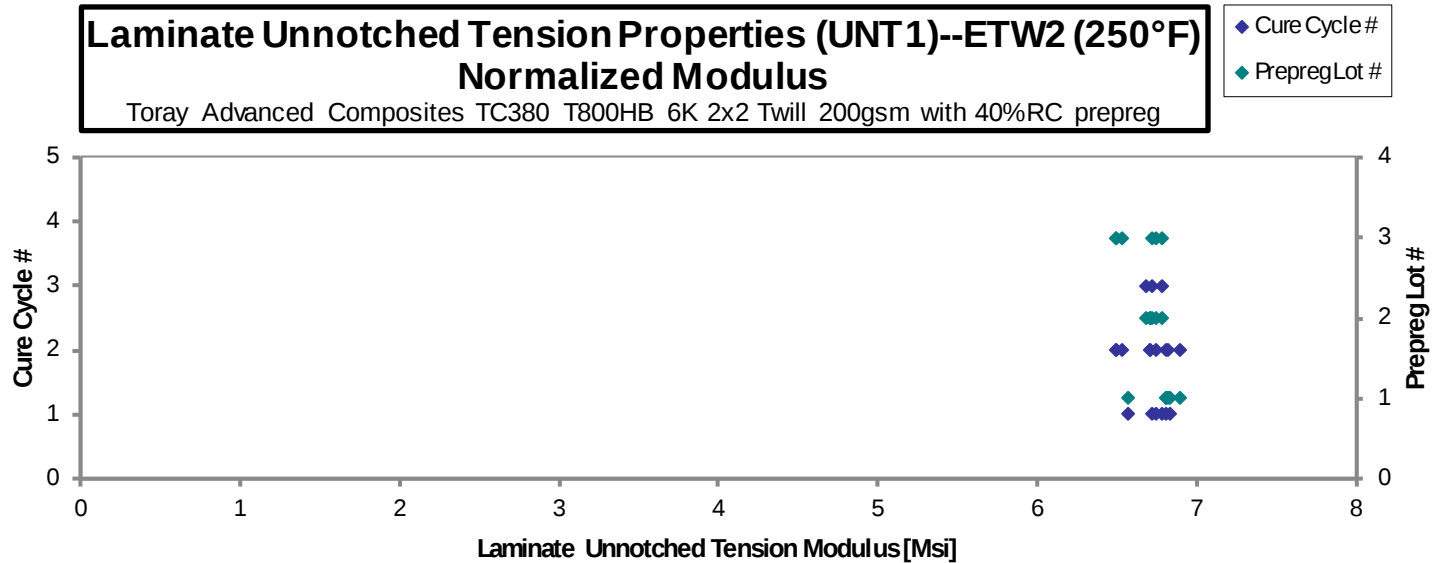
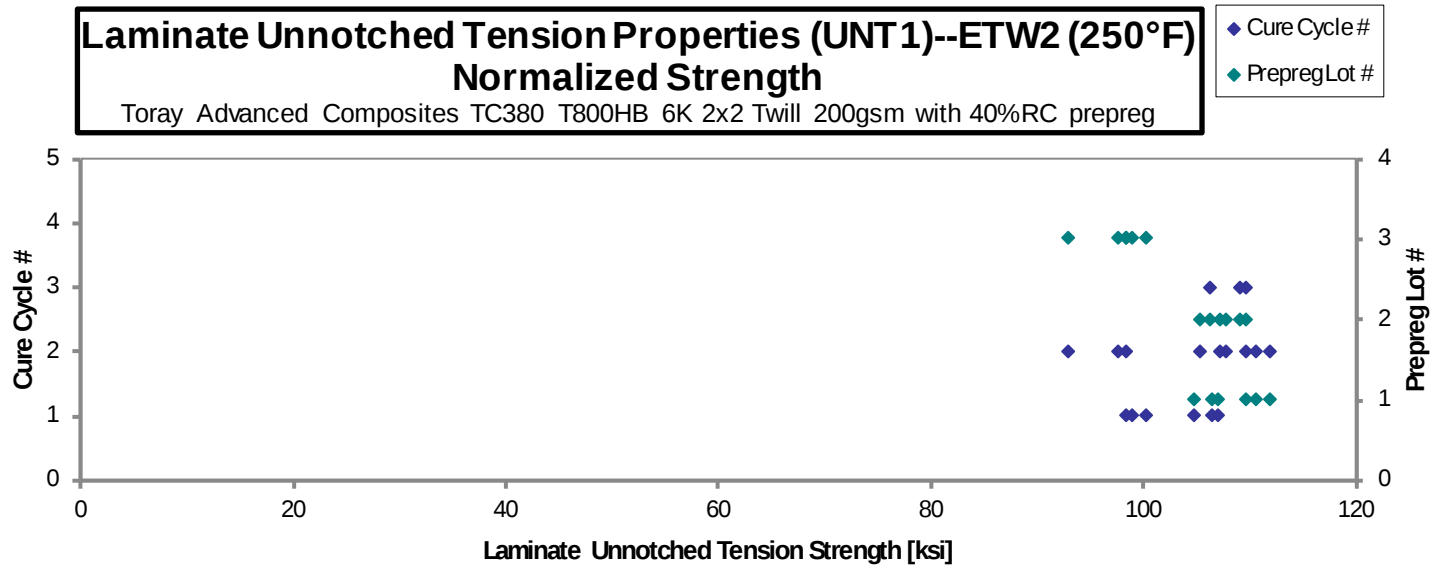
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEAA111E	A	C1	1	1	105.4	6.704	0.07147	8	LGT, LWB
TCEAA112E	A	C1	1	1	103.5	6.648	0.07240	8	LGT, LWB
TCEAA113E	A	C1	1	1	102.0	6.400	0.07232	8	LGT, LWB
TCEAA211E	A	C2	1	2	111.1	6.750	0.07097	8	M(D,L)GB, M(D,L)WT
TCEAA212E	A	C2	1	2	109.9	6.778	0.07083	8	M(D,L)GB, M(D,L)WT, M(D,L)WB
TCEAA213E	A	C2	1	2	108.5	6.833	0.07112	8	M(D,L)GM, M(D,L)WT
TCEAB211E	B	C2	2	2	102.1	6.544	0.07262	8	M(D,L)GB, M(D,L)WT
TCEAB212E	B	C2	2	2	102.8	6.442	0.07338	8	M(D,L)GB, M(D,L)WT
TCEAB213E	B	C2	2	2	104.0	6.478	0.07290	8	M(D,L)GB, M(D,L)WT
TCEAB311E	B	C3	2	3	103.2	6.491	0.07247	8	LWT, LGB
TCEAB312E	B	C3	2	3	107.2	6.606	0.07163	8	LGT, LWB
TCEAB313E	B	C3	2	3	111.1	6.880	0.06947	8	AGM
TCEAC111E	C	C1	3	1	97.49	6.600	0.07242	8	AGM, AWT
TCEAC112E	C	C1	3	1	95.66	6.567	0.07237	8	AWT, AGM
TCEAC113E	C	C1	3	1	96.24	6.539	0.07240	8	AWB, AGT
TCEAC211E	C	C2	3	2	91.18	6.413	0.07175	8	AGT, AWB
TCEAC212E	C	C2	3	2	95.33	6.345	0.07210	8	AGT, AWB
TCEAC213E	C	C2	3	2	97.34	6.419	0.07122	8	AWT, AWB, AGB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008933	107.0	6.806
0.009050	106.4	6.837
0.009040	104.7	6.575
0.008871	112.0	6.804
0.008854	110.6	6.820
0.008890	109.6	6.903
0.009077	105.3	6.750
0.009173	107.2	6.715
0.009113	107.7	6.708
0.009058	106.2	6.682
0.008954	109.1	6.722
0.008683	109.7	6.789
0.009052	100.3	6.789
0.009046	98.33	6.751
0.009050	98.97	6.725
0.008969	92.93	6.536
0.009013	97.64	6.499
0.008902	98.47	6.494

Average 102.4 6.580
 Standard Dev. 5.897 0.1581
 Coeff. of Var. [%] 5.757 2.402
 Min. 91.18 6.345
 Max. 111.1 6.880
 Number of Spec. 18 18

Average_{norm} 0.008985 104.6 6.717
 Standard Dev._{norm} 5.430 0.1187
 Coeff. of Var. [%]_{norm} 5.193 1.767
 Min. 0.008683 92.93 6.494
 Max. 0.009173 112.0 6.903
 Number of Spec. 18 18 18



4.8 “10/80/10” Unnotched Tension 2 Properties (UNT2)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

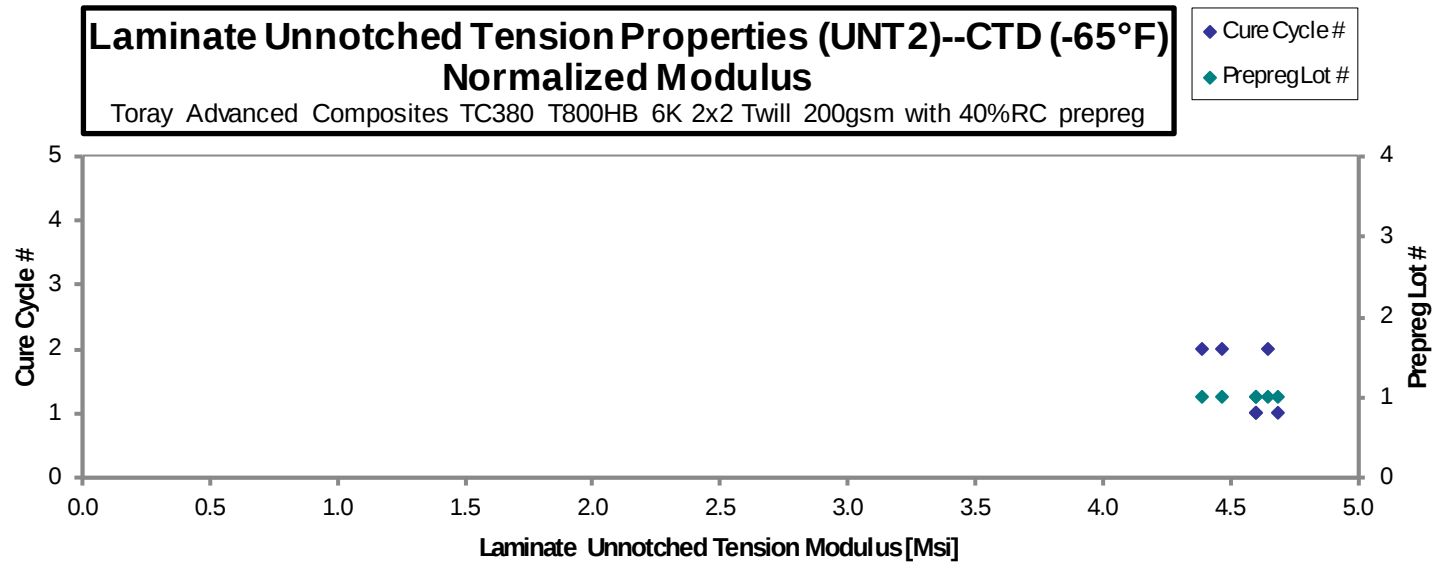
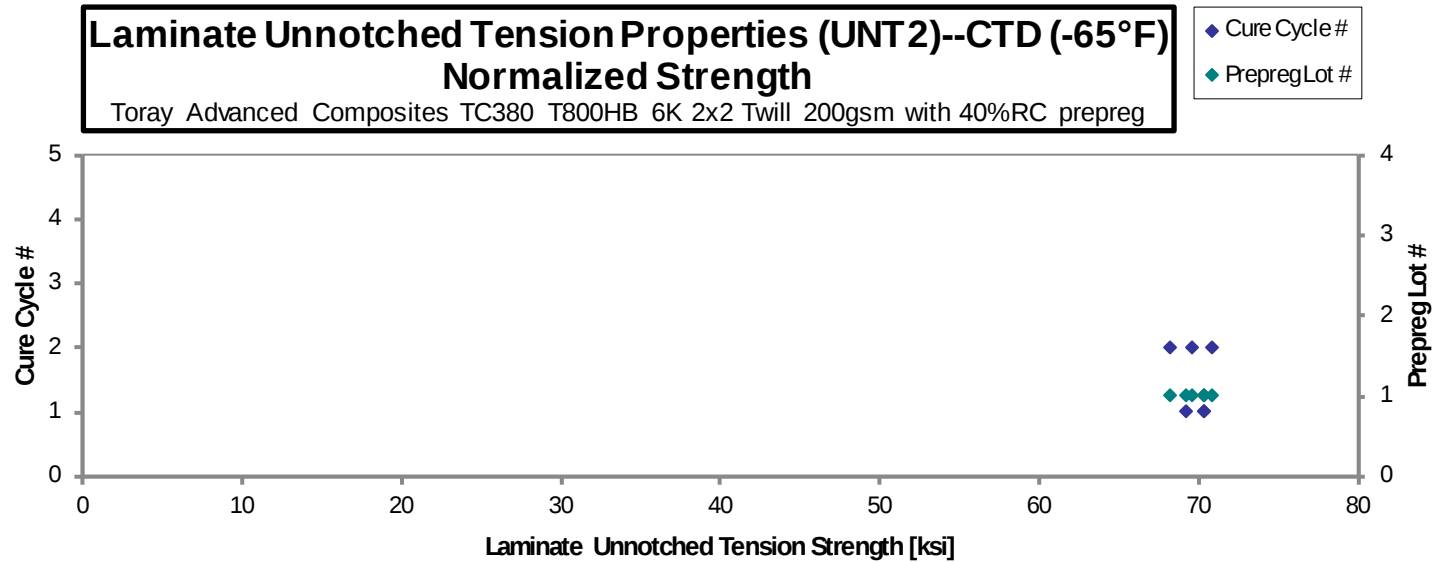
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEBA111B	A	C1	1	1	71.68	4.688	0.08633	10	AGM
TCEBA112B	A	C1	1	1	70.37	4.676	0.08658	10	AGT
TCEBA113B	A	C1	1	1	71.08	4.737	0.08712	10	AGB
TCEBA211B	A	C2	1	2	70.87	4.647	0.08795	10	AGT
TCEBA212B	A	C2	1	2	68.51	4.485	0.08763	10	AGT
TCEBA213B	A	C2	1	2	69.50	4.387	0.08805	10	AGB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008633	70.32	4.599
0.008658	69.24	4.601
0.008712	70.37	4.690
0.008795	70.83	4.644
0.008763	68.22	4.466
0.008805	69.54	4.390

Average **70.34** **4.603**
Standard Dev. **1.157** **0.1364**
Coeff. of Var. [%] **1.645** **2.964**
Min. **68.51** **4.387**
Max. **71.68** **4.737**
Number of Spec. **6** **6**

Average_{norm} **0.008728** **69.75** **4.565**
Standard Dev._{norm} **0.9512** **0.1139**
Coeff. of Var. [%]_{norm} **1.364** **2.494**
Min. **0.008633** **68.22** **4.390**
Max. **0.008805** **70.83** **4.690**
Number of Spec. **6** **6** **6**



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

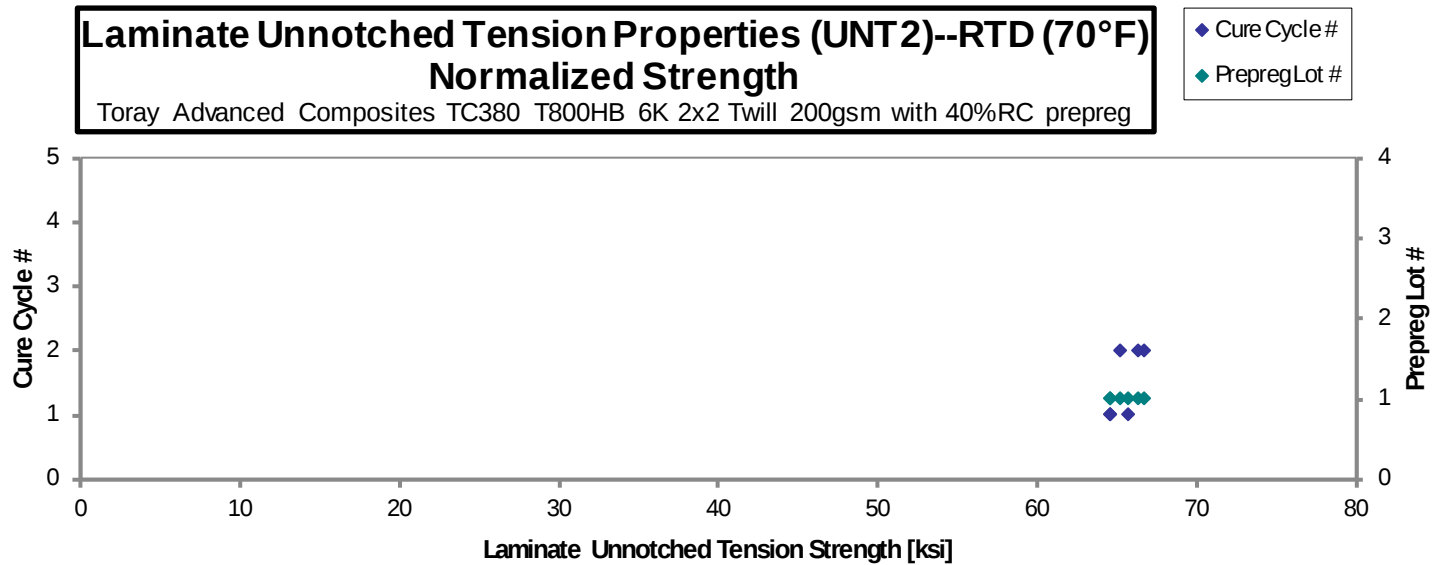
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEBA111A	A	C1	1	1	70.55	4.751	0.08060	10	AGM
TCEBA112A	A	C1	1	1	69.09	4.590	0.08372	10	AGB
TCEBA113A	A	C1	1	1	66.40	4.435	0.08555	10	AGB
TCEBA211A	A	C2	1	2	70.65	4.714	0.08125	10	AGT
TCEBA212A	A	C2	1	2	69.33	4.502	0.08470	10	AGT
TCEBA213A	A	C2	1	2	67.29	4.356	0.08667	10	AGB

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008060	64.62	4.352
0.008372	65.73	4.367
0.008555	64.55	4.311
0.008125	65.23	4.353
0.008470	66.73	4.333
0.008667	66.27	4.290

Average 68.89 4.558
Standard Dev. 1.724 0.1562
Coeff. of Var. [%] 2.503 3.428
Min. 66.40 4.356
Max. 70.65 4.751
Number of Spec. 6 6

Average_{norm} 0.008375 65.52 4.334
Standard Dev._{norm} 0.8833 0.02900
Coeff. of Var. [%]_{norm} 1.348 0.6691
Min. 0.008060 64.55 4.290
Max. 0.008667 66.73 4.367
Number of Spec. 6 6 6



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

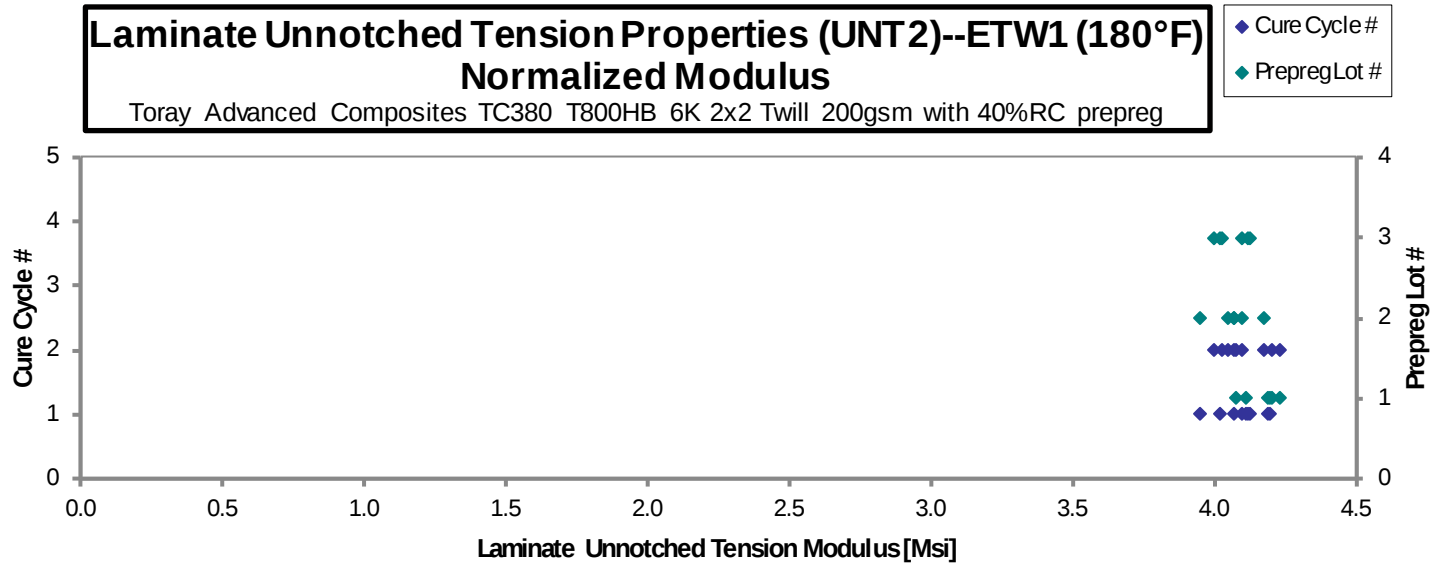
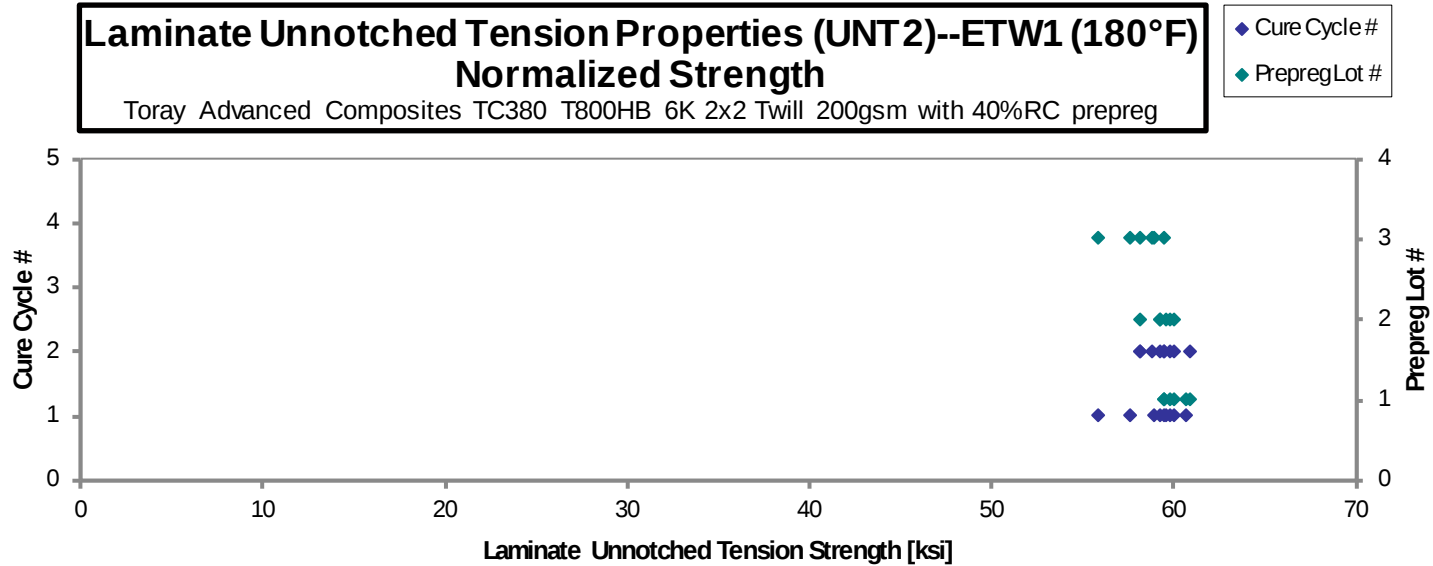
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEBA111D	A	C1	1	1	61.87	4.364	0.08455	10	AGT
TCEBA112D	A	C1	1	1	65.10	4.551	0.08110	10	AGT
TCEBA113D	A	C1	1	1	63.06	4.270	0.08472	10	AGM
TCEBA211D	A	C2	1	2	61.29	4.364	0.08533	10	AGT
TCEBA212D	A	C2	1	2	64.47	4.453	0.08305	10	AGT
TCEBA213D	A	C2	1	2	60.59	4.133	0.08685	10	AGT
TCEBB111D	B	C1	2	1	64.96	4.426	0.08095	10	AWT
TCEBB112D	B	C1	2	1	61.58	4.234	0.08515	10	AGM
TCEBB113D	B	C1	2	1	59.82	3.994	0.08708	10	AGT
TCEBB211D	B	C2	2	2	63.46	4.444	0.08060	10	AGB
TCEBB212D	B	C2	2	2	61.60	4.345	0.08457	10	AGM
TCEBB213D	B	C2	2	2	60.87	4.102	0.08680	10	AGT
TCEBC111D	C	C1	3	1	60.95	4.498	0.08063	10	M(A,D)GM
TCEBC112D	C	C1	3	1	60.48	4.222	0.08385	10	AGM
TCEBC113D	C	C1	3	1	59.52	4.167	0.08710	10	AGB
TCEBC211D	C	C2	3	2	61.08	4.153	0.08475	10	AWB
TCEBC212D	C	C2	3	2	60.56	4.106	0.08635	10	AGM
TCEBC213D	C	C2	3	2	58.92	4.153	0.08683	10	AGB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008455	59.45	4.193
0.008110	60.00	4.195
0.008472	60.71	4.110
0.008533	59.43	4.231
0.008305	60.84	4.203
0.008685	59.80	4.079
0.008095	59.76	4.071
0.008515	59.58	4.097
0.008708	59.20	3.952
0.008060	58.12	4.070
0.008457	59.20	4.176
0.008680	60.04	4.046
0.008063	55.85	4.121
0.008385	57.63	4.023
0.008710	58.91	4.125
0.008475	58.83	4.000
0.008635	59.43	4.029
0.008683	58.13	4.098

Average 61.68 4.277
 Standard Dev. 1.826 0.1597
 Coeff. of Var. [%] 2.960 3.733
 Min. 58.92 3.994
 Max. 65.10 4.551
 Number of Spec. 18 18

Average_{norm} 0.008446 59.16 4.101
 Standard Dev._{norm} 1.176 0.07674
 Coeff. of Var. [%]_{norm} 1.988 1.871
 Min. 0.008060 55.85 3.952
 Max. 0.008710 60.84 4.231
 Number of Spec. 18 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

0.008800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEBA111E	A	C1	1	1	54.99	3.731	0.08953	10	AGT
TCEBA112E	A	C1	1	1	54.13	3.801	0.08963	10	AGM
TCEBA113E	A	C1	1	1	54.35	3.791	0.08985	10	AGM
TCEBA211E	A	C2	1	2	52.91	3.736	0.09095	10	AGM
TCEBA212E	A	C2	1	2	52.25	3.648	0.09192	10	AGT
TCEBA213E	A	C2	1	2	53.01	3.709	0.09137	10	AWB
TCEBB111E	B	C1	2	1	52.37	3.692	0.09057	10	AGM
TCEBB112E	B	C1	2	1	53.63	3.711	0.08973	10	AGM
TCEBB113E	B	C1	2	1	53.95	3.746	0.08853	10	AWB
TCEBB211E	B	C2	2	2	53.36	3.622	0.08938	10	AGM
TCEBB212E	B	C2	2	2	53.10	3.688	0.08962	10	AWB
TCEBB213E	B	C2	2	2	53.67	3.732	0.08835	10	AGT
TCEBC111E	C	C1	3	1	55.30	3.978	0.08928	10	AGB
TCEBC112E	C	C1	3	1	56.42	4.006	0.08902	10	AGB
TCEBC113E	C	C1	3	1	55.38	4.192	0.08838	10	AGB
TCEBC211E	C	C2	3	2	55.91	4.014	0.08728	10	AGM
TCEBC212E	C	C2	3	2	55.97	4.048	0.08748	10	AGB
TCEBC213E	C	C2	3	2	55.60	4.110	0.08745	10	AGB

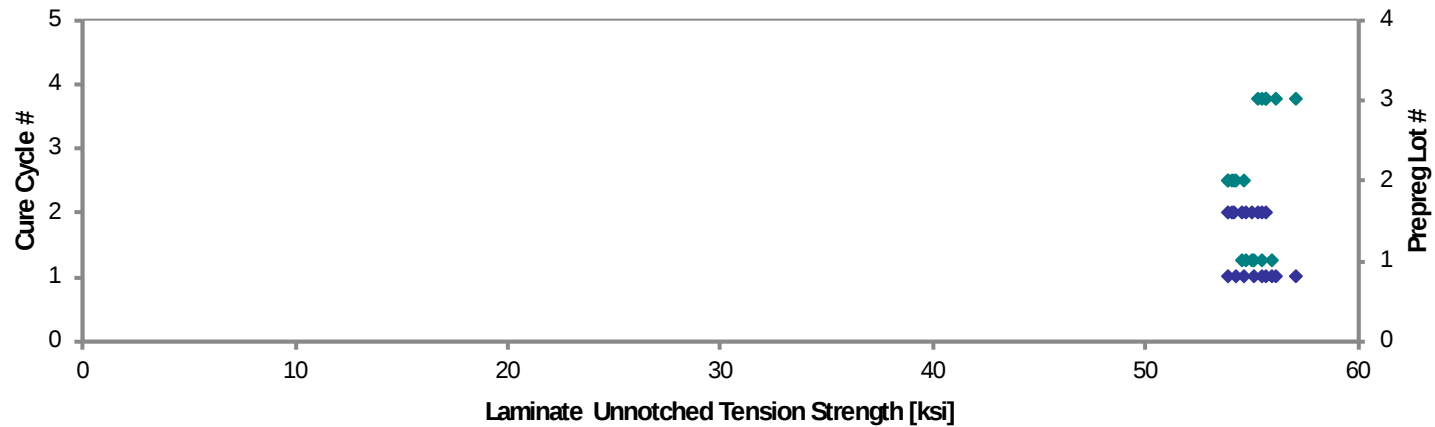
Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008953	55.95	3.796
0.008963	55.14	3.872
0.008985	55.49	3.871
0.009095	54.69	3.861
0.009192	54.58	3.810
0.009137	55.04	3.850
0.009057	53.90	3.800
0.008973	54.68	3.784
0.008853	54.27	3.769
0.008938	54.20	3.678
0.008962	54.07	3.755
0.008835	53.89	3.746
0.008928	56.11	4.036
0.008902	57.08	4.052
0.008838	55.63	4.210
0.008728	55.45	3.981
0.008748	55.64	4.024
0.008745	55.25	4.084

Average 54.24 3.831
 Standard Dev. 1.305 0.1759
 Coeff. of Var. [%] 2.407 4.592
 Min. 52.25 3.622
 Max. 56.42 4.192
 Number of Spec. 18 18

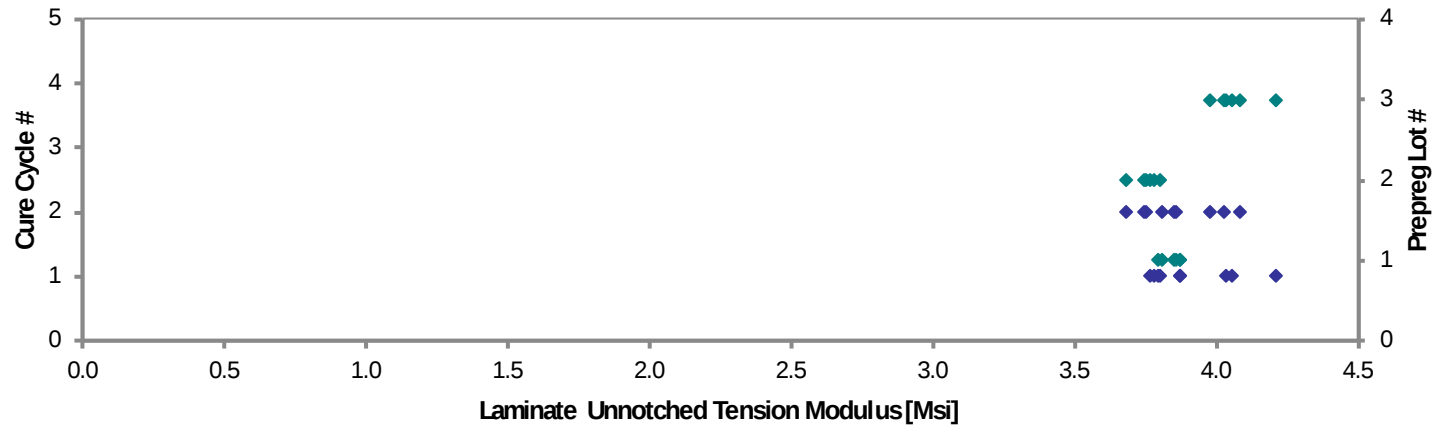
Average_{norm} 0.008935 55.06 3.888
 Standard Dev._{norm} 0.8594 0.1435
 Coeff. of Var. [%]_{norm} 1.561 3.691
 Min. 0.008728 53.89 3.678
 Max. 0.009192 57.08 4.210
 Number of Spec. 18 18 18

**Laminate Unnotched Tension Properties (UNT2)--ETW2 (250°F)
Normalized Strength**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

**Laminate Unnotched Tension Properties (UNT2)--ETW2 (250°F)
Normalized Modulus**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg



4.9 “40/20/40” Unnotched Tension 3 Properties (UNT3)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

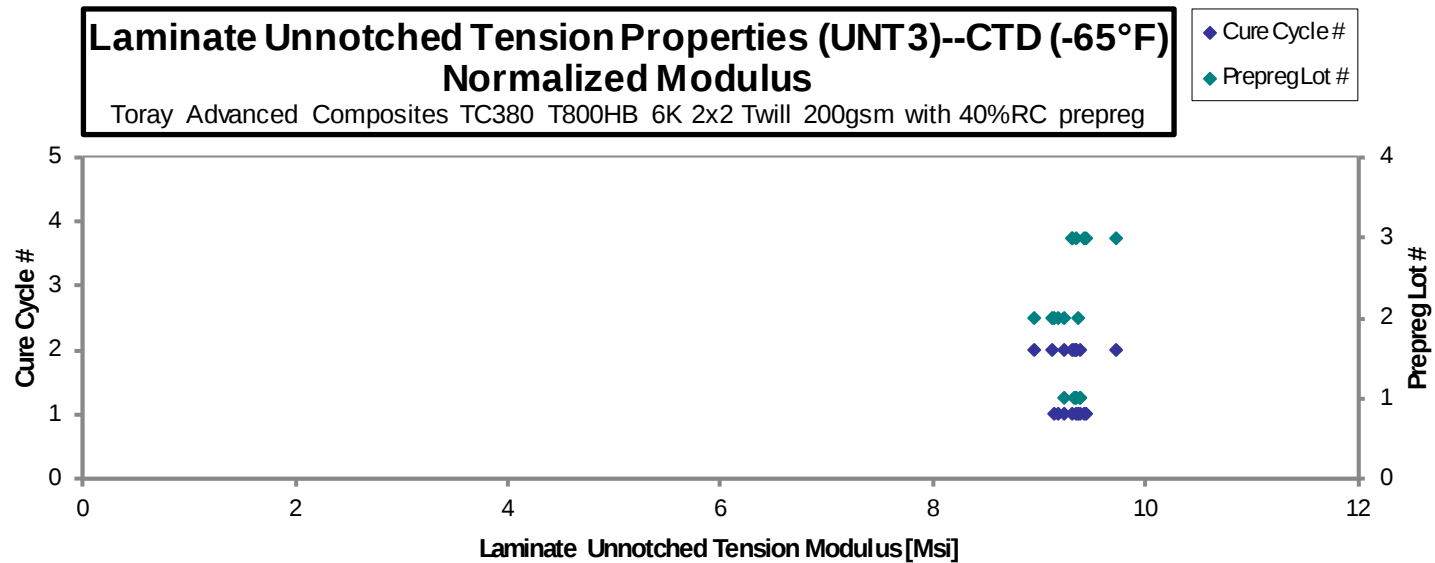
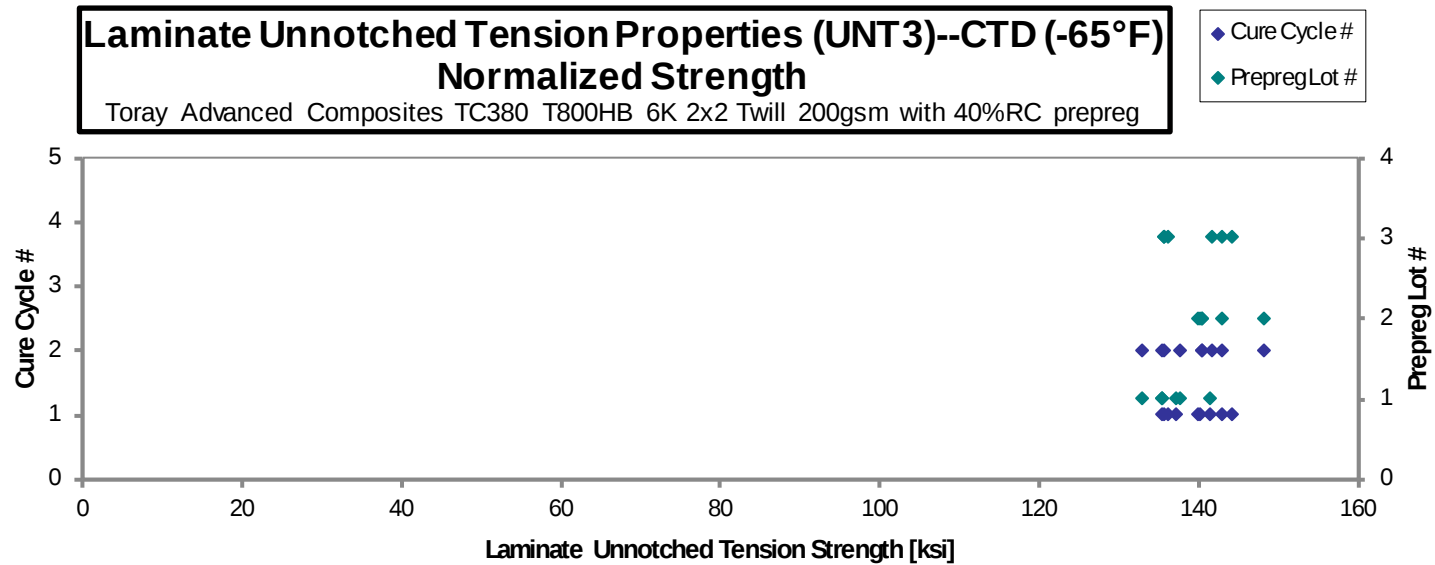
t_{ply} [in]

0.008800

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]
TCECA111B	A	C1	1	1	137.7	9.413	0.08770	10	LWT, LAB	0.008770	137.2	9.381
TCECA112B	A	C1	1	1	141.8	9.370	0.08780	10	LWB, LAT	0.008780	141.4	9.349
TCECA113B	A	C1	1	1	137.2	9.352	0.08692	10	LWB, LAT	0.008692	135.5	9.237
TCECA211B	A	C2	1	2	137.1	9.504	0.08685	10	LAT, LWB	0.008685	135.3	9.380
TCECA212B	A	C2	1	2	138.6	9.404	0.08750	10	LWT, LAB	0.008750	137.8	9.351
TCECA213B	A	C2	1	2	132.7	9.325	0.08810	10	LAT, LWB	0.008810	132.8	9.335
TCECB111B	B	C1	2	1	137.1	9.169	0.08992	10	LWB, LAT	0.008992	140.1	9.369
TCECB112B	B	C1	2	1	136.6	8.905	0.09030	10	LWT, LAB	0.009030	140.2	9.137
TCECB113B	B	C1	2	1	140.5	9.029	0.08945	10	LWT, LAB	0.008945	142.8	9.178
TCECB211B	B	C2	2	2	143.5	8.951	0.09083	10	LAB, LWT	0.009083	148.1	9.239
TCECB212B	B	C2	2	2	135.2	8.790	0.09140	10	LAT, LWB	0.009140	140.5	9.129
TCECB213B	B	C2	2	2	136.6	8.711	0.09047	10	LWT, LAB	0.009047	140.5	8.955
TCECC111B	C	C1	3	1	145.7	9.410	0.08713	10	M(A,L)GT, M(A,L)WT, LAB	0.008713	144.3	9.317
TCECC112B	C	C1	3	1	139.3	9.662	0.08577	10	AGT, AWT, AAB	0.008577	135.7	9.417
TCECC113B	C	C1	3	1	138.7	9.621	0.08640	10	AAT, LWB	0.008640	136.2	9.446
TCECC211B	C	C2	3	2	141.3	9.699	0.08822	10	AGB, AWT	0.008822	141.7	9.723
TCECC212B	C	C2	3	2	143.1	9.316	0.08797	10	M(A,L)GB, AAT	0.008797	143.0	9.313
TCECC213B	C	C2	3	2	135.7	9.351	0.08793	10	M(A,L)GB, M(A,L)AT	0.008793	135.6	9.344

Average 138.8 9.277
Standard Dev. 3.301 0.2919
Coeff. of Var. [%] 2.378 3.147
Min. 132.7 8.711
Max. 145.7 9.699
Number of Spec. 18 18

Average_{norm} 0.008837 139.4 9.311
Standard Dev._{norm} 3.894 0.1600
Coeff. of Var. [%]_{norm} 2.794 1.718
Min. 0.008577 132.8 8.955
Max. 0.009140 148.1 9.723
Number of Spec. 18 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

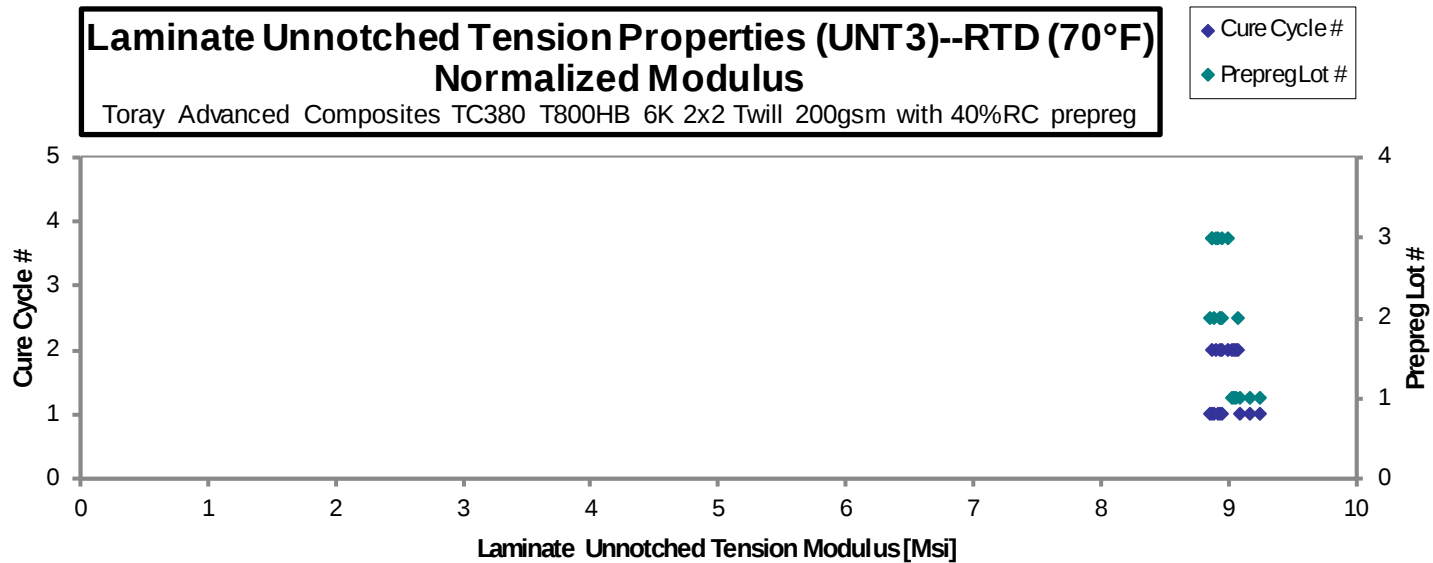
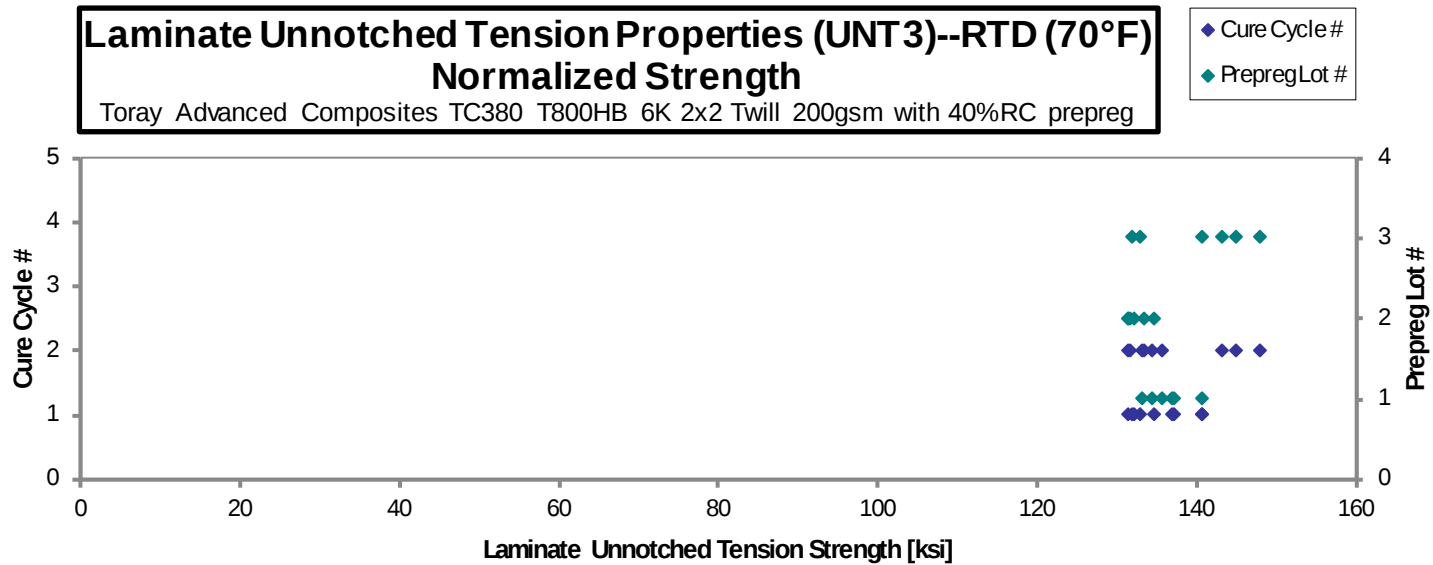
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCECA111A	A	C1	1	1	149.4	9.932	0.08060	10	LAB, LGT
TCECA112A	A	C1	1	1	143.6	9.678	0.08407	10	LGB, LAT
TCECA113A	A	C1	1	1	143.4	9.343	0.08640	10	LGB, LAT
TCECA211A	A	C2	1	2	149.1	9.919	0.08012	10	LWB, M(A,L)WT
TCECA212A	A	C2	1	2	143.1	9.656	0.08262	10	LWB, M(A,L)WT
TCECA213A	A	C2	1	2	137.4	9.345	0.08523	10	LAT
TCECB111A	B	C1	2	1	147.8	9.803	0.08020	10	LAT, LWB
TCECB112A	B	C1	2	1	138.3	9.320	0.08357	10	LAT, LWB
TCECB113A	B	C1	2	1	134.2	9.018	0.08670	10	LAT, LWB
TCECB211A	B	C2	2	2	145.7	9.759	0.08053	10	LGB, LAT
TCECB212A	B	C2	2	2	137.2	9.474	0.08432	10	LWT, LAB
TCECB213A	B	C2	2	2	130.0	8.837	0.08913	10	LWT, LAB
TCECC111A	C	C1	3	1	155.6	9.808	0.07955	10	AAB, AGT
TCECC112A	C	C1	3	1	140.9	9.438	0.08308	10	M(A,L)GB, AAT
TCECC113A	C	C1	3	1	136.4	9.245	0.08517	10	M(A,L)GB, M(A,L)AT
TCECC211A	C	C2	3	2	149.3	9.380	0.08445	10	M(A,L)AT, M(A,L)GB
TCECC212A	C	C2	3	2	148.1	9.073	0.08607	10	M(A,L)GT, AAB
TCECC213A	C	C2	3	2	147.6	8.870	0.08825	10	M(A,L)GT, M(A,L)AB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008060	136.8	9.097
0.008407	137.1	9.245
0.008640	140.8	9.173
0.008012	135.7	9.030
0.008262	134.3	9.065
0.008523	133.1	9.051
0.008020	134.7	8.934
0.008357	131.4	8.850
0.008670	132.2	8.885
0.008053	133.3	8.931
0.008432	131.5	9.078
0.008913	131.7	8.951
0.007955	140.7	8.867
0.008308	133.0	8.911
0.008517	132.0	8.947
0.008445	143.2	9.001
0.008607	144.9	8.873
0.008825	148.0	8.896

Average 143.2 9.439
 Standard Dev. 6.577 0.3447
 Coeff. of Var. [%] 4.594 3.652
 Min. 130.0 8.837
 Max. 155.6 9.932
 Number of Spec. 18 18

Average_{norm} 0.008389 136.4 8.988
 Standard Dev._{norm} 5.090 0.1121
 Coeff. of Var. [%]_{norm} 3.732 1.247
 Min. 0.007955 131.4 8.850
 Max. 0.008913 148.0 9.245
 Number of Spec. 18 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

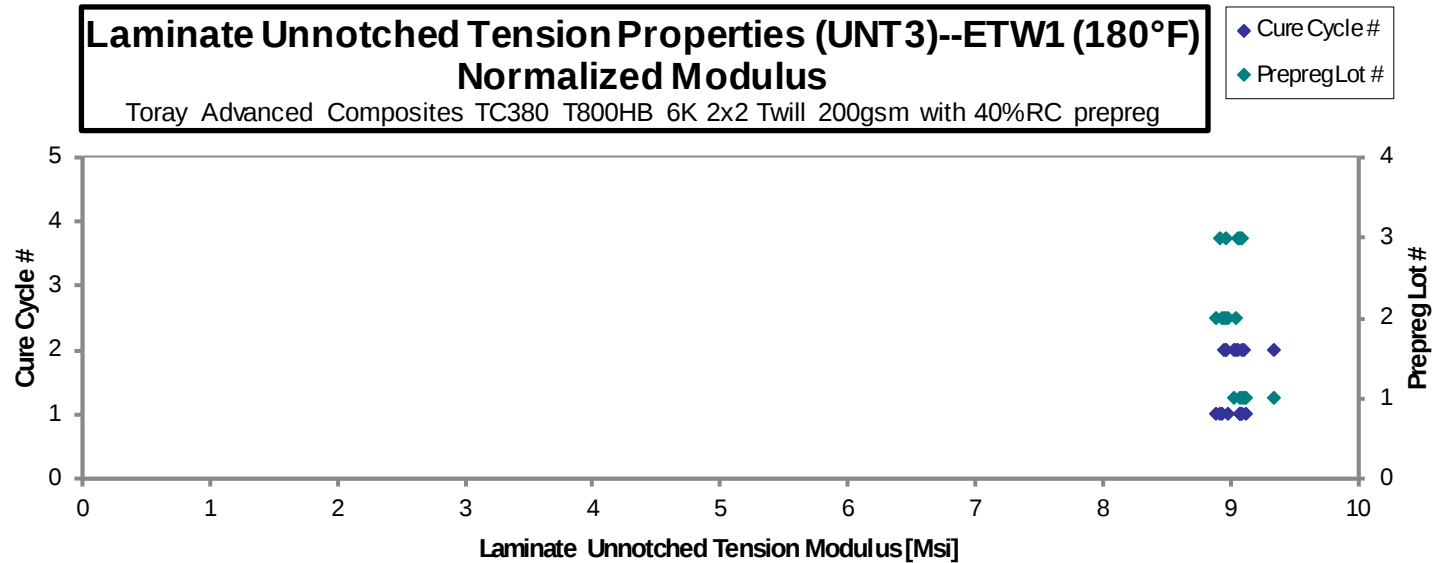
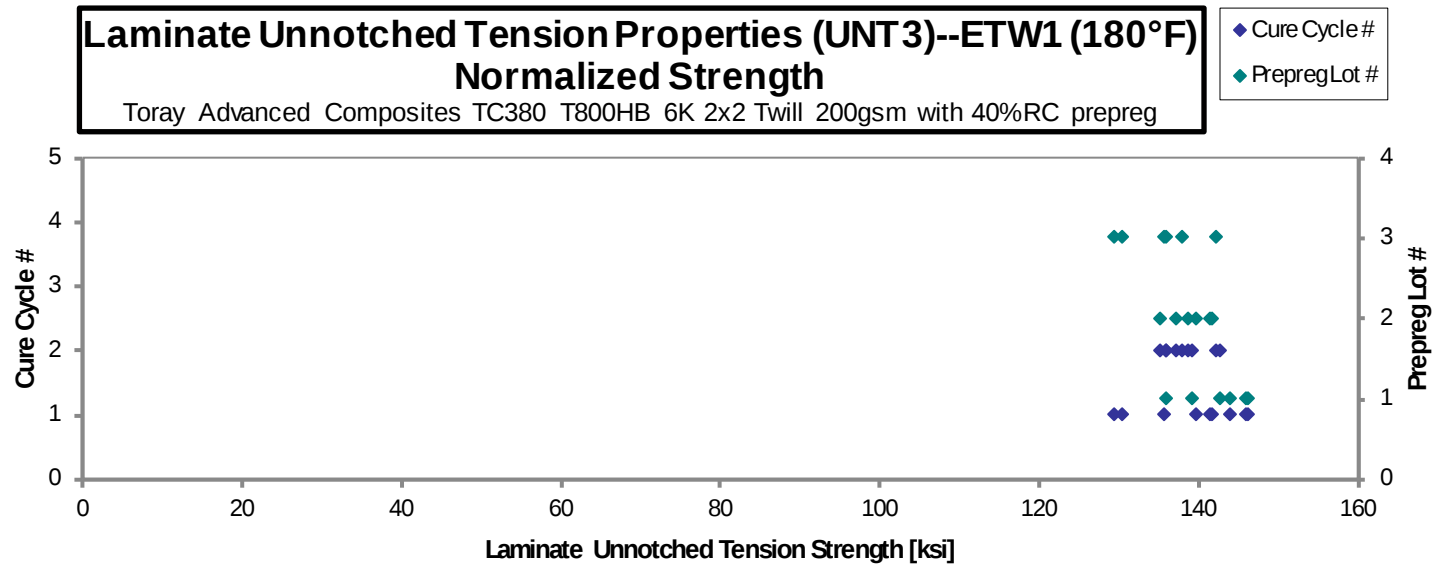
t_{ply} [in]

0.008800

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]
TCECA111D	A	C1	1	1	149.5	9.429	0.08470	10	LGB, M(A,L)WT	0.008470	143.9	9.075
TCECA112D	A	C1	1	1	156.5	9.769	0.08222	10	M(A,L)WB, LWT	0.008222	146.2	9.127
TCECA113D	A	C1	1	1	149.4	9.312	0.08595	10	LWB, LAT	0.008595	145.9	9.095
TCECA211D	A	C2	1	2	144.5	9.454	0.08473	10	M(A,L)WB, LWT	0.008473	139.1	9.103
TCECA212D	A	C2	1	2	146.4	9.733	0.08168	10	M(A,L)WT, LWB	0.008168	135.9	9.035
TCECA213D	A	C2	1	2	149.2	9.765	0.08425	10	LWT, M(A,L)WB	0.008425	142.8	9.349
TCECB111D	B	C1	2	1	143.0	9.140	0.08602	10	M(A,L)WT, M(A,L)WB	0.008602	139.7	8.934
TCECB112D	B	C1	2	1	155.7	9.761	0.08013	10	LAT, LWB	0.008013	141.8	8.889
TCECB113D	B	C1	2	1	147.3	9.348	0.08453	10	M(A,L)WT, LAB	0.008453	141.5	8.980
TCECB211D	B	C2	2	2	139.2	9.100	0.08665	10	LAT, M(A,L)GB	0.008665	137.1	8.961
TCECB212D	B	C2	2	2	148.2	9.660	0.08237	10	LAT, M(A,L)WB	0.008237	138.7	9.042
TCECB213D	B	C2	2	2	136.6	9.048	0.08707	10	LAT, LWB	0.008707	135.1	8.952
TCECC111D	C	C1	3	1	136.1	9.553	0.08367	10	AWT, LWB, AGB	0.008367	129.4	9.083
TCECC112D	C	C1	3	1	140.8	9.796	0.08150	10	AGB, AWT, M(A,L)WB	0.008150	130.4	9.073
TCECC113D	C	C1	3	1	147.8	9.714	0.08080	10	AGB, AWT, AGT	0.008080	135.7	8.919
TCECC211D	C	C2	3	2	143.8	9.183	0.08707	10	AAT, AWB, AGB	0.008707	142.3	9.085
TCECC212D	C	C2	3	2	142.1	9.340	0.08537	10	AWT, AWB, AGB	0.008537	137.9	9.060
TCECC213D	C	C2	3	2	136.4	8.996	0.08767	10	AWT, AWB, AGB	0.008767	135.9	8.962

Average 145.1 9.450
Standard Dev. 6.020 0.2789
Coeff. of Var. [%] 4.148 2.951
Min. 136.1 8.996
Max. 156.5 9.796
Number of Spec. 18 18

Average_{norm} 0.008424 138.9 9.040
Standard Dev._{norm} 4.720 0.1054
Coeff. of Var. [%]_{norm} 3.399 1.166
Min. 0.008013 129.4 8.889
Max. 0.008767 146.2 9.349
Number of Spec. 18 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

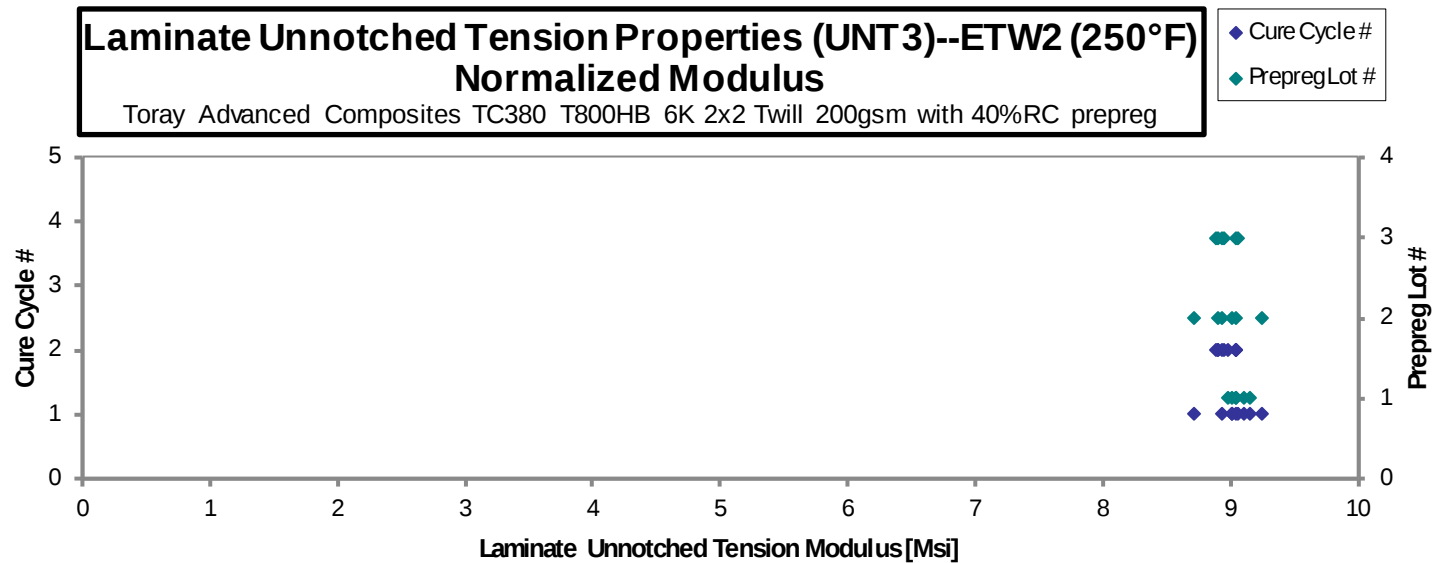
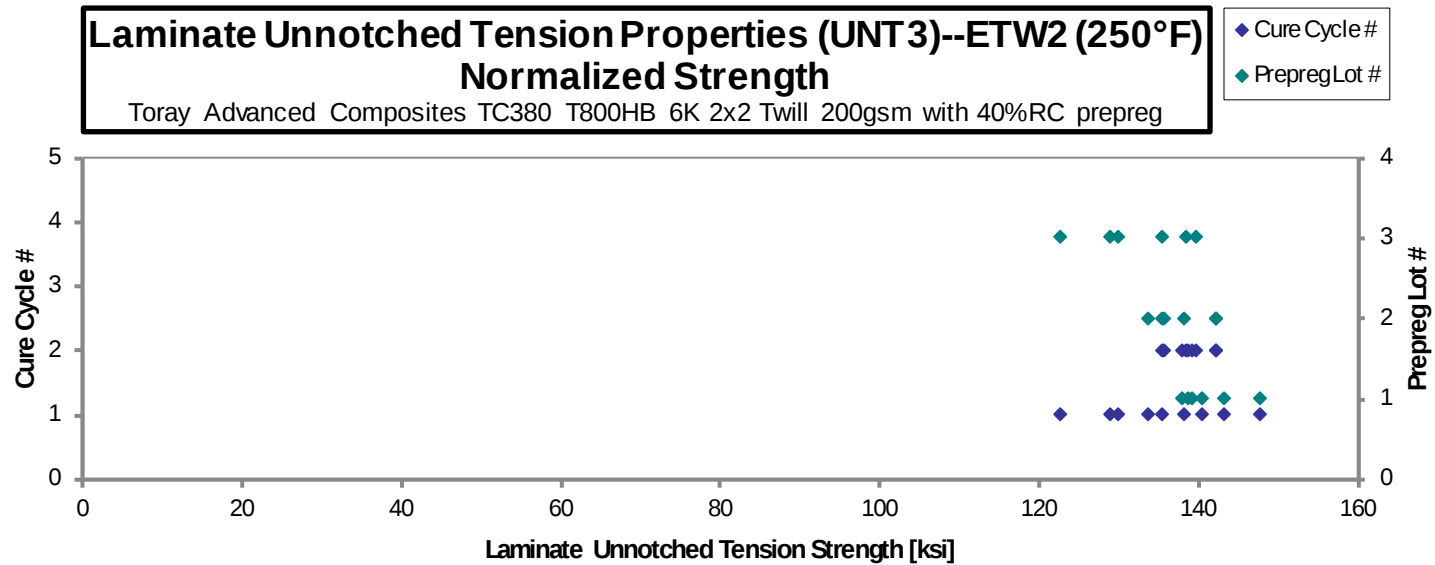
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCECA111E	A	C1	1	1	138.5	8.720	0.09092	10	LGB, LAT
TCECA112E	A	C1	1	1	143.0	8.821	0.09092	10	LAB, M(A,L)GT
TCECA113E	A	C1	1	1	136.6	8.891	0.09055	10	LWB, M(A,L)GB, LAT
TCECA211E	A	C2	1	2	137.0	8.838	0.08937	10	LGB, M(A,L)WT
TCECA212E	A	C2	1	2	134.9	8.843	0.09005	10	LAT, LWB, M(A,L)GB
TCECA213E	A	C2	1	2	135.9	8.864	0.08973	10	LAT, LWB, LGB
TCECB111E	B	C1	2	1	130.5	8.393	0.09130	10	M(A,L)WT, LGB
TCECB112E	B	C1	2	1	127.3	8.580	0.09248	10	LAT, LWB
TCECB113E	B	C1	2	1	133.4	8.930	0.09112	10	LAT, LWB
TCECB211E	B	C2	2	2	128.8	8.445	0.09270	10	M(A,D,L)WB, M(A,L)GT
TCECB212E	B	C2	2	2	135.2	8.504	0.09252	10	M(D,L)AT, LGM, M(D,L)WB
TCECB213E	B	C2	2	2	136.2	8.661	0.09190	10	M(D,L)WT, M(D,L)WB
TCECC111E	C	C1	3	1	129.3	9.091	0.08777	10	AWT, AGT
TCECC112E	C	C1	3	1	120.9	8.805	0.08935	10	AGT, M(A,L)GB
TCECC113E	C	C1	3	1	128.6	8.959	0.08883	10	M(A,D)GM, AWT, M(A,L)WB
TCECC211E	C	C2	3	2	136.6	8.771	0.08913	10	AWT, M(A,L)GT, AWB
TCECC212E	C	C2	3	2	133.9	8.815	0.08892	10	M(A,L)GT, AWB
TCECC213E	C	C2	3	2	137.4	8.809	0.08942	10	AWB, AGB, AGT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.009092	143.1	9.009
0.009092	147.7	9.113
0.009055	140.5	9.148
0.008937	139.1	8.975
0.009005	138.0	9.049
0.008973	138.6	9.039
0.009130	135.4	8.708
0.009248	133.8	9.017
0.009112	138.1	9.247
0.009270	135.6	8.896
0.009252	142.1	8.940
0.009190	142.2	9.044
0.008777	129.0	9.067
0.008935	122.7	8.940
0.008883	129.9	9.044
0.008913	138.4	8.884
0.008892	135.3	8.906
0.008942	139.6	8.950

Average 133.6 8.763
 Standard Dev. 5.147 0.1836
 Coeff. of Var. [%] 3.854 2.095
 Min. 120.9 8.393
 Max. 143.0 9.091
 Number of Spec. 18 18

Average_{norm} 0.009039 137.2 8.999
 Standard Dev._{norm} 5.803 0.1180
 Coeff. of Var. [%]_{norm} 4.230 1.311
 Min. 0.008777 122.7 8.708
 Max. 0.009270 147.7 9.247
 Number of Spec. 18 18 18



4.10 “25/50/25” Unnotched Compression 1 Properties (UNC1)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

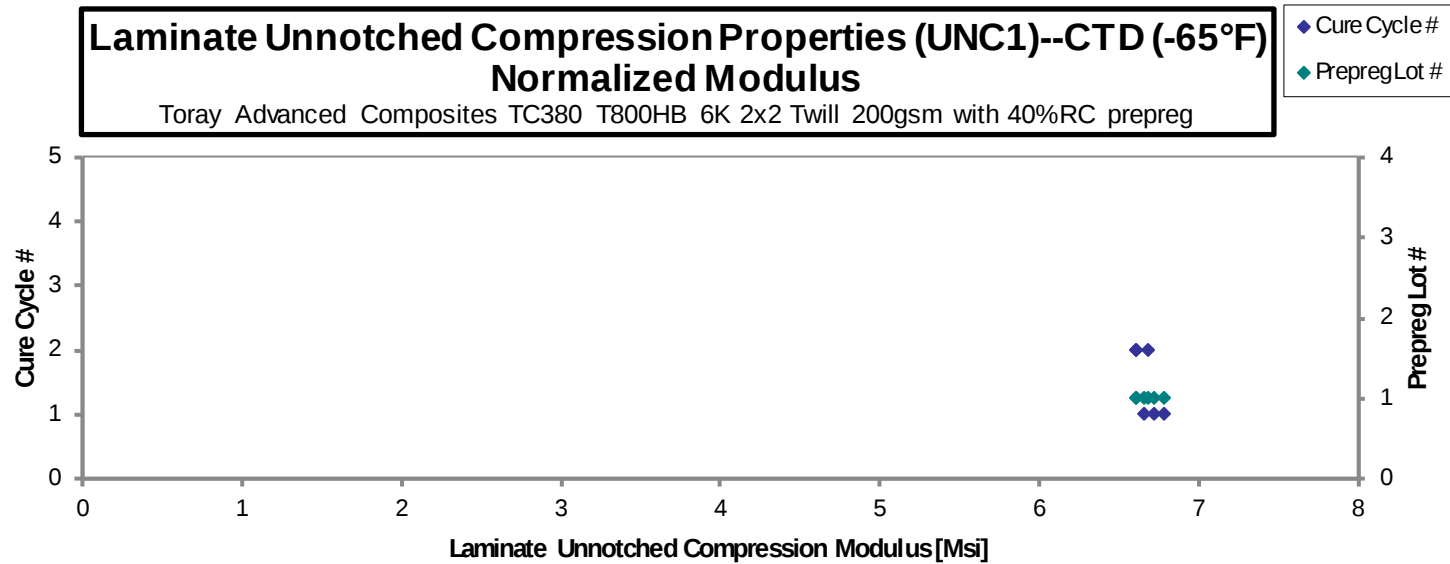
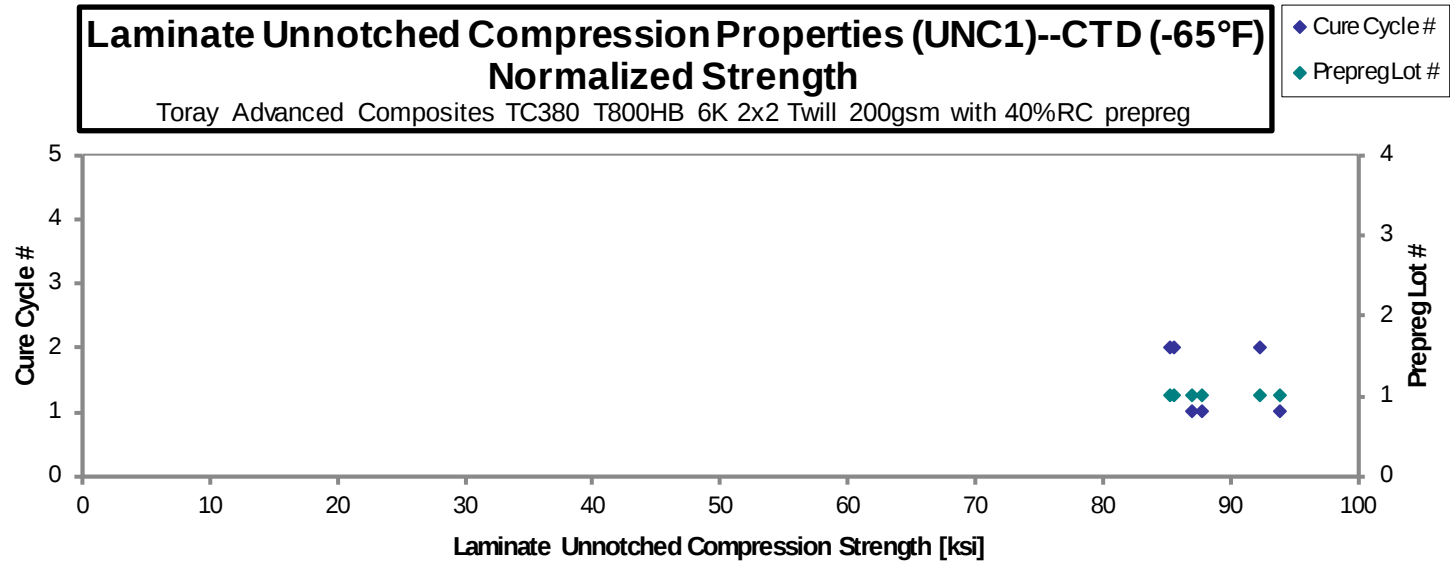
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEWA111B	A	C1	1	1	90.89	6.896	0.1359	16	BGM
TCEWA112B	A	C1	1	1	96.43	6.909	0.1371	16	BGM
TCEWA113B	A	C1	1	1	88.13	6.876	0.1390	16	BGM
TCEWA211B	A	C2	1	2	95.86	6.948	0.1355	16	BGM
TCEWA212B	A	C2	1	2	88.67	6.852	0.1358	16	BGM
TCEWA213B	A	C2	1	2	87.32	6.769	0.1375	16	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008492	87.70	6.654
0.008569	93.89	6.727
0.008688	87.01	6.788
0.008469	92.25	6.686
0.008488	85.53	6.609
0.008596	85.29	6.612

Average 91.22 6.875
Standard Dev. 4.000 0.06087
Coeff. of Var. [%] 4.385 0.8854
Min. 87.32 6.769
Max. 96.43 6.948
Number of Spec. 6 6

Average_{norm} 0.008550 88.61 6.679
Standard Dev._{norm} 3.608 0.06964
Coeff. of Var. [%]_{norm} 4.072 1.043
Min. 0.008469 85.29 6.609
Max. 0.008688 93.89 6.788
Number of Spec. 6 6 6



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

0.008800

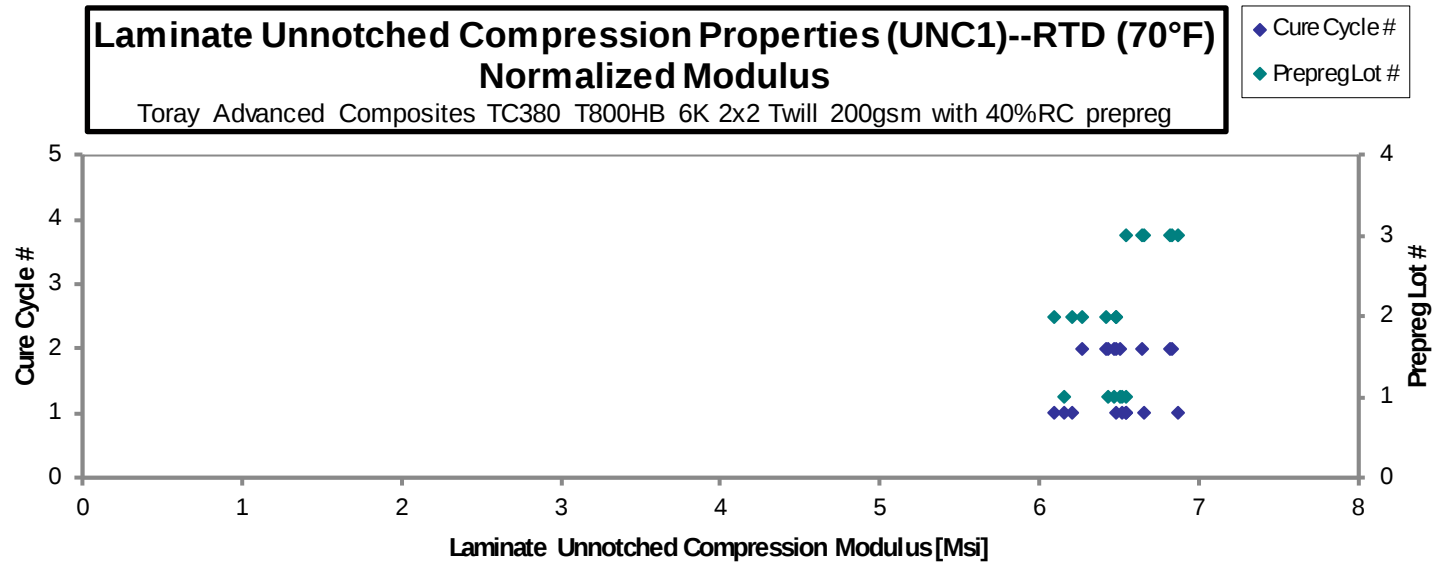
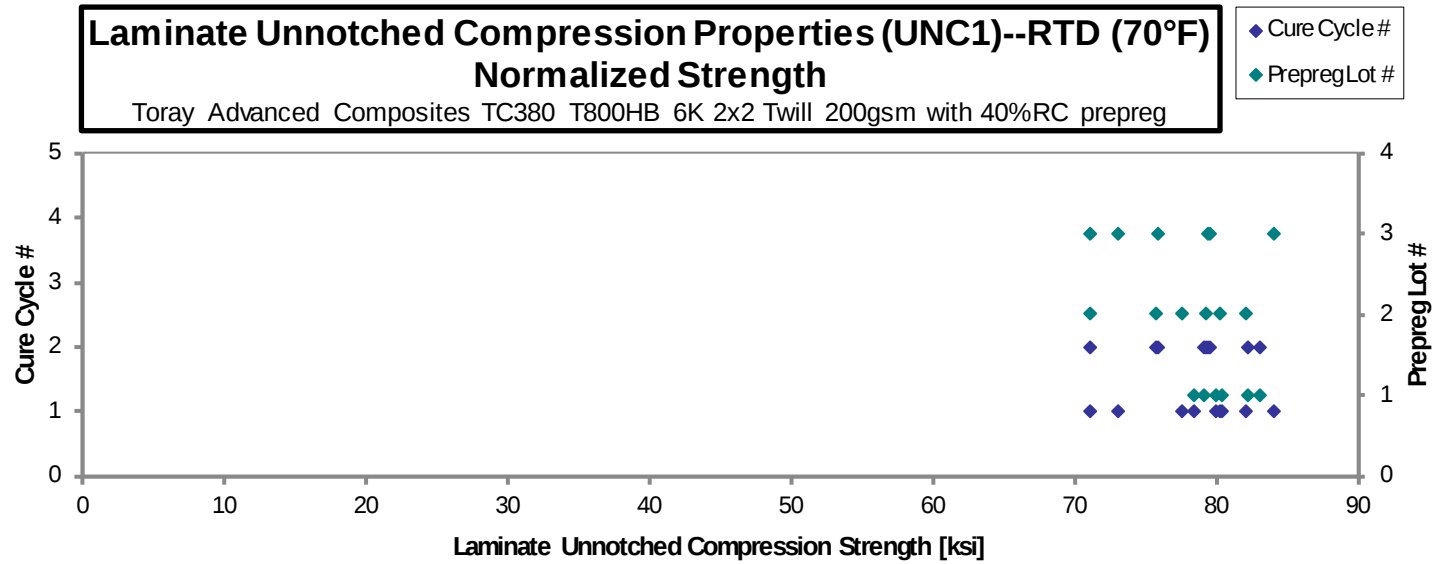
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEWA111A*	A	C1	1	1	86.74	7.241	0.1273	16	BGM
TCEWA112A*	A	C1	1	1	87.33	7.085	0.1296	16	BGM
TCEWA113A	A	C1	1	1	85.03	6.545	0.1324	16	BGM
TCEWA211A	A	C2	1	2	93.42	7.281	0.1252	16	HAB
TCEWA212A	A	C2	1	2	90.35	7.150	0.1281	16	BGM
TCEWA213A	A	C2	1	2	85.38	6.938	0.1305	16	BAB
TCEWB111A	B	C1	2	1	88.62	6.996	0.1305	16	BGM
TCEWB112A	B	C1	2	1	84.67	6.428	0.1335	16	BGM
TCEWB113A	B	C1	2	1	80.04	6.402	0.1365	16	BGM
TCEWB211A	B	C2	2	2	78.42	6.919	0.1276	16	BGM
TCEWB212A	B	C2	2	2	81.34	6.888	0.1313	16	BGM
TCEWB213A	B	C2	2	2	83.05	6.795	0.1345	16	BGM
TCEWC111A	C	C1	3	1	76.76	7.419	0.1304	16	BGM
TCEWC112A	C	C1	3	1	77.71	6.963	0.1324	16	BGM
TCEWC113A	C	C1	3	1	87.94	6.963	0.1345	16	BGM
TCEWC211A	C	C2	3	2	84.05	7.229	0.1330	16	BGM
TCEWC212A	C	C2	3	2	79.03	7.119	0.1351	16	BGM
TCEWC213A	C	C2	3	2	82.04	6.864	0.1364	16	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.007958	78.45	6.549
0.008098	80.37	6.519
0.008275	79.95	6.155
0.007824	83.06	6.473
0.008003	82.17	6.502
0.008154	79.11	6.429
0.008153	82.10	6.482
0.008341	80.25	6.093
0.008528	77.57	6.205
0.007977	71.08	6.272
0.008203	75.82	6.420
0.008403	79.31	6.489
0.008149	71.08	6.870
0.008273	73.06	6.546
0.008408	84.03	6.653
0.008310	79.37	6.827
0.008444	75.83	6.831
0.008527	79.50	6.651

* Modulus are averaged values of 2 strain gages.

Average	84.00	6.957
Standard Dev.	4.623	0.2820
Coeff. of Var. [%]	5.504	4.054
Min.	76.76	6.402
Max.	93.42	7.419
Number of Spec.	18	18

Average _{norm}	0.008224	78.45	6.498
Standard Dev. _{norm}		3.789	0.2224
Coeff. of Var. [%] _{norm}		4.830	3.423
Min.	0.007824	71.08	6.093
Max.	0.008528	84.03	6.870
Number of Spec.	18	18	18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

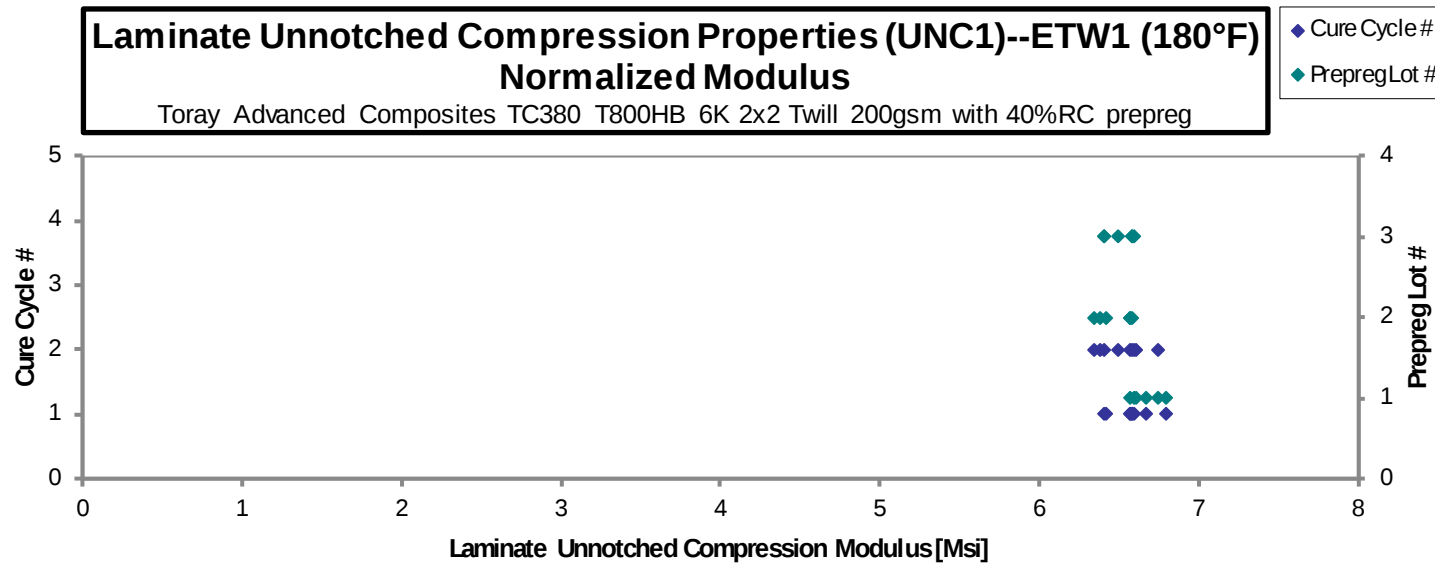
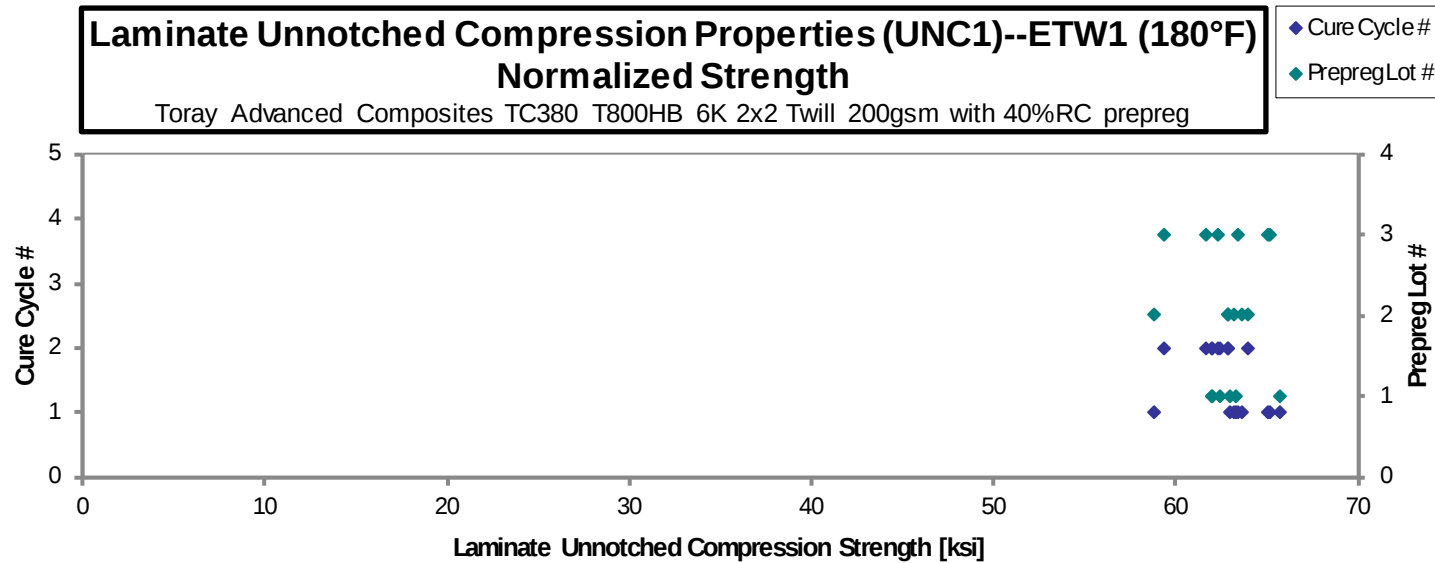
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEWA111D	A	C1	1	1	66.00	6.695	0.1402	16	BGM
TCEWA112D	A	C1	1	1	68.62	7.403	0.1293	16	BGM
TCEWA113D	A	C1	1	1	67.67	7.021	0.1318	16	BAB
TCEWA211D	A	C2	1	2	63.04	6.855	0.1385	16	M(B,H)AT
TCEWA212D	A	C2	1	2	68.94	7.332	0.1266	16	HAB
TCEWA213D	A	C2	1	2	68.04	7.202	0.1292	16	BGM
TCEWB111D	B	C1	2	1	58.66	6.565	0.1412	16	HAB
TCEWB112D	B	C1	2	1	63.05	6.513	0.1421	16	BGM
TCEWB113D	B	C1	2	1	61.53	6.255	0.1446	16	BGM
TCEWB211D	B	C2	2	2	63.19	6.613	0.1400	16	BGM
TCEWB212D	B	C2	2	2	63.39	6.324	0.1420	16	BAB
TCEWB213D	B	C2	2	2	62.40	6.296	0.1418	16	BGM
TCEWC111D	C	C1	3	1	66.86	6.764	0.1372	16	BGM
TCEWC112D	C	C1	3	1	65.62	6.643	0.1397	16	BGM
TCEWC113D	C	C1	3	1	64.07	6.473	0.1393	16	BGM
TCEWC211D	C	C2	3	2	63.00	6.658	0.1393	16	M(B,H)AT
TCEWC212D	C	C2	3	2	59.87	6.547	0.1396	16	BGM
TCEWC213D	C	C2	3	2	61.69	6.411	0.1407	16	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008765	65.74	6.668
0.008083	63.03	6.800
0.008234	63.32	6.570
0.008655	62.00	6.742
0.007909	61.97	6.590
0.008072	62.41	6.606
0.008824	58.82	6.583
0.008880	63.63	6.572
0.009039	63.19	6.424
0.008752	62.85	6.577
0.008876	63.94	6.378
0.008864	62.85	6.341
0.008573	65.13	6.590
0.008728	65.08	6.588
0.008703	63.36	6.402
0.008704	62.31	6.585
0.008725	59.36	6.492
0.008794	61.65	6.406

Average 64.20 6.698
 Standard Dev. 3.000 0.3434
 Coeff. of Var. [%] 4.673 5.127
 Min. 58.66 6.255
 Max. 68.94 7.403
 Number of Spec. 18 18

Average_{norm} 0.008621 62.81 6.551
 Standard Dev._{norm} 1.762 0.1237
 Coeff. of Var. [%]_{norm} 2.804 1.889
 Min. 0.007909 58.82 6.341
 Max. 0.009039 65.74 6.800
 Number of Spec. 18 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

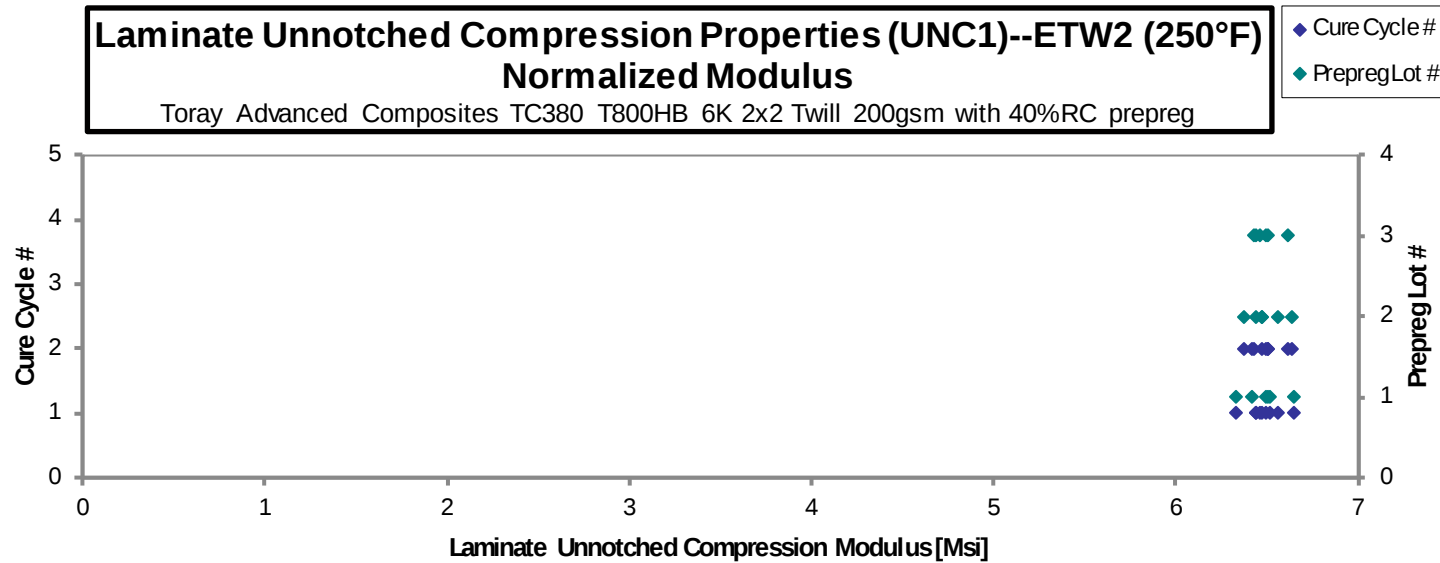
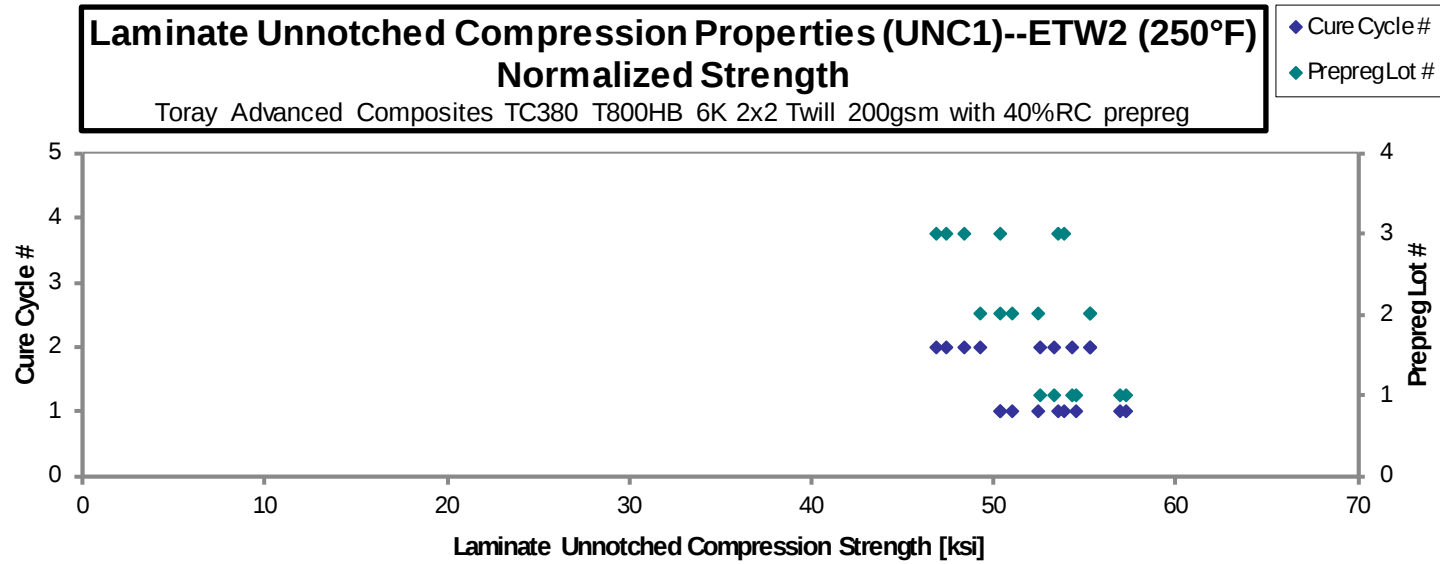
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEWA111E	A	C1	1	1	55.45	6.439	0.1385	16	BGM
TCEWA112E	A	C1	1	1	56.83	6.638	0.1410	16	BGM
TCEWA113E	A	C1	1	1	56.67	6.452	0.1422	16	BGM
TCEWA211E	A	C2	1	2	54.52	6.564	0.1378	16	BAT
TCEWA212E	A	C2	1	2	54.90	6.570	0.1394	16	BGM
TCEWA213E	A	C2	1	2	52.61	6.508	0.1406	16	BAB
TCEWB111E	B	C1	2	1	51.07	6.384	0.1446	16	M(B,H)GM
TCEWB112E	B	C1	2	1	49.47	6.350	0.1435	16	BGM
TCEWB113E	B	C1	2	1	51.12	6.449	0.1406	16	BGM
TCEWB211E	B	C2	2	2	54.99	6.594	0.1417	16	M(B,H)GM
TCEWB212E	B	C2	2	2	49.08	6.354	0.1413	16	M(B,H)GM
TCEWB213E	B	C2	2	2	55.76	6.527	0.1398	16	M(B,H)GM
TCEWC111E	C	C1	3	1	54.09	6.515	0.1403	16	BGM
TCEWC112E	C	C1	3	1	54.11	6.527	0.1394	16	BAT
TCEWC113E	C	C1	3	1	51.50	6.587	0.1377	16	BAT
TCEWC211E	C	C2	3	2	47.56	6.523	0.1405	16	BAT
TCEWC212E	C	C2	3	2	49.24	6.541	0.1383	16	M(B,H)AT
TCEWC213E	C	C2	3	2	47.93	6.763	0.1376	16	BGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008653	54.53	6.331
0.008814	56.91	6.648
0.008885	57.22	6.515
0.008609	53.34	6.422
0.008709	54.34	6.503
0.008789	52.54	6.499
0.009038	52.44	6.557
0.008966	50.40	6.470
0.008784	51.03	6.438
0.008854	55.33	6.635
0.008832	49.26	6.377
0.008734	55.34	6.478
0.008767	53.89	6.490
0.008711	53.57	6.462
0.008604	50.36	6.441
0.008779	47.44	6.508
0.008646	48.38	6.427
0.008602	46.85	6.611

Average 52.61 6.516
 Standard Dev. 3.051 0.1026
 Coeff. of Var. [%] 5.799 1.574
 Min. 47.56 6.350
 Max. 56.83 6.763
 Number of Spec. 18 18

Average_{norm} 0.008765 52.40 6.490
 Standard Dev._{norm} 3.116 0.08372
 Coeff. of Var. [%]_{norm} 5.946 1.290
 Min. 0.008602 46.85 6.331
 Max. 0.009038 57.22 6.648
 Number of Spec. 18 18 18



4.11 “10/80/10” Unnotched Compression 2 Properties (UNC2)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

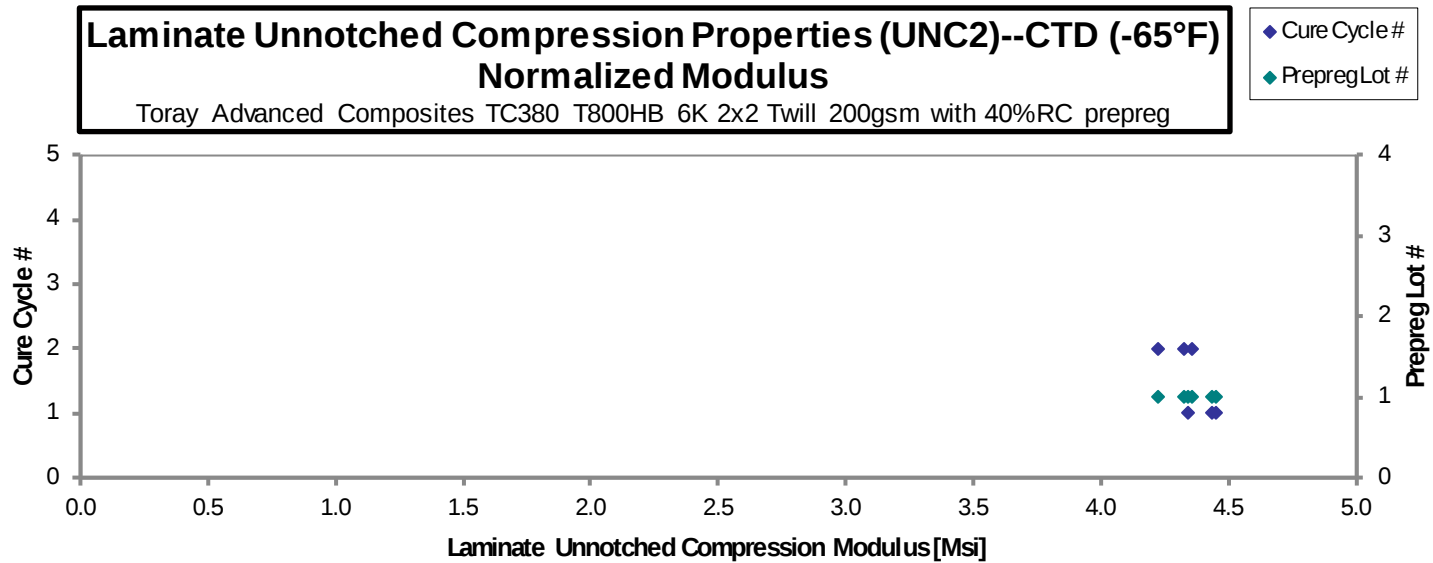
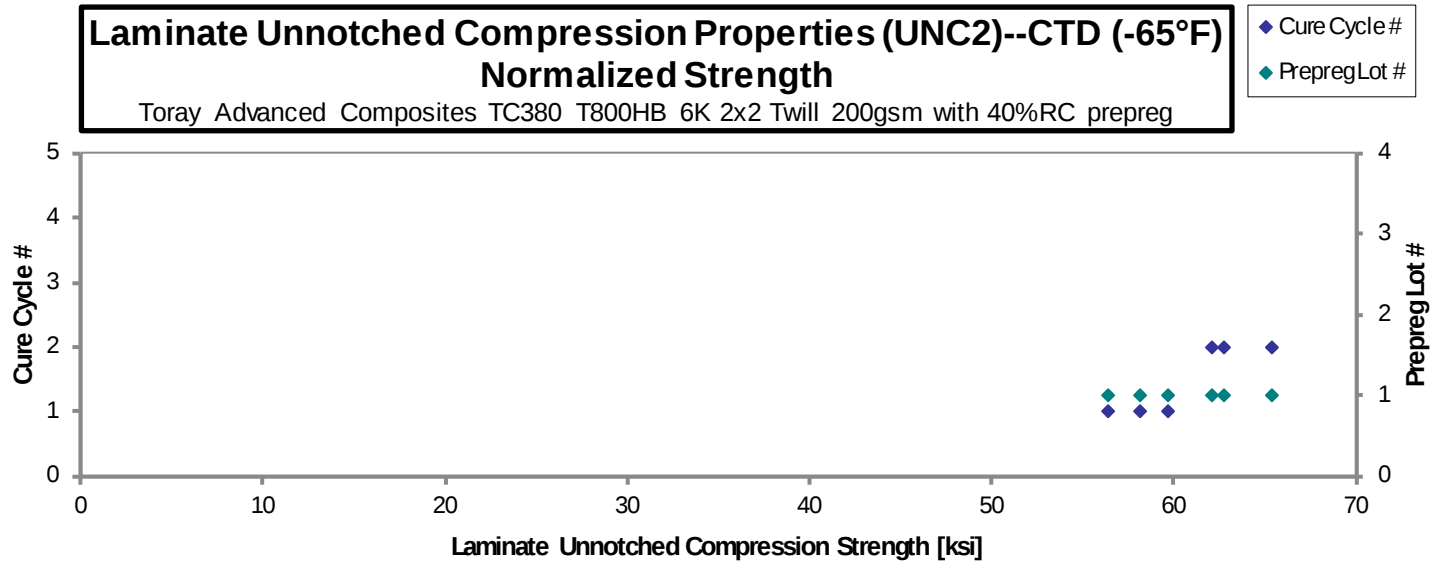
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEXA111B	A	C1	1	1	61.83	4.602	0.08488	10	BGM
TCEXA112B	A	C1	1	1	57.39	4.422	0.08640	10	BGM
TCEXA113B	A	C1	1	1	58.76	4.498	0.08703	10	BGM
TCEXA211B	A	C2	1	2	64.67	4.398	0.08450	10	BGM
TCEXA212B	A	C2	1	2	67.59	4.472	0.08513	10	BGM
TCEXA213B	A	C2	1	2	63.82	4.431	0.08650	10	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008488	59.64	4.439
0.008640	56.34	4.341
0.008703	58.11	4.448
0.008450	62.10	4.223
0.008513	65.39	4.326
0.008650	62.73	4.355

Average 62.34 4.470
Standard Dev. 3.815 0.07360
Coeff. of Var. [%] 6.120 1.646
Min. 57.39 4.398
Max. 67.59 4.602
Number of Spec. 6 6

Average_{norm} 0.008574 60.72 4.355
Standard Dev._{norm} 3.312 0.08246
Coeff. of Var. [%]_{norm} 5.454 1.893
Min. 0.008450 56.34 4.223
Max. 0.008703 65.39 4.448
Number of Spec. 6 6 6



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

0.008800

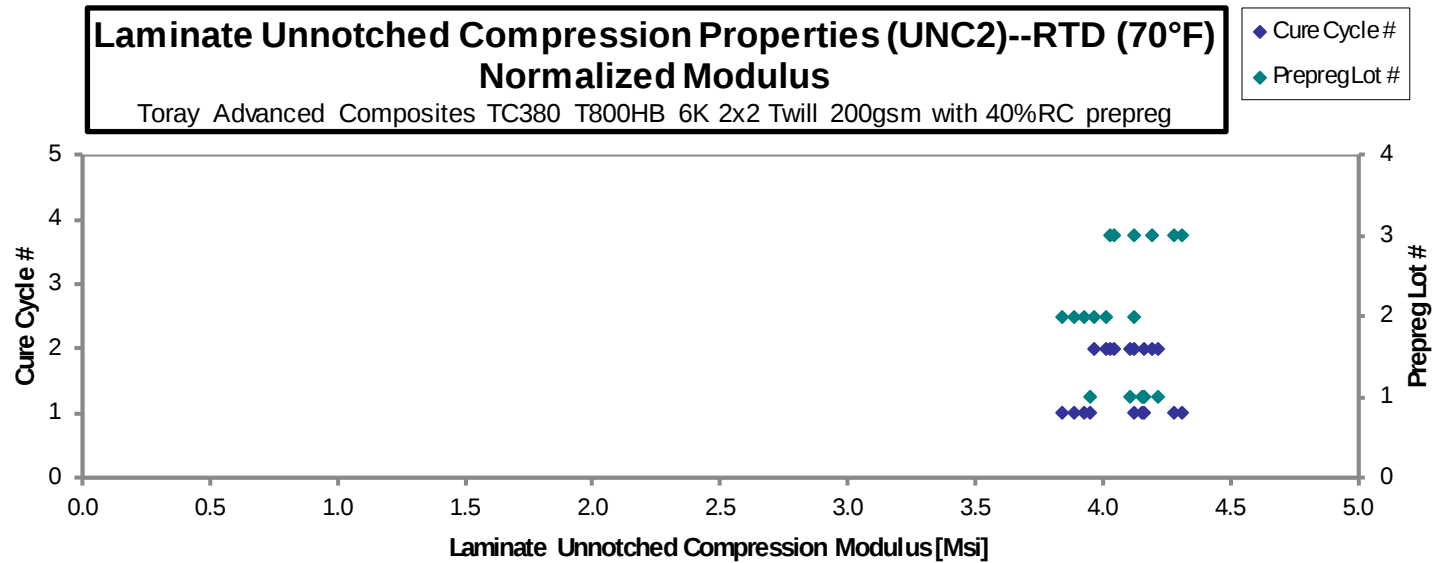
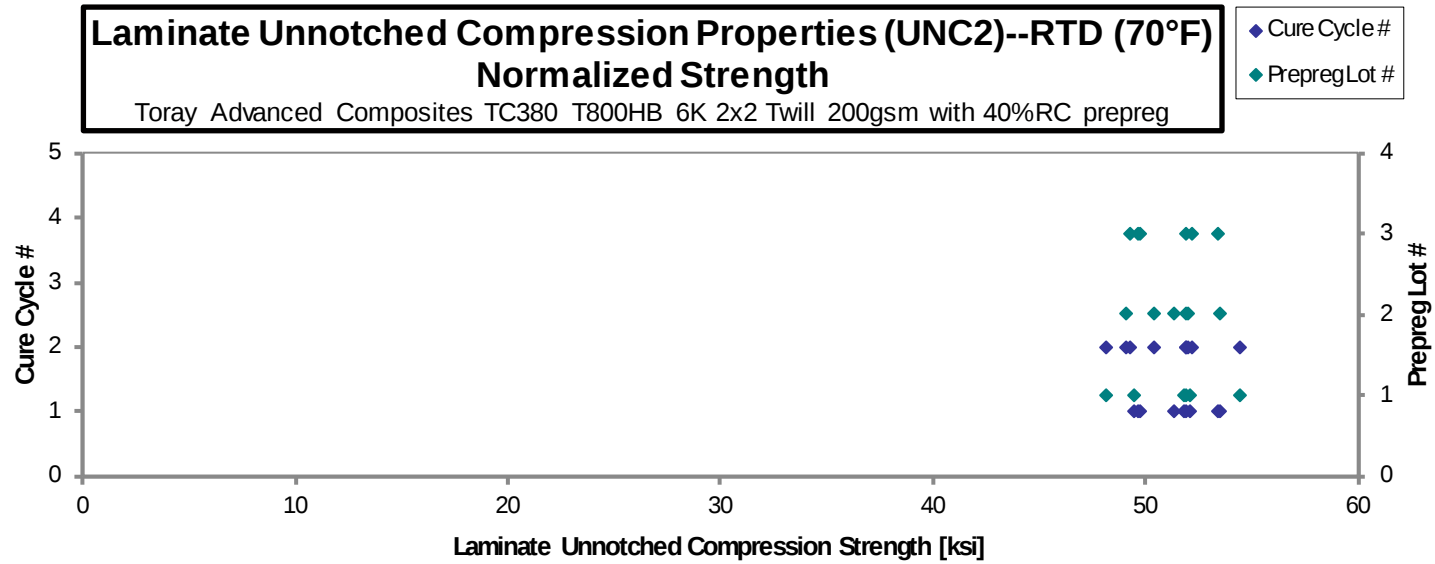
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEXA111A*	A	C1	1	1	58.43	4.656	0.07852	10	BGM
TCEXA112A*	A	C1	1	1	56.59	4.538	0.08063	10	BGM
TCEXA113A	A	C1	1	1	53.04	4.230	0.08215	10	BGM
TCEXA211A	A	C2	1	2	54.61	4.657	0.07765	10	BGM
TCEXA212A	A	C2	1	2	60.27	4.673	0.07947	10	BGM
TCEXA213A	A	C2	1	2	55.87	4.484	0.08172	10	BGM
TCEXB111A	B	C1	2	1	58.66	4.262	0.08022	10	BGM
TCEXB112A	B	C1	2	1	54.86	4.193	0.08238	10	BGM
TCEXB113A	B	C1	2	1	54.05	3.999	0.08453	10	BGM
TCEXB211A	B	C2	2	2	50.96	4.167	0.08472	10	BGM
TCEXB212A	B	C2	2	2	52.29	4.142	0.08757	10	BGM
TCEXB213A	B	C2	2	2	49.78	3.911	0.08918	10	BGM
TCEXC111A	C	C1	3	1	54.52	4.734	0.08020	10	BGM
TCEXC112A	C	C1	3	1	53.55	4.430	0.08183	10	BGM
TCEXC113A	C	C1	3	1	55.41	4.445	0.08478	10	BGM
TCEXC211A	C	C2	3	2	54.88	4.262	0.08323	10	BGM
TCEXC212A	C	C2	3	2	54.28	4.361	0.08468	10	BGM
TCEXC213A	C	C2	3	2	50.74	4.166	0.08540	10	BGM

* Modulus are averaged values of 2 strain gages.

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.007852	52.13	4.154
0.008063	51.85	4.158
0.008215	49.51	3.949
0.007765	48.19	4.109
0.007947	54.42	4.220
0.008172	51.88	4.164
0.008022	53.47	3.885
0.008238	51.36	3.925
0.008453	51.92	3.841
0.008472	49.06	4.011
0.008757	52.03	4.122
0.008918	50.45	3.964
0.008020	49.69	4.314
0.008183	49.79	4.119
0.008478	53.39	4.282
0.008323	51.90	4.031
0.008468	52.23	4.197
0.008540	49.24	4.043

Average **54.60** **4.350**
Standard Dev. **2.769** **0.2413**
Coeff. of Var. [%] **5.071** **5.546**
Min. **49.78** **3.911**
Max. **60.27** **4.734**
Number of Spec. **18** **18**

Average_{norm} **0.008271** **51.25** **4.083**
Standard Dev._{norm} **1.715** **0.1350**
Coeff. of Var. [%]_{norm} **3.347** **3.306**
Min. **0.007765** **48.19** **3.841**
Max. **0.008918** **54.42** **4.314**
Number of Spec. **18** **18** **18**



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

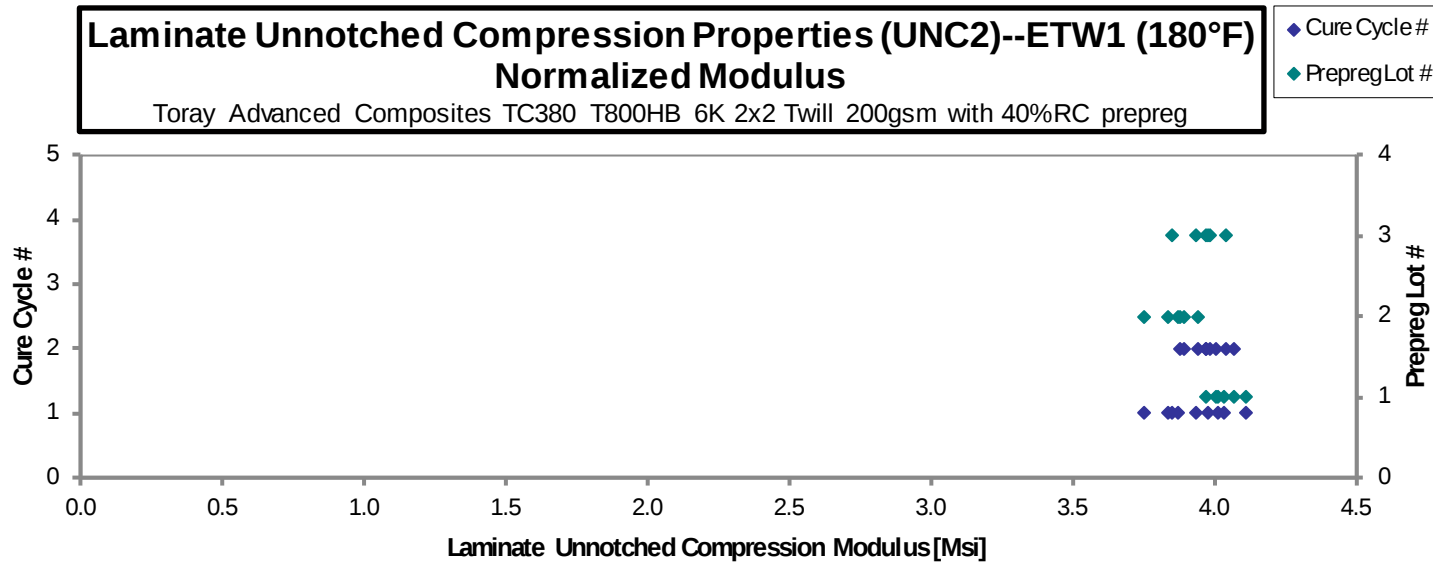
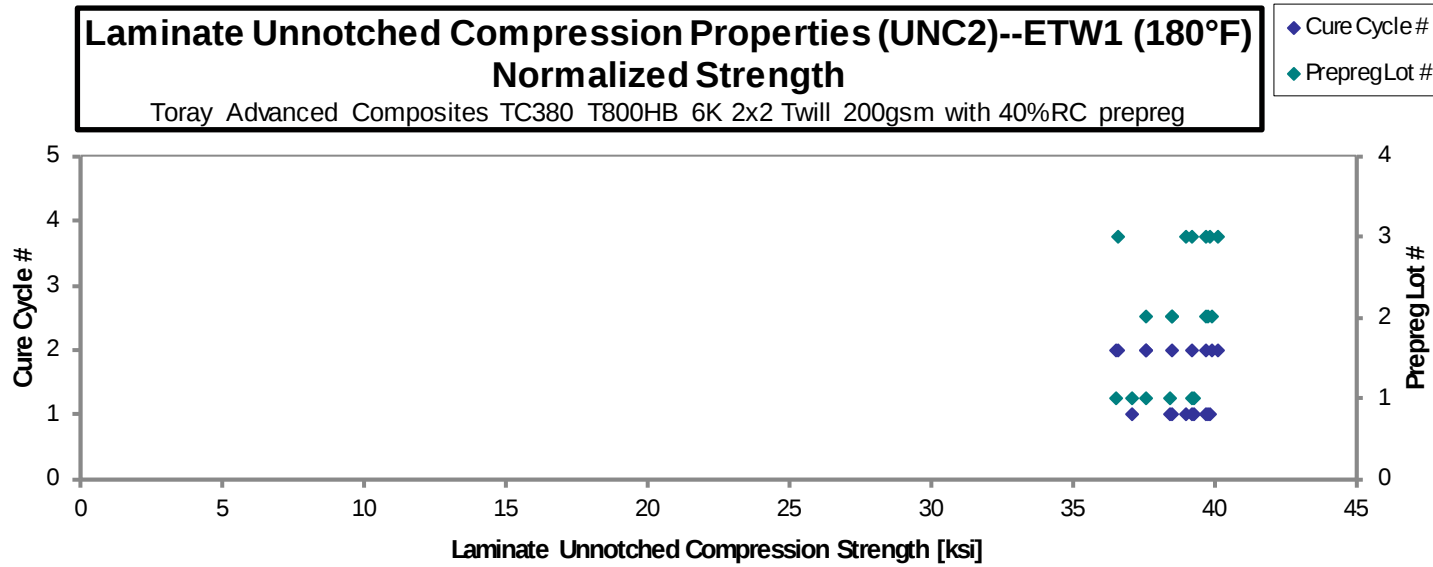
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEXA111D	A	C1	1	1	38.09	3.980	0.08877	10	BGM
TCEXA112D	A	C1	1	1	43.66	4.485	0.07912	10	BAB
TCEXA113D	A	C1	1	1	40.02	4.432	0.08165	10	BAB
TCEXA211D	A	C2	1	2	36.77	4.001	0.08740	10	BAB
TCEXA212D	A	C2	1	2	43.94	4.483	0.07860	10	BGM
TCEXA213D	A	C2	1	2	40.90	4.423	0.08093	10	BAB
TCEXB111D	B	C1	2	1	39.69	3.876	0.08798	10	BAB
TCEXB112D	B	C1	2	1	39.50	3.725	0.08868	10	BAB
TCEXB113D	B	C1	2	1	38.03	3.787	0.08912	10	BAT
TCEXB211D	B	C2	2	2	36.02	3.734	0.09177	10	BAB
TCEXB212D	B	C2	2	2	36.68	3.694	0.09238	10	BAT
TCEXB213D	B	C2	2	2	38.09	3.767	0.09215	10	BGM
TCEXC111D	C	C1	3	1	40.30	3.894	0.08707	10	BGM
TCEXC112D	C	C1	3	1	39.09	3.969	0.08823	10	BGM
TCEXC113D	C	C1	3	1	38.81	3.916	0.08847	10	BGM
TCEXC211D	C	C2	3	2	40.94	4.054	0.08623	10	BGM
TCEXC212D	C	C2	3	2	40.39	4.108	0.08658	10	BGM
TCEXC213D	C	C2	3	2	36.81	4.004	0.08758	10	BGM

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008877	38.42	4.014
0.007912	39.25	4.033
0.008165	37.13	4.112
0.008740	36.52	3.974
0.007860	39.25	4.004
0.008093	37.62	4.068
0.008798	39.69	3.876
0.008868	39.80	3.754
0.008912	38.51	3.835
0.009177	37.56	3.894
0.009238	38.51	3.878
0.009215	39.89	3.945
0.008707	39.87	3.853
0.008823	39.19	3.979
0.008847	39.01	3.937
0.008623	40.12	3.972
0.008658	39.74	4.042
0.008758	36.64	3.985

Average 39.32 4.019
Standard Dev. 2.220 0.2676
Coeff. of Var. [%] 5.646 6.658
Min. 36.02 3.694
Max. 43.94 4.485
Number of Spec. 18 18

Average_{norm} 0.008682 38.71 3.953
Standard Dev._{norm} 1.167 0.09091
Coeff. of Var. [%]_{norm} 3.014 2.300
Min. 0.007860 36.52 3.754
Max. 0.009238 40.12 4.112
Number of Spec. 18 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

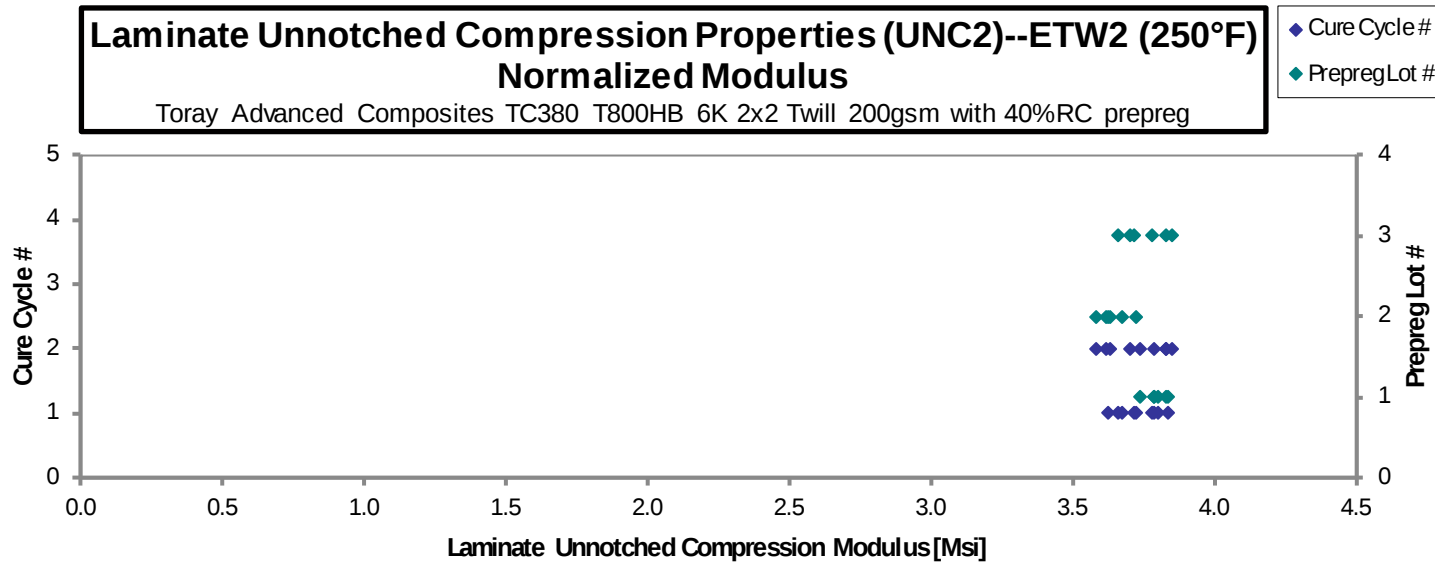
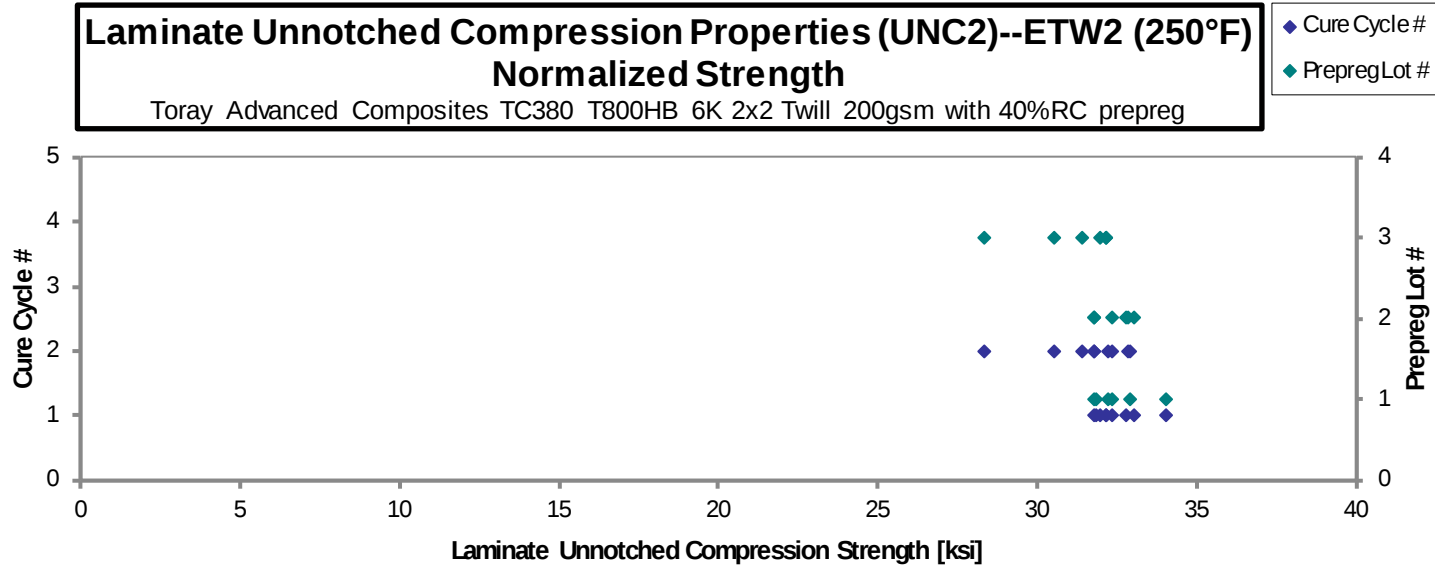
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEXA111E	A	C1	1	1	32.16	3.831	0.08705	10	BGM
TCEXA112E	A	C1	1	1	31.70	3.780	0.08848	10	BAB
TCEXA113E	A	C1	1	1	33.64	3.794	0.08907	10	BGM
TCEXA211E	A	C2	1	2	32.88	3.891	0.08667	10	BAB
TCEXA212E	A	C2	1	2	32.80	3.778	0.08825	10	BGM
TCEXA213E	A	C2	1	2	31.74	3.683	0.08935	10	BGM
TCEXB111E	B	C1	2	1	32.31	3.637	0.09005	10	M(B,D)GM
TCEXB112E	B	C1	2	1	31.90	3.573	0.08925	10	BGM
TCEXB113E	B	C1	2	1	32.92	3.686	0.08768	10	BGM
TCEXB211E	B	C2	2	2	31.74	3.614	0.08815	10	BAB
TCEXB212E	B	C2	2	2	33.07	3.655	0.08750	10	BGM
TCEXB213E	B	C2	2	2	32.67	3.679	0.08563	10	BGM
TCEXC111E	C	C1	3	1	31.30	3.586	0.08990	10	BGM
TCEXC112E	C	C1	3	1	32.03	3.701	0.08842	10	BGM
TCEXC113E	C	C1	3	1	32.25	3.792	0.08778	10	BGM
TCEXC211E	C	C2	3	2	31.47	3.711	0.08780	10	BGM
TCEXC212E	C	C2	3	2	30.73	3.879	0.08742	10	M(B,H)GM
TCEXC213E	C	C2	3	2	28.74	3.882	0.08682	10	BAT

Avg. t _{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008705	31.81	3.790
0.008848	31.87	3.800
0.008907	34.05	3.840
0.008667	32.38	3.832
0.008825	32.89	3.789
0.008935	32.22	3.740
0.009005	33.06	3.722
0.008925	32.36	3.623
0.008768	32.81	3.672
0.008815	31.79	3.620
0.008750	32.88	3.634
0.008563	31.79	3.580
0.008990	31.97	3.664
0.008842	32.18	3.718
0.008778	32.17	3.783
0.008780	31.40	3.702
0.008742	30.52	3.853
0.008682	28.35	3.830

Average 32.00 3.731
Standard Dev. 1.084 0.1016
Coeff. of Var. [%] 3.387 2.724
Min. 28.74 3.573
Max. 33.64 3.891
Number of Spec. 18 18

Average_{norm} 0.008807 32.03 3.733
Standard Dev._{norm} 1.185 0.08619
Coeff. of Var. [%]_{norm} 3.700 2.309
Min. 0.008563 28.35 3.580
Max. 0.009005 34.05 3.853
Number of Spec. 18 18 18



4.12 “40/20/40” Unnotched Compression 3 Properties (UNC3)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

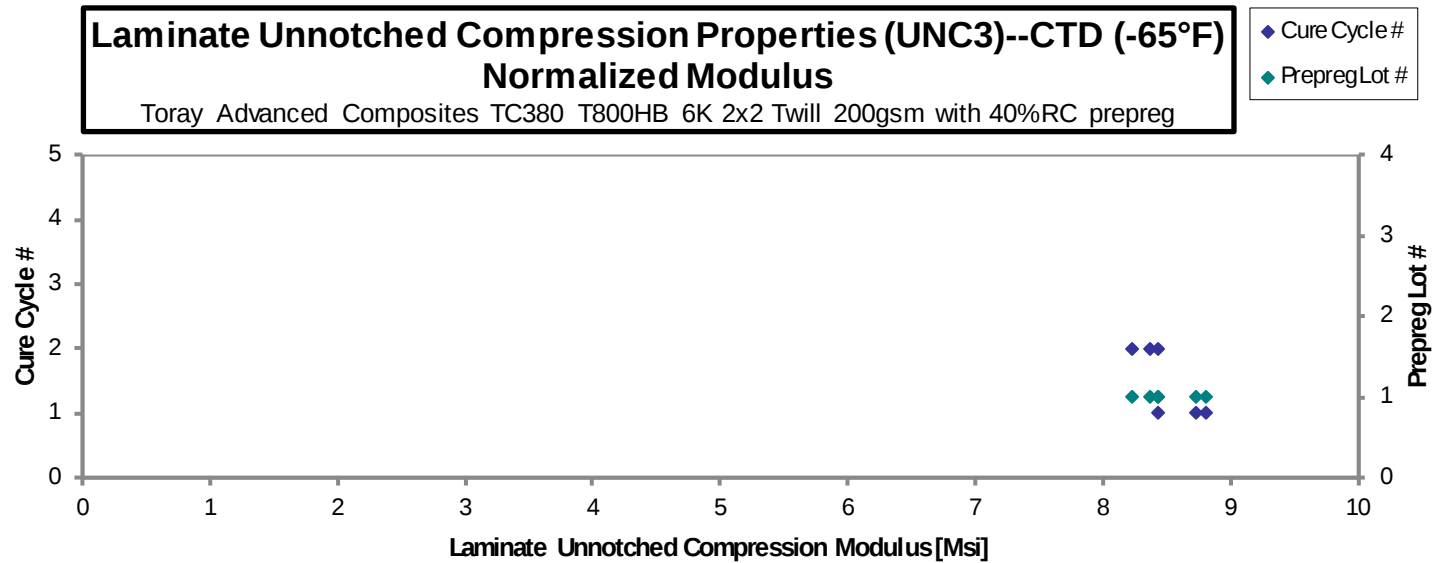
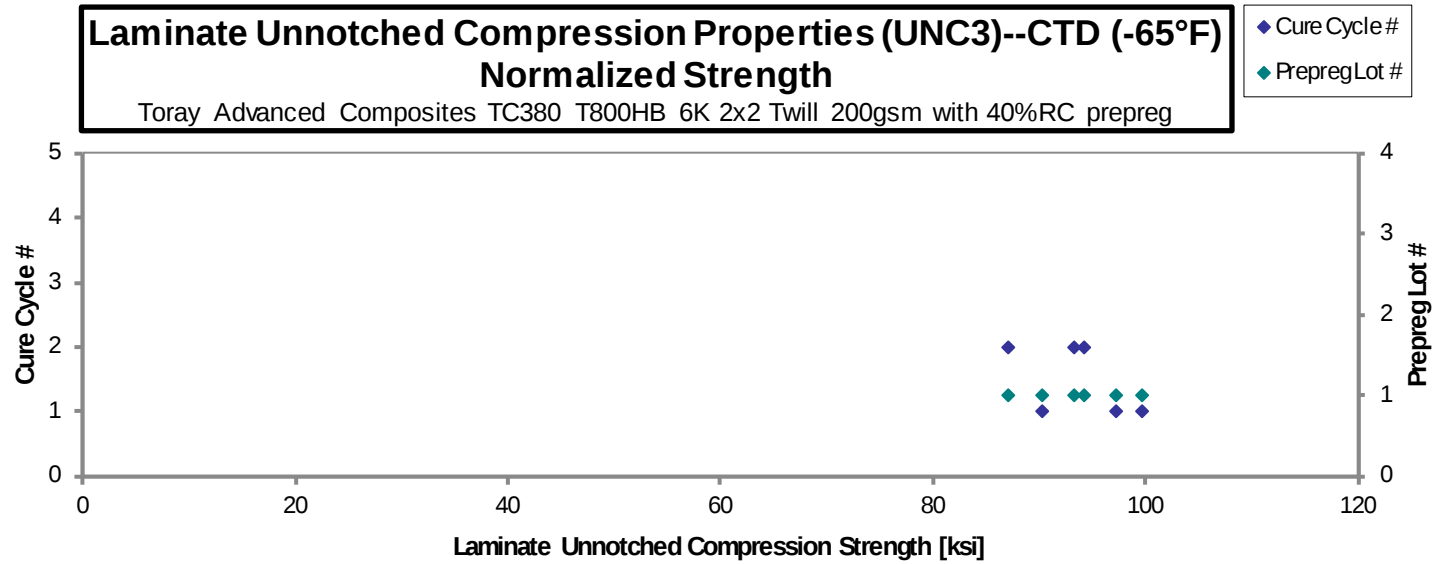
0.008800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEYA111B	A	C1	1	1	104.1	9.186	0.08432	10	BAT
TCEYA112B	A	C1	1	1	92.73	8.957	0.08573	10	BGM
TCEYA113B	A	C1	1	1	99.95	8.674	0.08558	10	BGM
TCEYA211B	A	C2	1	2	98.38	8.597	0.08425	10	BGM
TCEYA212B	A	C2	1	2	89.81	8.689	0.08538	10	BGM
TCEYA213B	A	C2	1	2	95.00	8.531	0.08640	10	BGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008432	99.72	8.802
0.008573	90.34	8.726
0.008558	97.20	8.436
0.008425	94.19	8.231
0.008538	87.14	8.431
0.008640	93.28	8.375

Average 96.66 8.772
Standard Dev. 5.175 0.2493
Coeff. of Var. [%] 5.354 2.842
Min. 89.81 8.531
Max. 104.1 9.186
Number of Spec. 6 6

Average_{norm} 0.008528 93.64 8.500
Standard Dev._{norm} 4.545 0.2185
Coeff. of Var. [%]_{norm} 4.853 2.571
Min. 0.008425 87.14 8.231
Max. 0.008640 99.72 8.802
Number of Spec. 6 6 6



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

0.008800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEYA111A*	A	C1	1	1	99.27	9.440	0.07845	10	BAB
TCEYA112A*	A	C1	1	1	91.33	9.218	0.08008	10	BGM
TCEYA113A	A	C1	1	1	88.56	8.526	0.08157	10	BGM
TCEYA211A	A	C2	1	2	91.54	8.951	0.07757	10	BAT
TCEYA212A	A	C2	1	2	93.74	8.591	0.07952	10	BGM
TCEYA213A	A	C2	1	2	91.13	8.893	0.08090	10	BAT
TCEYB111A	B	C1	2	1	90.68	9.068	0.07898	10	BAB
TCEYB112A	B	C1	2	1	85.71	8.878	0.08137	10	BAT
TCEYB113A	B	C1	2	1	81.68	8.565	0.08345	10	BGM
TCEYB211A	B	C2	2	2	95.53	9.291	0.07907	10	BAB
TCEYB212A	B	C2	2	2	81.96	9.088	0.08198	10	M(B,H)AB
TCEYB213A	B	C2	2	2	93.48	8.729	0.08410	10	BGM
TCEYB214A**	B	C2	2	2	93.48		0.08548	10	BGM
TCEYC111A	C	C1	3	1	90.00	8.683	0.08162	10	BGM
TCEYC112A	C	C1	3	1	91.10	8.985	0.08393	10	BGM
TCEYC113A	C	C1	3	1	84.12	8.887	0.08527	10	BGM
TCEYC211A	C	C2	3	2	86.82	8.893	0.08405	10	BGM
TCEYC212A	C	C2	3	2	80.78	8.872	0.08498	10	BGM
TCEYC213A	C	C2	3	2	87.59	8.493	0.08645	10	BAT

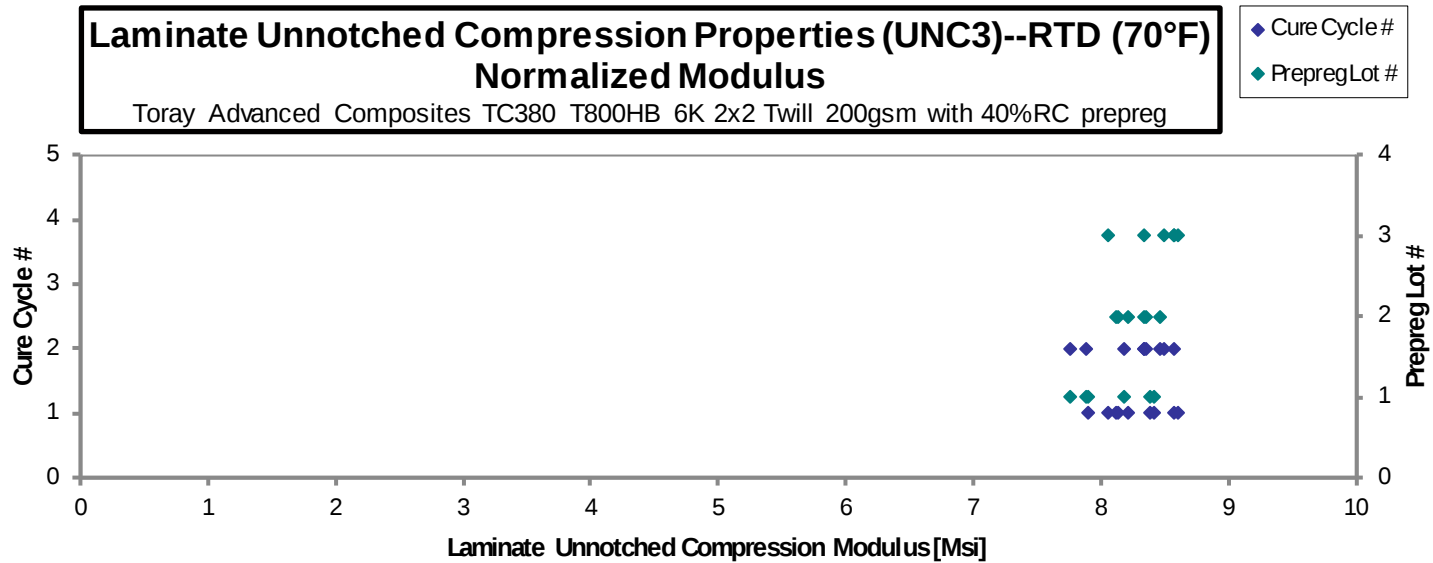
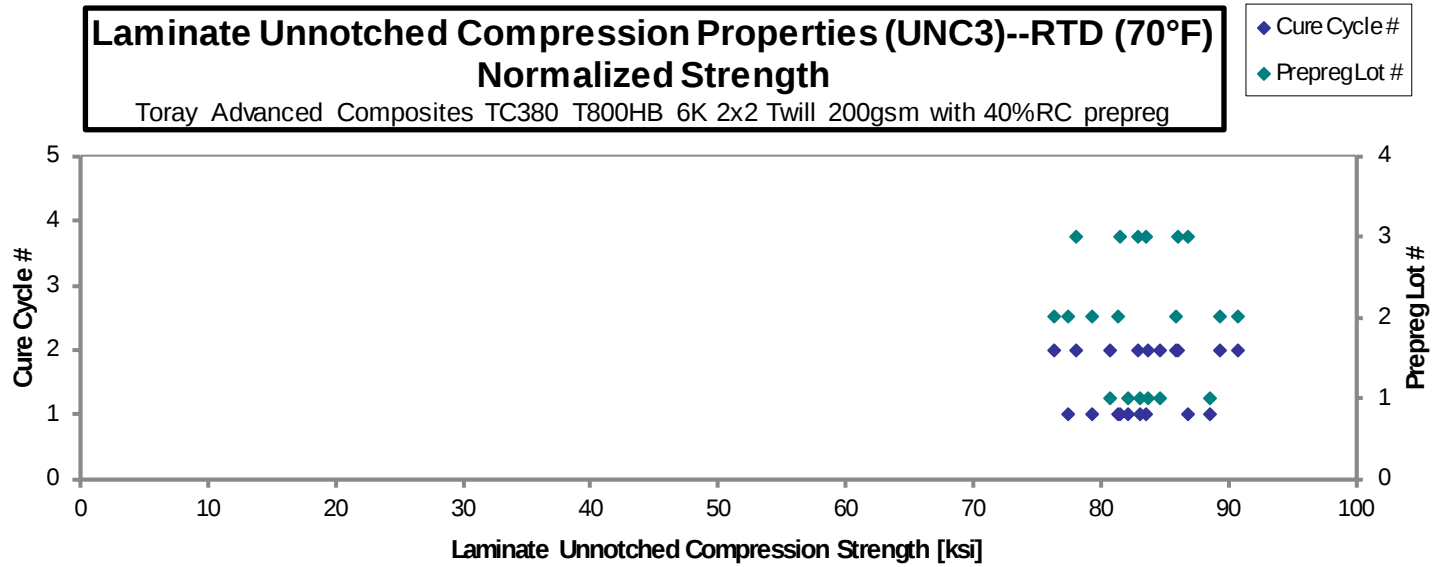
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.007845	88.50	8.415
0.008008	83.11	8.388
0.008157	82.09	7.903
0.007757	80.69	7.890
0.007952	84.70	7.763
0.008090	83.77	8.175
0.007898	81.39	8.139
0.008137	79.25	8.209
0.008345	77.46	8.122
0.007907	85.84	8.348
0.008198	76.35	8.466
0.008410	89.34	8.342
0.008548	90.81	
0.008162	83.47	8.053
0.008393	86.89	8.569
0.008527	81.51	8.611
0.008405	82.92	8.494
0.008498	78.01	8.568
0.008645	86.05	8.343

* Modulus are averaged values of 2 strain gages.

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

Average 89.40 8.892
Standard Dev. 4.971 0.2666
Coeff. of Var. [%] 5.561 2.998
Min. 80.78 8.493
Max. 99.27 9.440
Number of Spec. 19 18

Average_{norm} 0.008204 83.27 8.267
Standard Dev._{norm} 4.021 0.2509
Coeff. of Var. [%]_{norm} 4.829 3.035
Min. 0.007757 76.35 7.763
Max. 0.008645 90.81 8.611
Number of Spec. 19 19 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

0.008800

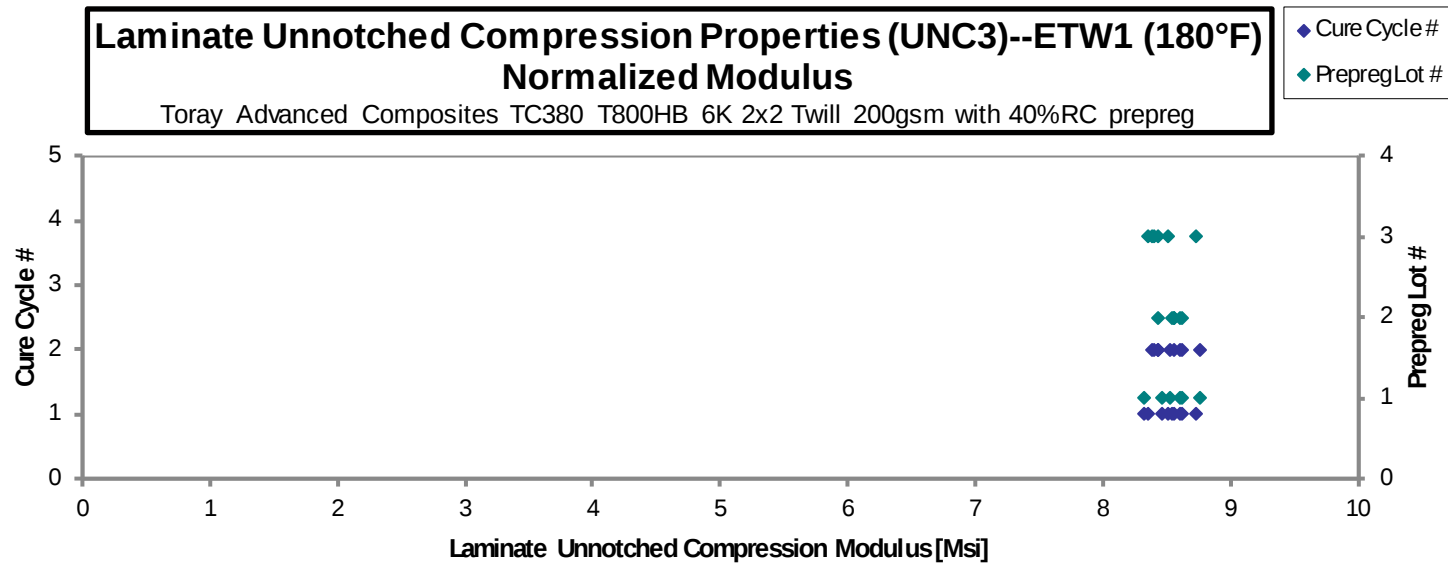
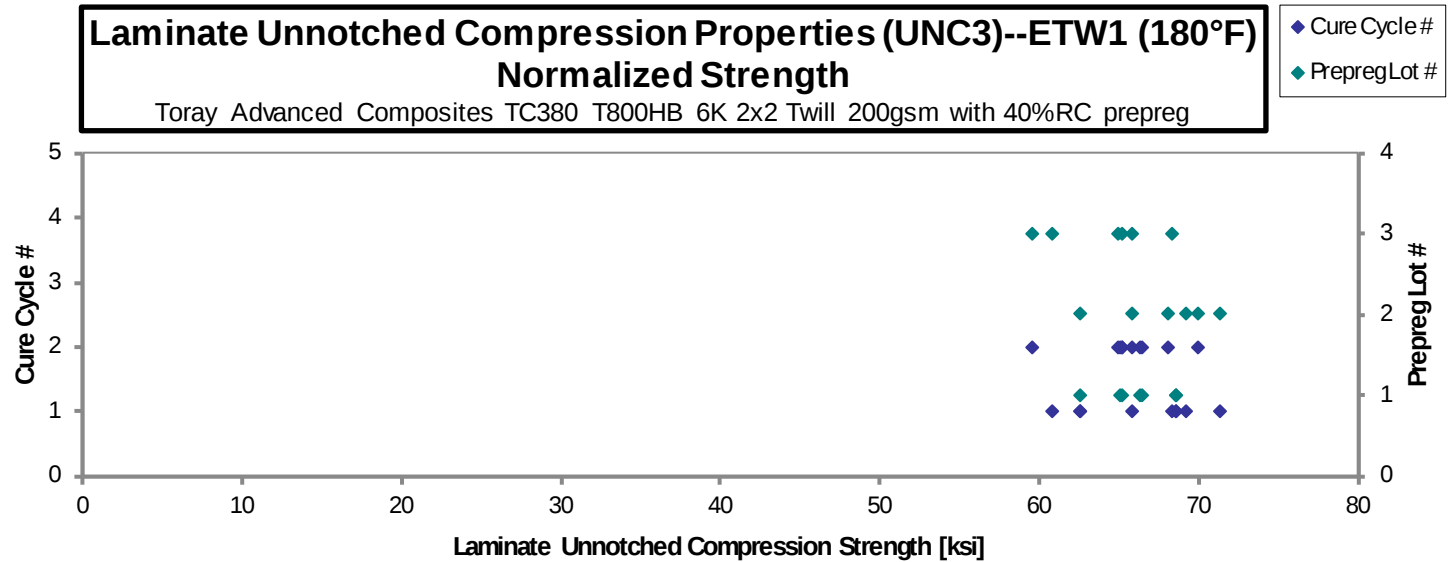
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEYA111D	A	C1	1	1	69.36	8.699	0.08698	10	BAT
TCEYA112D	A	C1	1	1	69.99	9.308	0.07863	10	BAB
TCEYA113D	A	C1	1	1	74.77	9.239	0.08065	10	BAB
TCEYA211D	A	C2	1	2	66.71	8.679	0.08748	10	HAB
TCEYA212D*	A	C2	1	2	73.69		0.07785	10	BGM
TCEYA213D	A	C2	1	2	72.63	9.322	0.08052	10	HAB
TCEYA214D	A	C2	1	2	69.68	9.375	0.08218	10	HAB
TCEYB111D	B	C1	2	1	72.29	8.738	0.08682	10	BAT
TCEYB112D	B	C1	2	1	62.75	8.574	0.08773	10	BAB
TCEYB113D	B	C1	2	1	69.11	8.544	0.08813	10	M(B,H)AB
TCEYB211D	B	C2	2	2	66.65	8.534	0.08688	10	BGM
TCEYB212D	B	C2	2	2	68.07	8.561	0.08797	10	BAT
TCEYB213D	B	C2	2	2	69.24	8.523	0.08890	10	HAB/HIB
TCEYC111D	C	C1	3	1	66.02	8.530	0.08782	10	BAT
TCEYC112D	C	C1	3	1	67.77	8.661	0.08868	10	BAB
TCEYC113D	C	C1	3	1	59.62	8.176	0.08985	10	BAT
TCEYC211D	C	C2	3	2	64.53	8.301	0.08887	10	BAB
TCEYC212D	C	C2	3	2	59.23	8.351	0.08857	10	BGM
TCEYC213D	C	C2	3	2	65.20	8.457	0.08773	10	BAB

* Specimen was not gaged, only strength is reported.

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008698	68.56	8.598
0.007863	62.54	8.317
0.008065	68.53	8.468
0.008748	66.32	8.628
0.007785	65.19	
0.008052	66.45	8.530
0.008218	65.08	8.756
0.008682	71.31	8.621
0.008773	62.56	8.548
0.008813	69.21	8.557
0.008688	65.80	8.426
0.008797	68.04	8.558
0.008890	69.94	8.610
0.008782	65.88	8.512
0.008868	68.29	8.729
0.008985	60.87	8.348
0.008887	65.17	8.383
0.008857	59.61	8.405
0.008773	65.00	8.431

Average **67.75** **8.699**
 Standard Dev. **4.283** **0.3653**
 Coeff. of Var. [%] **6.322** **4.200**
 Min. **59.23** **8.176**
 Max. **74.77** **9.375**
 Number of Spec. **19** **18**

Average_{norm} **0.008591** **66.02** **8.524**
 Standard Dev._{norm} **3.082** **0.1239**
 Coeff. of Var. [%]_{norm} **4.668** **1.453**
 Min. **0.007785** **59.61** **8.317**
 Max. **0.008985** **71.31** **8.756**
 Number of Spec. **19** **19** **18**



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

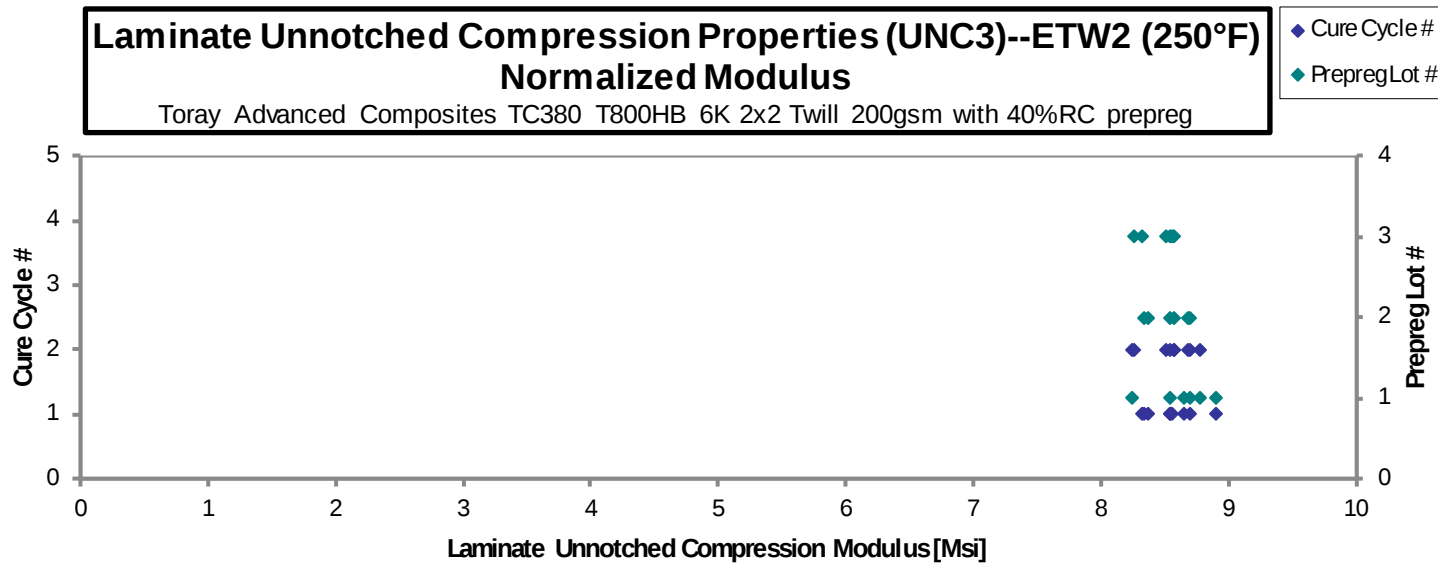
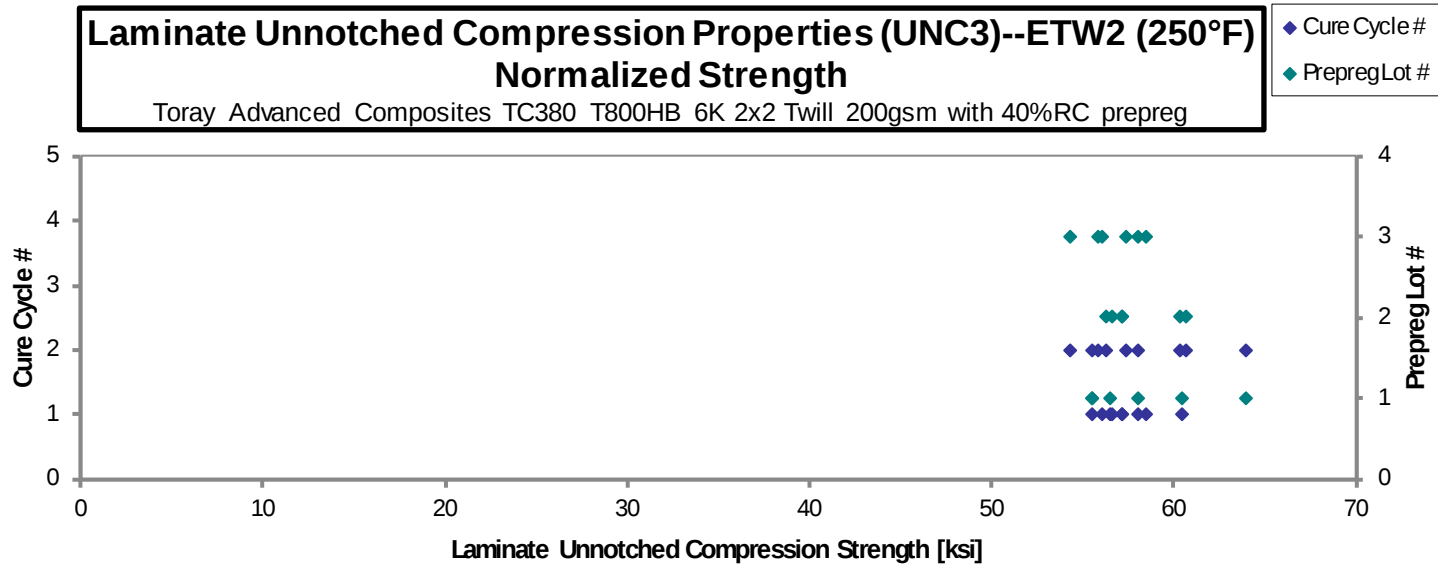
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEYA111E	A	C1	1	1	57.94	9.129	0.08577	10	M(B,H)GM
TCEYA112E	A	C1	1	1	55.99	8.762	0.08730	10	HAT/HIT
TCEYA113E	A	C1	1	1	60.36	8.625	0.08820	10	HAT, HIT
TCEYA211E	A	C2	1	2	57.43	9.092	0.08502	10	BAB
TCEYA212E	A	C2	1	2	58.41	8.608	0.08740	10	M(B,H)GM
TCEYA213E	A	C2	1	2	63.76	8.228	0.08822	10	BAB
TCEYB111E	B	C1	2	1	56.65	8.276	0.08872	10	M(B,H)AT
TCEYB112E	B	C1	2	1	57.41	8.396	0.08768	10	M(B,H)AT
TCEYB113E	B	C1	2	1	57.90	8.736	0.08607	10	M(B,H)AT
TCEYB211E	B	C2	2	2	59.89	8.619	0.08862	10	M(B,H)AT
TCEYB212E	B	C2	2	2	60.37	8.666	0.08838	10	BAB, HIT
TCEYB213E	B	C2	2	2	57.01	8.677	0.08688	10	M(B,H)GM
TCEYC111E	C	C1	3	1	57.58	8.208	0.08932	10	BAB
TCEYC112E	C	C1	3	1	57.42	8.451	0.08893	10	BAT
TCEYC113E	C	C1	3	1	56.44	8.611	0.08750	10	BAB
TCEYC211E	C	C2	3	2	56.14	8.303	0.08760	10	BAT
TCEYC212E	C	C2	3	2	54.91	8.593	0.08712	10	BAB
TCEYC213E	C	C2	3	2	58.24	8.694	0.08675	10	M(B,H)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.008577	56.47	8.898
0.008730	55.55	8.692
0.008820	60.50	8.645
0.008502	55.48	8.784
0.008740	58.01	8.549
0.008822	63.91	8.248
0.008872	57.12	8.344
0.008768	57.20	8.366
0.008607	56.63	8.544
0.008862	60.31	8.680
0.008838	60.63	8.703
0.008688	56.29	8.566
0.008932	58.45	8.331
0.008893	58.03	8.541
0.008750	56.12	8.562
0.008760	55.89	8.265
0.008712	54.36	8.507
0.008675	57.41	8.570

Average 57.99 8.593
 Standard Dev. 2.052 0.2584
 Coeff. of Var. [%] 3.538 3.007
 Min. 54.91 8.208
 Max. 63.76 9.129
 Number of Spec. 18 18

Average_{norm} 0.008753 57.69 8.544
 Standard Dev._{norm} 2.357 0.1789
 Coeff. of Var. [%]_{norm} 4.085 2.093
 Min. 0.008502 54.36 8.248
 Max. 0.008932 63.91 8.898
 Number of Spec. 18 18 18



4.13 “25/50/25” Open-Hole Tension 1 Properties (OHT1)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

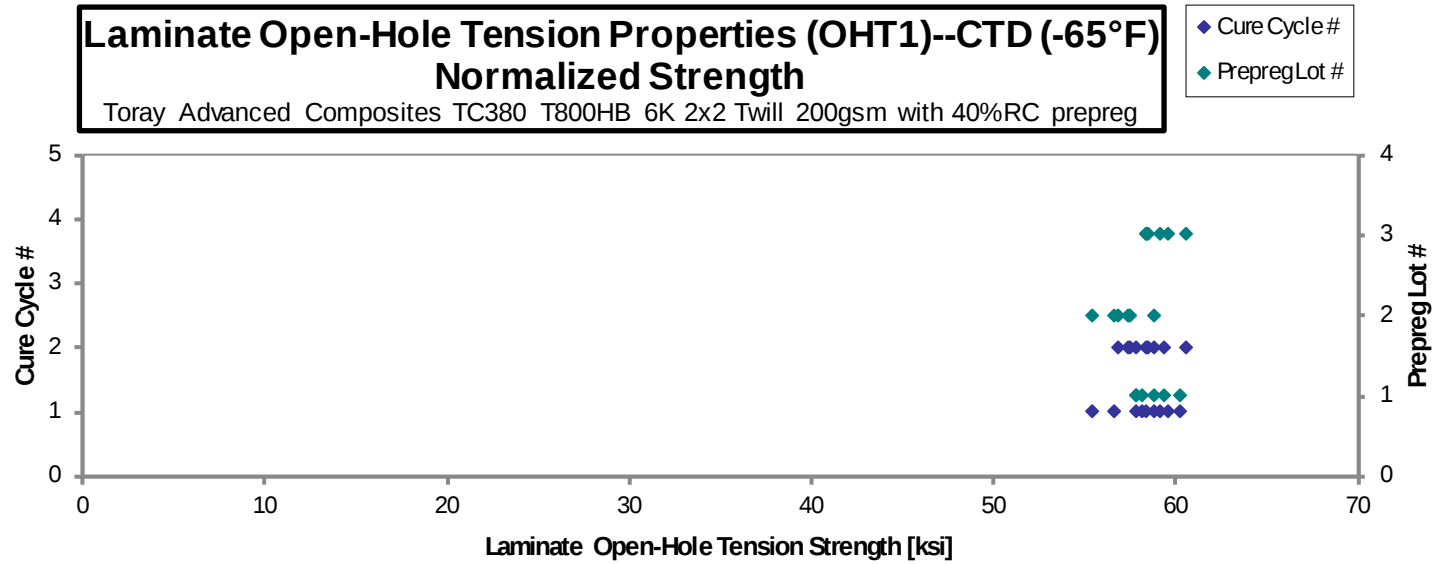
 t_{ply} [in]

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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]
TCEDA111B	A	C1	1	1	55.94	0.1463	16	LGM	0.009146	58.14
TCEDA112B	A	C1	1	1	58.06	0.1461	16	LGM	0.009130	60.24
TCEDA113B	A	C1	1	1	55.64	0.1463	16	LGM	0.009141	57.80
TCEDA211B	A	C2	1	2	56.84	0.1471	16	LGM	0.009196	59.40
TCEDA212B	A	C2	1	2	56.37	0.1468	16	LGM	0.009173	58.76
TCEDA213B	A	C2	1	2	55.45	0.1468	16	LGM	0.009177	57.82
TCEDB111B	B	C1	2	1	54.36	0.1468	16	LGM	0.009172	56.65
TCEDB112B	B	C1	2	1	56.68	0.1460	16	LGM	0.009122	58.76
TCEDB113B	B	C1	2	1	53.49	0.1459	16	LGM	0.009121	55.44
TCEDB211B	B	C2	2	2	56.84	0.1424	16	LGM	0.008901	57.49
TCEDB212B	B	C2	2	2	56.61	0.1427	16	LGM	0.008916	57.35
TCEDB213B	B	C2	2	2	55.64	0.1439	16	LGM	0.008993	56.85
TCEDC111B	C	C1	3	1	57.73	0.1443	16	LGM	0.009017	59.15
TCEDC112B	C	C1	3	1	58.42	0.1436	16	LGM	0.008973	59.57
TCEDC113B	C	C1	3	1	57.27	0.1435	16	LGM	0.008969	58.37
TCEDC211B	C	C2	3	2	60.14	0.1418	16	LGM	0.008864	60.57
TCEDC212B	C	C2	3	2	57.70	0.1427	16	LGM	0.008916	58.45
TCEDC213B	C	C2	3	2	57.57	0.1427	16	LGM	0.008920	58.36

Average 56.71
Standard Dev. 1.537
Coeff. of Var. [%] 2.710
Min. 53.49
Max. 60.14
Number of Spec. 18

Average_{norm} 0.009047 58.29
Standard Dev._{norm} 1.283
Coeff. of Var. [%]_{norm} 2.200
Min. 0.008864 55.44
Max. 0.009196 60.57
Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

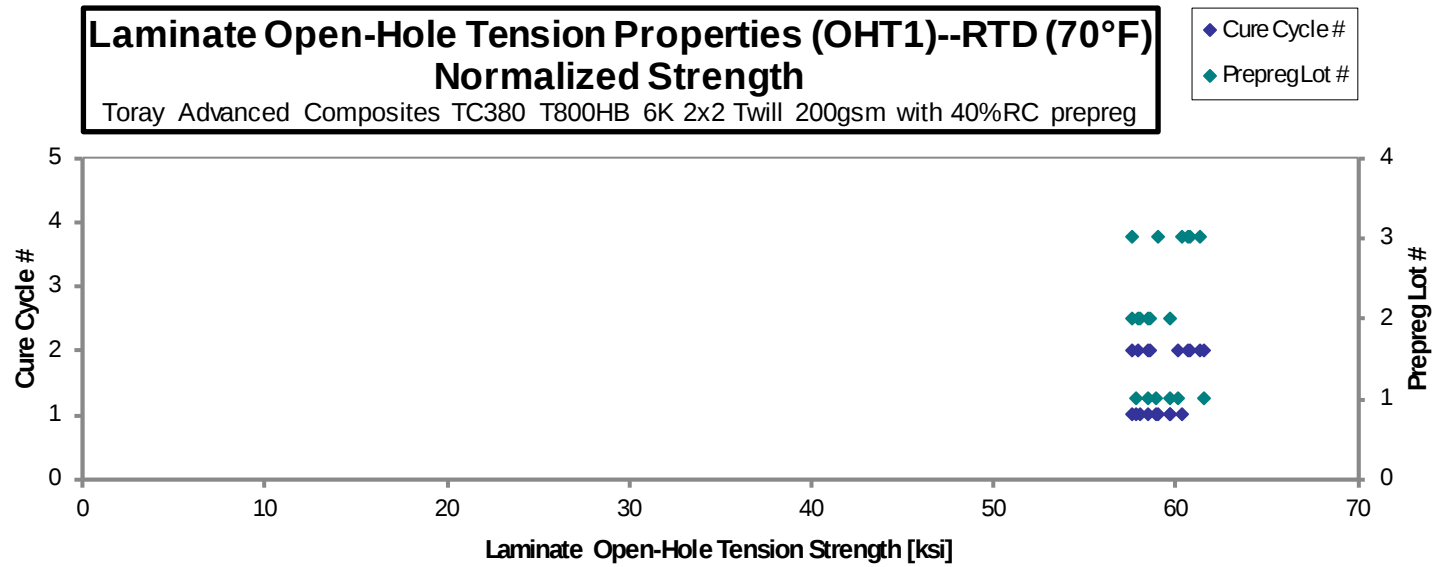
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEDA111A	A	C1	1	1	60.48	0.1372	16	M(A,L)GM
TCEDA112A	A	C1	1	1	56.74	0.1435	16	M(A,L)GM
TCEDA113A	A	C1	1	1	57.31	0.1467	16	M(A,L)GM
TCEDA211A	A	C2	1	2	60.13	0.1369	16	M(A,L)GM
TCEDA212A	A	C2	1	2	59.94	0.1445	16	M(A,L)GM
TCEDA213A	A	C2	1	2	57.33	0.1477	16	M(A,L)GM
TCEDB111A	B	C1	2	1	63.07	0.1332	16	M(A,L)GM
TCEDB112A	B	C1	2	1	58.19	0.1404	16	M(A,L)GM
TCEDB113A	B	C1	2	1	56.68	0.1452	16	M(A,L)GM
TCEDB211A	B	C2	2	2	60.54	0.1340	16	M(A,L)GM
TCEDB212A	B	C2	2	2	58.41	0.1413	16	M(A,L)GM
TCEDB213A	B	C2	2	2	56.35	0.1449	16	M(A,L)GM
TCEDC111A	C	C1	3	1	59.13	0.1371	16	LGM
TCEDC112A	C	C1	3	1	59.77	0.1421	16	LGM
TCEDC113A	C	C1	3	1	57.62	0.1442	16	LGM
TCEDC211A	C	C2	3	2	62.60	0.1367	16	LGM
TCEDC212A	C	C2	3	2	60.77	0.1421	16	LGM
TCEDC213A	C	C2	3	2	59.81	0.1430	16	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008577	58.95
0.008970	57.84
0.009167	59.70
0.008554	58.45
0.009030	61.51
0.009232	60.15
0.008322	59.65
0.008773	58.01
0.009077	58.47
0.008374	57.61
0.008833	58.64
0.009056	57.99
0.008570	57.58
0.008879	60.31
0.009009	58.99
0.008544	60.77
0.008880	61.33
0.008934	60.72

Average 59.16
Standard Dev. 1.974
Coeff. of Var. [%] 3.337
Min. 56.35
Max. 63.07
Number of Spec. 18

Average_{norm} 0.008821 59.26
Standard Dev._{norm} 1.297
Coeff. of Var. [%]_{norm} 2.188
Min. 0.008322 57.58
Max. 0.009232 61.51
Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

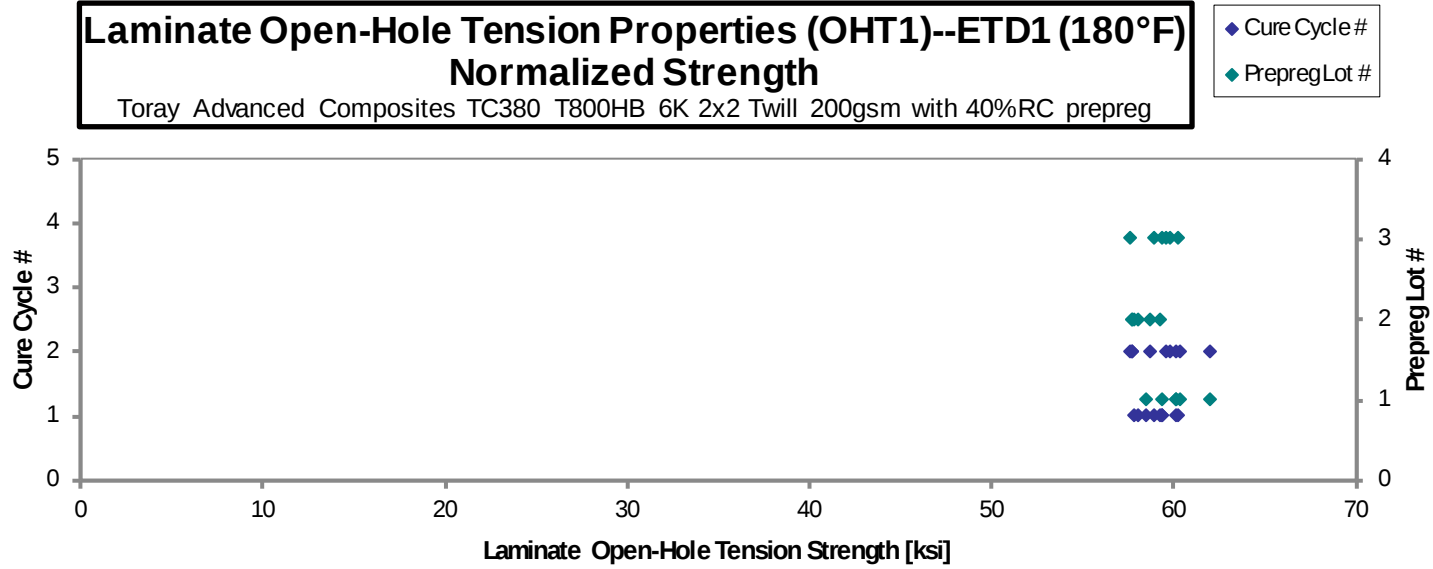
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEDA111C	A	C1	1	1	56.07	0.1467	16	LGM
TCEDA112C	A	C1	1	1	58.40	0.1432	16	M(A,L)GM
TCEDA113C	A	C1	1	1	61.56	0.1376	16	LGM
TCEDA211C	A	C2	1	2	59.19	0.1474	16	LGM
TCEDA212C	A	C2	1	2	59.13	0.1437	16	LGM
TCEDA213C	A	C2	1	2	62.14	0.1362	16	LGM
TCEDB111C	B	C1	2	1	55.82	0.1459	16	M(A,L)GM
TCEDB112C	B	C1	2	1	58.79	0.1418	16	LGM
TCEDB113C	B	C1	2	1	60.58	0.1348	16	AGM
TCEDB211C	B	C2	2	2	57.75	0.1432	16	LGM
TCEDB212C	B	C2	2	2	58.23	0.1395	16	M(A,L)GM
TCEDB213C	B	C2	2	2	61.65	0.1319	16	AGM
TCEDC111C	C	C1	3	1	57.58	0.1442	16	LGM
TCEDC112C	C	C1	3	1	58.78	0.1422	16	M(A,L)GM
TCEDC113C	C	C1	3	1	61.49	0.1379	16	LGM
TCEDC211C	C	C2	3	2	58.58	0.1439	16	LGM
TCEDC212C	C	C2	3	2	57.19	0.1419	16	LGM
TCEDC213C	C	C2	3	2	60.96	0.1376	16	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009170	58.43
0.008951	59.40
0.008600	60.16
0.009210	61.95
0.008980	60.34
0.008513	60.11
0.009121	57.85
0.008865	59.23
0.008424	57.99
0.008949	58.72
0.008716	57.67
0.008245	57.76
0.009014	58.97
0.008884	59.34
0.008617	60.21
0.008991	59.85
0.008867	57.62
0.008602	59.59

Average 59.10
 Standard Dev. 1.920
 Coeff. of Var. [%] 3.248
 Min. 55.82
 Max. 62.14
 Number of Spec. 18

Average_{norm} 0.008818 59.18
 Standard Dev._{norm} 1.172
 Coeff. of Var. [%]_{norm} 1.980
 Min. 0.008245 57.62
 Max. 0.009210 61.95
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

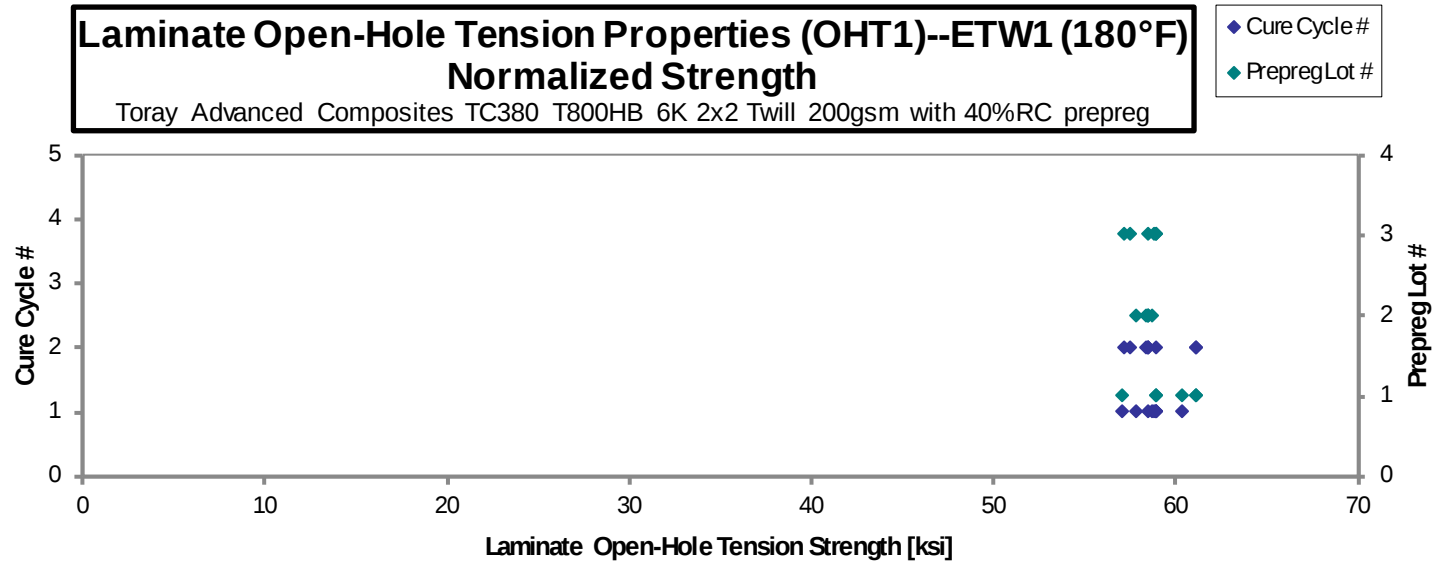
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEDA111D	A	C1	1	1	59.25	0.1434	16	M(A,L)GM
TCEDA112D	A	C1	1	1	56.66	0.1463	16	M(A,L)GM
TCEDA113D	A	C1	1	1	55.07	0.1458	16	M(A,L)GM
TCEDA211D	A	C2	1	2	58.12	0.1428	16	AGM
TCEDA212D	A	C2	1	2	58.54	0.1470	16	M(A,L)GM
TCEDA213D	A	C2	1	2	58.49	0.1471	16	M(A,L)GM
TCEDB111D	B	C1	2	1	58.34	0.1417	16	M(A,L)GM
TCEDB112D	B	C1	2	1	55.83	0.1458	16	M(A,L)GM
TCEDB113D	B	C1	2	1	56.12	0.1467	16	M(A,L)GM
TCEDB211D	B	C2	2	2	57.92	0.1419	16	M(A,L)GM
TCEDB212D	B	C2	2	2	56.61	0.1456	16	M(A,L)GM
TCEDB213D	B	C2	2	2	56.70	0.1454	16	M(A,L)GM
TCEDC111D	C	C1	3	1	58.57	0.1417	16	LGM
TCEDC112D	C	C1	3	1	57.65	0.1436	16	LGM
TCEDC113D	C	C1	3	1	57.81	0.1435	16	M(A,L)GM
TCEDC211D	C	C2	3	2	55.78	0.1442	16	LGM
TCEDC212D	C	C2	3	2	56.49	0.1433	16	LGM
TCEDC213D	C	C2	3	2	57.62	0.1429	16	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008965	60.35
0.009145	58.88
0.009113	57.03
0.008927	58.96
0.009186	61.11
0.009191	61.08
0.008853	58.69
0.009111	57.80
0.009168	58.46
0.008871	58.39
0.009097	58.52
0.009084	58.53
0.008855	58.94
0.008977	58.81
0.008970	58.93
0.009011	57.12
0.008954	57.48
0.008930	58.47

Average 57.31
 Standard Dev. 1.181
 Coeff. of Var. [%] 2.061
 Min. 55.07
 Max. 59.25
 Number of Spec. 18

Average_{norm} 0.009023
 Standard Dev._{norm} 1.143
 Coeff. of Var. [%]_{norm} 1.946
 Min. 0.008853
 Max. 0.009191
 Number of Spec. 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

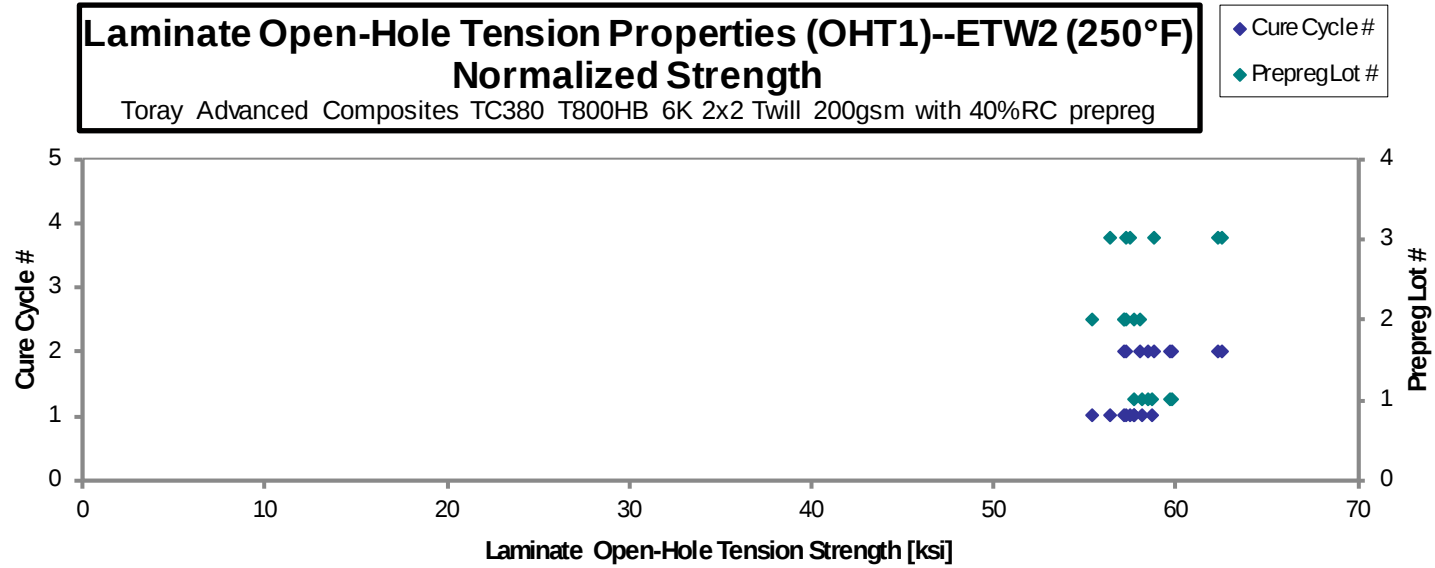
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEDA111E	A	C1	1	1	56.58	0.1448	16	M(A,L)GM
TCEDA112E	A	C1	1	1	56.70	0.1456	16	M(A,L)GM
TCEDA113E	A	C1	1	1	55.62	0.1462	16	M(A,L)GM
TCEDA211E	A	C2	1	2	57.93	0.1454	16	AGM
TCEDA212E	A	C2	1	2	56.56	0.1457	16	AGM
TCEDA213E	A	C2	1	2	58.66	0.1434	16	AGM
TCEDB111E	B	C1	2	1	53.37	0.1461	16	AGM
TCEDB112E	B	C1	2	1	54.76	0.1469	16	AGM
TCEDB113E	B	C1	2	1	55.88	0.1454	16	M(A,L)GM
TCEDB211E	B	C2	2	2	55.77	0.1444	16	AGM
TCEDB212E	B	C2	2	2	55.57	0.1450	16	M(A,L)GM
TCEDB213E	B	C2	2	2	56.83	0.1439	16	AGM
TCEDC111E	C	C1	3	1	56.07	0.1417	16	M(A,L)GM
TCEDC112E	C	C1	3	1	55.88	0.1443	16	M(A,L)GM
TCEDC113E	C	C1	3	1	56.71	0.1428	16	AGM
TCEDC211E	C	C2	3	2	57.73	0.1434	16	M(A,L)GM
TCEDC212E	C	C2	3	2	60.74	0.1450	16	M(A,L)GM
TCEDC213E	C	C2	3	2	62.03	0.1416	16	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009051	58.20
0.009102	58.65
0.009135	57.74
0.009085	59.81
0.009106	58.52
0.008960	59.73
0.009133	55.39
0.009181	57.13
0.009089	57.72
0.009024	57.19
0.009064	57.23
0.008995	58.09
0.008855	56.42
0.009017	57.26
0.008926	57.53
0.008964	58.80
0.009060	62.54
0.008847	62.36

Average 56.86
 Standard Dev. 2.039
 Coeff. of Var. [%] 3.586
 Min. 53.37
 Max. 62.03
 Number of Spec. 18

Average_{norm} 0.009033 58.35
 Standard Dev._{norm} 1.835
 Coeff. of Var. [%]_{norm} 3.145
 Min. 0.008847 55.39
 Max. 0.009181 62.54
 Number of Spec. 18 18



4.14 “10/80/10” Open-Hole Tension 2 Properties (OHT2)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

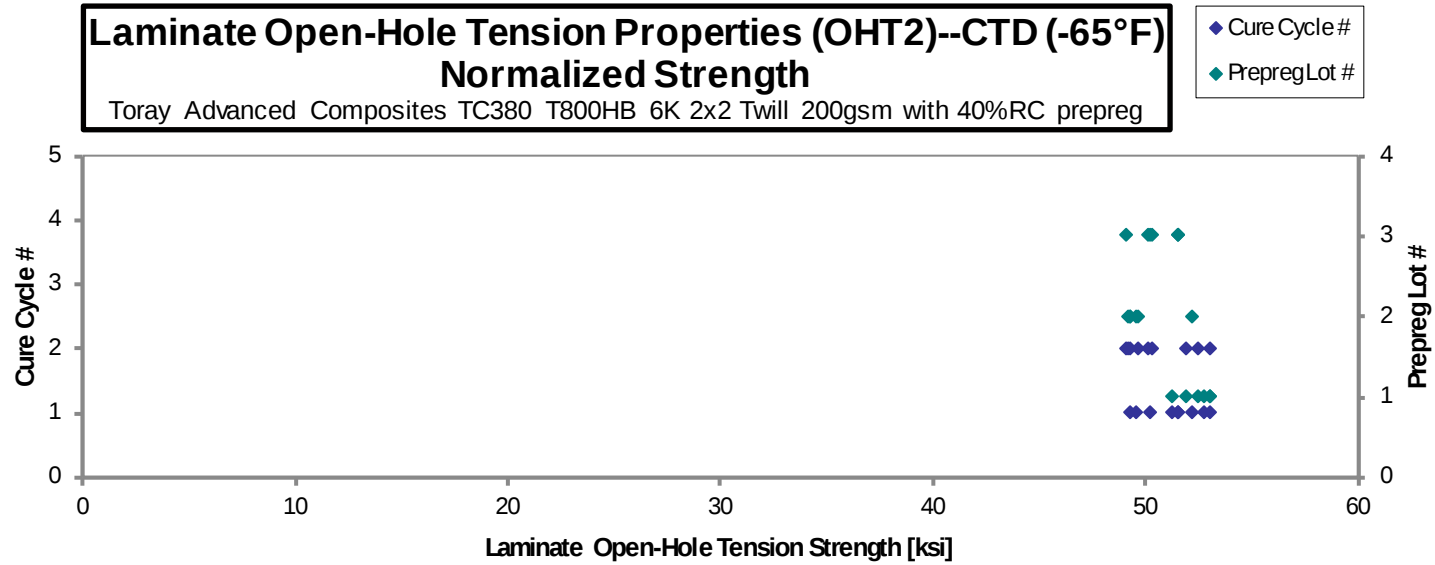
 t_{ply} [in]

0.008800

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]
TCEEA111B	A	C1	1	1	51.49	0.09062	10	AGM	0.009062	53.02
TCEEA112B	A	C1	1	1	51.47	0.09027	10	AGM	0.009027	52.79
TCEEA113B	A	C1	1	1	49.70	0.09077	10	AGM	0.009077	51.26
TCEEA211B	A	C2	1	2	51.08	0.09138	10	AGM	0.009138	53.04
TCEEA212B	A	C2	1	2	50.91	0.09077	10	AGM	0.009077	52.51
TCEEA213B	A	C2	1	2	50.08	0.09127	10	AGM	0.009127	51.93
TCEEB111B	B	C1	2	1	48.07	0.09068	10	AGM	0.009068	49.53
TCEEB112B	B	C1	2	1	48.17	0.09012	10	AGM	0.009012	49.32
TCEEB113B	B	C1	2	1	50.68	0.09057	10	AGM	0.009057	52.16
TCEEB211B	B	C2	2	2	47.79	0.09082	10	AGM	0.009082	49.32
TCEEB212B	B	C2	2	2	47.68	0.09167	10	AGM	0.009167	49.66
TCEEB213B	B	C2	2	2	47.31	0.09150	10	AGM	0.009150	49.19
TCEEC111B	C	C1	3	1	50.52	0.08747	10	AGM	0.008747	50.21
TCEEC112B	C	C1	3	1	51.85	0.08743	10	AGM	0.008743	51.51
TCEEC114B	C	C1	3	1	51.44	0.08817	10	AGM	0.008817	51.53
TCEEC211B	C	C2	3	2	49.89	0.08875	10	AGM	0.008875	50.32
TCEEC212B	C	C2	3	2	49.47	0.08908	10	AGM	0.008908	50.08
TCEEC213B	C	C2	3	2	48.25	0.08948	10	AGM	0.008948	49.06

Average 49.77
 Standard Dev. 1.528
 Coeff. of Var. [%] 3.069
 Min. 47.31
 Max. 51.85
 Number of Spec. 18

Average_{norm} 0.009004 50.91
 Standard Dev._{norm} 1.434
 Coeff. of Var. [%]_{norm} 2.817
 Min. 0.008743 49.06
 Max. 0.009167 53.04
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

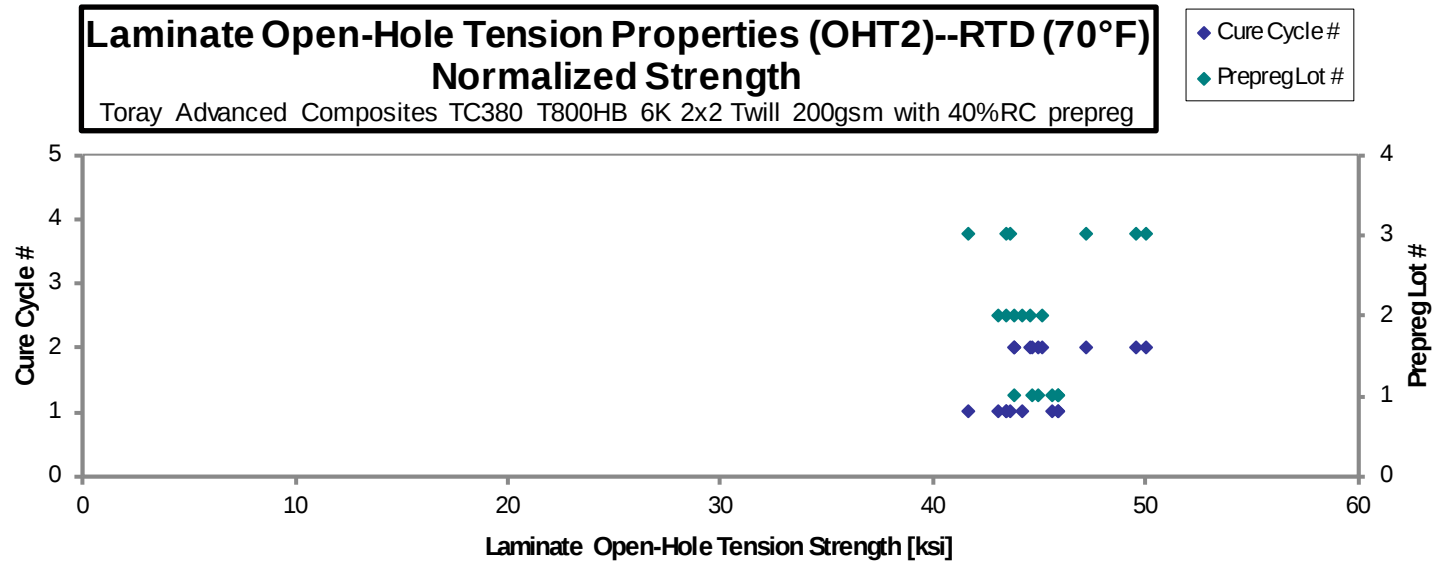
 t_{ply} [in]

0.008800

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]
TCEEA111A	A	C1	1	1	47.73	0.08417	10	AGM	0.008417	45.65
TCEEA112A	A	C1	1	1	45.04	0.08968	10	AGM	0.008968	45.90
TCEEA113A	A	C1	1	1	44.33	0.09112	10	AGM	0.009112	45.90
TCEEA211A	A	C2	1	2	45.19	0.08543	10	AGM	0.008543	43.88
TCEEA212A	A	C2	1	2	43.97	0.09003	10	AGM	0.009003	44.98
TCEEA213A	A	C2	1	2	42.66	0.09220	10	AGM	0.009220	44.69
TCEEB111A	B	C1	2	1	45.36	0.08353	10	AGM	0.008353	43.05
TCEEB112A	B	C1	2	1	43.05	0.08890	10	AGM	0.008890	43.49
TCEEB113A	B	C1	2	1	42.28	0.09195	10	AGM	0.009195	44.17
TCEEB211A	B	C2	2	2	42.22	0.09128	10	AGM	0.009128	43.80
TCEEB212A	B	C2	2	2	43.08	0.09223	10	AGM	0.009223	45.16
TCEEB213A	B	C2	2	2	42.66	0.09190	10	AGM	0.009190	44.55
TCEEC111A	C	C1	3	1	45.16	0.08472	10	AGM	0.008472	43.47
TCEEC112A	C	C1	3	1	41.70	0.08792	10	AGM	0.008792	41.66
TCEEC113A	C	C1	3	1	43.41	0.08840	10	AGM	0.008840	43.61
TCEEC211A	C	C2	3	2	48.54	0.08558	10	AGM	0.008558	47.20
TCEEC212A	C	C2	3	2	49.25	0.08858	10	AGM	0.008858	49.58
TCEEC213A	C	C2	3	2	49.09	0.08962	10	AGM	0.008962	49.99

Average 44.71
 Standard Dev. 2.449
 Coeff. of Var. [%] 5.477
 Min. 41.70
 Max. 49.25
 Number of Spec. 18

Average_{norm} 0.008874 45.04
 Standard Dev._{norm} 2.141
 Coeff. of Var. [%]_{norm} 4.754
 Min. 0.008353 41.66
 Max. 0.009223 49.99
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

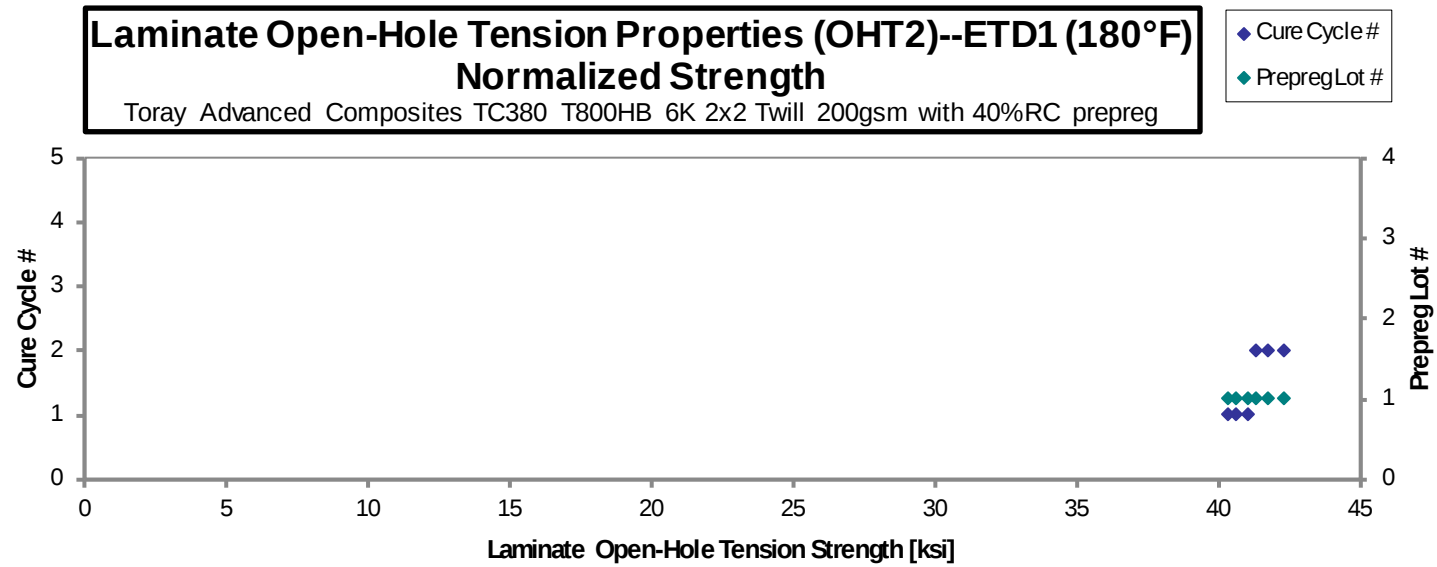
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEEA111C	A	C1	1	1	39.11	0.09148	10	AGM
TCEEA112C	A	C1	1	1	40.45	0.08923	10	AGM
TCEEA113C	A	C1	1	1	42.17	0.08417	10	AGM
TCEEA211C	A	C2	1	2	39.43	0.09230	10	AGM
TCEEA212C	A	C2	1	2	41.41	0.08988	10	AGM
TCEEA213C	A	C2	1	2	43.23	0.08502	10	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009148	40.66
0.008923	41.02
0.008417	40.33
0.009230	41.36
0.008988	42.30
0.008502	41.77

Average 40.97
 Standard Dev. 1.602
 Coeff. of Var. [%] 3.910
 Min. 39.11
 Max. 43.23
 Number of Spec. 6

Average_{norm} 0.008868 41.24
 Standard Dev._{norm} 0.7249
 Coeff. of Var. [%]_{norm} 1.758
 Min. 0.008417 40.33
 Max. 0.009230 42.30
 Number of Spec. 6 6



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

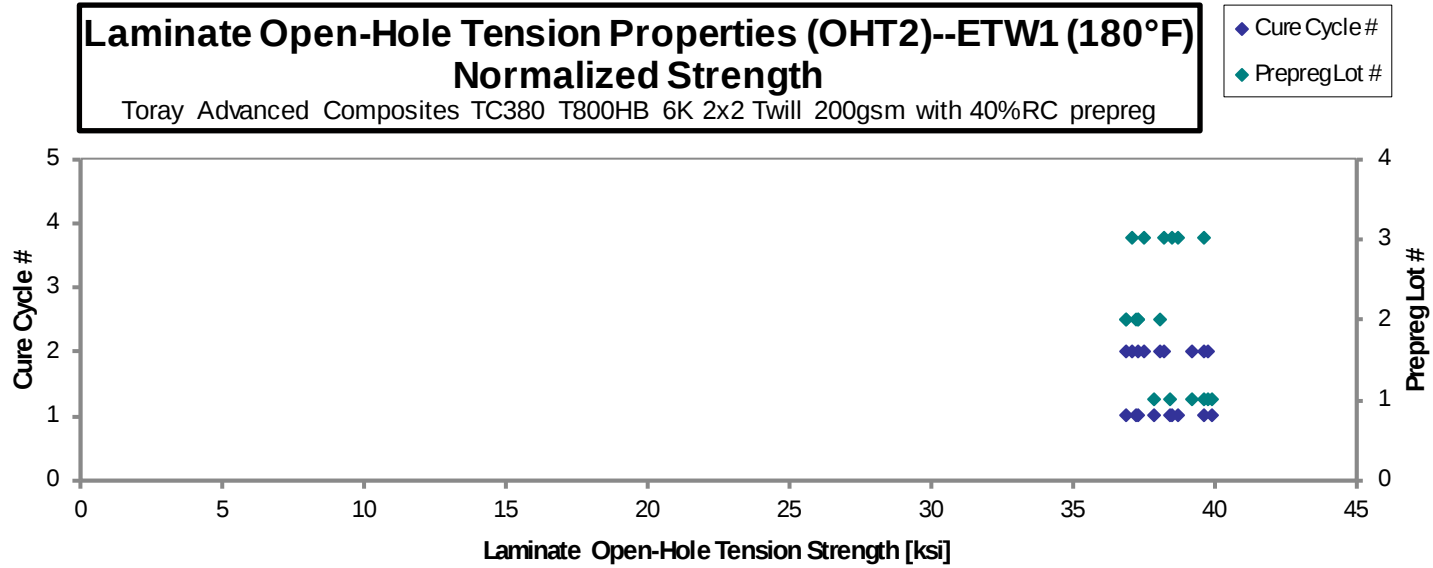
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEEA111D	A	C1	1	1	39.21	0.08958	10	AGM
TCEEA112D	A	C1	1	1	36.75	0.09077	10	AGM
TCEEA113D	A	C1	1	1	37.45	0.09040	10	AGM
TCEEA211D	A	C2	1	2	38.70	0.09015	10	AGM
TCEEA212D	A	C2	1	2	37.56	0.09183	10	AGM
TCEEA213D	A	C2	1	2	38.42	0.09118	10	AGM
TCEEB111D	B	C1	2	1	36.25	0.09045	10	AGM
TCEEB112D	B	C1	2	1	39.13	0.08292	10	AGM
TCEEB113D	B	C1	2	1	36.86	0.08902	10	AGM
TCEEB211D	B	C2	2	2	38.53	0.08420	10	AGM
TCEEB212D	B	C2	2	2	36.58	0.09168	10	AGM
TCEEB213D	B	C2	2	2	35.65	0.09217	10	AGM
TCEEC111D	C	C1	3	1	38.50	0.08800	10	AGM
TCEEC112D	C	C1	3	1	39.76	0.08768	10	AGM
TCEEC113D	C	C1	3	1	40.21	0.08482	10	AGM
TCEEC211D	C	C2	3	2	36.45	0.08948	10	AGM
TCEEC212D	C	C2	3	2	37.38	0.08830	10	AGM
TCEEC213D	C	C2	3	2	39.44	0.08530	10	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008958	39.92
0.009077	37.91
0.009040	38.47
0.009015	39.64
0.009183	39.19
0.009118	39.81
0.009045	37.26
0.008292	36.87
0.008902	37.29
0.008420	36.87
0.009168	38.11
0.009217	37.34
0.008800	38.50
0.008768	39.62
0.008482	38.75
0.008948	37.07
0.008830	37.50
0.008530	38.23

Average 37.94
 Standard Dev. 1.342
 Coeff. of Var. [%] 3.537
 Min. 35.65
 Max. 40.21
 Number of Spec. 18

Average_{norm} 0.008877 38.24
 Standard Dev._{norm} 1.054
 Coeff. of Var. [%]_{norm} 2.757
 Min. 0.008292 36.87
 Max. 0.009217 39.92
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

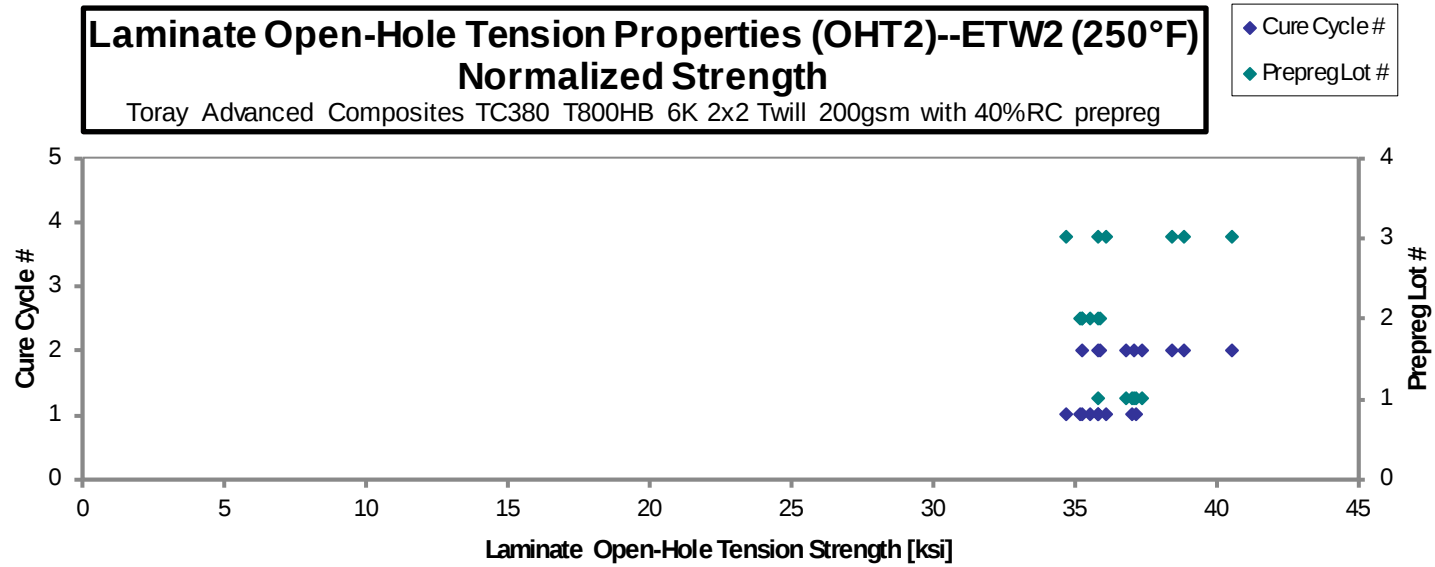
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEEA111E	A	C1	1	1	35.30	0.08938	10	AGM
TCEEA112E	A	C1	1	1	36.02	0.09075	10	AGM
TCEEA113E	A	C1	1	1	35.90	0.09078	10	AGM
TCEEA211E	A	C2	1	2	36.30	0.09002	10	AGM
TCEEA212E	A	C2	1	2	36.06	0.09120	10	AGM
TCEEA213E	A	C2	1	2	35.36	0.09157	10	AGM
TCEEB111E	B	C1	2	1	34.57	0.08980	10	AGM
TCEEB112E	B	C1	2	1	35.20	0.08890	10	AGM
TCEEB113E	B	C1	2	1	34.40	0.09007	10	AGM
TCEEB211E	B	C2	2	2	34.90	0.09057	10	AGM
TCEEB212E	B	C2	2	2	33.77	0.09195	10	AGM
TCEEB213E	B	C2	2	2	34.09	0.09253	10	AGM
TCEEC111E	C	C1	3	1	35.49	0.08892	10	AGM
TCEEC112E	C	C1	3	1	36.05	0.08808	10	AGM
TCEEC113E	C	C1	3	1	34.76	0.08777	10	AGM
TCEEC211E	C	C2	3	2	38.40	0.08810	10	AGM
TCEEC212E	C	C2	3	2	38.23	0.08952	10	AGM
TCEEC213E	C	C2	3	2	39.78	0.08968	10	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008938	35.86
0.009075	37.15
0.009078	37.04
0.009002	37.13
0.009120	37.37
0.009157	36.79
0.008980	35.27
0.008890	35.56
0.009007	35.21
0.009057	35.92
0.009195	35.29
0.009253	35.85
0.008892	35.86
0.008808	36.09
0.008777	34.67
0.008810	38.45
0.008952	38.89
0.008968	40.54

Average **35.81**
 Standard Dev. **1.576**
 Coeff. of Var. [%] **4.402**
 Min. **33.77**
 Max. **39.78**
 Number of Spec. **18**

Average_{norm} **0.008998** **36.61**
 Standard Dev._{norm} **1.499**
 Coeff. of Var. [%]_{norm} **4.094**
 Min. **0.008777** **34.67**
 Max. **0.009253** **40.54**
 Number of Spec. **18** **18**



4.15 “40/20/40” Open-Hole Tension 3 Properties (OHT3)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

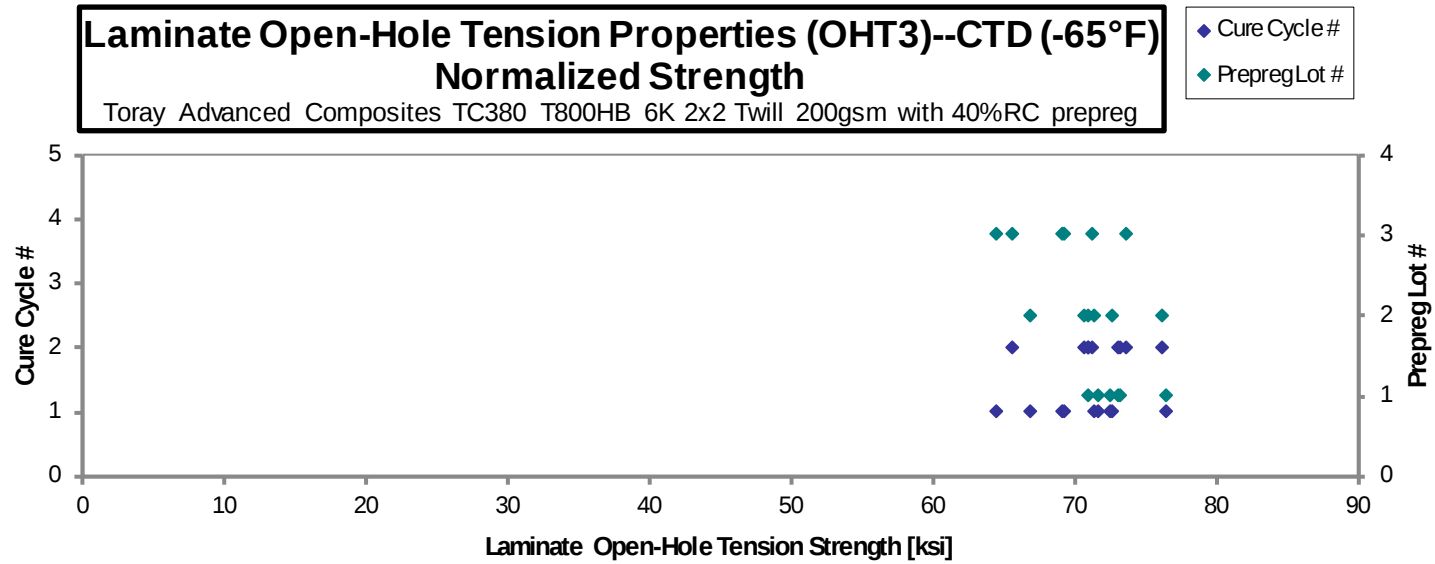
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEFA111B	A	C1	1	1	69.21	0.09113	10	LGM
TCEFA112B	A	C1	1	1	70.47	0.09052	10	LGM
TCEFA113B	A	C1	1	1	74.31	0.09048	10	LGM
TCEFA211B	A	C2	1	2	72.66	0.08868	10	LGM
TCEFA212B	A	C2	1	2	70.22	0.08887	10	LGM
TCEFA213B	A	C2	1	2	72.54	0.08865	10	LGM
TCEFB111B	B	C1	2	1	71.02	0.09000	10	LGM
TCEFB112B	B	C1	2	1	69.33	0.09053	10	LGM
TCEFB113B	B	C1	2	1	64.80	0.09087	10	LGM
TCEFB211B	B	C2	2	2	70.41	0.08867	10	LGM
TCEFB212B	B	C2	2	2	76.11	0.08805	10	LGM
TCEFB213B	B	C2	2	2	70.10	0.08880	10	LGM
TCEFC111B	C	C1	3	1	68.82	0.08843	10	LGM
TCEFC112B	C	C1	3	1	64.14	0.08838	10	LGM
TCEFC113B	C	C1	3	1	69.02	0.08830	10	LGM
TCEFC211B	C	C2	3	2	74.47	0.08695	10	LGM
TCEFC212B	C	C2	3	2	66.68	0.08663	10	LGM
TCEFC213B	C	C2	3	2	71.43	0.08775	10	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009113	71.67
0.009052	72.49
0.009048	76.41
0.008868	73.23
0.008887	70.91
0.008865	73.08
0.009000	72.64
0.009053	71.33
0.009087	66.91
0.008867	70.95
0.008805	76.15
0.008880	70.73
0.008843	69.16
0.008838	64.42
0.008830	69.26
0.008695	73.58
0.008663	65.65
0.008775	71.23

Average 70.32
Standard Dev. 3.134
Coeff. of Var. [%] 4.457
Min. 64.14
Max. 76.11
Number of Spec. 18

Average_{norm} 0.008898 71.10
Standard Dev._{norm} 3.184
Coeff. of Var. [%]_{norm} 4.478
Min. 0.008663 64.42
Max. 0.009113 76.41
Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

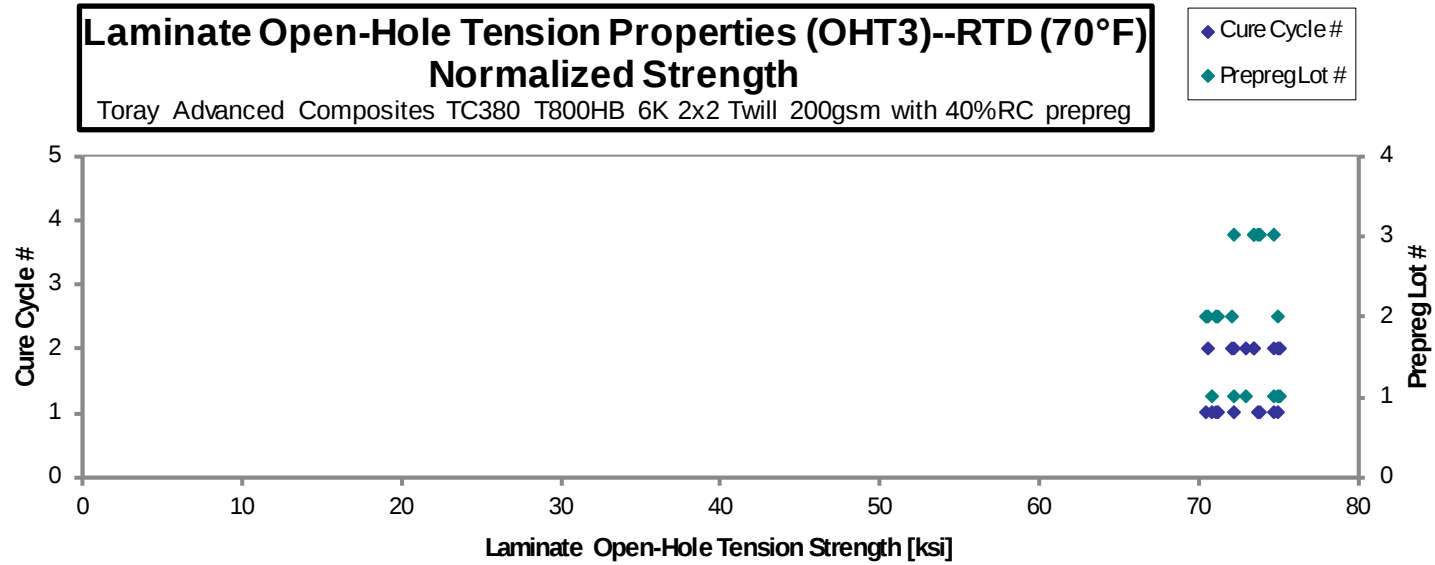
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEFA111A	A	C1	1	1	74.52	0.08362	10	M(A,L)GM
TCEFA112A	A	C1	1	1	73.52	0.08982	10	LGM
TCEFA113A	A	C1	1	1	68.01	0.09340	10	M(A,L)GM
TCEFA211A	A	C2	1	2	79.31	0.08327	10	M(A,L)GM
TCEFA212A	A	C2	1	2	72.83	0.08812	10	M(A,L)GM
TCEFA213A	A	C2	1	2	72.73	0.09048	10	M(A,L)GM
TCEFB111A	B	C1	2	1	68.32	0.09070	10	M(A,L)GM
TCEFB112A	B	C1	2	1	69.27	0.09047	10	M(A,L)GM
TCEFB113A	B	C1	2	1	69.95	0.08938	10	M(A,L)GM
TCEFB211A	B	C2	2	2	75.88	0.08367	10	M(A,L)GM
TCEFB212A	B	C2	2	2	69.76	0.08902	10	M(A,L)GM
TCEFB213A	B	C2	2	2	72.73	0.09075	10	M(A,L)GM
TCEFC111A	C	C1	3	1	76.74	0.08573	10	LGM
TCEFC112A	C	C1	3	1	73.75	0.08812	10	M(A,L)GM
TCEFC113A	C	C1	3	1	73.43	0.08835	10	AGM
TCEFC211A	C	C2	3	2	74.88	0.08488	10	LGM
TCEFC212A	C	C2	3	2	73.48	0.08795	10	LGM
TCEFC213A	C	C2	3	2	73.12	0.08845	10	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008362	70.81
0.008982	75.04
0.009340	72.18
0.008327	75.05
0.008812	72.93
0.009048	74.78
0.009070	70.42
0.009047	71.21
0.008938	71.05
0.008367	72.14
0.008902	70.56
0.009075	75.00
0.008573	74.76
0.008812	73.85
0.008835	73.72
0.008488	72.23
0.008795	73.44
0.008845	73.49

Average 72.90
 Standard Dev. 2.968
 Coeff. of Var. [%] 4.072
 Min. 68.01
 Max. 79.31
 Number of Spec. 18

Average_{norm} 0.008812 72.93
 Standard Dev._{norm} 1.656
 Coeff. of Var. [%]_{norm} 2.271
 Min. 0.008327 70.42
 Max. 0.009340 75.05
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

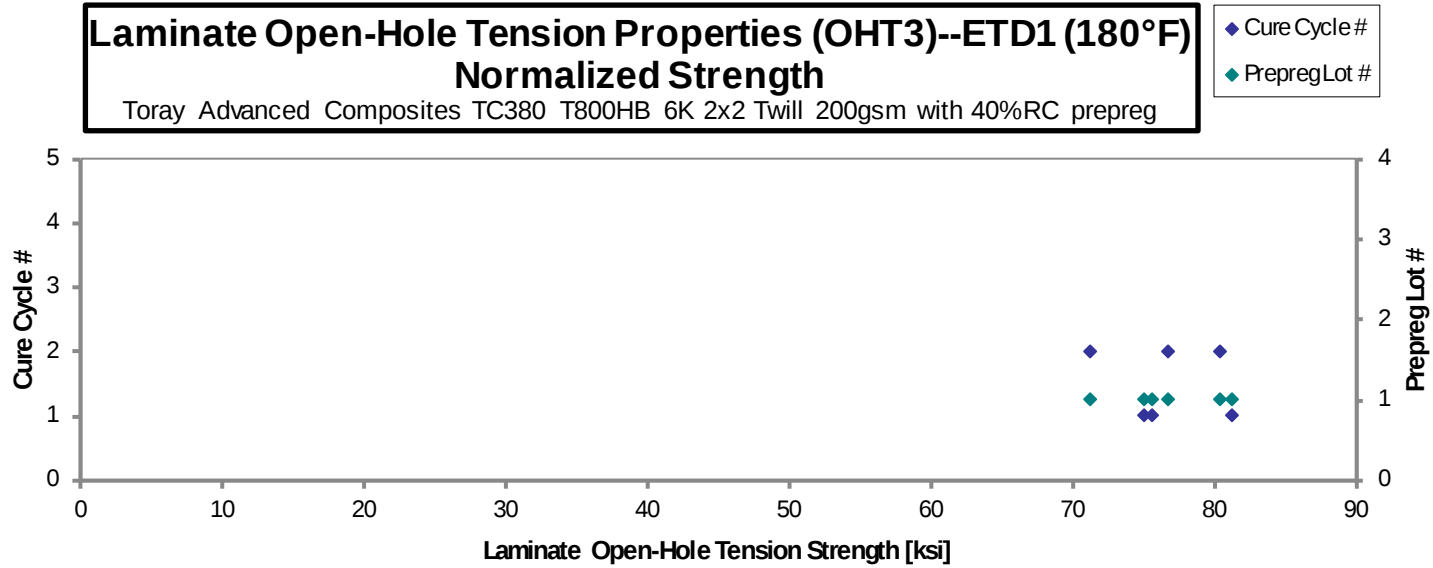
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEFA111C	A	C1	1	1	78.39	0.09120	10	LGM
TCEFA112C	A	C1	1	1	74.50	0.08863	10	LGM
TCEFA113C	A	C1	1	1	79.95	0.08325	10	M(A,L)GM
TCEFA211C	A	C2	1	2	78.99	0.08952	10	LGM
TCEFA212C	A	C2	1	2	71.89	0.08728	10	LGM
TCEFA213C	A	C2	1	2	82.56	0.08175	10	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009120	81.24
0.008863	75.04
0.008325	75.64
0.008952	80.35
0.008728	71.30
0.008175	76.70

Average 77.71
 Standard Dev. 3.870
 Coeff. of Var. [%] 4.980
 Min. 71.89
 Max. 82.56
 Number of Spec. 6

Average_{norm} 0.008694 76.71
 Standard Dev._{norm} 3.660
 Coeff. of Var. [%]_{norm} 4.772
 Min. 0.008175 71.30
 Max. 0.009120 81.24
 Number of Spec. 6 6



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

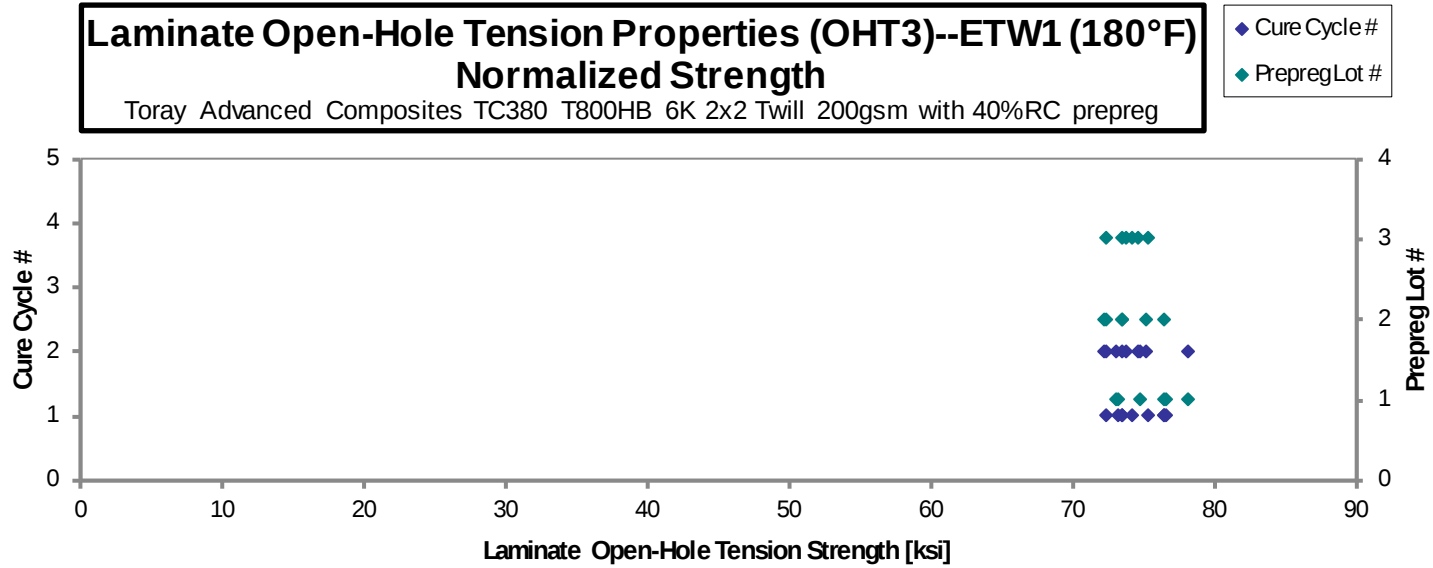
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEFA111D	A	C1	1	1	72.23	0.08928	10	M(A,L)GM
TCEFA112D	A	C1	1	1	73.95	0.09100	10	M(A,L)GM
TCEFA113D	A	C1	1	1	73.69	0.09142	10	M(A,L)GM
TCEFA211D	A	C2	1	2	75.71	0.08693	10	M(A,L)GM
TCEFA212D	A	C2	1	2	76.53	0.08978	10	M(A,L)GM
TCEFA213D	A	C2	1	2	71.95	0.08935	10	M(A,L)GM
TCEFB111D	B	C1	2	1	78.41	0.08243	10	M(A,L)GM
TCEFB112D	B	C1	2	1	74.43	0.09035	10	M(A,L)GM
TCEFB113D	B	C1	2	1	71.21	0.08950	10	M(A,L)GM
TCEFB211D	B	C2	2	2	71.00	0.08957	10	M(A,L)GM
TCEFB212D	B	C2	2	2	78.13	0.08280	10	M(A,L)GM
TCEFB213D	B	C2	2	2	75.59	0.08762	10	M(A,L)GM
TCEFC111D	C	C1	3	1	73.42	0.08807	10	M(A,L)GM
TCEFC112D	C	C1	3	1	74.90	0.08727	10	M(A,L)GM
TCEFC113D	C	C1	3	1	78.69	0.08427	10	M(A,L)GM
TCEFC211D	C	C2	3	2	74.42	0.08728	10	M(A,L)GM
TCEFC212D	C	C2	3	2	76.54	0.08585	10	M(A,L)GM
TCEFC213D	C	C2	3	2	76.83	0.08290	10	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008928	73.28
0.009100	76.47
0.009142	76.55
0.008693	74.79
0.008978	78.09
0.008935	73.05
0.008243	73.45
0.009035	76.42
0.008950	72.43
0.008957	72.26
0.008280	73.51
0.008762	75.26
0.008807	73.47
0.008727	74.27
0.008427	75.35
0.008728	73.81
0.008585	74.67
0.008290	72.38

Average 74.87
 Standard Dev. 2.389
 Coeff. of Var. [%] 3.191
 Min. 71.00
 Max. 78.69
 Number of Spec. 18

Average_{norm} 0.008754 74.42
 Standard Dev._{norm} 1.661
 Coeff. of Var. [%]_{norm} 2.233
 Min. 0.008243 72.26
 Max. 0.009142 78.09
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

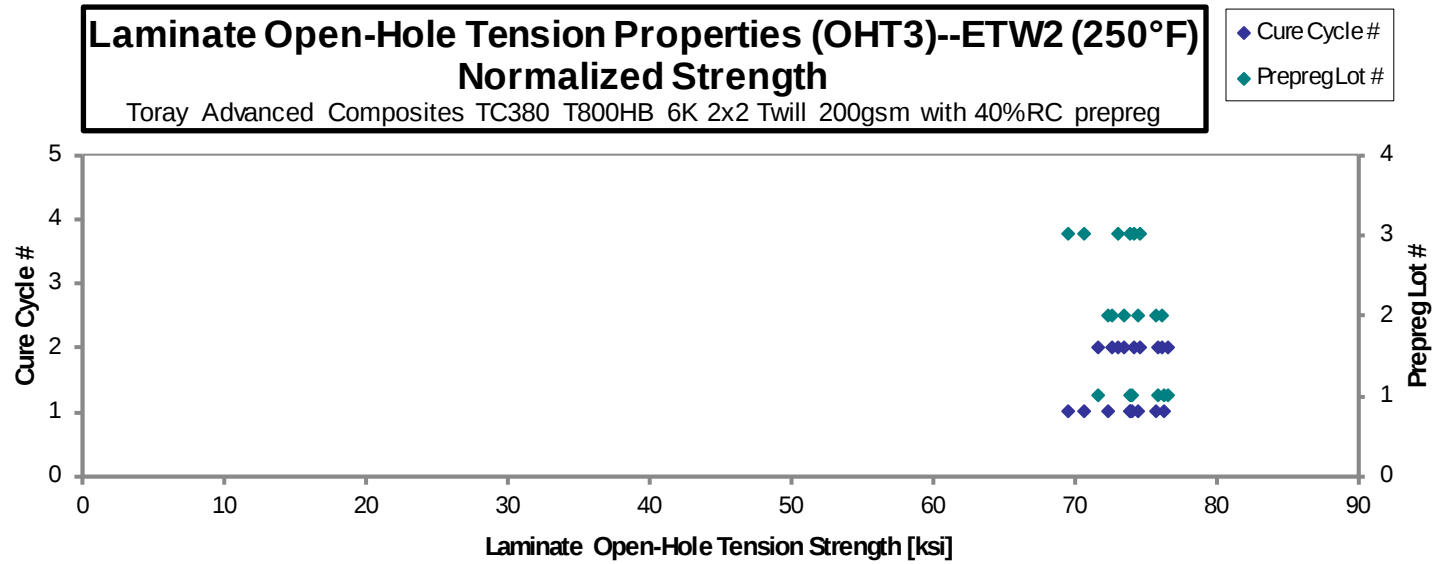
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEFA111E	A	C1	1	1	72.67	0.08955	10	M(A,L)GM
TCEFA112E	A	C1	1	1	71.97	0.09052	10	M(A,L)GM
TCEFA113E	A	C1	1	1	73.74	0.09100	10	M(A,L)GM
TCEFA211E	A	C2	1	2	75.91	0.08797	10	M(A,L)GM
TCEFA212E	A	C2	1	2	70.58	0.08940	10	M(A,L)GM
TCEFA213E	A	C2	1	2	75.49	0.08922	10	M(A,L)GM
TCEFB111E	B	C1	2	1	73.84	0.08883	10	M(A,L)GM
TCEFB112E	B	C1	2	1	70.40	0.09042	10	M(A,L)GM
TCEFB113E	B	C1	2	1	73.86	0.09030	10	M(A,L)GM
TCEFB211E	B	C2	2	2	75.35	0.08902	10	M(A,L)GM
TCEFB212E	B	C2	2	2	72.11	0.08872	10	M(A,L)GM
TCEFB213E	B	C2	2	2	71.69	0.09018	10	M(A,L)GM
TCEFC111E	C	C1	3	1	69.85	0.08755	10	AGM
TCEFC112E	C	C1	3	1	71.13	0.08752	10	M(A,L)GM
TCEFC113E	C	C1	3	1	74.77	0.08695	10	M(A,L)GM
TCEFC211E	C	C2	3	2	73.69	0.08853	10	M(A,L)GM
TCEFC212E	C	C2	3	2	73.49	0.08750	10	M(A,L)GM
TCEFC213E	C	C2	3	2	74.74	0.08790	10	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008955	73.95
0.009052	74.03
0.009100	76.26
0.008797	75.88
0.008940	71.70
0.008922	76.53
0.008883	74.54
0.009042	72.33
0.009030	75.79
0.008902	76.22
0.008872	72.69
0.009018	73.47
0.008755	69.49
0.008752	70.74
0.008695	73.88
0.008853	74.13
0.008750	73.07
0.008790	74.66

Average 73.07
 Standard Dev. 1.858
 Coeff. of Var. [%] 2.543
 Min. 69.85
 Max. 75.91
 Number of Spec. 18

Average_{norm} 0.008895 73.85
 Standard Dev._{norm} 1.961
 Coeff. of Var. [%]_{norm} 2.656
 Min. 0.008695 69.49
 Max. 0.009100 76.53
 Number of Spec. 18 18



4.16 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

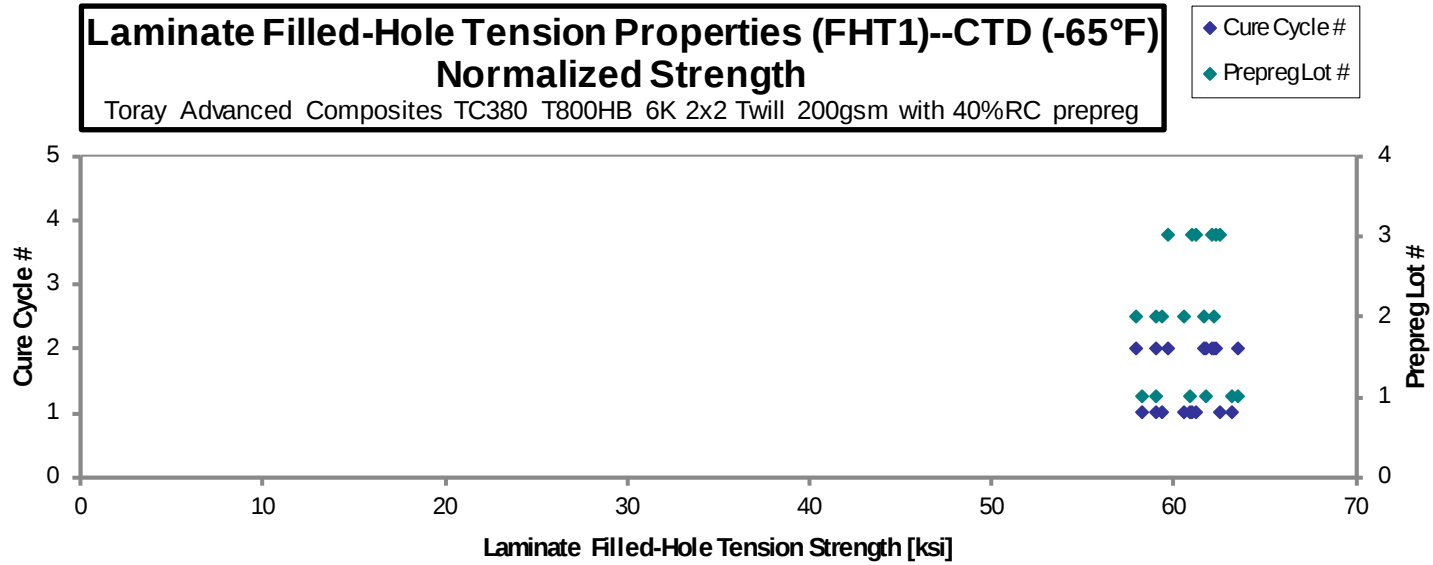
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE4A111B	A	C1	1	1	60.80	0.1464	16	LGM
TCE4A112B	A	C1	1	1	56.24	0.1458	16	LGM
TCE4A113B	A	C1	1	1	58.51	0.1466	16	LGM
TCE4A211B	A	C2	1	2	60.10	0.1447	16	LGM
TCE4A212B	A	C2	1	2	61.94	0.1445	16	LGM
TCE4A213B	A	C2	1	2	57.53	0.1446	16	LGM
TCE4B111B	B	C1	2	1	57.81	0.1446	16	LGM
TCE4B112B	B	C1	2	1	58.94	0.1446	16	LGM
TCE4B113B	B	C1	2	1	57.19	0.1454	16	LGM
TCE4B211B	B	C2	2	2	60.80	0.1441	16	LGM
TCE4B212B	B	C2	2	2	56.98	0.1432	16	LGM
TCE4B213B	B	C2	2	2	60.53	0.1433	16	LGM
TCE4C111B	C	C1	3	1	60.93	0.1415	16	LGM
TCE4C112B	C	C1	3	1	62.47	0.1408	16	LGM
TCE4C113B	C	C1	3	1	60.70	0.1415	16	LGM
TCE4C211B	C	C2	3	2	59.40	0.1415	16	LGM
TCE4C212B	C	C2	3	2	61.69	0.1418	16	LGM
TCE4C213B	C	C2	3	2	61.39	0.1429	16	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009152	63.23
0.009110	58.22
0.009165	60.93
0.009044	61.77
0.009030	63.56
0.009036	59.08
0.009039	59.37
0.009036	60.53
0.009085	59.05
0.009008	62.24
0.008949	57.94
0.008956	61.61
0.008842	61.22
0.008802	62.49
0.008842	60.99
0.008845	59.70
0.008859	62.11
0.008931	62.30

Average 59.66
Standard Dev. 1.900
Coeff. of Var. [%] 3.184
Min. 56.24
Max. 62.47
Number of Spec. 18

Average_{norm} 0.008985 60.91
Standard Dev._{norm} 1.684
Coeff. of Var. [%]_{norm} 2.764
Min. 0.008802 57.94
Max. 0.009165 63.56
Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

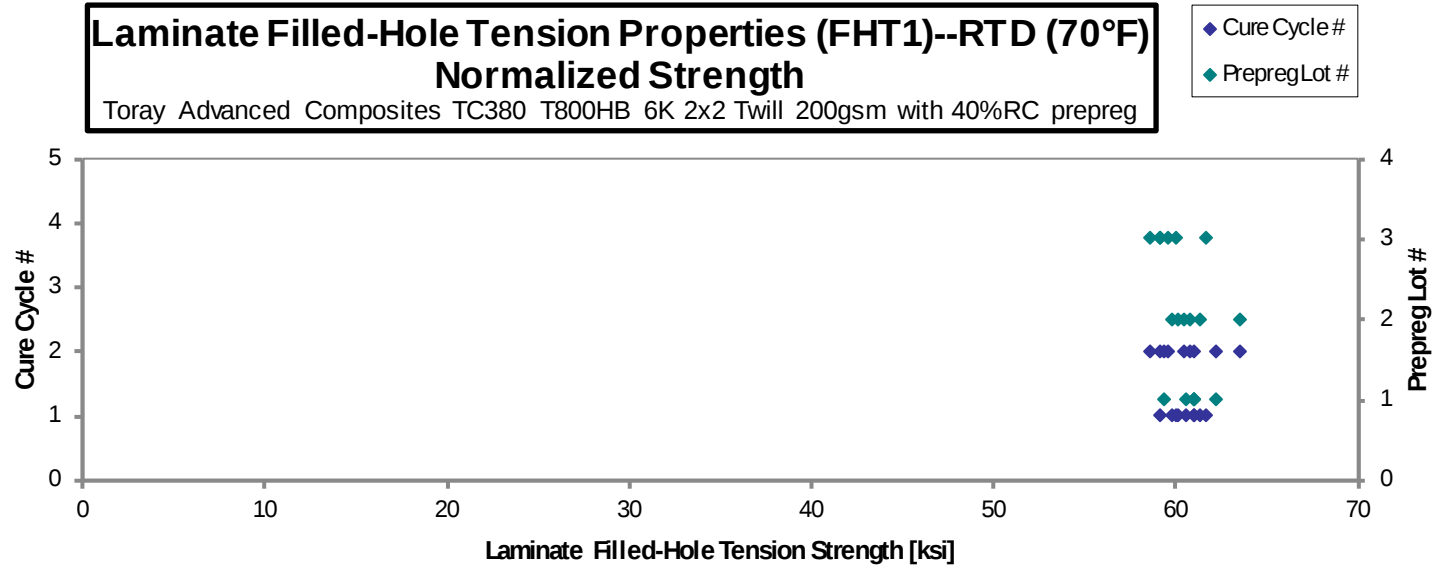
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE4A111A	A	C1	1	1	62.72	0.1370	16	M(A,L)GM
TCE4A112A	A	C1	1	1	59.23	0.1439	16	M(A,L)GM
TCE4A113A	A	C1	1	1	58.05	0.1478	16	M(A,L)GM
TCE4A211A	A	C2	1	2	64.50	0.1331	16	M(A,L)GM
TCE4A212A	A	C2	1	2	59.29	0.1409	16	M(A,L)GM
TCE4A213A	A	C2	1	2	60.42	0.1450	16	M(A,L)GM
TCE4B111A	B	C1	2	1	63.66	0.1330	16	M(A,L)GM
TCE4B112A	B	C1	2	1	59.66	0.1411	16	M(A,L)GM
TCE4B113A	B	C1	2	1	59.44	0.1453	16	M(A,L)GM
TCE4B211A	B	C2	2	2	64.00	0.1336	16	M(A,L)GM
TCE4B212A	B	C2	2	2	60.07	0.1417	16	M(A,L)GM
TCE4B213A	B	C2	2	2	61.91	0.1444	16	M(A,L)GM
TCE4C111A	C	C1	3	1	62.34	0.1356	16	LGM
TCE4C112A	C	C1	3	1	61.70	0.1407	16	LGM
TCE4C113A	C	C1	3	1	58.38	0.1426	16	LGM
TCE4C211A	C	C2	3	2	60.97	0.1367	16	LGM
TCE4C212A	C	C2	3	2	58.75	0.1428	16	LGM
TCE4C213A	C	C2	3	2	57.38	0.1439	16	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008563	61.03
0.008995	60.54
0.009240	60.95
0.008318	60.96
0.008803	59.31
0.009059	62.20
0.008315	60.15
0.008819	59.79
0.009080	61.34
0.008350	60.73
0.008853	60.44
0.009027	63.51
0.008473	60.03
0.008792	61.64
0.008910	59.11
0.008543	59.18
0.008923	59.57
0.008994	58.64

Average 60.69
 Standard Dev. 2.141
 Coeff. of Var. [%] 3.528
 Min. 57.38
 Max. 64.50
 Number of Spec. 18

Average_{norm} 0.008781
 Standard Dev._{norm} 1.211
 Coeff. of Var. [%]_{norm} 2.001
 Min. 0.008315
 Max. 0.009240
 Number of Spec. 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

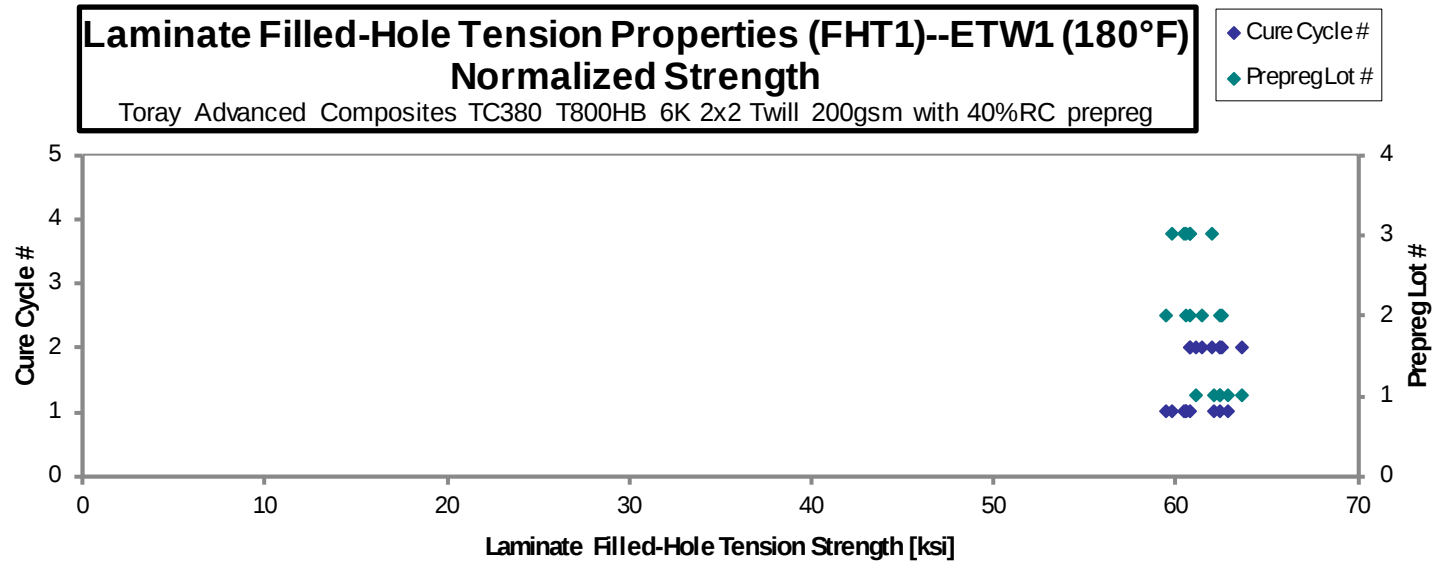
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE4A111D	A	C1	1	1	59.84	0.1462	16	M(A,L)GM
TCE4A112D	A	C1	1	1	65.02	0.1361	16	M(A,L)GM
TCE4A113D	A	C1	1	1	61.28	0.1435	16	M(A,L)GM
TCE4A211D	A	C2	1	2	61.29	0.1463	16	M(A,L)GM
TCE4A212D	A	C2	1	2	61.20	0.1436	16	M(A,L)GM
TCE4A213D	A	C2	1	2	63.26	0.1361	16	M(A,L)GM
TCE4B111D	B	C1	2	1	59.09	0.1444	16	M(A,L)GM
TCE4B112D	B	C1	2	1	59.45	0.1440	16	AGM
TCE4B113D	B	C1	2	1	57.83	0.1449	16	M(A,L)GM
TCE4B211D	B	C2	2	2	61.28	0.1437	16	M(A,L)GM
TCE4B212D	B	C2	2	2	65.29	0.1346	16	M(A,L)GM
TCE4B213D	B	C2	2	2	61.22	0.1413	16	AGM
TCE4C111D	C	C1	3	1	59.23	0.1436	16	AGM
TCE4C112D	C	C1	3	1	63.25	0.1347	16	AGM
TCE4C113D	C	C1	3	1	60.39	0.1394	16	AGM
TCE4C211D	C	C2	3	2	60.33	0.1418	16	M(A,L)GM
TCE4C212D	C	C2	3	2	60.91	0.1405	16	M(A,L)GM
TCE4C213D	C	C2	3	2	63.93	0.1365	16	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009134	62.12
0.008503	62.83
0.008967	62.45
0.009144	63.69
0.008974	62.41
0.008506	61.15
0.009027	60.61
0.009002	60.81
0.009054	59.50
0.008982	62.55
0.008410	62.40
0.008828	61.41
0.008977	60.42
0.008421	60.53
0.008715	59.81
0.008860	60.74
0.008782	60.79
0.008532	61.99

Average 61.34
 Standard Dev. 2.072
 Coeff. of Var. [%] 3.378
 Min. 57.83
 Max. 65.29
 Number of Spec. 18

Average_{norm} 0.008823 61.46
 Standard Dev._{norm} 1.142
 Coeff. of Var. [%]_{norm} 1.859
 Min. 0.008410 59.50
 Max. 0.009144 63.69
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

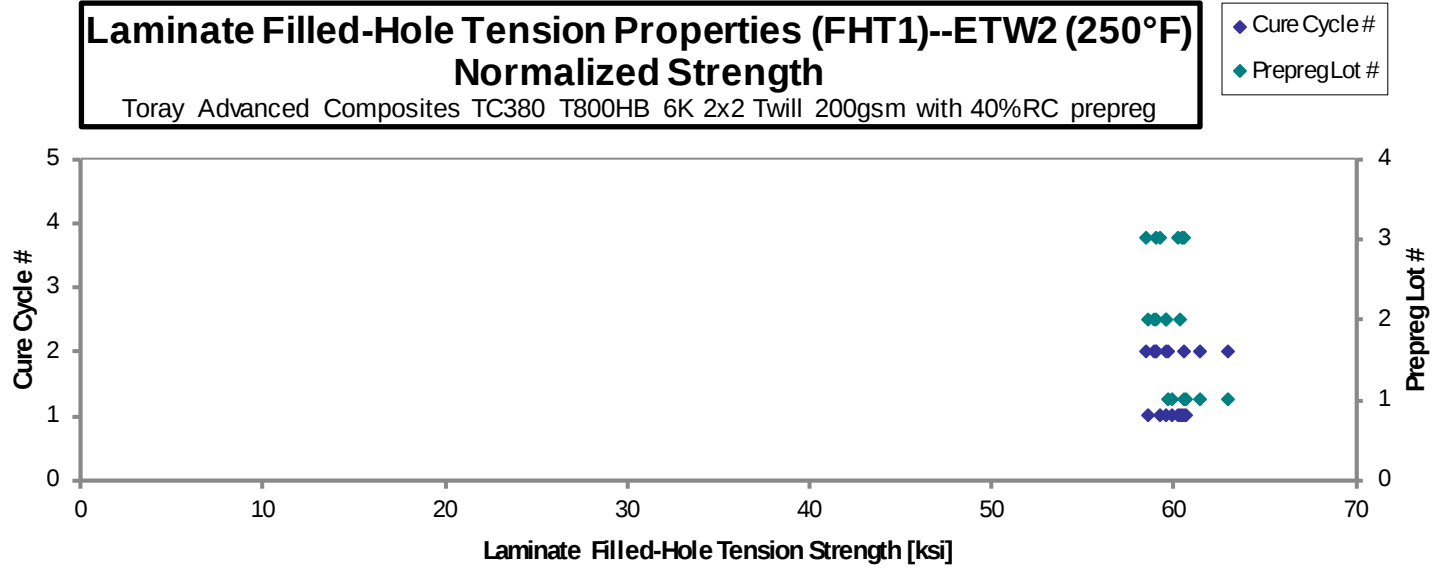
0.008800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE4A111E	A	C1	1	1	58.05	0.1452	16	AGM
TCE4A112E	A	C1	1	1	59.38	0.1435	16	M(A,L)GM
TCE4A113E	A	C1	1	1	59.11	0.1446	16	M(A,L)GM
TCE4A211E	A	C2	1	2	62.01	0.1431	16	M(A,L)GM
TCE4A212E	A	C2	1	2	59.60	0.1451	16	AGM
TCE4A213E	A	C2	1	2	57.75	0.1456	16	AGM
TCE4B111E	B	C1	2	1	57.81	0.1450	16	M(A,L)GM
TCE4B112E	B	C1	2	1	63.87	0.1331	16	M(A,L)GM
TCE4B113E	B	C1	2	1	58.69	0.1406	16	AGM
TCE4B211E	B	C2	2	2	57.09	0.1454	16	AGM
TCE4B212E	B	C2	2	2	57.65	0.1454	16	M(A,L)GM
TCE4B213E	B	C2	2	2	57.19	0.1453	16	AGM
TCE4C111E	C	C1	3	1	60.64	0.1403	16	M(A,L)GM
TCE4C112E	C	C1	3	1	59.27	0.1406	16	AGM
TCE4C113E	C	C1	3	1	60.09	0.1411	16	AGM
TCE4C211E	C	C2	3	2	59.49	0.1432	16	AGM
TCE4C212E	C	C2	3	2	58.00	0.1432	16	M(A,L)GM
TCE4C213E	C	C2	3	2	57.68	0.1428	16	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009075	59.86
0.008970	60.52
0.009034	60.68
0.008941	63.00
0.009068	61.42
0.009097	59.70
0.009064	59.54
0.008319	60.38
0.008786	58.60
0.009086	58.95
0.009090	59.55
0.009082	59.03
0.008769	60.43
0.008790	59.20
0.008817	60.20
0.008952	60.52
0.008952	59.01
0.008924	58.49

Average 59.08
 Standard Dev. 1.764
 Coeff. of Var. [%] 2.986
 Min. 57.09
 Max. 63.87
 Number of Spec. 18

Average_{norm} 0.008934 59.95
 Standard Dev._{norm} 1.106
 Coeff. of Var. [%]_{norm} 1.845
 Min. 0.008319 58.49
 Max. 0.009097 63.00
 Number of Spec. 18 18



4.17 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

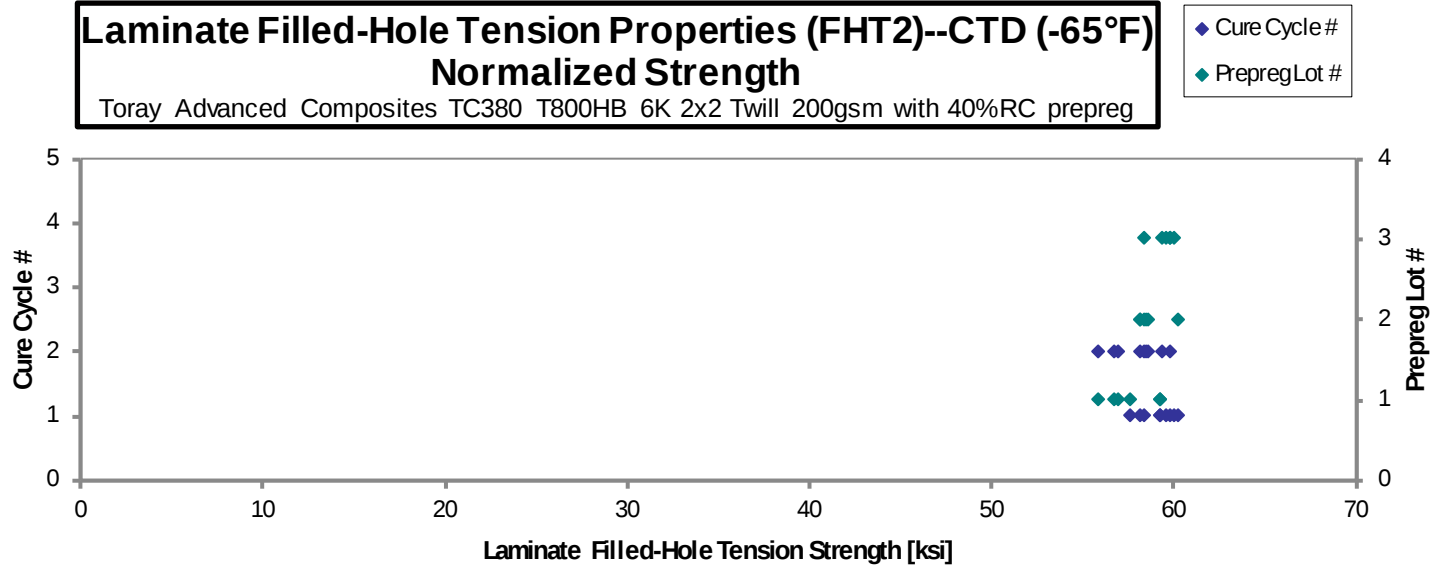
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE5A111B	A	C1	1	1	57.09	0.09132	10	AGM
TCE5A112B	A	C1	1	1	57.62	0.09052	10	AGM
TCE5A113B	A	C1	1	1	55.78	0.09087	10	AGM
TCE5A211B	A	C2	1	2	55.18	0.09052	10	AGM
TCE5A212B	A	C2	1	2	55.94	0.08962	10	AGM
TCE5A213B	A	C2	1	2	54.17	0.09073	10	AGM
TCE5B111B	B	C1	2	1	55.90	0.09193	10	AGM
TCE5B112B	B	C1	2	1	55.52	0.09210	10	AGM
TCE5B113B	B	C1	2	1	57.72	0.09188	10	AGM
TCE5B211B	B	C2	2	2	57.19	0.09017	10	AGM
TCE5B212B	B	C2	2	2	56.87	0.09005	10	AGM
TCE5B213B	B	C2	2	2	57.00	0.09030	10	AGM
TCE5C111B	C	C1	3	1	58.75	0.08955	10	AGM
TCE5C112B	C	C1	3	1	59.33	0.08902	10	AGM
TCE5C113B	C	C1	3	1	58.97	0.08887	10	AGM
TCE5C211B	C	C2	3	2	59.07	0.08847	10	AGM
TCE5C212B	C	C2	3	2	59.57	0.08835	10	AGM
TCE5C213B	C	C2	3	2	58.02	0.08850	10	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009132	59.24
0.009052	59.27
0.009087	57.60
0.009052	56.76
0.008962	56.97
0.009073	55.85
0.009193	58.40
0.009210	58.11
0.009188	60.27
0.009017	58.59
0.009005	58.20
0.009030	58.49
0.008955	59.79
0.008902	60.02
0.008887	59.55
0.008847	59.39
0.008835	59.81
0.008850	58.35

Average 57.21
Standard Dev. 1.569
Coeff. of Var. [%] 2.743
Min. 54.17
Max. 59.57
Number of Spec. 18

Average_{norm} 0.009015 58.59
Standard Dev._{norm} 1.216
Coeff. of Var. [%]_{norm} 2.075
Min. 0.008835 55.85
Max. 0.009210 60.27
Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

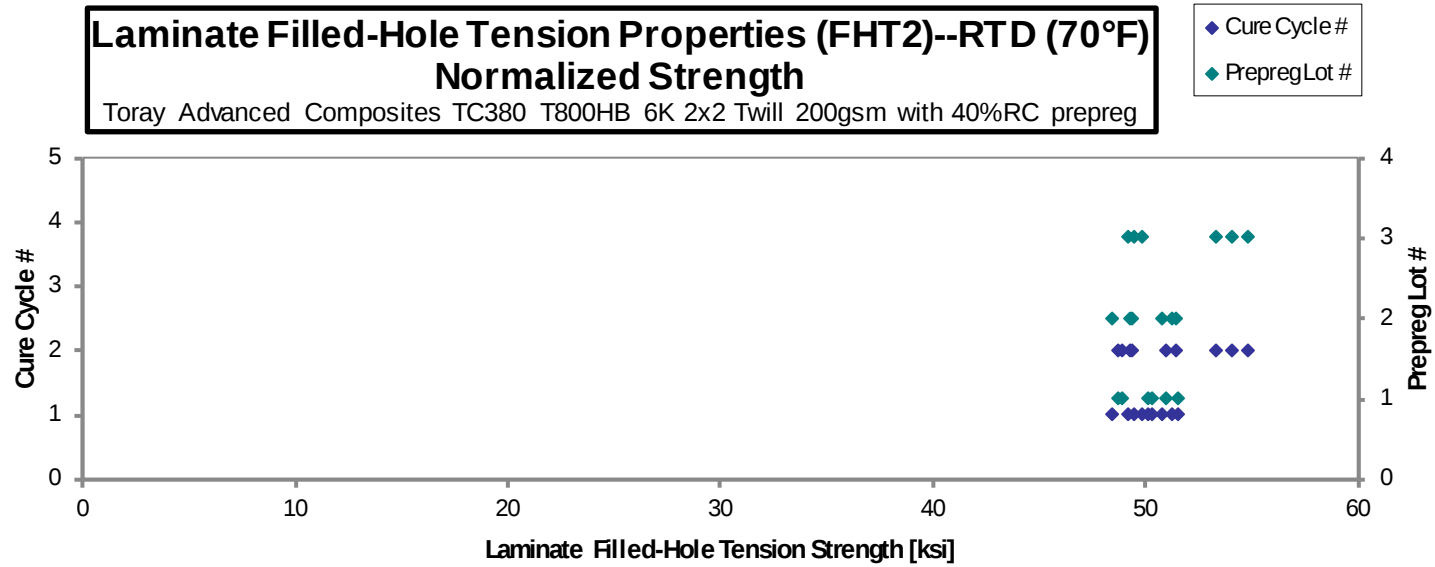
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE5A111A	A	C1	1	1	51.88	0.08498	10	AGM
TCE5A112A	A	C1	1	1	50.60	0.08967	10	AGM
TCE5A113A	A	C1	1	1	47.84	0.09255	10	AGM
TCE5A211A	A	C2	1	2	52.66	0.08523	10	AGM
TCE5A212A	A	C2	1	2	47.58	0.09038	10	AGM
TCE5A213A	A	C2	1	2	46.91	0.09143	10	AGM
TCE5B111A	B	C1	2	1	51.24	0.08313	10	AGM
TCE5B112A	B	C1	2	1	49.46	0.09038	10	AGM
TCE5B113A	B	C1	2	1	48.55	0.09292	10	AGM
TCE5B211A	B	C2	2	2	54.41	0.08322	10	AGM
TCE5B212A	B	C2	2	2	48.65	0.08920	10	AGM
TCE5B213A	B	C2	2	2	47.39	0.09173	10	AGM
TCE5C111A	C	C1	3	1	50.74	0.08528	10	AGM
TCE5C112A	C	C1	3	1	51.44	0.08527	10	AGM
TCE5C113A	C	C1	3	1	49.51	0.08790	10	AGM
TCE5C211A	C	C2	3	2	56.94	0.08478	10	AGM
TCE5C212A	C	C2	3	2	54.17	0.08783	10	AGM
TCE5C213A	C	C2	3	2	52.80	0.08890	10	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008498	50.10
0.008967	51.56
0.009255	50.32
0.008523	51.00
0.009038	48.87
0.009143	48.74
0.008313	48.41
0.009038	50.80
0.009292	51.26
0.008322	51.45
0.008920	49.32
0.009173	49.40
0.008528	49.17
0.008527	49.84
0.008790	49.45
0.008478	54.86
0.008783	54.07
0.008890	53.34

Average 50.71
 Standard Dev. 2.769
 Coeff. of Var. [%] 5.460
 Min. 46.91
 Max. 56.94
 Number of Spec. 18

Average_{norm} 0.008804 50.66
 Standard Dev._{norm} 1.856
 Coeff. of Var. [%]_{norm} 3.663
 Min. 0.008313 48.41
 Max. 0.009292 54.86
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

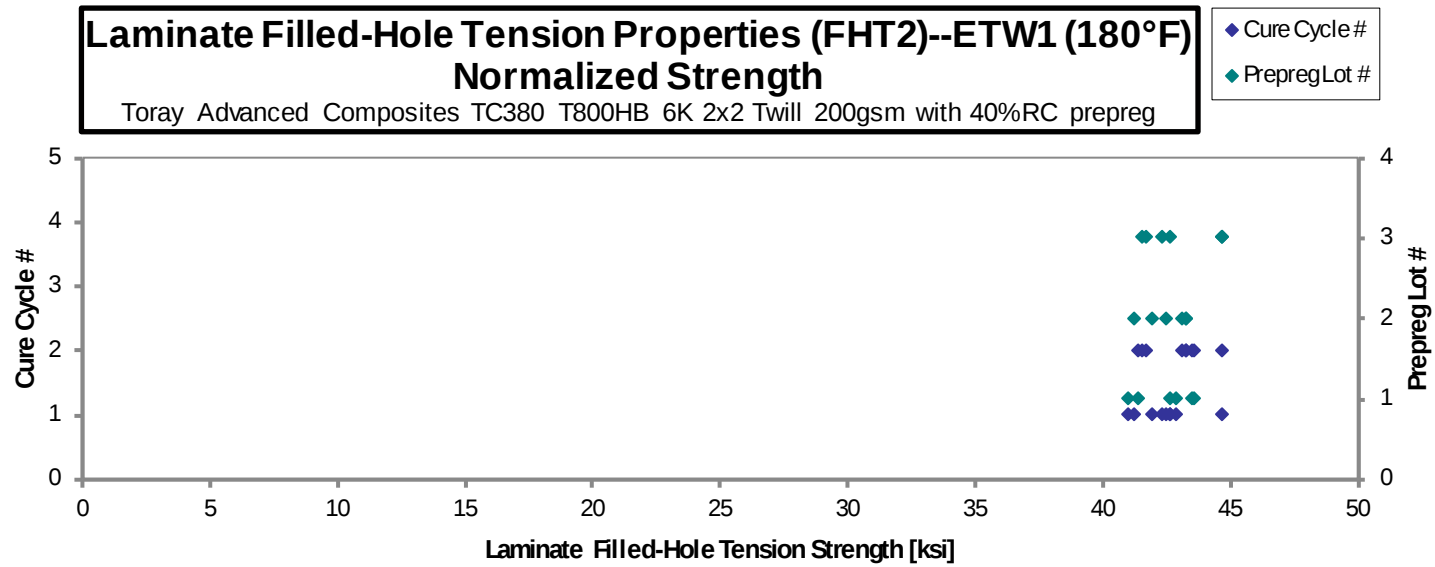
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE5A111D	A	C1	1	1	40.38	0.09340	10	AGM
TCE5A112D	A	C1	1	1	39.52	0.09127	10	AGM
TCE5A113D	A	C1	1	1	43.94	0.08533	10	AGM
TCE5A211D	A	C2	1	2	41.74	0.09173	10	AGM
TCE5A212D	A	C2	1	2	42.96	0.08920	10	AGM
TCE5A213D	A	C2	1	2	43.63	0.08350	10	AGM
TCE5B111D	B	C1	2	1	39.18	0.09257	10	AGM
TCE5B112D	B	C1	2	1	44.51	0.08290	10	AGM
TCE5B113D	B	C1	2	1	42.23	0.08847	10	AGM
TCE5B211D	B	C2	2	2	41.58	0.09158	10	AGM
TCE5B212D	B	C2	2	2	42.83	0.08862	10	AGM
TCE5B213D	B	C2	2	2	45.92	0.08290	10	AGM
TCE5C111D	C	C1	3	1	41.49	0.08982	10	AGM
TCE5C112D	C	C1	3	1	41.38	0.09073	10	AGM
TCE5C113D	C	C1	3	1	44.64	0.08800	10	AGM
TCE5C211D	C	C2	3	2	41.18	0.08902	10	AGM
TCE5C212D	C	C2	3	2	41.71	0.08765	10	AGM
TCE5C213D	C	C2	3	2	45.91	0.08563	10	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009340	42.86
0.009127	40.99
0.008533	42.60
0.009173	43.51
0.008920	43.55
0.008350	41.40
0.009257	41.21
0.008290	41.93
0.008847	42.46
0.009158	43.28
0.008862	43.13
0.008290	43.26
0.008982	42.35
0.009073	42.67
0.008800	44.64
0.008902	41.66
0.008765	41.54
0.008563	44.68

Average 42.49
 Standard Dev. 1.973
 Coeff. of Var. [%] 4.643
 Min. 39.18
 Max. 45.92
 Number of Spec. 18

Average_{norm} 0.008846 42.65
 Standard Dev._{norm} 1.083
 Coeff. of Var. [%]_{norm} 2.539
 Min. 0.008290 40.99
 Max. 0.009340 44.68
 Number of Spec. 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

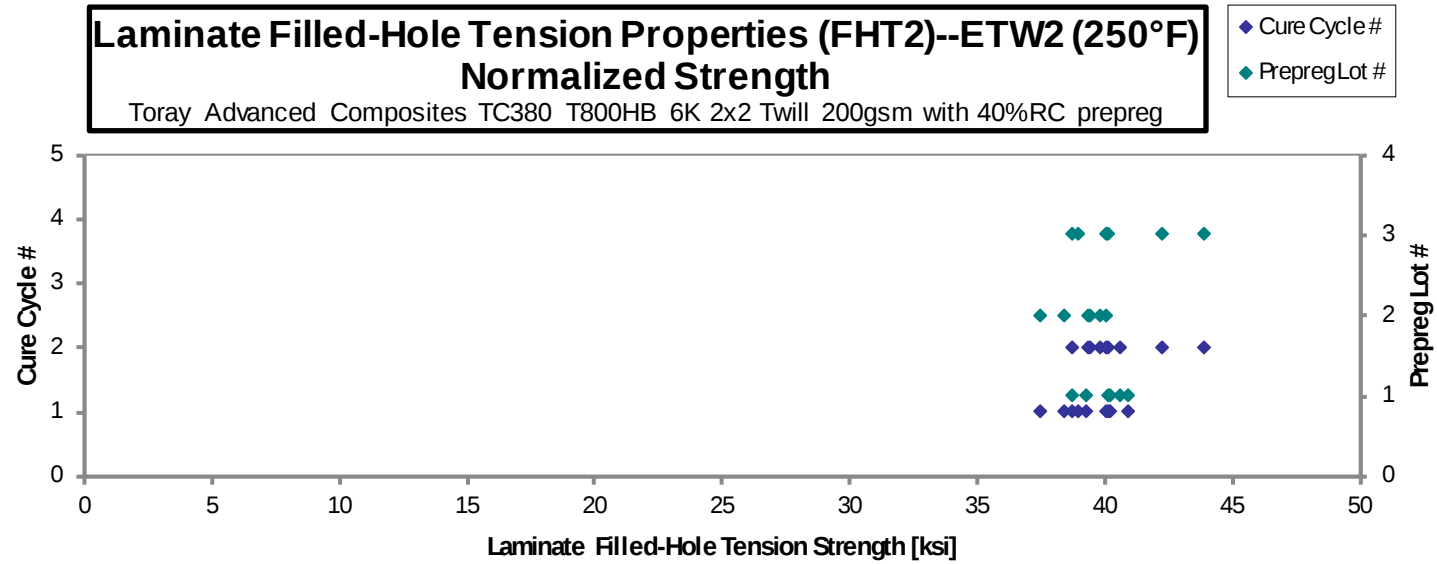
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE5A111E	A	C1	1	1	39.14	0.09203	10	AGM
TCE5A112E	A	C1	1	1	38.86	0.09112	10	AGM
TCE5A113E	A	C1	1	1	38.22	0.09045	10	AGM
TCE5A211E	A	C2	1	2	38.35	0.09207	10	AGM
TCE5A212E	A	C2	1	2	38.81	0.09207	10	AGM
TCE5A213E	A	C2	1	2	37.66	0.09038	10	AGM
TCE5B111E	B	C1	2	1	37.66	0.08967	10	AGM
TCE5B112E	B	C1	2	1	37.08	0.08895	10	AGM
TCE5B113E	B	C1	2	1	38.94	0.09043	10	AGM
TCE5B211E	B	C2	2	2	38.04	0.09100	10	AGM
TCE5B212E	B	C2	2	2	37.88	0.09150	10	AGM
TCE5B213E	B	C2	2	2	38.87	0.09022	10	AGM
TCE5C111E	C	C1	3	1	38.36	0.08928	10	AGM
TCE5C112E	C	C1	3	1	40.17	0.08790	10	AGM
TCE5C113E	C	C1	3	1	38.48	0.08858	10	AGM
TCE5C211E	C	C2	3	2	40.23	0.08765	10	AGM
TCE5C212E	C	C2	3	2	42.32	0.08777	10	AGM
TCE5C213E	C	C2	3	2	43.97	0.08780	10	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009203	40.94
0.009112	40.24
0.009045	39.29
0.009207	40.12
0.009207	40.61
0.009038	38.68
0.008967	38.37
0.008895	37.48
0.009043	40.01
0.009100	39.34
0.009150	39.39
0.009022	39.85
0.008928	38.92
0.008790	40.12
0.008858	38.73
0.008765	40.07
0.008777	42.20
0.008780	43.87

Average 39.06
 Standard Dev. 1.710
 Coeff. of Var. [%] 4.379
 Min. 37.08
 Max. 43.97
 Number of Spec. 18

Average_{norm} 0.008994 39.90
 Standard Dev._{norm} 1.452
 Coeff. of Var. [%]_{norm} 3.638
 Min. 0.008765 37.48
 Max. 0.009207 43.87
 Number of Spec. 18 18



4.18 “40/20/40” Filled-Hole Tension 3 Properties (FHT3)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

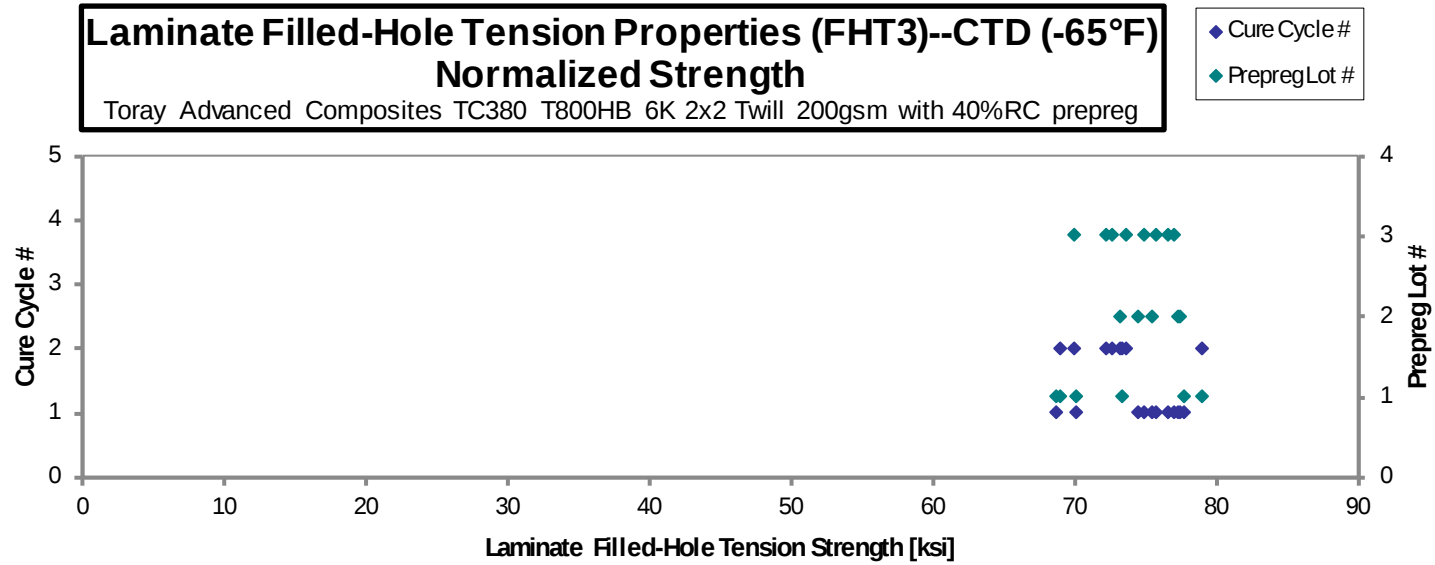
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCE6A111B	A	C1	1	1	77.43	0.08830	10	LGM	0.008830	77.69
TCE6A112B	A	C1	1	1	70.14	0.08800	10	LGM	0.008800	70.14
TCE6A113B	A	C1	1	1	68.26	0.08850	10	AGM	0.008850	68.65
TCE6A211B	A	C2	1	2	75.99	0.09148	10	LGM	0.009148	79.00
TCE6A212B	A	C2	1	2	66.68	0.09102	10	LGM	0.009102	68.97
TCE6A213B	A	C2	1	2	70.60	0.09140	10	LGM	0.009140	73.32
TCE6B111B	B	C1	2	1	73.56	0.09030	10	LGM	0.009030	75.49
TCE6B112B	B	C1	2	1	75.58	0.09012	10	LGM	0.009012	77.40
TCE6B113B	B	C1	2	1	75.39	0.09023	10	LGM	0.009023	77.30
TCEFB114B	B	C1	2	1	73.66	0.08895	10	LGM	0.008895	74.46
TCEFB214B	B	C2	2	2	70.35	0.09160	10	LGM	0.009160	73.23
TCE6C111B	C	C1	3	1	77.01	0.08750	10	LGM	0.008750	76.57
TCE6C112B	C	C1	3	1	77.32	0.08758	10	M(A,L)GM	0.008758	76.95
TCE6C113B	C	C1	3	1	75.90	0.08787	10	M(A,L)GM	0.008787	75.78
TCE6C114B	C	C1	3	1	74.55	0.08847	10	LGM	0.008847	74.95
TCE6C211B	C	C2	3	2	71.94	0.08843	10	M(A,L)GM	0.008843	72.29
TCE6C212B	C	C2	3	2	69.52	0.08858	10	M(A,L)GM	0.008858	69.98
TCE6C213B	C	C2	3	2	73.48	0.08815	10	LGM	0.008815	73.60
TCE6C214B	C	C2	3	2	72.12	0.08857	10	LGM	0.008857	72.58

TCEFB114B and TCEFB214B: Specimens were taken from OHT3 and tested as FHT3.

Average 73.13
Standard Dev. 3.201
Coeff. of Var. [%] 4.377
Min. 66.68
Max. 77.43
Number of Spec. 19

Average_{norm} 0.008921 74.12
Standard Dev._{norm} 3.106
Coeff. of Var. [%]_{norm} 4.191
Min. 0.008750 68.65
Max. 0.009160 79.00
Number of Spec. 19 19



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

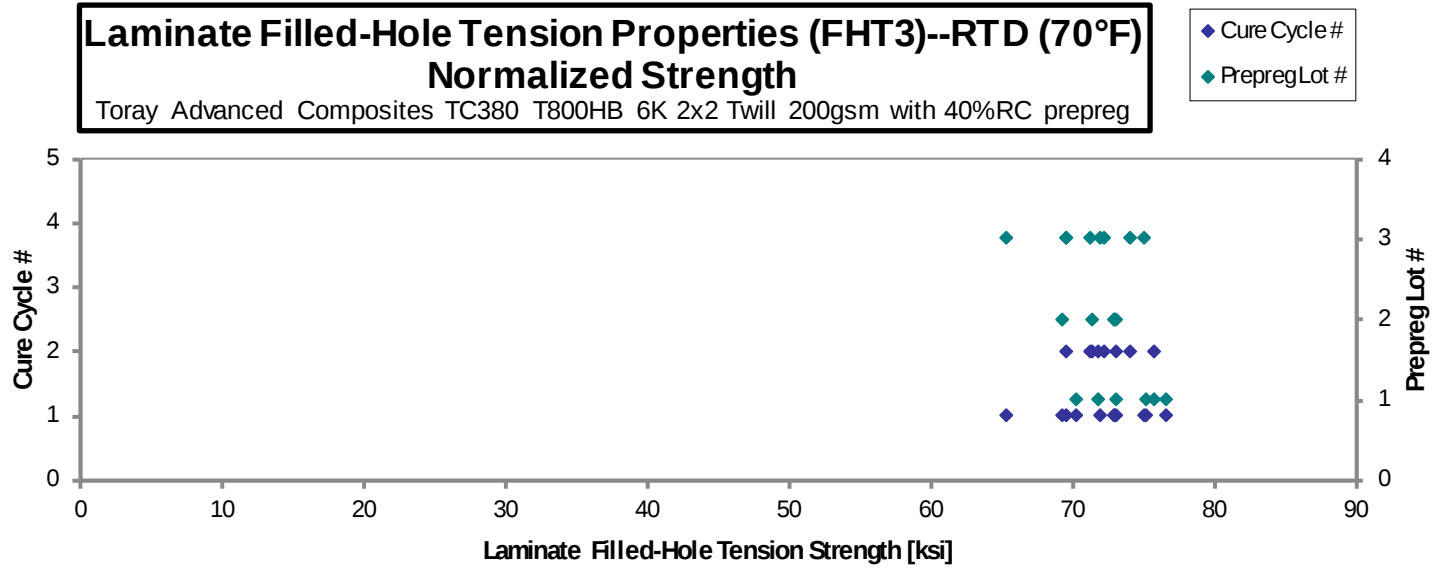
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCE6A111A	A	C1	1	1	73.64	0.08398	10	LGM	0.008398	70.28
TCE6A112A	A	C1	1	1	75.98	0.08863	10	M(A,L)GM	0.008863	76.53
TCE6A113A	A	C1	1	1	73.74	0.08978	10	M(A,L)GM	0.008978	75.23
TCE6A211A	A	C2	1	2	80.21	0.08313	10	M(A,L)GM	0.008313	75.77
TCE6A212A	A	C2	1	2	71.67	0.08818	10	M(A,L)GM	0.008818	71.82
TCE6A213A	A	C2	1	2	70.43	0.09135	10	M(A,L)GM	0.009135	73.11
TCE6B111A	B	C1	2	1	71.57	0.08970	10	M(A,L)GM	0.008970	72.95
TCE6B112A	B	C1	2	1	71.51	0.08980	10	M(A,L)GM	0.008980	72.97
TCE6B113A	B	C1	2	1	68.31	0.08928	10	M(A,L)GM	0.008928	69.30
TCEFB114A	B	C1	2	1	71.69	0.08962	10	LGM	0.008962	73.01
TCEFB214A	B	C2	2	2	69.92	0.08978	10	LGM	0.008978	71.33
TCE6C111A	C	C1	3	1	77.79	0.08485	10	AGM	0.008485	75.01
TCE6C112A	C	C1	3	1	71.54	0.08857	10	AGM	0.008857	72.00
TCE6C113A	C	C1	3	1	68.47	0.08940	10	AGM	0.008940	69.56
TCE6C114A	C	C1	3	1	64.98	0.08848	10	LGM	0.008848	65.34
TCE6C211A	C	C2	3	2	71.51	0.08555	10	M(A,L)GM	0.008555	69.52
TCE6C212A	C	C2	3	2	74.25	0.08780	10	AGM	0.008780	74.08
TCE6C213A	C	C2	3	2	69.96	0.08963	10	M(A,L)GM	0.008963	71.26
TCE6C214A	C	C2	3	2	70.71	0.08990	10	LGM	0.008990	72.24

TCEFB114A and TCEFB214A: Specimens were taken from OHT3 and tested as FHT3.

Average 71.99
Standard Dev. 3.469
Coeff. of Var. [%] 4.819
Min. 64.98
Max. 80.21
Number of Spec. 19

Average_{norm} 0.008829 **72.17**
Standard Dev._{norm} **2.686**
Coeff. of Var. [%]_{norm} **3.722**
Min. 0.008313 **65.34**
Max. 0.009135 **76.53**
Number of Spec. 19 **19**



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

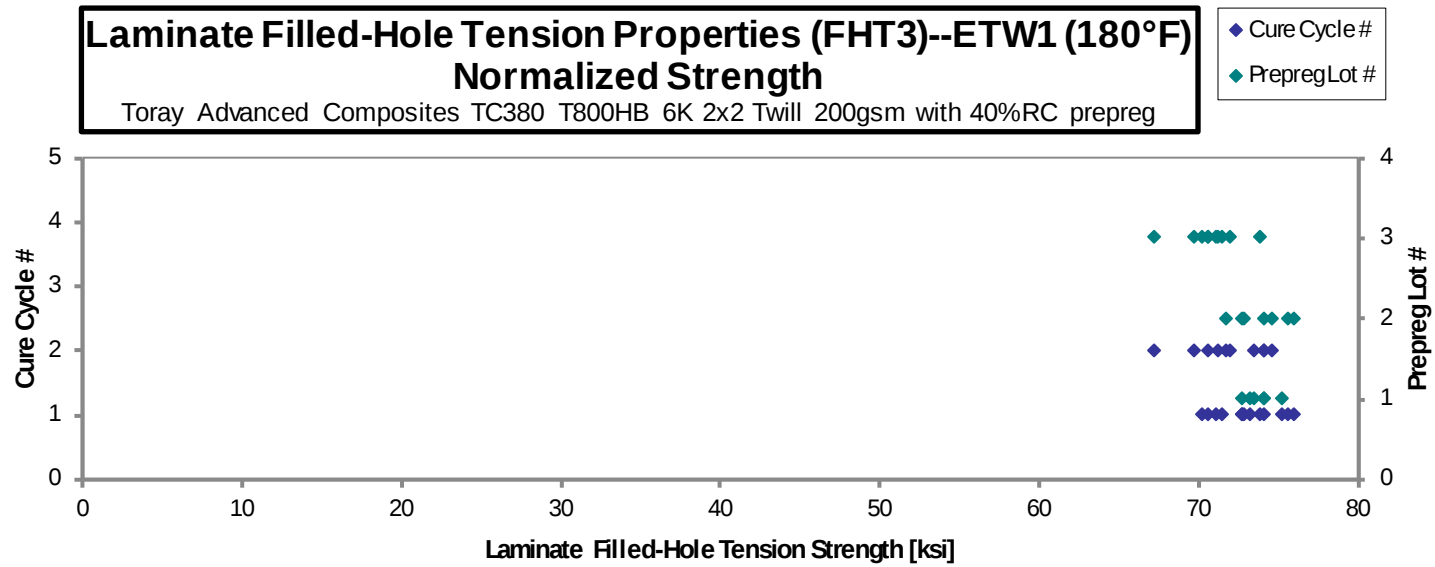
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCE6A111D	A	C1	1	1	74.56	0.08873	10	M(A,L)GM	0.008873	75.18
TCE6A112D	A	C1	1	1	74.61	0.08638	10	LGM	0.008638	73.24
TCE6A113D	A	C1	1	1	78.58	0.08150	10	M(A,L)GM	0.008150	72.78
TCE6A211D	A	C2	1	2	70.68	0.09222	10	M(A,L)GM	0.009222	74.06
TCE6A212D	A	C2	1	2	71.72	0.09010	10	M(A,L)GM	0.009010	73.43
TCE6A213D	A	C2	1	2	76.22	0.08550	10	M(A,L)GM	0.008550	74.05
TCE6B111D	B	C1	2	1	79.42	0.08378	10	LGM	0.008378	75.62
TCE6B112D	B	C1	2	1	71.33	0.08980	10	LGM	0.008980	72.79
TCE6B113D	B	C1	2	1	72.49	0.08992	10	M(A,L)GM	0.008992	74.07
TCEFB114D	B	C1	2	1	72.39	0.08843	10	LGM	0.008843	72.75
TCEFB115D	B	C1	2	1	75.89	0.08815	10	AGM	0.008815	76.02
TCEFB214D	B	C2	2	2	72.84	0.09008	10	M(A,L)GM	0.009008	74.56
TCEFB215D	B	C2	2	2	70.25	0.08992	10	LGM	0.008992	71.78
TCE6C111D	C	C1	3	1	70.17	0.08853	10	M(A,L)GM	0.008853	70.60
TCE6C112D	C	C1	3	1	74.58	0.08438	10	M(A,L)GM	0.008438	71.52
TCE6C113D	C	C1	3	1	70.17	0.08807	10	AGM	0.008807	70.22
TCE6C114D	C	C1	3	1	73.64	0.08830	10	M(A,L)GM	0.008830	73.90
TCE6C115D	C	C1	3	1	70.93	0.08825	10	LGM	0.008825	71.13
TCE6C211D	C	C2	3	2	69.39	0.08848	10	LGM	0.008848	69.77
TCE6C212D	C	C2	3	2	69.91	0.08887	10	M(A,L)GM	0.008887	70.60
TCE6C213D	C	C2	3	2	71.03	0.08825	10	AGM	0.008825	71.23
TCE6C214D	C	C2	3	2	66.63	0.08872	10	LGM	0.008872	67.17
TCE6C215D	C	C2	3	2	71.19	0.08900	10	M(A,L)GM	0.008900	72.00

TCEFB114D, TCEFB115D, TCEFB214D and TCEFB215D: Specimens were taken from OHT3 and tested as FHT3.

Average 72.55
 Standard Dev. 3.039
 Coeff. of Var. [%] 4.188
 Min. 66.63
 Max. 79.42
 Number of Spec. 23

Average_{norm} 0.008806 72.54
 Standard Dev._{norm} 2.110
 Coeff. of Var. [%]_{norm} 2.908
 Min. 0.008150 67.17
 Max. 0.009222 76.02
 Number of Spec. 23 23



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

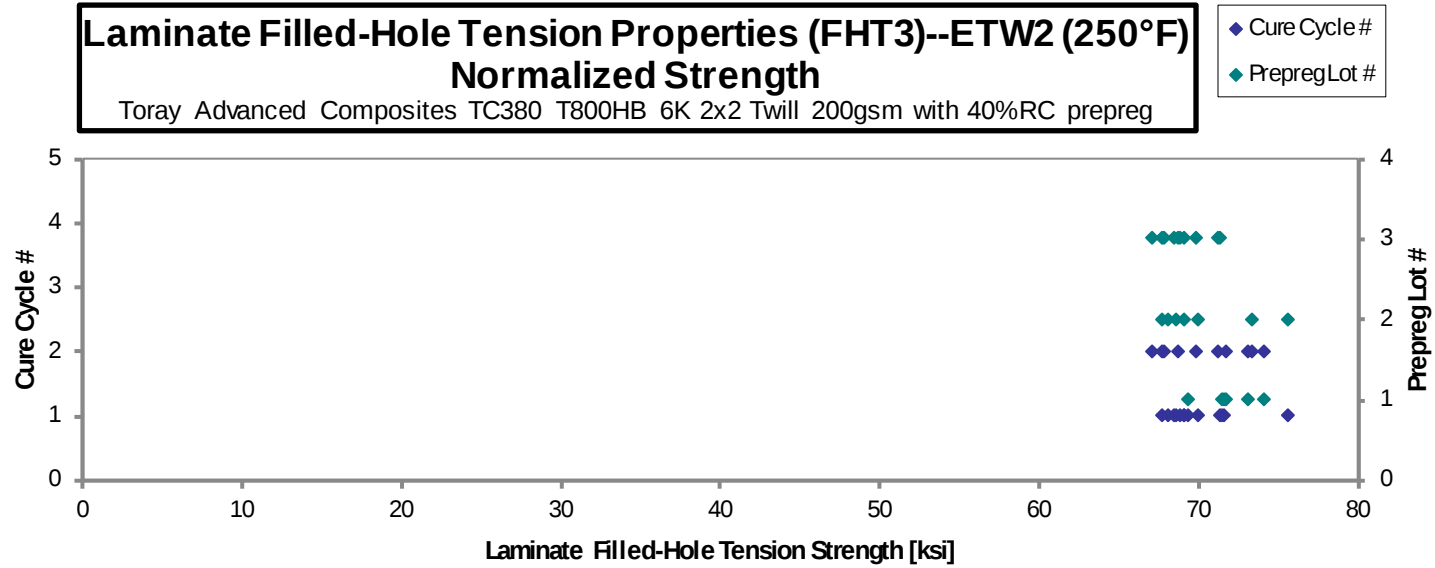
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
TCE6A111E	A	C1	1	1	67.83	0.08998	10	M(A,L)GM	0.008998	69.36
TCE6A112E	A	C1	1	1	70.33	0.08965	10	M(A,L)GM	0.008965	71.64
TCE6A113E	A	C1	1	1	70.90	0.08867	10	M(A,L)GM	0.008867	71.43
TCE6A211E	A	C2	1	2	71.44	0.08998	10	M(A,L)GM	0.008998	73.05
TCE6A212E	A	C2	1	2	71.91	0.09065	10	M(A,L)GM	0.009065	74.07
TCE6A213E	A	C2	1	2	69.72	0.09053	10	LGM	0.009053	71.73
TCE6B111E	B	C1	2	1	74.45	0.08930	10	M(A,L)GM	0.008930	75.55
TCE6B112E	B	C1	2	1	67.51	0.09005	10	M(A,L)GM	0.009005	69.08
TCE6B113E	B	C1	2	1	68.41	0.09007	10	M(A,L)GM	0.009007	70.01
TCEFB114E	B	C1	2	1	69.04	0.08742	10	M(A,L)GM	0.008742	68.59
TCEFB115E	B	C1	2	1	73.06	0.08195	10	AGM	0.008195	68.04
TCEFB214E	B	C2	2	2	66.47	0.08972	10	LGM	0.008972	67.76
TCEFB215E	B	C2	2	2	72.17	0.08942	10	M(A,L)GM	0.008942	73.33
TCE6C111E	C	C1	3	1	69.50	0.08755	10	M(A,L)GM	0.008755	69.14
TCE6C112E	C	C1	3	1	71.60	0.08772	10	LGM	0.008772	71.37
TCE6C113E	C	C1	3	1	69.21	0.08757	10	AGM	0.008757	68.87
TCE6C114E	C	C1	3	1	68.04	0.08757	10	M(A,L)GM	0.008757	67.71
TCE6C115E	C	C1	3	1	68.37	0.08813	10	M(A,L)GM	0.008813	68.47
TCE6C211E	C	C2	3	2	66.82	0.08933	10	M(A,L)GM	0.008933	67.83
TCE6C212E	C	C2	3	2	68.31	0.08855	10	AGM	0.008855	68.73
TCE6C213E	C	C2	3	2	68.79	0.08582	10	LGM	0.008582	67.08
TCE6C214E	C	C2	3	2	74.35	0.08432	10	M(A,L)GM	0.008432	71.24
TCE6C215E	C	C2	3	2	69.45	0.08843	10	AGM	0.008843	69.80

TCEFB114E, TCEFB115E, TCEFB214E and TCEFB215E: Specimens were taken from OHT3 and tested as FHT3.

Average 69.90
 Standard Dev. 2.244
 Coeff. of Var. [%] 3.211
 Min. 66.47
 Max. 74.45
 Number of Spec. 23

Average_{norm} 0.008836 70.17
 Standard Dev._{norm} 2.285
 Coeff. of Var. [%]_{norm} 3.256
 Min. 0.008195 67.08
 Max. 0.009065 75.55
 Number of Spec. 23 23



4.19 “25/50/25” Open-Hole Compression 1 Properties (OHC1)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

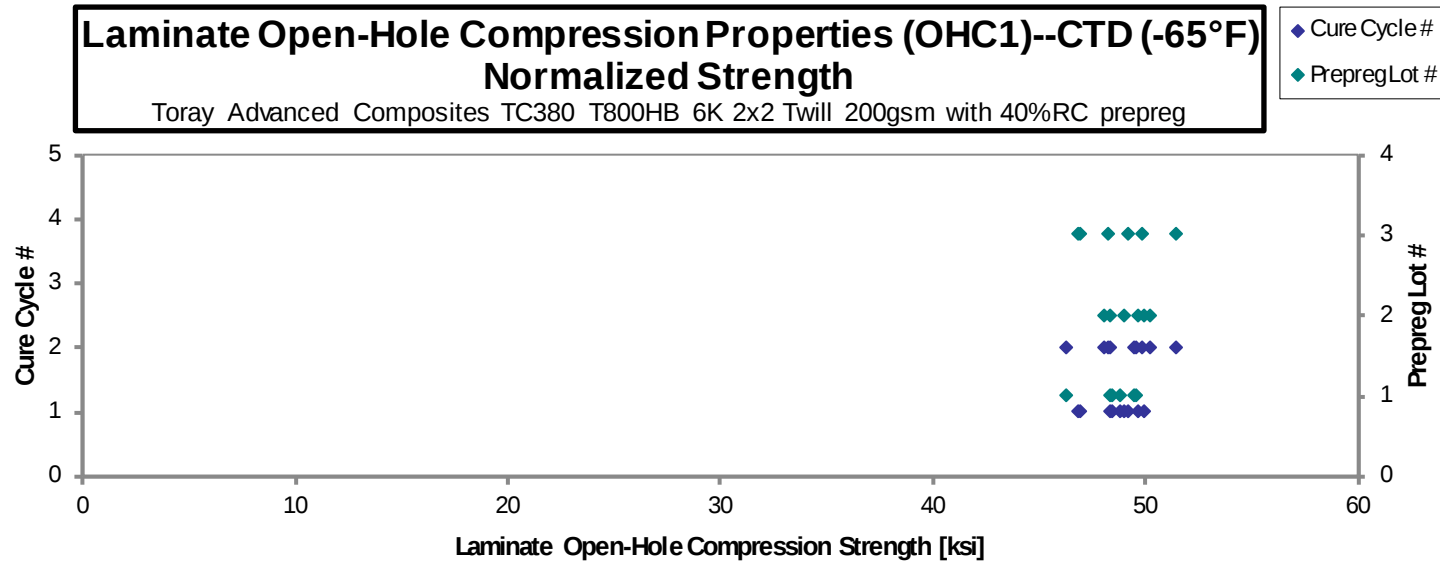
 t_{ply} [in]

0.008800

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]
TCEGA111B	A	C1	1	1	47.30	0.1442	16	M(A,L)GM	0.009009	48.42
TCEGA112B	A	C1	1	1	47.50	0.1434	16	M(A,L)GM	0.008963	48.38
TCEGA113B	A	C1	1	1	47.78	0.1440	16	M(A,L)GM	0.008997	48.85
TCEGA211B	A	C2	1	2	44.53	0.1463	16	M(A,L)GM	0.009145	46.27
TCEGA212B	A	C2	1	2	48.06	0.1448	16	M(A,L)GM	0.009051	49.43
TCEGA213B	A	C2	1	2	48.09	0.1452	16	M(A,L)GM	0.009076	49.60
TCEGB111B	B	C1	2	1	47.83	0.1443	16	M(A,L)GM	0.009016	49.00
TCEGB112B	B	C1	2	1	49.00	0.1435	16	M(A,L)GM	0.008967	49.92
TCEGB113B	B	C1	2	1	48.41	0.1444	16	M(A,L)GM	0.009024	49.64
TCEGB211B	B	C2	2	2	46.66	0.1451	16	M(A,L)GM	0.009070	48.09
TCEGB212B	B	C2	2	2	46.95	0.1449	16	M(A,L)GM	0.009054	48.30
TCEGB213B	B	C2	2	2	48.66	0.1454	16	M(A,L)GM	0.009084	50.24
TCEGC111B	C	C1	3	1	46.60	0.1415	16	M(A,L)GM	0.008842	46.82
TCEGC112B	C	C1	3	1	48.91	0.1417	16	M(A,L)GM	0.008856	49.23
TCEGC113B	C	C1	3	1	46.59	0.1417	16	M(A,L)GM	0.008855	46.89
TCEGC211B	C	C2	3	2	47.55	0.1430	16	M(A,L)GM	0.008935	48.28
TCEGC212B	C	C2	3	2	49.02	0.1433	16	M(A,L)GM	0.008954	49.87
TCEGC213B	C	C2	3	2	50.72	0.1427	16	M(A,L)GM	0.008918	51.40

Average 47.79
Standard Dev. 1.328
Coeff. of Var. [%] 2.780
Min. 44.53
Max. 50.72
Number of Spec. 18

Average_{norm} 0.008990 48.81
Standard Dev._{norm} 1.295
Coeff. of Var. [%]_{norm} 2.654
Min. 0.008842 46.27
Max. 0.009145 51.40
Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

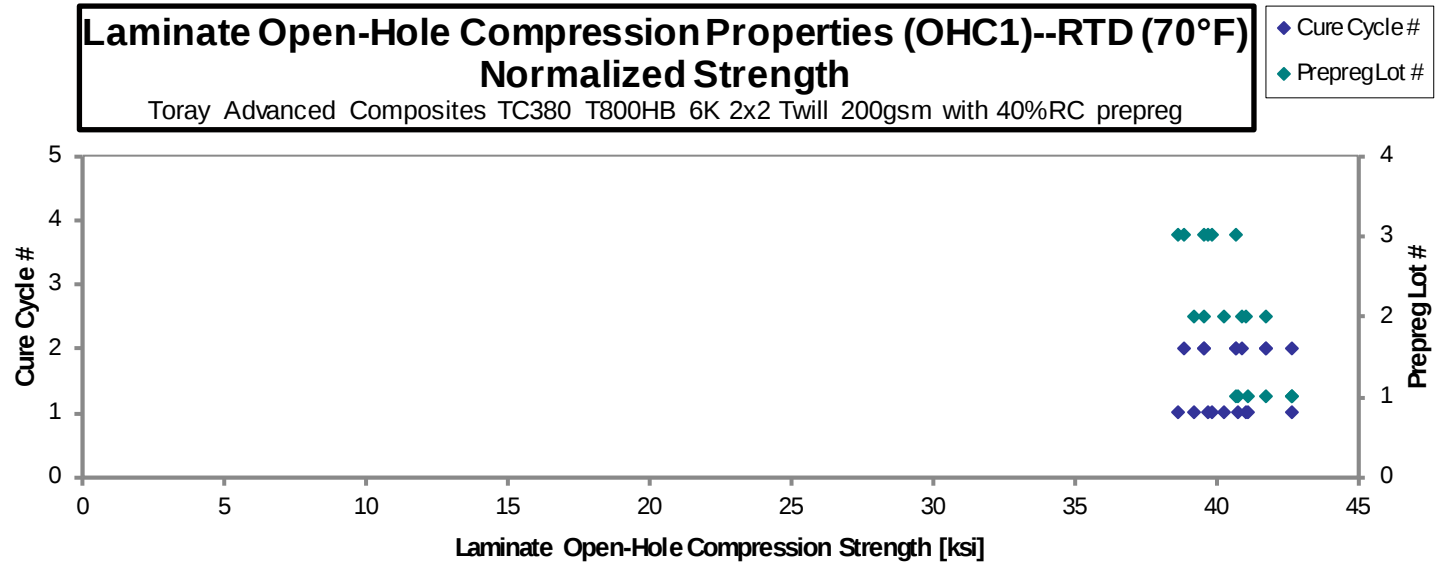
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEGA111A	A	C1	1	1	42.87	0.1350	16	LGM
TCEGA112A	A	C1	1	1	40.40	0.1420	16	LGM
TCEGA113A	A	C1	1	1	41.39	0.1451	16	LGM
TCEGA211A	A	C2	1	2	43.37	0.1356	16	LGM
TCEGA212A	A	C2	1	2	42.02	0.1429	16	LGM
TCEGA213A	A	C2	1	2	38.92	0.1472	16	LGM
TCEGB111A	B	C1	2	1	41.79	0.1322	16	LGM
TCEGB112A	B	C1	2	1	40.79	0.1390	16	M(L,A)GM
TCEGB113A	B	C1	2	1	40.47	0.1428	16	LGM
TCEGB211A	B	C2	2	2	41.42	0.1346	16	LGM
TCEGB212A	B	C2	2	2	40.41	0.1426	16	LGM
TCEGB213A	B	C2	2	2	40.22	0.1462	16	LGM
TCEGC111A	C	C1	3	1	39.99	0.1361	16	M(A,L)GM
TCEGC112A	C	C1	3	1	39.76	0.1407	16	LGM
TCEGC113A	C	C1	3	1	39.21	0.1431	16	M(A,L)GM
TCEGC211A	C	C2	3	2	39.75	0.1377	16	M(A,L)GM
TCEGC212A	C	C2	3	2	40.37	0.1420	16	M(A,L)GM
TCEGC213A	C	C2	3	2	38.12	0.1460	16	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008435	41.09
0.008877	40.75
0.009071	42.66
0.008476	41.78
0.008932	42.65
0.009199	40.69
0.008259	39.22
0.008684	40.25
0.008925	41.05
0.008410	39.59
0.008909	40.91
0.009134	41.75
0.008505	38.65
0.008796	39.74
0.008946	39.86
0.008603	38.86
0.008877	40.73
0.009126	39.53

Average 40.63
 Standard Dev. 1.341
 Coeff. of Var. [%] 3.301
 Min. 38.12
 Max. 43.37
 Number of Spec. 18

Average_{norm} 0.008787
 Standard Dev._{norm} 1.188
 Coeff. of Var. [%]_{norm} 2.929
 Min. 0.008259
 Max. 0.009199
 Number of Spec. 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

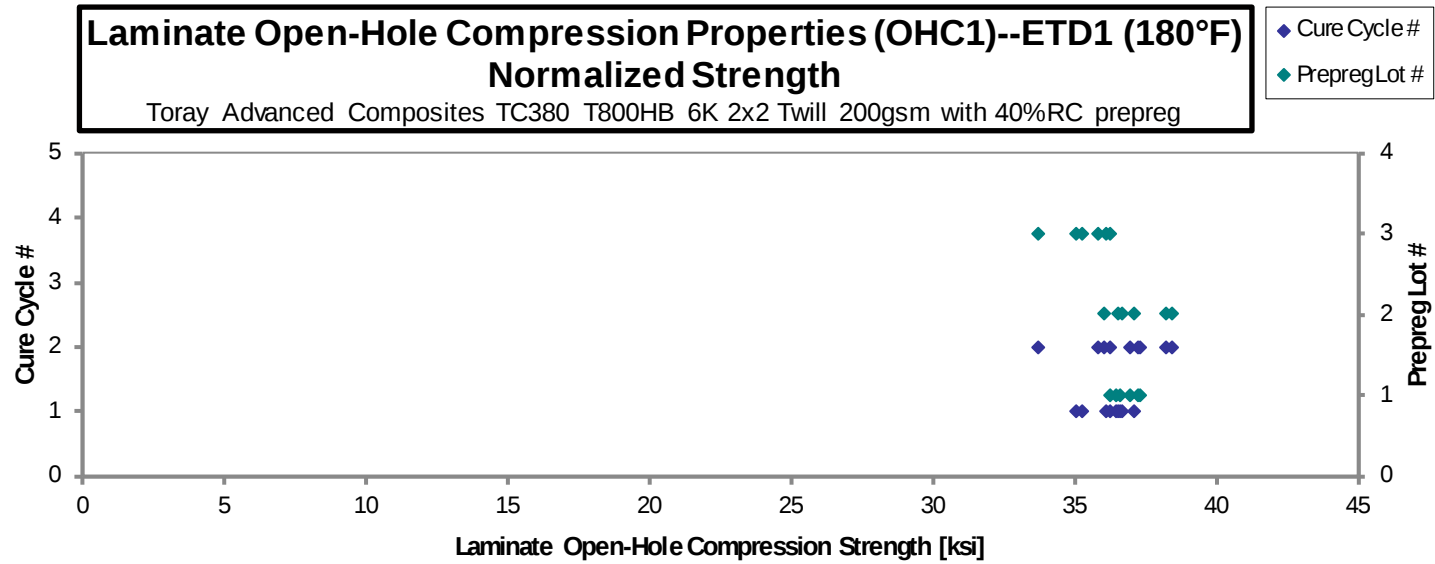
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEGA111C	A	C1	1	1	35.20	0.1458	16	M(A,L)GM
TCEGA112C	A	C1	1	1	35.70	0.1431	16	LGM
TCEGA113C	A	C1	1	1	38.14	0.1352	16	LGM
TCEGA211C	A	C2	1	2	36.02	0.1459	16	M(A,L)GM
TCEGA212C	A	C2	1	2	36.54	0.1424	16	M(A,L)GM
TCEGA213C	A	C2	1	2	38.58	0.1360	16	LGM
TCEGB111C	B	C1	2	1	36.37	0.1438	16	M(A,L)GM
TCEGB112C	B	C1	2	1	36.94	0.1399	16	M(A,L)GM
TCEGB113C	B	C1	2	1	38.36	0.1342	16	M(A,L)GM
TCEGB211C	B	C2	2	2	36.86	0.1461	16	M(A,L)GM
TCEGB212C	B	C2	2	2	38.10	0.1421	16	LGM
TCEGB213C	B	C2	2	2	37.96	0.1337	16	LGM
TCEGC111C	C	C1	3	1	34.77	0.1420	16	LGM
TCEGC112C	C	C1	3	1	36.24	0.1403	16	M(A,L)GM
TCEGC113C	C	C1	3	1	36.77	0.1349	16	M(A,L)GM
TCEGC211C	C	C2	3	2	35.08	0.1439	16	M(A,L)GM
TCEGC212C	C	C2	3	2	33.29	0.1427	16	M(A,L)GM
TCEGC213C	C	C2	3	2	36.92	0.1382	16	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009115	36.46
0.008941	36.28
0.008447	36.61
0.009116	37.31
0.008902	36.96
0.008500	37.27
0.008984	37.13
0.008744	36.70
0.008386	36.56
0.009130	38.25
0.008878	38.44
0.008358	36.06
0.008875	35.06
0.008769	36.11
0.008433	35.24
0.008991	35.84
0.008918	33.74
0.008635	36.23

Average 36.55
 Standard Dev. 1.407
 Coeff. of Var. [%] 3.851
 Min. 33.29
 Max. 38.58
 Number of Spec. 18

Average_{norm} 0.008785 36.46
 Standard Dev._{norm} 1.108
 Coeff. of Var. [%]_{norm} 3.040
 Min. 0.008358 33.74
 Max. 0.009130 38.44
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

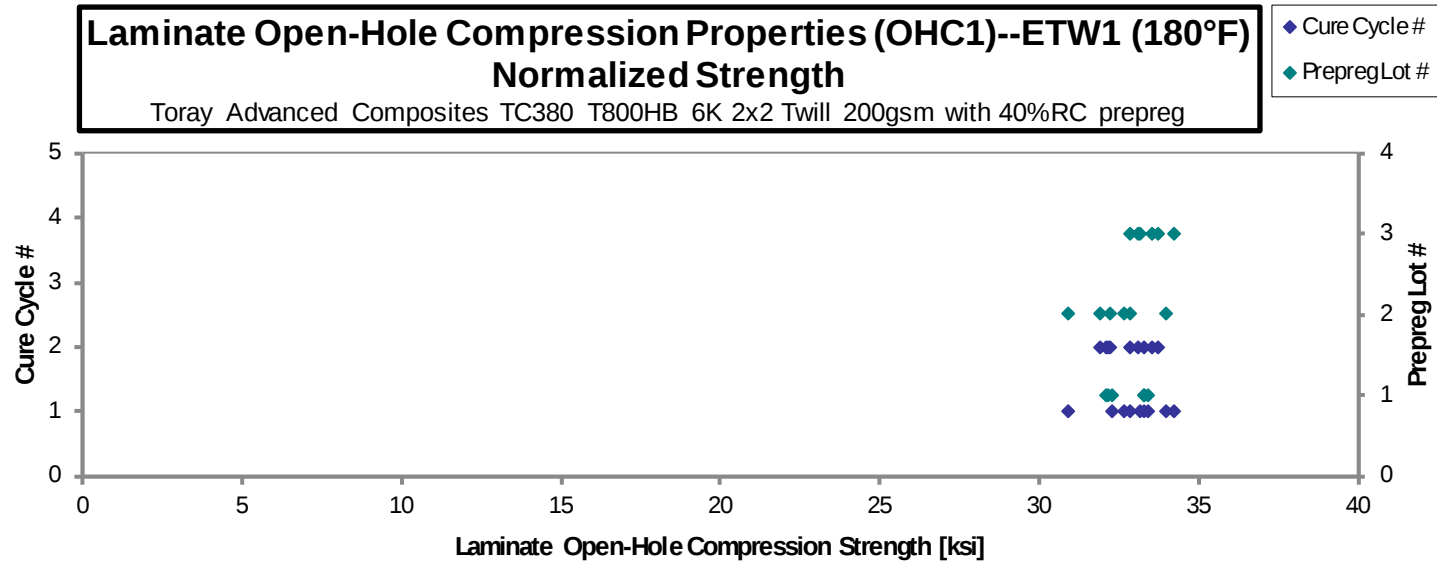
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEGA111D	A	C1	1	1	33.19	0.1418	16	LGM
TCEGA112D	A	C1	1	1	32.50	0.1443	16	LGM
TCEGA113D	A	C1	1	1	31.50	0.1445	16	LGM
TCEGA211D	A	C2	1	2	31.76	0.1424	16	LGM
TCEGA212D	A	C2	1	2	31.13	0.1456	16	M(A,L)GM
TCEGA213D	A	C2	1	2	32.18	0.1456	16	LGM
TCEGB111D	B	C1	2	1	31.33	0.1390	16	LGM
TCEGB112D	B	C1	2	1	31.89	0.1442	16	M(A,L)GM
TCEGB113D	B	C1	2	1	33.16	0.1444	16	M(A,L)GM
TCEGB211D	B	C2	2	2	32.06	0.1415	16	M(A,L)GM
TCEGB212D	B	C2	2	2	30.80	0.1460	16	M(A,L)GM
TCEGB213D	B	C2	2	2	31.69	0.1460	16	M(A,L)GM
TCEGC111D	C	C1	3	1	33.35	0.1388	16	M(A,L)GM
TCEGC112D	C	C1	3	1	32.97	0.1416	16	M(A,L)GM
TCEGC113D	C	C1	3	1	34.25	0.1407	16	M(A,L)GM
TCEGC211D	C	C2	3	2	32.59	0.1448	16	M(A,L)GM
TCEGC212D	C	C2	3	2	32.94	0.1441	16	M(A,L)GM
TCEGC213D	C	C2	3	2	32.30	0.1444	16	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008863	33.43
0.009021	33.32
0.009028	32.32
0.008902	32.13
0.009098	32.18
0.009098	33.27
0.008689	30.93
0.009009	32.65
0.009022	34.00
0.008845	32.23
0.009124	31.94
0.009123	32.86
0.008676	32.88
0.008852	33.17
0.008792	34.22
0.009052	33.52
0.009008	33.72
0.009024	33.12

Average **32.31**
 Standard Dev. **0.8916**
 Coeff. of Var. [%] **2.759**
 Min. **30.80**
 Max. **34.25**
 Number of Spec. **18**

Average_{norm} **0.008957** **32.88**
 Standard Dev._{norm} **0.8218**
 Coeff. of Var. [%]_{norm} **2.499**
 Min. **0.008676** **30.93**
 Max. **0.009124** **34.22**
 Number of Spec. **18** **18**



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

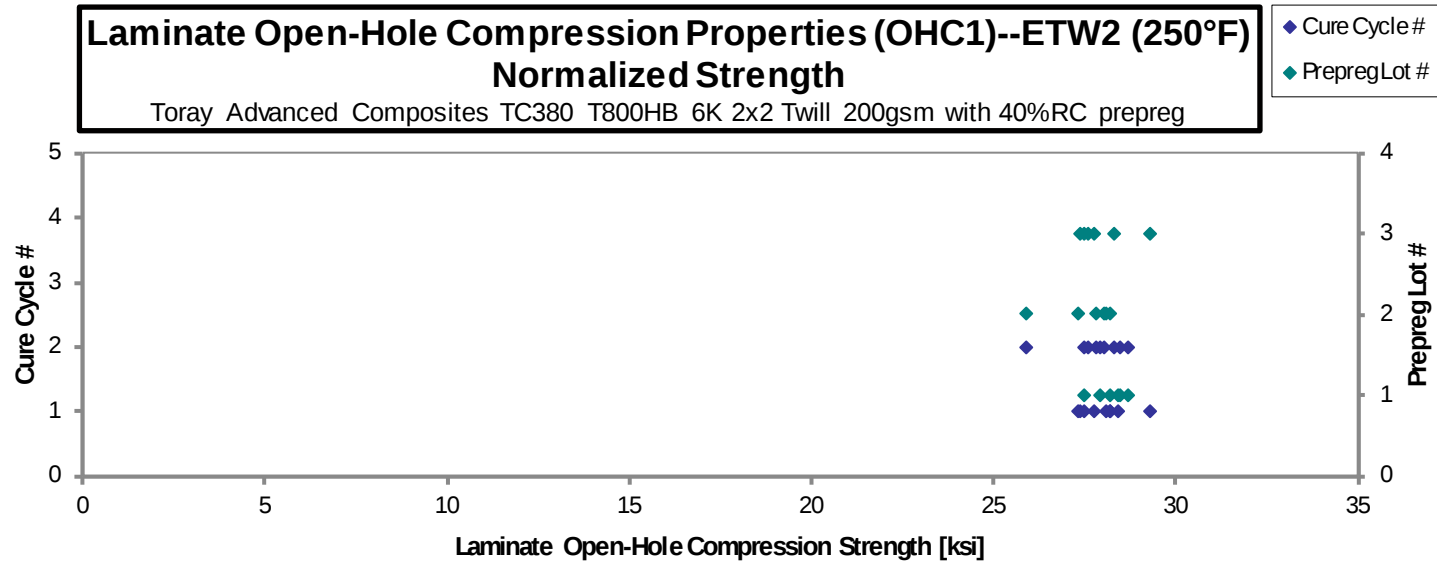
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEGA111E	A	C1	1	1	27.85	0.1425	16	LGM
TCEGA112E	A	C1	1	1	27.86	0.1436	16	LGM
TCEGA113E	A	C1	1	1	26.89	0.1441	16	M(A,L)GM
TCEGA211E	A	C2	1	2	27.17	0.1447	16	LGM
TCEGA212E	A	C2	1	2	27.67	0.1461	16	M(A,L)GM
TCEGA213E	A	C2	1	2	27.52	0.1456	16	M(A,L)GM
TCEGB111E	B	C1	2	1	26.62	0.1444	16	LGM
TCEGB112E	B	C1	2	1	27.23	0.1453	16	LGM
TCEGB113E	B	C1	2	1	27.58	0.1440	16	LGM
TCEGB211E	B	C2	2	2	25.25	0.1443	16	M(A,L)GM
TCEGB212E	B	C2	2	2	27.08	0.1457	16	LGM
TCEGB213E	B	C2	2	2	26.85	0.1458	16	LGM
TCEGC111E	C	C1	3	1	27.77	0.1407	16	M(A,L)GM
TCEGC112E	C	C1	3	1	27.39	0.1406	16	M(A,L)GM
TCEGC113E	C	C1	3	1	29.33	0.1407	16	M(A,L)GM
TCEGC211E	C	C2	3	2	27.80	0.1434	16	M(A,L)GM
TCEGC212E	C	C2	3	2	26.90	0.1444	16	M(A,L)GM
TCEGC213E	C	C2	3	2	26.81	0.1444	16	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008905	28.18
0.008977	28.42
0.009003	27.51
0.009045	27.93
0.009133	28.72
0.009101	28.47
0.009027	27.31
0.009079	28.09
0.008999	28.20
0.009020	25.89
0.009103	28.01
0.009114	27.81
0.008793	27.75
0.008790	27.36
0.008792	29.30
0.008960	28.31
0.009027	27.59
0.009024	27.49

Average 27.31
 Standard Dev. 0.8030
 Coeff. of Var. [%] 2.940
 Min. 25.25
 Max. 29.33
 Number of Spec. 18

Average_{norm} 0.008994 27.91
 Standard Dev._{norm} 0.7175
 Coeff. of Var. [%]_{norm} 2.571
 Min. 0.008790 25.89
 Max. 0.009133 29.30
 Number of Spec. 18 18



4.20 “10/80/10” Open-Hole Compression 2 Properties (OHC2)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

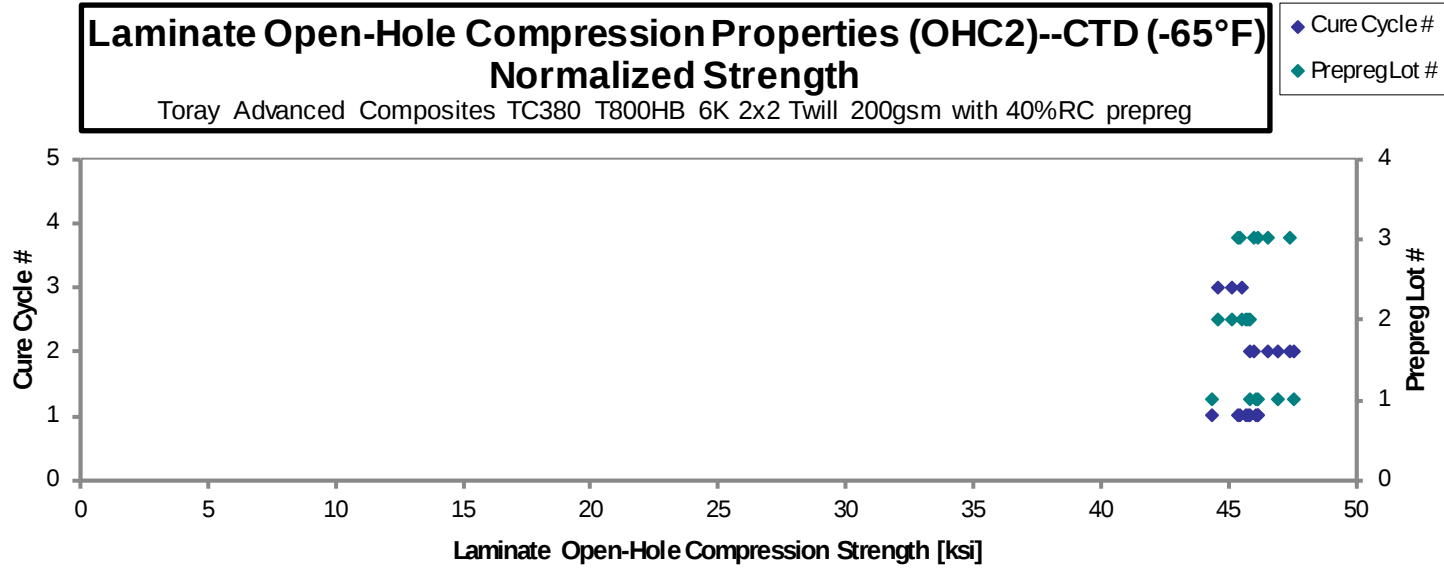
 t_{ply} [in]

0.008800

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]
TCEHA111B	A	C1	1	1	44.80	0.1811	20	M(A,L)GM	0.009055	46.10
TCEHA112B	A	C1	1	1	43.00	0.1815	20	M(A,L)GM	0.009076	44.35
TCEHA113B	A	C1	1	1	44.77	0.1816	20	M(A,L)GM	0.009078	46.19
TCEHA211B	A	C2	1	2	45.48	0.1816	20	M(A,L)GM	0.009080	46.93
TCEHA212B	A	C2	1	2	46.08	0.1816	20	M(A,L)GM	0.009078	47.53
TCEHA213B	A	C2	1	2	44.52	0.1814	20	M(A,L)GM	0.009068	45.88
TCEHB111B	B	C1	2	1	44.81	0.1795	20	M(A,L)GM	0.008977	45.71
TCEHB112B	B	C1	2	1	44.94	0.1792	20	M(A,L)GM	0.008959	45.76
TCEHB113B	B	C1	2	1	44.96	0.1796	20	M(A,L)GM	0.008980	45.88
TCEHB311B	B	C3	2	3	43.87	0.1788	20	M(A,L)GM	0.008942	44.58
TCEHB312B	B	C3	2	3	44.52	0.1785	20	M(A,L)GM	0.008926	45.16
TCEHB313B	B	C3	2	3	44.49	0.1802	20	M(A,L)GM	0.009010	45.55
TCEHC111B	C	C1	3	1	45.12	0.1773	20	M(A,L)GM	0.008864	45.45
TCEHC112B	C	C1	3	1	45.07	0.1772	20	M(A,L)GM	0.008858	45.36
TCEHC113B	C	C1	3	1	45.64	0.1780	20	M(A,L)GM	0.008898	46.15
TCEHC211B	C	C2	3	2	46.46	0.1795	20	M(A,L)GM	0.008973	47.38
TCEHC212B	C	C2	3	2	45.24	0.1790	20	M(A,L)GM	0.008950	46.01
TCEHC213B	C	C2	3	2	45.73	0.1792	20	M(A,L)GM	0.008958	46.55

Average 44.97
 Standard Dev. 0.7919
 Coeff. of Var. [%] 1.761
 Min. 43.00
 Max. 46.46
 Number of Spec. 18

Average_{norm} 0.008985 45.92
 Standard Dev._{norm} 0.8362
 Coeff. of Var. [%]_{norm} 1.821
 Min. 0.008858 44.35
 Max. 0.009080 47.53
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

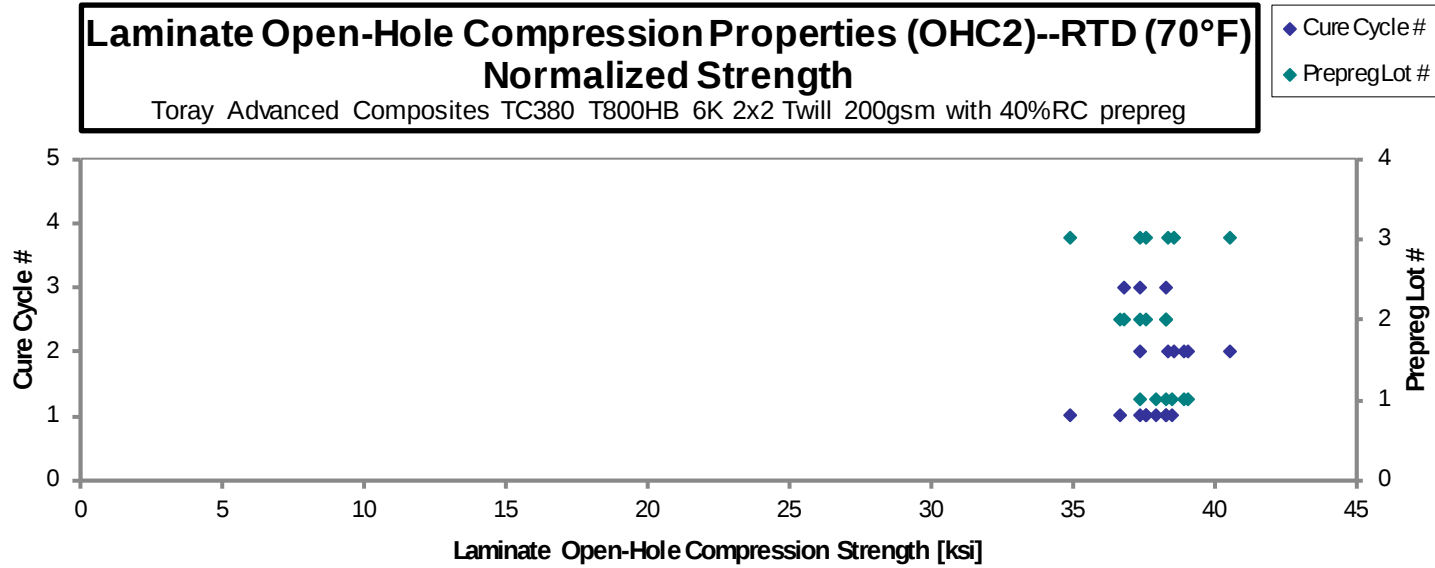
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEHA111A	A	C1	1	1	39.18	0.1704	20	M(L,A)GM
TCEHA112A	A	C1	1	1	38.02	0.1773	20	M(L,A)GM
TCEHA113A	A	C1	1	1	37.41	0.1813	20	M(L,A)GM
TCEHA211A	A	C2	1	2	38.65	0.1703	20	M(L,A)GM
TCEHA212A	A	C2	1	2	38.43	0.1783	20	M(L,A)GM
TCEHA213A	A	C2	1	2	37.84	0.1816	20	M(L,A)GM
TCEHB111A	B	C1	2	1	39.31	0.1684	20	M(L,A)GM
TCEHB112A	B	C1	2	1	37.09	0.1742	20	M(L,A)GM
TCEHB113A	B	C1	2	1	37.80	0.1785	20	M(L,A)GM
TCEHB311A	B	C3	2	3	38.74	0.1700	20	M(L,A)GM
TCEHB312A	B	C3	2	3	36.78	0.1761	20	M(L,A)GM
TCEHB313A	B	C3	2	3	37.57	0.1793	20	M(L,A)GM
TCEHC111A	C	C1	3	1	35.78	0.1718	20	LGM
TCEHC112A	C	C1	3	1	37.24	0.1777	20	M(A,L)GM
TCEHC113A	C	C1	3	1	36.65	0.1795	20	M(A,L)GM
TCEHC211A	C	C2	3	2	39.01	0.1732	20	M(A,L)GM
TCEHC212A	C	C2	3	2	38.15	0.1780	20	M(A,L)GM
TCEHC213A	C	C2	3	2	39.55	0.1806	20	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008520	37.94
0.008864	38.30
0.009066	38.54
0.008515	37.40
0.008916	38.93
0.009082	39.06
0.008421	37.61
0.008711	36.71
0.008923	38.33
0.008500	37.42
0.008806	36.80
0.008964	38.27
0.008591	34.93
0.008883	37.59
0.008977	37.38
0.008662	38.40
0.008899	38.58
0.009030	40.58

Average 37.96
 Standard Dev. 1.027
 Coeff. of Var. [%] 2.705
 Min. 35.78
 Max. 39.55
 Number of Spec. 18

Average_{norm} 0.008796 37.93
 Standard Dev._{norm} 1.177
 Coeff. of Var. [%]_{norm} 3.102
 Min. 0.008421 34.93
 Max. 0.009082 40.58
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

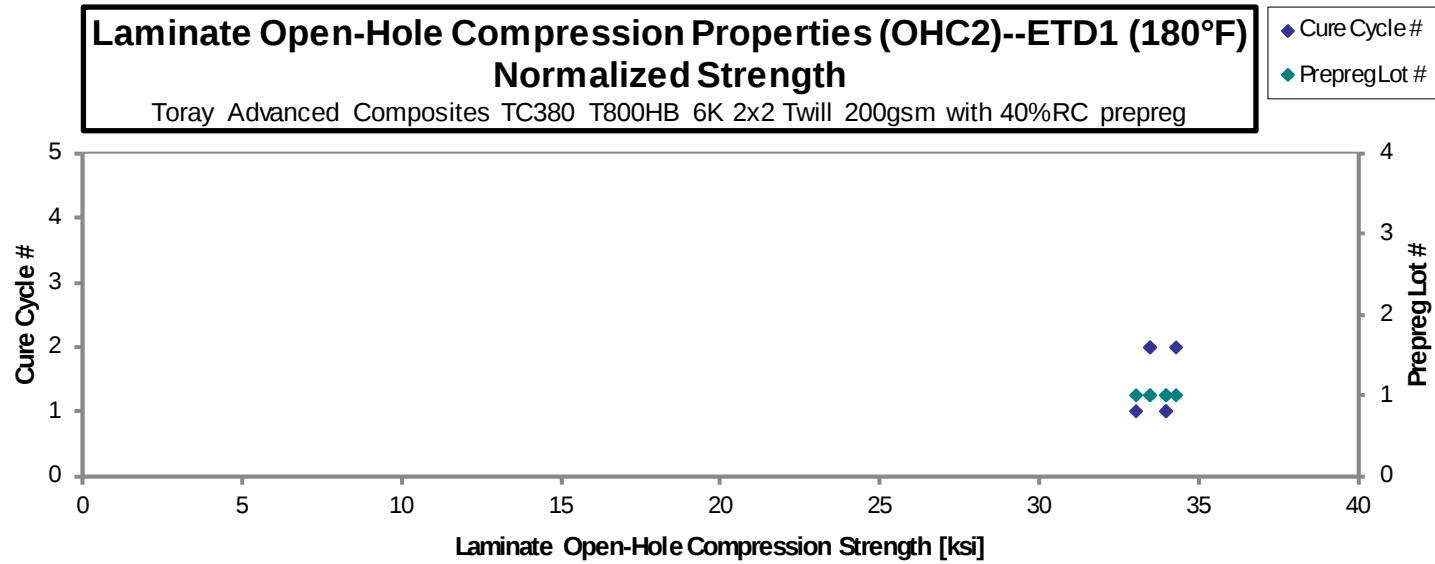
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEHA111C	A	C1	1	1	32.94	0.1817	20	M(A,L)GM
TCEHA112C	A	C1	1	1	33.58	0.1781	20	LGM
TCEHA113C	A	C1	1	1	34.43	0.1689	20	M(A,L)GM
TCEHA211C	A	C2	1	2	32.51	0.1813	20	M(A,L)GM
TCEHA212C	A	C2	1	2	33.32	0.1770	20	M(A,L)GM
TCEHA213C	A	C2	1	2	35.67	0.1693	20	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009085	34.01
0.008907	33.99
0.008444	33.03
0.009063	33.48
0.008849	33.50
0.008466	34.32

Average 33.74
 Standard Dev. 1.145
 Coeff. of Var. [%] 3.392
 Min. 32.51
 Max. 35.67
 Number of Spec. 6

Average_{norm} 0.008802 33.72
 Standard Dev._{norm} 0.4666
 Coeff. of Var. [%]_{norm} 1.384
 Min. 0.008444 33.03
 Max. 0.009085 34.32
 Number of Spec. 6 6



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

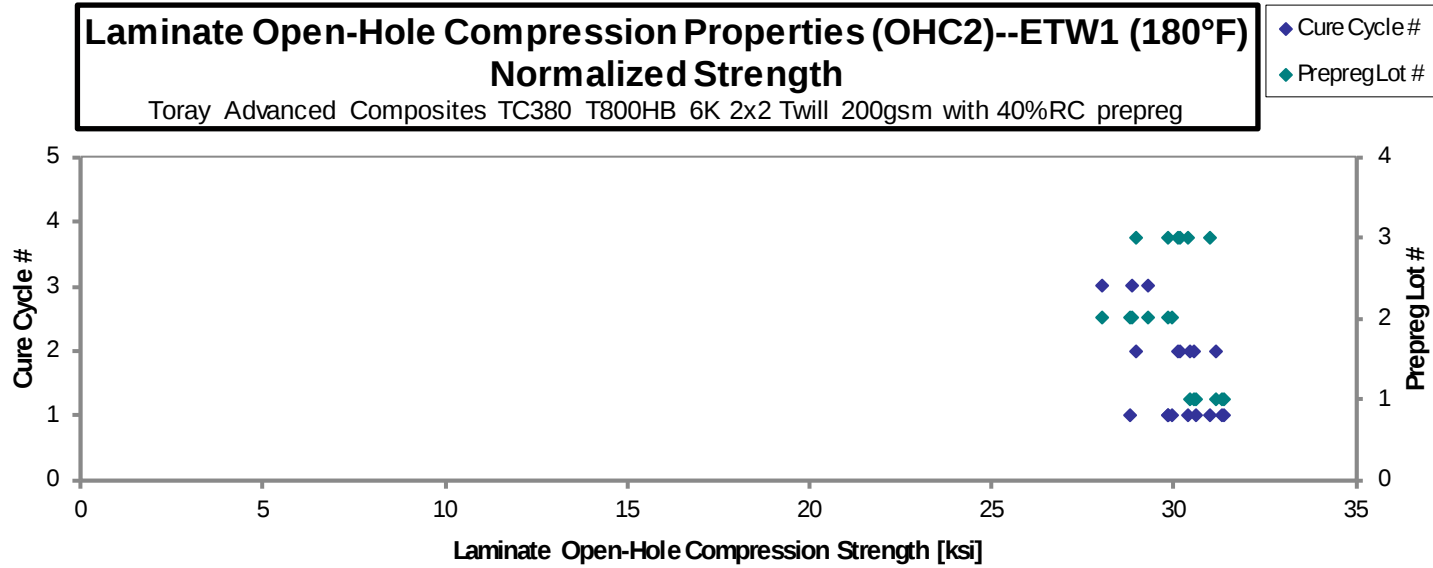
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEHA111D	A	C1	1	1	30.35	0.1776	20	M(A,L)GM
TCEHA112D	A	C1	1	1	30.49	0.1812	20	M(A,L)GM
TCEHA113D	A	C1	1	1	30.38	0.1815	20	M(A,L)GM
TCEHA211D	A	C2	1	2	30.27	0.1777	20	M(A,L)GM
TCEHA212D	A	C2	1	2	29.53	0.1816	20	M(A,L)GM
TCEHA213D	A	C2	1	2	30.16	0.1819	20	M(A,L)GM
TCEHB111D	B	C1	2	1	29.21	0.1798	20	M(A,L)GM
TCEHB112D	B	C1	2	1	30.01	0.1758	20	M(A,L)GM
TCEHB113D	B	C1	2	1	29.92	0.1695	20	M(A,L)GM
TCEHB311D	B	C3	2	3	28.34	0.1791	20	M(A,L)GM
TCEHB312D	B	C3	2	3	29.44	0.1753	20	M(A,L)GM
TCEHB313D	B	C3	2	3	29.39	0.1679	20	M(A,L)GM
TCEHC111D	C	C1	3	1	29.93	0.1786	20	AGM
TCEHC112D	C	C1	3	1	30.91	0.1699	20	AGM
TCEHC113D	C	C1	3	1	30.81	0.1770	20	M(A,L)GM
TCEHC211D	C	C2	3	2	29.55	0.1798	20	M(A,L)GM
TCEHC212D	C	C2	3	2	29.84	0.1777	20	M(A,L)GM
TCEHC213D	C	C2	3	2	29.75	0.1713	20	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008878	30.61
0.009061	31.39
0.009077	31.34
0.008883	30.55
0.009079	30.47
0.009096	31.17
0.008989	29.84
0.008788	29.96
0.008473	28.81
0.008953	28.84
0.008763	29.31
0.008393	28.03
0.008929	30.37
0.008493	29.84
0.008849	30.98
0.008988	30.18
0.008886	30.13
0.008564	28.96

Average 29.90
 Standard Dev. 0.6192
 Coeff. of Var. [%] 2.071
 Min. 28.34
 Max. 30.91
 Number of Spec. 18

Average_{norm} 0.008841 30.04
 Standard Dev._{norm} 0.9518
 Coeff. of Var. [%]_{norm} 3.168
 Min. 0.008393 28.03
 Max. 0.009096 31.39
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

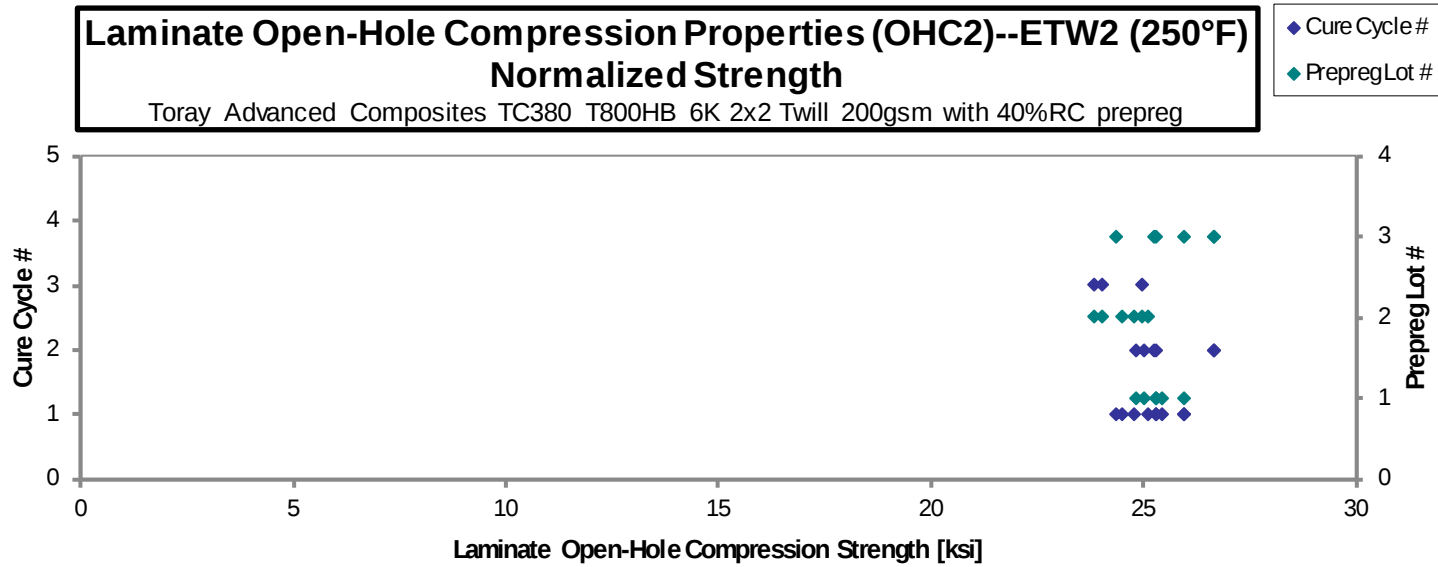
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEHA111E	A	C1	1	1	25.18	0.1815	20	M(A,L)GM
TCEHA112E	A	C1	1	1	24.53	0.1825	20	M(A,L)GM
TCEHA113E	A	C1	1	1	24.53	0.1814	20	M(A,L)GM
TCEHA211E	A	C2	1	2	24.58	0.1810	20	M(A,L)GM
TCEHA212E	A	C2	1	2	24.16	0.1823	20	M(A,L)GM
TCEHA213E	A	C2	1	2	24.04	0.1816	20	M(A,L)GM
TCEHB111E	B	C1	2	1	23.92	0.1801	20	M(A,L)GM
TCEHB112E	B	C1	2	1	24.16	0.1804	20	M(A,L)GM
TCEHB113E	B	C1	2	1	24.55	0.1801	20	M(A,L)GM
TCEHB311E	B	C3	2	3	23.26	0.1802	20	M(A,L)GM
TCEHB312E	B	C3	2	3	23.38	0.1809	20	M(A,L)GM
TCEHB313E	B	C3	2	3	24.44	0.1799	20	M(A,L)GM
TCEHC111E	C	C1	3	1	25.60	0.1786	20	M(A,L)GM
TCEHC112E	C	C1	3	1	24.94	0.1786	20	M(A,L)GM
TCEHC113E	C	C1	3	1	23.91	0.1792	20	M(A,L)GM
TCEHC211E	C	C2	3	2	24.85	0.1788	20	M(A,L)GM
TCEHC212E	C	C2	3	2	26.11	0.1799	20	M(A,L)GM
TCEHC213E	C	C2	3	2	26.10	0.1798	20	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009077	25.97
0.009123	25.43
0.009068	25.28
0.009050	25.28
0.009117	25.03
0.009082	24.81
0.009004	24.48
0.009020	24.76
0.009006	25.12
0.009011	23.82
0.009046	24.03
0.008993	24.98
0.008928	25.98
0.008928	25.30
0.008958	24.34
0.008938	25.24
0.008994	26.68
0.008991	26.67

Average 24.57
 Standard Dev. 0.8042
 Coeff. of Var. [%] 3.273
 Min. 23.26
 Max. 26.11
 Number of Spec. 18

Average_{norm} 0.009019
 Standard Dev._{norm} 0.7892
 Coeff. of Var. [%]_{norm} 3.134
 Min. 0.008928
 Max. 0.009123
 Number of Spec. 18



4.21 “40/20/40” Open-Hole Compression 3 Properties (OHC3)

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

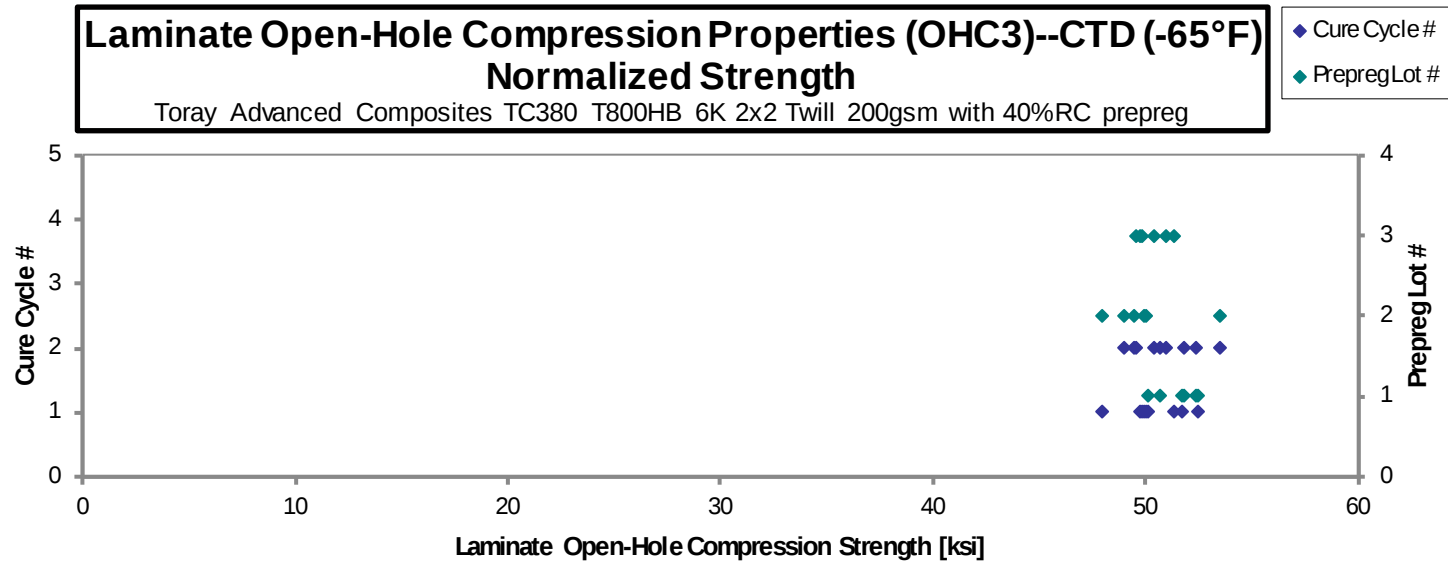
 t_{ply} [in]

0.008800

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]
TCEIA111B	A	C1	1	1	50.58	0.1825	20	M(A,L)GM	0.009125	52.45
TCEIA112B	A	C1	1	1	50.21	0.1814	20	M(A,L)GM	0.009069	51.75
TCEIA113B	A	C1	1	1	48.57	0.1817	20	M(A,L)GM	0.009085	50.14
TCEIA211B	A	C2	1	2	48.80	0.1830	20	M(A,L)GM	0.009148	50.73
TCEIA212B	A	C2	1	2	50.39	0.1828	20	M(A,L)GM	0.009141	52.34
TCEIA213B	A	C2	1	2	49.68	0.1835	20	M(A,L)GM	0.009176	51.81
TCEIB111B	B	C1	2	1	49.01	0.1794	20	M(A,L)GM	0.008970	49.95
TCEIB112B	B	C1	2	1	49.42	0.1782	20	M(A,L)GM	0.008912	50.05
TCEIB113B	B	C1	2	1	47.02	0.1794	20	M(A,L)GM	0.008968	47.92
TCEIB211B	B	C2	2	2	48.12	0.1793	20	M(A,L)GF	0.008964	49.02
TCEIB212B	B	C2	2	2	48.71	0.1786	20	M(A,L)GF	0.008932	49.44
TCEIB213B	B	C2	2	2	52.33	0.1801	20	M(A,L)GF	0.009004	53.54
TCEIC111B	C	C1	3	1	49.13	0.1784	20	M(A,L)GM	0.008921	49.80
TCEIC112B	C	C1	3	1	50.81	0.1780	20	M(A,L)GM	0.008900	51.39
TCEIC113B	C	C1	3	1	49.20	0.1778	20	M(A,L)GM	0.008891	49.71
TCEIC211B	C	C2	3	2	50.04	0.1794	20	LGM	0.008968	50.99
TCEIC212B	C	C2	3	2	49.81	0.1781	20	M(A,L)GM	0.008903	50.40
TCEIC213B	C	C2	3	2	48.80	0.1786	20	M(A,L)GM	0.008932	49.53

Average 49.48
 Standard Dev. 1.178
 Coeff. of Var. [%] 2.381
 Min. 47.02
 Max. 52.33
 Number of Spec. 18

Average_{norm} 0.009000 50.61
 Standard Dev._{norm} 1.398
 Coeff. of Var. [%]_{norm} 2.763
 Min. 0.008891 47.92
 Max. 0.009176 53.54
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

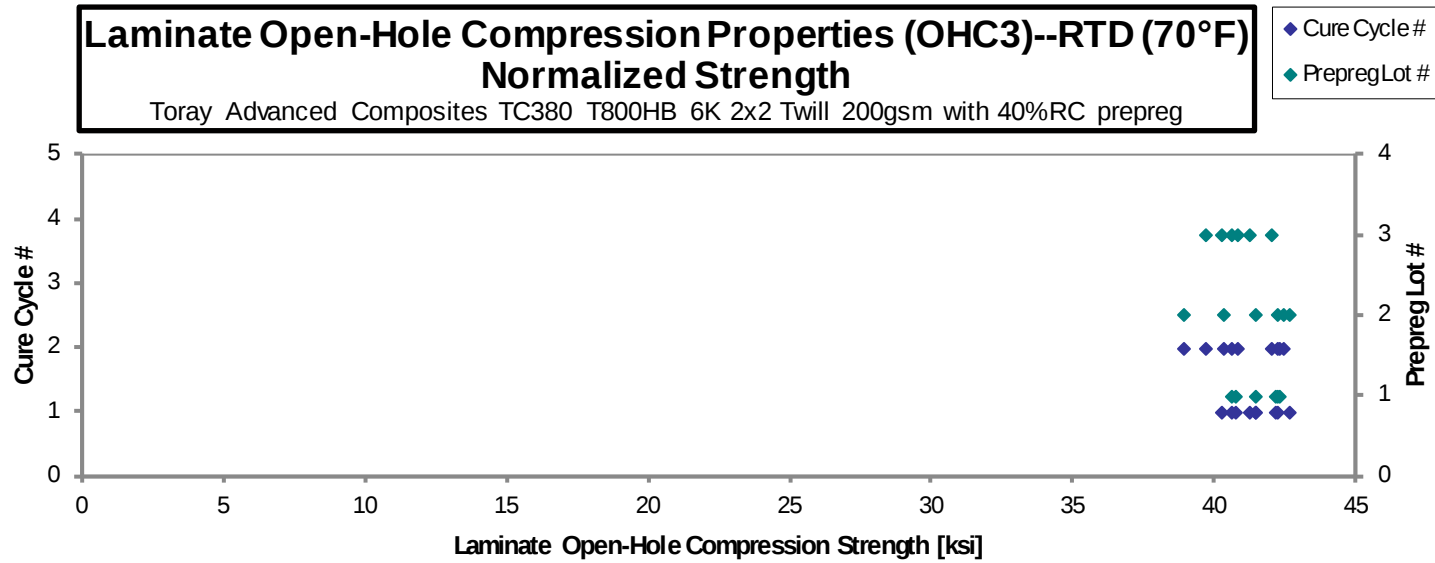
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEIA111A	A	C1	1	1	42.86	0.1703	20	LGM
TCEIA112A	A	C1	1	1	40.10	0.1790	20	LGM
TCEIA113A	A	C1	1	1	40.75	0.1823	20	LGM
TCEIA211A	A	C2	1	2	42.17	0.1696	20	LGM
TCEIA212A	A	C2	1	2	41.73	0.1786	20	LGM
TCEIA213A	A	C2	1	2	40.64	0.1829	20	LGM
TCEIB111A	B	C1	2	1	44.58	0.1685	20	LGM
TCEIB112A	B	C1	2	1	41.78	0.1748	20	LGM
TCEIB113A	B	C1	2	1	41.62	0.1788	20	LGM
TCEIB211A	B	C2	2	2	40.40	0.1697	20	LGM
TCEIB212A	B	C2	2	2	42.64	0.1754	20	LGM
TCEIB213A	B	C2	2	2	39.70	0.1788	20	LGM
TCEIC111A	C	C1	3	1	41.25	0.1719	20	M(A,L)GM
TCEIC112A	C	C1	3	1	40.93	0.1773	20	M(A,L)GM
TCEIC113A	C	C1	3	1	39.86	0.1796	20	M(A,L)GM
TCEIC211A	C	C2	3	2	40.76	0.1716	20	M(A,L)GM
TCEIC212A	C	C2	3	2	40.60	0.1773	20	M(A,L)GM
TCEIC213A	C	C2	3	2	41.16	0.1797	20	M(A,L)GM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008514	41.47
0.008949	40.77
0.009117	42.22
0.008479	40.63
0.008930	42.35
0.009145	42.23
0.008424	42.67
0.008739	41.49
0.008939	42.27
0.008485	38.95
0.008771	42.50
0.008941	40.34
0.008593	40.27
0.008867	41.24
0.008978	40.66
0.008578	39.73
0.008863	40.89
0.008986	42.03

Average 41.31
 Standard Dev. 1.208
 Coeff. of Var. [%] 2.925
 Min. 39.70
 Max. 44.58
 Number of Spec. 18

Average_{norm} 0.008794 41.26
 Standard Dev._{norm} 1.055
 Coeff. of Var. [%]_{norm} 2.556
 Min. 0.008424 38.95
 Max. 0.009145 42.67
 Number of Spec. 18 18



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

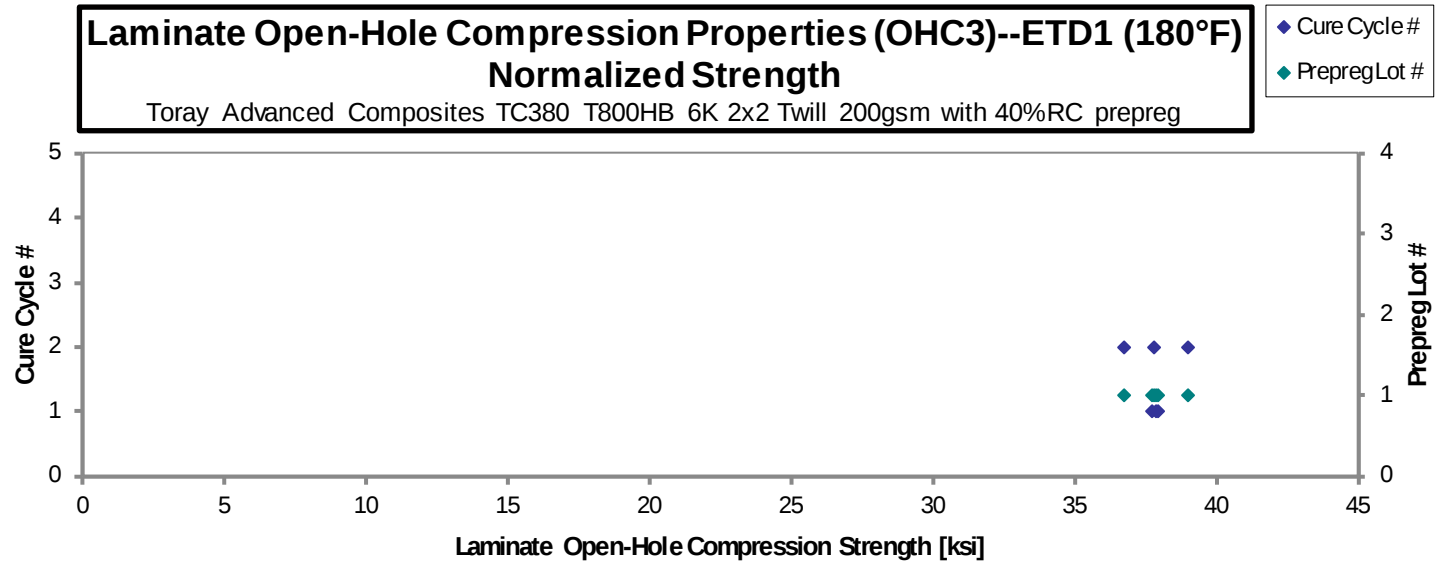
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEIA111C	A	C1	1	1	36.79	0.1806	20	LGM
TCEIA112C	A	C1	1	1	37.92	0.1761	20	M(A,L)GM
TCEIA113C	A	C1	1	1	39.28	0.1696	20	M(A,L)GM
TCEIA211C	A	C2	1	2	36.32	0.1831	20	M(A,L)GM
TCEIA212C	A	C2	1	2	36.11	0.1791	20	LGM
TCEIA213C	A	C2	1	2	40.12	0.1711	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009028	37.74
0.008805	37.95
0.008479	37.85
0.009153	37.78
0.008957	36.76
0.008557	39.01

Average 37.76
 Standard Dev. 1.651
 Coeff. of Var. [%] 4.372
 Min. 36.11
 Max. 40.12
 Number of Spec. 6

Average_{norm} 0.008830 37.85
 Standard Dev._{norm} 0.7166
 Coeff. of Var. [%]_{norm} 1.893
 Min. 0.008479 36.76
 Max. 0.009153 39.01
 Number of Spec. 6



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

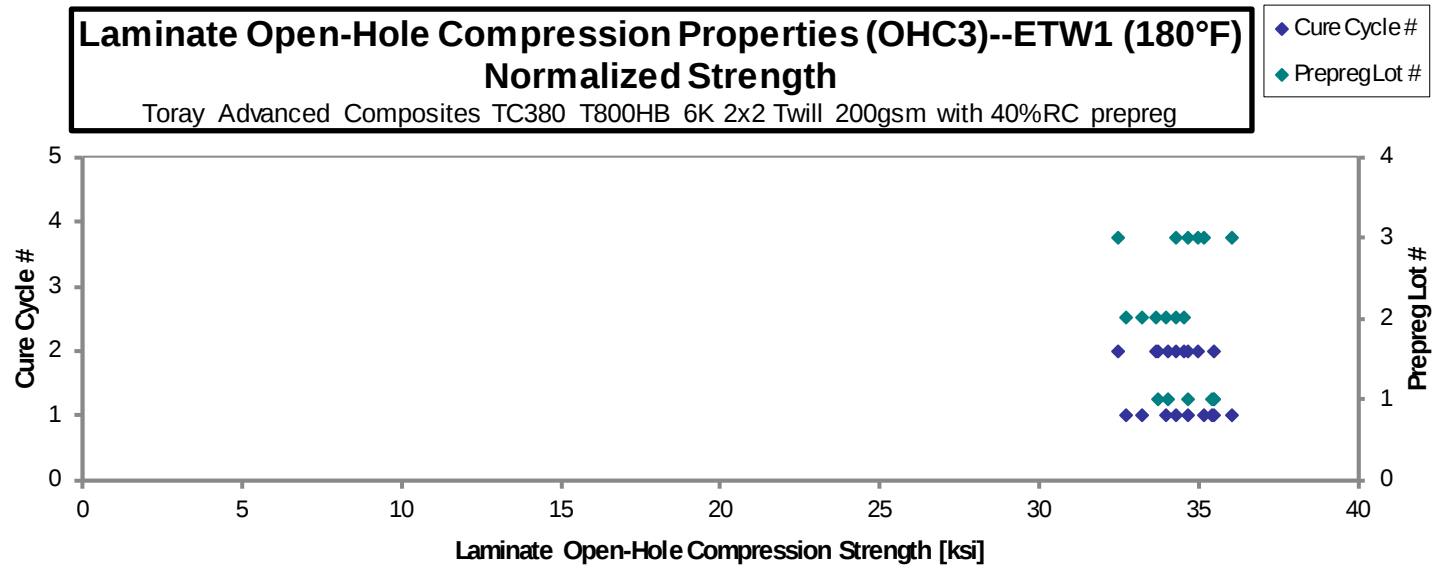
0.008800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEIA111D	A	C1	1	1	34.61	0.1765	20	M(A,L)GM
TCEIA112D	A	C1	1	1	34.78	0.1795	20	LGM
TCEIA113D	A	C1	1	1	34.47	0.1808	20	LGM
TCEIA211D	A	C2	1	2	33.61	0.1768	20	M(A,L)GM
TCEIA212D	A	C2	1	2	34.31	0.1820	20	LGM
TCEIA213D	A	C2	1	2	32.80	0.1826	20	LGM
TCEIB111D	B	C1	2	1	33.65	0.1778	20	LGM
TCEIB112D	B	C1	2	1	33.25	0.1731	20	M(A,L)GM
TCEIB113D	B	C1	2	1	35.24	0.1659	20	LGM
TCEIB211D	B	C2	2	2	33.96	0.1791	20	M(A,L)GM
TCEIB212D	B	C2	2	2	33.93	0.1747	20	LGM
TCEIB213D	B	C2	2	2	35.55	0.1698	20	LGM
TCEIC111D	C	C1	3	1	33.97	0.1776	20	LGM
TCEIC112D	C	C1	3	1	36.08	0.1716	20	LGM
TCEIC113D	C	C1	3	1	35.44	0.1791	20	LGM
TCEIC211D	C	C2	3	2	34.20	0.1783	20	LGM
TCEIC212D	C	C2	3	2	34.95	0.1763	20	LGM
TCEIC213D	C	C2	3	2	33.39	0.1711	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008823	34.70
0.008973	35.46
0.009042	35.41
0.008840	33.76
0.009100	35.48
0.009128	34.02
0.008892	34.00
0.008657	32.71
0.008293	33.21
0.008956	34.56
0.008736	33.68
0.008492	34.30
0.008880	34.28
0.008578	35.17
0.008955	36.06
0.008915	34.65
0.008813	35.00
0.008557	32.47

Average **34.34**
 Standard Dev. **0.8780**
 Coeff. of Var. [%] **2.557**
 Min. **32.80**
 Max. **36.08**
 Number of Spec. **18**

Average_{norm} **0.008813** **34.39**
 Standard Dev._{norm} **0.9840**
 Coeff. of Var. [%]_{norm} **2.862**
 Min. **0.008293** **32.47**
 Max. **0.009128** **36.06**
 Number of Spec. **18** **18**



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

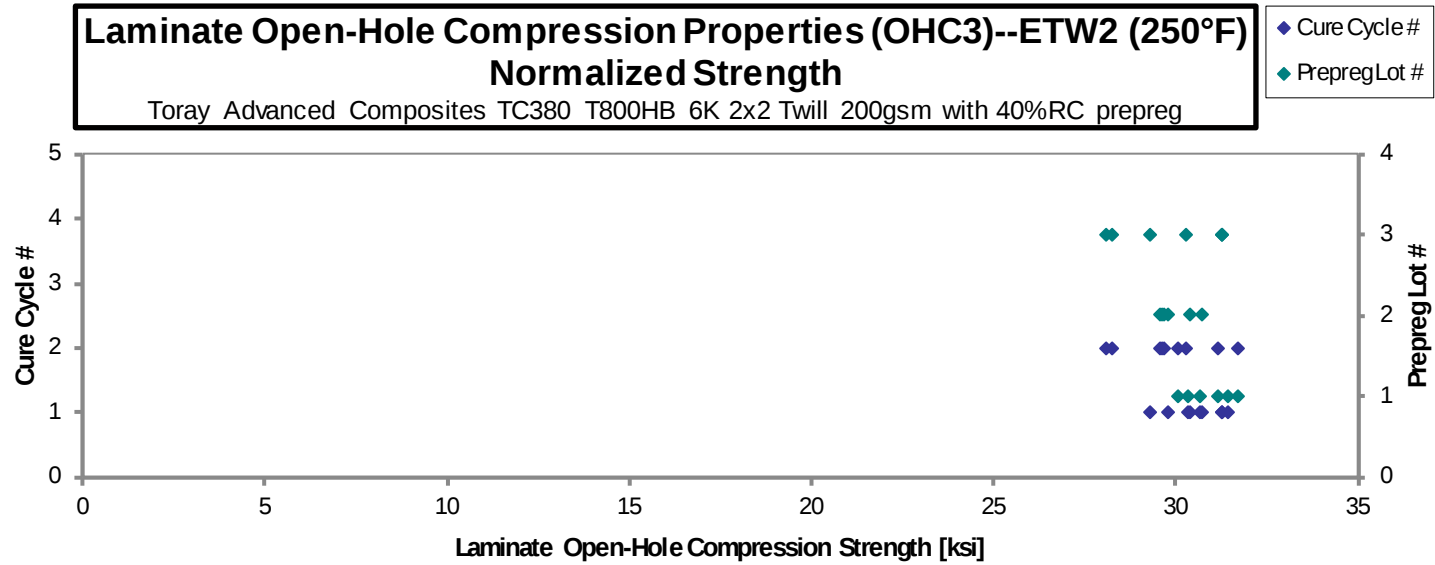
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEIA111E	A	C1	1	1	29.86	0.1787	20	LGM
TCEIA112E	A	C1	1	1	30.08	0.1795	20	LGM
TCEIA113E	A	C1	1	1	30.92	0.1789	20	LGM
TCEIA211E	A	C2	1	2	30.11	0.1820	20	LGM
TCEIA212E	A	C2	1	2	30.53	0.1829	20	LGM
TCEIA213E	A	C2	1	2	28.85	0.1833	20	LGM
TCEIB111E	B	C1	2	1	29.87	0.1791	20	LGM
TCEIB112E	B	C1	2	1	29.89	0.1811	20	LGM
TCEIB113E	B	C1	2	1	29.23	0.1794	20	LGM
TCEIB211E	B	C2	2	2	29.10	0.1789	20	LGM
TCEIB212E	B	C2	2	2	29.10	0.1796	20	LGM
TCEIB213E	B	C2	2	2	29.11	0.1790	20	LGM
TCEIC111E	C	C1	3	1	28.80	0.1791	20	M(A,L)GM
TCEIC112E	C	C1	3	1	30.80	0.1788	20	LGM
TCEIC113E	C	C1	3	1	30.91	0.1781	20	M(A,L)GM
TCEIC211E	C	C2	3	2	27.66	0.1788	20	LGM
TCEIC212E	C	C2	3	2	27.75	0.1791	20	LGM
TCEIC213E	C	C2	3	2	29.95	0.1781	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008933	30.31
0.008975	30.68
0.008943	31.42
0.009101	31.14
0.009146	31.73
0.009165	30.05
0.008957	30.40
0.009053	30.75
0.008968	29.79
0.008943	29.57
0.008978	29.68
0.008948	29.60
0.008953	29.30
0.008942	31.29
0.008906	31.29
0.008941	28.10
0.008957	28.25
0.008903	30.30

Average 29.58
 Standard Dev. 0.9667
 Coeff. of Var. [%] 3.268
 Min. 27.66
 Max. 30.92
 Number of Spec. 18

Average_{norm} 0.008984 30.20
 Standard Dev._{norm} 1.027
 Coeff. of Var. [%]_{norm} 3.401
 Min. 0.008903 28.10
 Max. 0.009165 31.73
 Number of Spec. 18 18



4.22 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)

In some cases of FHC1>UNC1, UNC1 data is recommended for design. The FHC1 data is for informational purposes only and is not appropriate to be used for design. Shaded values indicated FHC1>UNC1.

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

0.008800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE7A111B	A	C1	1	1	82.78	0.1431	16	M(A,L)GF
TCE7A112B	A	C1	1	1	88.73	0.1425	16	M(A,L)GF
TCE7A113B	A	C1	1	1	88.83	0.1428	16	M(A,L)WB
TCE7A114B	A	C1	1	1	89.87	0.1435	16	M(A,L)GF
TCE7A211B	A	C2	1	2	91.16	0.1431	16	M(A,L)WB
TCE7A212B	A	C2	1	2	90.38	0.1426	16	M(A,L)GF
TCE7A213B	A	C2	1	2	91.18	0.1437	16	M(A,L)WT
TCE7A214B	A	C2	1	2	89.77	0.1452	16	M(A,L)GT

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008945	84.15
0.008905	89.79
0.008926	90.10
0.008969	91.59
0.008946	92.67
0.008915	91.55
0.008979	93.04
0.009076	92.59

Average 89.09
Standard Dev. 2.709
Coeff. of Var. [%] 3.041
Min. 82.78
Max. 91.18
Number of Spec. 8

Average_{norm} 0.008958
Standard Dev._{norm} 2.893
Coeff. of Var. [%]_{norm} 3.190
Min. 0.008905
Max. 0.009076
Number of Spec. 8

90.69

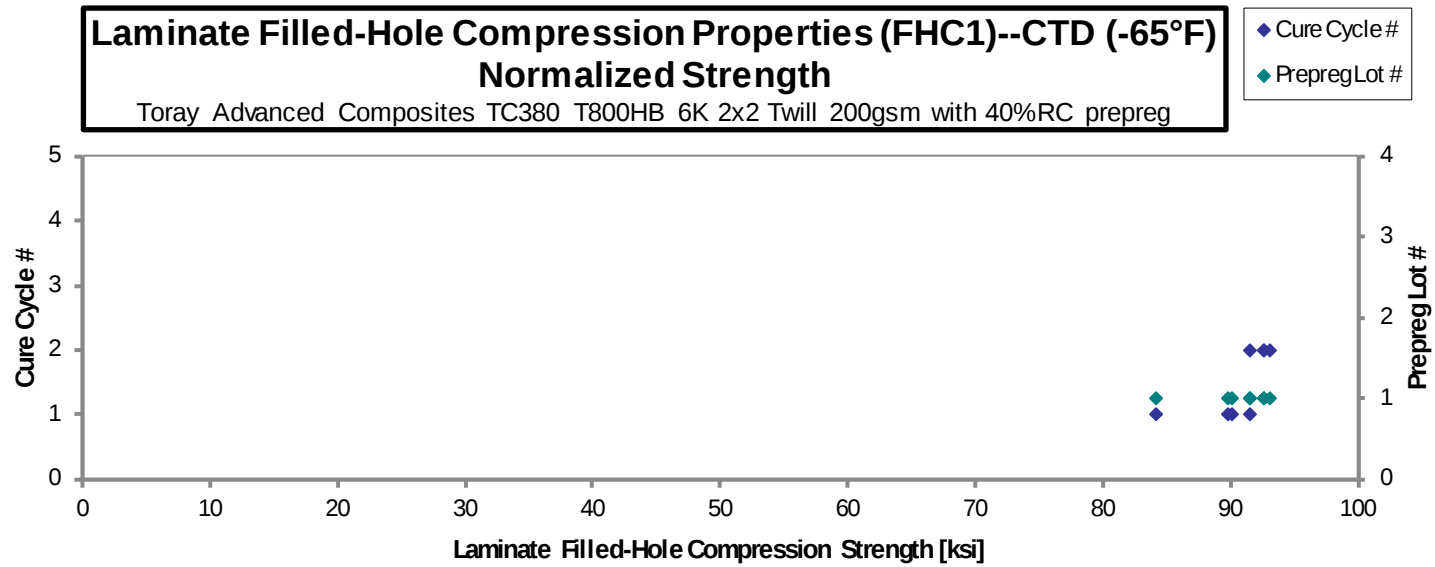
2.893

3.190

84.15

93.04

8



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

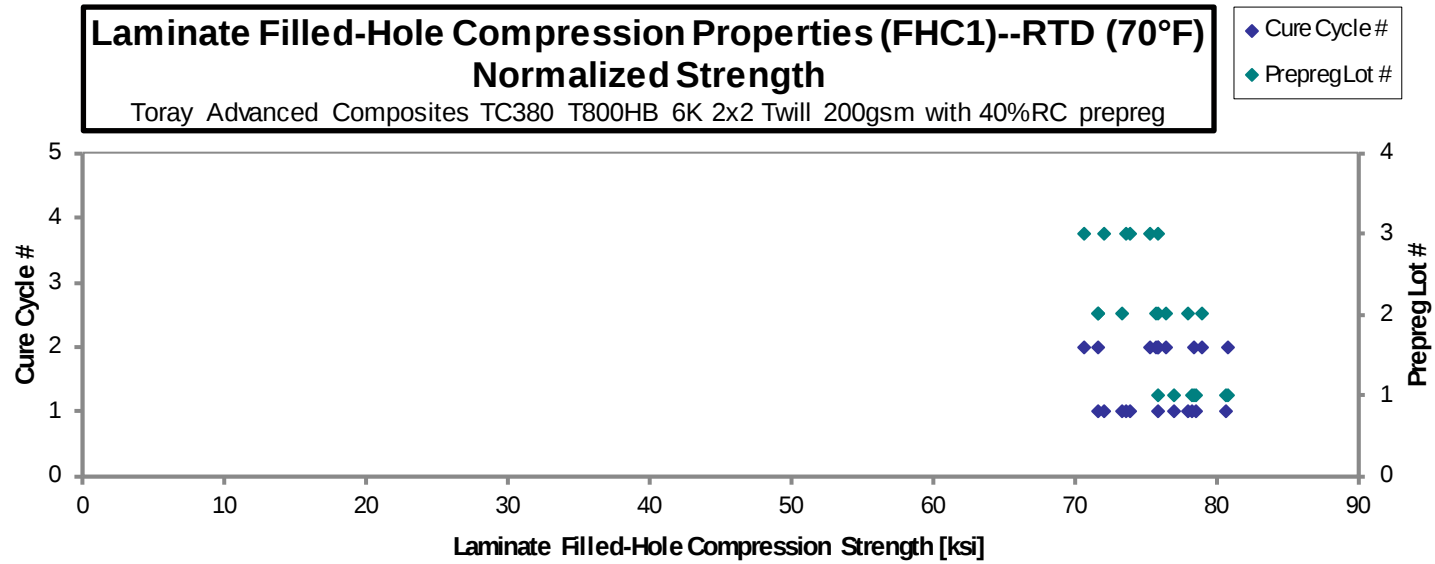
 t_{ply} [in]

0.008800

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]
TCE7A111A	A	C1	1	1	80.32	0.1349	16	M(A,L)WB	0.008431	76.95
TCE7A112A	A	C1	1	1	78.37	0.1413	16	M(A,L)GF	0.008829	78.63
TCE7A113A	A	C1	1	1	76.55	0.1440	16	M(A,L)GF	0.009002	78.31
TCE7A114A	A	C1	1	1	78.86	0.1440	16	M(A,L)WB	0.009002	80.67
TCE7A211A	A	C2	1	2	79.31	0.1347	16	M(A,L)GF	0.008416	75.85
TCE7A212A	A	C2	1	2	80.47	0.1415	16	M(A,L)GF	0.008846	80.89
TCE7A213A	A	C2	1	2	76.73	0.1440	16	M(A,L)GF	0.009002	78.50
TCE7B111A	B	C1	2	1	75.98	0.1360	16	LWB	0.008501	73.40
TCE7B112A	B	C1	2	1	71.48	0.1412	16	M(A,L)GF	0.008823	71.67
TCE7B113A	B	C1	2	1	73.25	0.1458	16	M(A,L)GF	0.009113	75.85
TCE7B114A	B	C1	2	1	74.90	0.1466	16	LGB	0.009164	77.99
TCE7B211A	B	C2	2	2	76.30	0.1323	16	M(A,L)GF	0.008271	71.71
TCE7B212A	B	C2	2	2	75.07	0.1421	16	LWB	0.008879	75.75
TCE7B213A	B	C2	2	2	73.66	0.1462	16	M(A,L)GF	0.009138	76.48
TCE7B214A	B	C2	2	2	75.72	0.1469	16	LGF	0.009178	78.98
TCE7C111A	C	C1	3	1	72.74	0.1396	16	M(A,L)WB	0.008726	72.13
TCE7C112A	C	C1	3	1	72.96	0.1426	16	LWT	0.008915	73.91
TCE7C113A	C	C1	3	1	72.15	0.1438	16	LGF	0.008985	73.67
TCE7C211A	C	C2	3	2	78.25	0.1356	16	LWT	0.008477	75.38
TCE7C212A	C	C2	3	2	71.74	0.1386	16	LWB	0.008665	70.64
TCE7C213A	C	C2	3	2	75.94	0.1408	16	LWB	0.008800	75.94

Average 75.75
 Standard Dev. 2.797
 Coeff. of Var. [%] 3.693
 Min. 71.48
 Max. 80.47
 Number of Spec. 21

Average_{norm} 0.008817 75.87
 Standard Dev._{norm} 2.965
 Coeff. of Var. [%]_{norm} 3.907
 Min. 0.008271 70.64
 Max. 0.009178 80.89
 Number of Spec. 21 21



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

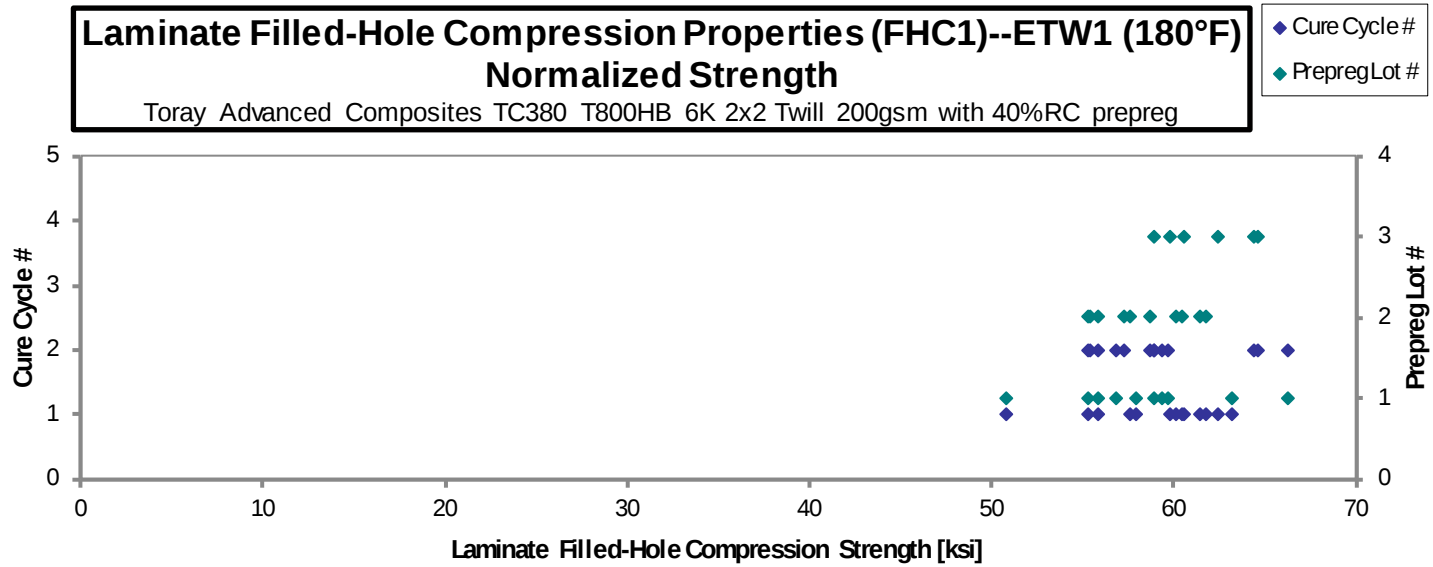
 t_{ply} [in]

0.008800

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]
TCE7A111D	A	C1	1	1	56.87	0.1435	16	M(A,L)GF	0.008966	57.94
TCE7A112D	A	C1	1	1	55.43	0.1405	16	M(A,L)GF	0.008780	55.30
TCE7A113D	A	C1	1	1	58.45	0.1345	16	M(A,L)GF	0.008403	55.81
TCE7A114D	A	C1	1	1	52.87	0.1353	16	M(A,L)WB	0.008457	50.82
TCE7A115D	A	C1	1	1	62.60	0.1421	16	M(A,L)GF	0.008883	63.20
TCE7A211D	A	C2	1	2	64.76	0.1440	16	LWT	0.009001	66.24
TCE7A212D	A	C2	1	2	59.20	0.1401	16	LWT	0.008755	58.89
TCE7A213D	A	C2	1	2	60.48	0.1325	16	LAB	0.008278	56.89
TCE7A214D	A	C2	1	2	61.75	0.1354	16	LWT	0.008464	59.39
TCE7A215D	A	C2	1	2	59.41	0.1415	16	LWB	0.008845	59.71
TCE7B111D	B	C1	2	1	60.04	0.1448	16	LWB	0.009051	61.76
TCE7B112D	B	C1	2	1	61.52	0.1406	16	LWT	0.008784	61.41
TCE7B113D	B	C1	2	1	60.94	0.1330	16	LAB	0.008315	57.57
TCE7B114D	B	C1	2	1	62.49	0.1355	16	LWB	0.008470	60.15
TCE7B115D	B	C1	2	1	60.07	0.1417	16	LGT	0.008856	60.46
TCE7B211D	B	C2	2	2	53.28	0.1465	16	LGF	0.009155	55.43
TCE7B212D	B	C2	2	2	56.80	0.1420	16	LGF	0.008873	57.27
TCE7B213D	B	C2	2	2	57.31	0.1358	16	LAB	0.008488	55.28
TCE7B214D	B	C2	2	2	58.20	0.1351	16	LAB	0.008444	55.84
TCE7B215D	B	C2	2	2	58.58	0.1411	16	LGF	0.008819	58.71
TCE7C111D	C	C1	3	1	61.15	0.1438	16	AGF	0.008990	62.47
TCE7C112D	C	C1	3	1	59.53	0.1416	16	AGF	0.008847	59.84
TCE7C113D	C	C1	3	1	61.77	0.1381	16	AGF	0.008632	60.60
TCE7C211D	C	C2	3	2	64.26	0.1411	16	M(A,L)GF	0.008817	64.39
TCE7C212D	C	C2	3	2	65.17	0.1397	16	M(A,L)GF	0.008728	64.64
TCE7C213D	C	C2	3	2	61.04	0.1358	16	M(A,L)GF	0.008489	58.88

Average 59.77
 Standard Dev. 3.125
 Coeff. of Var. [%] 5.229
 Min. 52.87
 Max. 65.17
 Number of Spec. 26

Average_{norm} 0.008715
 Standard Dev._{norm} 3.468
 Coeff. of Var. [%]_{norm} 5.860
 Min. 0.008278
 Max. 0.009155
 Number of Spec. 26



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

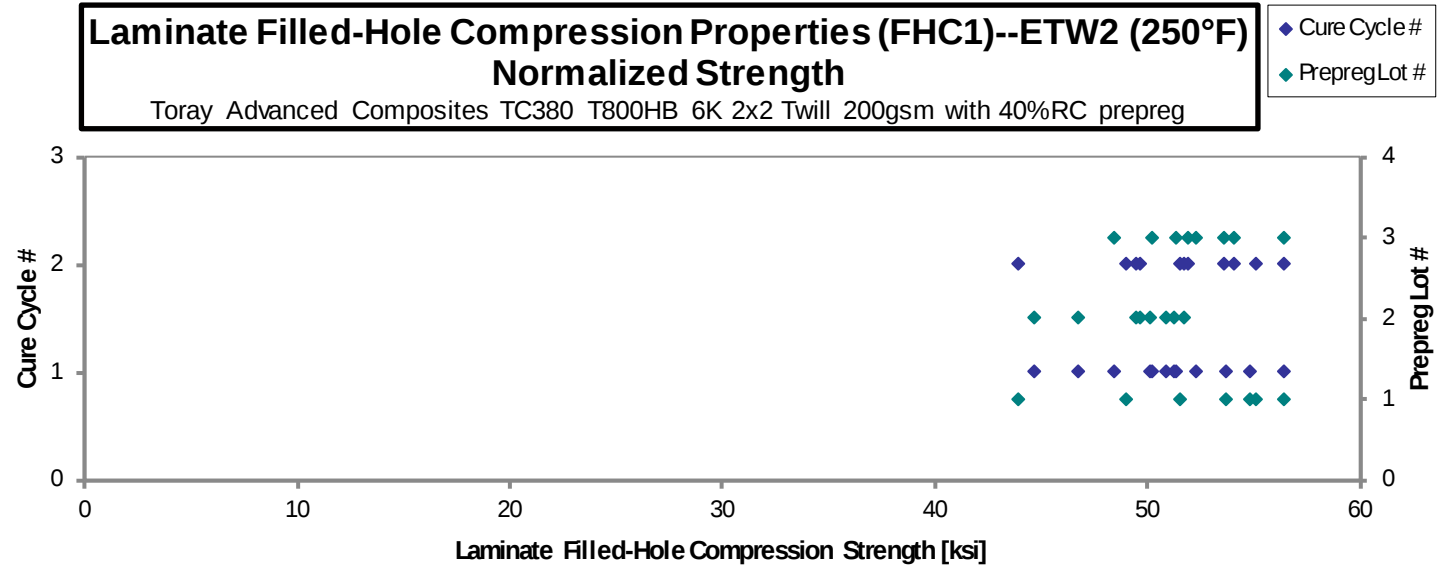
 t_{ply} [in]

0.008800

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]
TCE7A111E	A	C1	1	1	55.09	0.1442	16	M(A,L)GF	0.009014	56.42
TCE7A112E	A	C1	1	1	53.65	0.1440	16	M(A,L)GF	0.008997	54.85
TCE7A113E	A	C1	1	1	52.87	0.1431	16	M(A,L)GF	0.008944	53.74
TCE7A211E	A	C2	1	2	42.66	0.1449	16	M(A,L)AB	0.009058	43.91
TCE7A212E	A	C2	1	2	47.93	0.1441	16	M(A,L)GF	0.009004	49.04
TCE7A213E	A	C2	1	2	50.86	0.1428	16	M(A,L)GF	0.008925	51.58
TCE7A214E	A	C2	1	2	54.53	0.1423	16	M(A,L)GF	0.008891	55.09
TCE7B111E	B	C1	2	1	48.56	0.1452	16	M(A,L)GF	0.009077	50.09
TCE7B112E	B	C1	2	1	49.32	0.1462	16	LWT	0.009136	51.21
TCE7B113E	B	C1	2	1	49.51	0.1448	16	M(A,L)GF	0.009047	50.90
TCE7B114E	B	C1	2	1	47.00	0.1400	16	LWB	0.008751	46.74
TCE7B115E	B	C1	2	1	47.57	0.1321	16	LWT	0.008257	44.64
TCE7B211E	B	C2	2	2	48.01	0.1457	16	M(A,L)GF	0.009104	49.67
TCE7B212E	B	C2	2	2	47.24	0.1476	16	M(A,L)GF	0.009222	49.51
TCE7B213E	B	C2	2	2	49.59	0.1469	16	M(A,L)GF	0.009183	51.75
TCE7C111E	C	C1	3	1	51.50	0.1430	16	AGF	0.008938	52.30
TCE7C112E	C	C1	3	1	47.36	0.1440	16	LGT	0.009002	48.45
TCE7C113E	C	C1	3	1	49.13	0.1439	16	LGT	0.008992	50.20
TCE7C114E	C	C1	3	1	50.94	0.1418	16	AWB	0.008863	51.30
TCE7C211E	C	C2	3	2	56.30	0.1411	16	AWB	0.008820	56.43
TCE7C212E	C	C2	3	2	53.77	0.1416	16	AGF	0.008849	54.07
TCE7C213E	C	C2	3	2	51.37	0.1422	16	AWT	0.008888	51.88
TCE7C214E	C	C2	3	2	53.81	0.1404	16	AGF	0.008773	53.64

Average 50.37
 Standard Dev. 3.263
 Coeff. of Var. [%] 6.478
 Min. 42.66
 Max. 56.30
 Number of Spec. 23

Average_{norm} 0.008945 51.19
 Standard Dev._{norm} 3.315
 Coeff. of Var. [%]_{norm} 6.475
 Min. 0.008257 43.91
 Max. 0.009222 56.43
 Number of Spec. 23 23



4.23 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

In some cases of FHC2>UNC2, UNC2 data is recommended for design. The FHC 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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

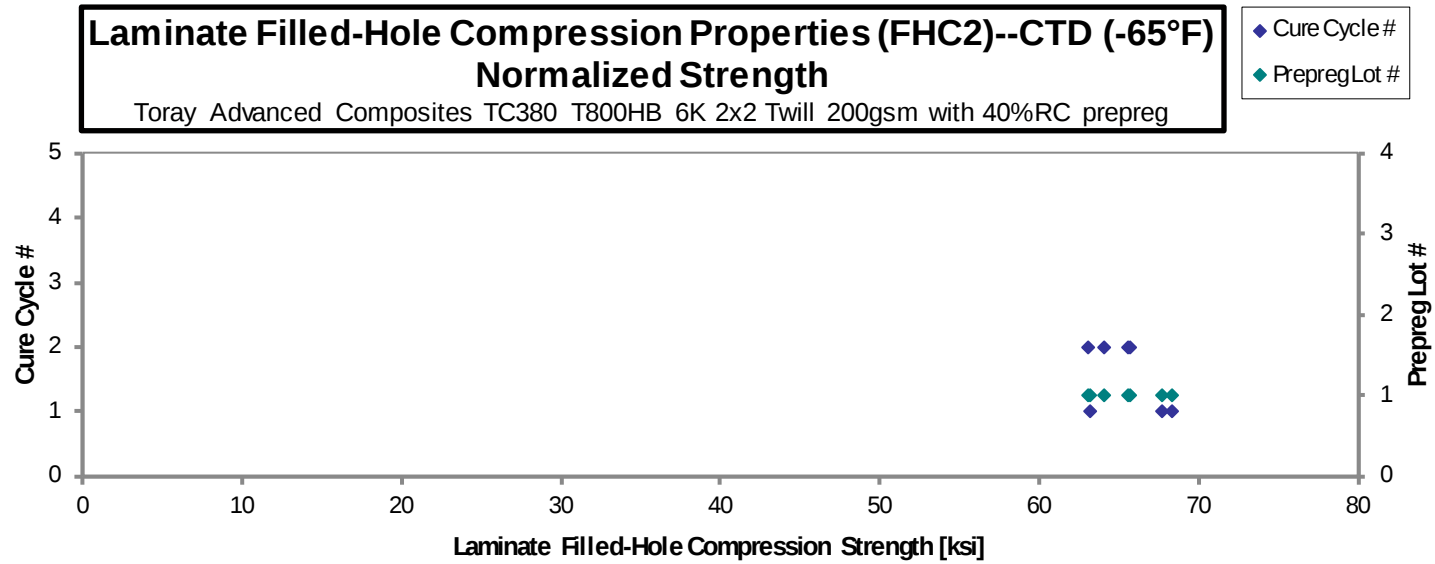
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE8A111B	A	C1	1	1	66.30	0.1799	20	M(A,L)GF
TCE8A112B	A	C1	1	1	67.00	0.1794	20	M(A,L)GF
TCE8A113B	A	C1	1	1	61.57	0.1807	20	M(A,L)GF
TCE8A211B	A	C2	1	2	62.41	0.1806	20	AGF
TCE8A212B	A	C2	1	2	63.75	0.1811	20	M(A,L)GF
TCE8A213B	A	C2	1	2	61.52	0.1803	20	AWT
TCE8A214B	A	C2	1	2	63.62	0.1819	20	M(A,L)GT

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008994	67.76
0.008971	68.30
0.009033	63.20
0.009032	64.05
0.009057	65.61
0.009017	63.04
0.009097	65.77

Average **63.74**
Standard Dev. **2.182**
Coeff. of Var. [%] **3.423**
Min. **61.52**
Max. **67.00**
Number of Spec. **7**

Average_{norm} **0.009029** **65.39**
Standard Dev._{norm} **2.096**
Coeff. of Var. [%]_{norm} **3.206**
Min. **0.008971** **63.04**
Max. **0.009097** **68.30**
Number of Spec. **7** **7**



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

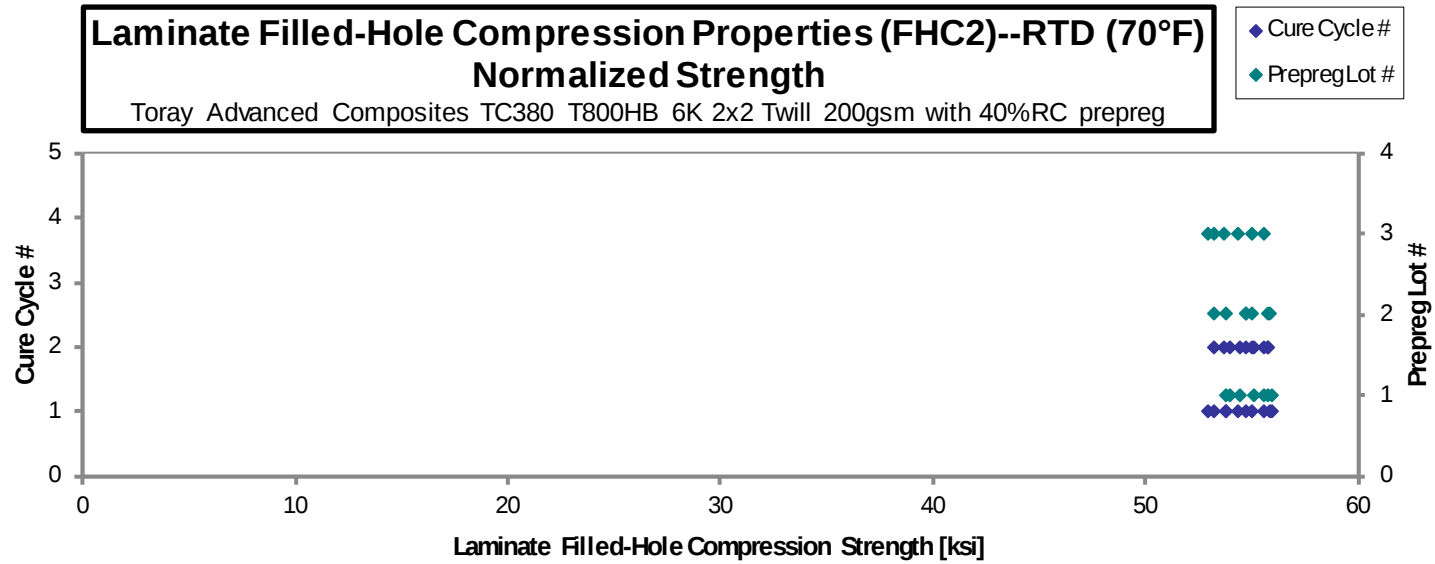
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE8A111A	A	C1	1	1	58.27	0.1691	20	M(A,L)GF
TCE8A112A	A	C1	1	1	53.82	0.1759	20	LGB
TCE8A113A	A	C1	1	1	54.38	0.1798	20	LGF
TCE8A211A	A	C2	1	2	56.62	0.1694	20	M(A,L)WB
TCE8A212A	A	C2	1	2	54.88	0.1768	20	LWB
TCE8A213A	A	C2	1	2	52.48	0.1811	20	M(A,L)GB
TCE8A214A	A	C2	1	2	54.06	0.1817	20	M(A,L)GT
TCE8B111A	B	C1	2	1	56.56	0.1675	20	AGB
TCE8B112A	B	C1	2	1	55.08	0.1748	20	AGF
TCE8B113A	B	C1	2	1	54.64	0.1798	20	M(A,L)WB
TCE8B114A	B	C1	2	1	53.14	0.1822	20	M(A,L)GF
TCE8B211A	B	C2	2	2	55.58	0.1685	20	M(A,L)GF
TCE8B212A	B	C2	2	2	54.88	0.1754	20	AGT
TCE8B213A	B	C2	2	2	54.32	0.1807	20	LGF
TCE8C111A	C	C1	3	1	54.13	0.1722	20	M(A,L)WB
TCE8C112A	C	C1	3	1	52.92	0.1770	20	M(A,L)GF, LGT
TCE8C113A	C	C1	3	1	53.53	0.1788	20	M(A,L)GT
TCE8C211A	C	C2	3	2	55.19	0.1712	20	M(A,L)GB
TCE8C212A	C	C2	3	2	54.88	0.1765	20	M(A,L)GF
TCE8C213A	C	C2	3	2	54.81	0.1784	20	M(A,L)WB

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008454	55.98
0.008797	53.80
0.008988	55.54
0.008469	54.49
0.008842	55.14
0.009054	54.00
0.009084	55.80
0.008373	53.82
0.008741	54.71
0.008991	55.82
0.009111	55.01
0.008424	53.21
0.008770	54.69
0.009034	55.77
0.008611	52.97
0.008849	53.22
0.008941	54.39
0.008560	53.69
0.008823	55.02
0.008919	55.55

Average **54.71**
 Standard Dev. **1.353**
 Coeff. of Var. [%] **2.472**
 Min. **52.48**
 Max. **58.27**
 Number of Spec. **20**

Average_{norm} **0.008792** **54.63**
 Standard Dev._{norm} **0.9642**
 Coeff. of Var. [%]_{norm} **1.765**
 Min. **0.008373** **52.97**
 Max. **0.009111** **55.98**
 Number of Spec. **20** **20**



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

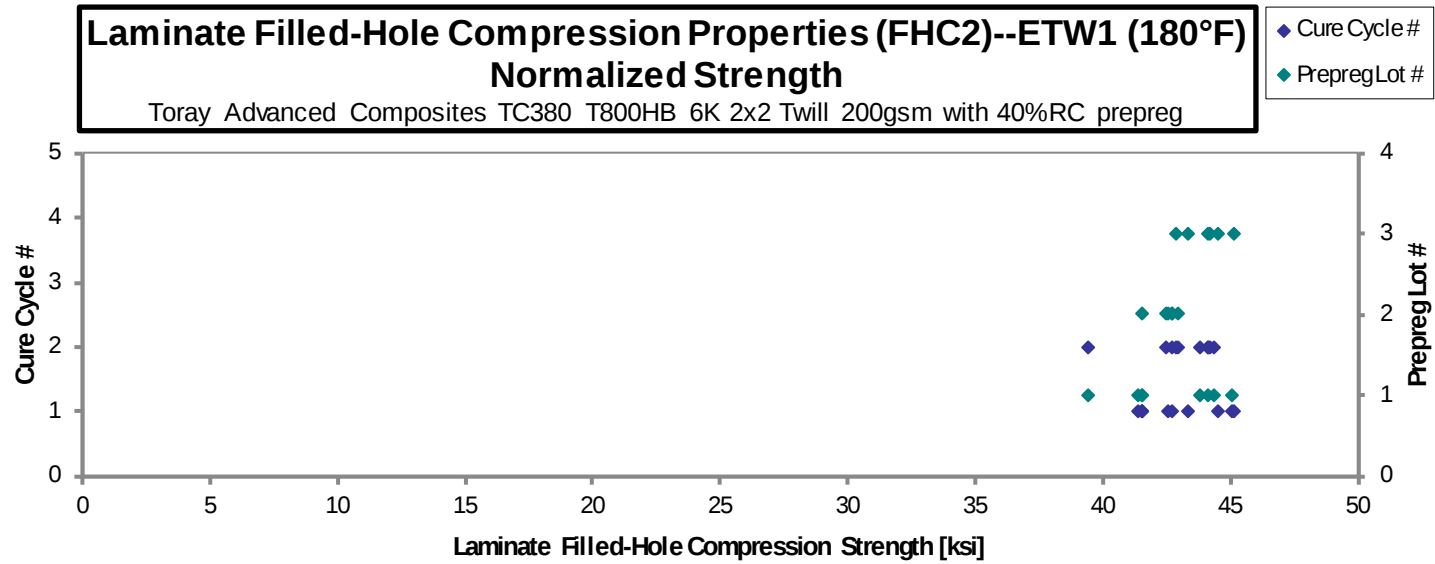
 t_{ply} [in]

0.008800

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]
TCE8A111D	A	C1	1	1	44.07	0.1799	20	M(A,L)GF	0.008993	45.03
TCE8A112D	A	C1	1	1	41.54	0.1754	20	M(A,L)WT	0.008772	41.41
TCE8A113D	A	C1	1	1	43.25	0.1689	20	M(A,L)GT	0.008444	41.50
TCE8A114D	A	C1	1	1	43.16	0.1695	20	M(A,L)GF	0.008477	41.57
TCE8A211D	A	C2	1	2	43.25	0.1805	20	M(A,L)GB	0.009023	44.35
TCE8A212D	A	C2	1	2	43.69	0.1764	20	LGF	0.008819	43.78
TCE8A213D	A	C2	1	2	45.71	0.1698	20	M(A,L)WT	0.008490	44.10
TCE8A214D	A	C2	1	2	40.86	0.1698	20	M(A,L)GT	0.008491	39.42
TCE8B111D	B	C1	2	1	41.22	0.1818	20	M(A,L)GF	0.009089	42.57
TCE8B112D	B	C1	2	1	42.57	0.1766	20	M(A,L)GF	0.008831	42.72
TCE8B113D	B	C1	2	1	43.18	0.1694	20	M(A,L)GF	0.008470	41.56
TCE8B211D	B	C2	2	2	41.30	0.1811	20	M(A,L)GB	0.009053	42.49
TCE8B212D	B	C2	2	2	44.17	0.1711	20	LWB	0.008557	42.95
TCE8B213D	B	C2	2	2	42.37	0.1774	20	M(A,L)WB	0.008872	42.71
TCE8C111D	C	C1	3	1	44.40	0.1789	20	AGF	0.008943	45.12
TCE8C112D	C	C1	3	1	44.46	0.1763	20	M(A,L)GT	0.008815	44.54
TCE8C113D	C	C1	3	1	44.45	0.1717	20	AGB	0.008583	43.35
TCE8C211D	C	C2	3	2	43.44	0.1791	20	AGF	0.008953	44.19
TCE8C212D	C	C2	3	2	44.26	0.1754	20	AWT	0.008768	44.09
TCE8C213D	C	C2	3	2	43.92	0.1719	20	AGF	0.008596	42.90

Average **43.26**
 Standard Dev. **1.283**
 Coeff. of Var. [%] **2.966**
 Min. **40.86**
 Max. **45.71**
 Number of Spec. **20**

Average_{norm} **0.008752** **43.02**
 Standard Dev._{norm} **1.445**
 Coeff. of Var. [%]_{norm} **3.360**
 Min. **0.008444** **39.42**
 Max. **0.009089** **45.12**
 Number of Spec. **20** **20**



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

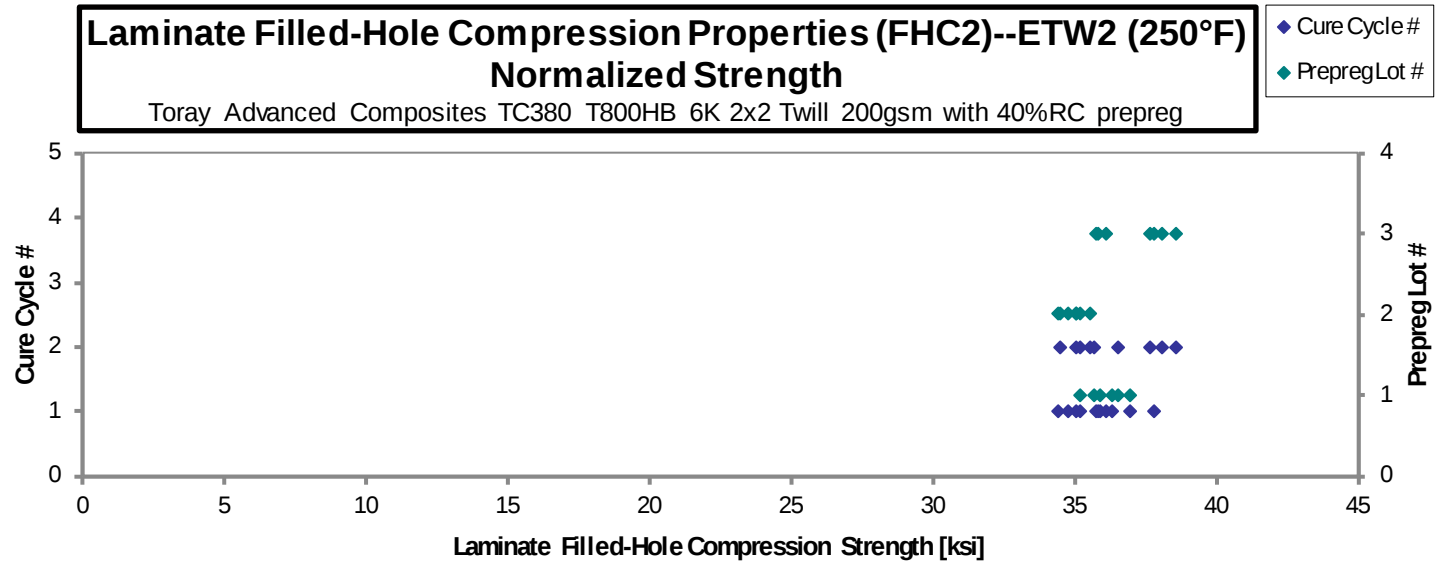
 t_{ply} [in]

0.008800

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]
TCE8A111E	A	C1	1	1	36.12	0.1803	20	M(A,L)GB	0.009013	36.99
TCE8A112E	A	C1	1	1	34.90	0.1810	20	M(A,L)GB	0.009048	35.88
TCE8A113E	A	C1	1	1	35.64	0.1795	20	M(A,L)GB	0.008974	36.35
TCE8A211E	A	C2	1	2	35.55	0.1811	20	M(A,L)GT	0.009053	36.57
TCE8A212E	A	C2	1	2	34.02	0.1820	20	M(A,L)GT	0.009101	35.19
TCE8A213E	A	C2	1	2	34.59	0.1816	20	M(A,L)GF	0.009078	35.69
TCE8B111E	B	C1	2	1	33.54	0.1806	20	M(A,L)WB	0.009029	34.41
TCE8B112E	B	C1	2	1	33.42	0.1831	20	M(A,L)GF	0.009154	34.77
TCE8B113E	B	C1	2	1	33.98	0.1823	20	M(A,L)GT	0.009113	35.18
TCE8B114E	B	C1	2	1	34.69	0.1779	20	M(A,L)GT	0.008893	35.05
TCE8B211E	B	C2	2	2	34.68	0.1804	20	M(A,L)GF	0.009021	35.55
TCE8B212E	B	C2	2	2	33.82	0.1824	20	M(A,L)GF	0.009118	35.05
TCE8B213E	B	C2	2	2	33.47	0.1813	20	LGT	0.009065	34.47
TCE8C111E	C	C1	3	1	35.53	0.1789	20	AGF	0.008944	36.11
TCE8C112E	C	C1	3	1	36.94	0.1800	20	AGF	0.008999	37.78
TCE8C113E	C	C1	3	1	35.18	0.1789	20	AGT	0.008947	35.76
TCE8C114E	C	C1	3	1	36.01	0.1752	20	AGF	0.008760	35.84
TCE8C211E	C	C2	3	2	38.06	0.1783	20	AGF, LWT	0.008913	38.55
TCE8C212E	C	C2	3	2	37.69	0.1779	20	AGF, AWT	0.008895	38.09
TCE8C213E	C	C2	3	2	37.24	0.1780	20	AGF	0.008898	37.66

Average **35.25**
 Standard Dev. **1.416**
 Coeff. of Var. [%] **4.018**
 Min. **33.42**
 Max. **38.06**
 Number of Spec. **20**

Average_{norm} **0.009001** **36.05**
 Standard Dev._{norm} **1.216**
 Coeff. of Var. [%]_{norm} **3.373**
 Min. **0.008760** **34.41**
 Max. **0.009154** **38.55**
 Number of Spec. **20** **20**



4.24 “40/20/40” Filled-Hole Compression 3 Properties (FHC3)

In some cases of FHC3>UNC3, UNC3 data is recommended for design. The FHC3 data is for informational purposes only and is not appropriate to be used for design. Shaded values indicated FHC3>UNC3.

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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

0.008800

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]
TCE9A111B	A	C1	1	1	93.04	0.1815	20	M(A,L)GF	0.009076	95.95
TCE9A112B	A	C1	1	1	98.82	0.1817	20	M(A,L)GF	0.009085	102.0
TCE9A113B	A	C1	1	1	94.49	0.1821	20	M(A,L)GF	0.009106	97.78
TCE9A211B	A	C2	1	2	98.85	0.1852	20	M(A,L)GF	0.009258	104.0
TCE9A212B	A	C2	1	2	89.96	0.1849	20	M(A,L)GF	0.009247	94.53
TCE9A213B	A	C2	1	2	97.14	0.1854	20	M(A,L)WB	0.009271	102.3
TCE9A214B	A	C2	1	2	93.91	0.1871	20	M(A,L)WT	0.009357	99.85
TCE9B111B	B	C1	2	1	91.39	0.1786	20	LGF	0.008929	92.73
TCE9B112B	B	C1	2	1	91.19	0.1780	20	M(A,L)GF	0.008898	92.20
TCE9B113B	B	C1	2	1	96.22	0.1781	20	M(A,L)WT	0.008903	97.34
TCE9B114B	B	C1	2	1	86.66	0.1780	20	M(A,L)WT	0.008900	87.64
TCE9B211B	B	C2	2	2	95.60	0.1805	20	M(A,L)GT	0.009023	98.02
TCE9B212B	B	C2	2	2	92.82	0.1793	20	M(A,L)WT	0.008966	94.57
TCE9B213B	B	C2	2	2	94.88	0.1798	20	M(A,L)GF	0.008988	96.91
TCE9B214B	B	C2	2	2	96.07	0.1806	20	M(A,L)GM	0.009028	98.56

Average 94.07
Standard Dev. 3.344
Coeff. of Var. [%] 3.555
Min. 86.66
Max. 98.85
Number of Spec. 15

Average_{norm} 0.009069
Standard Dev._{norm} 4.282
Coeff. of Var. [%]_{norm} 4.416
Min. 0.008898
Max. 0.009357
Number of Spec. 15

96.96

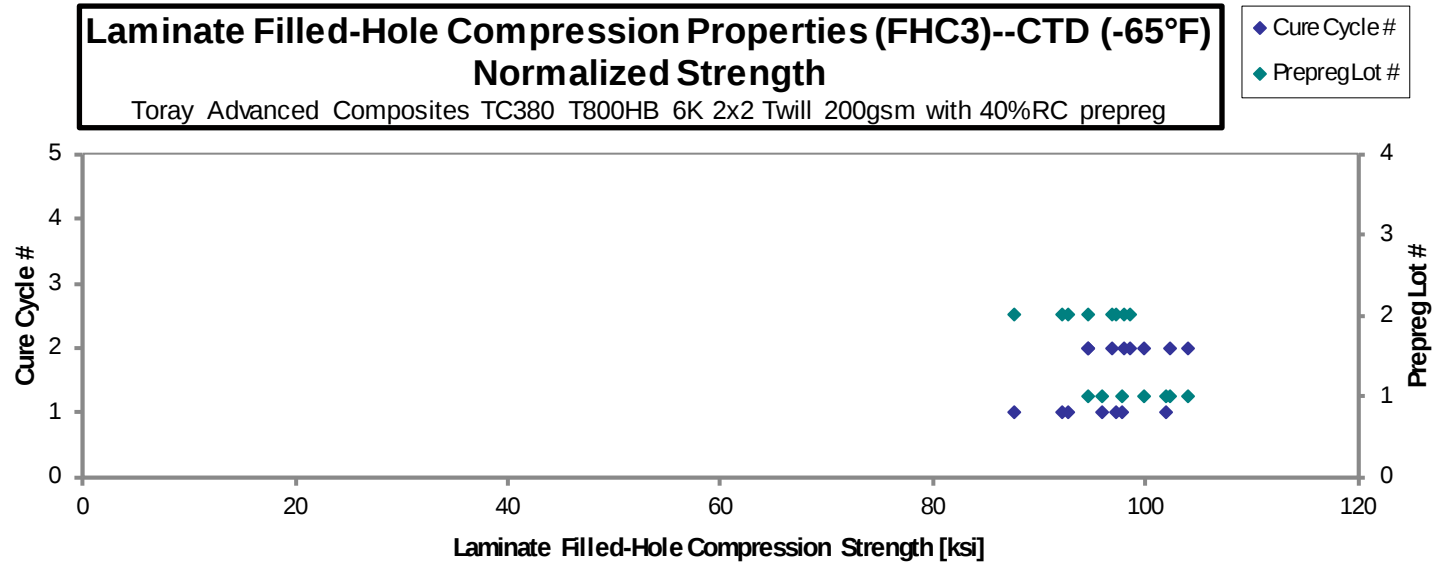
4.282

4.416

87.64

104.0

15



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

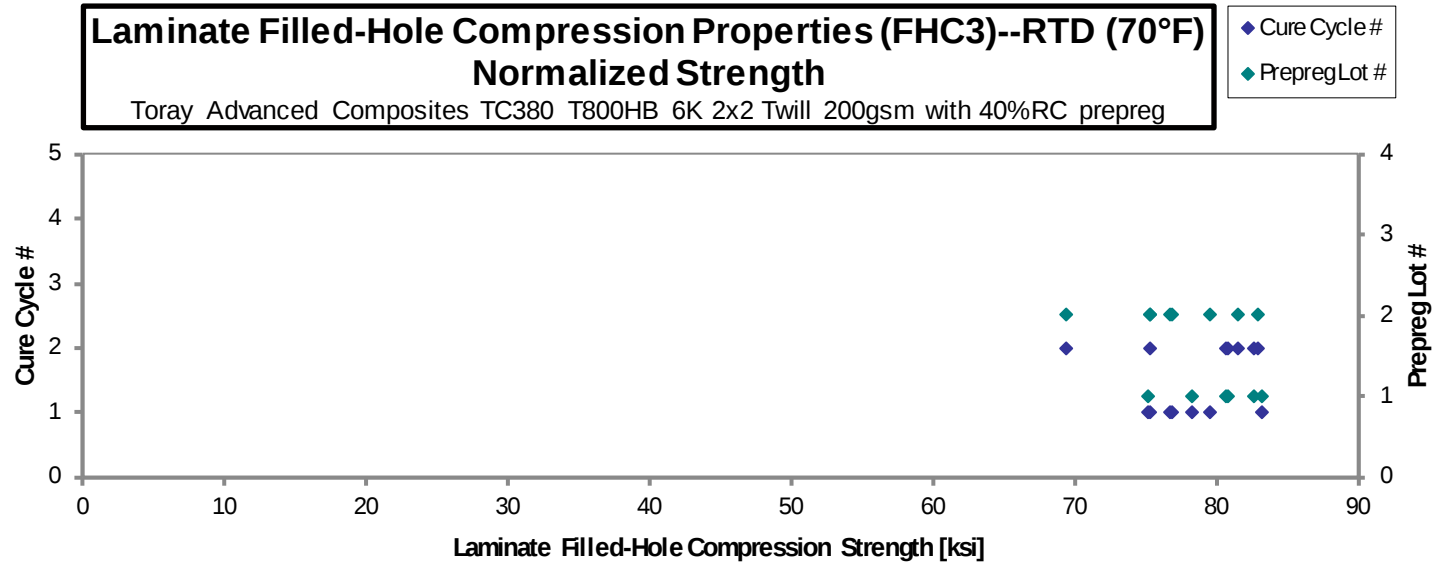
 t_{ply} [in]

0.008800

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]
TCE9A111A	A	C1	1	1	80.64	0.1710	20	M(A,L)GF	0.008548	78.33
TCE9A112A	A	C1	1	1	74.54	0.1777	20	M(A,L)GF	0.008885	75.26
TCE9A113A	A	C1	1	1	80.91	0.1811	20	M(A,L)GF	0.009054	83.25
TCE9A211A	A	C2	1	2	82.31	0.1726	20	M(A,L)GF	0.008630	80.72
TCE9A212A	A	C2	1	2	80.21	0.1815	20	M(A,L)GF	0.009075	82.72
TCE9A213A	A	C2	1	2	77.20	0.1843	20	M(A,L)GF	0.009213	80.82
TCE9B111A	B	C1	2	1	78.39	0.1693	20	M(A,L)GF	0.008463	75.39
TCE9B112A	B	C1	2	1	77.30	0.1751	20	M(A,L)GF	0.008756	76.91
TCE9B113A	B	C1	2	1	75.96	0.1779	20	LWB	0.008896	76.79
TCE9B114A	B	C1	2	1	78.27	0.1790	20	LGB	0.008951	79.61
TCE9B211A	B	C2	2	2	71.87	0.1699	20	LWB	0.008497	69.40
TCE9B212A	B	C2	2	2	75.01	0.1768	20	LGF	0.008838	75.33
TCE9B213A	B	C2	2	2	79.68	0.1801	20	LGF	0.009005	81.53
TCE9B214A	B	C2	2	2	80.63	0.1812	20	LGF	0.009058	82.99

Average 78.07
 Standard Dev. 2.942
 Coeff. of Var. [%] 3.769
 Min. 71.87
 Max. 82.31
 Number of Spec. 14

Average_{norm} 0.008848 78.50
 Standard Dev._{norm} 3.920
 Coeff. of Var. [%]_{norm} 4.994
 Min. 0.008463 69.40
 Max. 0.009213 83.25
 Number of Spec. 14 14



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

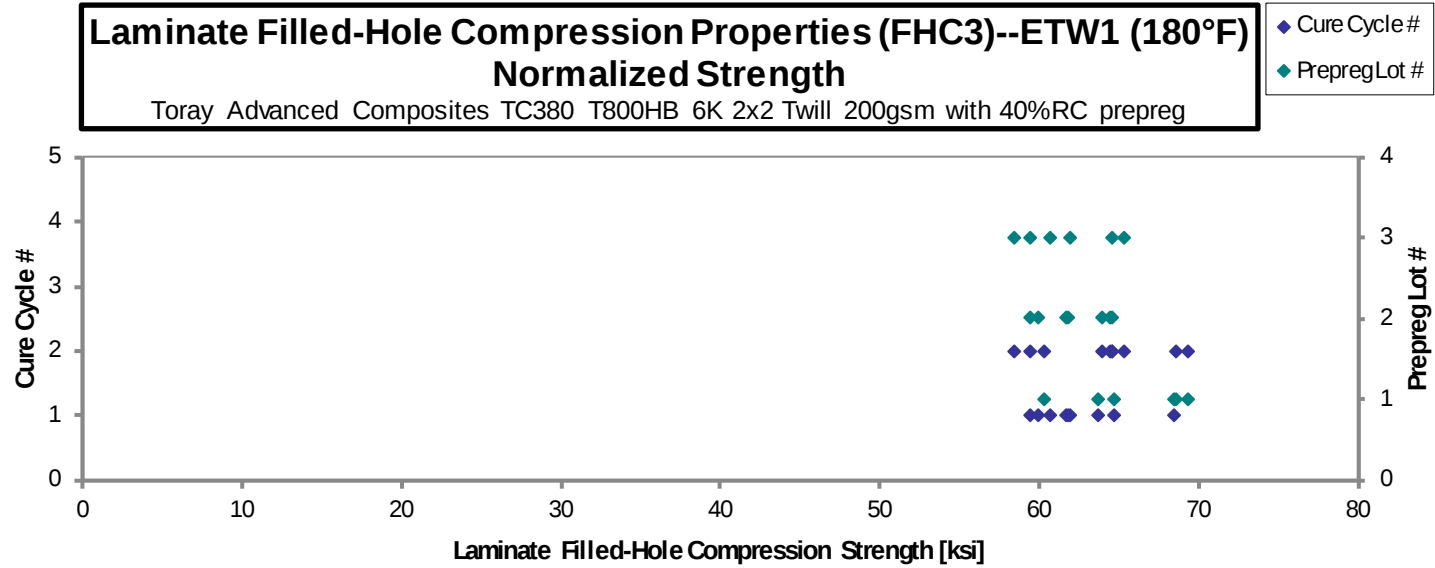
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE9A111D	A	C1	1	1	66.67	0.1807	20	LGF
TCE9A112D	A	C1	1	1	63.13	0.1776	20	LGF
TCE9A113D	A	C1	1	1	67.04	0.1699	20	LGF
TCE9A211D	A	C2	1	2	65.88	0.1851	20	M(A,L)GF
TCE9A212D	A	C2	1	2	66.68	0.1811	20	M(A,L)GF
TCE9A213D	A	C2	1	2	61.62	0.1722	20	LGF
TCE9B111D	B	C1	2	1	61.62	0.1765	20	M(A,L)GF
TCE9B112D	B	C1	2	1	62.84	0.1727	20	M(A,L)GF
TCE9B113D	B	C1	2	1	63.11	0.1672	20	M(A,L)GF
TCE9B211D	B	C2	2	2	63.47	0.1791	20	M(A,L)WB
TCE9B212D	B	C2	2	2	64.62	0.1754	20	LGF
TCE9B213D	B	C2	2	2	67.21	0.1673	20	M(A,L)GF
TCE9B214D	B	C2	2	2	62.20	0.1682	20	LGF
TCE9C111D	C	C1	3	1	64.05	0.1701	20	AGF
TCE9C112D	C	C1	3	1	59.68	0.1751	20	AGF
TCE9C113D	C	C1	3	1	59.57	0.1792	20	AGF
TCE9C211D	C	C2	3	2	66.55	0.1708	20	LGF
TCE9C212D	C	C2	3	2	58.23	0.1766	20	M(A,L)GF
TCE9C213D	C	C2	3	2	64.66	0.1779	20	M(A,L)GF

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.009034	68.45
0.008882	63.71
0.008496	64.73
0.009254	69.28
0.009054	68.60
0.008612	60.30
0.008824	61.79
0.008637	61.67
0.008362	59.97
0.008955	64.59
0.008772	64.41
0.008366	63.90
0.008408	59.43
0.008507	61.92
0.008756	59.38
0.008959	60.65
0.008542	64.60
0.008829	58.42
0.008897	65.37

Average 63.62
 Standard Dev. 2.701
 Coeff. of Var. [%] 4.246
 Min. 58.23
 Max. 67.21
 Number of Spec. 19

Average_{norm} 0.008744 63.22
 Standard Dev._{norm} 3.247
 Coeff. of Var. [%]_{norm} 5.135
 Min. 0.008362 58.42
 Max. 0.009254 69.28
 Number of Spec. 19 19



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

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

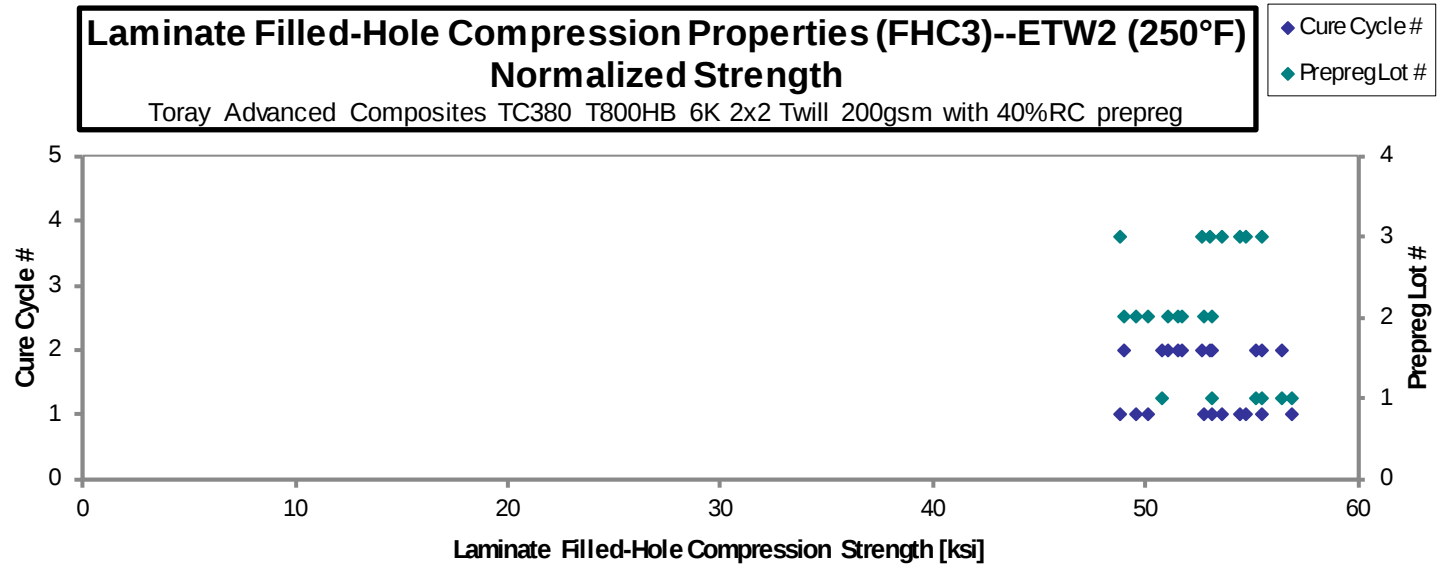
 t_{ply} [in]

0.008800

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]
TCE9A111E	A	C1	1	1	51.70	0.1808	20	LGF	0.009038	53.10
TCE9A112E	A	C1	1	1	53.60	0.1822	20	M(A,L)GF	0.009112	55.50
TCE9A113E	A	C1	1	1	55.13	0.1816	20	LGF	0.009081	56.89
TCE9A211E	A	C2	1	2	52.72	0.1844	20	M(A,L)GF	0.009220	55.24
TCE9A212E	A	C2	1	2	53.56	0.1856	20	M(A,L)GF	0.009278	56.46
TCE9A213E	A	C2	1	2	48.31	0.1849	20	LGF	0.009245	50.75
TCE9B111E	B	C1	2	1	48.73	0.1791	20	M(A,L)GF	0.008954	49.58
TCE9B112E	B	C1	2	1	51.73	0.1796	20	M(A,L)GF	0.008982	52.80
TCE9B113E	B	C1	2	1	49.11	0.1795	20	M(A,L)GF	0.008977	50.09
TCE9B211E	B	C2	2	2	50.19	0.1809	20	LWT	0.009043	51.58
TCE9B212E	B	C2	2	2	50.11	0.1816	20	LWT	0.009080	51.71
TCE9B213E	B	C2	2	2	51.81	0.1804	20	LGF	0.009019	53.10
TCE9B214E	B	C2	2	2	47.98	0.1796	20	M(A,L)GF	0.008978	48.95
TCE9B215E	B	C2	2	2	49.95	0.1799	20	LGF	0.008993	51.05
TCE9C111E	C	C1	3	1	56.73	0.1697	20	M(A,L)GF	0.008485	54.70
TCE9C112E	C	C1	3	1	49.04	0.1752	20	M(A,L)WB	0.008759	48.81
TCE9C113E	C	C1	3	1	53.32	0.1769	20	M(A,L)GF	0.008846	53.60
TCE9C114E	C	C1	3	1	53.79	0.1781	20	M(A,L)GF	0.008903	54.42
TCE9C211E	C	C2	3	2	54.46	0.1702	20	M(A,L)GF	0.008512	52.68
TCE9C212E	C	C2	3	2	53.25	0.1754	20	AGF	0.008768	53.06
TCE9C213E	C	C2	3	2	54.91	0.1778	20	M(A,L)GF	0.008889	55.47

Average 51.91
 Standard Dev. 2.524
 Coeff. of Var. [%] 4.862
 Min. 47.98
 Max. 56.73
 Number of Spec. 21

Average_{norm} 0.008960 52.84
 Standard Dev._{norm} 2.408
 Coeff. of Var. [%]_{norm} 4.557
 Min. 0.008485 48.81
 Max. 0.009278 56.89
 Number of Spec. 21 21



4.25 “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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

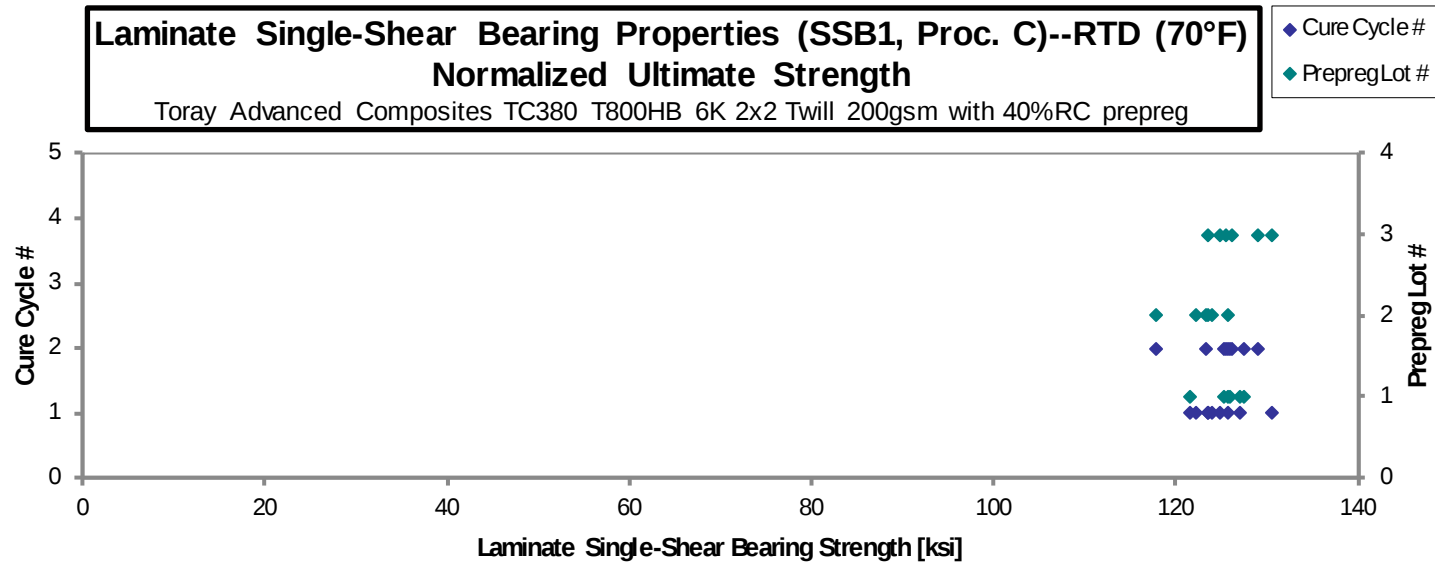
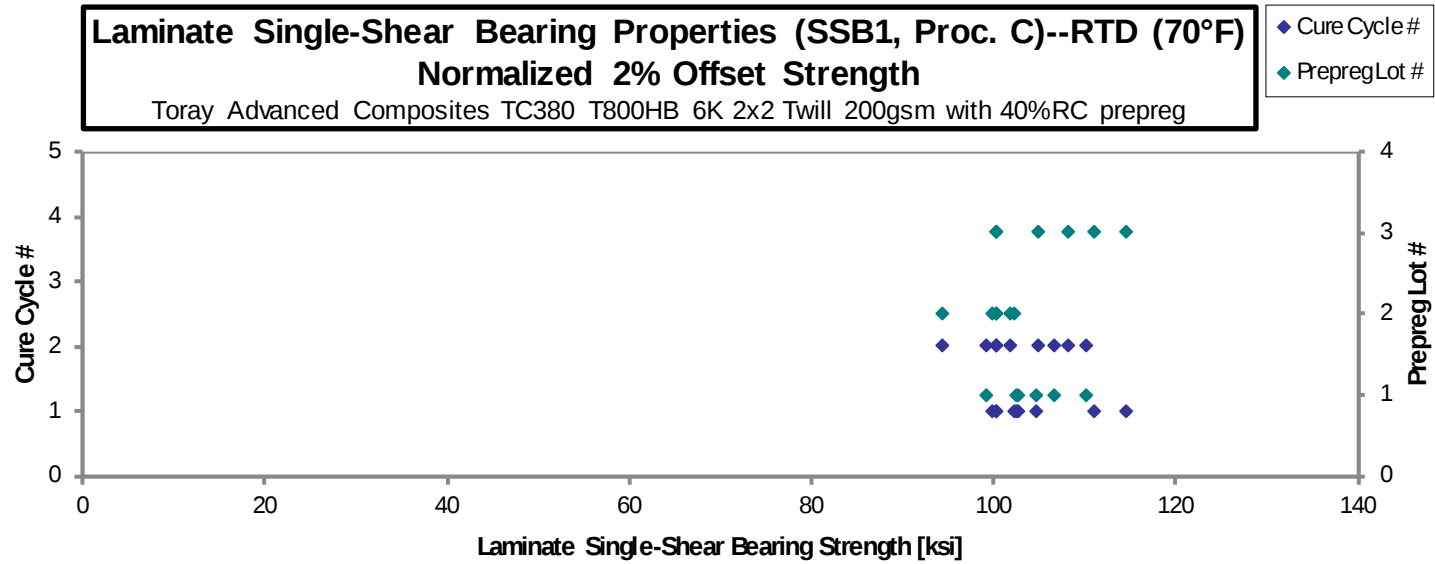
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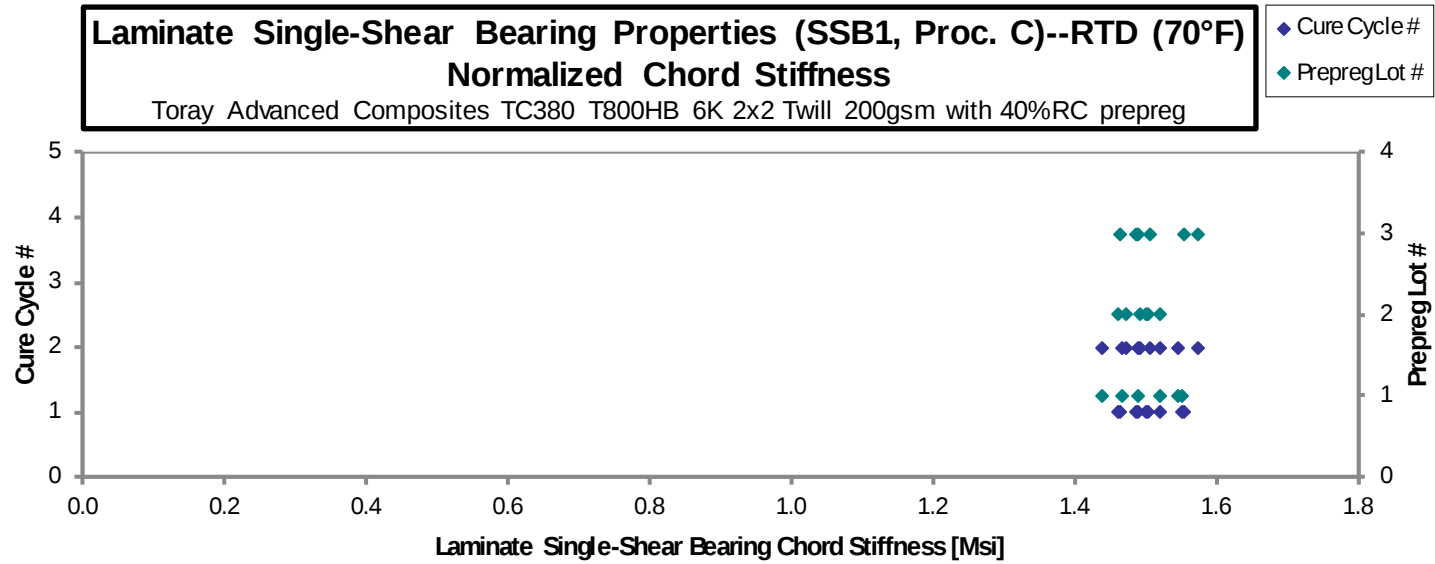
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE1A111A	A	C1	1	1	112.5	133.3	1.634	0.1285	16	B1I
TCE1A112A	A	C1	1	1	109.1	134.0	1.654	0.1322	16	B1I
TCE1A113A	A	C1	1	1	109.5	132.9	1.591	0.1345	16	B1I
TCE1A211A	A	C2	1	2	111.5	141.5	1.735	0.1254	16	B1I
TCE1A212A	A	C2	1	2	116.6	137.0	1.602	0.1288	16	B1I
TCE1A213A	A	C2	1	2	118.7	137.4	1.550	0.1307	16	B1I
TCE1B111A	B	C1	2	1	113.5	135.5	1.666	0.1269	16	B1I
TCE1B112A	B	C1	2	1	107.8	133.3	1.617	0.1309	16	B1I
TCE1B113A	B	C1	2	1	106.3	131.6	1.554	0.1323	16	B1I
TCE1B211A	B	C2	2	2	114.0	131.9	1.671	0.1259	16	B1I
TCE1B212A	B	C2	2	2	109.2	134.3	1.656	0.1293	16	B1I
TCE1B213A	B	C2	2	2	101.3	134.8	1.580	0.1313	16	B1I
TCE1C111A	C	C1	3	1	119.7	136.2	1.623	0.1349	16	B1I
TCE1C112A	C	C1	3	1	115.0	127.8	1.539	0.1361	16	B1I
TCE1C113A	C	C1	3	1	103.8	129.2	1.516	0.1360	16	B1I
TCE1C211A	C	C2	3	2	105.2	135.2	1.577	0.1344	16	B1I
TCE1C212A	C	C2	3	2	108.5	130.5	1.628	0.1362	16	B1I
TCE1C213A	C	C2	3	2	111.5	129.3	1.538	0.1365	16	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.008030	102.6	121.6	1.491
0.008261	102.4	125.8	1.553
0.008406	104.6	127.0	1.520
0.007838	99.27	126.0	1.545
0.008051	106.7	125.3	1.466
0.008168	110.2	127.6	1.439
0.007933	102.3	122.2	1.502
0.008178	100.2	123.9	1.503
0.008270	99.93	123.6	1.460
0.007867	101.9	117.9	1.494
0.008081	100.3	123.4	1.521
0.008204	94.43	125.7	1.473
0.008431	114.7	130.4	1.555
0.008505	111.1	123.6	1.487
0.008499	100.3	124.8	1.464
0.008401	100.4	129.0	1.505
0.008513	105.0	126.2	1.575
0.008533	108.1	125.4	1.491

Average 110.8 133.7 1.607
 Standard Dev. 5.001 3.351 0.05729
 Coeff. of Var. [%] 4.515 2.507 3.565
 Min. 101.3 127.8 1.516
 Max. 119.7 141.5 1.735
 Number of Spec. 18 18 18

Average_{norm} 0.008232 103.6 125.0 1.502
 Standard Dev_{norm} 4.980 2.849 0.03684
 Coeff. of Var. [%]_{norm} 4.808 2.280 2.452
 Min. 0.007838 94.43 117.9 1.439
 Max. 0.008533 114.7 130.4 1.575
 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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

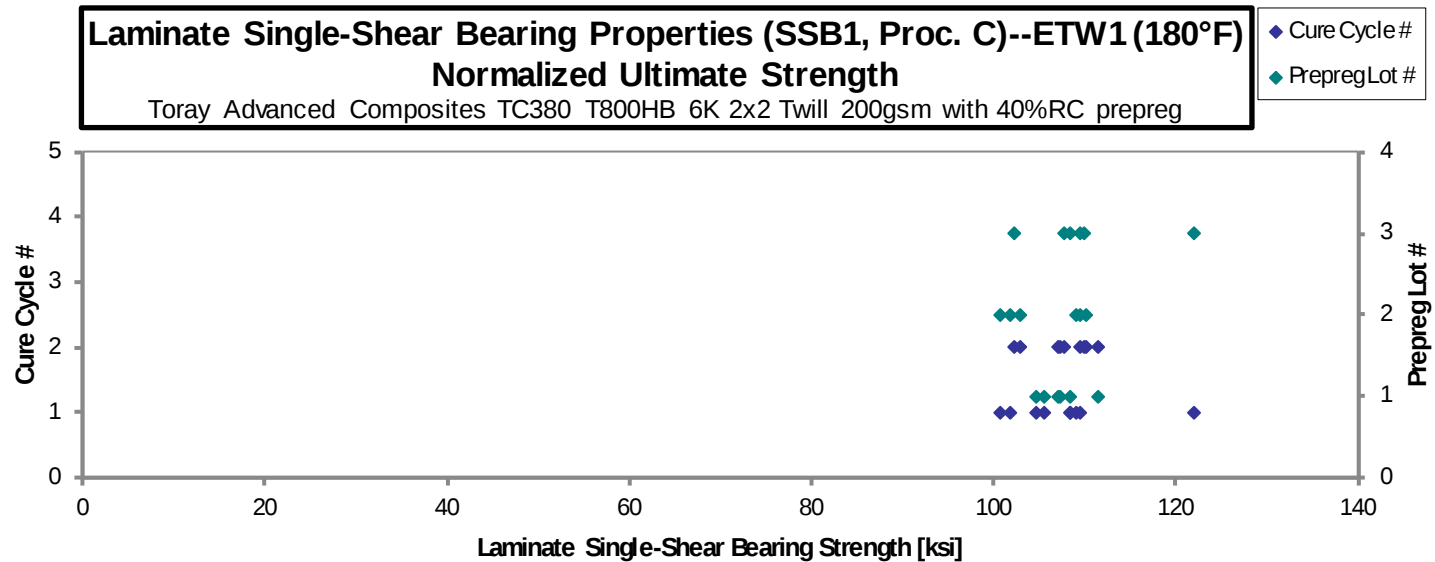
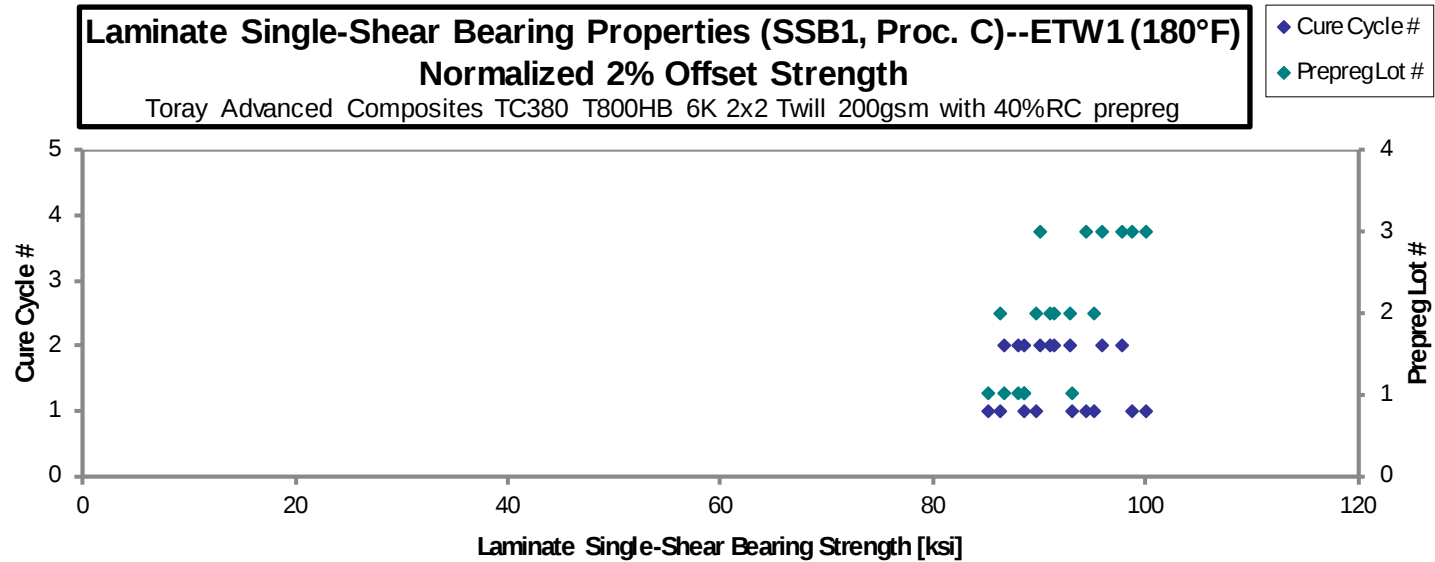
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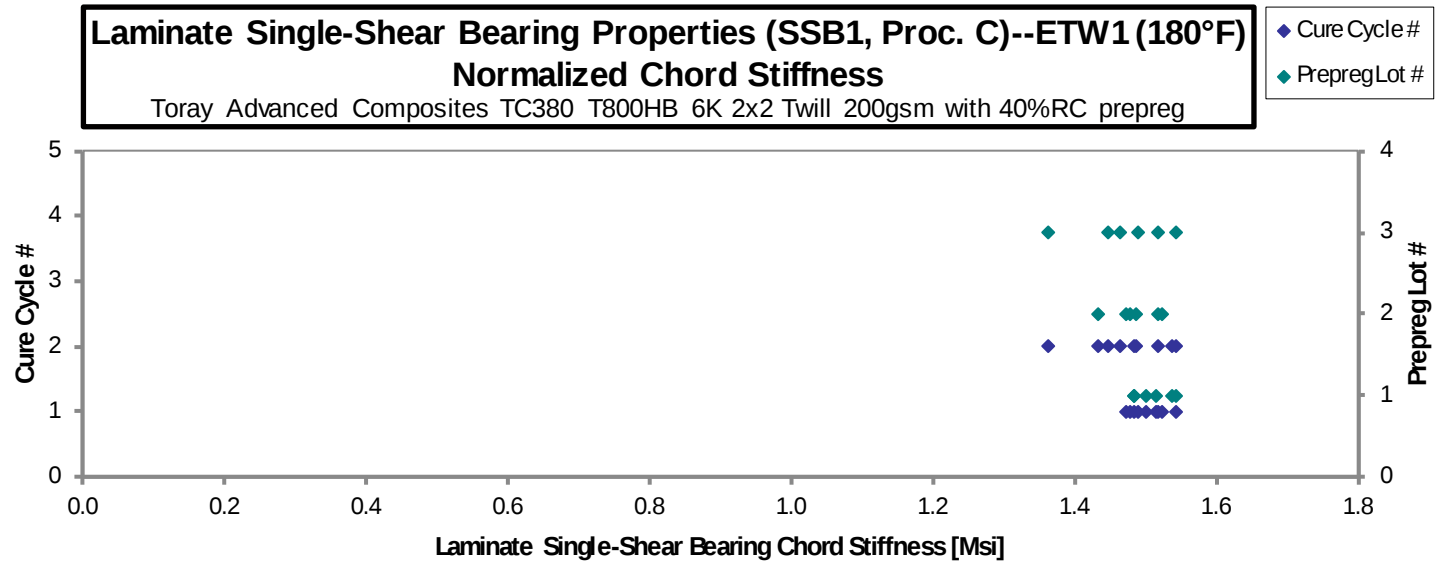
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE1A111D	A	C1	1	1	88.86	113.1	1.546	0.1351	16	B1I
TCE1A112D	A	C1	1	1	99.59	111.9	1.605	0.1317	16	B1I
TCE1A113D	A	C1	1	1	97.16	115.7	1.661	0.1284	16	B1I
TCE1A211D	A	C2	1	2	95.13	115.2	1.650	0.1311	16	B1I
TCE1A212D	A	C2	1	2	95.32	120.7	1.609	0.1299	16	B1I
TCE1A213D	A	C2	1	2	96.26	119.1	1.714	0.1268	16	B1I
TCE1B111D	B	C1	2	1	95.52	108.2	1.574	0.1323	16	B1I
TCE1B112D	B	C1	2	1	93.09	108.5	1.588	0.1307	16	B1I
TCE1B113D	B	C1	2	1	104.5	119.7	1.673	0.1283	16	B1I
TCE1B211D	B	C2	2	2	97.55	117.5	1.593	0.1314	16	B1I
TCE1B212D	B	C2	2	2	100.3	118.9	1.547	0.1304	16	B1I
TCE1B213D	B	C2	2	2	99.81	112.6	1.659	0.1288	16	B1I
TCE1C111D	C	C1	3	1	101.8	125.9	1.594	0.1364	16	B1I
TCE1C112D	C	C1	3	1	104.3	113.0	1.553	0.1351	16	B1I
TCE1C113D	C	C1	3	1	99.66	115.6	1.603	0.1334	16	B1I
TCE1C211D	C	C2	3	2	100.5	105.2	1.401	0.1370	16	B1I
TCE1C212D	C	C2	3	2	93.28	114.0	1.518	0.1359	16	B1I
TCE1C213D	C	C2	3	2	100.3	112.8	1.515	0.1346	16	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.008445	85.27	108.5	1.483
0.008231	93.15	104.7	1.502
0.008024	88.59	105.5	1.515
0.008196	88.60	107.3	1.537
0.008121	87.96	111.4	1.484
0.007922	86.66	107.2	1.543
0.008271	89.77	101.7	1.480
0.008166	86.38	100.7	1.474
0.008016	95.22	109.0	1.524
0.008211	91.03	109.6	1.487
0.008148	92.86	110.1	1.433
0.008052	91.33	103.0	1.518
0.008527	98.68	122.0	1.544
0.008443	100.1	108.4	1.490
0.008338	94.42	109.5	1.519
0.008560	97.76	102.3	1.363
0.008493	90.03	110.0	1.465
0.008410	95.84	107.8	1.448

Average 97.94 114.9 1.589
Standard Dev. 4.043 5.003 0.07204
Coeff. of Var. [%] 4.128 4.356 4.534
Min. 88.86 105.2 1.401
Max. 104.5 125.9 1.714
Number of Spec. 18 18 18

Average_{norm} 0.008254 91.87 107.7 1.489
Standard Dev._{norm} 4.411 4.783 0.04449
Coeff. of Var. [%]_{norm} 4.802 4.441 2.988
Min. 0.007922 85.27 100.7 1.363
Max. 0.008560 100.1 122.0 1.544
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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

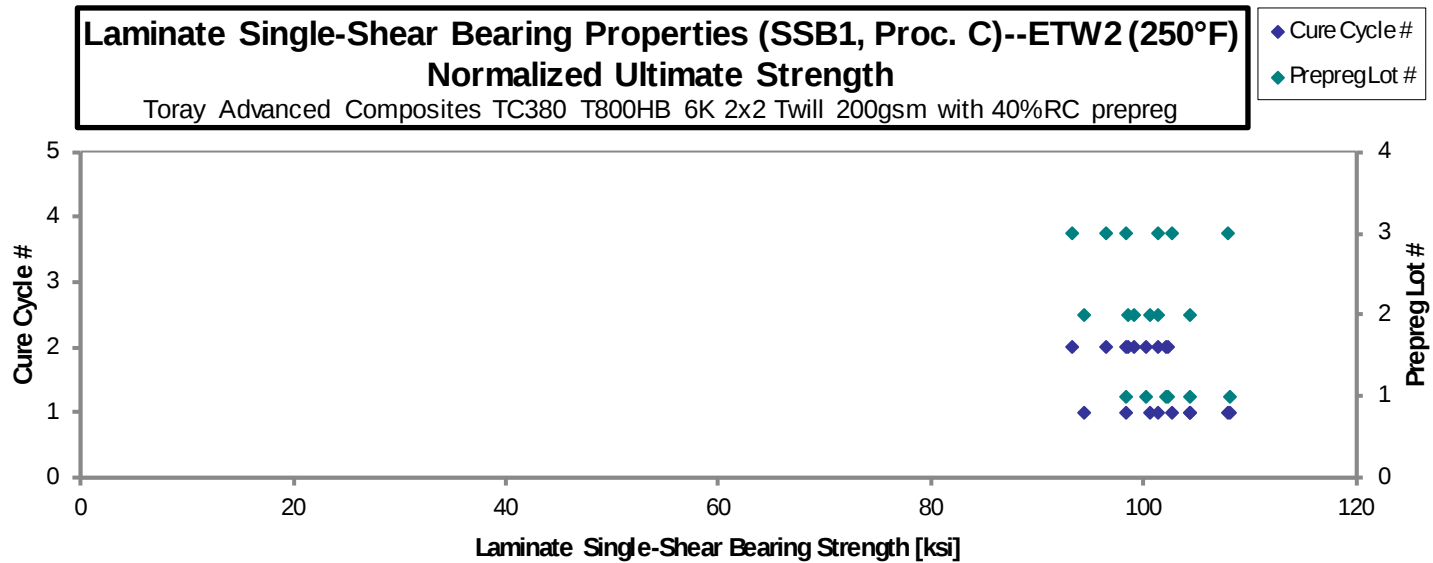
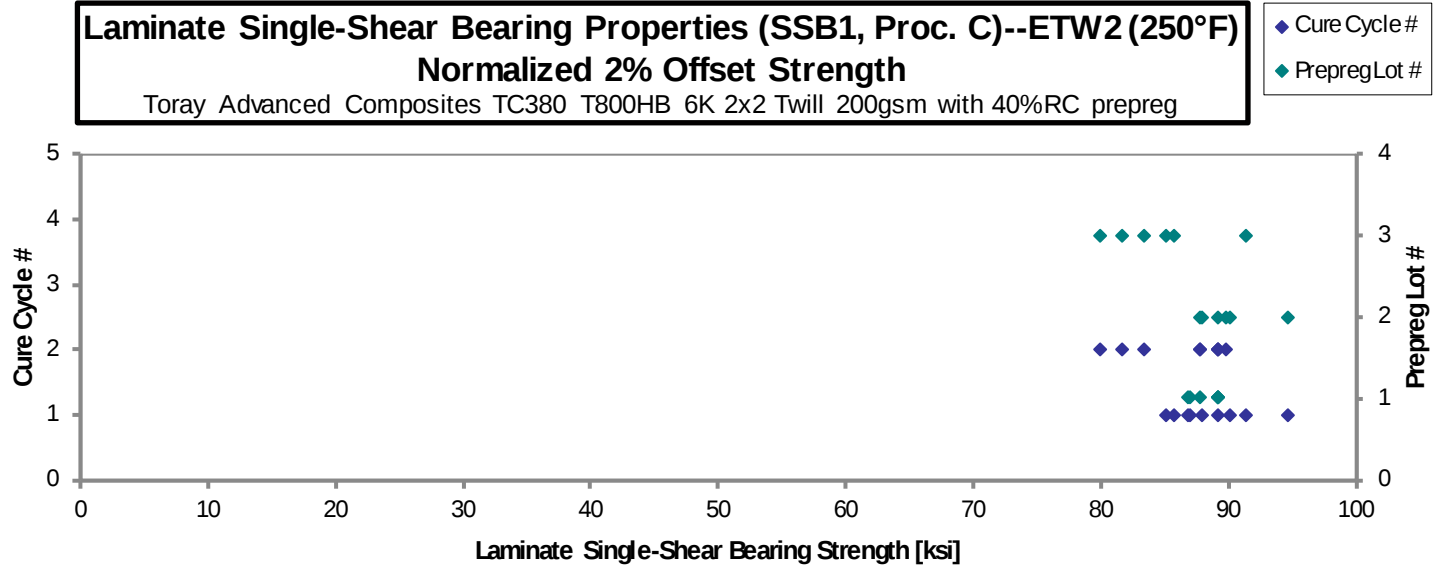
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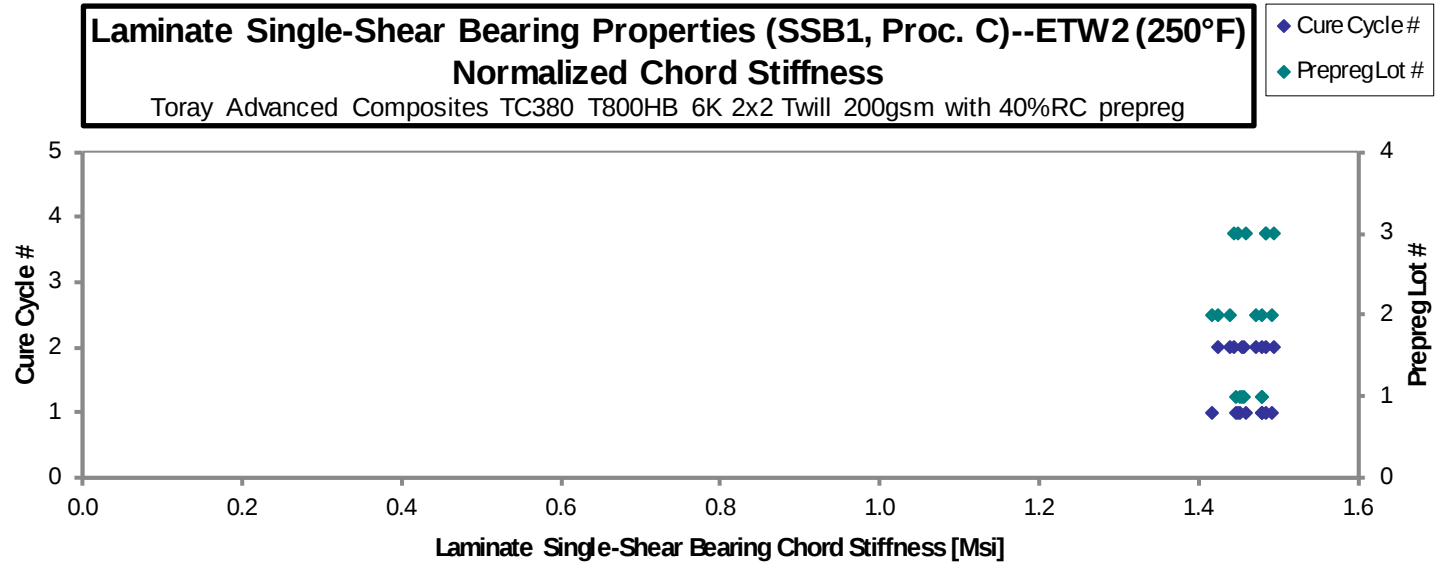
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE1A111E	A	C1	1	1	83.19	103.6	1.385	0.1471	16	B1I
TCE1A112E	A	C1	1	1	84.51	93.14	1.376	0.1487	16	B1I
TCE1A113E	A	C1	1	1	83.36	100.0	1.419	0.1469	16	B1I
TCE1A211E	A	C2	1	2	85.55	99.60	1.440	0.1446	16	B1I
TCE1A212E	A	C2	1	2	85.77	96.48	1.401	0.1463	16	B1I
TCE1A213E	A	C2	1	2	86.69	99.30	1.414	0.1448	16	B1I
TCE1B111E	B	C1	2	1	85.88	92.33	1.384	0.1440	16	B1I
TCE1B112E	B	C1	2	1	91.36	97.07	1.428	0.1459	16	B1I
TCE1B113E	B	C1	2	1	87.49	101.3	1.448	0.1450	16	B1I
TCE1B211E	B	C2	2	2	86.78	98.65	1.433	0.1447	16	B1I
TCE1B212E	B	C2	2	2	84.26	94.60	1.366	0.1467	16	B1I
TCE1B213E	B	C2	2	2	86.98	95.99	1.394	0.1454	16	B1I
TCE1C111E	C	C1	3	1	85.60	102.6	1.457	0.1410	16	B1I
TCE1C112E	C	C1	3	1	90.74	107.3	1.474	0.1418	16	B1I
TCE1C113E	C	C1	3	1	84.46	100.6	1.441	0.1418	16	B1I
TCE1C211E	C	C2	3	2	83.06	96.13	1.487	0.1414	16	B1I
TCE1C212E	C	C2	3	2	81.60	98.24	1.444	0.1409	16	B1I
TCE1C213E	C	C2	3	2	79.61	92.93	1.479	0.1413	16	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [ksi]
0.009191	86.89	108.2	1.446
0.009292	89.23	98.35	1.453
0.009183	86.99	104.4	1.480
0.009035	87.84	102.3	1.479
0.009146	89.14	100.3	1.456
0.009048	89.14	102.1	1.453
0.009002	87.85	94.45	1.416
0.009120	94.68	100.6	1.480
0.009063	90.10	104.4	1.491
0.009044	89.18	101.4	1.472
0.009171	87.81	98.58	1.424
0.009090	89.84	99.15	1.440
0.008813	85.72	102.8	1.459
0.008860	91.36	108.0	1.484
0.008861	85.05	101.3	1.451
0.008838	83.41	96.54	1.493
0.008806	81.66	98.31	1.445
0.008833	79.91	93.28	1.485

Average 85.38 98.33 1.426
Standard Dev. 2.872 3.967 0.03631
Coeff. of Var. [%] 3.363 4.034 2.546
Min. 79.61 92.33 1.366
Max. 91.36 107.3 1.487
Number of Spec. 18 18 18

Average_{norm} 0.009022 87.55 100.8 1.462
Standard Dev._{norm} 3.500 4.029 0.02272
Coeff. of Var. [%]_{norm} 3.998 3.997 1.555
Min. 0.008806 79.91 93.28 1.416
Max. 0.009292 94.68 108.2 1.493
Number of Spec. 18 18 18 18





4.26 “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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

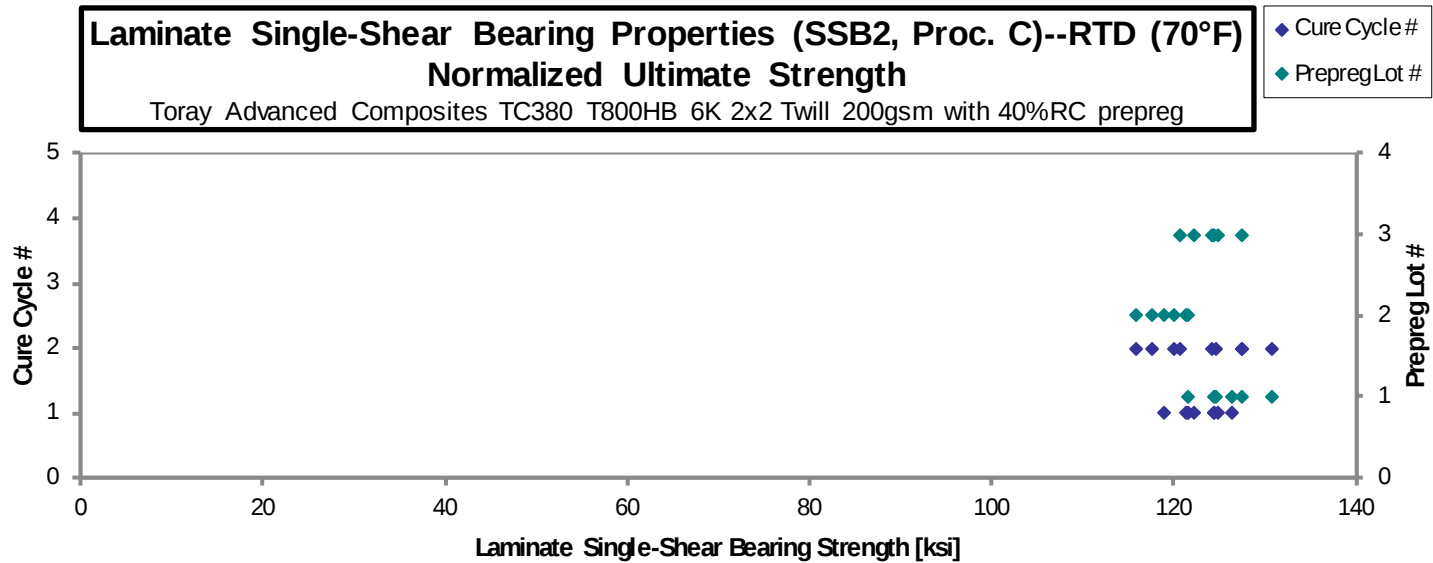
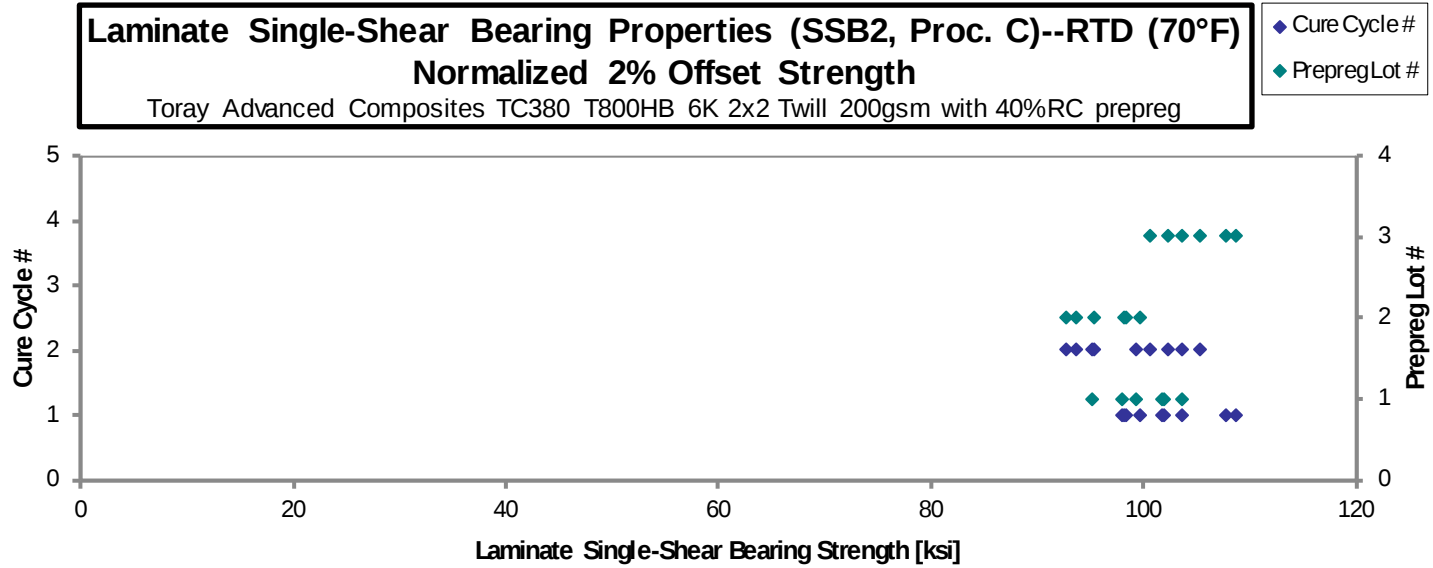
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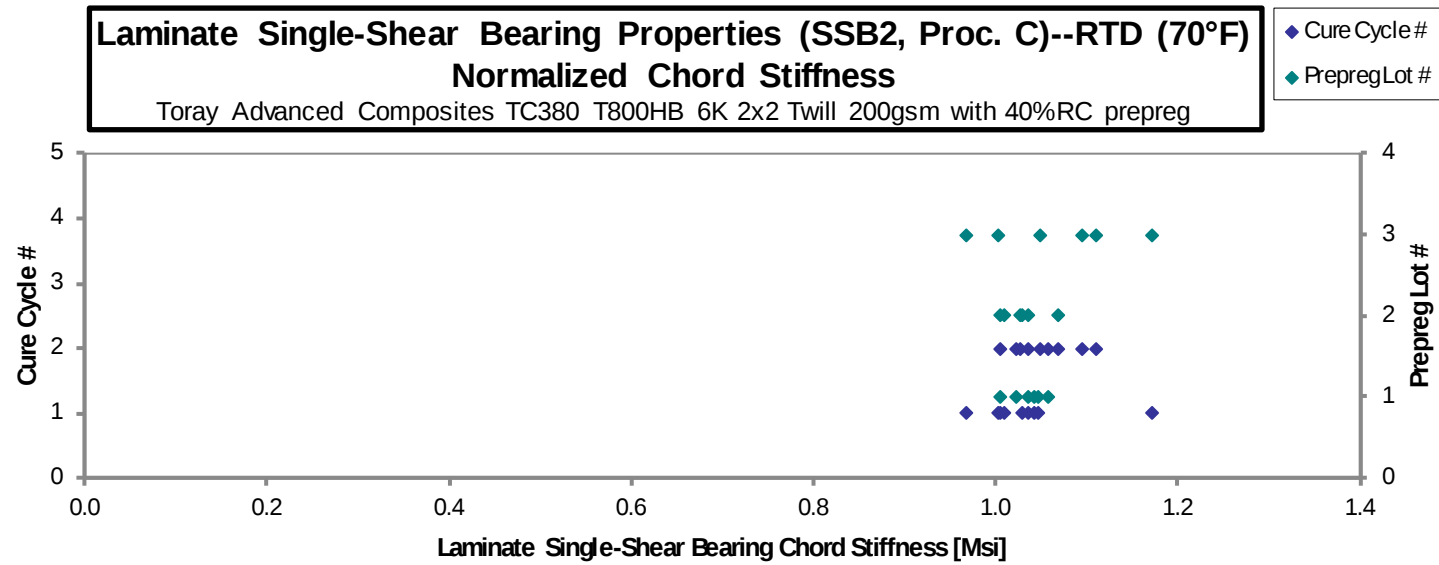
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE2A111A	A	C1	1	1	107.7	138.9	1.145	0.1602	20	B1I, E3I
TCE2A112A	A	C1	1	1	109.3	130.3	1.123	0.1642	20	B1I, E3I
TCE2A113A	A	C1	1	1	107.0	130.8	1.056	0.1674	20	B1I, E3I
TCE2A211A	A	C2	1	2	109.0	134.1	1.089	0.1674	20	B1I, E3I
TCE2A212A	A	C2	1	2	102.8	135.6	1.060	0.1699	20	B1I, E3I
TCE2A213A	A	C2	1	2	94.93	124.3	1.055	0.1766	20	B1I, E3I
TCE2B111A	B	C1	2	1	110.2	134.3	1.145	0.1593	20	B1I, E3I
TCE2B112A	B	C1	2	1	106.6	128.8	1.093	0.1625	20	B1I, E3I
TCE2B113A	B	C1	2	1	104.2	128.7	1.091	0.1659	20	B1I, E3I
TCE2B211A	B	C2	2	2	104.5	131.2	1.192	0.1579	20	B1I, E3I
TCE2B212A	B	C2	2	2	100.5	130.0	1.112	0.1624	20	B1I, E3I
TCE2B213A	B	C2	2	2	101.6	123.7	1.072	0.1651	20	B1I, E3I
TCE2C111A	C	C1	3	1	113.0	130.4	1.227	0.1680	20	B1I
TCE2C112A	C	C1	3	1	111.7	128.5	1.032	0.1711	20	B1I
TCE2C113A	C	C1	3	1	106.0	125.1	0.992	0.1719	20	B1I
TCE2C211A	C	C2	3	2	111.1	131.0	1.170	0.1669	20	B1I
TCE2C212A	C	C2	3	2	106.5	125.6	1.092	0.1692	20	B1I
TCE2C213A	C	C2	3	2	103.1	130.7	1.123	0.1717	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.008009	97.99	126.4	1.042
0.008209	102.0	121.5	1.048
0.008368	101.7	124.4	1.004
0.008368	103.6	127.5	1.036
0.008495	99.22	130.9	1.023
0.008829	95.24	124.7	1.059
0.007966	99.74	121.6	1.037
0.008125	98.42	118.9	1.009
0.008293	98.19	121.2	1.029
0.007893	93.69	117.7	1.069
0.008121	92.78	120.0	1.026
0.008253	95.29	116.0	1.005
0.008402	107.9	124.5	1.172
0.008555	108.6	124.9	1.003
0.008596	103.6	122.2	0.969
0.008343	105.3	124.2	1.110
0.008458	102.4	120.7	1.050
0.008585	100.6	127.5	1.095

Average 106.1 130.1 1.104
 Standard Dev. 4.505 3.989 0.05827
 Coeff. of Var. [%] 4.246 3.066 5.279
 Min. 94.93 123.7 0.9916
 Max. 113.0 138.9 1.227
 Number of Spec. 18 18 18

Average_{norm} 0.008326 100.3 123.0 1.044
 Standard Dev_{norm} 4.526 3.777 0.04664
 Coeff. of Var. [%]_{norm} 4.511 3.070 4.470
 Min. 0.007893 92.78 116.0 0.9685
 Max. 0.008829 108.6 130.9 1.172
 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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

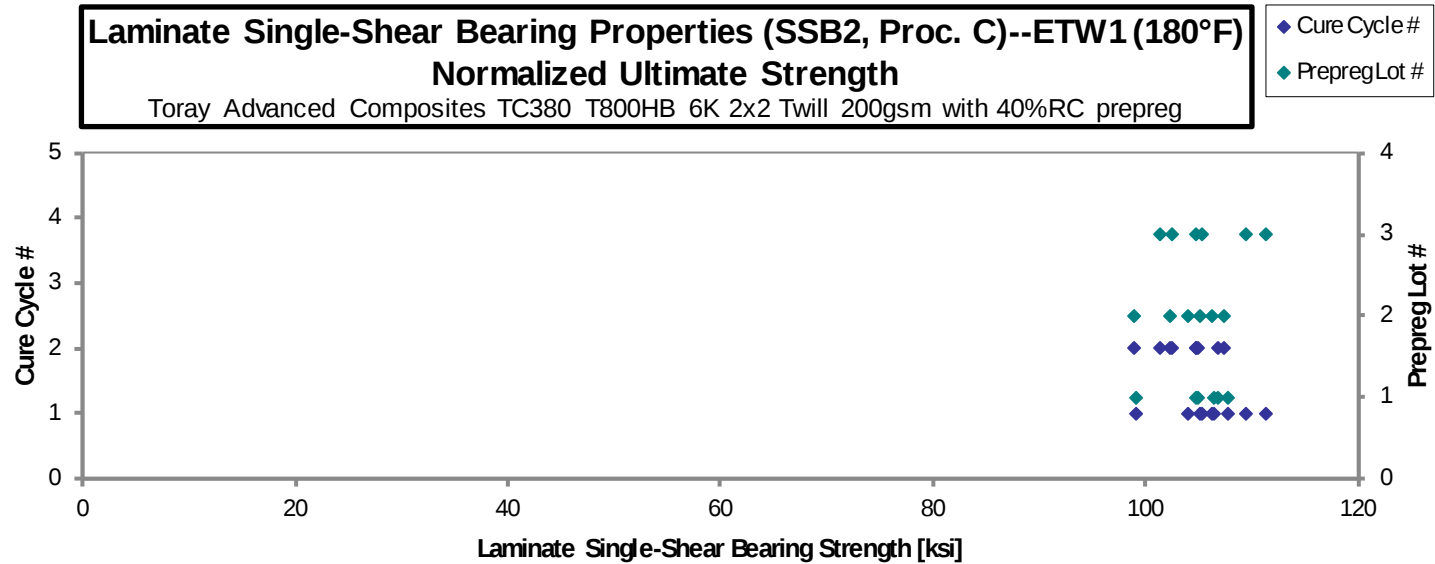
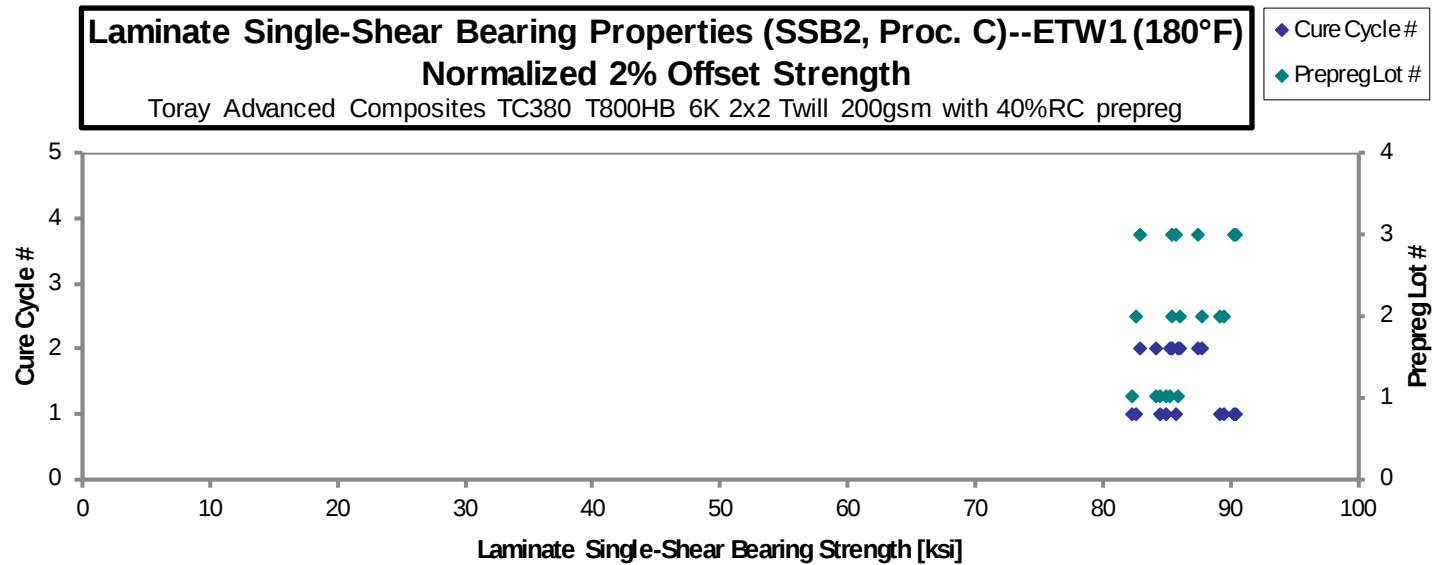
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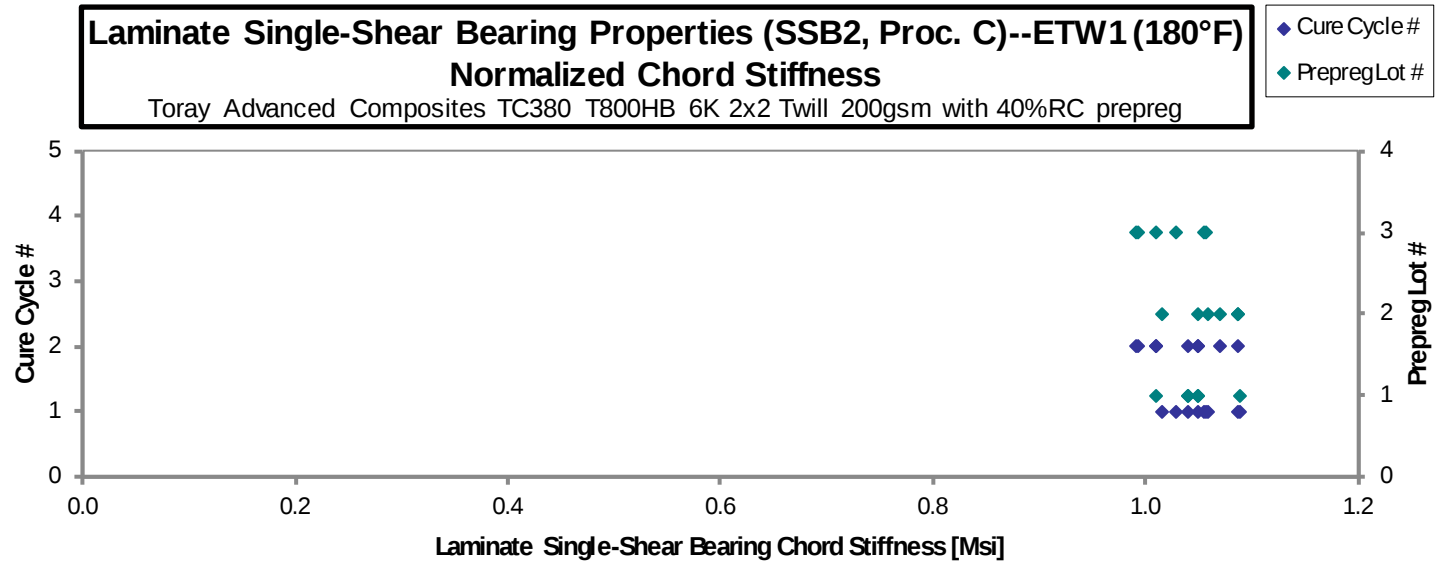
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TCE2A111D	A	C1	1	1	88.46	111.6	1.100	0.1680	20	B1I
TCE2A112D	A	C1	1	1	87.30	105.1	1.104	0.1659	20	B1I
TCE2A113D	A	C1	1	1	91.70	116.3	1.176	0.1630	20	B1I
TCE2A211D	A	C2	1	2	84.86	106.4	1.005	0.1767	20	B1I
TCE2A212D	A	C2	1	2	85.20	106.1	1.053	0.1739	20	B1I
TCE2A213D	A	C2	1	2	89.62	109.6	1.097	0.1686	20	B1I
TCE2B111D	B	C1	2	1	95.15	113.1	1.081	0.1655	20	B1I
TCE2B112D	B	C1	2	1	96.05	113.3	1.170	0.1635	20	B1I
TCE2B113D	B	C1	2	1	91.01	114.6	1.167	0.1599	20	B1I
TCE2B211D	B	C2	2	2	90.81	113.3	1.107	0.1669	20	B1I
TCE2B212D	B	C2	2	2	93.66	105.6	1.143	0.1649	20	B1I
TCE2B213D	B	C2	2	2	93.08	111.5	1.186	0.1614	20	B1I
TCE2C111D	C	C1	3	1	92.37	107.7	1.081	0.1720	20	B1I
TCE2C112D	C	C1	3	1	93.00	114.4	1.085	0.1712	20	B1I
TCE2C113D	C	C1	3	1	89.04	113.7	1.069	0.1694	20	B1I
TCE2C211D	C	C2	3	2	89.92	105.4	1.020	0.1712	20	B1I
TCE2C212D	C	C2	3	2	85.17	104.3	1.021	0.1712	20	B1I
TCE2C213D	C	C2	3	2	89.42	109.6	1.056	0.1683	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [ksi]
0.008399	84.43	106.5	1.049
0.008294	82.28	99.06	1.040
0.008150	84.93	107.7	1.089
0.008837	85.21	106.8	1.010
0.008696	84.19	104.9	1.041
0.008428	85.83	104.9	1.050
0.008273	89.45	106.3	1.016
0.008173	89.21	105.2	1.086
0.007993	82.65	104.1	1.059
0.008343	86.09	107.4	1.049
0.008243	87.73	98.90	1.071
0.008069	85.35	102.2	1.088
0.008600	90.28	105.3	1.056
0.008558	90.45	111.3	1.055
0.008472	85.72	109.5	1.029
0.008561	87.47	102.5	0.9921
0.008560	82.85	101.4	0.9928
0.008413	85.49	104.8	1.010

Average 90.32 110.1 1.095
Standard Dev. 3.319 3.916 0.05516
Coeff. of Var. [%] 3.674 3.558 5.036
Min. 84.86 104.3 1.005
Max. 96.05 116.3 1.186
Number of Spec. 18 18 18

Average_{norm} 0.008392 86.09 104.9 1.044
Standard Dev._{norm} 2.527 3.250 0.03044
Coeff. of Var. [%]_{norm} 2.935 3.098 2.917
Min. 0.007993 82.28 98.90 0.9921
Max. 0.008837 90.45 111.3 1.089
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 T800HB 6K 2X2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

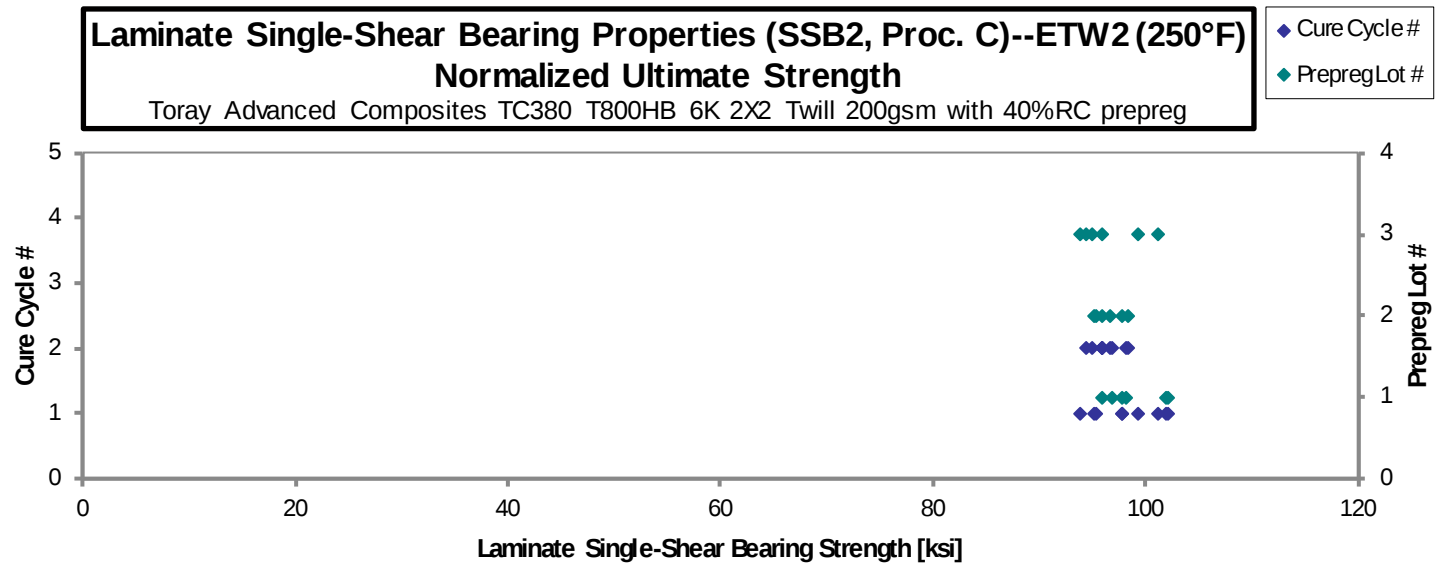
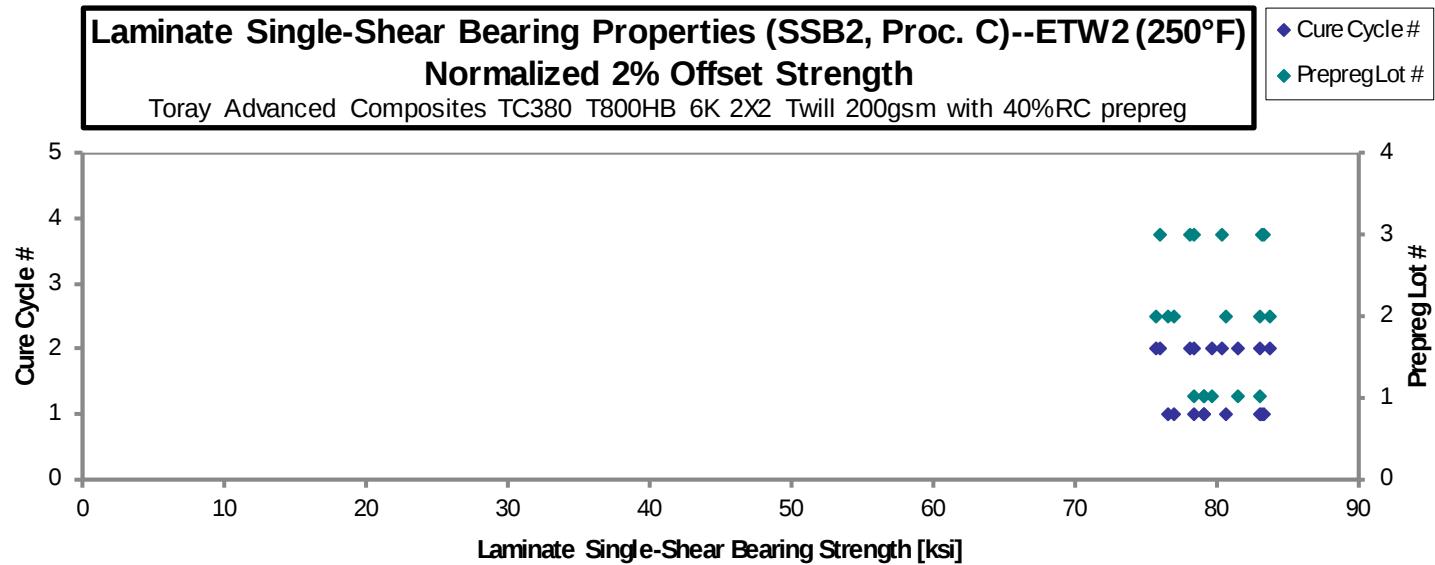
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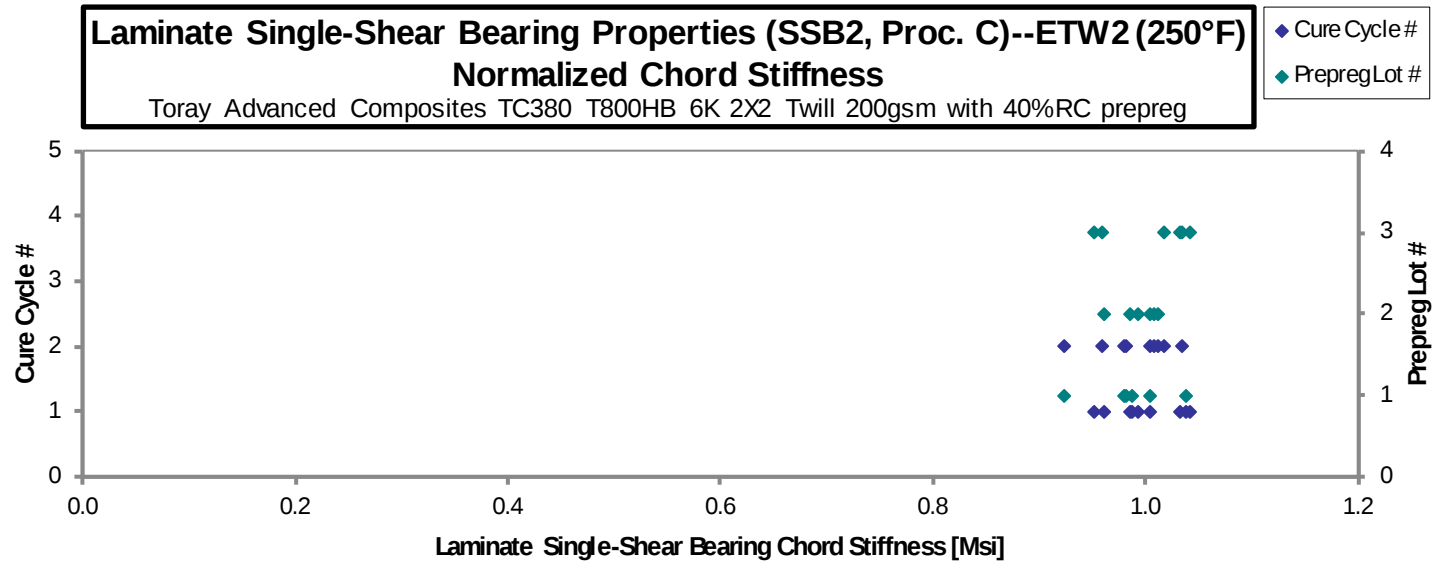
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE2A111E	A	C1	1	1	80.73	99.01	0.9583	0.1812	20	B1I
TCE2A112E	A	C1	1	1	75.79	93.69	0.9946	0.1837	20	B1I
TCE2A113E	A	C1	1	1	76.44	98.70	0.9717	0.1821	20	B1I
TCE2A211E	A	C2	1	2	76.70	92.23	0.8888	0.1830	20	B1I
TCE2A212E	A	C2	1	2	74.33	92.98	0.9299	0.1858	20	B1I
TCE2A213E	A	C2	1	2	77.79	92.51	0.9357	0.1843	20	B1I
TCE2B111E	B	C1	2	1	79.46	93.68	0.9475	0.1787	20	B1I
TCE2B112E	B	C1	2	1	74.53	95.11	0.9599	0.1809	20	B1I
TCE2B113E	B	C1	2	1	75.44	93.43	0.9720	0.1798	20	B1I
TCE2B211E	B	C2	2	2	82.81	97.36	1.000	0.1780	20	B1I
TCE2B212E	B	C2	2	2	73.88	94.28	0.9822	0.1805	20	B1I
TCE2B213E	B	C2	2	2	81.60	94.23	0.9866	0.1791	20	B1I
TCE2C111E	C	C1	3	1	82.09	99.82	1.019	0.1783	20	B1I
TCE2C112E	C	C1	3	1	82.32	92.76	0.9392	0.1783	20	B1I
TCE2C113E	C	C1	3	1	77.06	97.51	1.023	0.1792	20	B1I
TCE2C211E	C	C2	3	2	77.60	95.19	0.9517	0.1774	20	B1I
TCE2C212E	C	C2	3	2	75.34	94.02	1.007	0.1778	20	B1I
TCE2C213E	C	C2	3	2	79.30	93.24	1.021	0.1783	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.009061	83.12	101.9	0.9867
0.009185	79.11	97.79	1.038
0.009103	79.07	102.1	1.005
0.009151	79.75	95.91	0.9243
0.009290	78.46	98.15	0.9816
0.009216	81.46	96.88	0.9800
0.008936	80.69	95.13	0.9621
0.009043	76.59	97.74	0.9865
0.008988	77.05	95.43	0.9928
0.008898	83.73	98.44	1.011
0.009024	75.77	96.68	1.007
0.008953	83.02	95.87	1.004
0.008917	83.18	101.1	1.033
0.008913	83.38	93.95	0.9513
0.008958	78.44	99.25	1.041
0.008868	78.19	95.92	0.9590
0.008888	76.09	94.95	1.017
0.008917	80.35	94.47	1.035

Average 77.96 94.99 0.9716
Standard Dev. 2.961 2.414 0.03643
Coeff. of Var. [%] 3.798 2.542 3.749
Min. 73.88 92.23 0.8888
Max. 82.81 99.82 1.023
Number of Spec. 18 18 18

Average_{norm} 0.009017 79.86 97.32 0.9953
Standard Dev._{norm} 2.658 2.486 0.03249
Coeff. of Var. [%]_{norm} 3.328 2.554 3.264
Min. 0.008868 75.77 93.95 0.9243
Max. 0.009290 83.73 102.1 1.041
Number of Spec. 18 18 18 18





4.27 “40/20/40” 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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

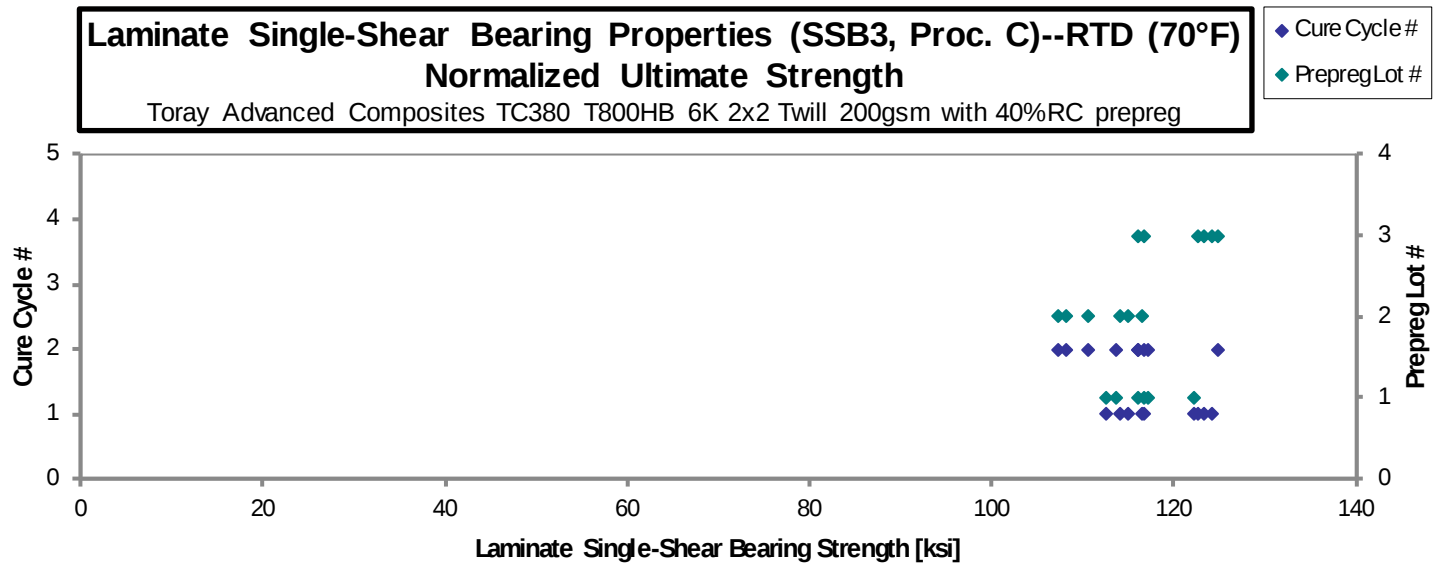
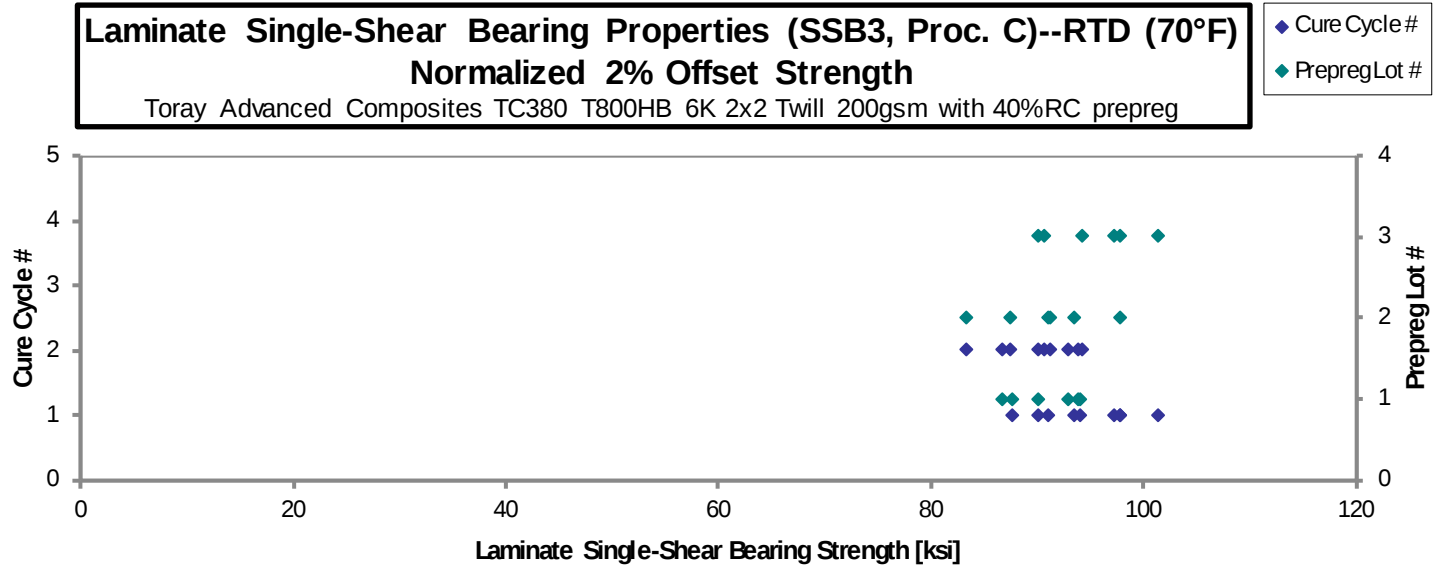
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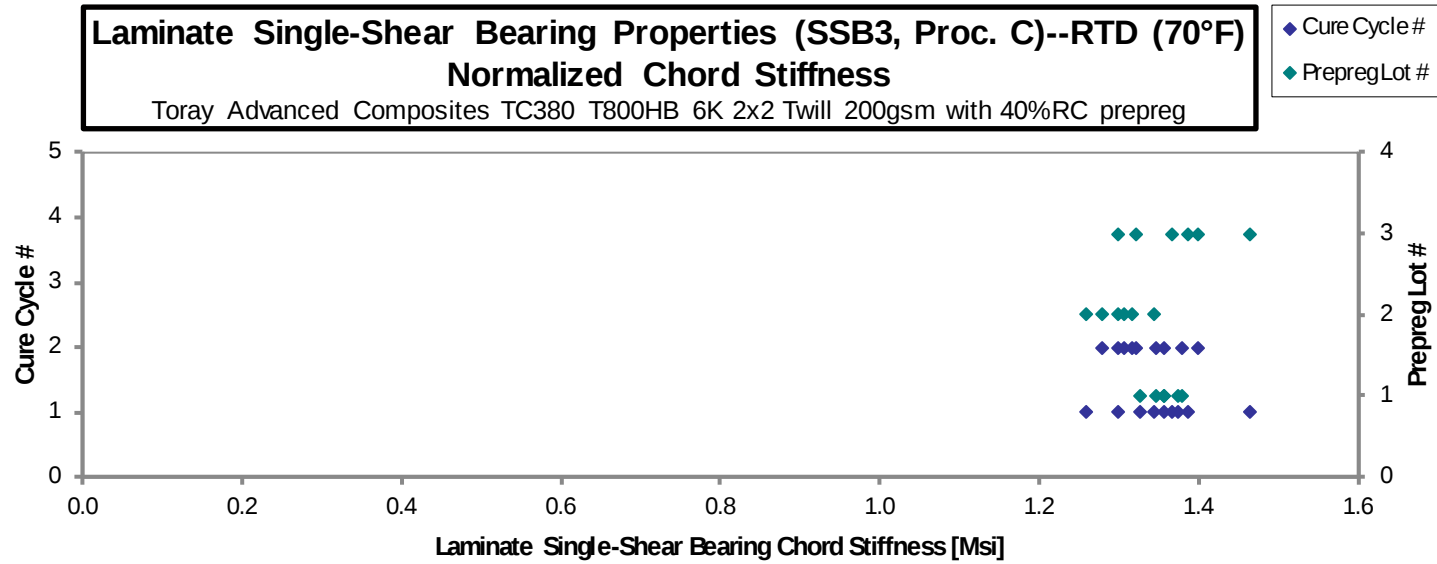
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE3A111A	A	C1	1	1	95.26	122.2	1.473	0.1621	20	B1I
TCE3A112A	A	C1	1	1	95.70	129.8	1.459	0.1657	20	B1I, E3I
TCE3A113A	A	C1	1	1	98.47	122.2	1.388	0.1682	20	B1I
TCE3A211A	A	C2	1	2	104.8	129.6	1.540	0.1576	20	B1I
TCE3A212A	A	C2	1	2	100.5	126.6	1.468	0.1628	20	B1I
TCE3A213A	A	C2	1	2	92.50	121.3	1.435	0.1650	20	B1I
TCE3B111A	B	C1	2	1	102.8	125.6	1.479	0.1599	20	B1I
TCE3B112A	B	C1	2	1	98.23	125.6	1.357	0.1632	20	B1I
TCE3B113A	B	C1	2	1	104.0	122.3	1.384	0.1654	20	B1I
TCE3B211A	B	C2	2	2	91.42	117.8	1.403	0.1605	20	B1I
TCE3B212A	B	C2	2	2	94.31	116.8	1.420	0.1632	20	B1I
TCE3B213A	B	C2	2	2	97.33	118.0	1.392	0.1651	20	B1I
TCE3C111A	C	C1	3	1	99.53	126.4	1.489	0.1729	20	B1I
TCE3C112A	C	C1	3	1	101.0	122.2	1.362	0.1766	20	B1I
TCE3C113A	C	C1	3	1	96.01	121.7	1.371	0.1782	20	B1I
TCE3C211A	C	C2	3	2	95.91	122.8	1.479	0.1664	20	B1I
TCE3C212A	C	C2	3	2	93.62	129.7	1.372	0.1695	20	B1I
TCE3C213A	C	C2	3	2	96.98	120.2	1.339	0.1709	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.008103	87.71	112.5	1.357
0.008287	90.12	122.2	1.374
0.008410	94.10	116.8	1.327
0.007880	93.87	116.0	1.379
0.008140	92.99	117.1	1.358
0.008250	86.72	113.7	1.345
0.007997	93.40	114.1	1.344
0.008159	91.08	116.4	1.258
0.008269	97.75	114.9	1.300
0.008023	83.35	107.4	1.279
0.008160	87.45	108.3	1.317
0.008255	91.30	110.7	1.306
0.008647	97.80	124.2	1.463
0.008832	101.4	122.6	1.367
0.008908	97.19	123.2	1.388
0.008318	90.66	116.1	1.398
0.008473	90.14	124.8	1.321
0.008543	94.15	116.7	1.300

Average 97.69 123.4 1.423
Standard Dev. 3.844 4.026 0.05689
Coeff. of Var. [%] 3.935 3.264 3.998
Min. 91.42 116.8 1.339
Max. 104.8 129.8 1.540
Number of Spec. 18 18 18

Average_{norm} 0.008314 92.29 116.5 1.343
Standard Dev_{norm} 4.521 5.212 0.04885
Coeff. of Var. [%]_{norm} 4.899 4.472 3.636
Min. 0.007880 83.35 107.4 1.258
Max. 0.008908 101.4 124.8 1.463
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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

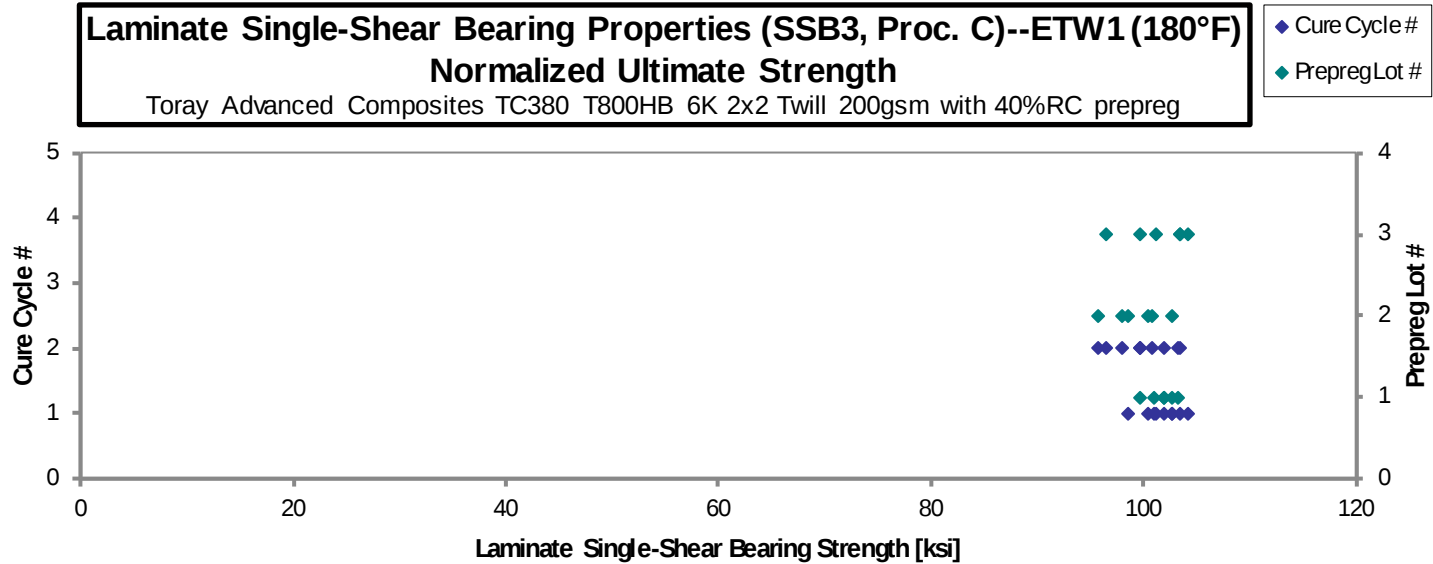
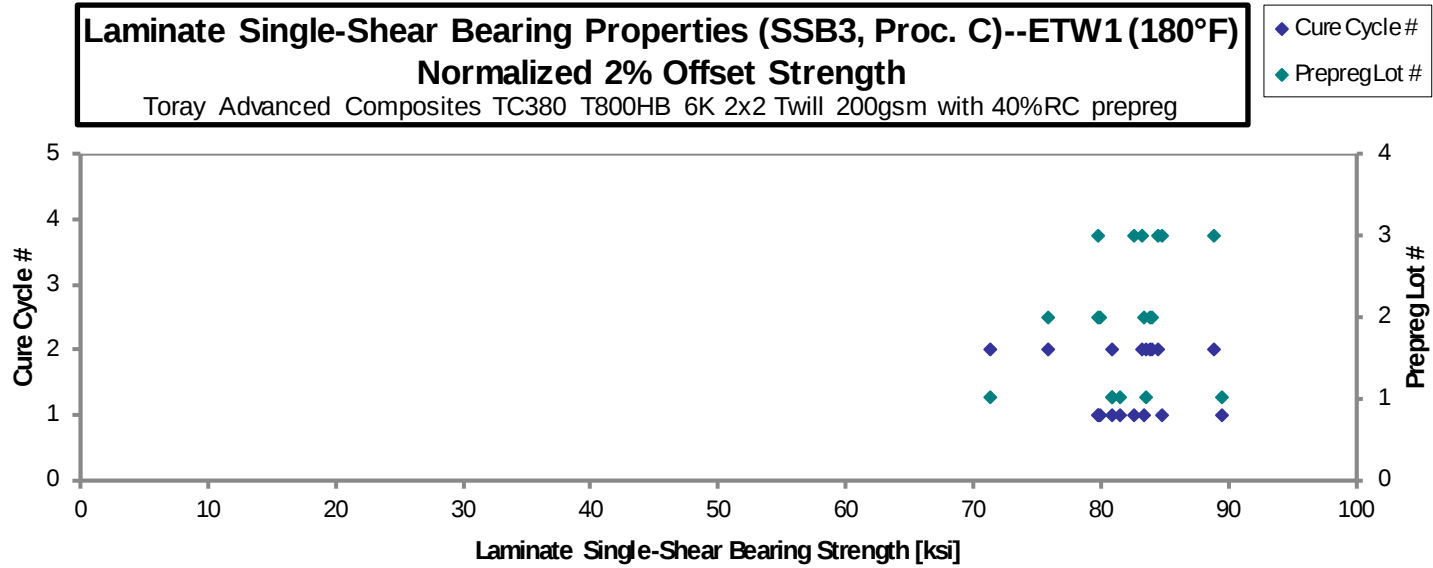
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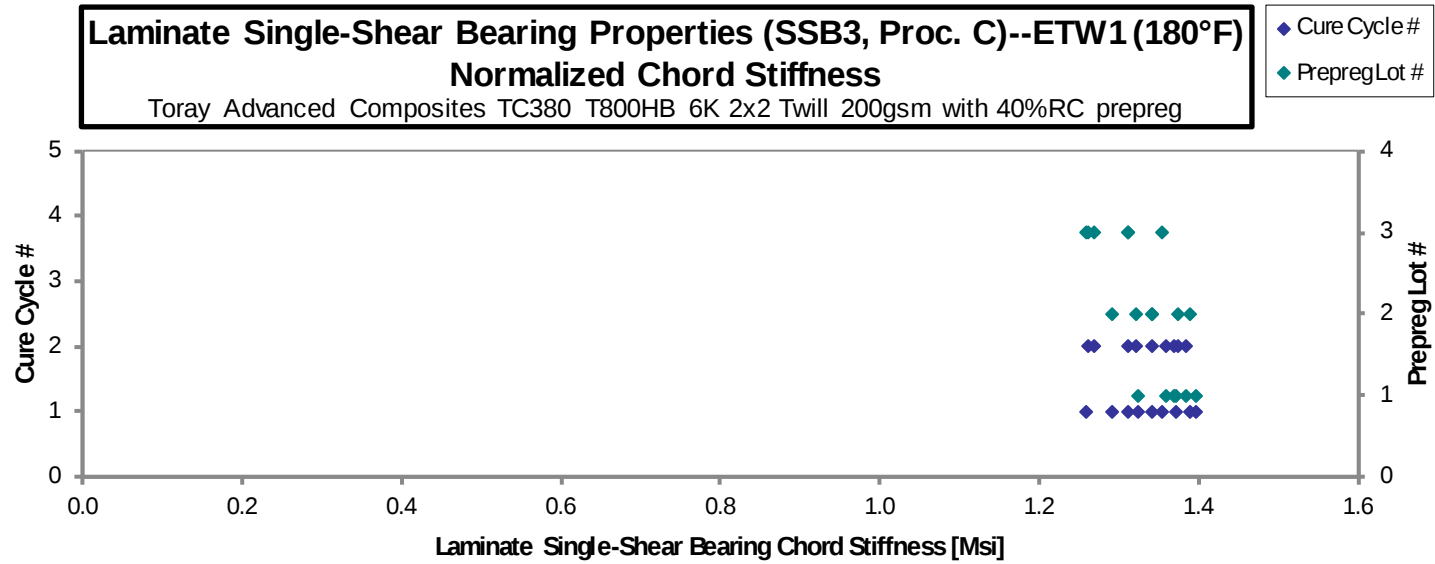
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE3A111D	A	C1	1	1	93.30	107.0	1.381	0.1689	20	B1I
TCE3A112D	A	C1	1	1	86.11	107.6	1.474	0.1668	20	B1I
TCE3A113D	A	C1	1	1	87.56	109.3	1.484	0.1627	20	B1I
TCE3A211D	A	C2	1	2	88.65	109.5	1.443	0.1658	20	B1I
TCE3A212D	A	C2	1	2	87.50	107.7	1.496	0.1628	20	B1I
TCE3A213D	A	C2	1	2	78.69	112.3	1.511	0.1596	20	B1I
TCE3B111D	B	C1	2	1	88.81	104.8	1.427	0.1654	20	B1I
TCE3B112D	B	C1	2	1	85.99	110.8	1.393	0.1632	20	B1I
TCE3B113D	B	C1	2	1	88.11	110.8	1.532	0.1596	20	B1I
TCE3B211D	B	C2	2	2	89.09	104.0	1.403	0.1658	20	B1I
TCE3B212D	B	C2	2	2	90.04	102.5	1.473	0.1643	20	B1I
TCE3B213D	B	C2	2	2	82.89	110.1	1.467	0.1611	20	B1I
TCE3C111D	C	C1	3	1	83.42	101.8	1.332	0.1789	20	B1I
TCE3C112D	C	C1	3	1	82.45	104.1	1.256	0.1763	20	B1I
TCE3C113D	C	C1	3	1	81.91	103.8	1.346	0.1716	20	B1I
TCE3C211D	C	C2	3	2	87.01	99.46	1.307	0.1708	20	B1I
TCE3C212D	C	C2	3	2	92.32	107.5	1.362	0.1695	20	B1I
TCE3C213D	C	C2	3	2	87.63	105.0	1.329	0.1671	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [ksi]
0.008443	89.51	102.7	1.325
0.008338	81.58	101.9	1.396
0.008135	80.94	101.1	1.372
0.008291	83.52	103.2	1.360
0.008139	80.93	99.61	1.384
0.007981	71.36	101.9	1.370
0.008269	83.45	98.50	1.341
0.008160	79.74	102.8	1.291
0.007980	79.90	100.5	1.389
0.008289	83.92	98.00	1.321
0.008216	84.06	95.74	1.375
0.008055	75.87	100.8	1.343
0.008943	84.78	103.5	1.354
0.008816	82.60	104.3	1.259
0.008578	79.84	101.2	1.312
0.008538	84.42	96.51	1.268
0.008474	88.90	103.5	1.312
0.008356	83.20	99.66	1.262

Average 86.75 106.6 1.412
Standard Dev. 3.724 3.568 0.07868
Coeff. of Var. [%] 4.293 3.348 5.572
Min. 78.69 99.46 1.256
Max. 93.30 112.3 1.532
Number of Spec. 18 18 18

Average_{norm} 0.008333 82.14 100.8 1.335
Standard Dev._{norm} 4.192 2.453 0.04434
Coeff. of Var. [%]_{norm} 5.103 2.432 3.321
Min. 0.007980 71.36 95.74 1.259
Max. 0.008943 89.51 104.3 1.396
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 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

t_{ply} [in]

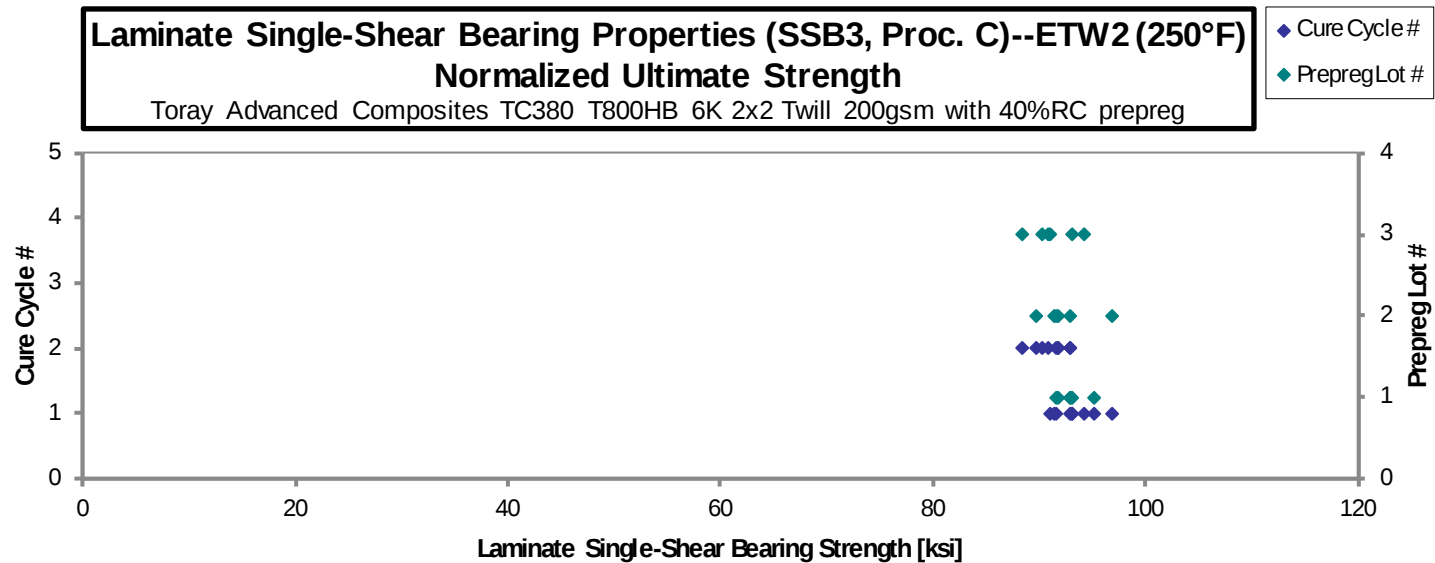
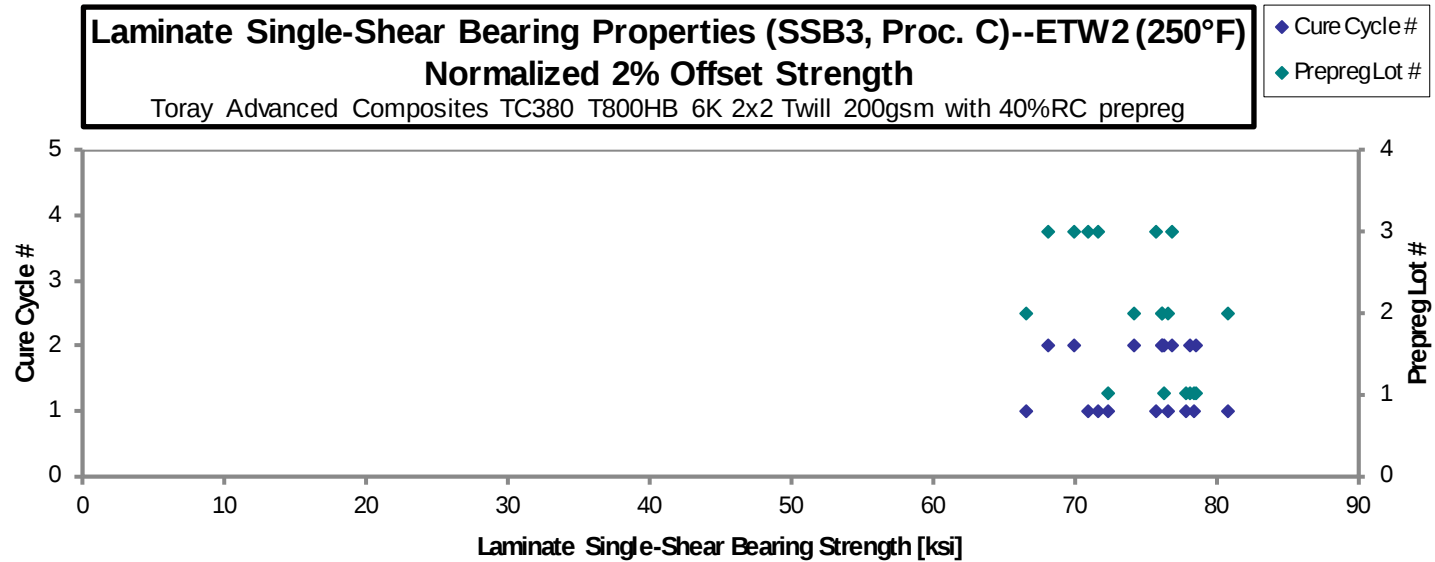
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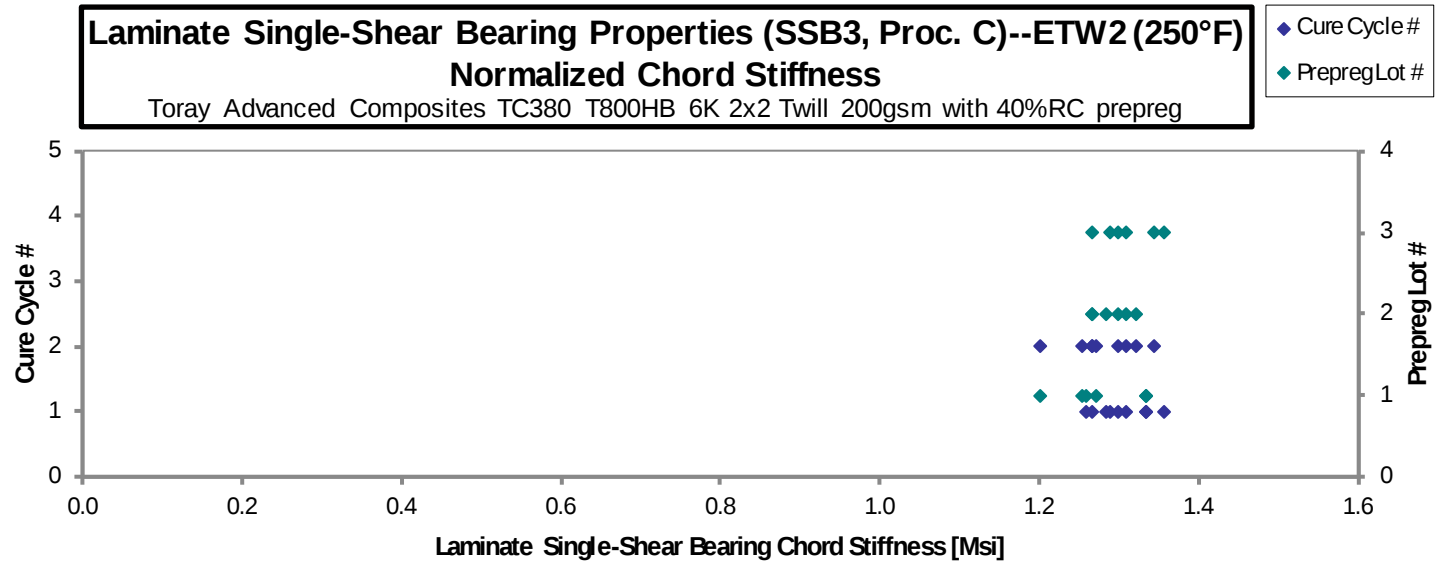
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCE3A111E	A	C1	1	1	70.75	91.12	1.232	0.1800	20	B1I
TCE3A112E	A	C1	1	1	75.97	92.18	1.292	0.1819	20	B1I
TCE3A113E	A	C1	1	1	75.86	89.27	1.300	0.1807	20	B1I
TCE3A211E	A	C2	1	2	76.36	90.36	1.169	0.1810	20	B1I
TCE3A212E	A	C2	1	2	73.18	89.11	1.202	0.1834	20	B1I
TCE3A213E	A	C2	1	2	75.57	88.72	1.228	0.1821	20	B1I
TCE3B111E	B	C1	2	1	79.32	94.93	1.285	0.1795	20	B1I
TCE3B112E	B	C1	2	1	64.28	88.21	1.223	0.1823	20	B1I
TCE3B113E	B	C1	2	1	74.11	89.87	1.241	0.1820	20	B1I
TCE3B211E	B	C2	2	2	75.48	90.89	1.309	0.1776	20	B1I
TCE3B212E	B	C2	2	2	73.97	88.90	1.228	0.1814	20	B1I
TCE3B213E	B	C2	2	2	72.54	87.77	1.271	0.1799	20	B1I
TCE3C111E	C	C1	3	1	74.48	92.65	1.278	0.1791	20	B1I
TCE3C112E	C	C1	3	1	69.83	91.69	1.269	0.1788	20	B1I
TCE3C113E	C	C1	3	1	70.89	90.07	1.341	0.1781	20	B1I
TCE3C211E	C	C2	3	2	67.04	87.05	1.246	0.1789	20	B1I
TCE3C212E	C	C2	3	2	75.62	88.72	1.286	0.1790	20	B1I
TCE3C213E	C	C2	3	2	69.50	90.25	1.336	0.1770	20	B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]	Ultimate Strength _{norm} [ksi]	Chord Stiffness _{norm} [Msi]
0.009000	72.36	93.19	1.260
0.009093	78.49	95.24	1.334
0.009036	77.89	91.66	1.335
0.009048	78.51	92.90	1.202
0.009170	76.26	92.86	1.253
0.009105	78.19	91.79	1.271
0.008973	80.88	96.80	1.310
0.009117	66.59	91.39	1.267
0.009098	76.62	92.91	1.283
0.008879	76.16	91.71	1.321
0.009068	76.22	91.61	1.265
0.008997	74.16	89.73	1.300
0.008953	75.78	94.26	1.300
0.008938	70.92	93.13	1.289
0.008903	71.72	91.13	1.357
0.008943	68.13	88.47	1.266
0.008950	76.91	90.23	1.308
0.008852	69.91	90.78	1.344

Average 73.04 90.10 1.263
Standard Dev. 3.725 1.935 0.04555
Coeff. of Var. [%] 5.099 2.148 3.606
Min. 64.28 87.05 1.169
Max. 79.32 94.93 1.341
Number of Spec. 18 18 18

Average_{norm} 0.009007 74.76 92.21 1.293
Standard Dev._{norm} 3.961 1.981 0.03853
Coeff. of Var. [%]_{norm} 5.298 2.148 2.981
Min. 0.008852 66.59 88.47 1.202
Max. 0.009170 80.88 96.80 1.357
Number of Spec. 18 18 18 18





4.28 “25/50/25” Compression After Impact 1 Properties (CAI1)

**Laminate Compression After Impact 1 Properties (CAI1)--CTD (-65°F)
Strength**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

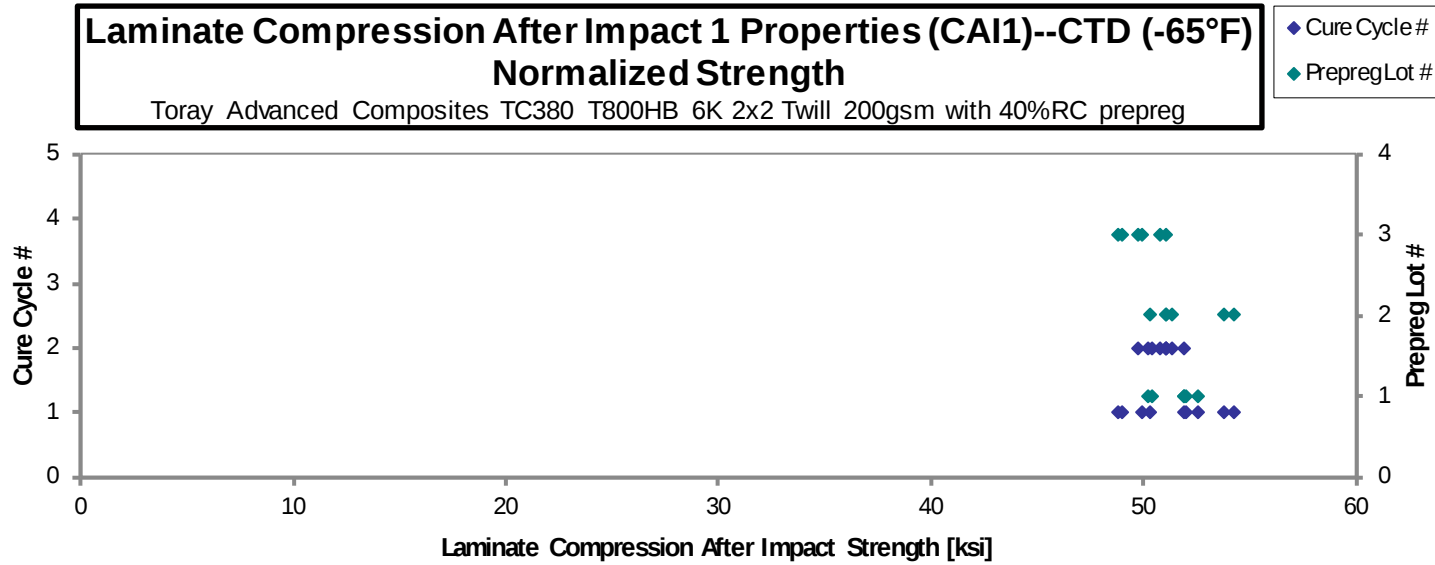
t_{ply} [in]

0.008800

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]
TCEKA111B	A	C1	1	1	50.40	329.6	0.2176	24	LDM	0.009067	51.93
TCEKA112B	A	C1	1	1	51.93	313.7	0.2113	24	LDM	0.008806	51.96
TCEKA113B	A	C1	1	1	51.74	322.6	0.2144	24	LDM	0.008935	52.54
TCEKA211B	A	C2	1	2	50.34	329.6	0.2176	24	LDM	0.009068	51.87
TCEKA212B	A	C2	1	2	50.78	313.7	0.2096	24	LDM	0.008733	50.39
TCEKA213B	A	C2	1	2	49.38	322.6	0.2150	24	LDM	0.008957	50.27
TCEKB111B	B	C1	2	1	50.64	319.1	0.2099	24	LDM	0.008745	50.32
TCEKB112B	B	C1	2	1	52.53	322.0	0.2164	24	LDM	0.009017	53.82
TCEKB113B	B	C1	2	1	53.16	322.2	0.2157	24	LDM	0.008986	54.29
TCEKB211B	B	C2	2	2	51.56	311.5	0.2092	24	LDM	0.008716	51.07
TCEKB212B	B	C2	2	2	50.10	321.7	0.2154	24	LDM	0.008973	51.08
TCEKB213B	B	C2	2	2	52.38	308.5	0.2069	24	LDM	0.008621	51.32
TCEKC112B	C	C1	3	1	48.27	320.5	0.2136	24	M(A,L)DM	0.008899	48.81
TCEKC113B	C	C1	3	1	49.76	310.6	0.2081	24	M(A,L)DM	0.008670	49.03
TCEKC114B	C	C1	3	1	49.72	316.6	0.2122	24	M(A,L)DM	0.008843	49.96
TCEKC211B	C	C2	3	2	50.45	310.7	0.2082	24	LDM	0.008673	49.73
TCEKC212B	C	C2	3	2	50.40	318.1	0.2128	24	LDM	0.008865	50.77
TCEKC214B	C	C2	3	2	50.90	318.6	0.2117	24	LDM	0.008822	51.03

Average 50.80
Standard Dev. 1.228
Coeff. of Var. [%] 2.418
Min. 48.27
Max. 53.16
Number of Spec. 18

Average_{norm} 0.008855 51.12
Standard Dev._{norm} 1.462
Coeff. of Var. [%]_{norm} 2.860
Min. 0.008621 48.81
Max. 0.009068 54.29
Number of Spec. 18 18



Laminate Compression After Impact 1 Properties (CAI1)--RTD (70°F) Strength

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

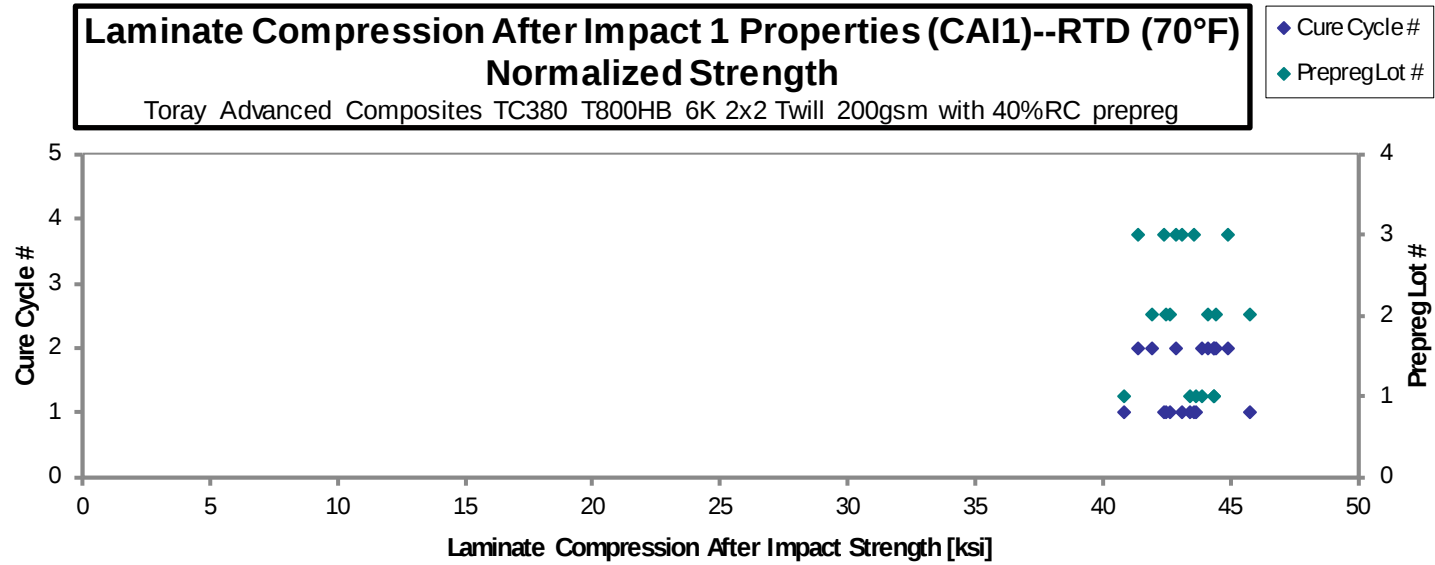
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEKA112A	A	C1	1	1	44.49	312.6	0.2061	24	LDM
TCEKA113A	A	C1	1	1	42.36	307.2	0.2176	24	LDM
TCEKA114A	A	C1	1	1	40.87	326.5	0.2112	24	LDM
TCEKA211A	A	C2	1	2	43.80	318.4	0.2117	24	LDM
TCEKA212A	A	C2	1	2	45.38	307.6	0.2063	24	LDM
TCEKA213A	A	C2	1	2	42.88	330.9	0.2186	24	LDM
TCEKB111A	B	C1	2	1	44.28	301.7	0.2027	24	LDM
TCEKB112A	B	C1	2	1	43.34	310.5	0.2077	24	LDM
TCEKB113A	B	C1	2	1	46.81	306.9	0.2065	24	LDM
TCEKB211A	B	C2	2	2	45.35	309.1	0.2054	24	LDM
TCEKB212A	B	C2	2	2	44.86	312.0	0.2093	24	LDM
TCEKB213A	B	C2	2	2	42.08	311.8	0.2105	24	LDM
TCEKC111A	C	C1	3	1	44.57	309.8	0.2066	24	LDM
TCEKC112A	C	C1	3	1	43.31	313.7	0.2100	24	LDM
TCEKC113A	C	C1	3	1	42.95	312.7	0.2083	24	LDM
TCEKC211A	C	C2	3	2	42.48	310.9	0.2057	24	LDM
TCEKC212A	C	C2	3	2	45.05	309.4	0.2106	24	LDM
TCEKC213A	C	C2	3	2	43.41	312.3	0.2085	24	LDM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008588	43.41
0.009067	43.65
0.008799	40.87
0.008820	43.89
0.008597	44.33
0.009108	44.38
0.008445	42.50
0.008653	42.61
0.008603	45.76
0.008559	44.11
0.008720	44.45
0.008770	41.94
0.008608	43.60
0.008752	43.07
0.008680	42.36
0.008570	41.37
0.008774	44.92
0.008686	42.85

Average **43.79**
 Standard Dev. **1.444**
 Coeff. of Var. [%] **3.297**
 Min. **40.87**
 Max. **46.81**
 Number of Spec. **18**

Average_{norm} **0.008711**
 Standard Dev._{norm} **1.265**
 Coeff. of Var. [%]_{norm} **2.918**
 Min. **0.008445**
 Max. **0.009108**
 Number of Spec. **18**



4.29 “40/20/40” Compression After Impact 3 Properties (CAI3)

**Laminate Compression After Impact 3 Properties (CAI3)--RTD (70°F)
Strength**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

normalizing

 t_{ply} [in]

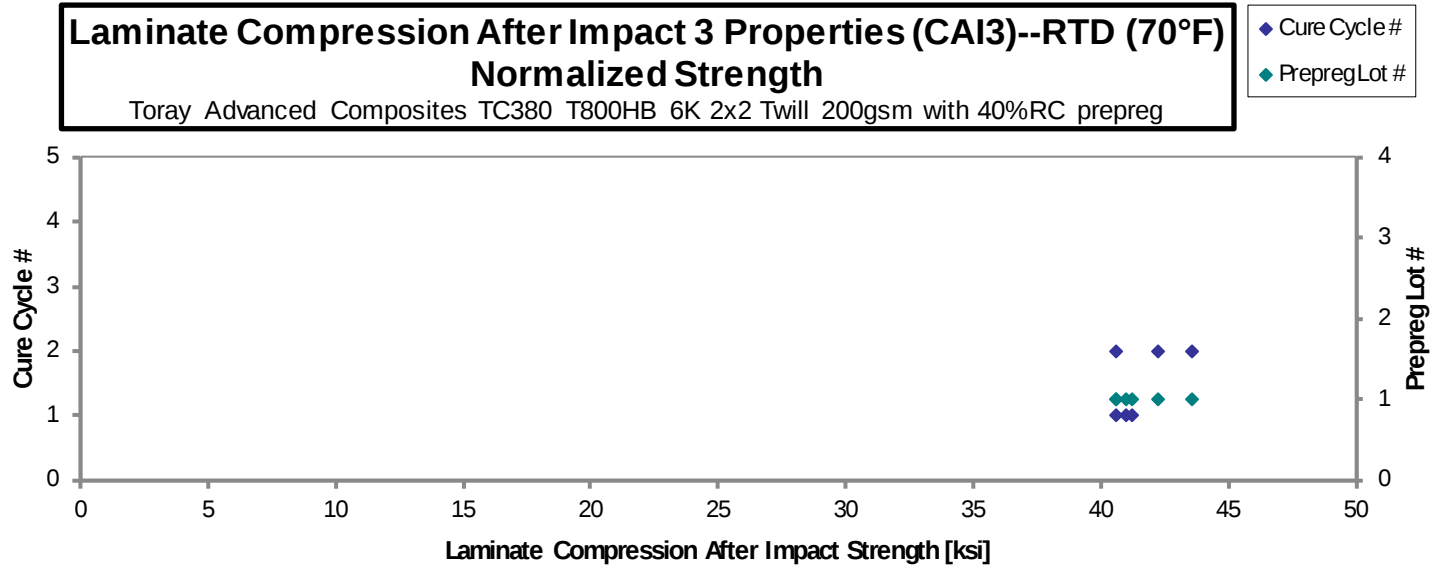
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode
TCEPA112A	A	C1	1	1	41.33	262.3	0.1746	20	LDM
TCEPA113A	A	C1	1	1	41.74	260.5	0.1738	20	LDM
TCEPA114A	A	C1	1	1	40.76	261.4	0.1752	20	LDM
TCEPA211A	A	C2	1	2	42.55	260.5	0.1747	20	LDM
TCEPA212A	A	C2	1	2	42.28	254.1	0.1689	20	LDM
TCEPA213A	A	C2	1	2	42.54	269.3	0.1801	20	LDM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.008732	41.01
0.008691	41.22
0.008758	40.56
0.008735	42.24
0.008443	40.57
0.009007	43.54

Average 41.87
 Standard Dev. 0.7245
 Coeff. of Var. [%] 1.730
 Min. 40.76
 Max. 42.55
 Number of Spec. 6

Average_{norm} 0.008728 41.52
 Standard Dev._{norm} 1.163
 Coeff. of Var. [%]_{norm} 2.800
 Min. 0.008443 40.56
 Max. 0.009007 43.54
 Number of Spec. 6 6



4.30 Interlaminar Tension Properties (ILT)

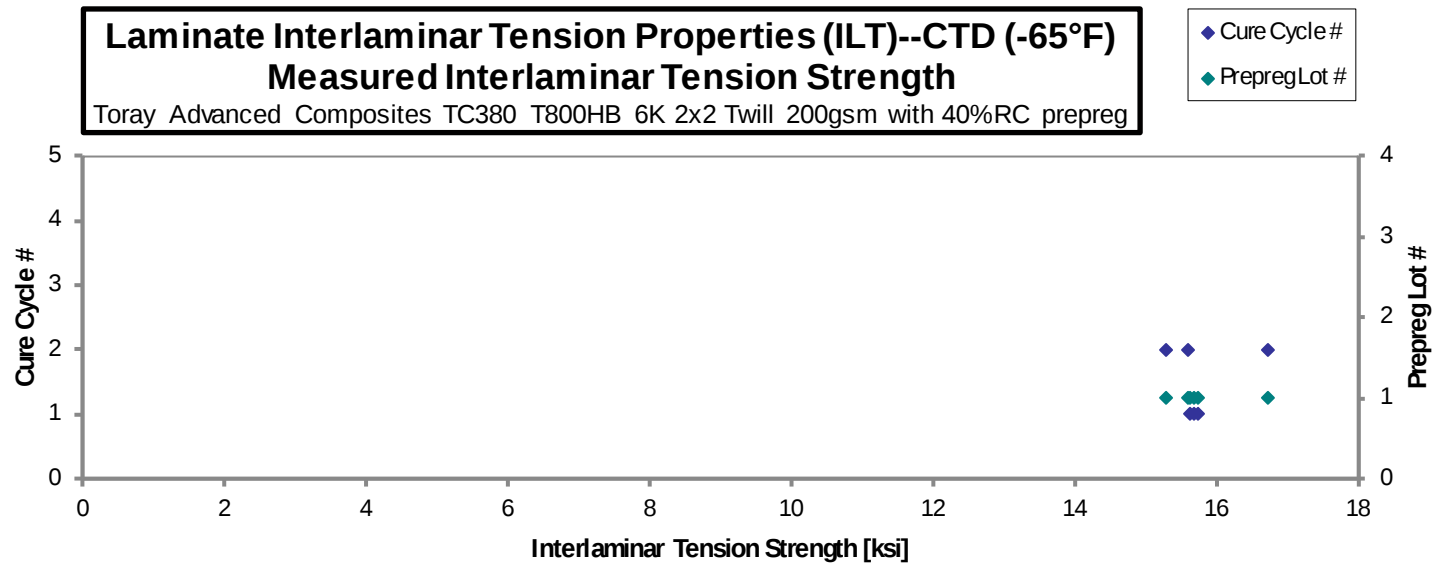
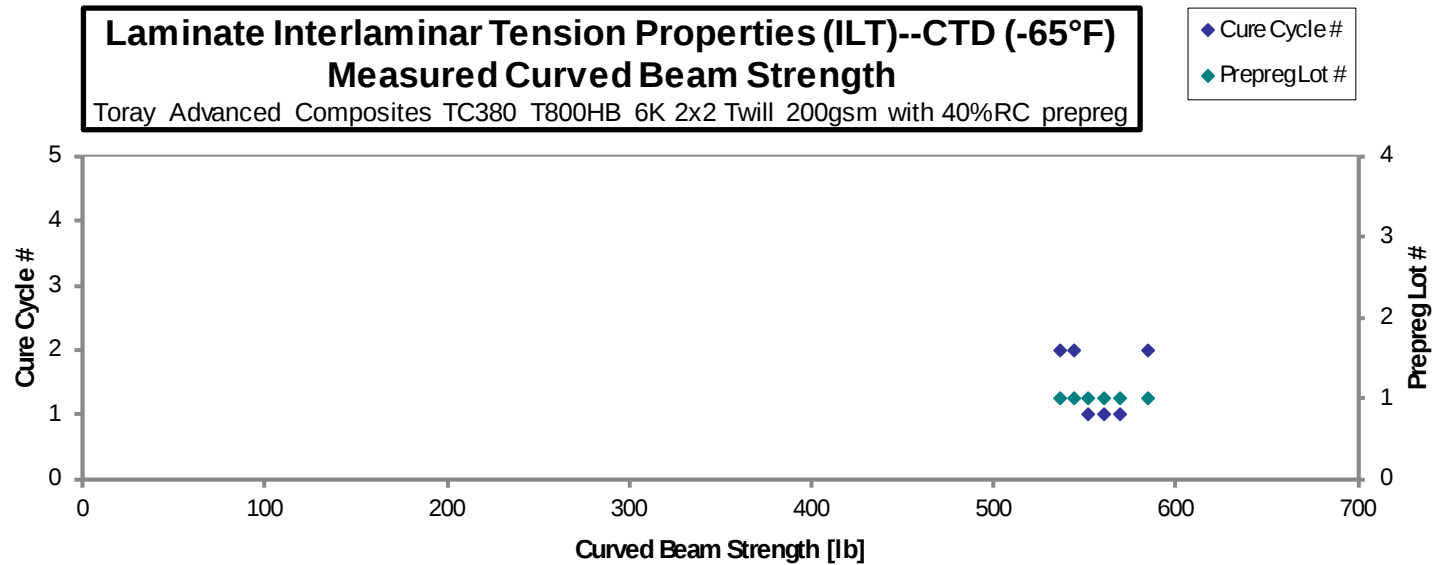
Laminate Interlaminar Tension Properties (ILT)--CTD (-65°F) Strength

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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
TCEMA111B*	A	C1	1	1	552.0	15.68	0.1641	20	0.008206	INTERLAMINAR TENSILE FAILURE
TCEMA112B*	A	C1	1	1	561.2	15.73	0.1659	20	0.008296	INTERLAMINAR TENSILE FAILURE
TCEMA113B*	A	C1	1	1	568.9	15.64	0.1686	20	0.008431	INTERLAMINAR TENSILE FAILURE
TCEMA211B*	A	C2	1	2	536.7	15.28	0.1638	20	0.008191	INTERLAMINAR TENSILE FAILURE
TCEMA212B*	A	C2	1	2	543.8	15.60	0.1628	20	0.008139	INTERLAMINAR TENSILE FAILURE
TCEMA213B*	A	C2	1	2	585.3	16.73	0.1633	20	0.008164	INTERLAMINAR TENSILE FAILURE

* Cross head displacement exceeds 0.2 inches.

Average	558.0	15.78	0.008238
Standard Dev.	17.72	0.4936	
Coeff. of Var. [%]	3.175	3.128	
Min.	536.7	15.28	0.008139
Max.	585.3	16.73	0.008431
Number of Spec.	6	6	6



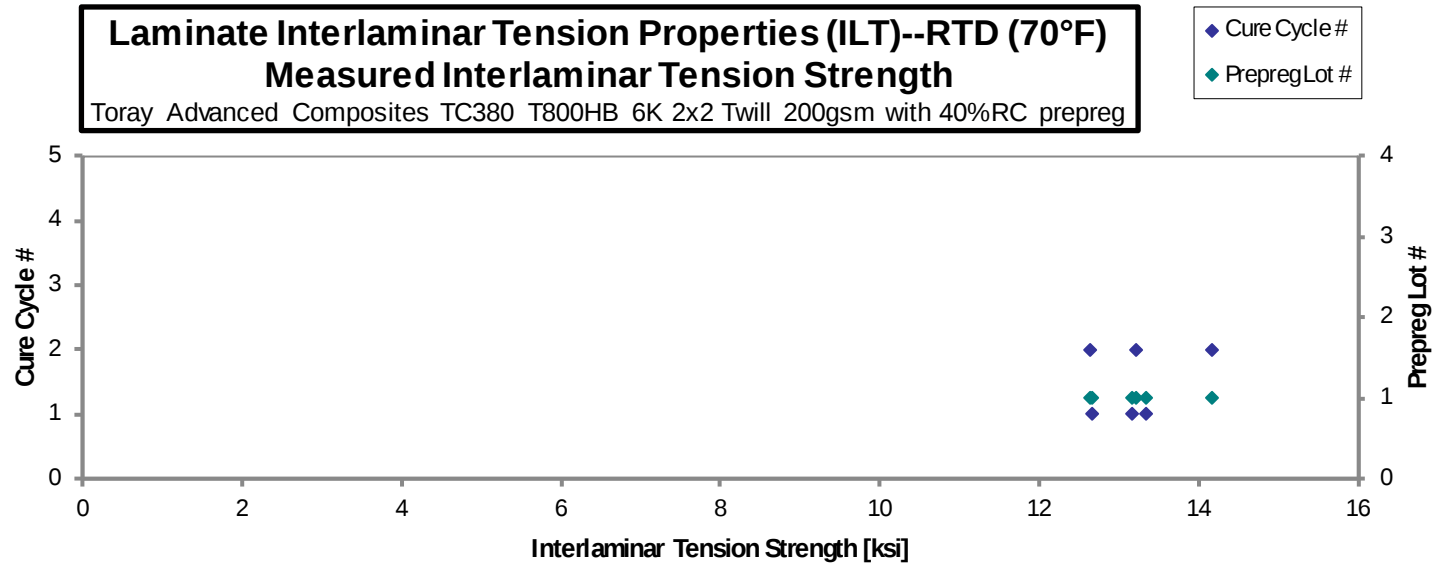
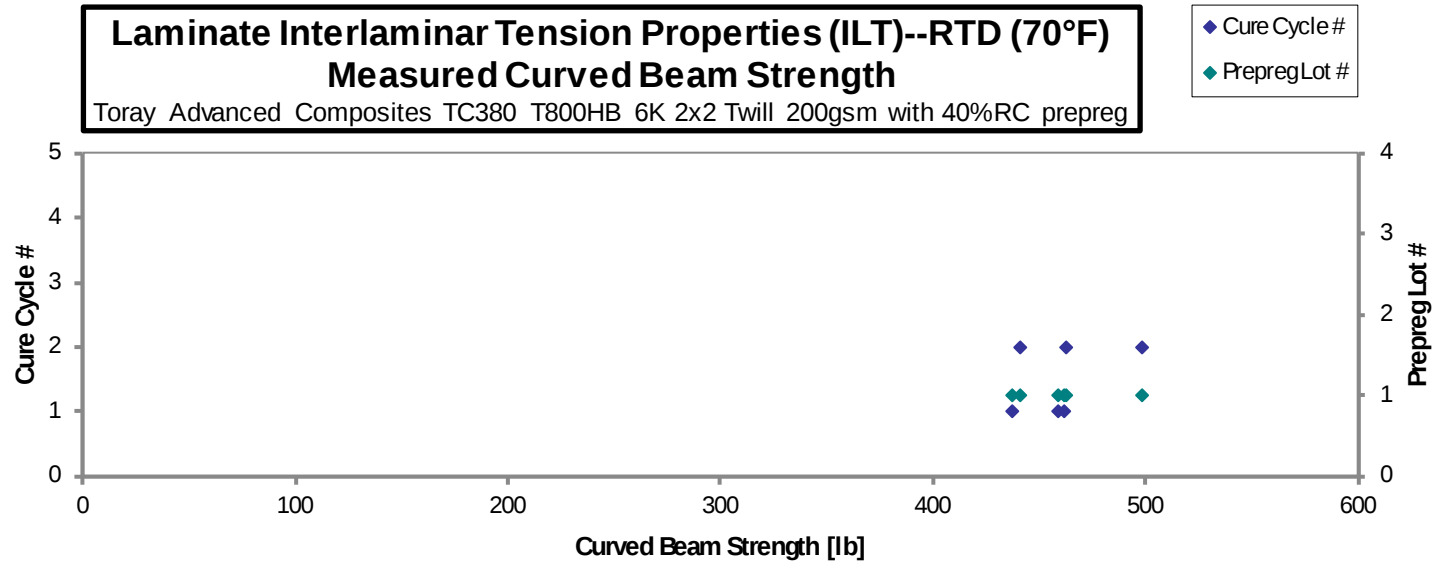
**Laminate Interlaminar Tension Properties (ILT)--RTD (70°F)
Strength**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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
TCEMA111A*	A	C1	1	1	461.4	13.35	0.1616	20	0.008079	INTERLAMINAR TENSILE FAILURE
TCEMA112A*	A	C1	1	1	458.7	13.17	0.1627	20	0.008134	INTERLAMINAR TENSILE FAILURE
TCEMA113A*	A	C1	1	1	437.2	12.68	0.1613	20	0.008066	INTERLAMINAR TENSILE FAILURE
TCEMA211A*	A	C2	1	2	462.3	13.21	0.1633	20	0.008165	INTERLAMINAR TENSILE FAILURE
TCEMA212A*	A	C2	1	2	498.4	14.17	0.1640	20	0.008201	INTERLAMINAR TENSILE FAILURE
TCEMA213A*	A	C2	1	2	440.9	12.65	0.1628	20	0.008139	INTERLAMINAR TENSILE FAILURE

* Cross head displacement exceeds 0.2 inches.

Average	459.8	13.20	0.008131
Standard Dev.	21.76	0.5544	
Coeff. of Var. [%]	4.731	4.198	
Min.	437.2	12.65	0.008066
Max.	498.4	14.17	0.008201
Number of Spec.	6	6	6



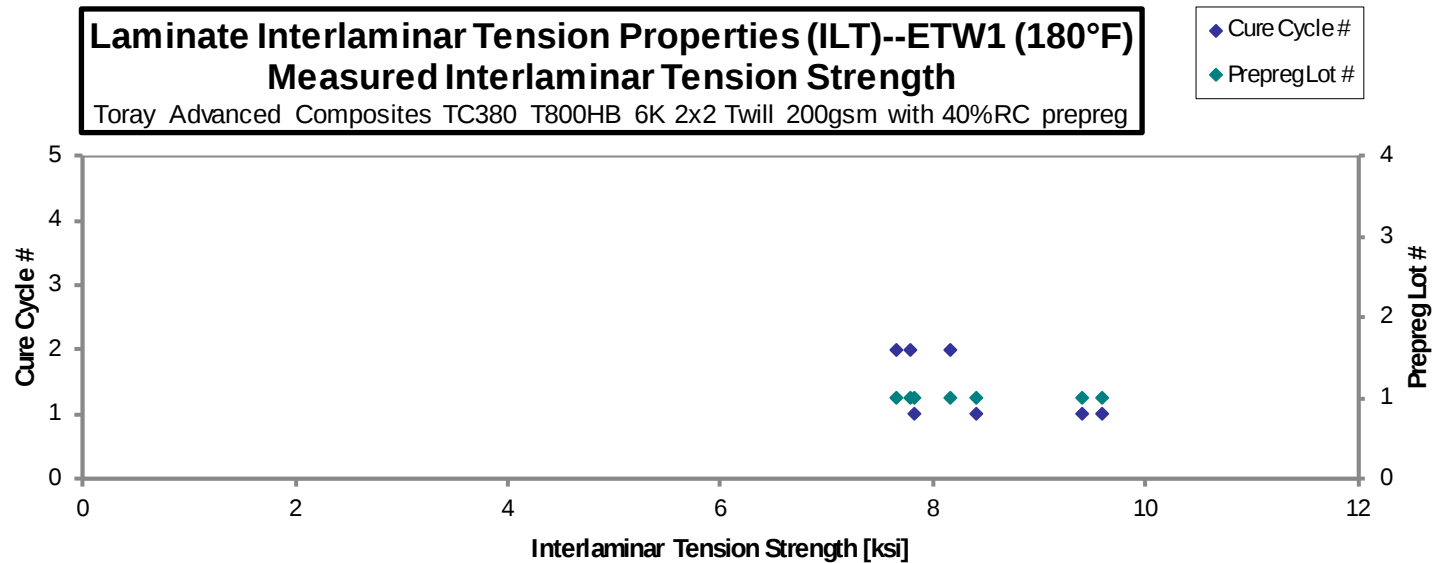
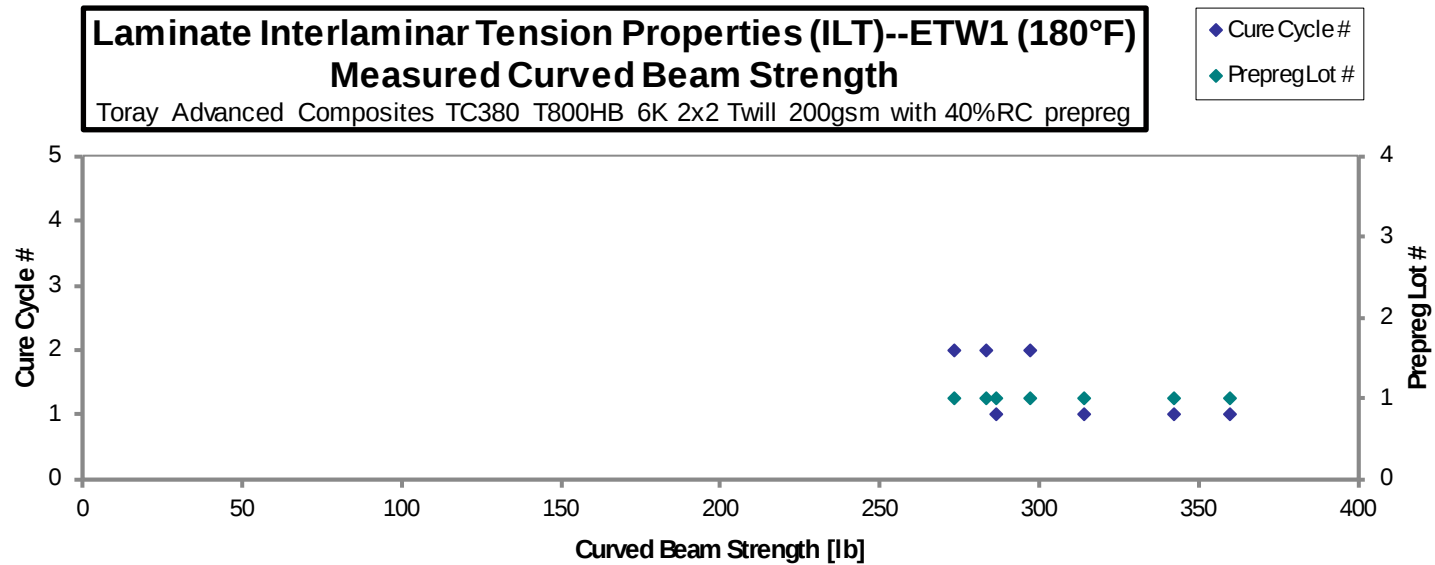
**Laminate Interlaminar Tension Properties (ILT)--ETW1 (180°F)
Strength**

Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%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
TCEMA111D*	A	C1	1	1	286.6	7.829	0.1696	20	0.008478	INTERLAMINAR TENSILE FAILURE
TCEMA112D*	A	C1	1	1	342.3	9.398	0.1689	20	0.008443	INTERLAMINAR TENSILE FAILURE
TCEMA113D*	A	C1	1	1	359.8	9.589	0.1731	20	0.008653	INTERLAMINAR TENSILE FAILURE
TCEMA114D*	A	C1	1	1	313.9	8.404	0.1724	20	0.008620	INTERLAMINAR TENSILE FAILURE
TCEMA211D*	A	C2	1	2	296.9	7.663	0.1777	20	0.008886	INTERLAMINAR TENSILE FAILURE
TCEMA212D*	A	C2	1	2	283.7	8.159	0.1624	20	0.008121	INTERLAMINAR TENSILE FAILURE
TCEMA213D	A	C2	1	2	273.1	7.783	0.1637	20	0.008185	INTERLAMINAR TENSILE FAILURE

* Cross head displacement exceeds 0.2 inches.

Average	308.0	8.404	0.008484
Standard Dev.	32.35	0.7872	
Coeff. of Var. [%]	10.50	9.367	
Min.	273.1	7.663	0.008121
Max.	359.8	9.589	0.008886
Number of Spec.	7	7	7



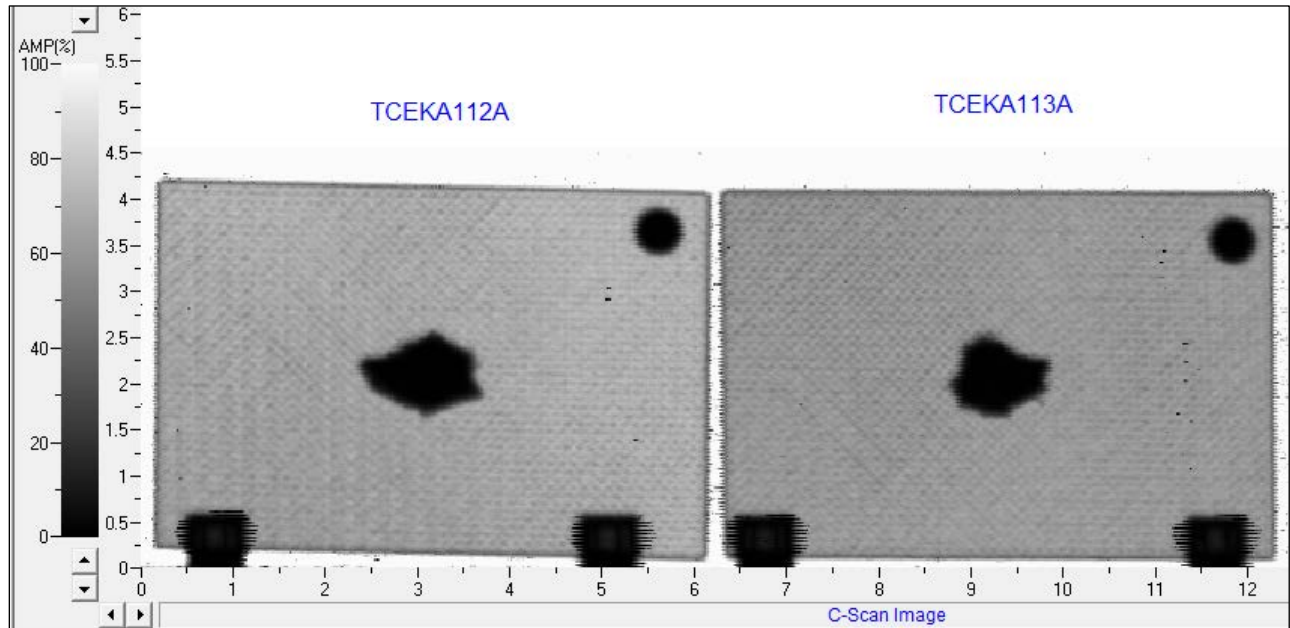
5. Additional Compression After Impact Data

5.1 “25/50/25” Compression After Impact 1 (CAI1)

Target Impact Energy Level: 1500 in-lb/in

Impactor Diameter: 0.625”

Representative of Damage Area:



Damage Area and Dent Depth Summary:

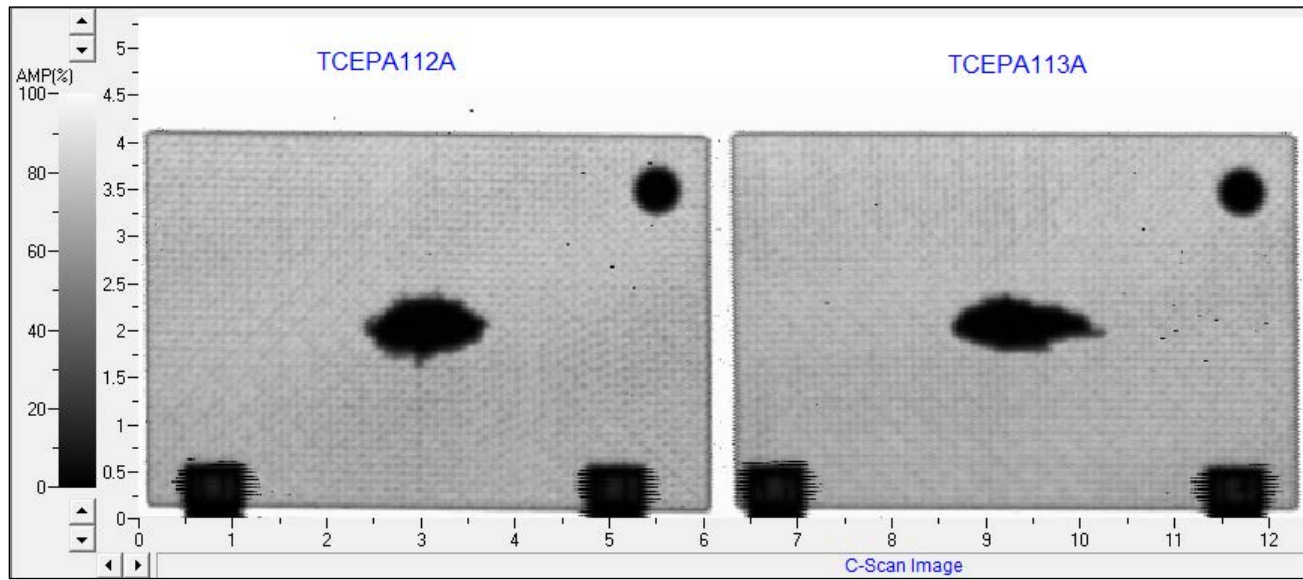
Specimen ID	Damage Area (inch ²)	Dent Depth (inch)
TCEKA111B	0.6536	0.0175
TCEKA112B	0.7512	0.0165
TCEKA113B	0.7120	0.0150
TCEKA211B	0.6596	0.0160
TCEKA212B	0.7120	0.0155
TCEKA213B	0.6892	0.0155
TCEKB111B	0.7056	0.0150
TCEKB112B	0.6780	0.0160
TCEKB113B	0.6496	0.0160
TCEKB211B	0.6592	0.0185
TCEKB212B	0.6664	0.0175
TCEKB213B	0.6556	0.0165
TCEKC111B	0.7164	0.0175
TCEKC112B	0.7440	0.0160
TCEKC113B	0.7244	0.0170
TCEKC114B	0.7548	0.0165
TCEKC211B	0.7924	0.0170
TCEKC212B	0.7176	0.0165
TCEKC213B	0.7464	0.0175
TCEKC214B	0.7464	0.0165
TCEKA112A	0.7508	0.0165
TCEKA113A	0.6404	0.0170
TCEKA114A	0.7032	0.0165
TCEKA211A	0.6988	0.0175
TCEKA212A	0.6424	0.0165
TCEKA213A	0.7176	0.0160
TCEKB111A	0.6176	0.0150
TCEKB112A	0.6556	0.0155
TCEKB113A	0.6488	0.0160
TCEKB211A	0.6664	0.0165
TCEKB212A	0.6860	0.0150
TCEKB213A	0.6764	0.0165
TCEKC111A	0.7232	0.0155
TCEKC112A	0.7224	0.0160
TCEKC113A	0.6752	0.0180
TCEKC211A	0.6980	0.0175
TCEKC212A	0.6764	0.0155
TCEKC213A	0.7604	0.0175

5.2 “40/20/40” Compression After Impact 3 (CAI3)

Target Impact Energy Level: 1500 in-lb/in

Impactor Diameter: 0.625”

Representative of Damage Area:

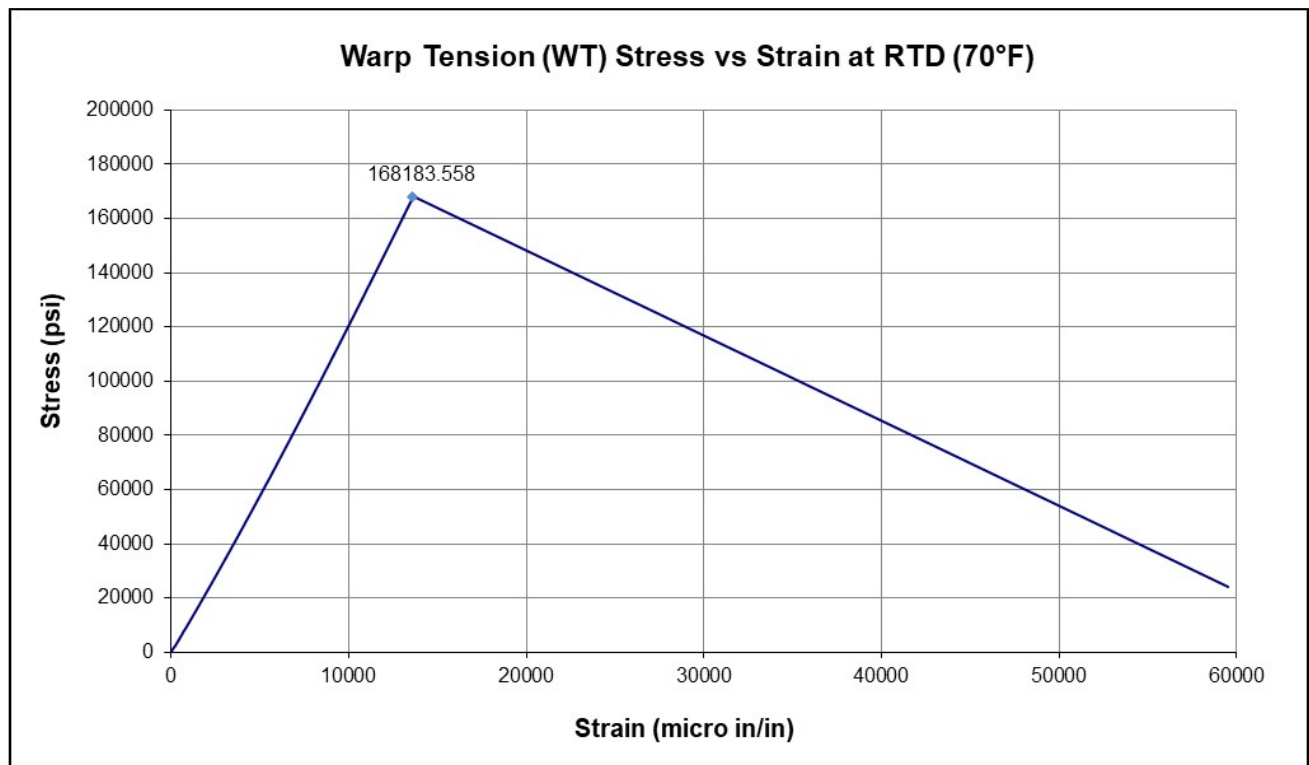
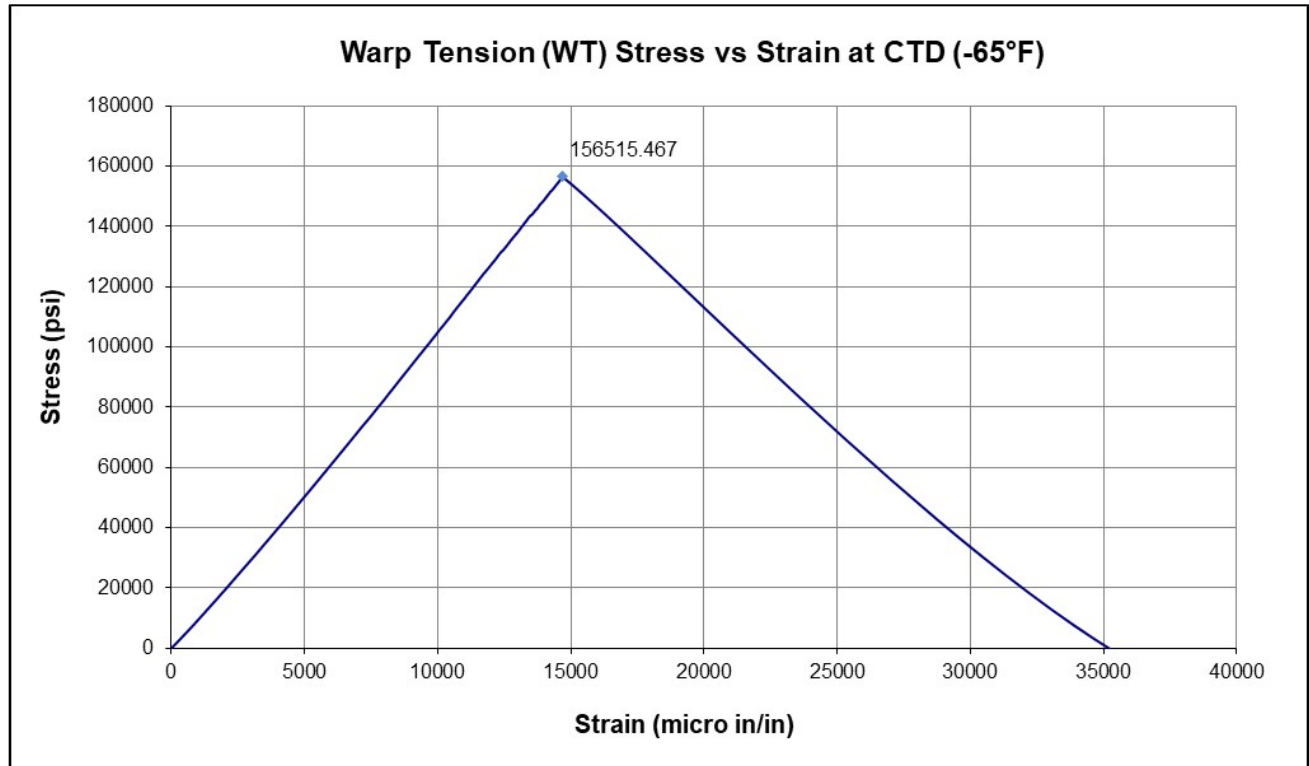


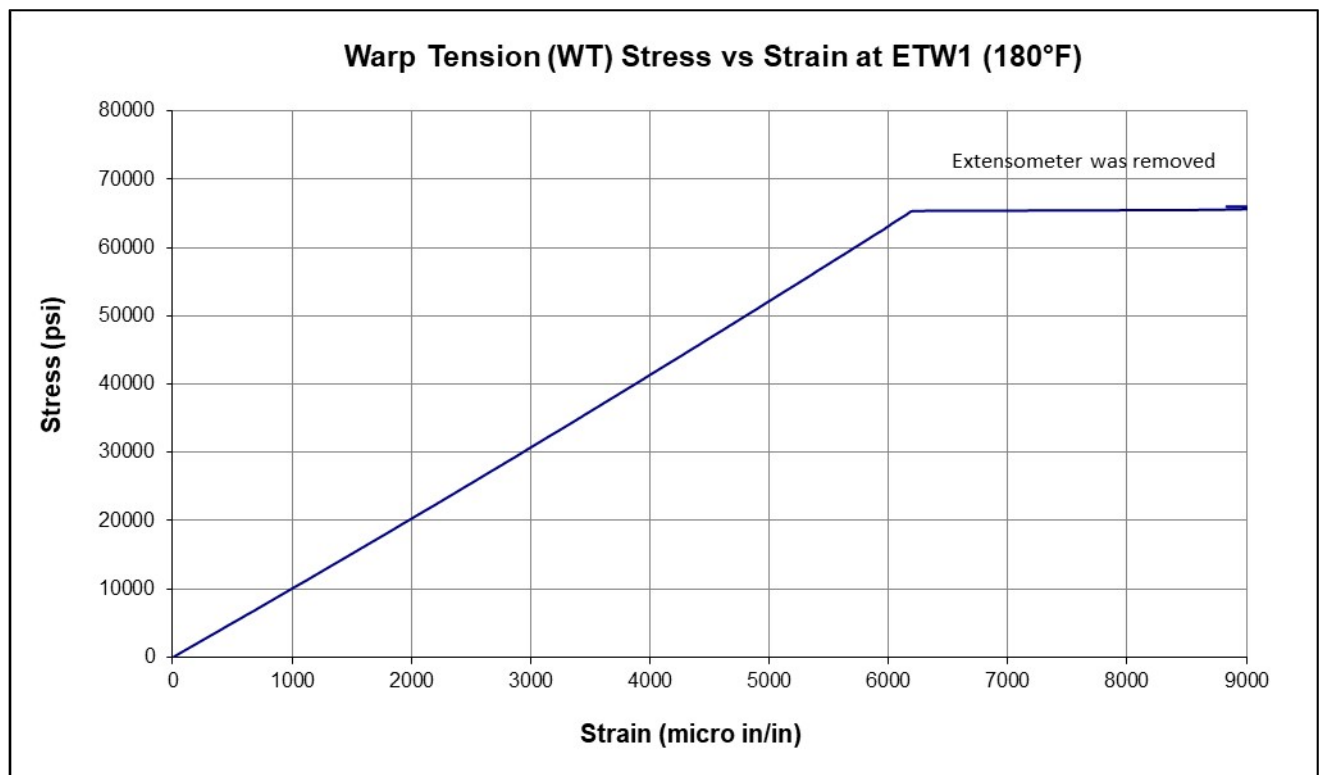
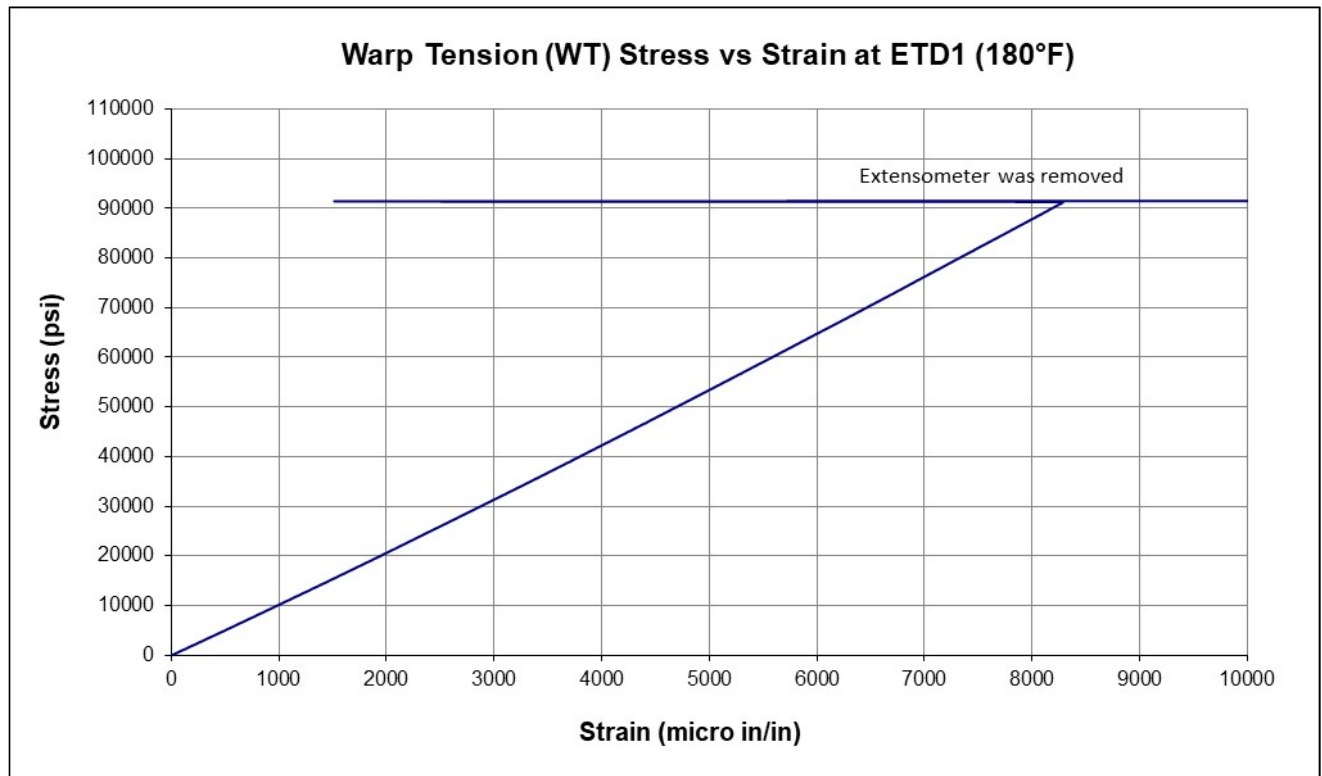
Damage Area and Dent Depth Summary:

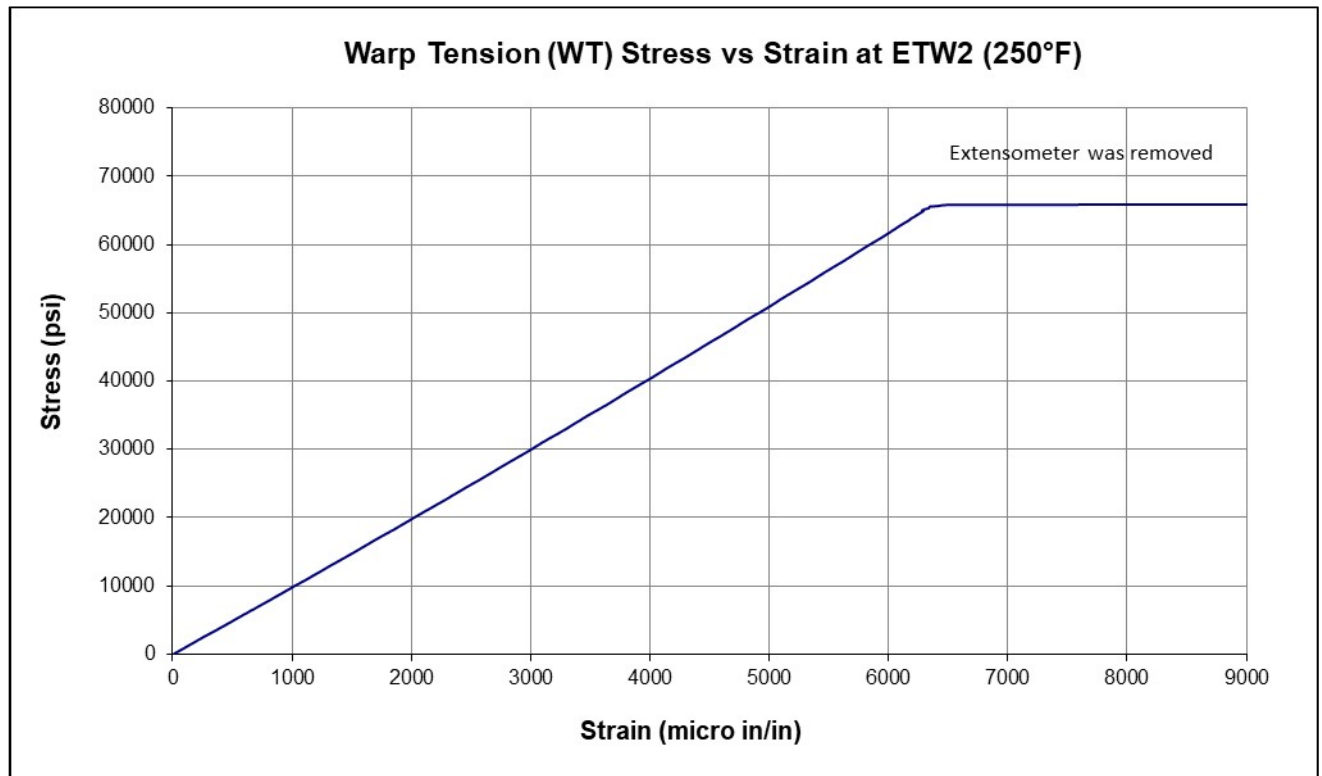
Specimen ID	Damage Area (inch ²)	Dent Depth (inch)
TCEPA112A	0.6248	0.0155
TCEPA113A	0.6244	0.0155
TCEPA114A	0.6296	0.0150
TCEPA211A	0.6264	0.0140
TCEPA212A	0.6420	0.0140
TCEPA213A	0.5780	0.0150

6. Full Stress vs. Strain Curve

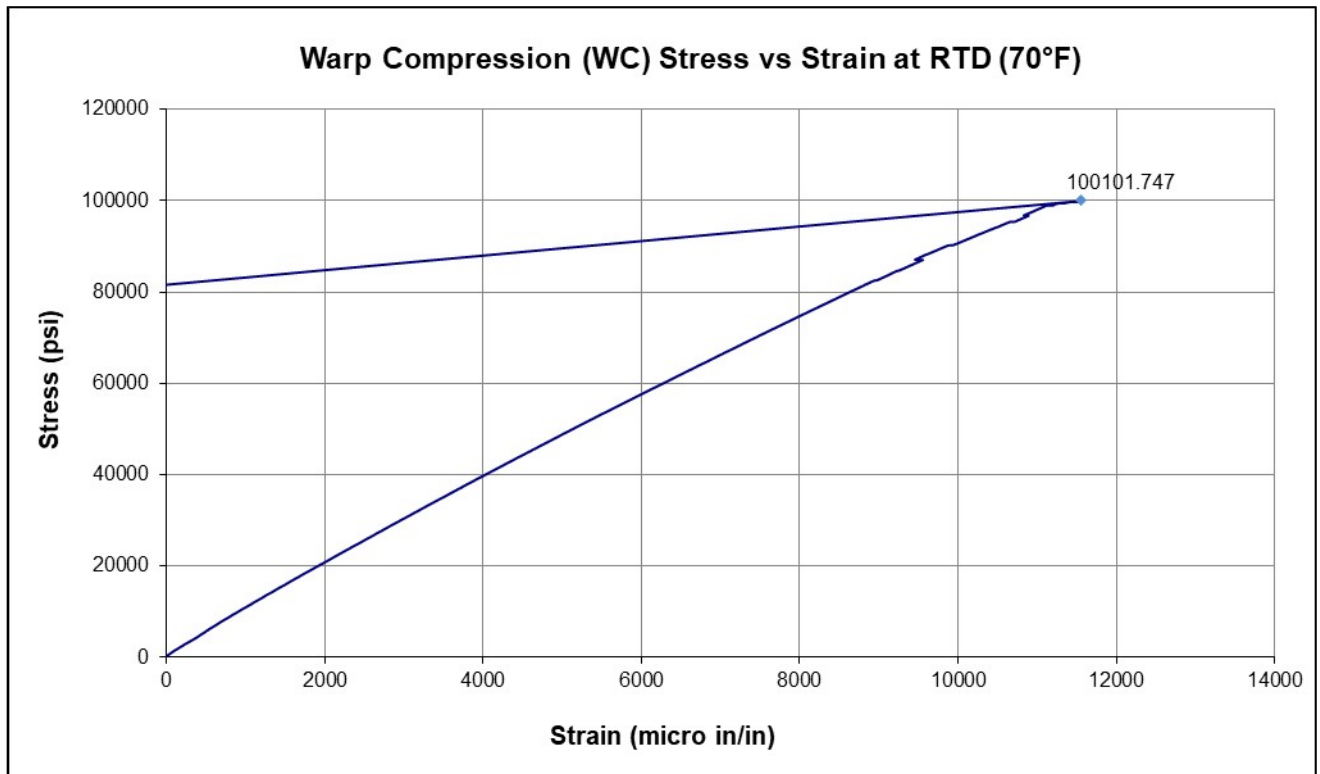
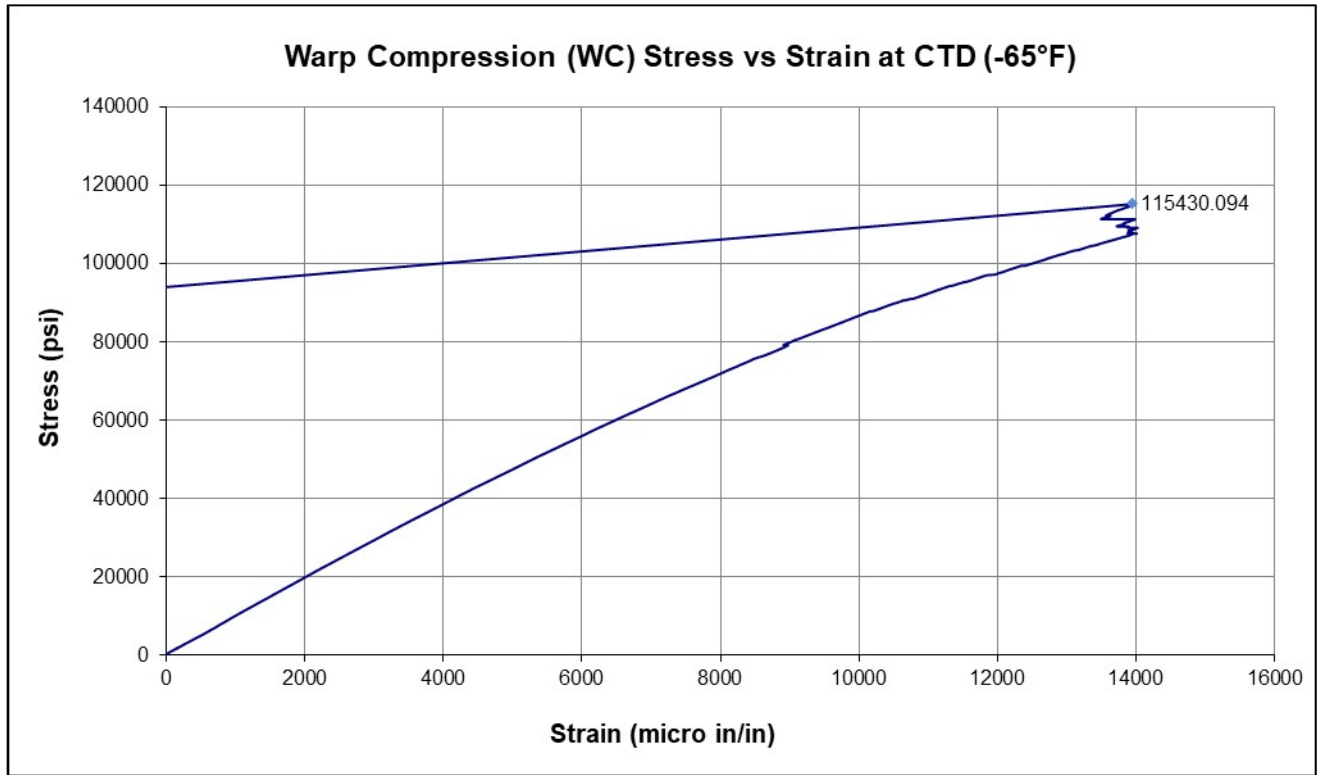
6.1 Warp Tension (WT)

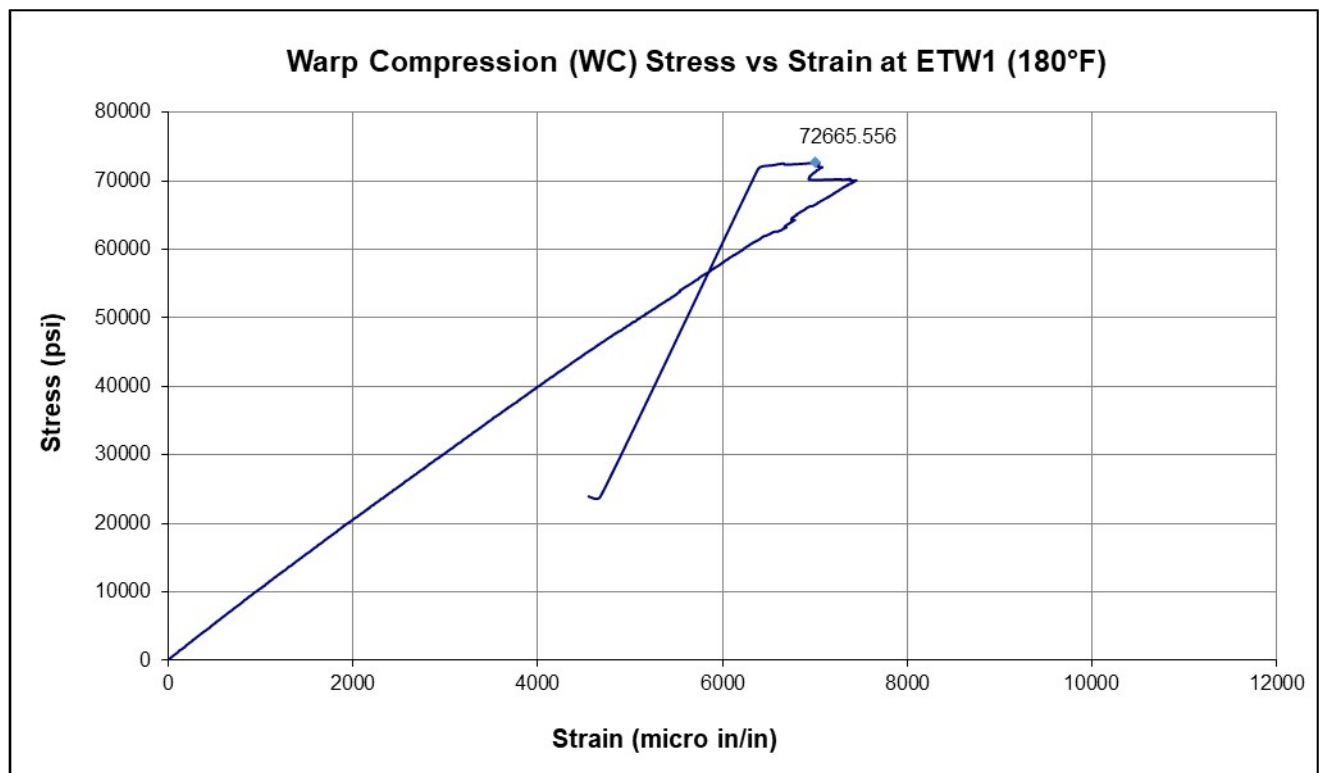
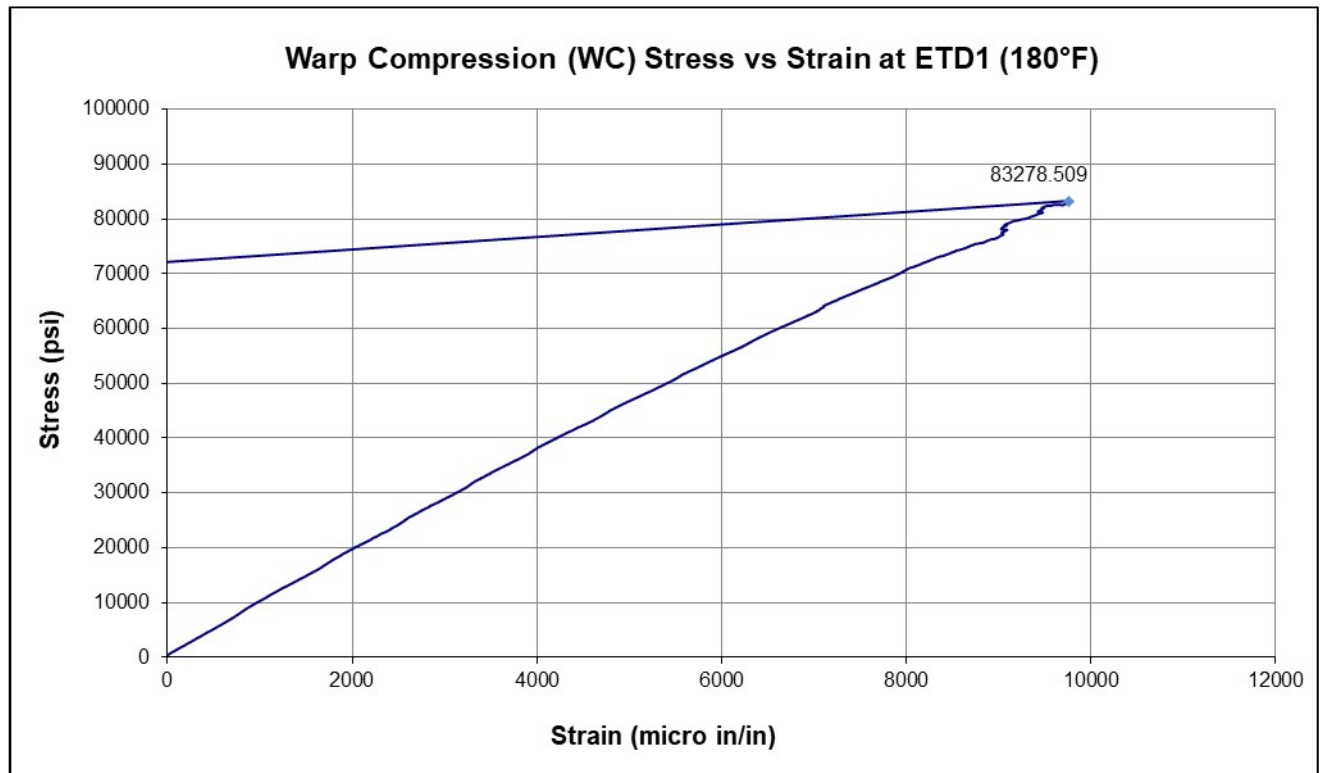


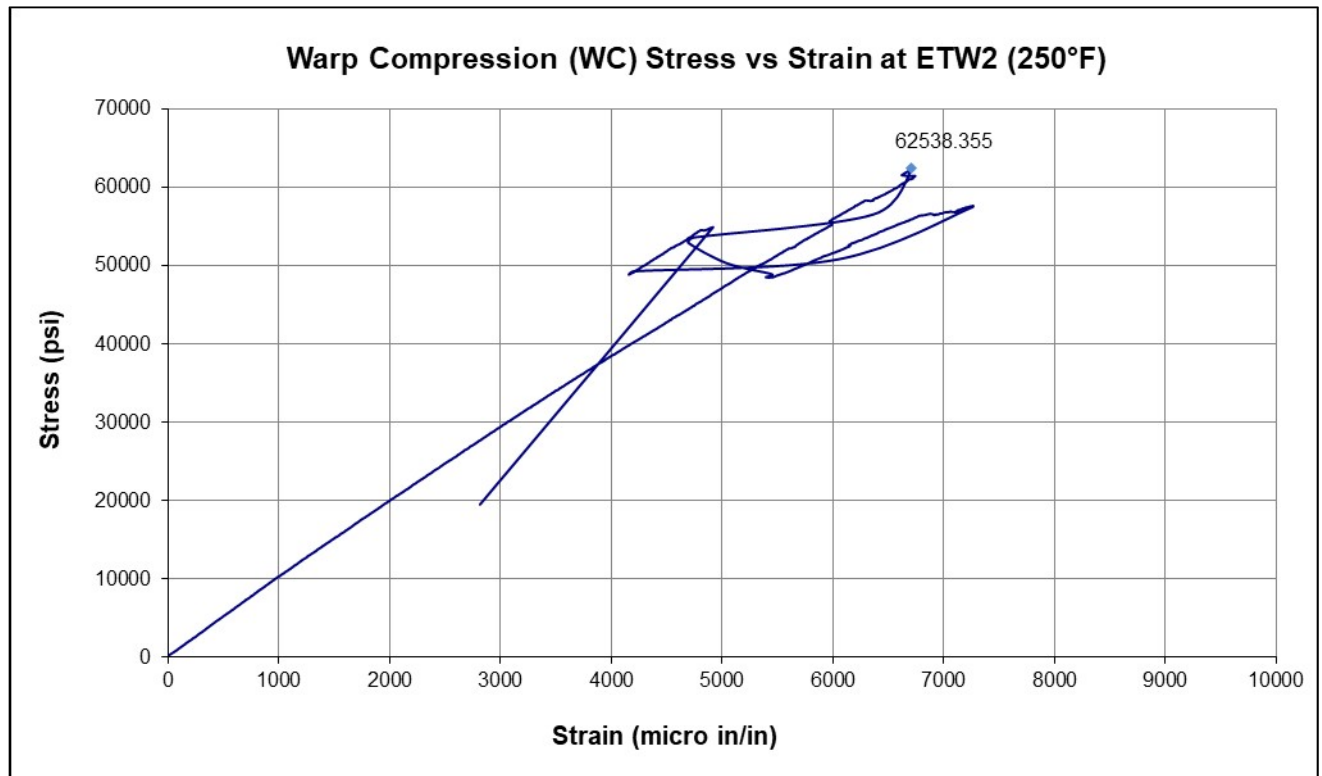




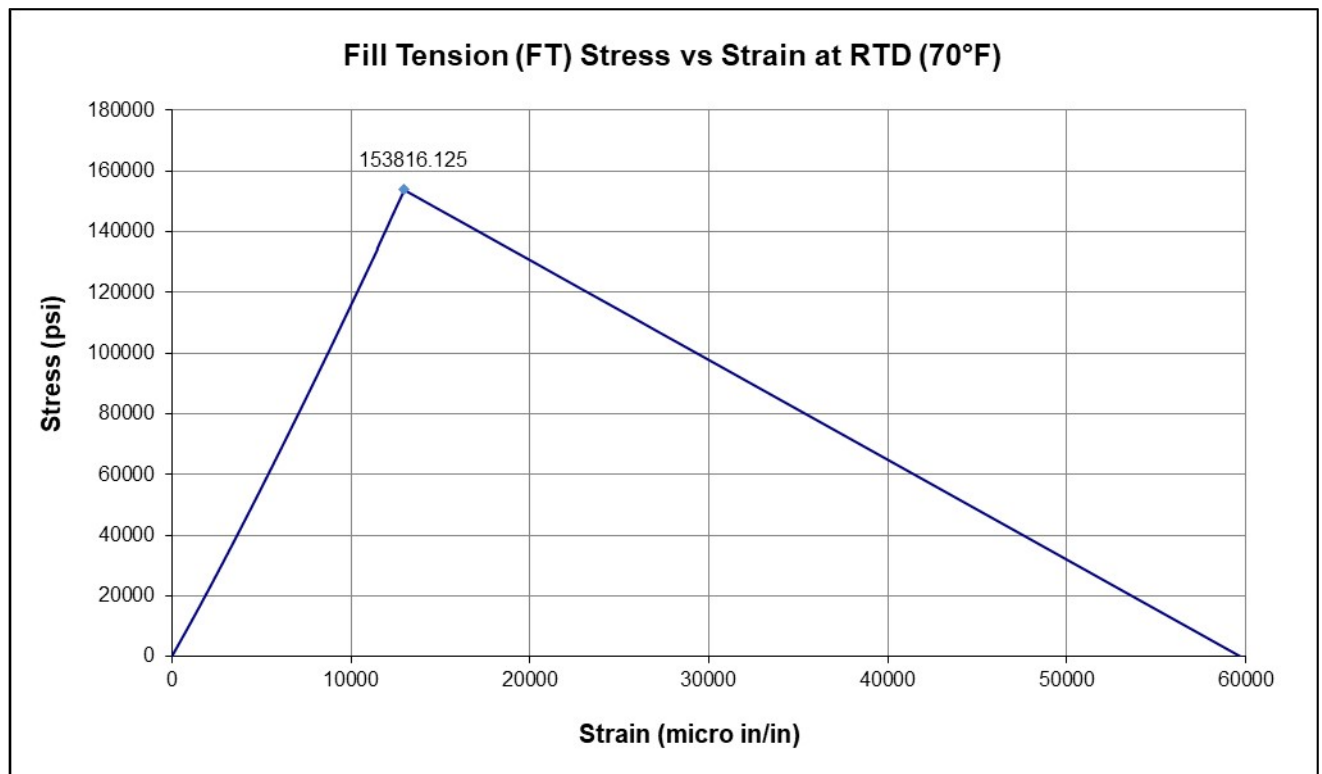
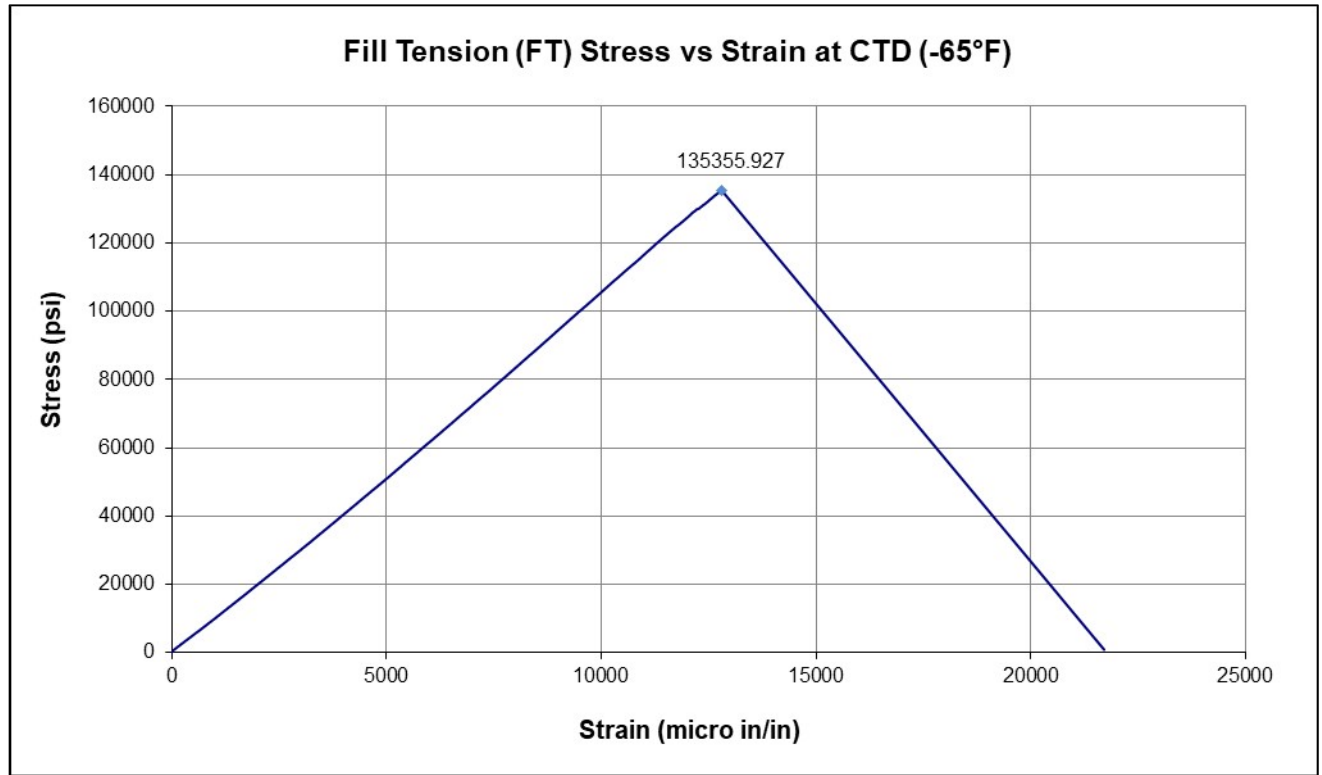
6.2 Warp Compression (WC)

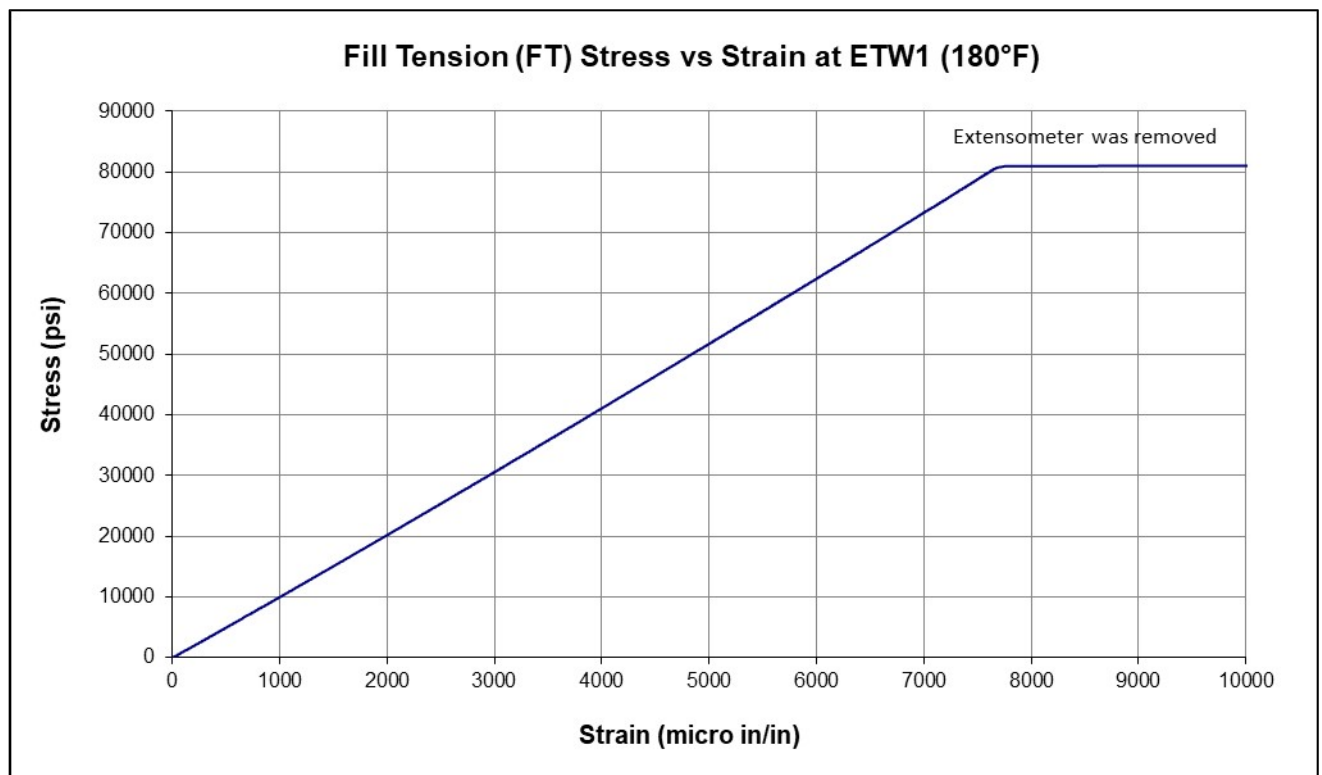
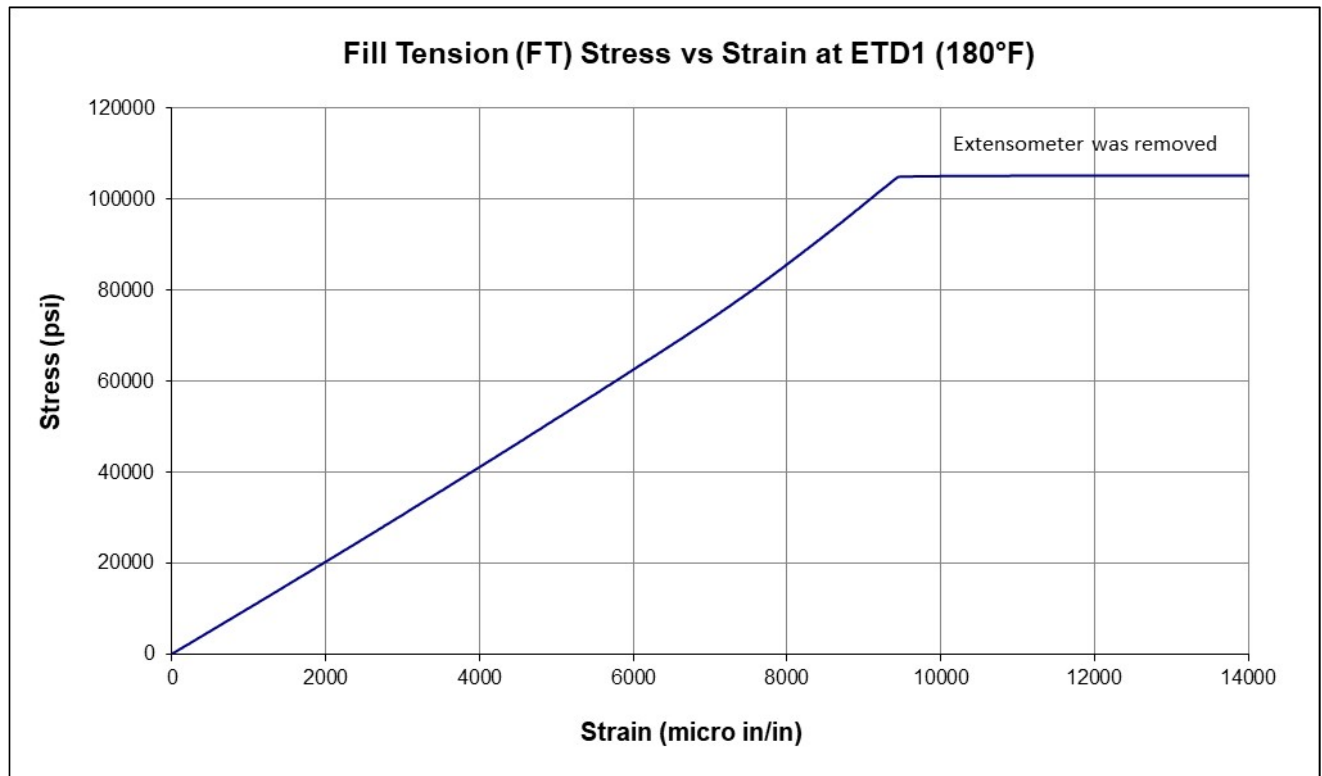


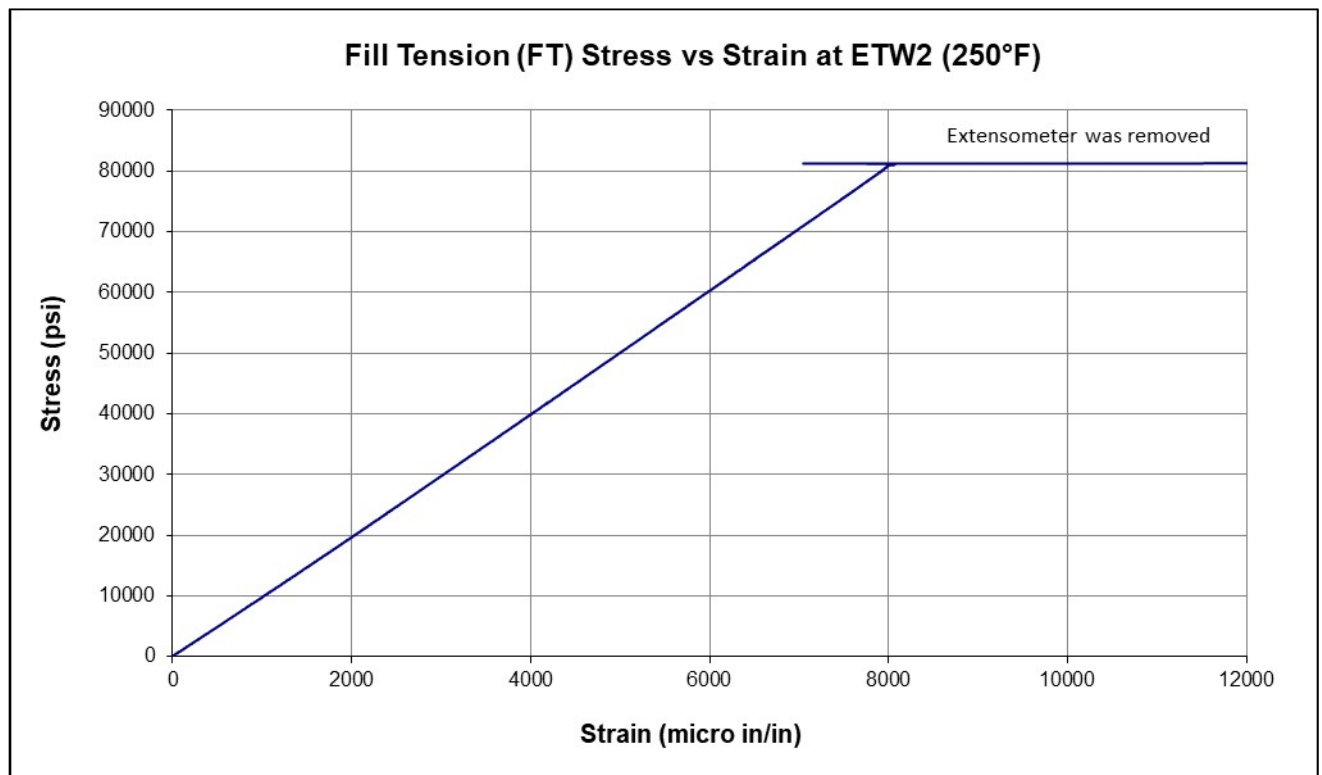




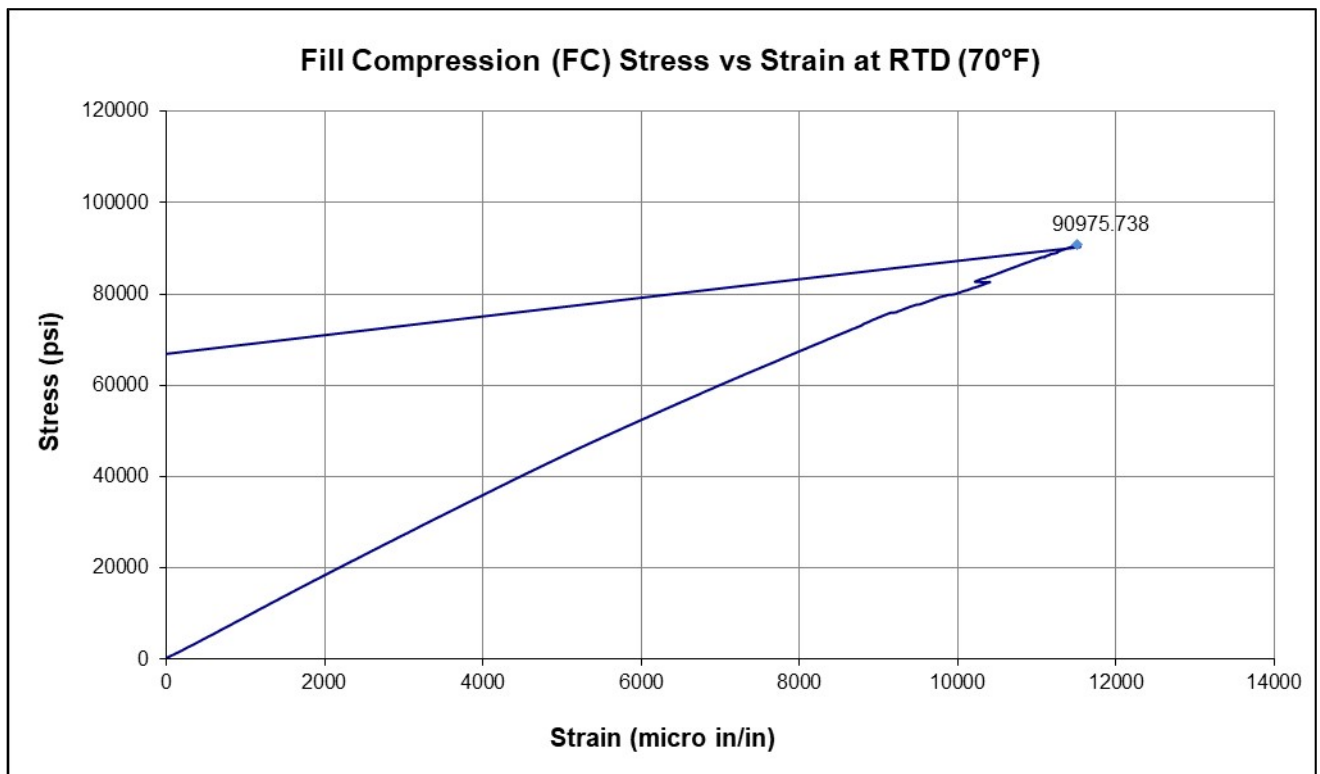
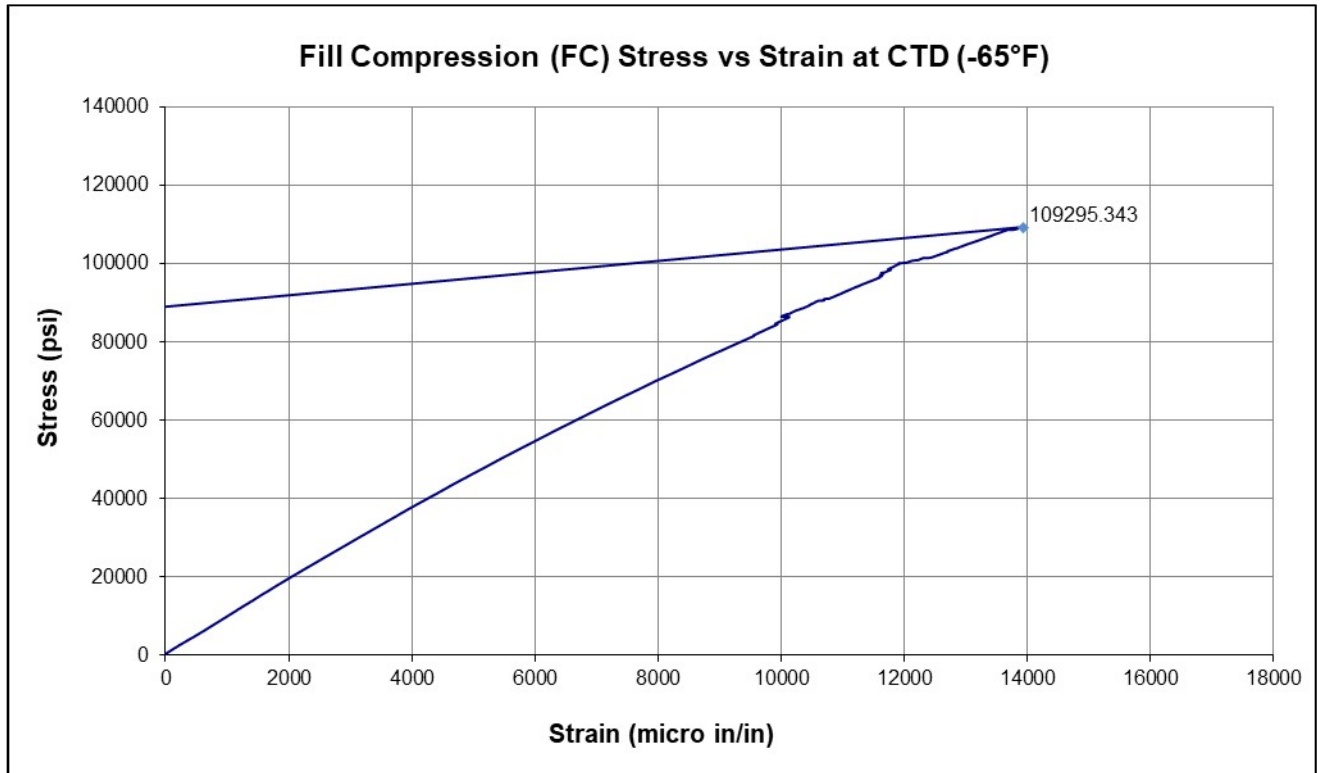
6.3 Fill Tension (FT)

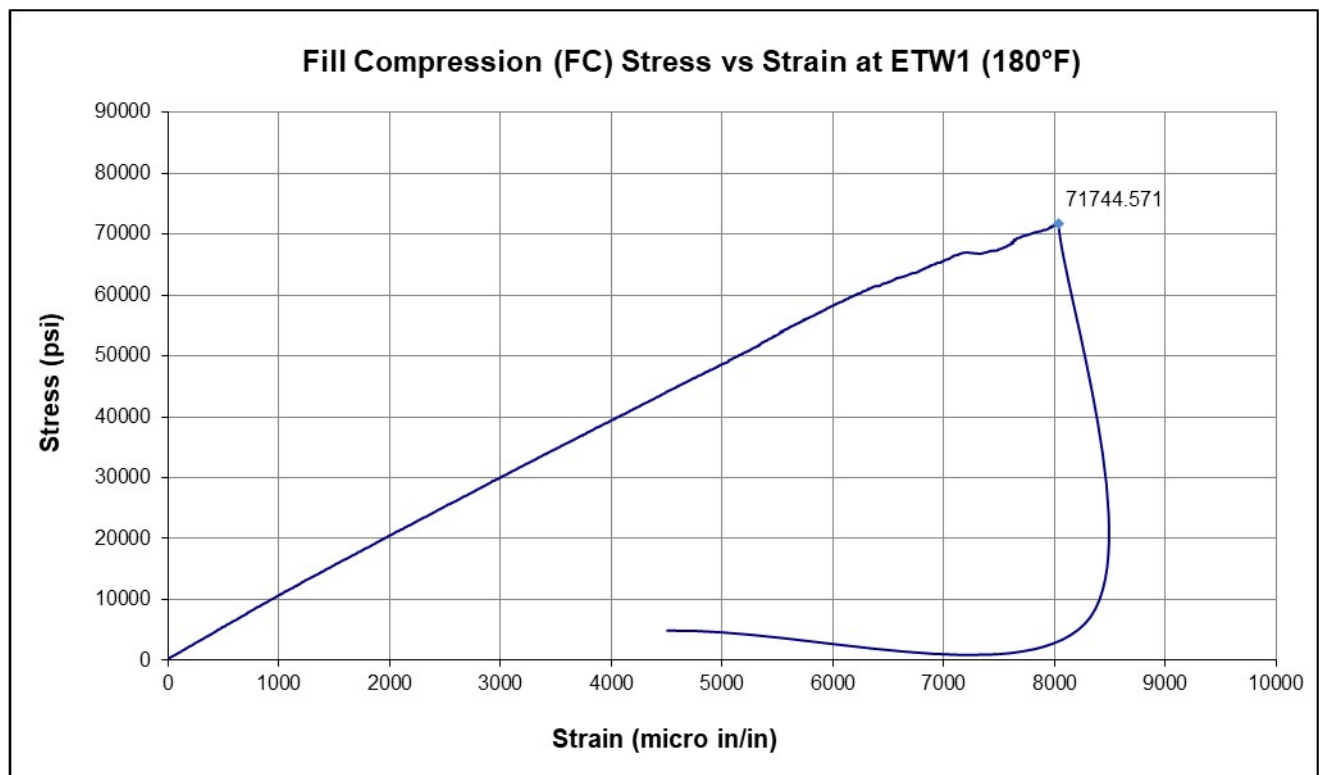
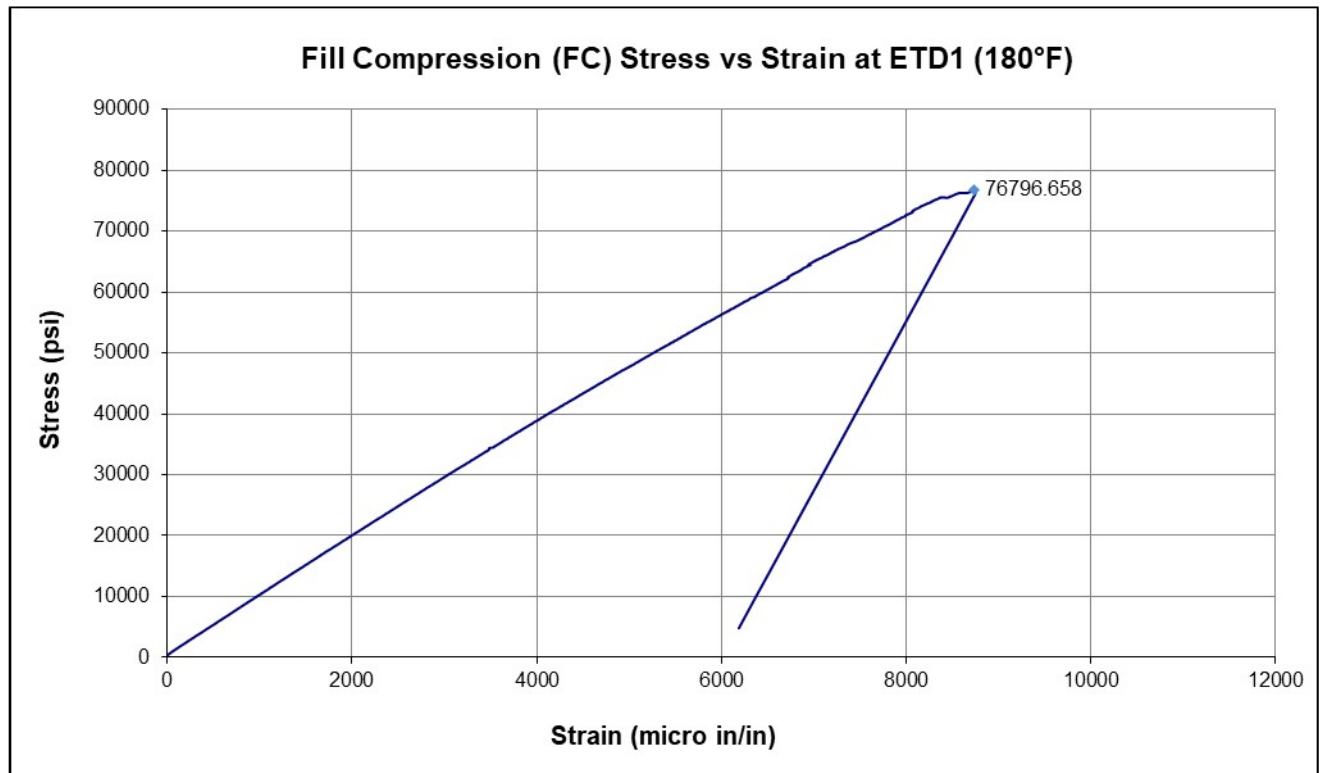


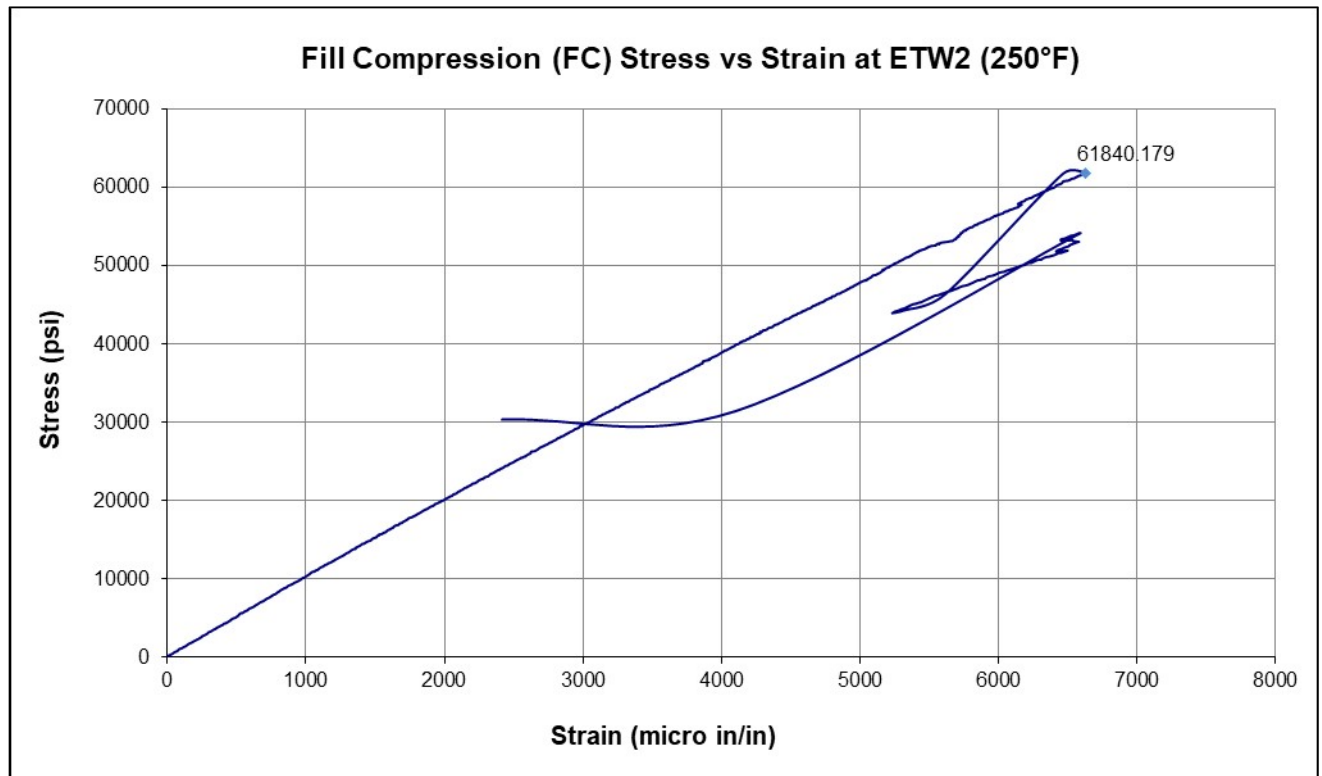




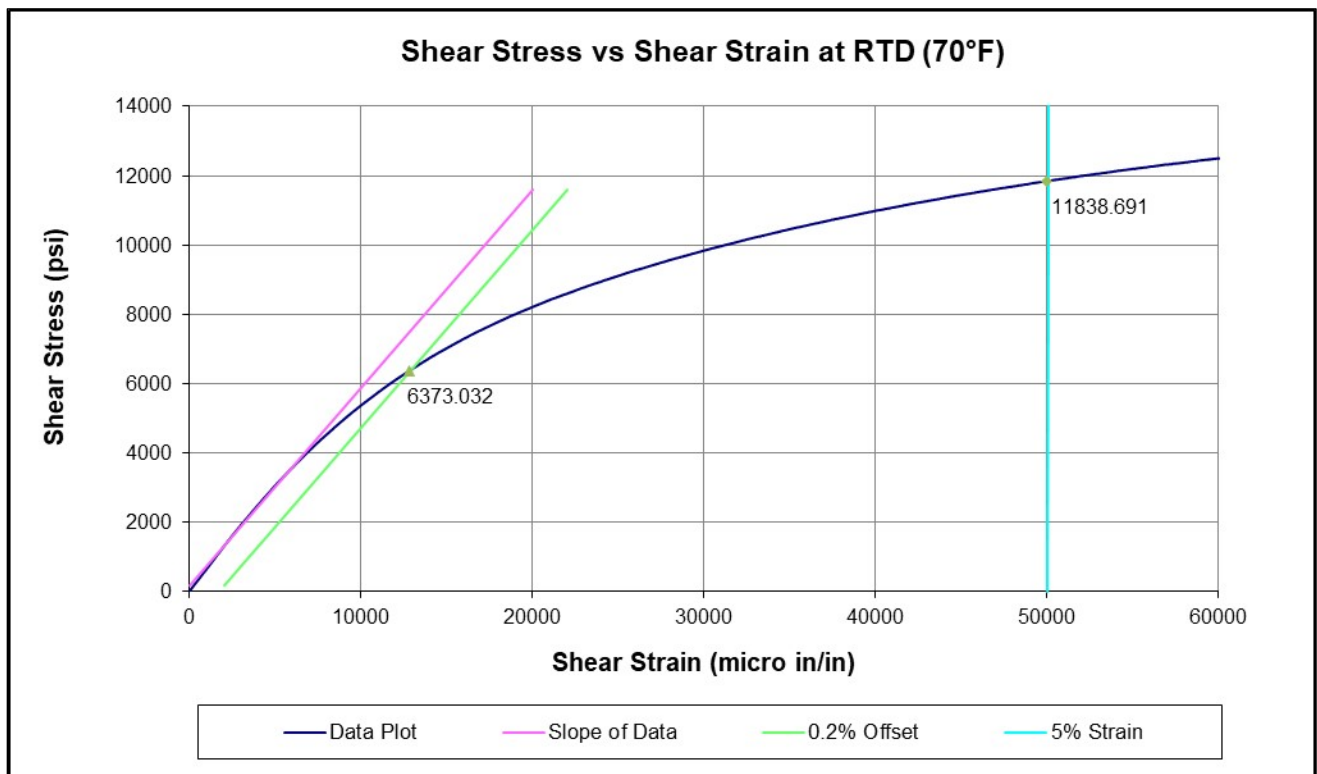
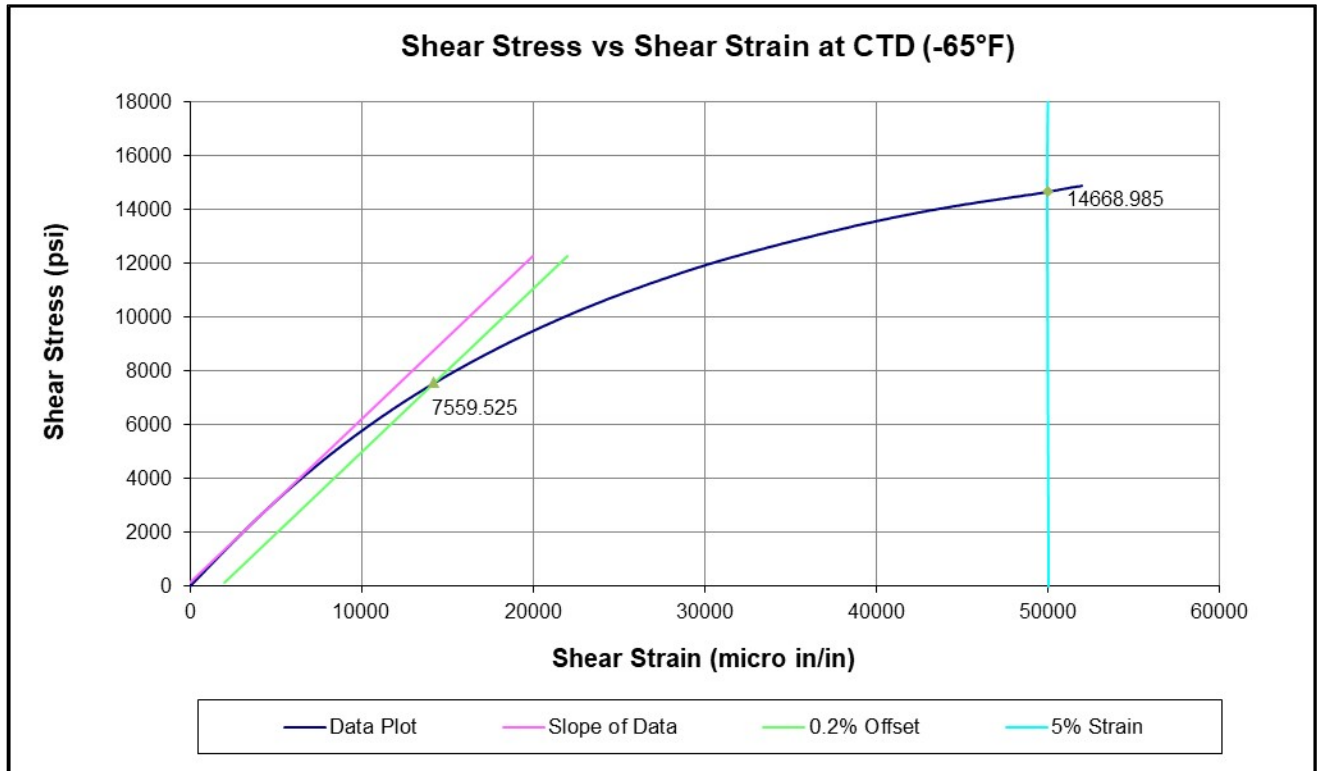
6.4 Fill Compression (FC)

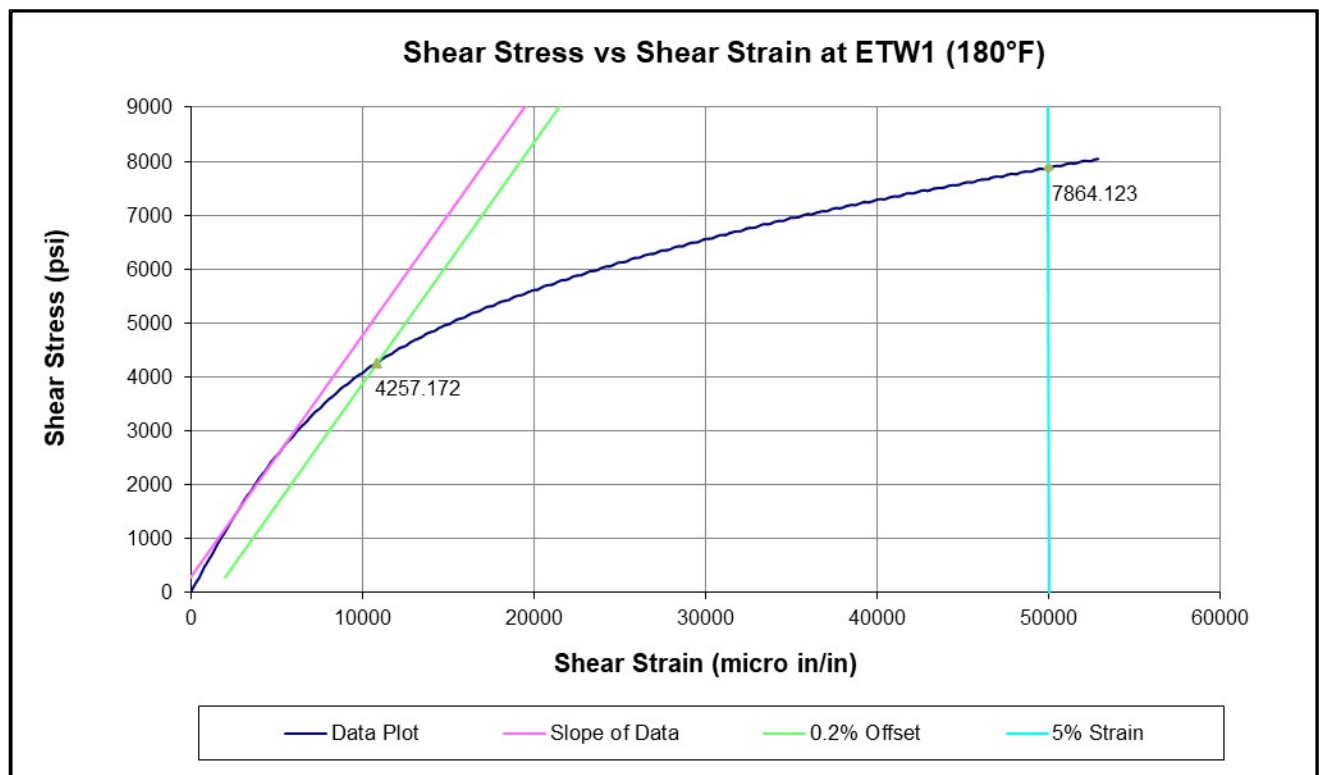
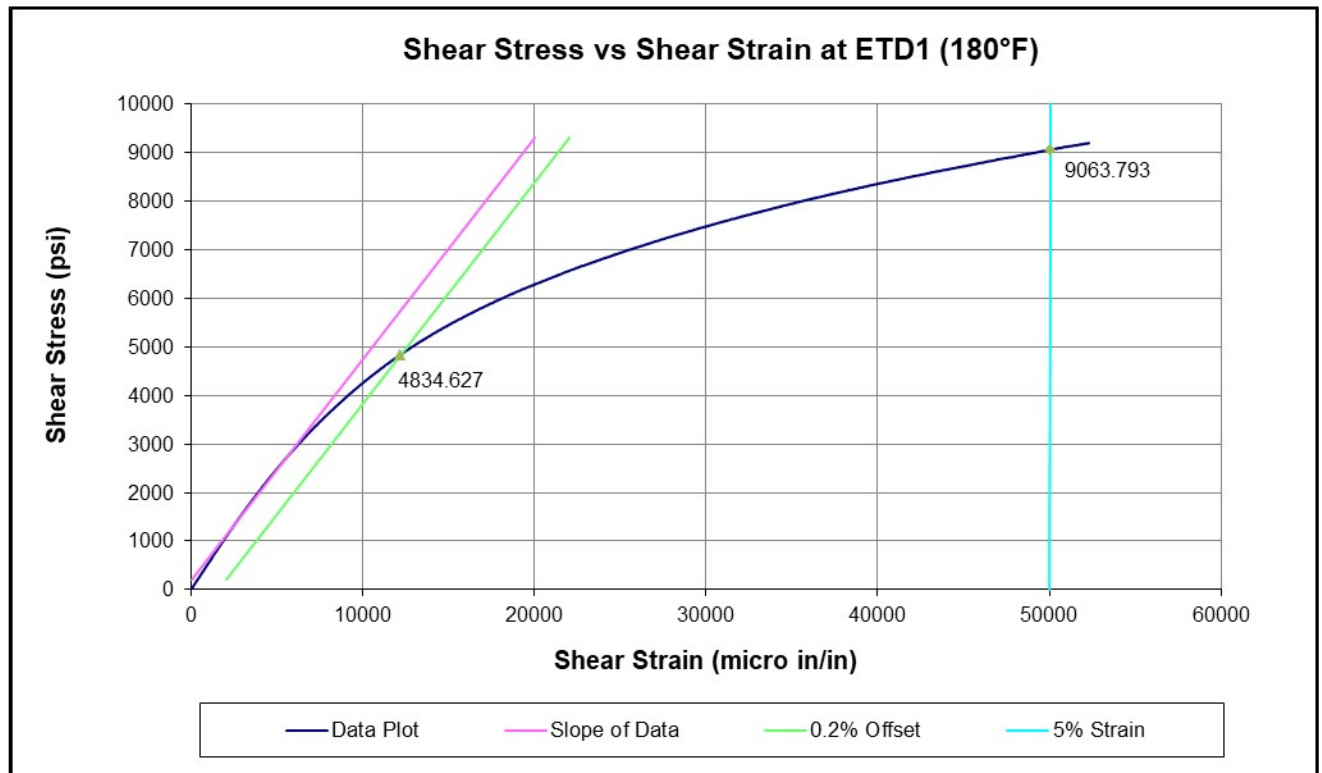


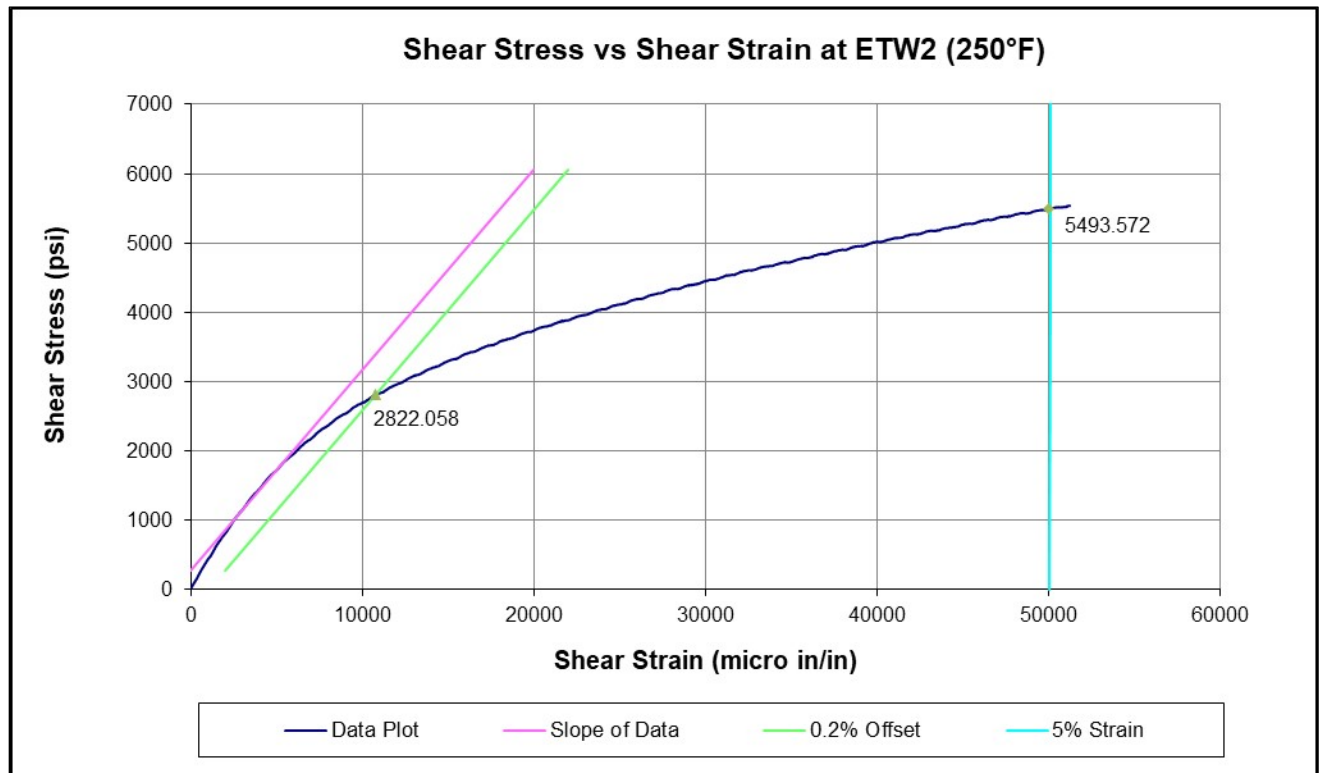




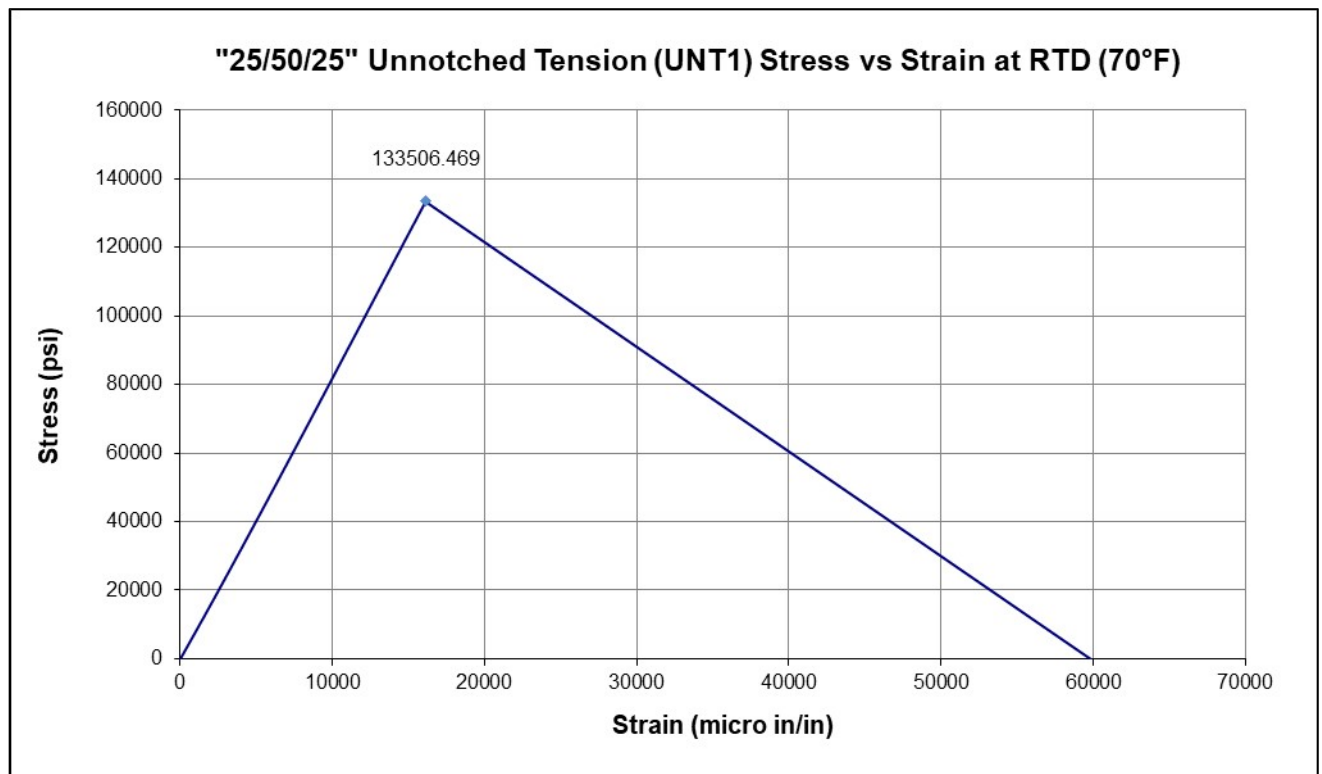
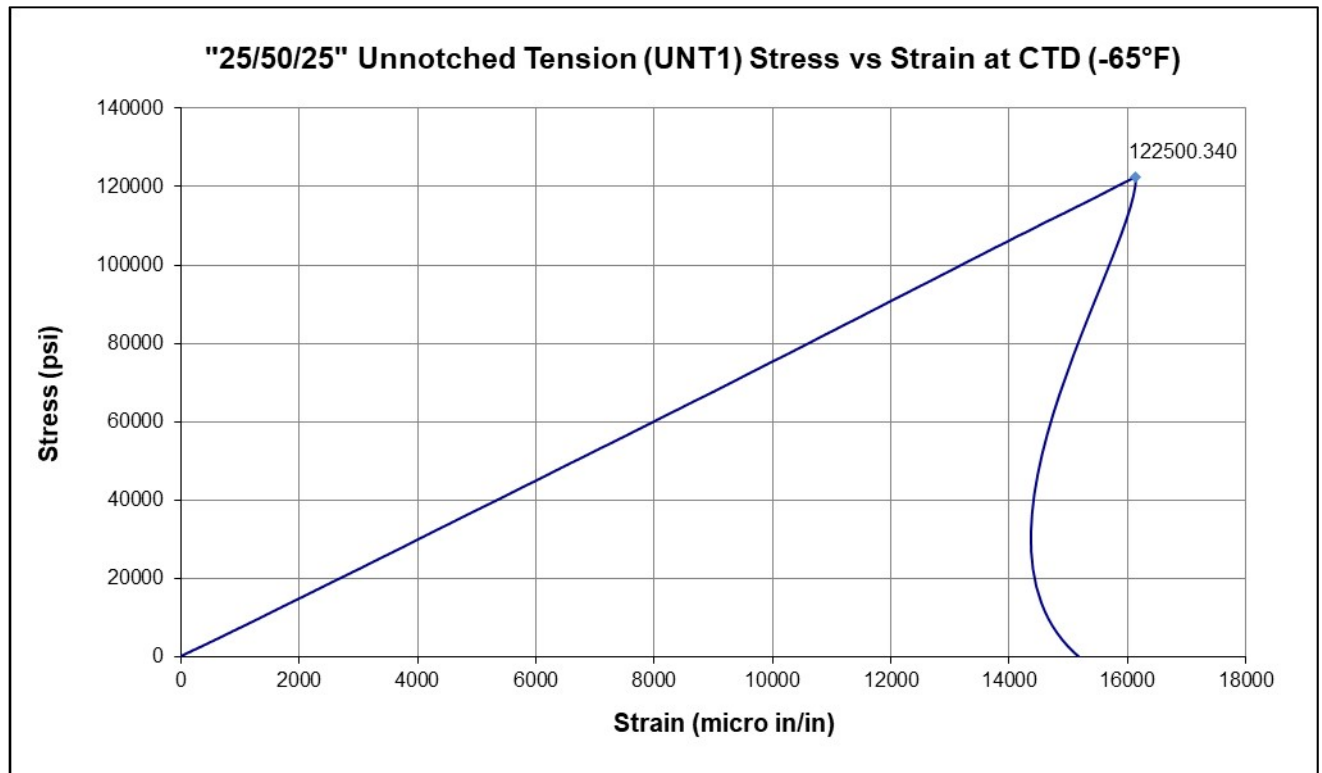
6.5 In-Plane Shear (IPS)

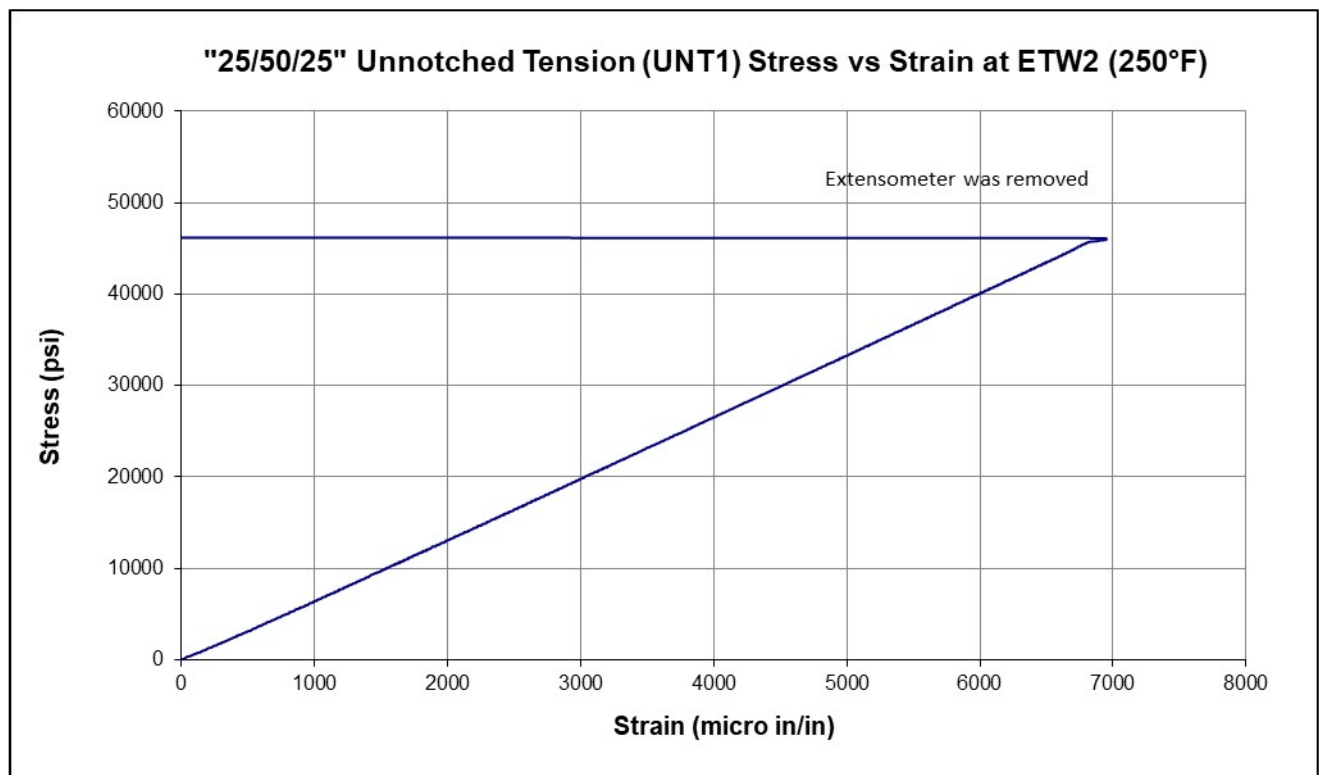
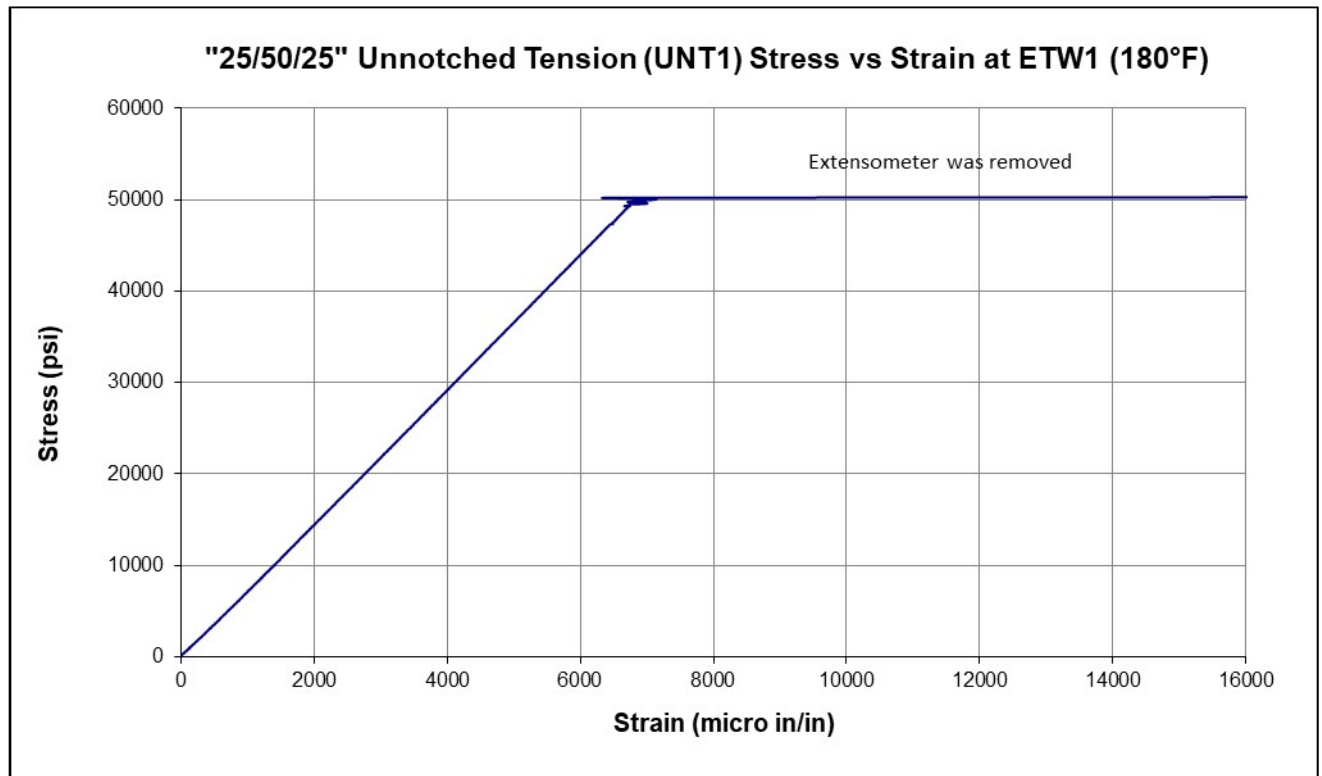




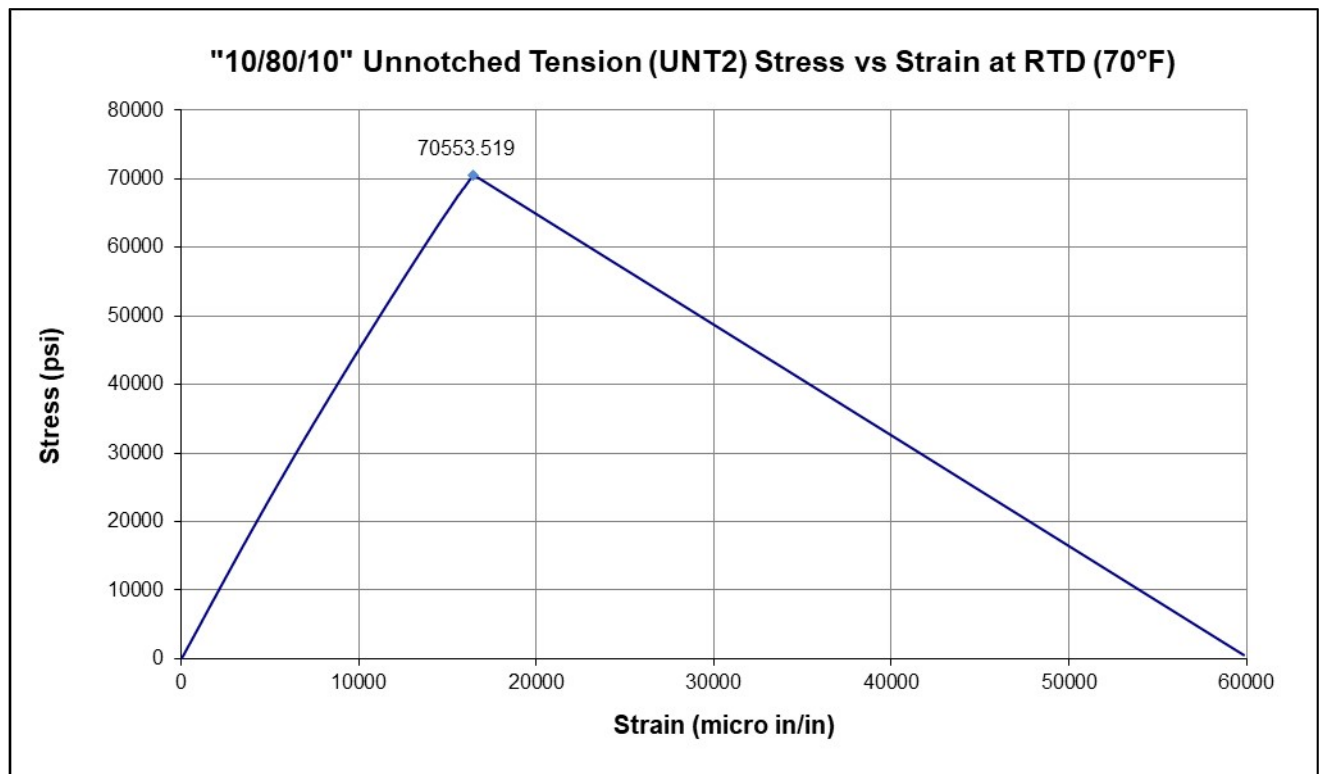
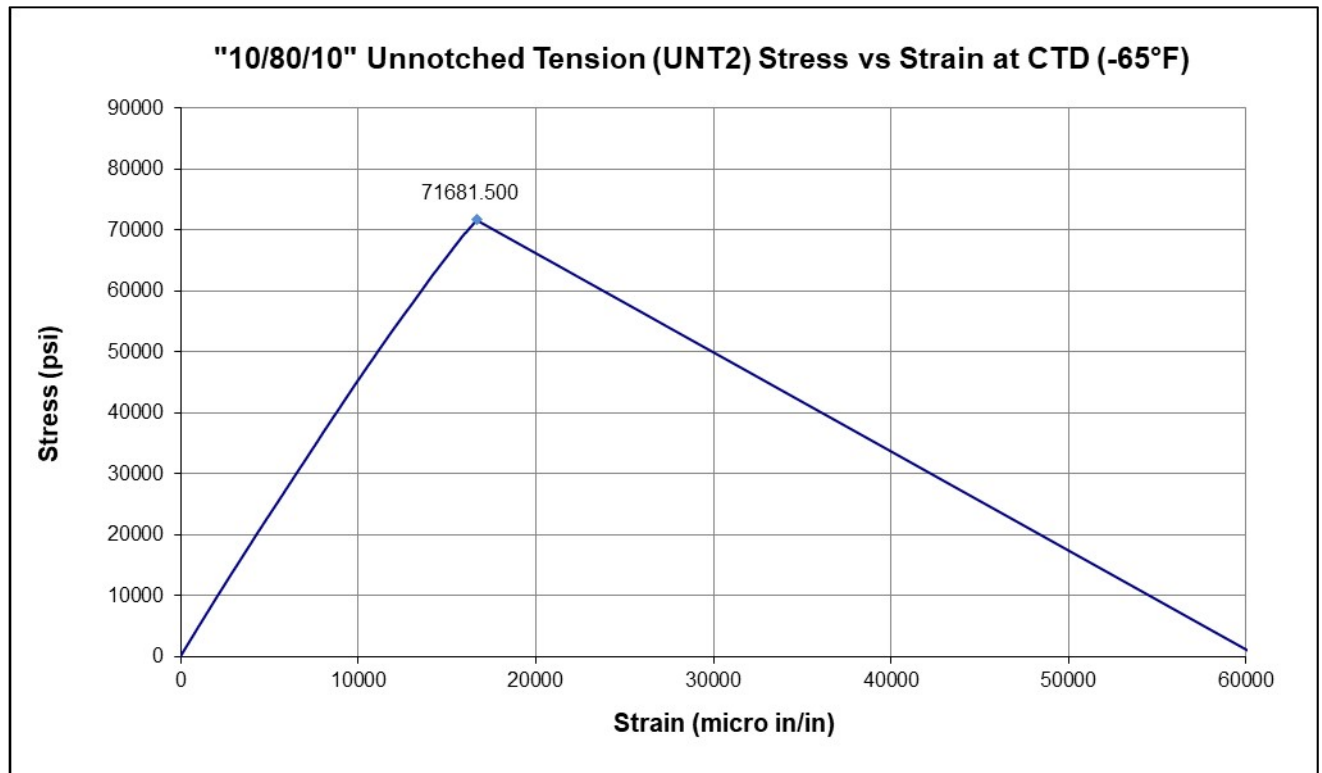


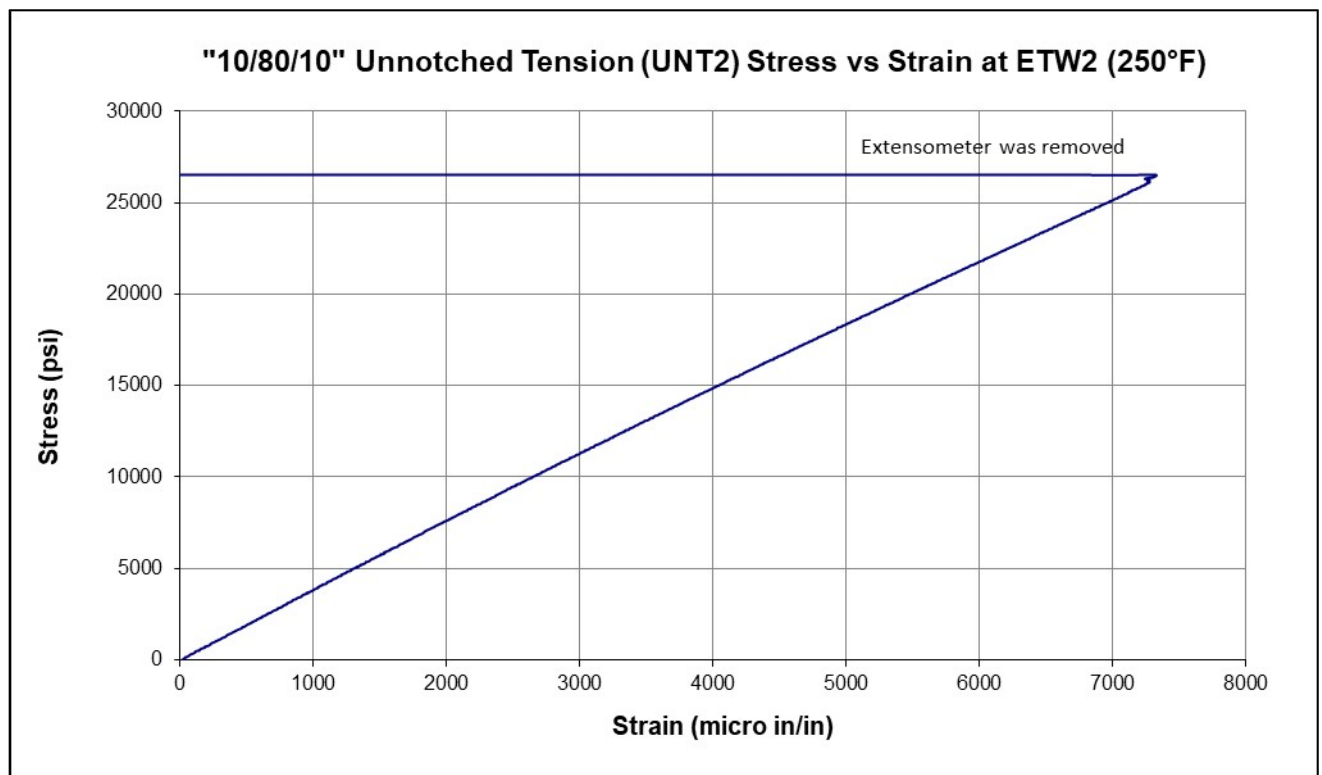
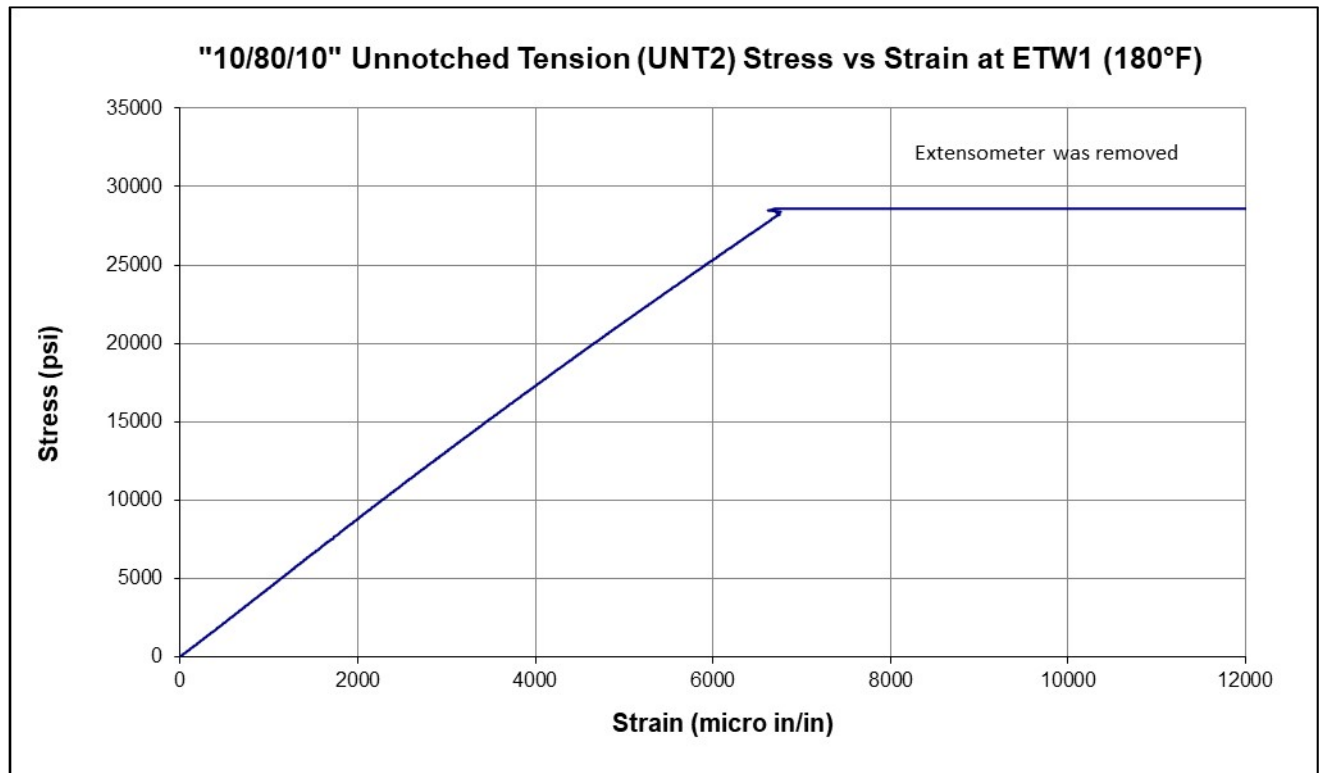
6.6 "25/50/25" Unnotched Tension 1 (UNT1)



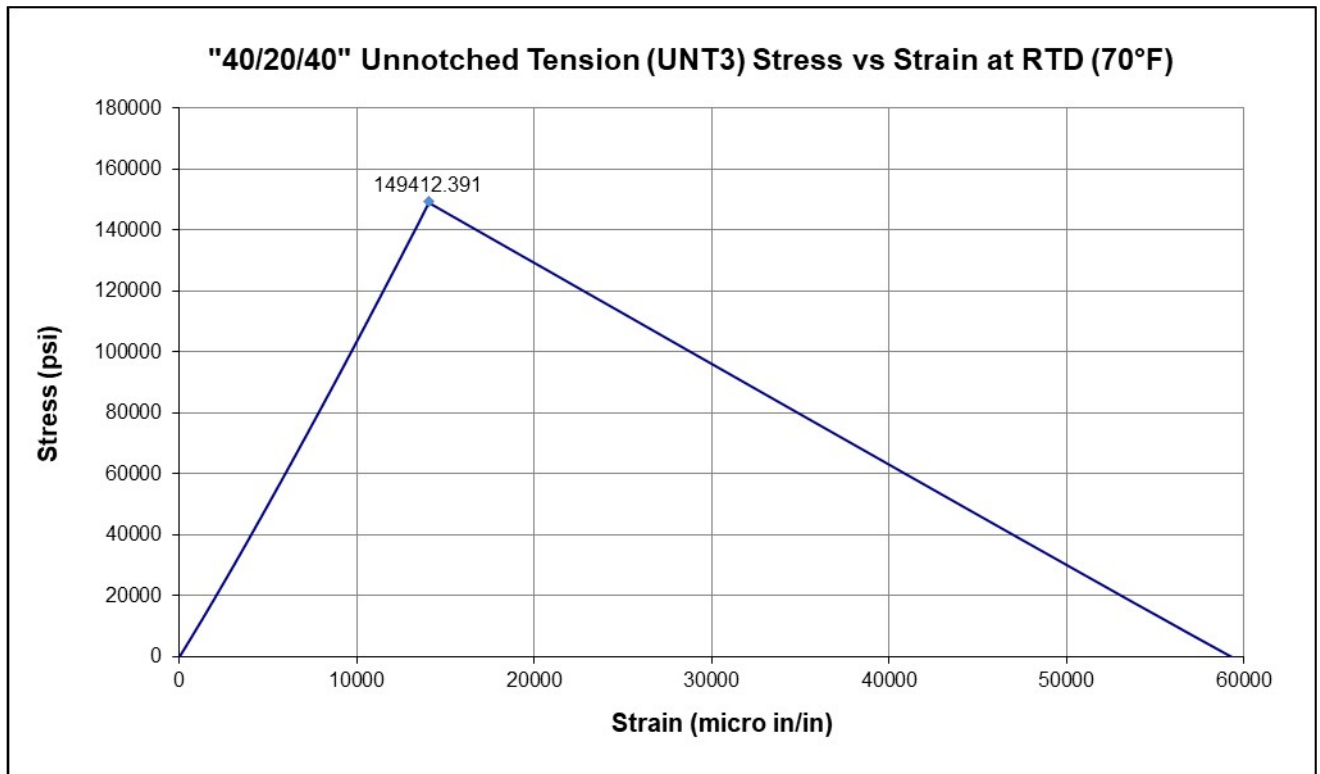
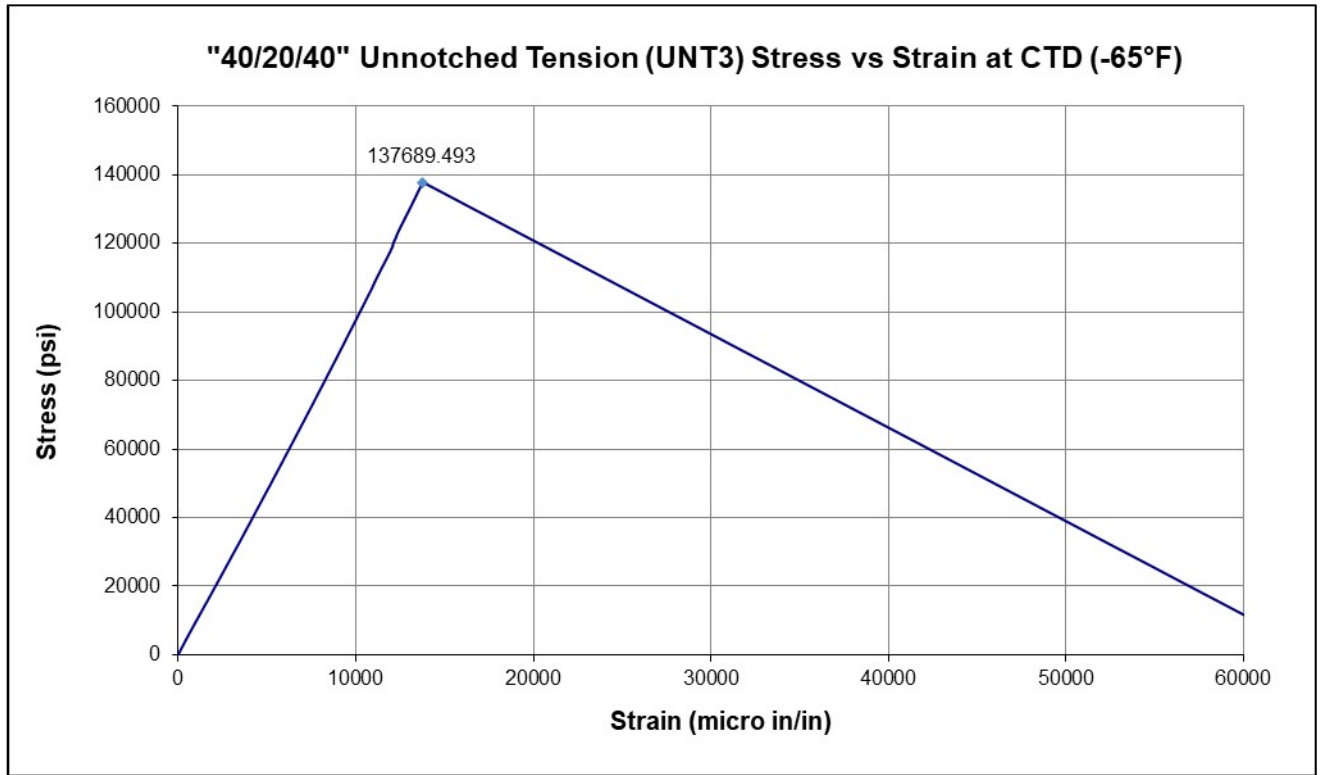


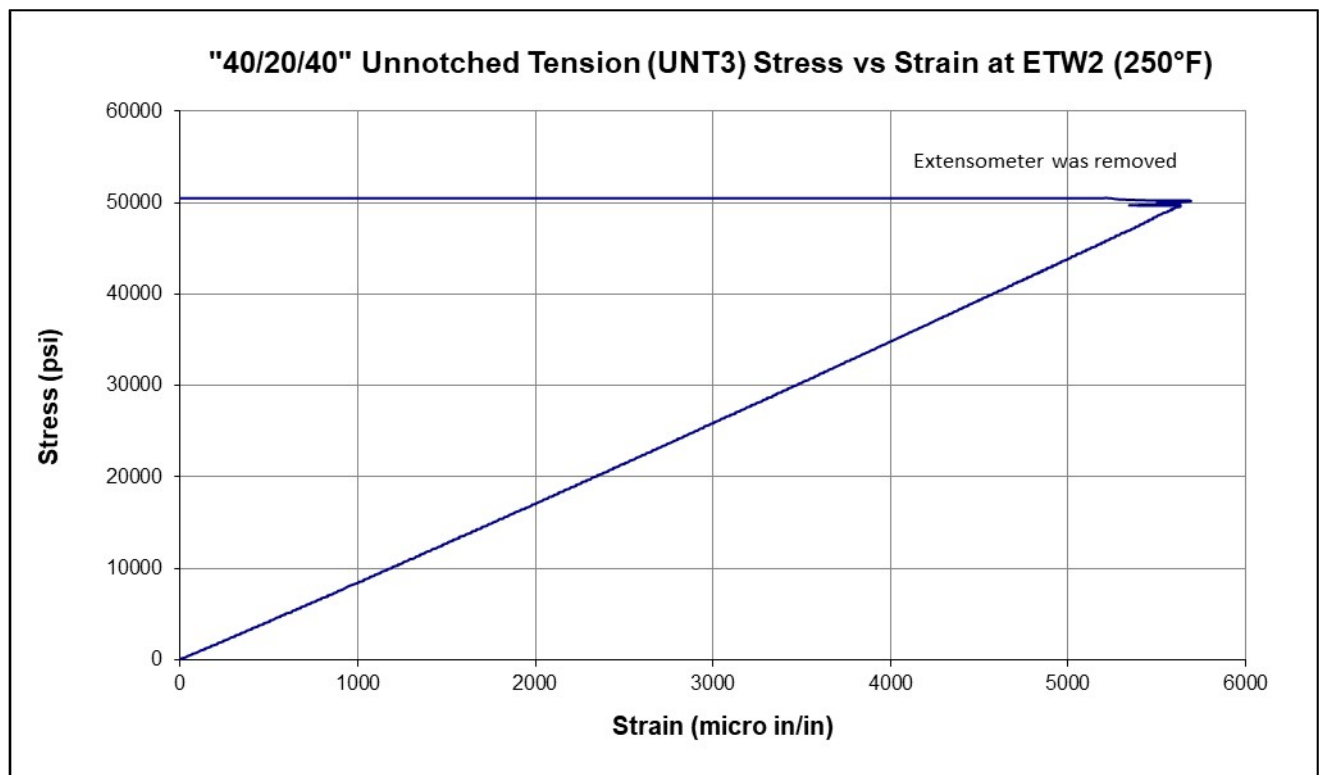
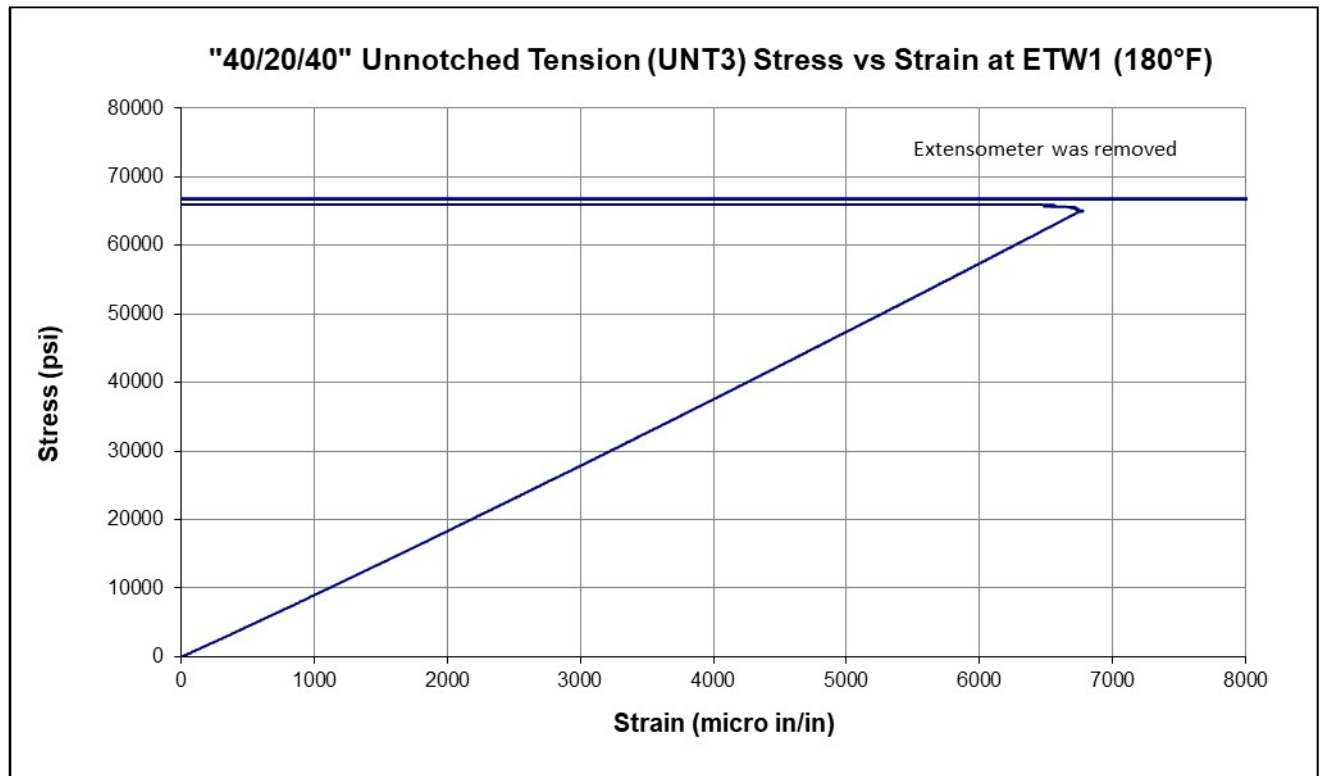
6.7 "10/80/10" Unnotched Tension 2 (UNT2)

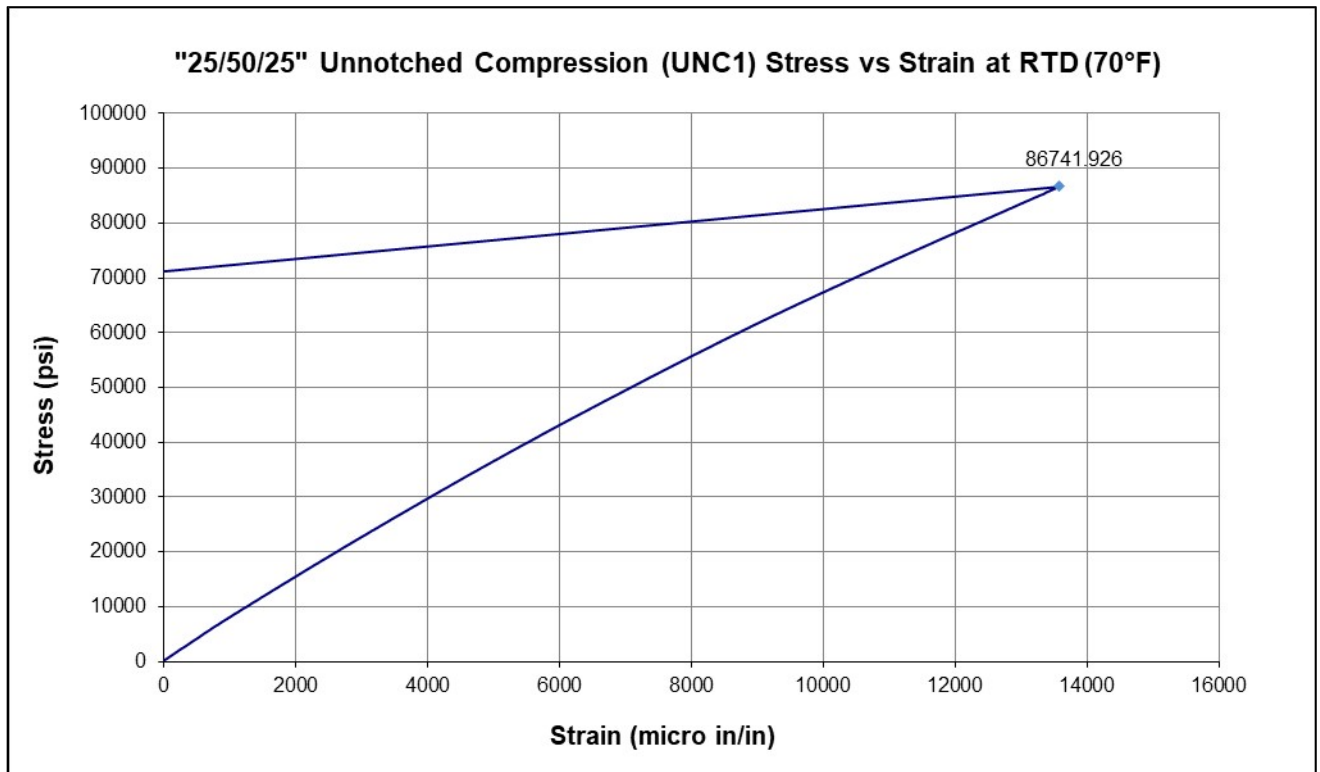
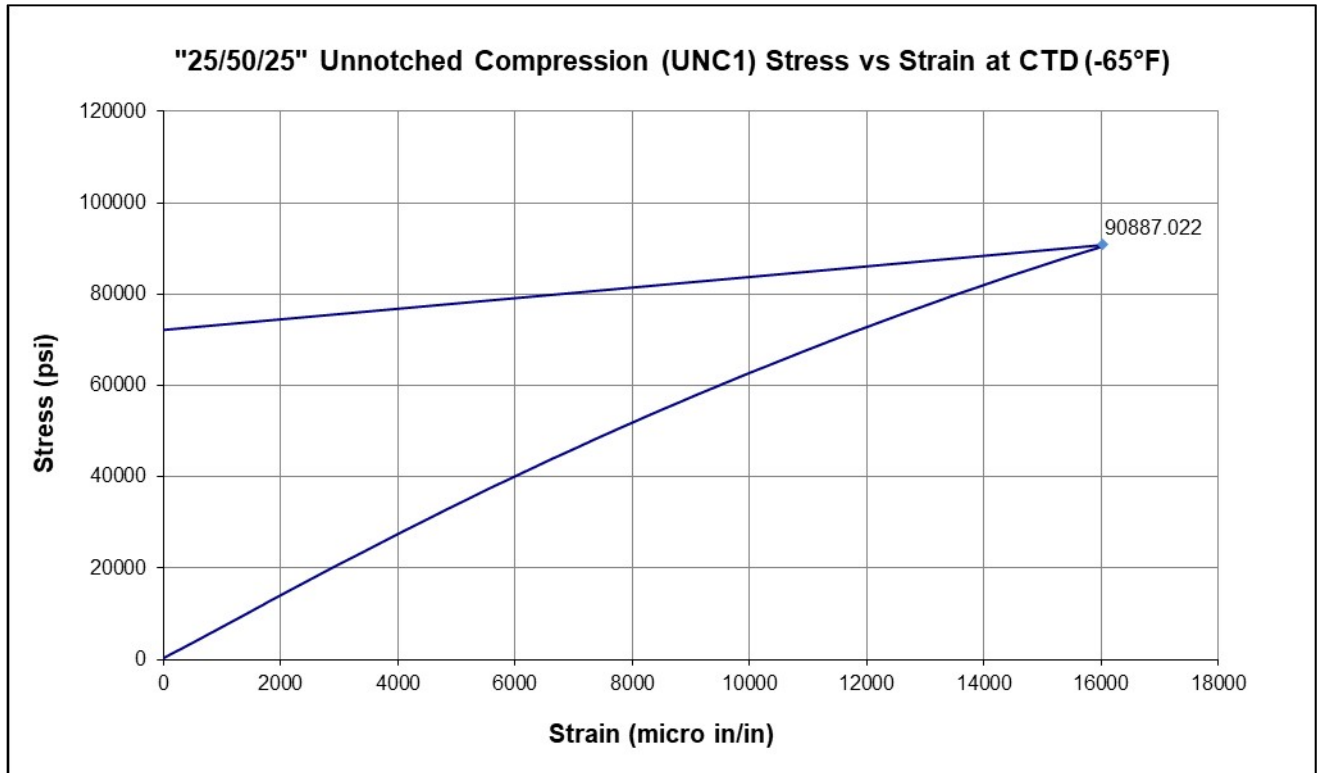


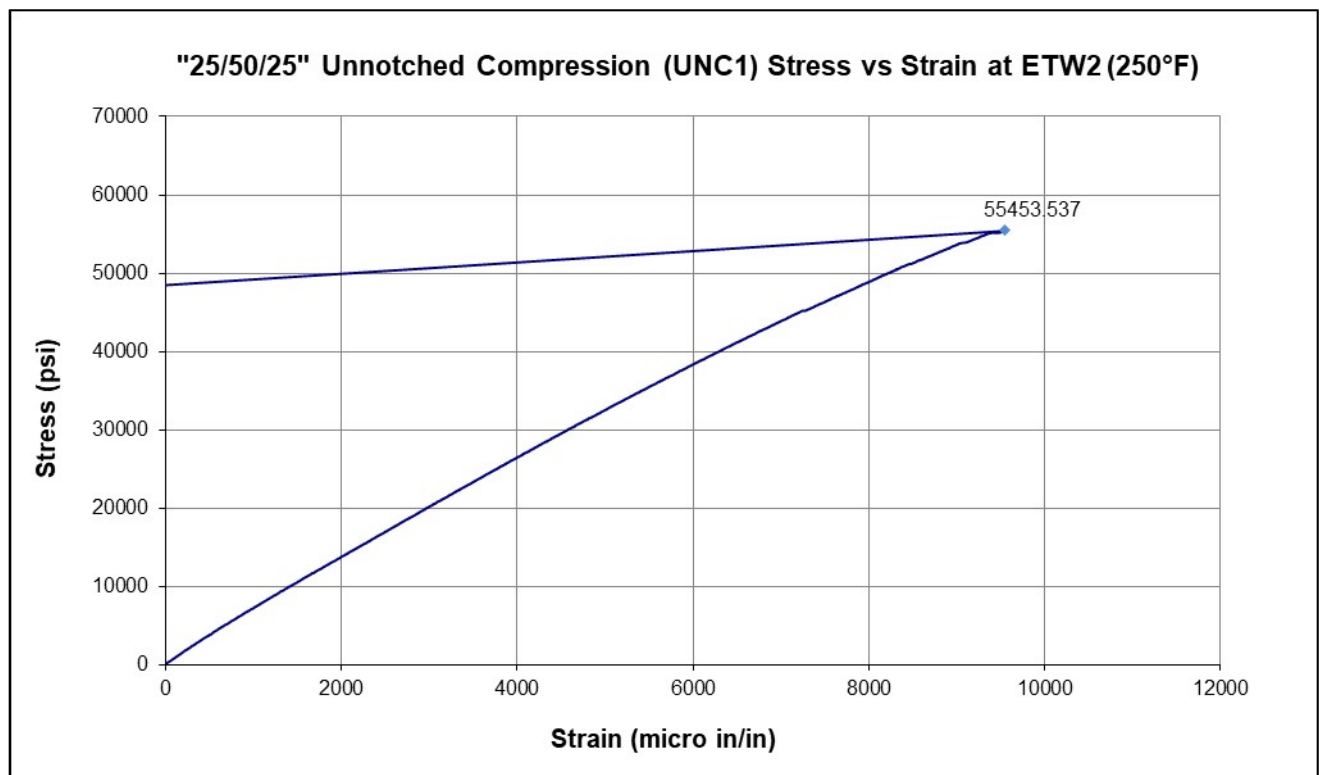
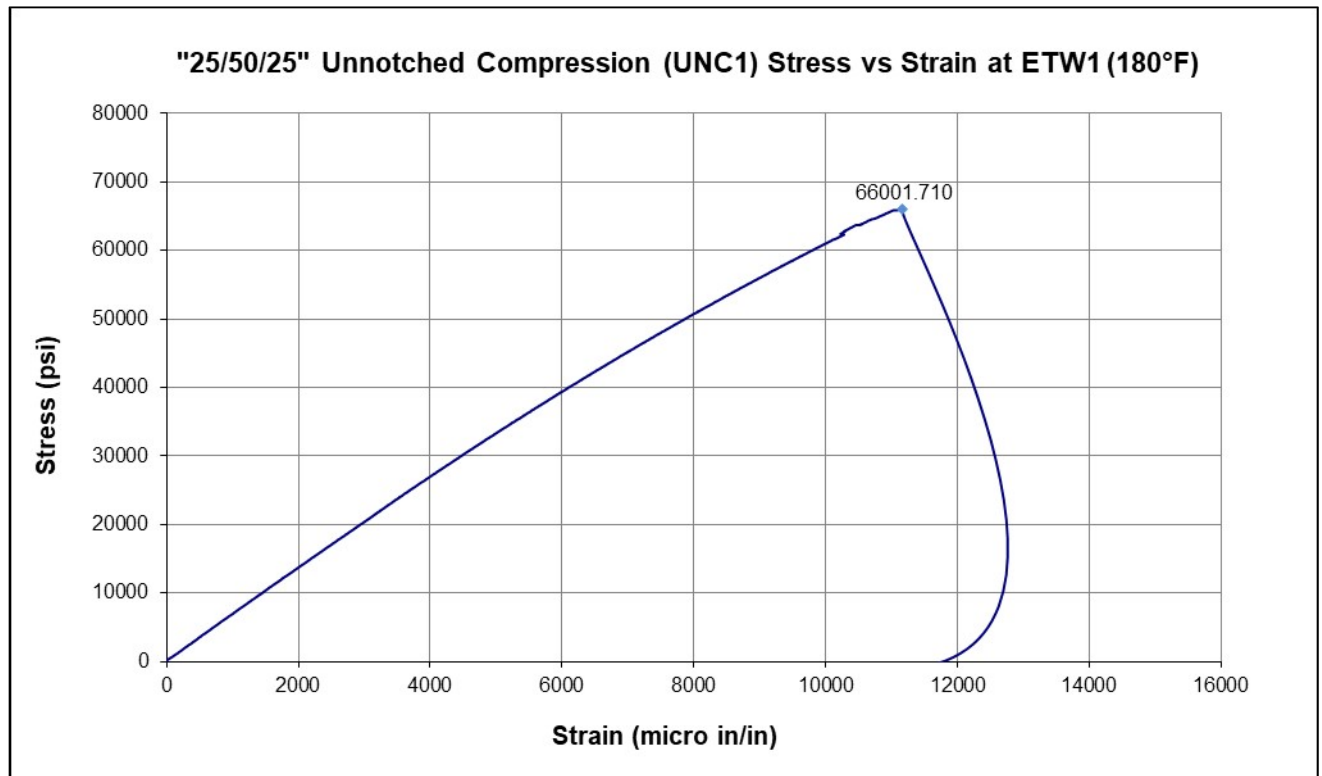


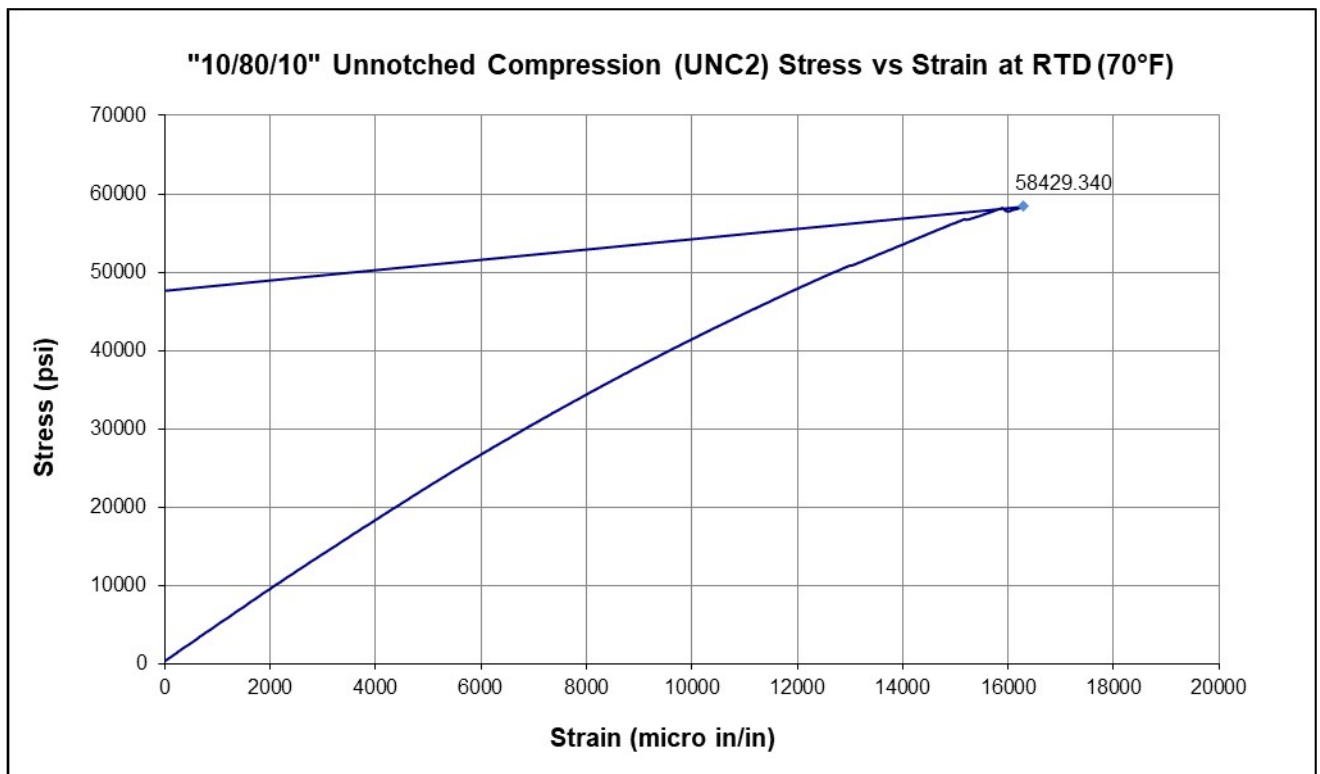
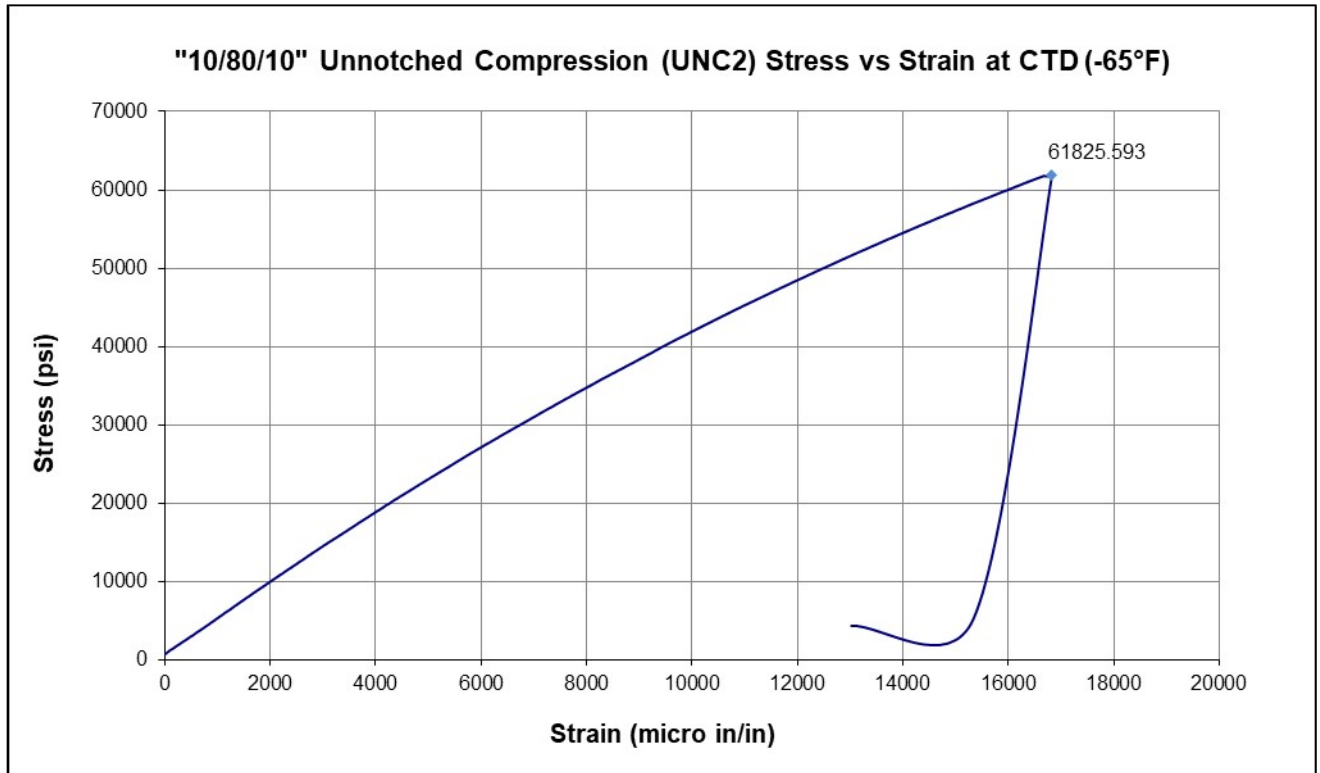
6.8 “40/20/40” Unnotched Tension 3 (UNT3)

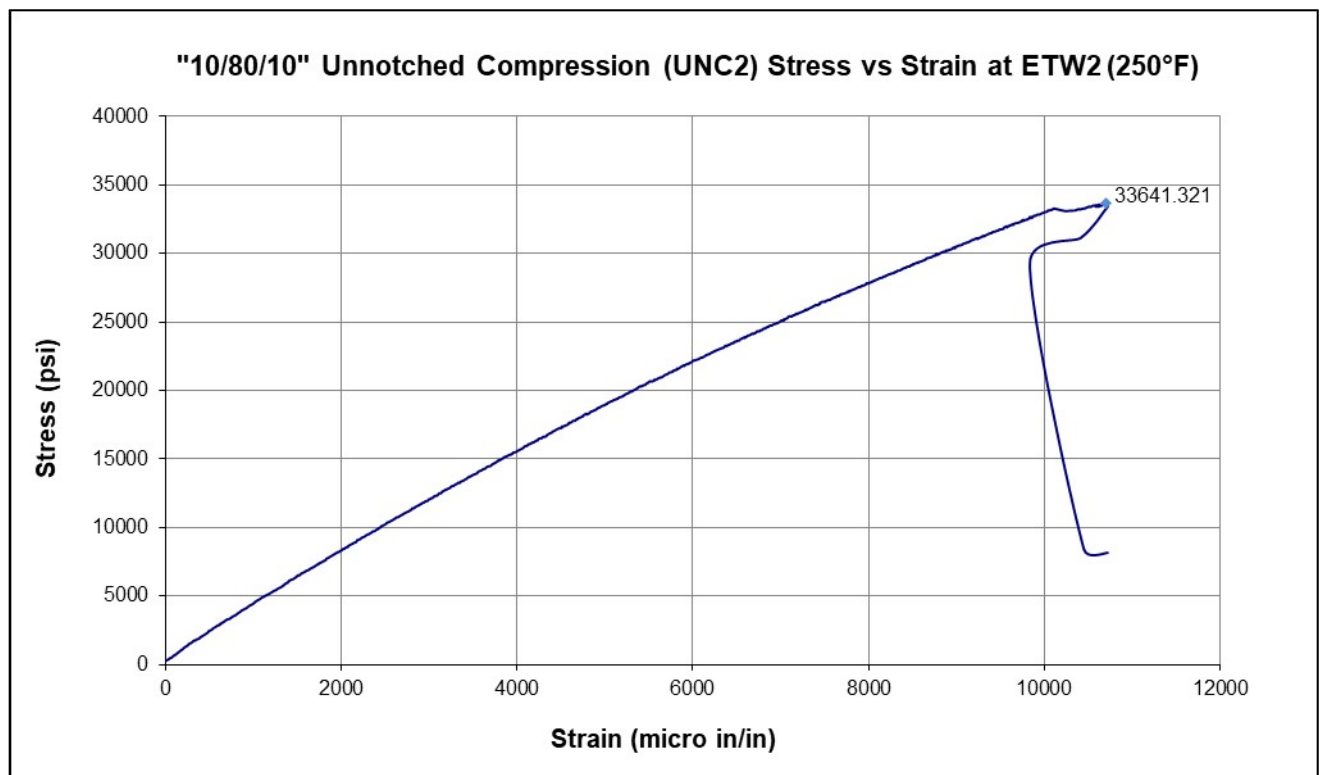
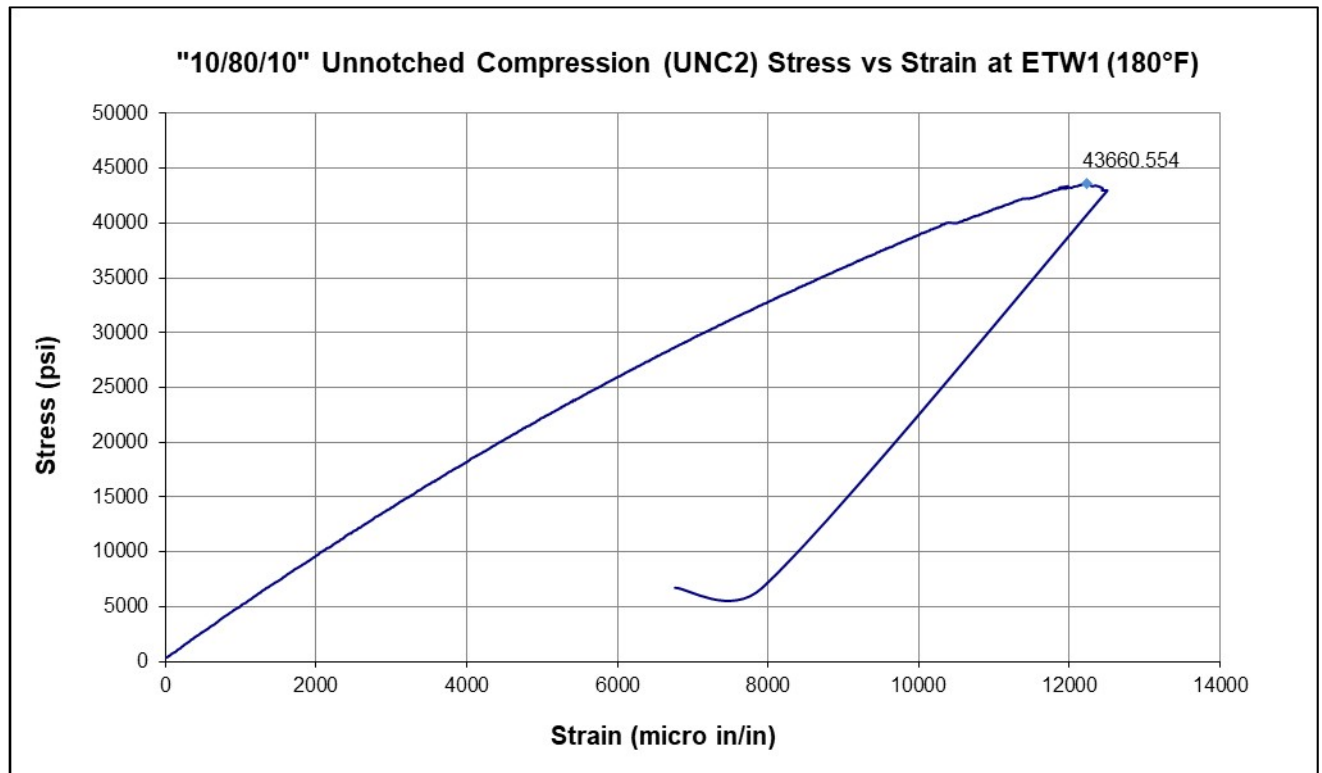


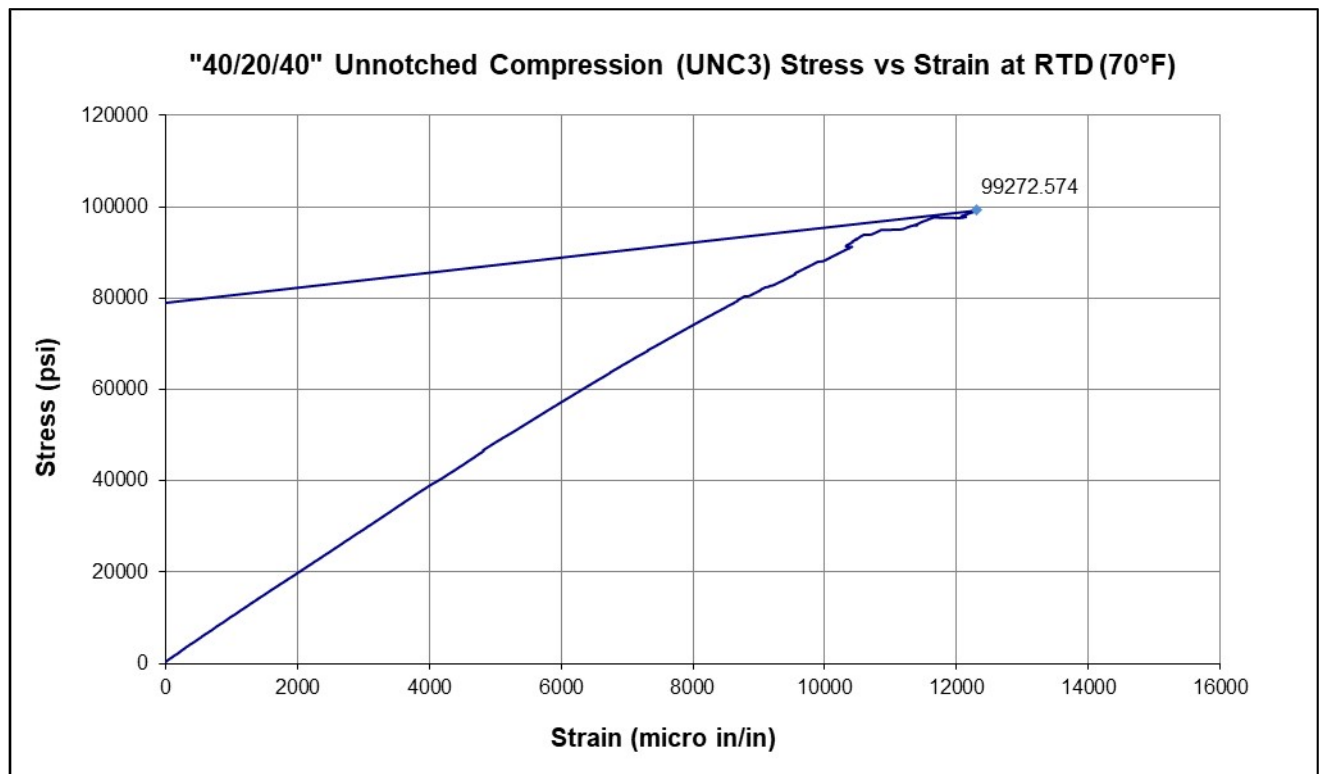
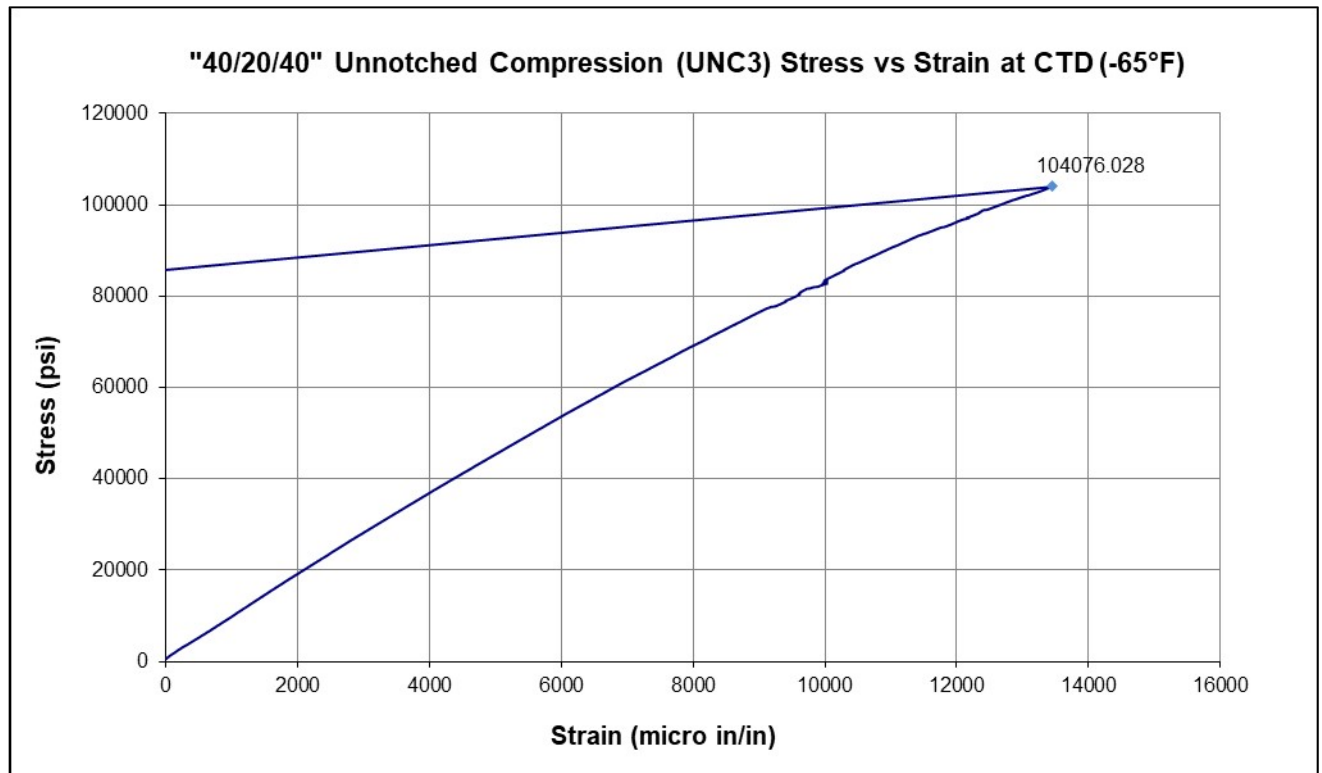


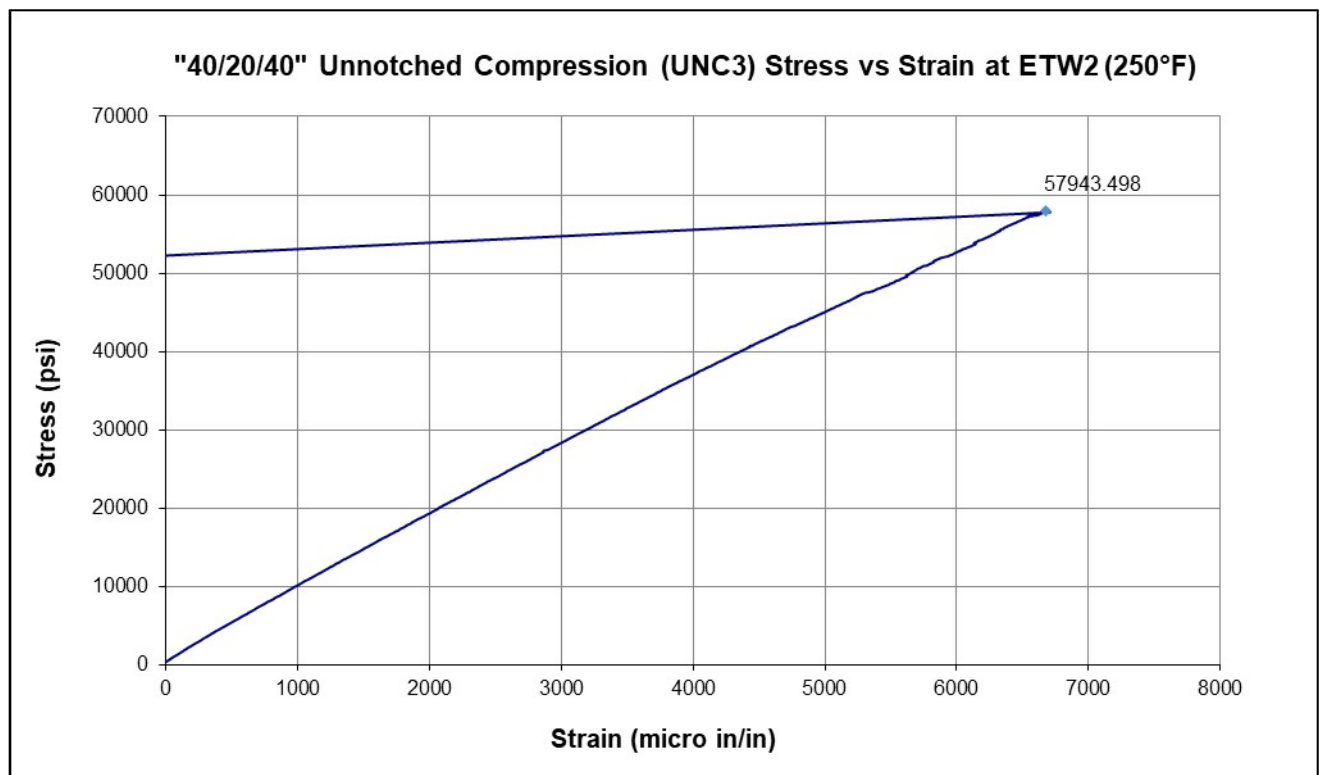
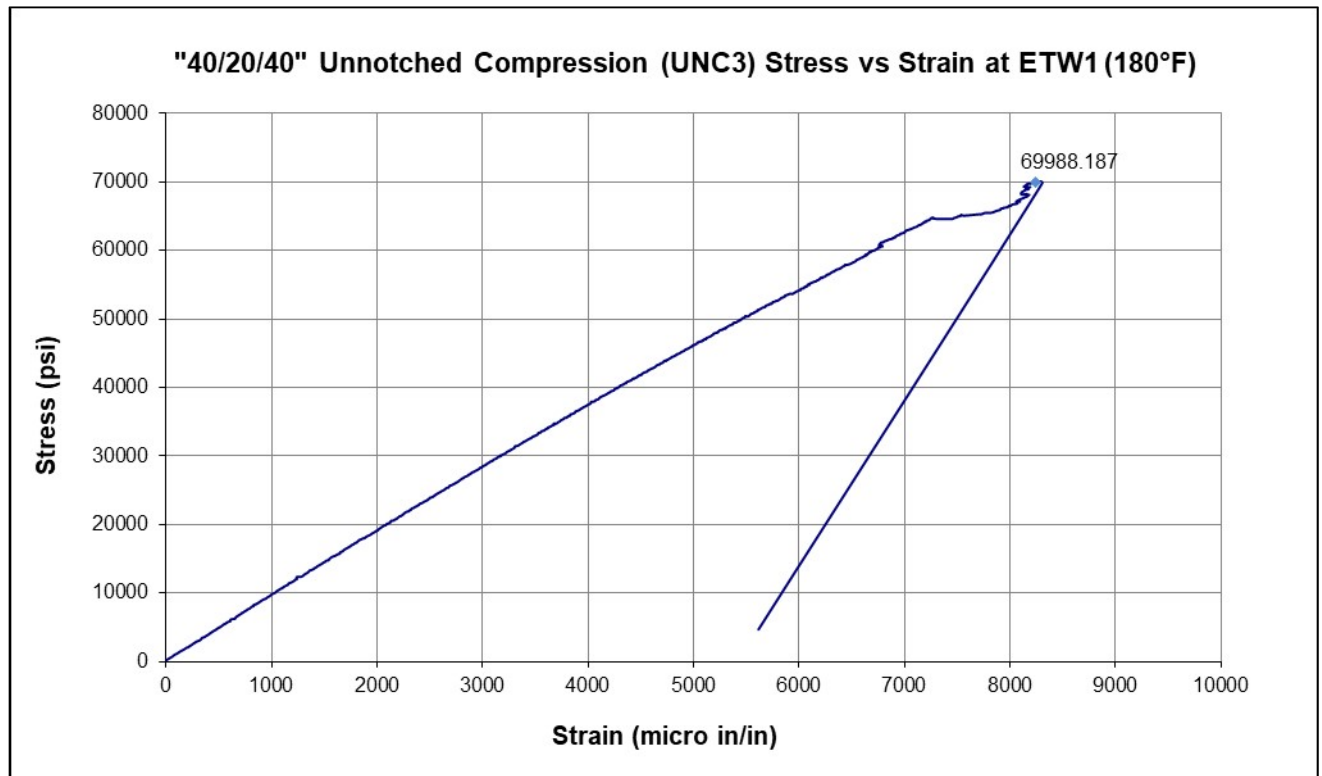
6.9 “25/50/25” Unnotched Compression 1 (UNC1)



6.10 “10/80/10” Unnotched Compression 2 (UNC2)



6.11 “40/20/40” Unnotched Compression 3 (UNC3)

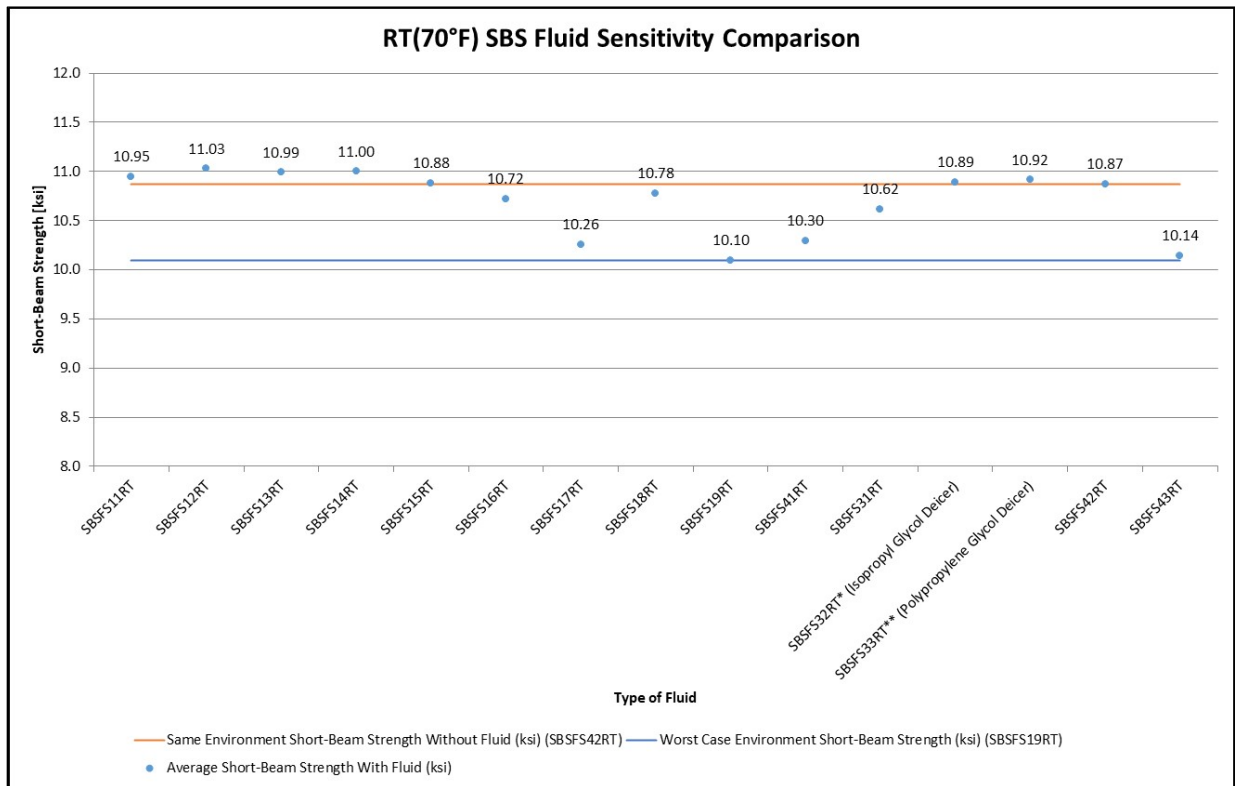


7. Fluid Sensitivity Comparison

7.1 Short Beam Strength Fluid Sensitivity (SBSFS)

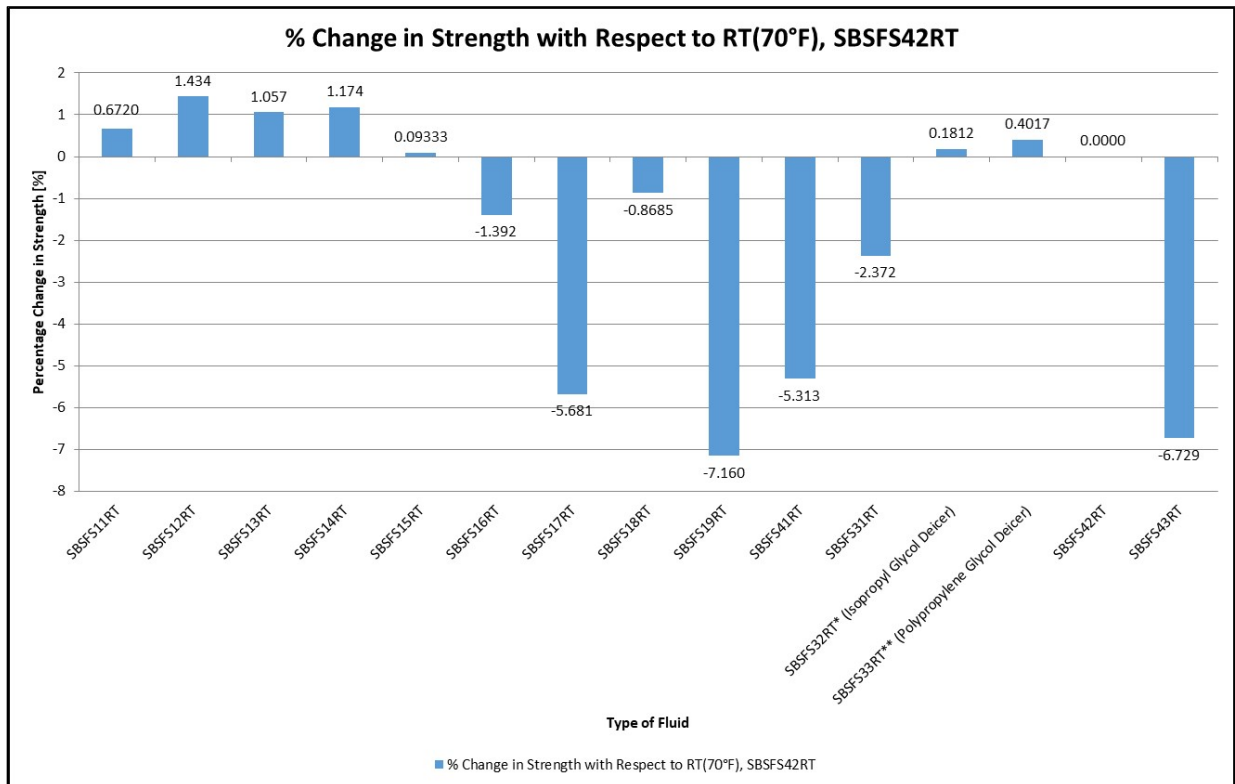
7.1.1 SBSFS Room Temperature Test Data

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	
SBSFS41RT	Distilled Water	
SBSFS31RT	MEK washing fluid	90 mins @ 70°F±10°F
SBSFS32RT	Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
SBSFS33RT	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
SBSFS42RT	Dry	Per section 6.1 Test Plan NTP 3801Q1
SBSFS43RT	85% Relative Humidity	Per section 6.1 Test Plan NTP 3801Q1



*SBSFS32RT - Deviated from test plan NTP 3801Q1 Rev B, specimens were soaked in Isopropyl Alcohol Deicing for 48 hours.

**SBSFS33RT - Deviated from test plan NTP 3801Q1 Rev B, specimens were soaked in Polypropylene Glycol Deicer for 90 minutes.



Fluid Sensitivity Screening
Short Beam Strength Properties (SBSFS)--RT(70°F) Strength
Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

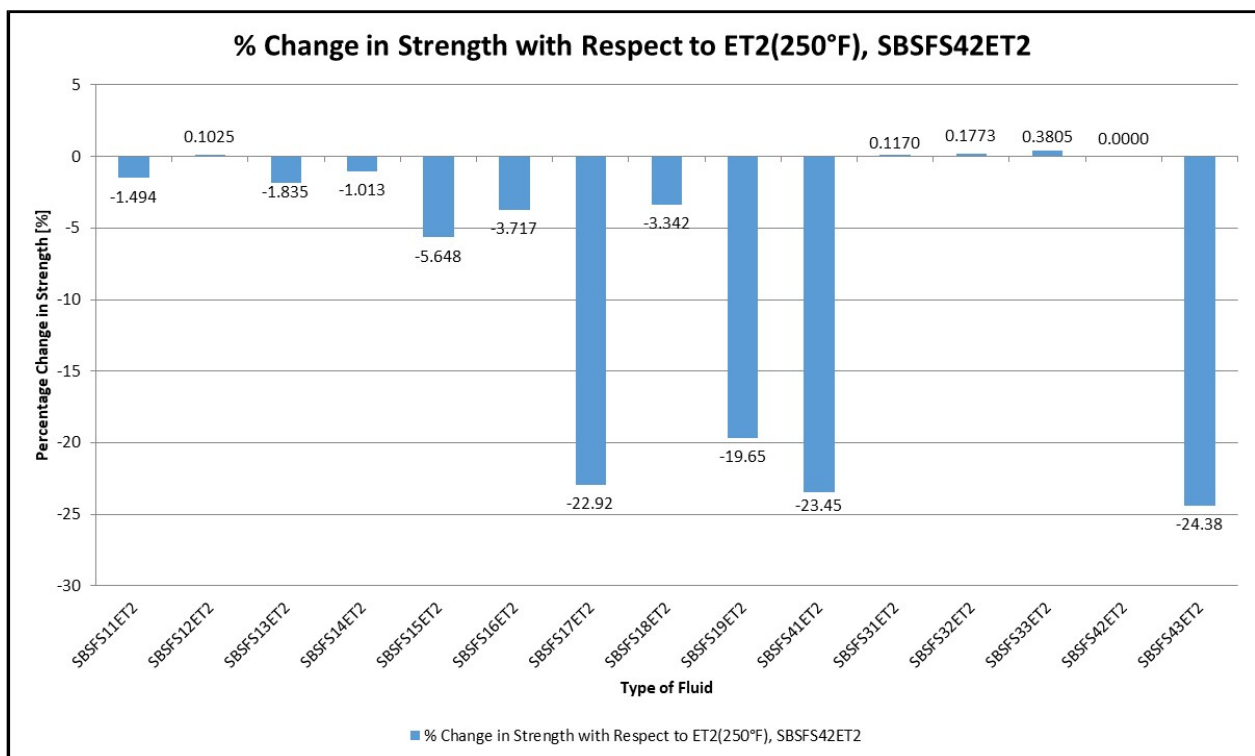
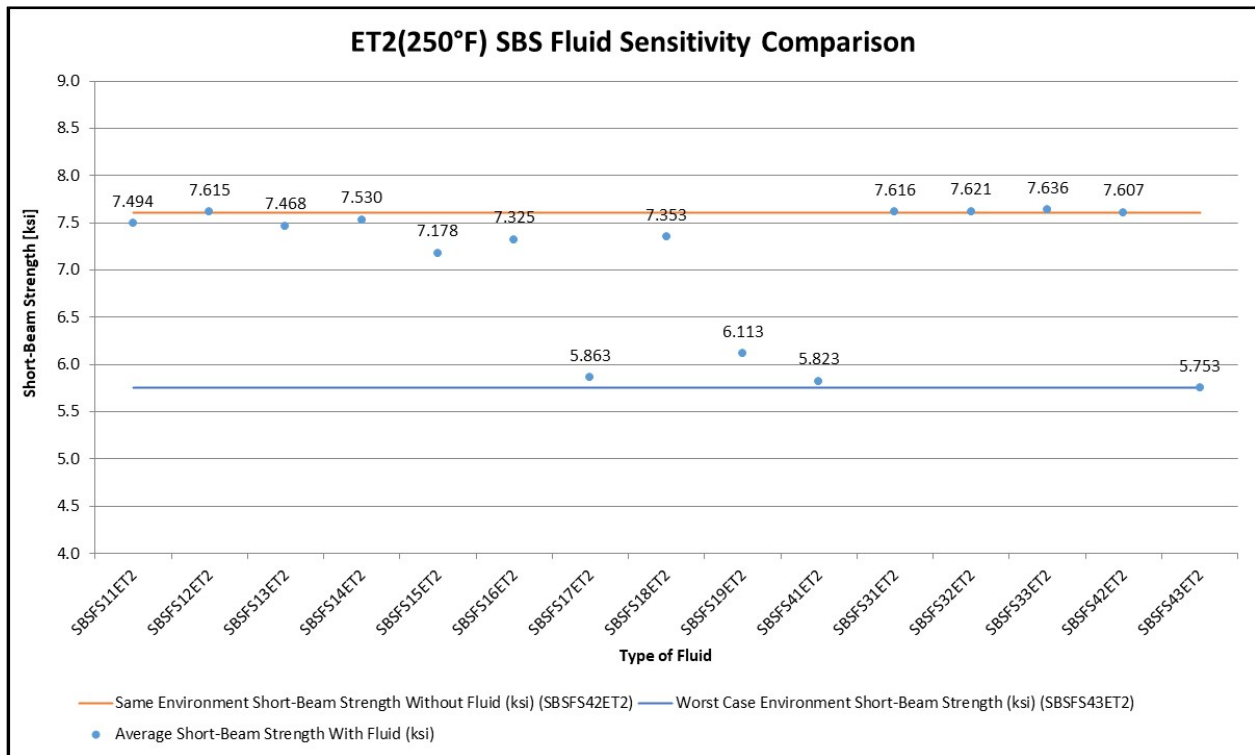
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Average Strength [ksi]	Failure Mode
SBSFS11RT	TCEQA111FS11RT	A	C1	1	1	10.96	0.1767	22	0.008033	10.95	ILS
	TCEQA112FS11RT	A	C1	1	1	10.91	0.1799	22	0.008175		ILS
	TCEQA113FS11RT	A	C1	1	1	11.24	0.1823	22	0.008286		ILS
	TCEQA114FS11RT	A	C1	1	1	10.88	0.1825	22	0.008296		ILS
	TCEQA115FS11RT	A	C1	1	1	10.95	0.1825	22	0.008296		ILS
	TCEQA116FS11RT	A	C1	1	1	10.74	0.1826	22	0.008298		ILS
SBSFS12RT	TCEQA111FS12RT	A	C1	1	1	10.86	0.1822	22	0.008283	11.03	ILS
	TCEQA112FS12RT	A	C1	1	1	11.05	0.1827	22	0.008305		ILS
	TCEQA114FS12RT	A	C1	1	1	11.19	0.1793	22	0.008151		ILS
	TCEQA115FS12RT	A	C1	1	1	10.95	0.1789	22	0.008132		ILS
	TCEQA116FS12RT	A	C1	1	1	11.09	0.1824	22	0.008291		ILS
	TCEQA111FS13RT	A	C1	1	1	10.85	0.1959	22	0.008902	10.99	ILS
SBSFS13RT	TCEQA112FS13RT	A	C1	1	1	11.14	0.1841	22	0.008368		ILS
	TCEQA113FS13RT	A	C1	1	1	11.06	0.1842	22	0.008374		ILS
	TCEQA115FS13RT	A	C1	1	1	10.89	0.1852	22	0.008418		ILS
	TCEQA116FS13RT	A	C1	1	1	10.98	0.1857	22	0.008442		ILS
	TCEQA117FS13RT	A	C1	1	1	11.02	0.1849	22	0.008402		ILS
	TCEQA111FS14RT	A	C1	1	1	11.07	0.1883	22	0.008558	11.00	ILS
SBSFS14RT	TCEQA112FS14RT	A	C1	1	1	11.16	0.1881	22	0.008549		ILS
	TCEQA113FS14RT	A	C1	1	1	11.00	0.1883	22	0.008558		ILS
	TCEQA114FS14RT	A	C1	1	1	10.86	0.1879	22	0.008539		ILS
	TCEQA115FS14RT	A	C1	1	1	10.92	0.1872	22	0.008510		ILS
	TCEQA111FS15RT	A	C1	1	1	10.72	0.1906	22	0.008661	10.88	ILS
SBSFS15RT	TCEQA112FS15RT	A	C1	1	1	10.91	0.1917	22	0.008715		ILS
	TCEQA113FS15RT	A	C1	1	1	11.01	0.1917	22	0.008714		ILS
	TCEQA114FS15RT	A	C1	1	1	10.78	0.1912	22	0.008689		ILS
	TCEQA115FS15RT	A	C1	1	1	11.01	0.1910	22	0.008682		ILS
	TCEQA111FS16RT	A	C1	1	1	10.79	0.1904	22	0.008655	10.72	ILS
SBSFS16RT	TCEQA112FS16RT	A	C1	1	1	11.04	0.1870	22	0.008502		ILS
	TCEQA114FS16RT	A	C1	1	1	10.44	0.1890	22	0.008592		ILS
	TCEQA115FS16RT	A	C1	1	1	11.02	0.1920	22	0.008725		ILS
	TCEQA116FS16RT	A	C1	1	1	10.33	0.1943	22	0.008831		ILS
	TCEQA111FS17RT	A	C1	1	1	10.16	0.1928	22	0.008763	10.26	ILS
SBSFS17RT	TCEQA112FS17RT	A	C1	1	1	10.31	0.1942	22	0.008828		ILS
	TCEQA113FS17RT	A	C1	1	1	10.12	0.1946	22	0.008847		ILS
	TCEQA114FS17RT	A	C1	1	1	10.17	0.1945	22	0.008841		ILS
	TCEQA115FS17RT	A	C1	1	1	10.51	0.1934	22	0.008792		ILS
	TCEQA111FS18RT	A	C1	1	1	10.91	0.1950	22	0.008864	10.78	ILS
SBSFS18RT	TCEQA112FS18RT	A	C1	1	1	10.67	0.1952	22	0.008873		ILS
	TCEQA113FS18RT	A	C1	1	1	10.94	0.1949	22	0.008861		ILS
	TCEQA114FS18RT	A	C1	1	1	10.55	0.1947	22	0.008849		ILS
	TCEQA115FS18RT	A	C1	1	1	10.83	0.1950	22	0.008863		ILS
	TCEQA111FS19RT	A	C1	1	1	10.15	0.1981	22	0.009004	10.10	ILS
SBSFS19RT	TCEQA112FS19RT	A	C1	1	1	10.30	0.1977	22	0.008986		ILS
	TCEQA113FS19RT	A	C1	1	1	10.20	0.1975	22	0.008977		ILS
	TCEQA114FS19RT	A	C1	1	1	10.01	0.1973	22	0.008967		ILS
	TCEQA115FS19RT	A	C1	1	1	9.817	0.1970	22	0.008954		ILS
	TCEQA111FS41RT	A	C1	1	1	10.41	0.1999	22	0.009088	10.30	ILS
SBSFS41RT	TCEQA112FS41RT	A	C1	1	1	10.31	0.1993	22	0.009059		ILS
	TCEQA113FS41RT	A	C1	1	1	10.19	0.1995	22	0.009069		ILS
	TCEQA114FS41RT	A	C1	1	1	10.17	0.1988	22	0.009037		ILS
	TCEQA115FS41RT	A	C1	1	1	10.40	0.1990	22	0.009045		ILS
	TCEQA113FS31RT	A	C1	1	1	10.59	0.1974	22	0.008974	10.62	ILS
SBSFS31RT	TCEQA114FS31RT	A	C1	1	1	10.65	0.1990	22	0.009047		ILS
	TCEQA115FS31RT	A	C1	1	1	10.69	0.1992	22	0.009055		ILS
	TCEQA116FS31RT	A	C1	1	1	10.69	0.1985	22	0.009023		ILS
	TCEQA117FS31RT	A	C1	1	1	10.46	0.1981	22	0.009006		ILS
	TCEQA111FS32RT*	A	C1	1	1	10.67	0.1992	22	0.009056	10.89	ILS
SBSFS32RT* (Isopropyl Glycol Deicer)	TCEQA112FS32RT*	A	C1	1	1	11.21	0.1995	22	0.009067		ILS
	TCEQA113FS32RT*	A	C1	1	1	10.64	0.1976	22	0.008980		ILS
	TCEQA115FS32RT*	A	C1	1	1	10.81	0.1870	22	0.008498		ILS
	TCEQA116FS32RT*	A	C1	1	1	11.14	0.1932	22	0.008780		ILS
	TCEQA111FS33RT	A	C1	1	1	11.15	0.1979	22	0.008993	10.92	ILS
SBSFS33RT** (Polypropylene Glycol Deicer)	TCEQA112FS33RT	A	C1	1	1	11.11	0.1979	22	0.008995		ILS
	TCEQA113FS33RT	A	C1	1	1	10.95	0.1990	22	0.009045		ILS
	TCEQA114FS33RT	A	C1	1	1	10.57	0.1998	22	0.009082		ILS
	TCEQA115FS33RT	A	C1	1	1	10.82	0.1995	22	0.009070		ILS
	TCEQA111FS42RT	A	C1	1	1	10.68	0.1984	22	0.009017	10.87	ILS, COMPRESSION
SBSFS42RT	TCEQA112FS42RT	A	C1	1	1	11.02	0.2005	22	0.009111		ILS, COMPRESSION
	TCEQA113FS42RT	A	C1	1	1	11.03	0.2011	22	0.009142		ILS, COMPRESSION
	TCEQA114FS42RT	A	C1	1	1	10.89	0.2005	22	0.009113		ILS, COMPRESSION
	TCEQA115FS42RT	A	C1	1	1	10.75	0.1998	22	0.009080		ILS, COMPRESSION
	TCEQA111FS43RT	A	C1	1	1	9.982	0.1983	22	0.009012	10.14	ILS
SBSFS43RT	TCEQA112FS43RT	A	C1	1	1	10.03	0.1943	22	0.008833		ILS
	TCEQA115FS43RT	A	C1	1	1	10.51	0.1980	22	0.009002		ILS
	TCEQA116FS43RT	A	C1	1	1	10.19	0.2000	22	0.009092		ILS
	TCEQA117FS43RT	A	C1	1	1	10.00	0.2004	22	0.009110		ILS

*SBSFS32RT - Deviated from test plan NTP 3801Q1 Rev B, specimens were soaked in Isopropyl Alcohol Deicing for 48 hours.

**SBSFS33RT - Deviated from test plan NTP 3801Q1 Rev B, specimens were soaked in Polypropylene Glycol Deicer for 90 minutes.

7.1.2 SBSFS Elevated Temperature Test Data

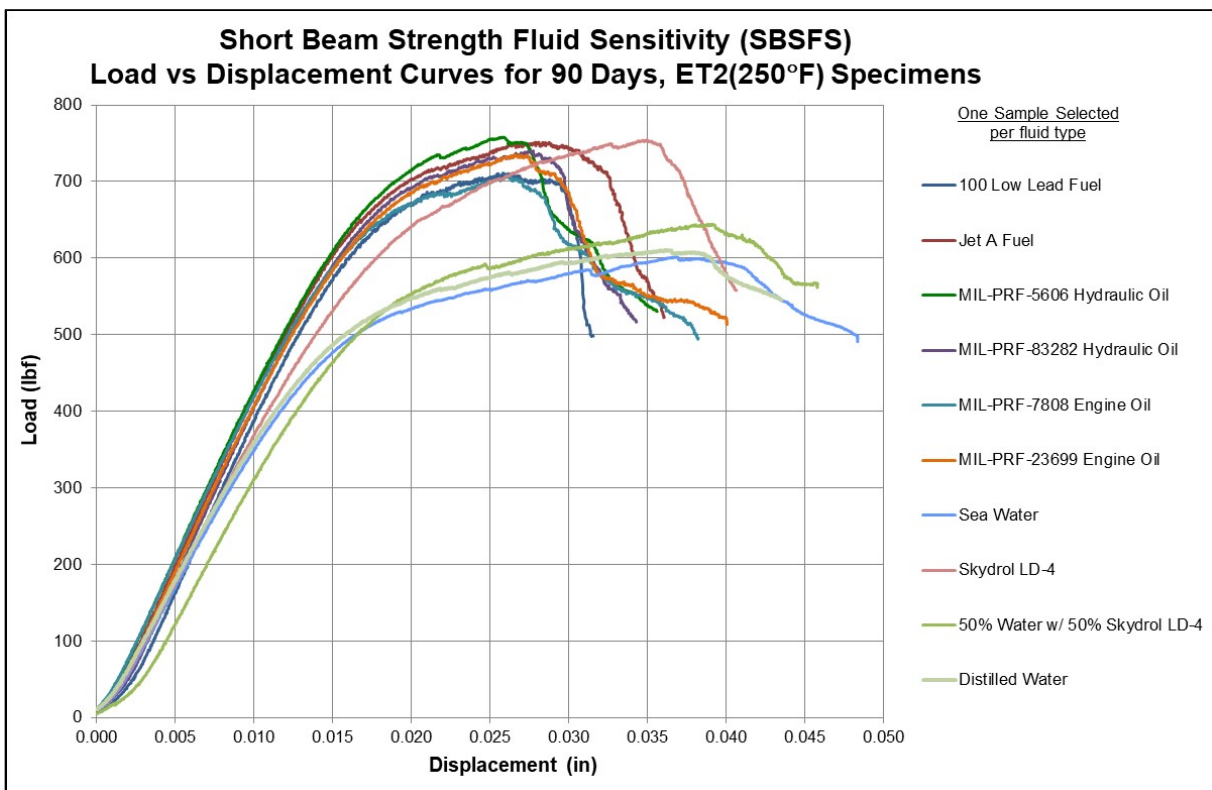
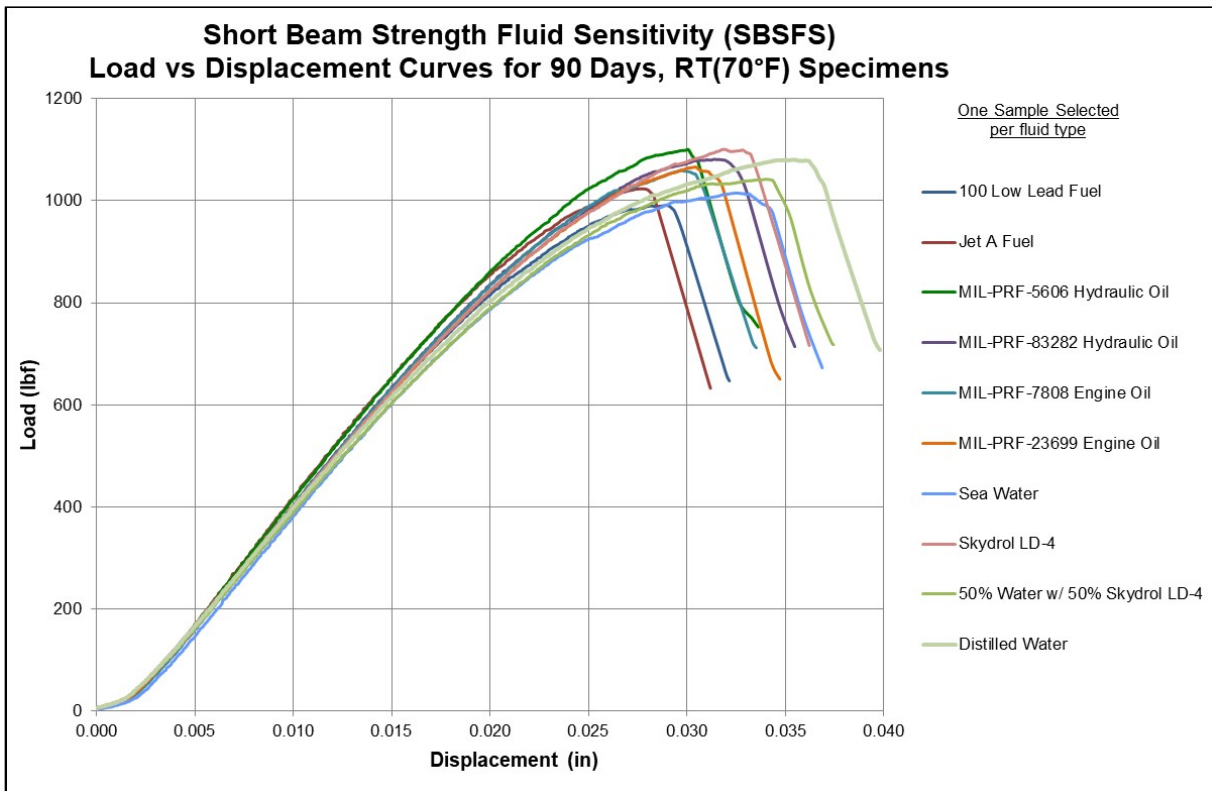
Code	Type of Fluid	Exposure
SBSFS11ET2	100 Low lead Fuel	90 days min @ 70°F±10°F
SBSFS12ET2	Jet A Fuel	
SBSFS13ET2	MIL-PRF-5606 Hydraulic Oil	
SBSFS14ET2	MIL-PRF-83282 Hydraulic Oil	
SBSFS15ET2	MIL-PRF-7808 Engine Oil	
SBSFS16ET2	MIL-PRF-23699 Engine Oil	
SBSFS17ET2	Sea Water	
SBSFS18ET2	Skydrol LD-4	
SBSFS19ET2	50% Water with 50% Skydrol LD-4	
SBSFS41ET2	Distilled Water	
SBSFS31ET2	MEK washing fluid	90 mins @ 70°F±10°F
SBSFS32ET2	Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
SBSFS33ET2	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
SBSFS42ET2	Dry	Per section 6.1 Test Plan NTP 3801Q1
SBSFS43ET2	85% Relative Humidity	Per section 6.1 Test Plan NTP 3801Q1

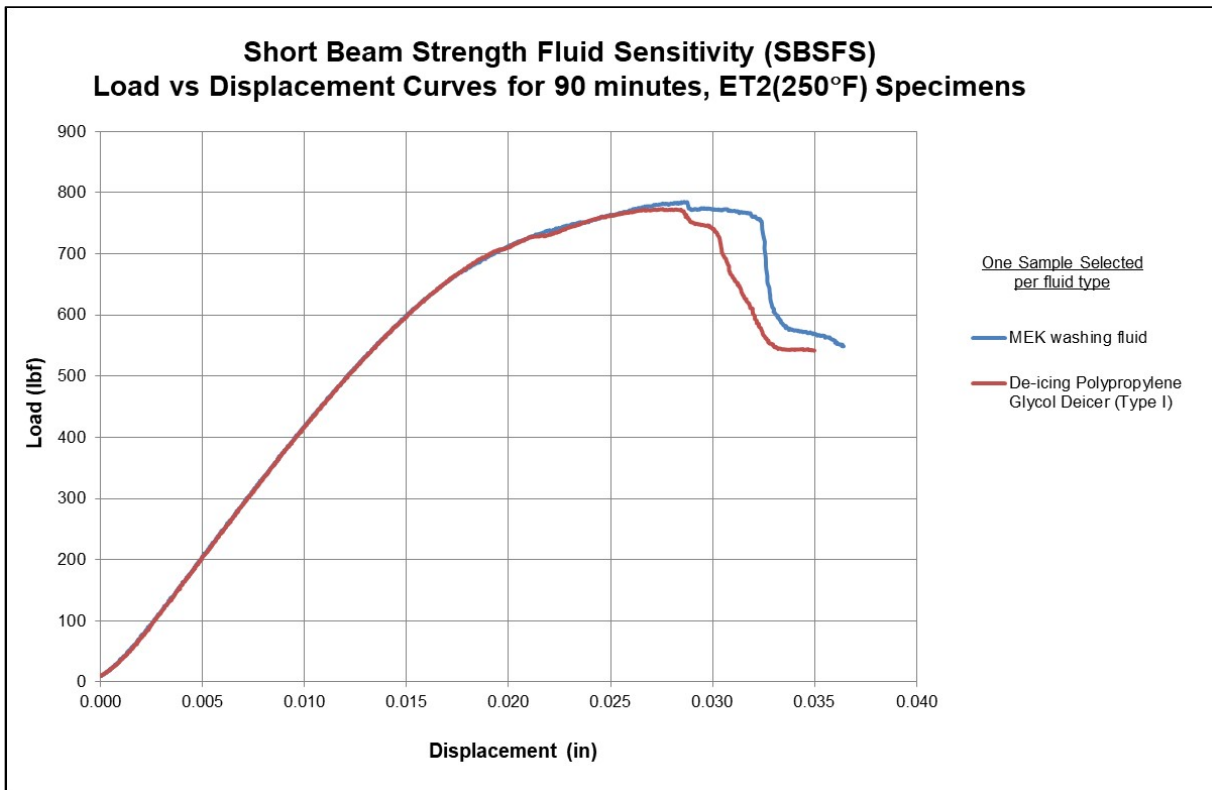
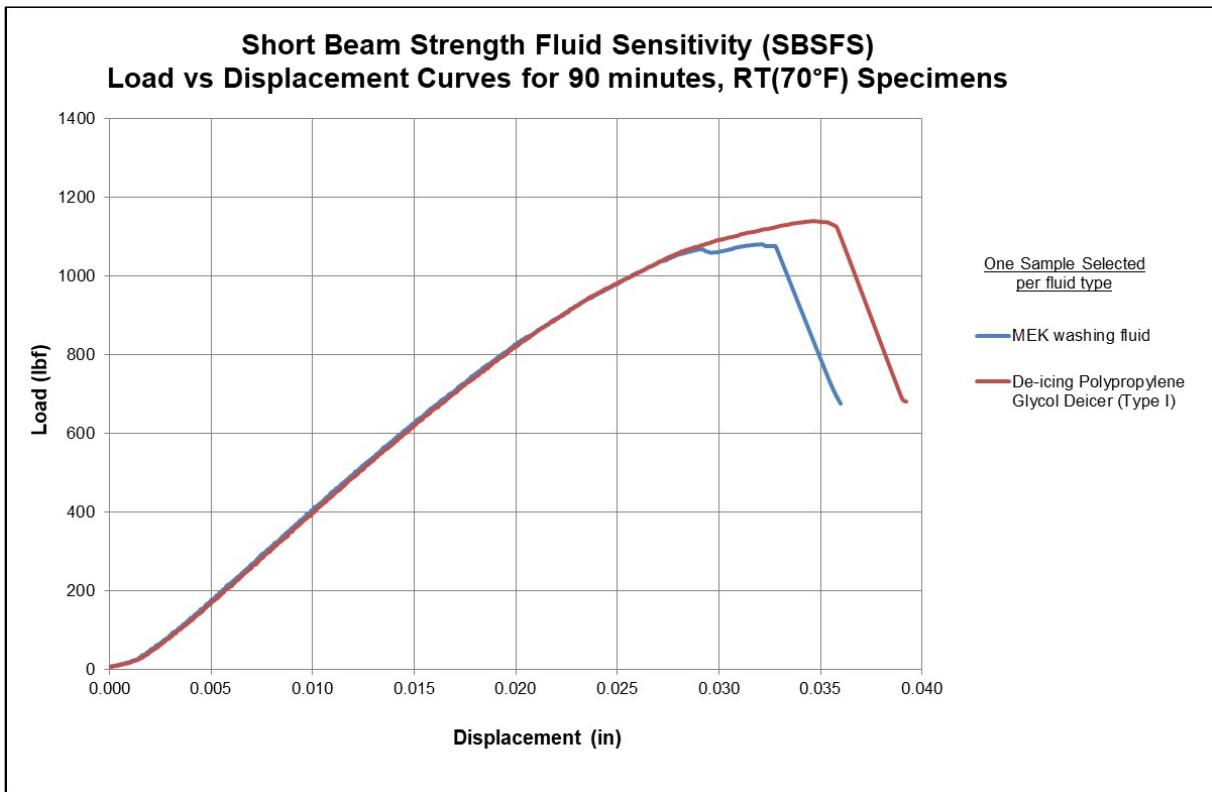


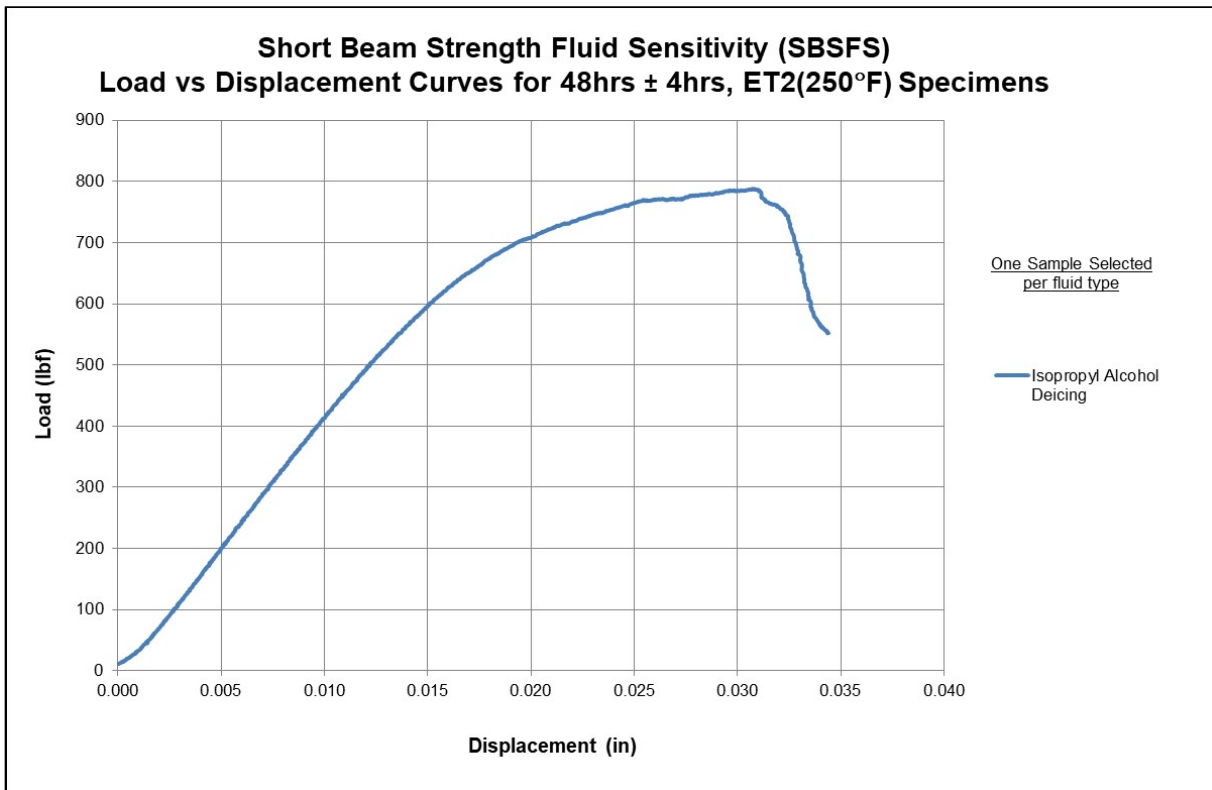
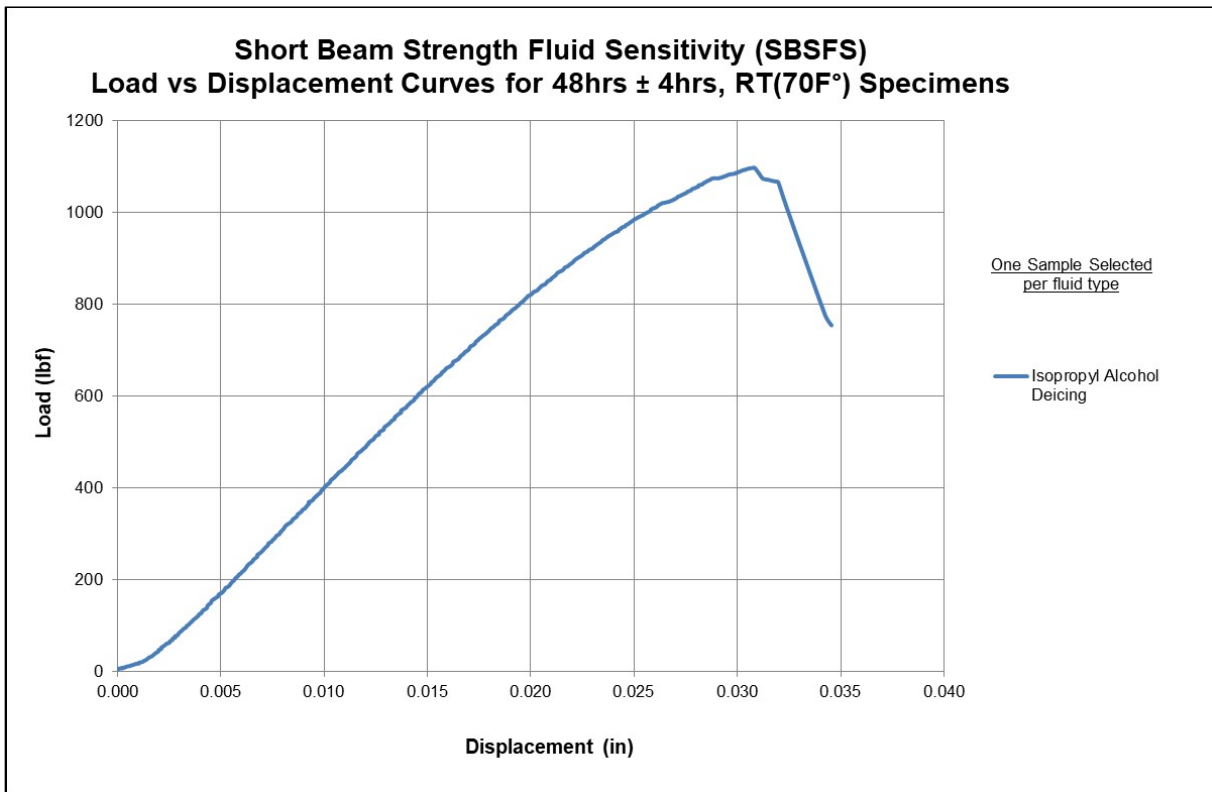
Fluid Sensitivity Screening
Short Beam Strength Properties (SBSFS)--ET2(250°F)Strength
Toray Advanced Composites TC380 T800HB 6K 2x2 Twill 200gsm with 40%RC prepreg

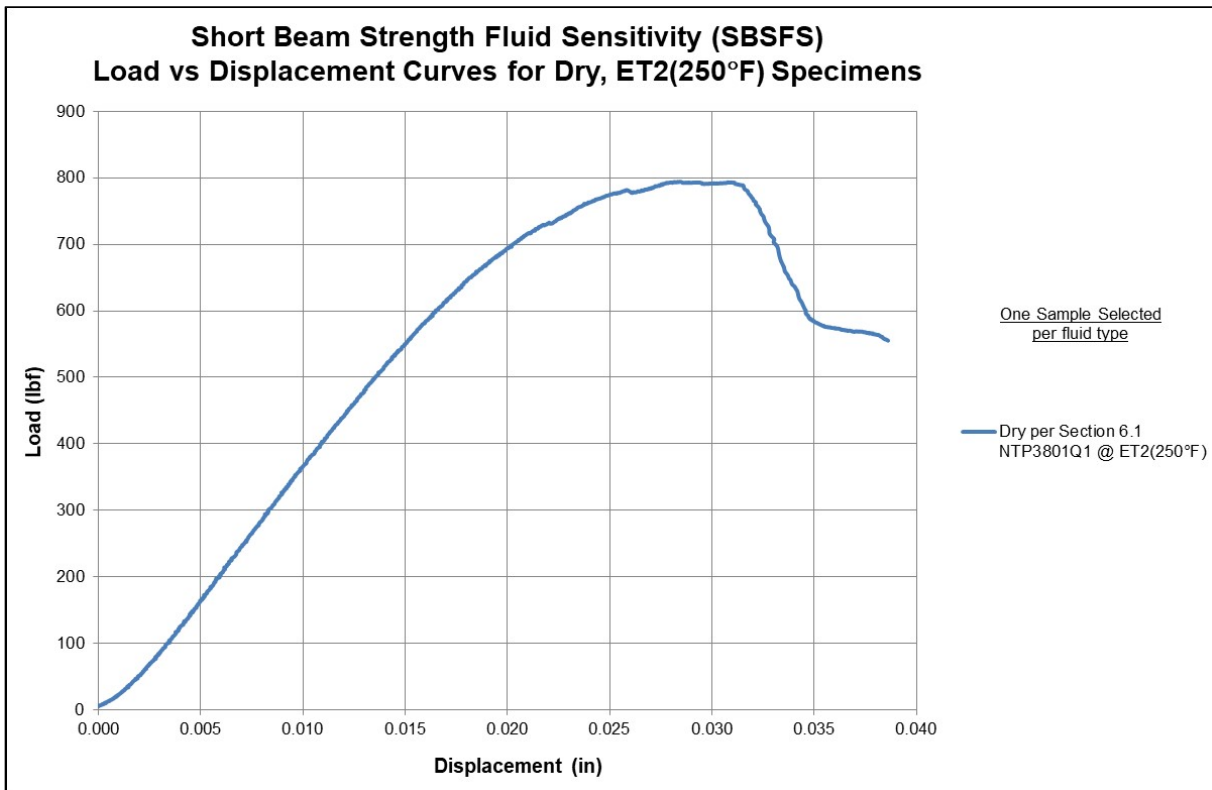
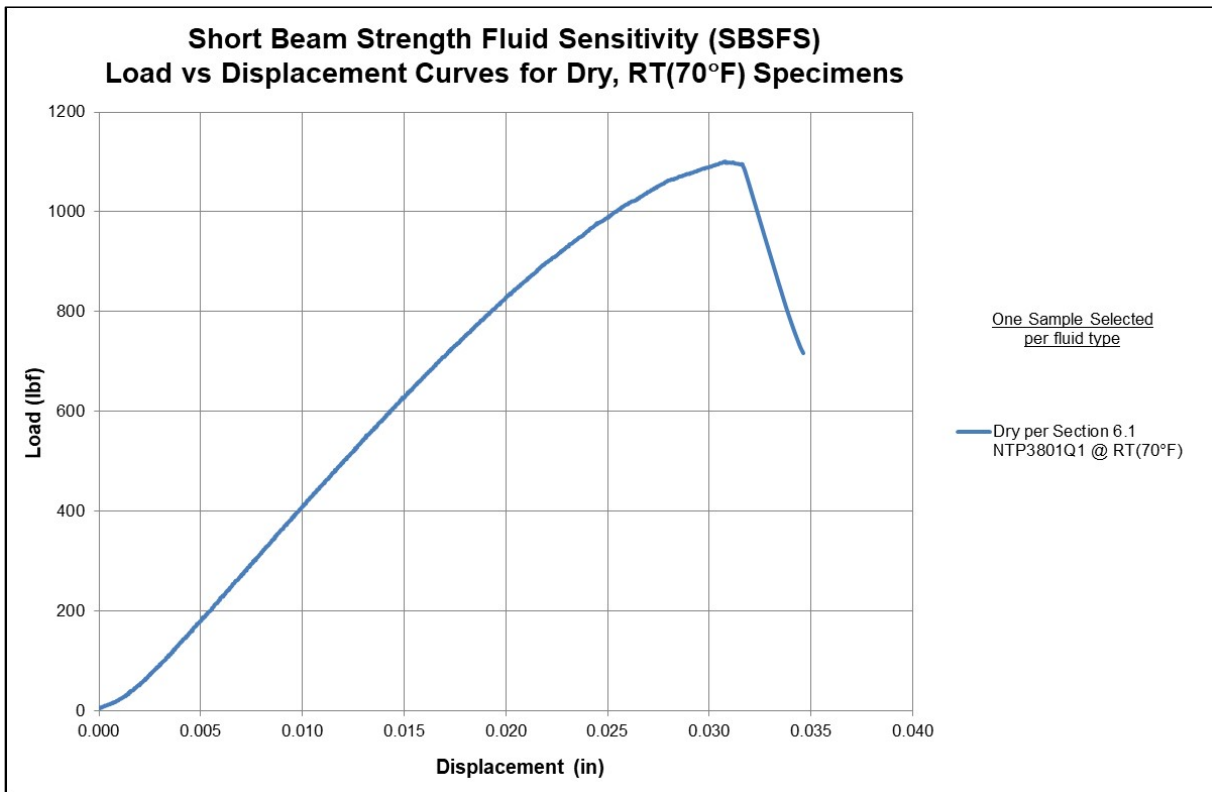
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Average Strength [ksi]	Failure Mode
SBSFS11ET2	TCEQA111FS11ET2	A	C1	1	1	7.627	0.1823	22	0.008286	7.494	ILS, INELEASTIC DEFORMATION
	TCEQA112FS11ET2	A	C1	1	1	7.271	0.1820	22	0.008273		ILS, INELEASTIC DEFORMATION
	TCEQA113FS11ET2	A	C1	1	1	7.562	0.1820	22	0.008274		ILS, INELEASTIC DEFORMATION
	TCEQA116FS11ET2	A	C1	1	1	7.541	0.1811	22	0.008233		ILS, INELEASTIC DEFORMATION
	TCEQA117FS11ET2	A	C1	1	1	7.468	0.1817	22	0.008258		ILS, INELEASTIC DEFORMATION
SBSFS12ET2	TCEQA111FS12ET2	A	C1	1	1	7.824	0.1859	22	0.008449	7.615	ILS, INELEASTIC DEFORMATION
	TCEQA112FS12ET2	A	C1	1	1	7.561	0.1856	22	0.008436		ILS, INELEASTIC DEFORMATION
	TCEQA113FS12ET2	A	C1	1	1	7.464	0.1854	22	0.008427		ILS, INELEASTIC DEFORMATION
	TCEQA114FS12ET2	A	C1	1	1	7.626	0.1962	22	0.008920		ILS, INELEASTIC DEFORMATION
	TCEQA115FS12ET2	A	C1	1	1	7.601	0.1962	22	0.008918		ILS, INELEASTIC DEFORMATION
SBSFS13ET2	TCEQA112FS13ET2	A	C1	1	1	7.420	0.1976	22	0.008980	7.468	ILS, INELEASTIC DEFORMATION
	TCEQA113FS13ET2	A	C1	1	1	7.372	0.1979	22	0.008995		ILS, INELEASTIC DEFORMATION
	TCEQA115FS13ET2	A	C1	1	1	7.721	0.1891	22	0.008596		ILS, INELEASTIC DEFORMATION
	TCEQA116FS13ET2	A	C1	1	1	7.725	0.1889	22	0.008586		ILS, INELEASTIC DEFORMATION
	TCEQA117FS13ET2	A	C1	1	1	7.102	0.1979	22	0.008993		ILS, INELEASTIC DEFORMATION
SBSFS14ET2	TCEQA111FS14ET2	A	C1	1	1	7.613	0.1873	22	0.008514	7.530	ILS, INELEASTIC DEFORMATION
	TCEQA112FS14ET2	A	C1	1	1	7.470	0.1888	22	0.008582		ILS, INELEASTIC DEFORMATION
	TCEQA113FS14ET2	A	C1	1	1	7.468	0.1891	22	0.008597		ILS, INELEASTIC DEFORMATION
	TCEQA114FS14ET2	A	C1	1	1	7.440	0.1879	22	0.008540		ILS, INELEASTIC DEFORMATION
	TCEQA115FS14ET2	A	C1	1	1	7.661	0.1848	22	0.008400		ILS, INELEASTIC DEFORMATION
SBSFS15ET2	TCEQA111FS15ET2	A	C1	1	1	7.155	0.1906	22	0.008665	7.178	ILS, INELEASTIC DEFORMATION
	TCEQA112FS15ET2	A	C1	1	1	7.142	0.1900	22	0.008634		ILS, INELEASTIC DEFORMATION
	TCEQA113FS15ET2	A	C1	1	1	7.234	0.1897	22	0.008624		ILS, INELEASTIC DEFORMATION
	TCEQA114FS15ET2	A	C1	1	1	7.169	0.1904	22	0.008655		ILS, INELEASTIC DEFORMATION
	TCEQA115FS15ET2	A	C1	1	1	7.189	0.1910	22	0.008683		ILS, INELEASTIC DEFORMATION
SBSFS16ET2	TCEQA111FS16ET2	A	C1	1	1	7.318	0.1936	22	0.008801	7.325	ILS, INELEASTIC DEFORMATION
	TCEQA112FS16ET2	A	C1	1	1	7.328	0.1932	22	0.008780		ILS, INELEASTIC DEFORMATION
	TCEQA113FS16ET2	A	C1	1	1	7.381	0.1932	22	0.008783		ILS, INELEASTIC DEFORMATION
	TCEQA114FS16ET2	A	C1	1	1	7.298	0.1928	22	0.008764		ILS, INELEASTIC DEFORMATION
	TCEQA115FS16ET2	A	C1	1	1	7.299	0.1926	22	0.008755		ILS, INELEASTIC DEFORMATION
SBSFS17ET2	TCEQA112FS17ET2	A	C1	1	1	5.986	0.1943	22	0.008830	5.863	ILS, INELEASTIC DEFORMATION
	TCEQA113FS17ET2	A	C1	1	1	5.870	0.1963	22	0.008922		ILS, INELEASTIC DEFORMATION
	TCEQA114FS17ET2	A	C1	1	1	5.836	0.1962	22	0.008917		ILS, INELEASTIC DEFORMATION
	TCEQA115FS17ET2	A	C1	1	1	5.860	0.1959	22	0.008905		ILS, INELEASTIC DEFORMATION
	TCEQA116FS17ET2	A	C1	1	1	5.765	0.1958	22	0.008902		ILS, INELEASTIC DEFORMATION
SBSFS18ET2	TCEQA111FS18ET2	A	C1	1	1	7.299	0.1967	22	0.008940	7.353	ILS, INELEASTIC DEFORMATION, COMPRESSION
	TCEQA112FS18ET2	A	C1	1	1	7.495	0.1947	22	0.008848		ILS, INELEASTIC DEFORMATION
	TCEQA113FS18ET2	A	C1	1	1	7.354	0.1911	22	0.008687		ILS, INELEASTIC DEFORMATION
	TCEQA115FS18ET2	A	C1	1	1	7.294	0.1917	22	0.008711		ILS, INELEASTIC DEFORMATION
	TCEQA116FS18ET2	A	C1	1	1	7.324	0.1959	22	0.008905		ILS, INELEASTIC DEFORMATION
SBSFS19ET2	TCEQA111FS19ET2	A	C1	1	1	6.320	0.1968	22	0.008944	6.113	ILS, INELEASTIC DEFORMATION
	TCEQA112FS19ET2	A	C1	1	1	6.087	0.1972	22	0.008964		ILS, INELEASTIC DEFORMATION
	TCEQA113FS19ET2	A	C1	1	1	6.206	0.1979	22	0.008995		ILS, INELEASTIC DEFORMATION
	TCEQA114FS19ET2	A	C1	1	1	5.881	0.1990	22	0.009044		ILS, INELEASTIC DEFORMATION
	TCEQA115FS19ET2	A	C1	1	1	6.070	0.1984	22	0.009019		ILS, INELEASTIC DEFORMATION
SBSFS41ET2	TCEQA116FS19ET2	A	C1	1	1	6.123	0.1971	22	0.008959	5.823	ILS, INELEASTIC DEFORMATION
	TCEQA117FS19ET2	A	C1	1	1	6.101	0.1925	22	0.008748		ILS, INELEASTIC DEFORMATION
	TCEQA111FS41ET2	A	C1	1	1	5.863	0.2010	22	0.009136		ILS, INELEASTIC DEFORMATION
	TCEQA112FS41ET2	A	C1	1	1	5.848	0.2009	22	0.009131		ILS, INELEASTIC DEFORMATION
	TCEQA113FS41ET2	A	C1	1	1	5.914	0.2006	22	0.009116		ILS, INELEASTIC DEFORMATION
SBSFS31ET2	TCEQA114FS41ET2	A	C1	1	1	5.681	0.1986	22	0.009027	7.616	ILS, INELEASTIC DEFORMATION
	TCEQA115FS41ET2	A	C1	1	1	5.810	0.1946	22	0.008845		ILS, INELEASTIC DEFORMATION
	TCEQA111FS31ET2	A	C1	1	1	7.670	0.1981	22	0.009003		ILS
	TCEQA112FS31ET2	A	C1	1	1	7.635	0.1976	22	0.008981		ILS
	TCEQA113FS31ET2	A	C1	1	1	7.721	0.1975	22	0.008978		ILS
SBSFS32ET2	TCEQA114FS31ET2	A	C1	1	1	7.554	0.1976	22	0.008982	7.621	ILS
	TCEQA115FS31ET2	A	C1	1	1	7.501	0.1977	22	0.008984		ILS
	TCEQA111FS32ET2	A	C1	1	1	7.505	0.1994	22	0.009062		ILS
	TCEQA112FS32ET2	A	C1	1	1	7.765	0.1998	22	0.009083		ILS
	TCEQA113FS32ET2	A	C1	1	1	7.594	0.1999	22	0.009087		ILS
SBSFS33ET2	TCEQA114FS32ET2	A	C1	1	1	7.748	0.1989	22	0.009042	7.636	ILS
	TCEQA115FS32ET2	A	C1	1	1	7.492	0.1983	22	0.009015		ILS
	TCEQA111FS33ET2	A	C1	1	1	7.885	0.1934	22	0.008789		ILS
	TCEQA114FS33ET2	A	C1	1	1	7.667	0.1975	22	0.008977		ILS
	TCEQA115FS33ET2	A	C1	1	1	7.495	0.1999	22	0.009086		ILS
SBSFS42ET2	TCEQA116FS33ET2	A	C1	1	1	7.563	0.2004	22	0.009110	7.607	ILS
	TCEQA117FS33ET2	A	C1	1	1	7.571	0.1993	22	0.009058		ILS
	TCEQA111FS42ET2	A	C1	1	1	7.719	0.1988	22	0.009035		ILS, COMPRESSION
	TCEQA112FS42ET2	A	C1	1	1	7.740	0.1992	22	0.009055		ILS, COMPRESSION
	TCEQA113FS42ET2	A	C1	1	1	7.705	0.1990	22	0.009046		ILS, COMPRESSION
SBSFS43ET2	TCEQA114FS42ET2	A	C1	1	1	7.277	0.2016	22	0.009164	5.753	ILS, COMPRESSION
	TCEQA115FS42ET2	A	C1	1	1	7.596	0.2022	22	0.009191		ILS, COMPRESSION
	TCEQA111FS43ET2	A	C1	1	1	6.082	0.1998	22	0.009082		ILS, INELEASTIC DEFORMATION, COMPRESSION
	TCEQA112FS43ET2	A	C1	1	1	5.789	0.1996	22	0.009071		ILS, INELEASTIC DEFORMATION
	TCEQA113FS43ET2	A	C1	1	1	5.695	0.1989	22	0.009039		ILS, INELEASTIC DEFORMATION
	TCEQA114FS43ET2	A	C1	1	1	5.560	0.1988	22	0.009036	5.753	ILS, INELEASTIC DEFORMATION
	TCEQA115FS43ET2	A	C1	1	1	5.638	0.1983	22	0.009012		ILS, INELEASTIC DEFORMATION, COMPRESSION

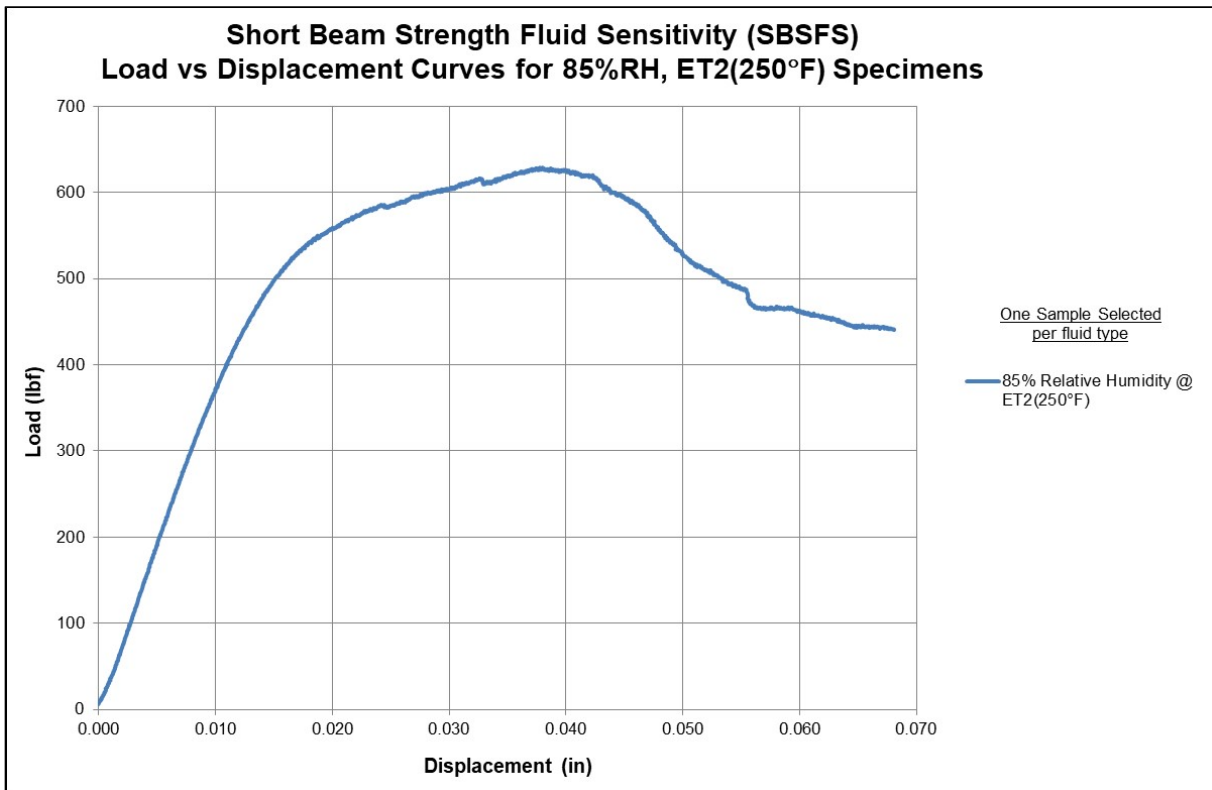
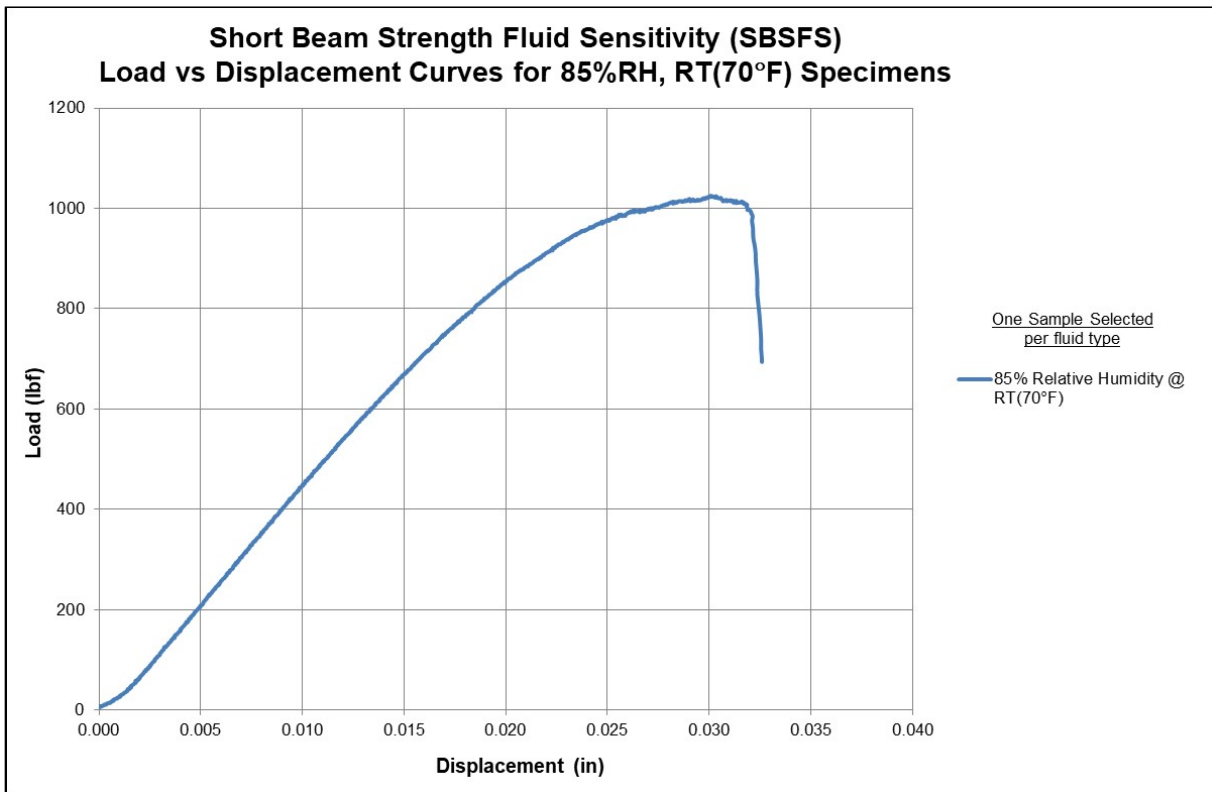
7.2 Load Displacement Curves





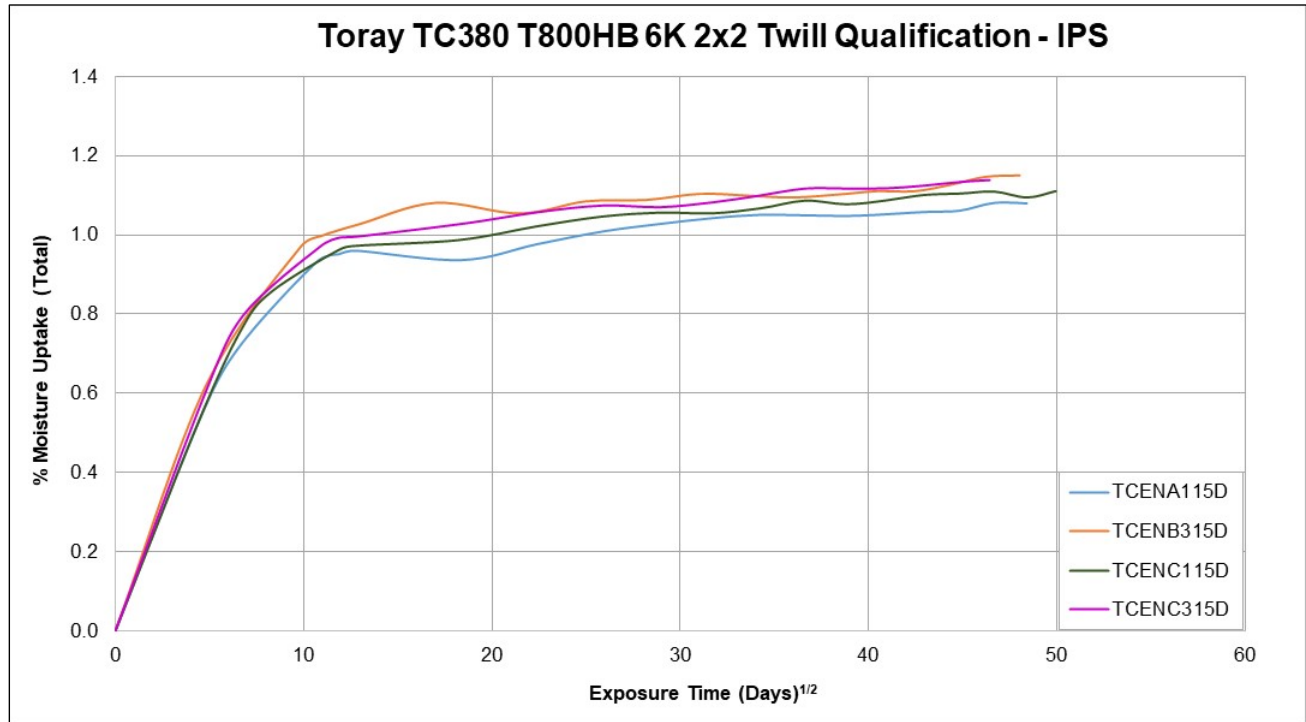




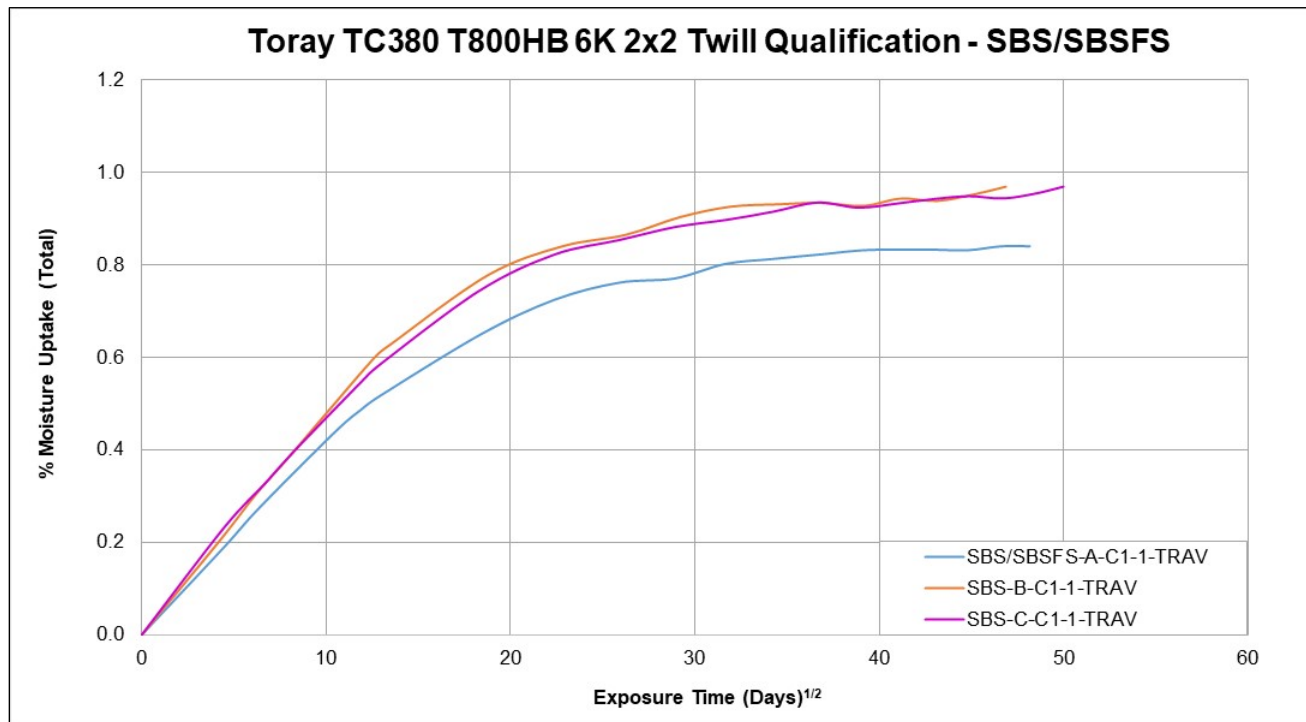


8. Moisture Conditioning Charts

8.1 In-Plane Shear (IPS) - Thinnest Panel



8.2 Short-Beam Strength (SBS) - Thickest Panel



9. DMA Results

9.1 DMA Dry Data

DMA Results Summary				
Toray Advanced Composites TC380 T800HB 6K 2x2 Twill Qualification DMA Dry				
Sample ID	Onset Storage Modulus		Peak of Tangent Delta	
	T _g [°C]	T _g [°F]	T _g [°C]	T _g [°F]
NTP3801Q1-TAC-T02-NR-SSB1-A-C1-1-DMA-D	208.69	407.64	218.11	424.60
NTP3801Q1-TAC-T02-NR-SSB1-A-C2-1-DMA-D	208.69	407.64	217.81	424.06
NTP3801Q1-TAC-T02-NR-SSB1-B-C1-1-DMA-D	209.56	409.21	218.62	425.52
NTP3801Q1-TAC-T02-NR-SSB1-B-C2-1-DMA-D	210.13	410.23	218.75	425.75
NTP3801Q1-TAC-T02-NR-SSB1-C-C1-1-DMA-D	210.03	410.05	219.37	426.87
NTP3801Q1-TAC-T02-NR-SSB1-C-C2-1-DMA-D	210.03	410.05	219.46	427.03
NTP3801Q1-TAC-T02-NR-SSB2-A-C1-1-DMA-D	209.10	408.38	219.47	427.05
NTP3801Q1-TAC-T02-NR-SSB2-A-C2-1-DMA-D	207.94	406.29	218.95	426.11
NTP3801Q1-TAC-T02-NR-SSB2-B-C1-1-DMA-D	207.18	404.92	217.33	423.19
NTP3801Q1-TAC-T02-NR-SSB2-B-C2-1-DMA-D	207.85	406.13	217.92	424.26
NTP3801Q1-TAC-T02-NR-SSB2-C-C1-1-DMA-D	210.09	410.16	220.63	429.13
NTP3801Q1-TAC-T02-NR-SSB2-C-C2-1-DMA-D	210.46	410.83	220.78	429.40
NTP3801Q1-TAC-T02-NR-WC/FC-A-C1-1-DMA-D	197.77	387.99	208.39	407.10
NTP3801Q1-TAC-T02-NR-WC/FC-A-C2-1-DMA-D	209.00	408.20	217.66	423.79
NTP3801Q1-TAC-T02-NR-WC/FC-B-C1-1-DMA-D	208.77	407.79	217.33	423.19
NTP3801Q1-TAC-T02-NR-WC/FC-B-C2-1-DMA-D	209.06	408.31	217.68	423.82
NTP3801Q1-TAC-T02-NR-WC/FC-C-C1-1-DMA-D	209.32	408.78	217.79	424.02
NTP3801Q1-TAC-T02-NR-WC/FC-C-C2-1-DMA-D	210.11	410.20	218.62	425.52
NTP3801Q1-TAC-T02-NR-WT-A-C1-1-DMA-D	209.07	408.33	217.94	424.29
NTP3801Q1-TAC-T02-NR-WT-A-C2-1-DMA-D	208.16	406.69	217.39	423.30
NTP3801Q1-TAC-T02-NR-WT-B-C1-1-DMA-D	209.40	408.92	217.86	424.15
NTP3801Q1-TAC-T02-NR-WT-B-C2-1-DMA-D	209.35	408.83	217.81	424.06
NTP3801Q1-TAC-T02-NR-WT-C-C1-1-DMA-D	201.63	394.93	212.90	415.22
NTP3801Q1-TAC-T02-NR-WT-C-C2-1-DMA-D	208.55	407.39	217.13	422.83
Average	208.33	407.00	217.74	423.93
Standard Deviation	2.84	5.11	2.49	4.48

9.2 DMA Wet Data

DMA Results Summary				
Toray Advanced Composites TC380 T800HB 6K 2x2 Twill Qualification DMA Wet				
Sample ID	Onset Storage Modulus		Peak of Tangent Delta	
	T _g [°C]	T _g [°F]	T _g [°C]	T _g [°F]
NTP3801Q1-TAC-T02-NR-SSB1-A-C1-1-DMA-W	166.55	331.79	182.56	360.61
NTP3801Q1-TAC-T02-NR-SSB1-A-C2-1-DMA-W	167.07	332.73	179.44	354.99
NTP3801Q1-TAC-T02-NR-SSB1-B-C1-1-DMA-W	166.52	331.74	190.63	375.13
NTP3801Q1-TAC-T02-NR-SSB1-B-C2-1-DMA-W	167.24	333.03	190.57	375.03
NTP3801Q1-TAC-T02-NR-SSB1-C-C1-1-DMA-W	163.89	327.00	183.45	362.21
NTP3801Q1-TAC-T02-NR-SSB1-C-C2-1-DMA-W	164.09	327.36	183.42	362.16
NTP3801Q1-TAC-T02-NR-SSB2-A-C1-1-DMA-W	166.62	331.92	186.32	367.38
NTP3801Q1-TAC-T02-NR-SSB2-A-C2-1-DMA-W	166.28	331.30	186.50	367.70
NTP3801Q1-TAC-T02-NR-SSB2-B-C1-1-DMA-W	167.24	333.03	192.93	379.27
NTP3801Q1-TAC-T02-NR-SSB2-B-C2-1-DMA-W	167.57	333.63	192.14	377.85
NTP3801Q1-TAC-T02-NR-SSB2-C-C1-1-DMA-W	163.92	327.06	184.17	363.51
NTP3801Q1-TAC-T02-NR-SSB2-C-C2-1-DMA-W	164.19	327.54	184.42	363.96
NTP3801Q1-TAC-T02-NR-WC/FC-A-C1-1-DMA-W	166.93	332.47	177.60	351.68
NTP3801Q1-TAC-T02-NR-WC/FC-A-C2-1-DMA-W	166.29	331.32	177.93	352.27
NTP3801Q1-TAC-T02-NR-WC/FC-B-C1-1-DMA-W	165.43	329.77	182.98	361.36
NTP3801Q1-TAC-T02-NR-WC/FC-B-C2-1-DMA-W	165.20	329.36	180.33	356.59
NTP3801Q1-TAC-T02-NR-WC/FC-C-C1-1-DMA-W	162.47	324.45	174.35	345.83
NTP3801Q1-TAC-T02-NR-WC/FC-C-C2-1-DMA-W	163.36	326.05	175.06	347.11
NTP3801Q1-TAC-T02-NR-WT-A-C1-1-DMA-W	166.29	331.32	181.40	358.52
NTP3801Q1-TAC-T02-NR-WT-A-C2-1-DMA-W	165.86	330.55	177.42	351.36
NTP3801Q1-TAC-T02-NR-WT-B-C1-1-DMA-W	166.00	330.80	180.06	356.11
NTP3801Q1-TAC-T02-NR-WT-B-C2-1-DMA-W	165.53	329.95	182.00	359.60
NTP3801Q1-TAC-T02-NR-WT-C-C1-1-DMA-W	162.67	324.81	173.90	345.02
NTP3801Q1-TAC-T02-NR-WT-C-C2-1-DMA-W	163.50	326.30	179.24	354.63
Average	165.45	329.80	182.45	360.41
Standard Deviation	1.55	2.79	5.40	9.72

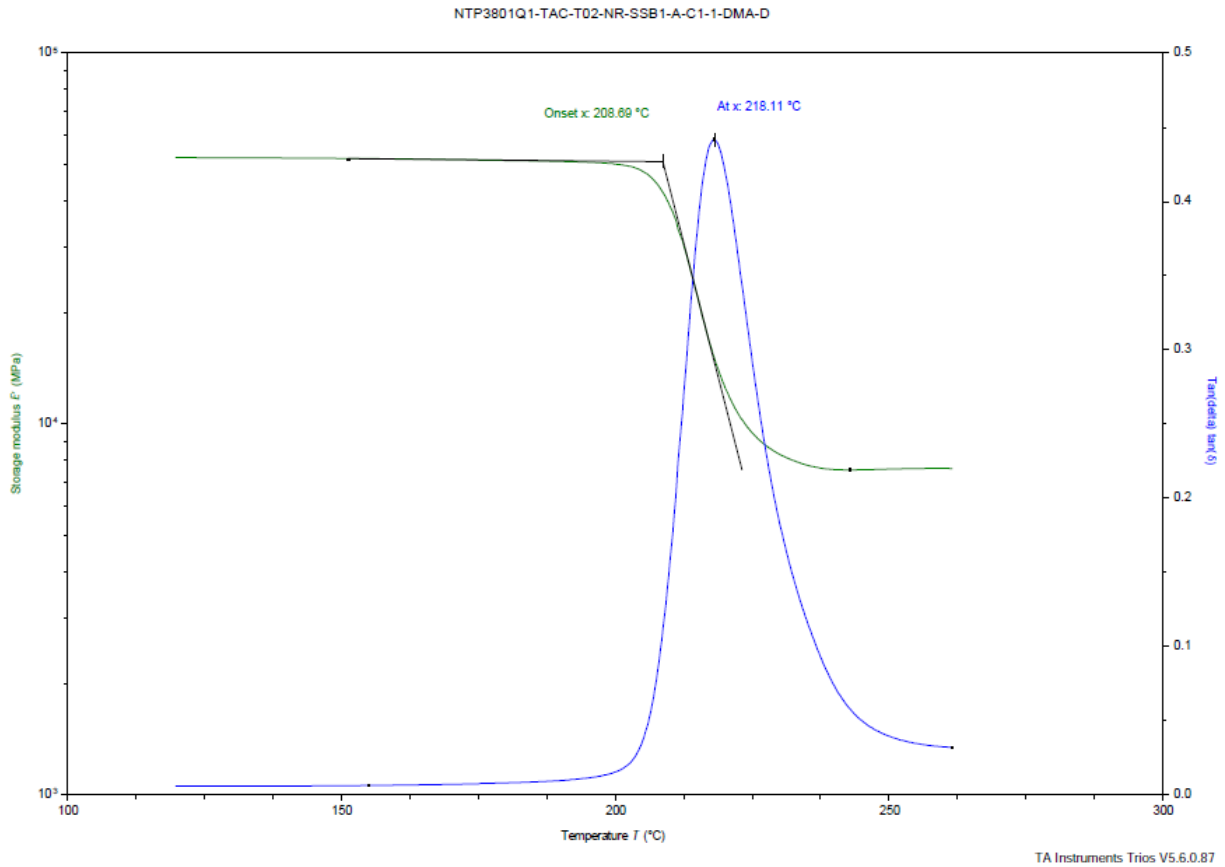
9.3 DMA Dry Batch A

A representative of DMA Dry profile from Batch A is provided below.

Sample: NTP3801Q1-TAC-T02-NR-SSB1-A-C1-1-DMA-D
Size: 50.00000 x 12.75000 x 3.08000 mm
Procedure name: Oscillation Temperature Ramp

DMA850

File: NTP3801Q1-TAC-T02-NR-SSB1-A-C1-1-DMA-D
Operator: Ping
Run Date: 8/23/2024 12:28:15 PM
Instrument: DMA 850-0398



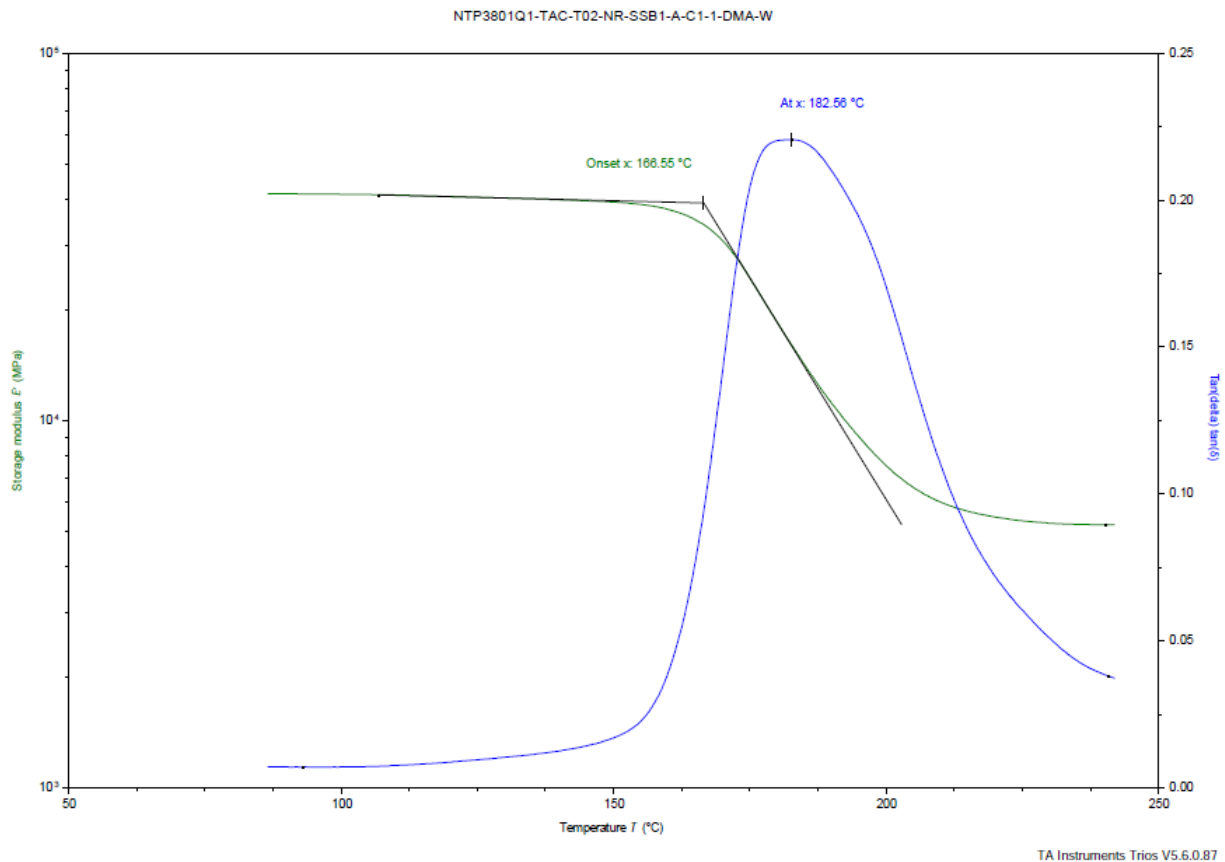
9.4 DMA Wet Batch A

A representative of DMA Wet profile from Batch A is provided below.

Sample: NTP3801Q1-TAC-T02-NR-SSB1-A-C1-1-DMA-W
Size: 50.00000 x 12.74000 x 3.11000 mm
Procedure name: Oscillation Temperature Ramp

DMA850

File: NTP3801Q1-TAC-T02-NR-SSB1-A-C1-1-DMA-W
Operator: Ping
Run Date: 2/1/2025 9:56:43 AM
Instrument: DMA 850-0398



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] ₁₂	WT	ETW1(180°F)	TCEJA115D	26.85	26.82	0.02600
		ETW2(250°F)	TCEJA115E	24.78	24.76	0.02010
[0] ₁₂	WC	ETW1(180°F)	TCELA115D	7.361	7.353	0.00820
		ETW2(250°F)	TCELA115E	7.486	7.470	0.01660
[90] ₁₂	FT	ETW1(180°F)	TCEUA115D	26.28	26.26	0.02050
		ETW2(250°F)	TCEUA115E	25.57	25.53	0.03430
[45/-45] _{2S}	IPS	ETW1(180°F)	TCENA115D	17.86	17.85	0.01360
		ETW2(250°F)	TCENA115E	16.67	16.65	0.01690
[0] ₂₂	SBS	ETW1(180°F)	T02-NR-SBS/SBSFS-A-C1-1-TRAV	2.191	2.189	0.00150
		ETW2(250°F)	TCDQA115E	1.090	1.088	0.00150
[45/0/-45/90] _S	UNT1	ETW1(180°F)	TCEAA115D	17.32	17.30	0.01880
		ETW2(250°F)	TCEAA115E	17.57	17.53	0.03630
[45/-45/90/45/-45] _S	UNT2	ETW1(180°F)	TCEBA115D	22.33	22.31	0.02410
		ETW2(250°F)	TCEBA115E	22.00	21.96	0.04050
[0/90/-45/0/90] _S	UNT3	ETW1(180°F)	TCECA115D	22.26	22.24	0.02420
		ETW2(250°F)	TCECA115E	21.63	21.59	0.03500
[45/0/-45/90] _{2S}	UNC1	ETW1(180°F)	TCEWA115D	9.360	9.352	0.00850
		ETW2(250°F)	TCEWA115E	9.710	9.694	0.01590
[45/-45/90/45/-45] _S	UNC2	ETW1(180°F)	TCEXA115D	5.841	5.836	0.00520
		ETW2(250°F)	TCEXA115E	6.090	6.075	0.01490
[0/90/-45/0/90] _S	UNC3	ETW1(180°F)	TCEYA115D	5.839	5.833	0.00580
		ETW2(250°F)	TCEYA115E	6.084	6.068	0.01620
[45/0/-45/90] _{2S}	OHT1	ETW1(180°F)	TCEDA115D	64.24	64.21	0.03440
		ETW2(250°F)	TCEDA115E	61.71	61.65	0.06060
[45/-45/90/45/-45] _S	OHT2	ETW1(180°F)	TCEEA115D	39.93	39.89	0.03630
		ETW2(250°F)	TCEEA115E	38.08	38.02	0.05280
[0/90/-45/0/90] _S	OHT3	ETW1(180°F)	TCEFA115D	39.88	39.84	0.03700
		ETW2(250°F)	TCEFA115E	37.76	37.69	0.06490
[45/0/-45/90] _{2S}	FHT1	ETW1(180°F)	TCD4A115D	52.59	52.57	0.02390
		ETW2(250°F)	TCD4A115E	52.78	52.72	0.05880
[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
[0/90/-45/0/90] _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] _{2S}	FHC1	ETW1(180°F)	TCD7A115D	52.78	52.76	0.02840
		ETW2(250°F)	TCD7A115E	52.96	52.91	0.05020
[45/-45/90/45/-45] _{2S}	FHC2	ETW1(180°F)	TCD8A115D	43.94	43.92	0.02570
		ETW2(250°F)	TCD8A115E	44.24	44.12	0.12020
[0/90/-45/0/90] _{2S}	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] _{2S}	OHC1	ETW1(180°F)	TCEGA115D	63.10	63.06	0.04170
		ETW2(250°F)	TCEGA115E	60.44	60.38	0.06220
[45/-45/90/45/-45] _{2S}	OHC2	ETW1(180°F)	TCEHA115D	79.57	79.53	0.04050
		ETW2(250°F)	TCEHA115E	75.40	75.34	0.06730
[0/90/-45/0/90] _{2S}	OHC3	ETW1(180°F)	TCEIA115D	79.09	79.05	0.03610
		ETW2(250°F)	TCEIA115E	75.63	75.57	0.06280
[45/0/-45/90] _{2S}	SSB1	ETW1(180°F)	TCE1A115D	28.98	28.96	0.02180
		ETW2(250°F)	TCE1A115E	27.49	27.45	0.03380
[45/-45/90/45/-45] _{2S}	SSB2	ETW1(180°F)	TCE2A115D	35.93	35.90	0.02430
		ETW2(250°F)	TCE2A115E	35.18	35.14	0.04370
[0/90/-45/0/90] _{2S}	SSB3	ETW1(180°F)	TCE3A115D	35.78	35.76	0.02940
		ETW2(250°F)	TCE3A115E	35.04	35.00	0.04480
[0] ₂₀	ILT	ETW1(180°F)	TCEMA115D	34.31	34.29	0.02210

11. Deviations

N/A